B.V.V. Sangha's

P. M. N. M. DENTAL COLLEGE & HOSPITAL
BAGALKOT - 587 101, KARNATAKA.

Department of Pedodontics & Preventive Dentistry
in association with
Indian Society of Pedodontics and Preventive Dentistry

1.87/2012

CERTIFICATE

This is to certify that Dr. DR. RUCHA

has attended the Continuing Dental Education Programme on

'TRANCE'FORMING MINDS – THE ART OF HYPNODONTICS

conducted by the Department of Pedodontics and Preventive Dentistry,

P. M. Nadagouda Memorial Dental College & Hospital, Bagalkot on 22nd December, 2017.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

01

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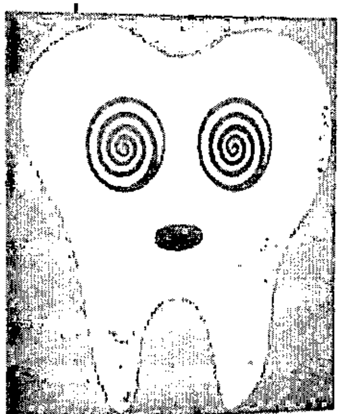
This is to certify that Dr. CHAITANYA R. UPPIN



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02

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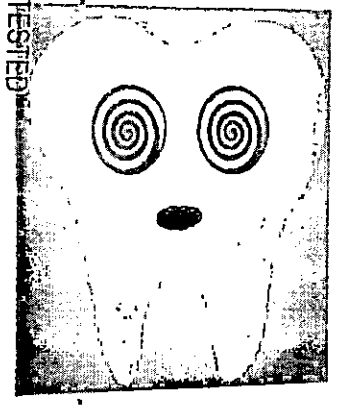

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Belagavi-590 010,Karnataka

03

BAGALKOT – 587 101, KARNATAKA.

Department of Pedodontics & Preventive Dentistry
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CERTIFICATE

This is to certify that Dr. GOWTHAM

has attended the Continuing Dental Education Programme on

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Dr. Srinivas Namineni
President, ISPPD

Dr. H. V. Kambalimath
Hon. Gen. Secretary, ISPPD

Dr. Shreenivas Vanaki
Principal & CDE Chairman

Dr. Shivaprakash P. I
Organizing Chairman

ATTESTED
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

04

P. M. N. M. DENTAL COLLEGE & HOSPITAL
BAGALKOT – 587 101, KARNATAKA.

Department of Pedodontics & Preventive Dentistry
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Indian Society of Pedodontics and Preventive Dentistry

18/7/2017

CERTIFICATE

This is to certify that Dr. MADHURA MUNDADA

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ATTESTED
Dr V A Krishnaiah
Registrar
KLE Academy of Higher Education and Research,
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Belagavi-590 010,Karnataka

05

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Hon. Gen. Secretary, ISPPD

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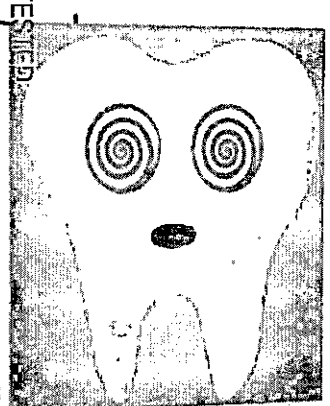
This is to certify that Dr. SHREYAS SHAH



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ATTESTED
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Registrar
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Belagavi-590 010,Karnataka

K.L.E. SOCIETY'S
SHRI KADASIDDHESHWAR ARTS COLLEGE AND
H. S. KOTAMBRI SCIENCE INSTITUTE,
VIDYANAGAR, HUBBALLI-580031 (Karnataka State)
(Accredited at 'A' Grade with 3.18 CGPA by NAAC)
Office: 0836-2372097 Website: skahsk.com E-mail: skahsk_hbl@yahoo.co.in

Ref: No.SKA/H.S.KSCI/2017-18/ Date: 16-03-2018

DEPARTMENT OF PSYCHOLOGY

To

Dr.Pramod C. Gadad,
Associate Professor,
K.L.E.Society's College of Pharmacy,
Vidyanagar,
Hubballi -31.

Respected Sir,

Sub: Thanking Letter

We take this opportunity to thank you for your impressive lecture on 16 /3/2018 at the Department of Psychology .The BA VI students immensely benefitted by the lecture on the topic "Types of Drugs and their impact on Mind and Body" and the interaction thereafter.

With best Wishes,

16/3/18

(Dr.S.J.Hangal)
Head, Dept. of Psychology

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

07

KLE
ACADEMY OF HIGHER EDUCATION AND RESEARCH

AICTE

BELAGAVI

KLE College of Pharmacy, Belagavi

Nehru Nagar, JNMC Campus, Belagavi - 590 010
Karnataka India

AICTE Sponsored Quality Improvement Programme

01st to 13th October 2018

Dr./Mr./Mrs/ Ms FATIMA S. DASANKOPPA

in recognition of ~~his~~ / her attendance as Resource Person / ~~Participant~~ at the Quality Improvement Programme on "TECHNOLOGICAL ADVANCES IN DRUG DELIVERY SYSTEM AND THEIR QUALITY MANAGEMENT"

Chief Co-ordinator
Dr. B.M. Patil

BELAGAVI 590 010. Seal

Co-ordinator
Dr. A. P Gadad

ATTESTED
Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
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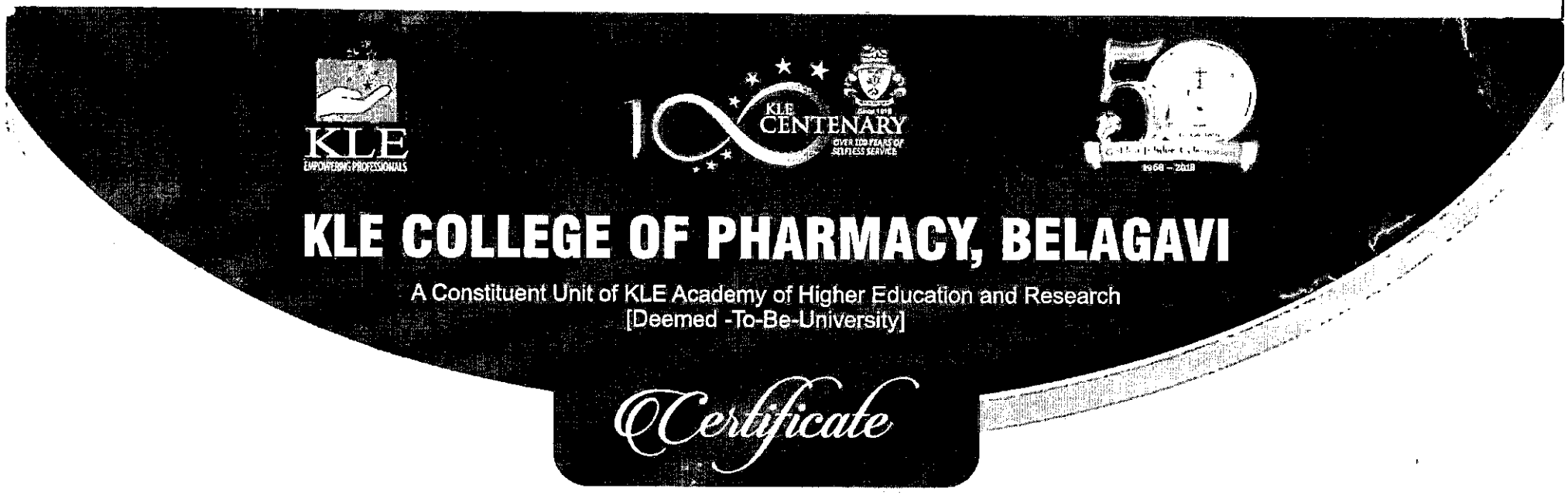
Belagavi-590 010,Karnataka

08



KLE COLLEGE OF PHARMACY, BELAGAVI

A Constituent Unit of KLE Academy of Higher Education and Research
[Deemed -To-Be-University]

Certificate

This is to certify that

Prof./Dr./Mr./Ms. B. C. KOTI

has participated as Resource Person /~~Poster Presenter~~ /~~Delegate~~ and attended the scientific sessions of

National Conference on **"Advances in Drug Discovery and Development"** held on the Occasion of **Golden Jubilee Year Celebrations,** on **26th & 27th October 2018** at KLE College of Pharmacy, Belagavi, Karnataka

ATTESTED
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Registrar
KLE Academy of Higher Education and Research,
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Belagavi-590 010,Karnataka

09

Dr. B. M. Patil
Chairman - LOC

Dr. S. S. Jalalpure
Convener

|| jai sri gurudev ||

Sri Adichunchanagiri Shikshana Trust ®

Sri Adichunchanagiri College of Pharmacy

B.G.Nagara-571448

Department of Pharmacology

In association with

Rajiv Gandhi University of Health Sciences, Bengaluru

Organizes Two Days National Seminar on

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Dr. B. RAMESH
Convener

Dr. BHEEMACHARI
Organizing Secretary

ATTESTED
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10

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K. L. E. SOCIETY'S

P. C. JABIN SCIENCE COLLEGE,

VIDYANAGAR, HUBBALLI-580031.

AUTONOMOUS COLLEGE

CPE - CONTINUATION PHASE-III

Re-Accredited by NAAC at 'A' Level

NIRF-17 MHRD, Ranking

89th National, 4th State Level

Ref. No. : Sci Exc/2018/1 Date : 28th Feb 2018

To,

Dr. Promod C. Gadad,
Associate Professor,
KLE's College, of Pharmacy,
Hubballi.

Sir,

We are thankful to you for accepting our invitation as a judge on occasion of **'National Day Celebration'** on **28th February 2018** and judging our students Science Model Exhibits. Your sincere efforts in this direction is highly appreciable.

Thanking you,

Principal

ATTESTED

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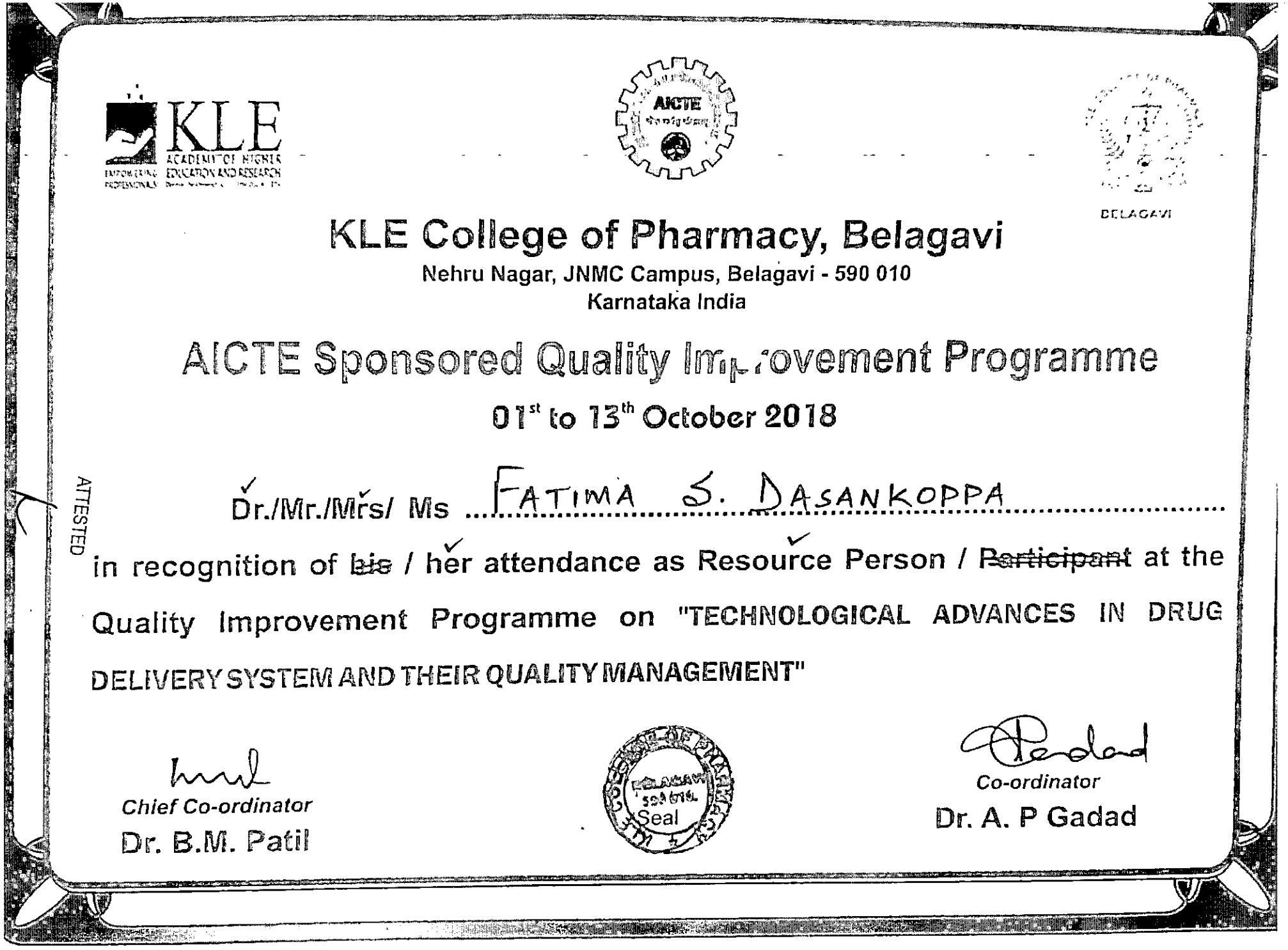

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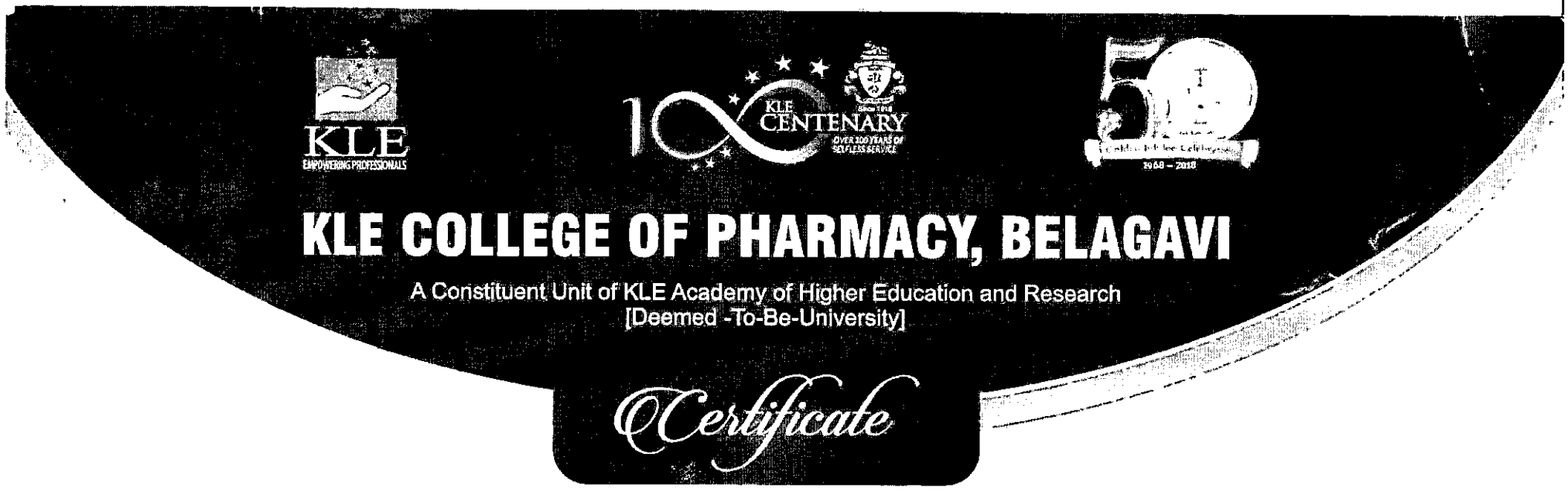

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॥ jai sri gurudev ॥

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KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

INSTITUTE OF NURSING SCIENCES

A Constituent Unit of
KLE Academy of Higher Education and Research
(Deemed-to-be-University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
NEHRU NAGAR, BELAGAVI – 590010, KARNATAKA, INDIA
Office: 091- 831– 2472303, **Fax:** 091- 831- 2475103, **Email:** principalnursingbgm@yahoo.com
Website: http://klenursingbgm.edu.in
Recognized by : Indian Nursing Council (New Delhi) - Karnataka Nursing Council (Bengaluru, Karnataka)

Institute of Nursing Sciences Belagavi

REPORT OF DEAN'S VISIT FROM THOMAS JEFFERSON UNIVERSITY, PHILADELPHIA, USA

Dr. Marie Ann Marino, EdD, RN, FAAN
Dean & Professor
Jefferson College of Nursing
Thomas Jefferson University, Philadelphia

Institutional Visit from16.09.2019 to 20.09.2019

As per the schedule Dean from Thomas Jefferson University, Philadelphia, USA had visited the institution and the itinerary with photographs.

Date	Time	Visit
16.09.2019 Monday	10.00 – 11.00 am	**Interaction with All Faculty** Conference Hall
	11.15 – 11.45 am	**College Presentation by** Dr. Sudha A Raddi, Dean, Faculty of Nursing
	11.45 – 12.30 pm	**Visit to Simulation Labs** College Tour
	2.30 – 4.00 pm	**Meeting with Hon'ble Vice Chancellor of KAHER, Deans of Nursing & Physiotherapy & Research Foundation Officials (Venue: Research Foundation)**
17.09.2019 Tuesday	10.00 – 11.00 am	**Presentation by Dr. Marie Ann Marino** An overview of TJU College of Nursing
	11.15 – 12.15 pm	**Interaction with Nurse Practitioner Students**
	2.30 – 4.00 pm	**Discussion with HOD's regarding joint projects and funding** (Conference Hall)
18.09.2019 Wednesday	10.00 – 10.30 am	Meeting with Venudhwani CRS, Coordinator Exam Section & NSS PO (Dean's Office)
	10.45 – 1.30 pm	Tour of KLES Dr. Prabhakar Kore Hospital & Medical Research Centre
	2.00 – 3.00 pm	Meeting with Clinical & Curriculum Coordinators
	3.15 – 4.00 pm	Interaction with PG Students (Conference Hall)
19.09.2019 Thursday	10.00 – 11.00 am	**Visit & Interaction** with **MPH** department faculty & students
	11.15 – 12.30 pm	**Interaction with students** (Brainstorm ideas for International Student Collaboration / Exposure / Exchange
	2.15 – 4.30 pm	**Visit to Primary Health Centre, Kinaye**
20.09.2019 Friday	10.00 – 11.00 am	Presentation by all HOD's regarding planned research projects with TJU and their progress
	11.15 – 12.30 pm	Meeting with Hon'ble Vice Chancellor, Registrar, Dean of Nursing regarding Future Plan

ATTESTED

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Website: http:/klenursingbgm.edu.in
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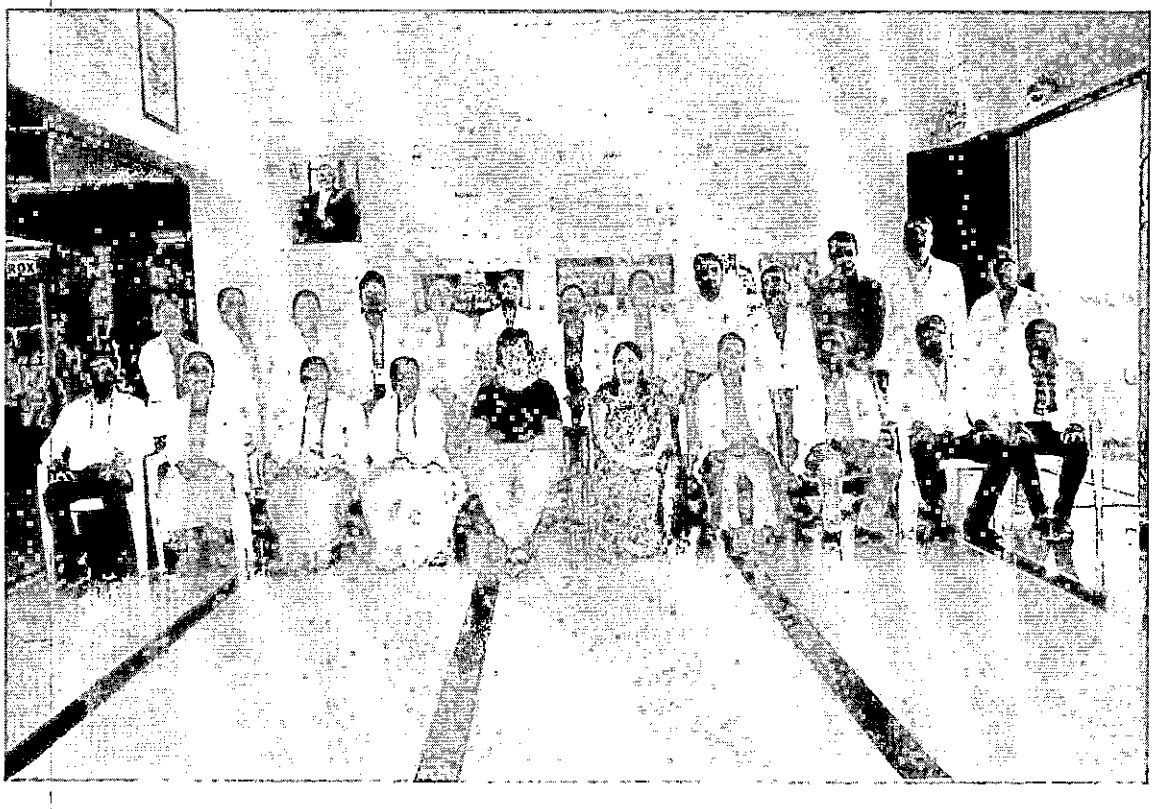
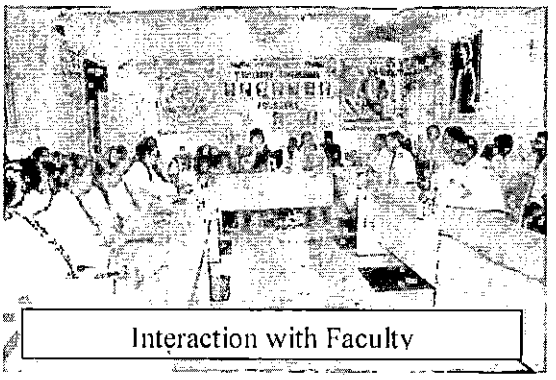
Day 1

Dr. Marie Ann Marino, Dean Faculty of Nursing welcomed with bouquets by Prof. Sudha Raddi, Dean Faculty of Nursing, Principal, KAHER INS, Prof. Sumitra LA, Vice Principal and other HOD's. Dr.Sudha Raddi presented about the presentation of college highlighting the salient features and achievements of Institution. After the presentation took a round of the KAHER INS led by principal and vice principal. They visited all the labs, library and was appreciated



Meeting with Dean



Interaction with Faculty

ATTESTED

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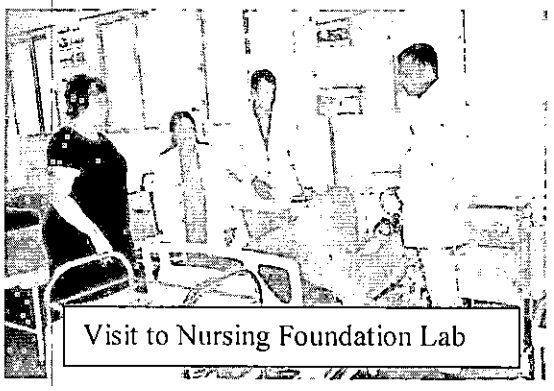
Visit to Child Health Nursing Lab

Visit to Community Health Nursing Lab



Visit to Nursing Foundation Lab

Visit to OBG Nursing Lab

Meeting with Hon'ble Vice Chancellor of KAHER, Deans of Nursing & Physiotherapy & Research Foundation Officials (Venue: Research Foundation)

ATTESTED

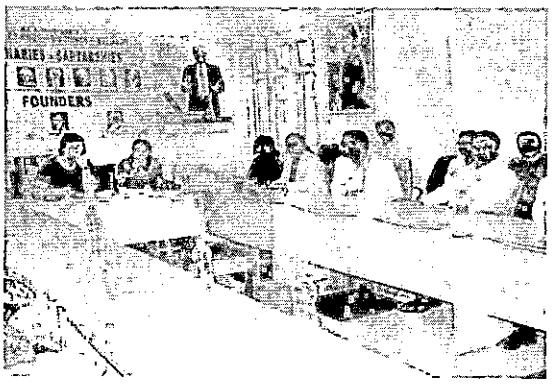
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010, Karnataka

Day 2

Presentation by Dr. Marie Ann Marino

Dean Briefed about the History of Thomas Jefferson University and presented about the college of nursing, Thomas Jefferson University.

a) Courses offered in TJU Nursing College
b) Doctor of Nurse Practice
c) Nurse Practitioner role and CRNA(Certified Registered Nurse Anesthetist)



Interaction with Nurse Practitioner Students

The Dean Interacted with PG Students of Critical care Nurse Practitioner of 1st & 2nd Year. The students expressed their desire about to Visit TJU as part of Student Exchange Program and to understand the work culture of Nurse Practitioner of TJU.

ATTESTED

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Institute of Nursing Sciences Belagavi

Discussion with HOD's regarding joint projects and funding

Dean of TJU discussed with the head of the department of Ins, where the concerned Head of the department briefed about the research work carried out with the collaboration of TJU. Dean of INS Explained the Initiated work with faculty in aspect with department

1. Indian Maternity Nurses attitude about Post Partum Care (PPC) – A qualitative study with Dept. of OBG Nursing.
2. Knowledge and attitudes of postpartum depression among health workers at various PHCs with Dept. of Community Health Nursing
3. Prevention of childhood injuries among mothers attending immunization clinic at KLE – A Focus group study with Dept. of Child Health Nursing
4. Impact of cervical cancer diagnosis on partner relationships with Dept. of Medical Surgical Nursing

Explained about the progress of the undergoing project on Knowledge and attitude of KLE hospital nurses regarding mental health

- The project started with Dept. of Mental Health Nursing.
- Data collection was carried out in various wards of the Dr.Prabhakar Kore charitable hospital and MRC, Belagavi.
- Total 400 samples data collection was done.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Day 2

Visit to Basic Science Research Centre.

The Dean's visited Basic Science Research Centre and welcomed by Dr.Sunil Jalalpure , Deputy Director of BSRC . Orientation was done and explained about the Projects sanctioned by the Govt. of India and other research activities carried out in the centre.

Tour of KLES Dr. Prabhakar Kore Hospital & Medical Research Centre

Dr. Sudha Raddi, Dean faculty of Nursing, and Principal, KAHER INS, Belagavi and Dr. Sanjeev Kumar, Dean faculty of Physiotherapy and Principal, KAHER IPT, Belagvi accompanied, Dr. Marie Ann Marino Dean Faculty of Nursing, Thomas Jefferson University, Philadelphia USA visited to KLES's Dr. Prabhakar Kore Hospital & MRC, Belagavi and KLES's Dr. Prabhakar Kore Charitable Hospital, Belagavi on 18.08.2019 from 11.30 am to 01.00 pm.

As per the itinerary, visited to MD & CEO office, where interacted with Dr. M. V. Jali, Medical Director and Chief Executive Officer, KLES's Dr. Prabhakar Kore Hospital & MRC, Belagavi. During the visit Sir explained about the bed strength, accreditations, achievements, and different specialty and super specialty services available in the hospital.

Visited to Markandeya ICU, Dr. Ambresh oriented the ward and explained the care provided at Markandeya ICU.

Visited to Pediatric ward, along with Ward I/C Nursing Superintendent oriented the ward, bed strength and the various care providing to the needy children. Visited to PICU, Kangaroo Mother Care and Milk bank. Concerned ward I/C were explained the brief information about their ward, care how they provide and success rate of treatment.

ATTESTED

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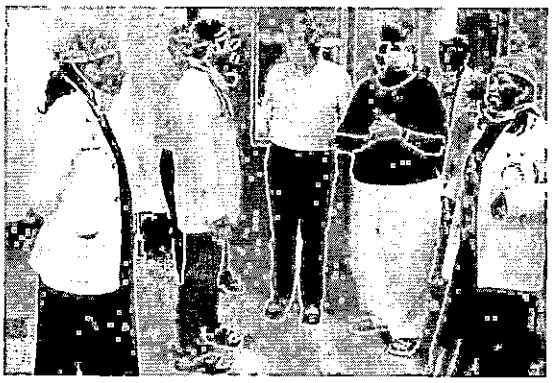
Belagavi-590 010,Karnataka

Day 3

Visit to Primary Health Centre, Kinaye

Dean & Faculty, Thomas Jefferson University, USA, visited Kinaye PHC on 19th September 2019 at 11.30 am. Dr. Prashant , medical officer PHC welcomed and interacted them with the staffs and students. During their visit discussed regarding overview of Primary health centre Kinaye, functions, and staffing pattern of PHC, population covered, Outreach activities conducted In the PHC and regarding ASHA workers, infrastructure, OPD, Lab, OT, Labour room, Pharmacy and service provided, National health programmes conducted, Cold chain maintenance, blood storage facility, referral services, training and continuing education of health team, IEC activities for the specific problems, public private partnership, health schemes and interacted with the patients and relatives.

ATTESTED

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Belagavi-590 010,Karnataka

INSTITUTE OF NURSING SCIENCES

A Constituent Unit of
KLE Academy of Higher Education and Research
(Deemed-to-be-University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
NEHRU NAGAR, BELAGAVI – 590010, KARNATAKA, INDIA
Office: 091- 831– 2472303, **Fax:** 091- 831- 2475103, **Email:** principalnursingbgm@yahoo.com
Website: http:/klenursingbgm.edu.in
Recognized by : Indian Nursing Council (New Delhi) - Karnataka Nursing Council (Bengaluru. Karnataka)

Day 4

Visit & Interaction with **MPH** department faculty & students

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Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Day 5
Interaction with PG and UG Students.

Students interacted with Dean of TJU on the following matters

- Students elective placement
- The courses offered by TJU
- PG Students discussed about the Nurse Practitioner Course.

ATTESTED

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Website: http://klenursingbgm.edu.in
Recognized by : Indian Nursing Council (New Delhi) - Karnataka Nursing Council (Bengaluru, Karnataka)

PROPOSED OUTCOMES OF THE DEAN'S VISIT, TJU

- Next visit from TJU CON, Research Chair (Amy Szajna /Patricia Kelly) in Feb-Mar, 2020.
- Next visit from KAHER will be by Dean, INS, India in Mar-Apr, 2020 for attending the **ENRS Conference** at Boston and presenting a paper / poster on KLE-TJU global collaboration.
- Proposal to conduct a study on use of artificial intelligence to detect and test item bias in health profession curriculum – an interprofessional analysis.
- Proposal to conduct a study on use of students as standardized patient. Books on scripts for standardized patients and how to use standardized patient will be sent by TJU. – **A pilot study for funding** will be done.
- Proposed foot clinics in Community settings like sugarcane fields, factories to begin as interdisciplinary team.
- Proposal for inter professional funding in palliative care. (Medical & Nursing)
- To introduce interdisciplinary health fair (All Constituent Units of KAHER) annually.
- Proposed study on nurses knowledge, attitude and self-efficacy in oral care among patients with tracheostomy in collaboration with VK Institute of Dental Sciences (Interdisciplinary study).
- Starting Online courses on
  1. Leadership / Reflection-Existing modules of TJU to be shared.
  2. Mental health first aid-Existing modules to be shared
  3. Nurse Practitioner –online modules will be shared by TJU
- Student exchange programme
- In respect of the 2020 year, declared by WHO as the year of Nursing & Midwifery, the safe motherhood day will be celebrated jointly by TJU & KLE on April 8th, 2020.
- Dean TJU proposed to fund three online academic scholarships.
- Dean TJU also proposed to fund scholarships for online CNE of Antibiotic Strengthening program.

Dean Faculty of Nursing,
Principal,
KAHER, Institute of Nursing Sciences,
Belagavi.

ATTESTED

Dr. V.A.Kothiwale
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KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

INSTITUTE OF PHYSIOTHERAPY

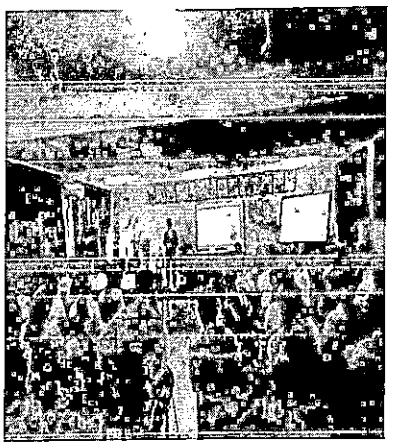
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed -to-be-University u/s 3 of the UGC Act, 1956)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
NEHRU NAGAR, BELAGAVI - 590010, KARNATAKA, INDIA
Office -0831-2473906, Fax - 0831 -2474727: Email: principalkipt@gmail.com: Web: klekipt.edu.in

KIPT/2018-19/

Date-12-06-2018

GUEST LECTURE

This is to inform that a guest lecture in collaboration with HRM and Psychology in Jain College of MCA and MBA, Belagavi was organized on 11th June 2018 on "Personality types and Multidimensional trend". The resource person for the guest lecture was Prof. Prasad Kapileshwari, The total number of participants benefited were 65.



Principal,
KAHER Institute of Physiotherapy
Belagavi

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH INSTITUTE OF PHYSIOTHERAPY ★ BELAGAVI

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

DR PRABHAKAR KORE BASIC SCIENCE RESEARCH CENTER
3rd Floor, V. K. Institute of Dental Sciences Campus,
KLE University, Nehru Nagar, Belagavi - 590 010. Karnataka - India
E-mail : research@kleuniversity.edu.in
Phone : +91-831-2444300 Extn. 4122

Dr. Prabhakar Kore
BASIC SCIENCE RESEARCH CENTER

Ref. No: BSRC/KAHER/18-19/151

Date: 13-03-2019

To

Professor [Dr.] K. D. Sonawane
Department of Biochemistry
Shivaji University
Kolhapur, Maharashtra, INDIA

Subject: Guest Lecture Invitation for Bioinformatics syllabus [MSc. II Semester students] at KAHER's 'Dr. Prabhakar Kore Basic Science Research Centre [BSRC]; Belagavi - 590 010, Karnataka

Dear Sir

With reference to the above cited subject, would like to kindly inform you that Dr. Prabhakar Kore Basic Science Research Centre [BSRC]; KLE Academy of Higher Education and Research [KAHER], Belagavi is running with a MSc.-Biotechnology course along with research activities. As a part of their curriculum, MSc. students have Bioinformatics subject in II semester of the course.

Therefore, we are pleased to invite you for your kind lecture for the same on Monday, 18th March 2019. Please accept our invitation and enlighten the students with your enormous experienced knowledge.

Thanking You

Dr. Prabhakar Kore Basic Science Research Centre (BSRC) * KLE Academy of Higher Education and Research, Belagavi.

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10. Karnataka. India.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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Registrar
KLE Academy of Higher Education and Research,
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Belagavi 590 010,Karnataka

Memorandum of Understanding

Between

Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi

and

KAHER's Dr. Prabhakar Kore Basic Science Research Center, Belagavi

This MoU is executed on Date 19/09/2019 between "Dr. Prabhakar Kore Basic Science Research Center", a premier center of Excellence, which expression shall mean and include unless repugnant to context hereof, its successor-in-interest, administration and assigns.

"Dr. Prabhakar Kore Basic Science Research Center" is one of the research centers with a built up area of 10,000 sq.ft. Hosting five labs that engage in basic research with state-of-the-art facilities for staff and research scholars. The research center is focused on the key areas of Molecular Biology, Medical Microbiology, Pharmaceutical Analysis, Natural Product Research and Cell Culture. The centre is located at 3rd Floor, V.K. Institute of Dental Sciences Campus, KAHER, Nehru Nagar, Belagavi – 590010, Karnataka, India.

AND

Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi, which expression shall mean and include unless repugnant to context hereof, its successors-interest, administrators and assigns.

The KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi was established in the year 1969, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi, a center for excellent learning, was founded in the year 1969 with a vision to provide quality education for the empowerment of the rural youth and to promote human excellence. The campus is spread over an area of 23.12 acres. College is located in Chikodi town of the Belagavi District of Karnataka State, India.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Whereas,

The parties have discussed and deliberated on various items of mutual interest and benefits and have deemed expedient to execute this **Memorandum of Understanding** so as to mutually co-operate in the field of curricula, research, training programs, and joint publications etc.

1. **Agreement sharing of facilitates**

1.1. Both the organizations have agreed to share their respective R & D facilities in order to promote academic and research interaction.

1.2. There will be provision for mutual sharing of experts from Dr. Prabhakar Kore Basic Science Research Center and resource persons from "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi "

2. **Agreement on Joint R & D Projects**

2.1. Research Projects in the identified areas will be jointly undertaken by "Dr. Prabhakar Kore Basic Science Research Center" and "KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi". Both the organizations will submit collaborative research projects to various National and International funding agencies. Both the organizations would ensure the successful completion of the funded research projects.

2.2. For all the matters concerned a coordination committee overseeing the issues consisting of _____ members (_____ members from "Dr. Prabhakar Kore Basic Science Research Center" and _____ members from "KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi" for identifying the issues in joint R & D projects to be carried out under this MoU. The ethical approval of the projects undertaken would be granted by Ethics Sub committees of "Dr. Prabhakar Kore Basic Science Research Center" and "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi" as registered under law.

3. **Agreement on Technology transfer:**

3.1. Both "Dr. Prabhakar Kore Basic Science Research Center" and "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi" agree mutually to share the technology transfer benefits whenever feasible.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

4. **Agreement on Joint Seminar / Conference / Workshops / Hands on training programmes.**

4.1. Both "Dr. Prabhakar Kore Basic Science Research Center" and "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi " agree to hold / conduct events (joint conference / workshop / Hands on training programmes) whenever feasible in "**Dr. Prabhakar Kore Basic Science Research Center**" or "**Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi**"

5. **Agreement on Industrial Visits**

5.1. **Both** "Dr. Prabhakar Kore Basic Science Research Center" and "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi" agree to organize industrial visits whenever feasible, for the students, staffs and delegates and also during the conference / workshops / Hands on training programmes.

6. **Agreement on Industrial Training:**

6.1. Both "Dr. Prabhakar Kore Basic Science Research Center" and "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi" agree to train the students and staff by organizing industrial training programmes whenever feasible related to technology, Analytical development, validation and documentation etc.

7. **Agreement on Placements:**

7.1. Both "Dr. Prabhakar Kore Basic Science Research Center" and "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi" agree to provide summer internships to students is another area. This helps in motivating the students, understanding industry environment and practices, job profiles, projects they can undertake besides facilitating them to earn some money to be spent usefully in the next academic year / semester.

8. **Agreement on Duration, Amendment and Termination of MoU**

8.1. This MoU shall be valid for a period of five years from the date of its signing. During the period of the validity, the MoU can be amended any time by mutual consent of both the parties in writing. The MoU can also be terminated by either party giving the order a written notice of its desire to terminate the MoU by giving three months' notice in advance. In the event of such termination both the parties shall cooperate in good spirit for the completion of the ongoing researchers.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

8.2. In witness of the two parties have signed his memorandum of understanding by the hand of, on behalf of "Dr. Prabhakar Kore Basic Science Research Center" and by the hand on behalf of "Department of Botany, KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi " on the date, month and year referred to above.

Signed by and on behalf of

Dr. Prabhakar Kore Basic Science Research Center

DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10, Karnataka, India.

Signed by and on behalf of

Department of Botany,
KLE Society's Basavaprabhu Kore Arts, Science and Commerce College, Chikodi

PRINCIPAL
KLES'S Basavaprabhu Kore
Arts, Science and Commerce College
CHIKODI - 591 201

Witness:

1. (Dr. Rahul R. Patil)

3. (Dr. Sunil. Dodamani)

2. (Dr. Lambhar G.V.)

4. (Dr. Satisha Hegde)

Dr. Prabhakar Kore Basic Science Research Center (BSRC) * KLE Academy of Higher Education and Research Belagavi

ATTESTED

Dr. V.A.Kothiwale
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KLE Academy of Higher Education and Research,
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Belagavi-590 010,Karnataka

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Belagavi-590 010,Karnataka

KLE Society's

BASAVAPRABHU KORE OF ARTS, SCIENCE AND COMMERCE, CHIKODI

DEPARTMENT OF BOTANY

To,

Dr. Sunil Jalalpure
Deputy Director
Dr. Prabhakar Kore BSRC
Belgavi

Sub: Permission to visit Basic Science Research Lab regd.....

Sir,

With reference to the above cited subject, as per the syllabus of Rani Channama University, Belgavi as a part of B.Sc. VI semester practicals, students have to visit a Research Laboratory to study the instruments and various techniques used in research. In this regard I request you kindly permit our students to visit KLE's Basic Science Research Centre Belgavi on 02/04/2019 and do the needful.

Thanking You.

Yours Faithfully,

HOD, Botany

Place: Chikodi
Date: 29/03/2019

Enclosure: List of students and staff visiting the research laboratory.

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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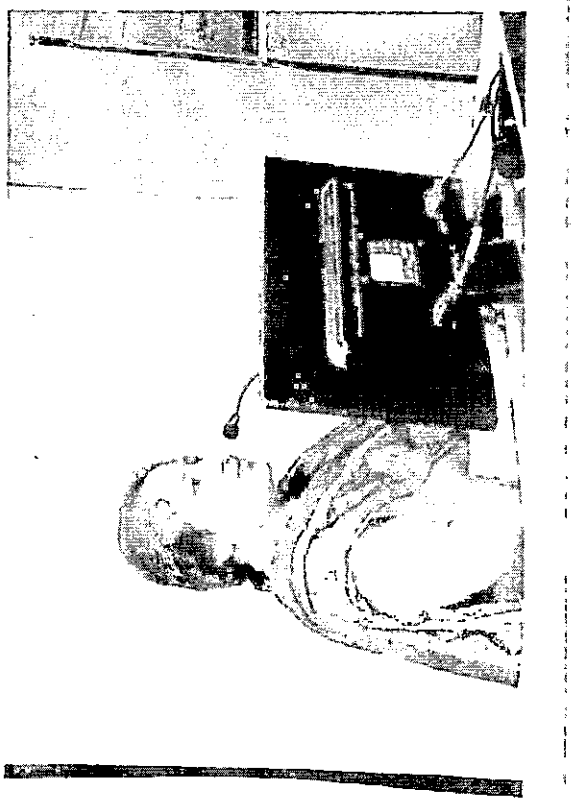

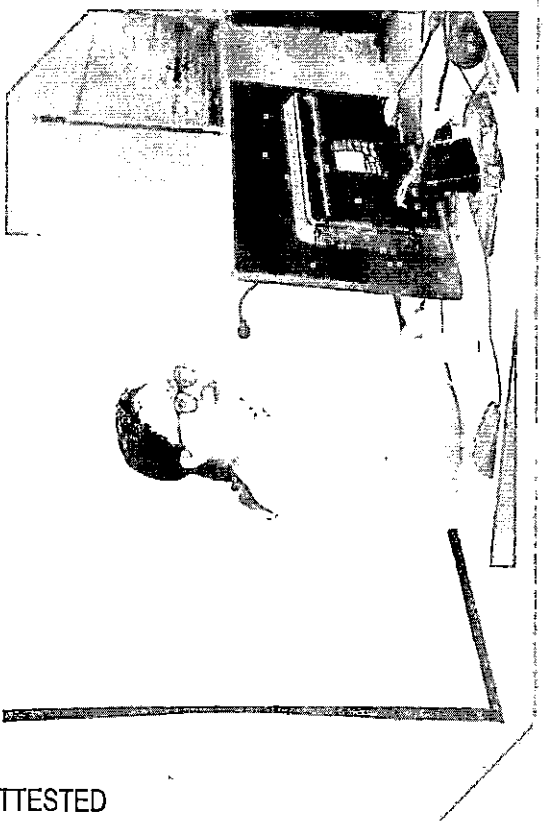

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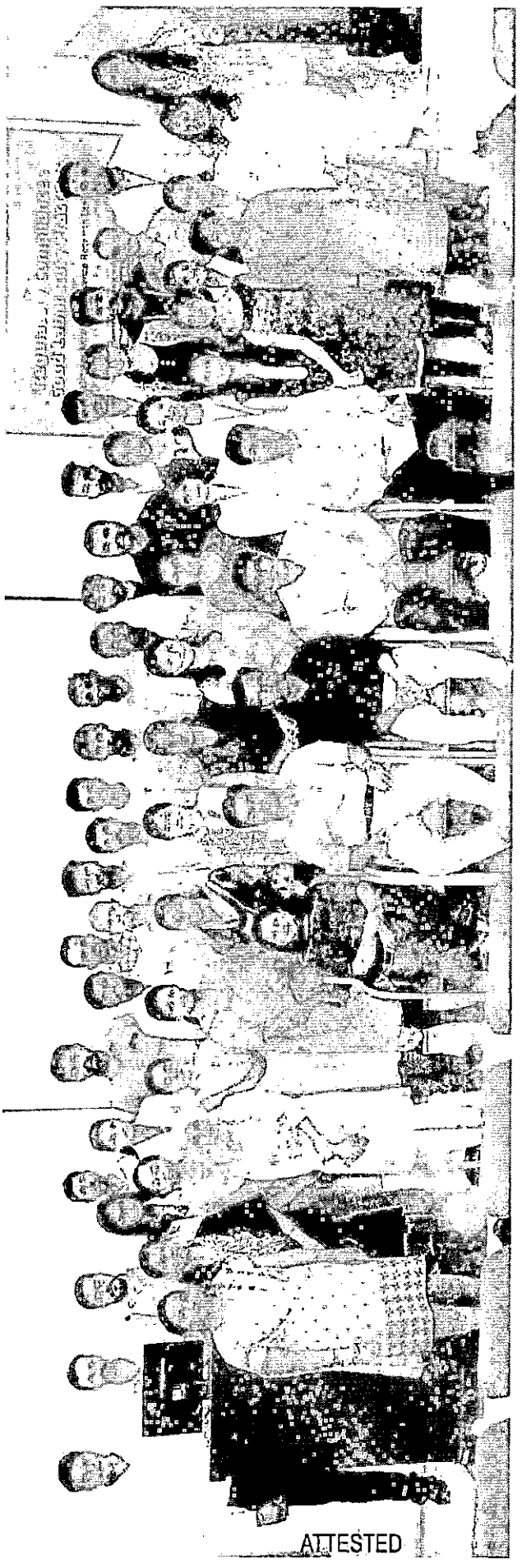
ATTESTED

Dr V A Kothiwale

KLE Academy of Higher Education and Research

Belagavi, Karnataka



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Belagavi-590 010,Karnataka

K.L.E.ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed-to-be-University)
Accredited A Grade by NAAC (2ND Cycle) Placed in Category A by MHRD (GoI)
DEPARTMENT OF E.N.T& HEAD AND NECK SURGERY
JAWAHARLAL NEHRU MEDICAL COLLEGE BELAGAVI
Extn.No:4094, 4072

Ref/Head & Neck Surgical Oncology/ Date: 31.12.2018

To,
Dr.Rajesh Kantharia
Medical Director
Head & Neck Oncosurgeon
KCHRC, Goraj Gujarat

(Through Proper Channel)

Respected Sir,

As a part of KAHER requirements following Postgraduate students in fellowship Head and Neck are posted to your Hospital as stipulated by KAHER, from January – 2019 to December–2019.They will be under your guidance for the purpose of training.

Kindly monitor their learning progress & give the completion certificate at the end of the posting.

S.No	Name of the students	Month
1.	Dr. Rahul Singh	01.01.2019-31.06.2019
2.	Dr. Pankaj Hotchandani	01.07.2019-31.12.2019

Thanking you,

Regards,
Dr Kumar Vinchurkar
Assoc.Prof. & I/C HOD Surgical Oncology
Course Co-ordinator for Oncology Fellowship
JNMC, KAHER, Belagavi.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Girija J. Mahantshetti
full name

has accomplished the task of Tutor for the medical student

Cristina Fernandez Zavala
full name

supervising his/her work on the research project

[illegible] Coverage of Under-5 Children in a Rural Area in Belgaum, India According to Universal Immunization Program
name of research project

at the department of Department of Community Medicine
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

July 2018
period

The mission of the Standing Committee On Research Exchange (SCORE) is to offer future physicians an opportunity to experience research and diversity in countries all over the world. This is achieved by providing a network of locally and internationally active students that globally facilitate access to research exchange projects. Through our programming and opportunities, we aim to develop both culturally sensitive students and skilled researchers intent on shaping the world of science in the upcoming future.

The MSAI India
National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

IFMSA President

ATTESTED

Dr. V A Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of the UGC Act 1956)
Belagavi-590 010,Karnataka

National Officer on Research Exchange

48

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Anuradha Patil
full name

has accomplished the task of Tutor for the medical student

Irene Morales Arjona
full name

supervising his/her work on the research project

Iodine Assessment in School Going Children and It's Relation of Iodine Deficiency and Cognitive Disability
name of research project

at the department of Department of Biochemistry
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

July 2018
period

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The MSAI India
National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

NMO President

ATTESTED

National Officer on Research Exchange

Dr. V A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed to be University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka.

49

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Anuradha Patil
full name

has accomplished the task of Tutor for the medical student

Emma Bigas Alsina
full name

supervising his/her work on the research project

Iodine Assessment in School Going Children and It's Relation of Iodine Deficiency and Cognitive Disability
name of research project

at the department of Department of Biochemistry
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

July 2018
period

The mission of the Standing Committee On Research Exchange (SCORE) is to offer future physicians an opportunity to experience research and diversity in countries all over the world. This is achieved by providing a network of locally and internationally active students that globally facilitate access to research exchange projects. Through our programming and opportunities, we aim to develop both cuturally sensitive students and skilled researchers intent on shaping the world of science in the upcoming future

The MSAI India
National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

NMO President

ATTESTED

National Officer on Research Exchange

KLE Academy of Higher Education and Research, (Deemed-to-be-University u/s 3 of the UGC Act 1956) Belagavi

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Sulakshana Baliga
full name

has accomplished the task of Tutor for the medical student

Bartlomiej Marcinkiewicz
full name

supervising his/her work on the research project

Risk Status Assessment in Pregnant Women in Rural Areas of Belagavi, India
name of research project

at the department of Department of Community Medicine
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

August 2018
period

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The MSAI India
National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

VERIFIED
Dr V A Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act 1956)
Belagavi-590 010,Karnataka

51

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Sulakshana Baliga
full name

has accomplished the task of Tutor for the medical student

Magdalena Rybaczek
full name

supervising his/her work on the research project

Risk Status Assessment in Pregnant Women in Rural Areas of Belagavi, India
name of research project

at the department of Department of Community Medicine
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

August 2018
period

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National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognizes the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

ATTESTED

Dr. V A Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be University u/s 3 of the UGC Act 1956)
Belagavi 590 010, Karnataka

18-19

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Harpreet Kour
full name

has accomplished the task of Tutor for the medical student

Reem Magdy
full name

supervising his/her ~~work on~~ the research project

Evaluation of Effect of Structured Exercise Therapy on Stress and Cognitive Functions of Young Adults with Type II Diabetes
name of research project

at the department of Physiology
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

August 2018
period

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National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

NMO President

ATTESTED

National Officer on Research Exchange

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956).
Belagavi-590 010,Karnataka

IEMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Girija J. Mahantshetti

full name

has accomplished the task of Tutor for the medical student

Silvia Nunez Laguna

full name

supervising his/her work on the research project

"Evaluation of Immunization Coverage of Under-5 Children in a Rural Area in Belagavi, India According to Universal Immunization Program"

name of research project

at the department of Department of Community Medicine

department

at Jawaharlal Nehru Medical College, Belagavi during the period of

name of university and country

August 2018

period

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The MSAI India

National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

ATTESTED

NMO President

National Officer on Research Exchange

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

Medical Students Association India

Reference Number: MSAI//EB//EX/2020/007 08th Oct 2020

To,
The Dean,
Jawaharalal Nehru Medical College,
Belagavi,Karnataka

Subject: Acknowledgement of Tutorship for Research Exchanges

Respected Madam/Sir,

This is to acknowledge that Dr. Nirmala Anand and Dr. Harpreet Kour have successfully hosted three Research Exchange Incoming students named Selma Heining, Nadia Rhizkisabrina and Valery Gomez from Indonesia, Germany and Catalonia respectively in the term 2018-19.

We congratulate Jawaharlal Nehru Medical College and K . L . E University on their successful endeavor. The Standing Committee on Research Exchange values the efforts and the interest that the professors of your esteemed medical college put to make the exchange period successful for our incoming exchange students.

We look forward to hosting more Research Exchange students with you for future IFMSA Research Exchanges.

Anindya Agarwal
Vice President for Exchanges
Medical Students Association of India
+91 9022733052 | vpx@msaindia.org

Jay Patel
National Officer on Research Exchange
Medical Students Association of India
+91 72030 30206 | score@msaindia.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that the medical student

FILIPPOS IOANNIS LAMPIS
full name

from GREECE
country

has successfully completed their research exchange project

ESTIMATION OF PREVALENCE OF METABOLIC SYNDROME AMONG FIRST YEAR MEDICAL STUDENTS
name of research exchange project

at the PHYSIOLOGY, KLE UNIVERSITY (KAHER) J.N. MEDICAL COLLEGE
name of department and university/hospital

BELAGAVI, INDIA during the period
country

JULY 2018 under the supervision of
period

DR. ANITA. TELI.
name of supervisor

The student has fulfilled the requirements for a researcl exchange according to the regulations of the Standing Committee on Research Exchange (SCORE) of the International Federation of Medical Students Associations (IFMSA).

(Dr. Anita. Teli)
Tutor/Institution

Hosting NORE/LORE

Sending NORE/LORE

Department of Physiology
No.
Date:

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Anita Teli

full name

has accomplished the task of Tutor for the medical student

Filippos Ioannis Lampis

full name

supervising his/her work on the research project

Prevalence of Metabolic Syndrome in Medical Students and Correlating it with Body Mass Index of the Students

name of research project

at the department of Department of Physiology

department

at Jawaharlal Nehru Medical College, Belagavi during the period of

name of university and country

July 2018

period

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The MSAI India

National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

NMO President

National Officer on Research Exchange

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that the medical student

ISABELLA ADORNO

full name

from BRAZIL

country

has successfully completed their research exchange project

ESTIMATION OF PREVALENCE OF METABOLIC SYNDROME AMONG FIRST YEAR MEDICAL STUDENTS

name of research exchange project

at the PHYSIOLOGY, KLE UNIVERSITY (KAHER), J.N. MEDICAL COLLEGE,

name of department and university/hospital

BELAGAVI, INDIA during the period

country

JULY 2018 under the supervision of

period

DR. ANITA. TELI

name of supervisor

The student has fulfilled the requirements for a researcl exchange according to the regulations of the Standing Committee on Research Exchange (SCORE) of the International Federation of Medical Students Associations (IFMSA).

(Dr. Anita Teli)

Tutor/Institution

Hosting NORE/LORE

Sending NORE/LORE

Department of Physiology
No.
Date:
J.N. Medical College, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

53

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Anita Teli

full name

has accomplished the task of Tutor for the medical student

Isabella Adorno

full name

supervising his/her work on the research project

Prevalence of Metabolic Syndrome In Medical Students and Correlating it With Body Mass Index of the Students

name of research project

at the department of Department of Physiology

department

at Jawaharlal Nehru Medical College, Belagavi during the period of

name of University and country

July 2018

period

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National Member Organization

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NMO President

ATTESTED

National Officer on Research Exchange

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

57

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Girija J. Mahantshetti

full name

has accomplished the task of Tutor for the medical student

Valery Gomez Mireia Mohammed

full name

supervising his/her work on the research project

[illegible] Immunization Coverage of Under-5 Children in a Rural Area in Belagavi, India According to Universal Immunization Program

name of research project

at the department of Department of Community Medicine

department

at Jawaharlal Nehru Medical College, Belagavi during the period of

name of university and country

August 2018

period

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National Member Organization

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NMO President

ATTESTED

National Officer on Research Exchange

Dr. V. A. Kotrashetti
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Harpreet Kour
full name

has accomplished the task of Tutor for the medical student

Ahmed Assar
full name

supervising his/her work on the research project

Evaluation of Effect of Structured Exercise Therapy on Stress and Cognitive Functions of Young Adults with Type II Diabetes
name of research project

at the department of Physiology
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

August 2018
period

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National Member Organization

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ATTESTED

NMO President

National Officer on Research Exchange

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka.

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Harpreet Kour
full name

has accomplished the task of Tutor for the medical student

Menna Osman
full name

supervising his/her work on the research project

Evaluation of Effect of Structured Exercise Therapy on Stress and Cognitive Functions of Young Adults with Type II Diabetes
name of research project

at the department of Physiology
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

August 2018
period

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National Member Organization

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NMO President

National Officer on Research Exchange

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

IFMSA
International Federation of Medical Students' Associations

SCORE
Research Exchange

Certificate

This is to certify that

Dr. Sulakshana Baliga
full name

has accomplished the task of Tutor for the medical student

Katherine Bernard
full name

supervising his/her work on the research project

Risk Status Assessment in Pregnant Women in Rural Areas of Belagavi, India
name of research project

at the department of Department of Community Medicine
department

at Jawaharlal Nehru Medical College, Belagavi during the period of
name of university and country

July 2018
period

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The MSAI India
National Member Organization

and the Standing Committee On Research Exchange (SCORE) of the International Federation of Medical Students' Associations (IFMSA) recognize the aforementioned tutor's contribution to our organization and to a worldwide development of research exchange.

ATTESTED

Dr. V A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

IFMSA
International Federation of Medical Students' Associations

OFFICIAL INVITATION LETTER

for a medical research training arranged by the
Standing Committee on Research Exchange,
International Federation of Medical Students' Associations

27th May, 2018

To whom it may concern,

Hereby **IFMSA-Spain**, the National Member Organization of the International Federation of Medical Students' Associations officially invites the student mentioned below to participate in the research exchange program in the period:

from *01/06/2018 at 30/06/2018*

NAME OF STUDENT: Polana Srujana
DATE OF BIRTH: 18-05-1998
GENDER: Female
NATIONALITY: United States
COUNTRY OF ORIGIN: India
PASSPORT NUMBER: 565413424

The professional part of the program will be organized at the following university clinic/institute. The student will perform a clinical or scientific research project under the supervision of his tutor – one of the staff members. The student will not receive a salary during the period of his exchange period.

PROJECT: Role of apolipoprotein D in the demyelination and remyelination processes: implications in multiple sclerosis
HOSPITAL: Hospital Universitario Central de Asturias (HUCA)
UNIVERSITY, CITY: Spain (IFMSA-SPAIN) - University of Oviedo, Oviedo
HOST COUNTRY: Spain
HOST ORGANISATION: IFMSA-Spain

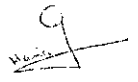
The hosting organization will provide the student with lodging and boarding for the full period of his exchange period.

Any further information regarding the research exchange program can be obtained from the National Officer on Research Exchange:

NAME: Maria Gonzalez Bisquert
ADDRESS: Edificio de ciencias de salud, Av. Ramón y Cajal, 7, 47005 Valladolid
TEL: +34 690299794
EMAIL: ifmsa.nore.spain@gmail.com
Yours sincerely,

Maria Gonzalez Bisquert

Stamp and signature of the NORE



Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

64

IFMSA
International Federation of Medical Students' Associations

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Research Exchange

Certificate

This is to certify that the Medical Student

Srujana Polana

full name

from India

country

has successfully completed his/her research exchange project entitled

Cuantificación electrocardiográfica de la respuesta a la infusión de Ajmalina en el diagnóstico del Sd. de Brugada

name of the research exchange project

in the department of Cardiology,

department

at HUCA, Spain during the period

name of the university and country

June 2018 under the supervision

period

of David Calvo Cuervo.

the name of the doctor

The student has fulfilled the requirements for a research exchange according to the regulations of the Standing Committee on Research Exchange (SCORE) of the International Federation of Medical Students´Associations (IFMSA).

Tutor/Institution

National/ Local Officer on Research Exchange

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

Journal of
Clinical Medicine

MDPI

Article

Spectral Analysis of the QT Interval Increases the Prediction Accuracy of Clinical Variables in Brugada Syndrome

Daniel García-Iglesias [1,2], Francisco Javier de Cos [3], Francisco Javier Romero [4], Srujana Polana [5], José Manuel Rubín [1,2], Diego Pérez [1,2], Julián Reguero [1,2], Jesús María de la Hera [1,2], Pablo Avanzas [1,2], Juan Gómez [2,6], Eliecer Coto [2,6], César Morís [1,2] and David Calvo [1,2,3,7,*]

1 Cadiology Department, Hospital Universitario Central de Asturias, 33012 Oviedo, Spain; daniel.garciai@sespa.es (D.G.-I.); jmrl100@gmail.com (J.M.R.); dpdcardio@gmail.com (D.P.); josejucasa@yahoo.es (J.R.); jesusdelahera@gmail.com (J.M.d.l.H.); avanzas@secardiologia.es (P.A.); cesarmoris@gmail.com (C.M.)
2 Instituto de Investigación Sanitaria del Principado de Asturias, 33012 Oviedo, Spain; uo167835@uniovi.es (J.G.); eliecer.coto@sespa.princast.es (E.C.)
3 Grupo para la Modelización Matemática Avanzada (MOMA), Universidad de Oviedo, 33003 Oviedo, Spain; fjcos@uniovi.es
4 Department of Medicine, Hospital Civil de Guadalajara Fray Antonio Alcalde, Guadalajara 44100, Mexico; romero_fco@outlook.es
5 Jawaharla Nehru Medical College, Belgaum 590001, Kartaka, India; janapolana@yahoo.com
6 Department of Molecular Genetics, Hospital Universitario Central de Asturias, 33012 Oviedo, Spain
7 Universidad Católica de Murcia, 30202 Murcia, Spain
* Correspondence: dcalvo307@secardiologia.es; Tel.: +34-895-108-000; Fax: +34985274688

Received: 1 September 2019; Accepted: 30 September 2019; Published: 4 October 2019

Abstract: (1) Background: The clinical management of Brugada Syndrome (BrS) remains suboptimal. (2) Objective: To explore the role of standard electrocardiogram (ECG) spectral analysis in diagnosis and risk stratification. (3) Methods: We analyzed 337 patients—43 with a spontaneous type I ECG pattern (Spont-BrS), 112 drug induced (Induct-BrS), and 182 with a negative response to the drug challenge (negative responders (NR)). ECGs were processed using the wavelet transform (high frequency: 85 to 130 Hz). (4) Results: The power of the high-frequency content in the ST segment (Total ST Power; $nV^2Hz^{-1}10^3$) was higher in BrS compared with NR patients (Spont-BrS: 28.126 (7.274–48.978) vs. Induc-BrS: 26.635 (15.846–37.424) vs. NR: 11.13 (8.917–13.343); $p = 0.002$). No differences were observed between ECG patterns in BrS patients. However, the Total ST Power of the type II or III ECG in NR patients was lower than in the same ECG patterns recorded from BrS patients (BrS: 31.07 (16.856–45.283); vs. NR: 10.8 (7.248–14.352) $nV^2Hz^{-1}10^3$; $p = 0.007$). The Total ST Power, age, and family history of BrS were independent predictors of positive responses to drug testing. Comparing models with versus those without Total ST Power, the area under the received operator curve (ROC) curve increased (with 0.607 vs. without 0.528, $p = 0.001$). Only syncope was associated with an increased risk (follow-up 55.8 ± 39.35 months). However, the area under the ROC curve increased significantly when the Total ST Power was included as a covariate (with 0.784 vs. without 0.715, $p = 0.04$). (5) Conclusions: The analysis of the high-frequency content of ECG signals increases the predictive capability of clinical variables in BrS patients.

Keywords: Brugada syndrome; spectral analysis; diagnosis; sudden cardiac death; prognosis

1. Introduction

Brugada syndrome (BrS) is an inherited disease with an increased risk of Sudden Cardiac Death (SCD) in apparently healthy individuals [1]. The diagnosis relies on the demonstration of a type I electrocardiogram (ECG) pattern, either occurring spontaneously or induced by the infusion of sodium channel blockers. However, the latter is questioned because of the suboptimal sensitivity of drug testing, which may negatively affect the prognosis in patients with false-negative responses [2]. Similarly, the intermittence of ECG patterns introduces a challenge to risk stratification and explains the conflicting results along different studies [3]. In fact, a significant portion of patients are reclassified with time and with an increasing number of ECG explorations [2].

Those limitations inherent to the visual inspection of ECG tracings might be overcome by quantitative analysis of the ECG signals. For that purpose, we previously demonstrated that the spectral decomposition of ECG signals with the wavelet transform of the QRS complexes allows for appropriate characterization of the high-frequency content, which exert a differential behavior between healthy individuals and patients affected by severe cardiac arrhythmias leading to SCD [4]. In the present work, we analyze an extensive cohort of patients with BrS and provide evidence of the potential utility of the spectral decomposition of ECG signals in improving the performance of diagnostic maneuvers and the accuracy of risk assessment beyond other variables commonly used in the clinic.

2. Methods

2.1. Population and Recording Protocol

From April 2005 to July 2018, data were collected from 337 patients with suspicious or confirmed BrS who were referred to our arrhythmia unit for diagnostic or therapeutic purposes (Figure S1). Patients were managed according to accepted recommendations at the time of evaluation [5] and classified as spontaneous BrS patients (Spont-BrS; patients displaying a spontaneous type I ECG pattern at the time of diagnosis), drug-induced BrS patients (Induc-BrS; patients displaying a type I ECG pattern during provocative testing with sodium blockers) and negative responder patients (NR; patients with suspicious BrS and a negative response to the provocative testing with sodium blockers).

Clinical baseline variables were obtained at the outpatient clinic. Patients displaying a spontaneous type I ECG were confirmed as having BrS, underwent risk stratification, and were referred for standard digital 12-lead ECG acquisition (see below). Patients with suspected BrS were referred for provocative testing with sodium blockers. According to recommendations, intravenous flecainide was continuously infused at a rate of 2.0 mg/kg body weight over 10 min (maximum dosage, 150 mg) [6]. Ajmaline was continuously infused at a rate of 1 mg/kg body weight over 10 min (maximum dosage, 50 mg). Before drug infusion, we checked for the absence of a type I ECG, both at the standard precordial position (V1 and V2 at the fourth intercostal space) and the high precordial position (V1 and V2 at the second intercostal space). At the end of the provocative testing, we explored the high precordial position for better sensitivity. ECG tracings were analyzed by two independent cardiac electrophysiologists and classified by consensus according to published recommendations as type I, II, or III [5]. The provocative testing was considered to display a positive response if the patient exhibited a type I ECG at any time during the protocol. The patients were retrospectively reviewed, and this study protocol was approved by the Ethics Committee. All patients gave informed consent.

2.2. Signal Processing

Standard ECGs (12 leads) were digitally used to extract the QT complexes (see Supplementary Materials for details) [4]. The time–frequency data of each QT complex were collected using the Wavelet transform (see Supplementary Materials for details). In accordance with previous reports, high-frequency content was defined as being within the range of 85 to 130 Hz [4]. Calculations were performed with R software (http://www.r-project.org) [7].

To analyze the distribution of the high-frequency content, we computed the cumulative power contained at each time epoch of the QT interval (Figure 1). From the obtained distribution, we defined (i) the Peak Power as the highest cumulative power of the high-frequency content, (ii) the Total Power as the area under the curve of the whole power function, (iii) the Total QRS Power as the area under the curve of the power function along the QRS interval, (iv) the Total ST Power as the area under the curve of the power function along the ST–T wave interval, and (v) the QRS to ST Total Power ratio as the ratio between the Total QRS Power and Total ST-Power.

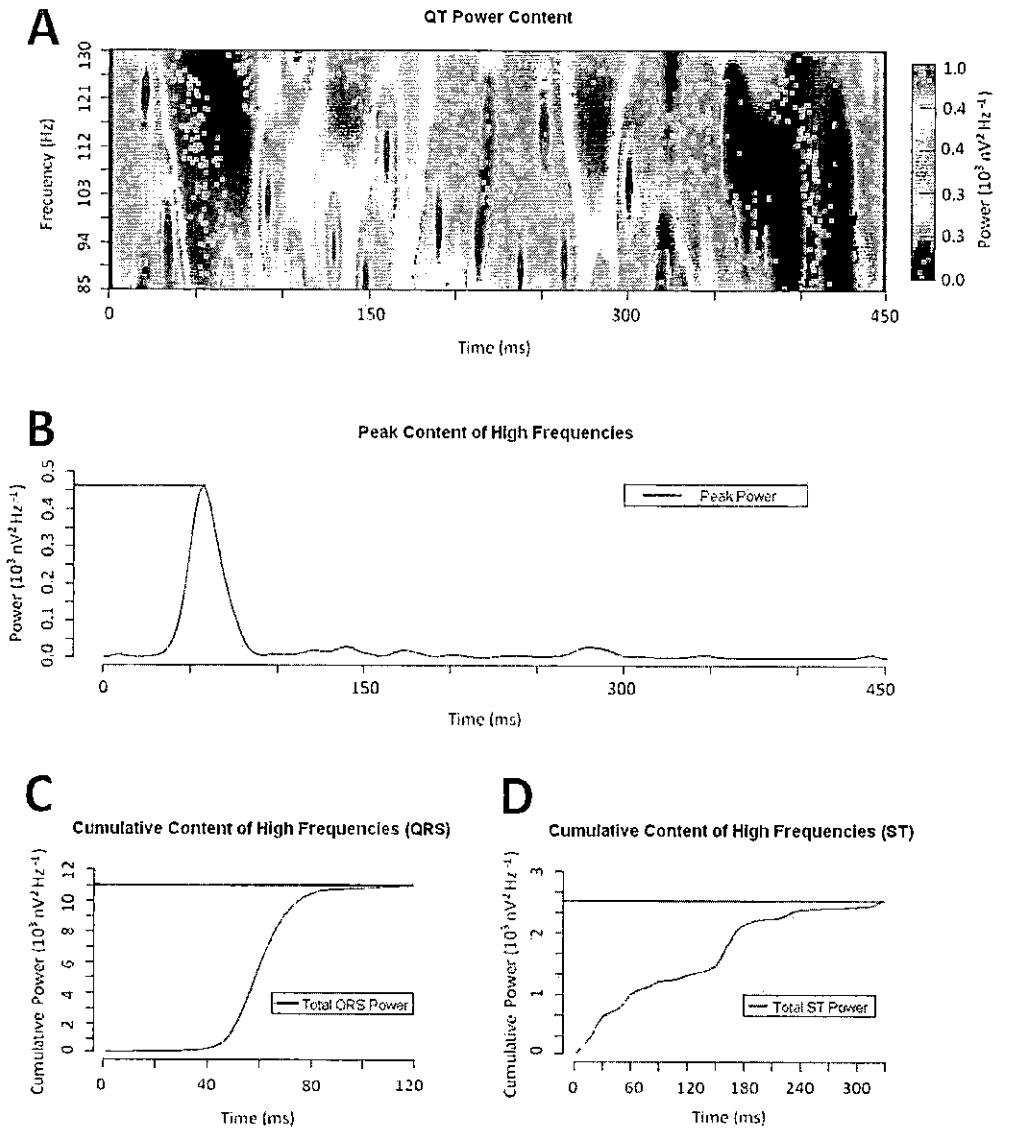

Figure 1. Example of a wavelet continuous transform on a QRS complex (frequency range: 85–130 Hz). **Panel A:** Power spectrum of the QRS complex. **Panel B:** Total high-frequency content at each time epoch. The brown dotted line marks the Peak Power. **Panel C & D:** Cumulative power of the high-frequency content along the QRS and ST interval. The colored dotted lines mark the Total QRS and ST Power respectively.

2.3. Definitions

The terms sudden cardiac arrest (SCA) and sudden cardiac death (SCD) have been defined previously in the literature [8]. Symptomatic patients were defined according to the presence of any type of syncope [2,9,10]. The end point of this study was the occurrence of SCA, SCD, or appropriate therapy using an implantable defibrillator (ICD) to treat life-threatening ventricular arrhythmias during the follow-up period.

2.4. Follow-Up

Spont-BrS and Induc-BrS patients had an annual follow-up at the outpatient clinic. Risk stratification was performed according to current clinical standard recommendations, taking patient preferences into consideration. An electrophysiological study was also performed according to the state-of-the-art methods at the time. The induction of sustained ventricular fibrillation was followed by preventive ICD implantation. Alternatively, an ICD was recommended for high-risk patients, including SCA survivors and symptomatic patients. In contrast, patients displaying a negative response were not stratified according to the BrS standards. Every patient was also directly interviewed in the outpatient clinic at the time of this study, and data regarding the clinical profile were re-checked if necessary.

2.5. Statistical Analysis

Categorical variables are reported as numbers and percentages. Continuous variables are reported as means (±standard deviation [SD] or 95% Confidence Intervals [CI95%]). The chi-square test and the Student *t* test (paired or unpaired as appropriate) were used for univariate analysis to contrast different variables. For multilevel univariate analysis, an ANOVA test was used. Logistic regression was used to contrast different variables as predictors of the responses to provocative testing and SCA/SCD/appropriate therapies from the ICD during follow-up. A received operator curve (ROC) was constructed in both cases to evaluate the diagnostic and prognostic accuracy of the multivariate analysis, comparing the different models with the deLong test. Analyses were performed using R software (http://www.r-project.org), and statistical significance was established at $p < 0.05$.

3. Results

3.1. Patients and Clinical Variables

The distribution of patients and clinical characteristics are summarized in Figure S1 and Table 1, respectively. Overall, BrS patients were slightly older than NR patients. Most of the Spont-BrS patients displayed a type I ECG pattern at the time of the digital ECG recording. Digital ECG records, acquired at the beginning of provocative testing, exhibited some differences between Induct-BrS and NR patients. Thus, most of the patients with a negative response to the provocative testing exhibited a normal ECG pattern at baseline, whereas the most frequent ECG pattern at baseline in the Induct-BrS cohort was the type II ECG pattern. The presence of syncope was equally distributed between groups. However, cardiac syncope and SCA were more frequent in BrS patients. An ICD was implanted in 22 Spont-BrS patients (51.16%) and in 23 Induct-BrS patients (20.54%), mainly because of sustained ventricular fibrillation induction in the electrophysiological study (11 patients; 24.44%) or previous cardiogenic syncope (13 patients; 28.89%)].

Table 1. Comparison of clinical variables between groups.

	Spont-BrS (N = 43)	Induc-BrS (N = 112)	NR Patients (N = 182)	p Value
Clinical features				
Age (years)	44.05 (12.3)	43.61 (14.51)	38.64 (14.98)	0.004
Male gender (%)	30 (90.7)	70 (62.5)	137 (75.28)	0.001
Family history of SCD at age <45 years (%)	18 (41.86)	68 (60.71)	73 (40.11)	0.002
Syncope (%)	11 (25.58)	28 (25)	56 (30.77)	0.521
Cardiac syncope (%)	7 (16.28)	12 (10.71)	5 (2.75)	0.002
SCA (%)	5 (11.63)	9 (8.04)	1 (0.549)	0.001
Smoker (%)	12 (27.9)	29 (25.89)	47 (25.82)	0.96
Hypertension (%)	7 (16.28)	18 (16.07)	21 (11.54)	0.473
Diabetes mellitus (%)	1 (2.33)	4 (3.57)	3 (1.65)	0.575
Dyslipidemia (%)	8 (18.61)	22 (19.64)	14 (7.69)	0.007
Cardiomyopathy (%) †	3 (6.98)	3 (2.68)	9 (4.95)	0.455
Cardiovascular drugs (%) ‡	11 (25.58)	18 (16.07)	23 (12.64)	0.104
PES Test performed	26 (60.47)	37 (33.04)	3 (1.65)	<0.001
Positive PES	8 (18.6)	4 (3.57)	0 (0)	<0.001
ICD implanted	22 (51.16)	23 (20.54)	2 (1.1)	<0.001
ECG pattern at the time of the digital record				
BrS type I (%)	38 (88.37)	0	0	<0.001
BrS type II (%)	3 (6.98)	59 (52.68)	36 (19.78)	<0.001
BrS type III (%)	0	22 (19.64)	39 (21.43)	0.004
BrS type II–III (%)	3 (6.98)	81 (72.62)	75 (41.21)	<0.001
Normal (%)	0	25 (22.32)	75 (41.21	<0.001

† All the cases displayed discrete left ventricle hypertrophy due to hypertension. ‡ All the cases on anti-hypertensive and/or lipid-lowering drugs. BrS: Brugada syndrome; SCA: sudden cardiac arrest; SCD: sudden cardiac death; Spont-BRS: spontaneous BrS patients; Induc-BRS: drug-induced BrS patients; NR: negative responder patients; PES: programmed electrical stimulation.

3.2. *The High-Frequency Content along the QT Interval*

The distribution of the high-frequency content along the QT interval was different between BrS patients and NR patients (Figure 2 and Table 2). Overall, the Total Power and the Total ST Power were significantly higher in BrS patients (either Spont-BrS or Induct-BrS) compared with NR patients. However, those differences were mainly determined by the differences observed in the right precordial leads (V1 and V2; See Table 2), while comparisons between other precordial leads displayed non-significant differences (V3 to V6; Total Power: Spont-BrS 27.932 (13.393–42.471) vs. Induc-BrS 42.991 (14.673–71.31) vs. NR patients 26.686 (22.626–30.747) $10^3 nV^2 Hz^{-1}$, $p = 0.483$; Total ST Power: Spont-BrS 12.821 (2.356–23.286) vs. Induc-BrS 12.735 (7.447–18.023) vs. NR patients 7.815 (6.139–9.49) $10^3 nV^2 Hz^{-1}$; $p = 0.062$).

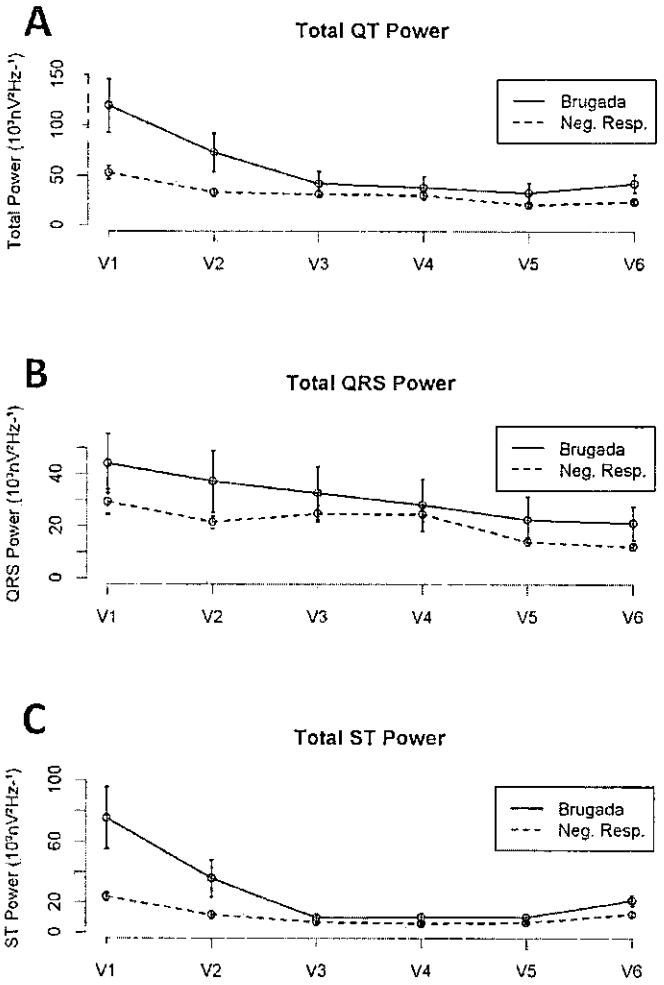

Figure 2. High-frequency content along precordial leads; Comparison between BrS patients and NR. **Panel A**: Total Power in the QT interval. **Panel B**: Total Power in the QRS interval. **Panel C**: Total Power in the ST interval.

Table 2. Comparative analysis of the high-frequency content between different clinical conditions.

	Spont-BrS	Induct-BrS	NR Patients	*p* Value
		All precordial leads		
Peak Power	0.734 (0.616–0.852)	1.439 (0.916–1.962)	0.871 (0.786–0.956)	0.677
Total Power	46.693 (34.811–58.575)	62.188 (46.143–78.233)	32.161 (29.752–34.57)	0.095
Total QRS Power	18.567 (15.884–21.25)	35.553 (22.559–48.547)	21.031 (19.119–22.943)	0.623
Total ST Power	28.126 (17.793–38.459)	26.635 (21.19–32.08)	11.13 (10.009–12.251)	0.002
QRS to ST Total Power	5.256 (3.947–6.565)	5.762 (4.931–6.593)	9.724 (8.075–11.373)	0.045
		Right precordial leads		
Peak Power	0.897 (0.74–1.054)	1.705 (1.127–2.283)	0.917 (0.801–1.033)	0.468

Table 2. *Cont.*

	Spont-BrS	Induct-BrS	NR Patients	*p* Value
Total Power	84.216 (52.704–115.728)	100.581 (77.381–123.781)	43.111 (38.832–47.39)	0.017
Total QRS Power	25.48 (21.46–29.5)	46.147 (30.805–61.489)	25.35 (22.267–28.433)	0.451
Total ST Power	58.736 (30.649–86.823)	54.434 (40.921–67.947)	17.761 (15.586–19.936)	0.003
QRS to ST Total Power	4.142 (3.075–5.209)	4.06 (3.445–4.675)	6.023 (5.067–6.979)	0.133

Figures within brackets denote the 95% confidence interval (CI95%). Units for Peak Power, Total Power, Total QRS Power, and Total ST Power are expressed as $10^3 nV^2 Hz^{-1}$.

When BrS patients were analyzed according to the time-domain description of the ECG records, we found no statistically significant differences between ECG patterns with regard to their high-frequency content (Table S1). However, we observed significant differences in the Total ST Power contained in type II or III ECG patterns (combined) when comparing NR with BrS patients (Table 3). Such differences were not found when we compared normal ECG patterns from BrS patients with those from NR patients (see Table S2 for detailed description). An independent analysis of type II and III ECG patterns is presented in Table S3. In summary, significant differences regarding the Total ST Power were identified when comparing Brugada patients and NR displaying a type II ECG pattern. Those differences were not observed when analyzing individuals displaying a type III ECG pattern. However, the number of patients available for analysis in that category was low, and therefore, the results were probably affected by a lack of statistical power.

Table 3. Comparative analysis of the high-frequency content between different electrocardiogram (ECG) patterns and clinical conditions.

	ECG Type I	ECG Type II or III		
	BrS Patients	BrS Patients	NR Patients	*p*
All precordial leads				
Peak Power	0.629 (0.421–0.836)	1.518 (0.186–2.85)	1.07 (0.762–1.379)	0.517
Total Power	47.415 (20.269–74.561)	69.721 (28.191–111.251)	36.259 (27.264–45.253)	0.121
Total QRS Power	16.665 (11.358–21.972)	38.651 (5.058–72.244)	25.458 (18.461–32.455)	0.446
Total ST Power	30.75 (7.171–54.329)	31.07 (16.856–45.283)	10.8 (7.248–14.352)	0.007
QRS to ST Total Power	3.849 (2.131–5.566)	5.853 (3.926–7.779)	12.132 (6.002–18.262)	0.055
Right precordial leads				
Peak Power	0.886 (0.529–1.244)	1.948 (0.43–3.466)	1.209 (0.771–1.647)	0.355
Total Power	89.832 (17.724–161.941)	120.243 (59.55–180.936)	51.683 (35.198–68.167)	0.033
Total QRS Power	25.041 (15.957–34.126)	53.695 (13.362–94.027)	32.757 (20.998–44.516)	0.324
Total ST Power	64.791 (0.574–129.008)	66.549 (31.128–101.969)	18.926 (11.609–26.242)	0.01
QRS to ST Total Power	3.471 (1.768–5.173)	4.284 (2.783–5.785)	7.666 (3.581–11.751)	0.125

Figures within brackets denote the CI95%. Units for Peak Power, Total Power, Total QRS Power, and Total ST Power are expressed as $10^3 nV^2 Hz^{-1}$.

3.3. Drug Challenge and the High-Frequency Content

Overall, 294 patients were admitted for drug challenge testing, and digitalized ECG records were obtained (baseline ECG records). We analyzed the diagnostic yield of the high-frequency content to predict positive responses to the test. In summary, 182 patients were classified as NR and 112 were classified as Induct-BrS. Univariate analysis demonstrated the Total Power and the Total ST Power at the right precordial leads, along with age, male gender, and family history of SCD or BrS, as variables with significant associations with the final drug testing results (Table 4). In the Multivariate Analysis, the Total ST Power, age, and family history of BrS were also found to be independent predictors of the final drug testing results (Table 4). Compared with a simplified model including age and family history of BrS, a completed model including the Total ST Power displayed an increased diagnostic yield. The inclusion of the Total ST Power significantly increased the ROC area under the curve compared with the simplified model (AUC completed model 0.607 vs. simplified model 0.528, $p = 0.001$; Figure 3A).

Table 4. Results of the Univariate and Multivariate analyses.

	Univariate		Multivariate	
	HR	*p*	HR	*p*
Model for prediction of positive response to the drug challenge				
Peak Power	3.251 (0.8–13.209)	0.099		
Total Power	1.054 (1.019–1.091)	0.003		
Total QRS Power	1.045 (0.991–1.102)	0.101		
Total ST Power	1.106 (1.043–1.174)	0.001	1.251 (1.082–1.447)	0.003
QRS to ST Total Power ratio	0.678 (0.407–1.13)	0.136		
Age	1.005 (1.002–1.009)	0.006	1.005 (1.001–1.008)	0.014
Male	0.865 (0.766–0.977)	0.02	0.925 (0.814–1.05)	0.225
Familiar History of SCD	1.215 (1.089–1.356)	0.001		
Familiar History of BrS	1.203 (1.066–1.358)	0.003	1.158 (1.019–1.317)	0.025
Syncope	0.936 (0.827–1.059)	0.289	0.914 (0.81–1.032)	0.146
Model for prediction of arrhythmic events during follow-up				
Peak Power	0.997 (0.414–2.398)	0.994		
Total Power	1.011 (0.991–1.031)	0.285		
Total QRS Power	0.999 (0.967–1.033)	0.967		
Total ST Power	1.025 (0.996–1.056)	0.096	1.041 (0.966–1.123)	0.291
QRS to ST Total Power ratio	0.536 (0.27–1.065)	0.075		
Age	1 (0.997–1.003)	0.905		
Spontaneous Type I Pattern	1.037 (0.936–1.148)	0.488	1.026 (0.923–1.141)	0.629
Male	1.036 (0.938–1.145)	0.482	1.041 (0.939–1.155)	0.441
Familiar History of SCD	0.955 (0.871–1.047)	0.322	0.951 (0.869–1.041)	0.278
Familiar History of BrS	0.928 (0.842–1.023)	0.133		
Syncope	1.206 (1.09–1.335)	<0.001	1.197 (1.079–1.329)	0.001
Positive PES	0.907 (0.765–1.075)	0.259	0.898 (0.756–1.067)	0.219
SCN5a Mutation	0.96 (0.86–1.073)	0.472	0.975 (0.873–1.089)	0.652

Numbers within brackets denote the CI95%.

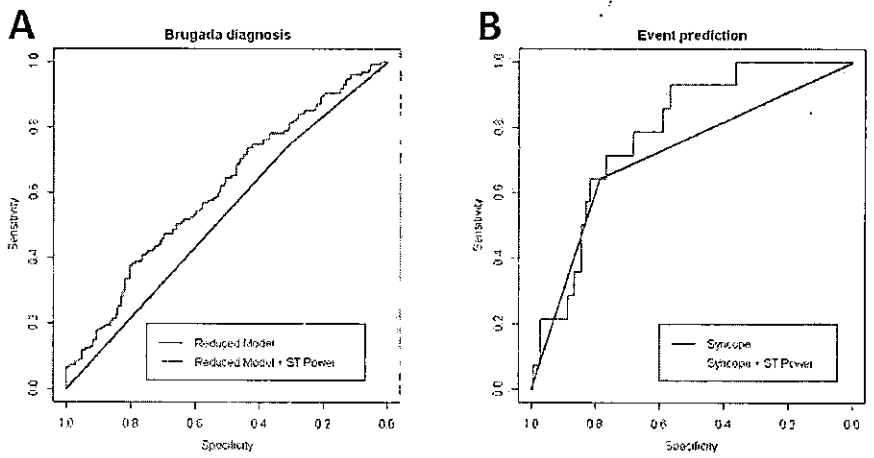

Figure 3. Comparative received operator curve (ROC) curve analysis from multivariate models. **Panel A**: ROC curve for BrS diagnosis during the drug testing. **Panel B**: ROC curve for arrhythmic event prediction.

In a subset of 211 patients, digitalized ECG data were also collected after Flecainide (n = 168) or Ajmaline (n = 43) infusion. In that cohort, 61 patients displayed a type I ECG pattern after drug testing and were subsequently classified as Induct-BrS patients. Overall, drug infusion attenuated the high-frequency content along the QT interval in all individuals (Figure 4 and Table S4). As displayed in Figure 4, no significant differences were observed in the rate of attenuation when comparing Induct-BrS patients with NR patients. In addition, Flecainide and Ajmaline attenuated the high-frequency content in a similar way (see Table S4 for details).

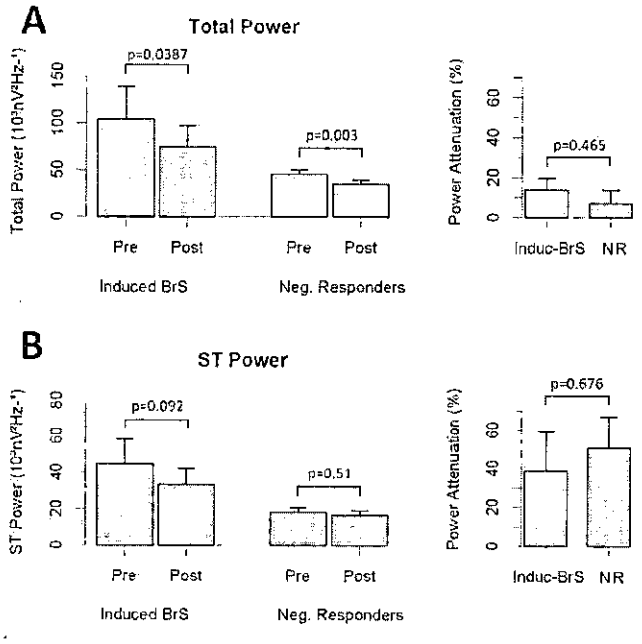

Figure 4. Effects of drug infusion on the high-frequency content of the QT interval for right precordial leads. **Panel A**: Total Power and attenuation of Total Power in Brugada patients and NR. **Panel B**: ST Power and attenuation of ST Power in Brugada patients and NR.

3.4. Prediction of Clinical Events During Follow-Up in Patients with Brugada Syndrome

The mean follow-up period was 55.8 ± 39.4 months (no patient was lost to follow-up). Overall, 14 patients (five Spont-BrS and nine Induct-BrS) had SCA or received appropriate ICD therapies because of ventricular fibrillation (9.03%). BrS patients with clinical events expressed a non-significant increase in the Total ST Power (51.18 [4.37–97.99] vs. 24.32 [14.86–33.79], $p = 0.248$) and in the Total ST Power along the right precordial leads (113.52 [−14.5 to 241.54] vs. 49.1 [25.17–73.04], $p = 0.307$). It translates into a significant reduction in the QRS to ST Total Power ratio compared with BrS patients without clinical events (Table S5). In the univariate and multivariate analyses, cardiac syncope was the unique variable associated with an increased risk of clinical events (Table 4). However, the inclusion of the Total ST Power contained in right precordial leads in addition to cardiac syncope resulted in the increased predictive capability of the model. As shown in Figure 3B, the completed model, including syncope and Total ST Power, increased the ROC area under the curve significantly compared with the model with syncope alone (completed model AUC 0.784 vs. only syncope model AUC 0.715, $p = 0.04$). Comparisons between BrS patients displayed that those with clinical events expressed a significant reduction in the QRS to ST Total Power ratio compared with asymptomatic BrS patients (Table S5).

4. Discussion

The results of our study show that the analysis of the high-frequency content of surface ECG signals adds diagnostic and prognostic information in BrS patients, as it helps to increase the predictive capability of clinical variables. We demonstrated that the high-frequency content exerts differential behaviors between BrS patients and controls, which is, to some extent, independent of the time domain classification of ECG patterns. Moreover, despite this differential behavior, the clinical significance shown in the ROC analysis for this parameter seems low compared with what was seen for the event prediction analysis. Because of that and although their role in BrS pathophysiology was not demonstrated in our work, the improvement in predictive capabilities adds more evidence in favor of the previously reported link between the high-frequency content and the risk for severe cardiac arrhythmias [4].

We are aware that translation to the clinic is far from being done; however, with the present work, we have paved the way for new quantitative measurements on ECG signals with the potential to improve the clinical management of BrS patients.

4.1. The Plausible Link between the High-Frequency Content and the Arrhythmogenic Substrate

Recent studies in BrS patients demonstrated that the arrhythmogenic substrate is confined to the epicardial layer of the right ventricle out-flow tract and free wall [11,12]. The electrograms recorded from the substrate characteristically displayed abnormal high-frequency potentials, expanding the length of the QRS interval and occupying positions at the ST segments. The abolition of such abnormal potentials has been proposed as a promising effective therapy that is able to reverse the type I ECG pattern and control arrhythmia recurrence. If the previous assumption is true, signal processing tools able to quantify the high-frequency content in the QT complexes might non-invasively characterize the arrhythmogenic substrate of BrS patients.

The signal average is the classical method applied to time domain records and has been postulated to have potential utility in the risk stratification of BrS patients [13–18]. However, the signal-averaged ECG is highly dependent on noise and requires long time records, which makes it tedious to use and has never previously helped to provide clear recommendations for patient management. In contrast, we and others previously demonstrated that the continuous wavelet transform may provide efficient analysis of the QRS signal, enabling the identification of late potentials by their subrogate in the frequency domain: the high-frequency content [4,19]. We hypothesized that the high-frequency content of the QT interval may correlate with the high-frequency electrograms founded as the arrhythmogenic

substrate in BrS patients. The latter remains speculative but is strongly supported by the data displayed in our work, which provides an incentive for future research.

4.2. The High-Frequency Content and Patient Prognosis in BrS

Symptoms are major clinical determinants of prognosis in BrS patients, leading to conservative approaches when considering ICD implantation in asymptomatic patients. Despite the possibility of a selection bias of survivors that precludes accurate estimations of the real incidence of SCA/SCD in the general population with BrS [20], most clinical series have demonstrated good prognosis of asymptomatic patients under close follow-up and management of lifestyle, avoidance of drugs with potential adverse effects, and prompt treatment of fever [21]. Under such conditions, the annual incidence of SCA/ICD therapies varies within the range of 0.5% to 1% [22]. However, more than 50% of SCA episodes may occur in previously asymptomatic patients [23], and the cumulative risk has been demonstrated as stable over time [24], which might lead the incidence of arrhythmic events to rise by up to 10% in the next 10 years. This is unacceptable from a clinical point of view and highlights the necessity for clinical improvements in risk stratification in order to prevent rare but devastating events.

Several ECG features may help in risk stratification including fragmentation of the QRS, association with early repolarization syndrome, increased Tpeak–Tend intervals, quantitative measurements on the terminal R wave in lead V1, or the extension of the PR interval [22]. These measurements are widely available in the clinic, as they can be easily performed on a standard ECG. However, the implementation of the automatic quantification of ECG properties might help to overcome subjective interpretation on the ECG tracings and errors occurring when performing hand-made measurements. As presented in our work, BrS patients behave with an increased high-frequency content along the QT interval compared with controls. This difference is highlighted in patients with type II or type III Brugada patterns, which are more challenging ECG presentations. In fact, the presence of increased high-frequency content is an independent predictor of BrS during the drug challenge test, which significantly increases the diagnosis accuracy of other described variables (i.e., age and family history of BrS) and increases the accuracy of syncope as a predictor of events in BrS patients.

In conclusion, our study shows that the high-frequency content of the QT complexes exerts differential behavior in BrS patients that may be linked to the arrhythmogenic substrate and provides additional information for the time domain classification of ECG patterns. Further investigation is needed to establish the roles of these factors as independent predictors of fatal events in the global population with BrS.

5. Limitations

Data regarding the clinical profiles and the characteristics of episodes of syncope were re-checked by direct interviews with the subjects of interest at the time of this study. Thus, we cannot be sure that the patients' memories regarding the conditions of syncope were accurate, which might be an important limitation when concluding the nature of syncope.

This study is observational and retrospective; thus, potential biases may arise because of missing data or inaccurate information collection. A second evaluation with other cohorts would be of interest for external validation. In addition, the number of patients included for analysis was low when attempting the analysis of subgroups (i.e., patients displaying the type III ECG pattern). The latter may have affected appropriate conclusions being reached.

Supplementary Materials: The following are available online at http://www.mdpi.com/2077-0383/8/10/1629/s1.

Author Contributions: D.G.-I.: conceptualization, investigation, and writing—original draft preparation; F.J.d.C.: conceptualization, writing—review and editing, and supervision; F.J.R.: investigation; S.P.: investigation; J.M.R.: writing—review and editing; D.P.: writing—review and editing; J.R.: writing—review and editing; J.M.d.l.H.: writing—review and editing; P.A.: writing—review and editing; J.G.: writing—review and editing; E.C.: writing—review and editing; C.M.: writing—review and editing; D.C.: conceptualization, investigation, writing—original draft preparation, writing—review and editing and supervision.

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IFMSA
International Federation of Medical Students' Associations

OFFICIAL INVITATION LETTER

for a medical research training arranged by the
Standing Committee on Research Exchange,
International Federation of Medical Students' Associations

27th April 2018

To whom it may concern,

Hereby *IFMSA CZ (IFMSA Czech Republic)*, the National Member Organization of the International Federation of Medical Students' Associations officially invites the student mentioned below to participate in the research exchange program in the period:

from *01/06/2018 to 29/6/2018*

NAME OF STUDENT: Shreya Anil Patted
DATE OF BIRTH: 01/11/1996
GENDER: Female
NATIONALITY:
COUNTRY OF ORIGIN: India
PASSPORT NUMBER: R8541147

The professional part of the program will be organized at the following university clinic/institute. The student will perform a scientific research project under the supervision of his tutor – one of the staff members. The student will not receive a salary during the period of his exchange period.

UNIVERSITY: Charles University in Prague
DEPARTMENT: CITY: Prague, National Institute of Mental Health, Third Faculty of Medicine
HOST COUNTRY: Czech Republic

The hosting organization will provide the student with lodging and boarding for the full period of his exchange period.

Any further information regarding the research exchange program can be obtained from the National Officer on Research Exchange:

NAME: Markéta Hlaváčková
ADDRESS: Vranovice 22, Rožmitál pod Třemšínem, 26242
TEL: +420 777305029
EMAIL: nore@ifmsa.cz

Yours sincerely,

Markéta Hlaváčková

nore ifmsa national officer on research exchange

medical students worldwide

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of the UGC Act 1956)
Belagavi-590 010,Karnataka

Medical Students Association
India

Reference Number: MSAI//EB//EX/2020/007 **08th Oct 2020**

To,
The Dean,
Jawaharalal Nehru Medical College,
Belagavi,Karnataka

Subject: Acknowledgement of Tutorship for Research Exchanges

Respected Madam/Sir,

This is to acknowledge that Dr. Nirmala Anand and Dr. Harpreet Kour have successfully hosted three Research Exchange Incoming students named Selma Heining, Nadia Rhizkisabrina and Valery Gomez from Indonesia, Germany and Catalonia respectively in the term 2018-19.

We congratulate Jawaharlal Nehru Medical College and K . L . E University on their successful endeavor. The Standing Committee on Research Exchange values the efforts and the interest that the professors of your esteemed medical college put to make the exchange period successful for our incoming exchange students.

We look forward to hosting more Research Exchange students with you for future IFMSA Research Exchanges.

Anindya Agarwal
Vice President for Exchanges
Medical Students Association of India
+91 9022733052 | vpx@msaindia.org

Jay Patel
National Officer on Research Exchange
Medical Students Association of India
+91 72030 30206 | score@msaindia.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

IFMSA

OFFICIAL INVITATION LETTER

DEPARTMENT
HOSPITAL
UNIVERSITY
HOST COUNTRY
HOST ORGANISATION
PERIOD

NATIONAL EXCHANGE OFFICER

medical students

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HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

Richard Derman, MD, MPH
Associate Provost, Global Affairs
Director, Global Health Research
Professor, Obstetrics & Gynecology

1020 Walnut Street, Suite 518
Philadelphia, PA 19107
T. 215-955-2153
F. 215-503-4026

April 5, 2019

Ms. Kiranmayi Vuthaluru
18-51 Gopal Nagar,
Hanumanpet, Malkajgiri,
Hyderabad 500047
Andhra Pradesh, India

Dear Ms. Vuthaluru,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

We have designed a robust and well-aligned curriculum for your time here at Thomas Jefferson University. Parth Lalakia (parth.lalakia@jefferson.edu) will be your main point of contact.

Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

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Dr. V.A.Kothiwale
Registrar
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Philadelphia, PA 19107
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F. 215-503-4026

April 5, 2019

Mr. Pranav Adhyapak
H. No. 863, Acharya Galli,
Shahapur
Belagavi 590003
Karnataka India

Dear Mr. Adhyapak,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

Dr. V.A.Kothiwale
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F. 215-503-4026

April 5, 2019

Mr. Cordeiro Kurt Sydney Francis
Flat No. 304, Classic Heights Apartments,
Ayodhya Nagar,
Belagavi 590003
Karnataka India

Dear Mr. Kurt,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Should you require any further information, please do not hesitate to contact me.

Sincerely,

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Thomas Jefferson University

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April 5, 2019

Ms. Shreya Anil Patted
Plot No. 664, Sector No. 5
"Sanskriti" Shree Nagar, MM Extension,
Belagavi 590016
Karnataka India

Dear Ms. Patted,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
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Professor, Obstetrics and Gynecology
Thomas Jefferson University

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April 5, 2019

Ms. Tanvi D Gizare
'Janani', H. No. 4,
Havelock Road, Camp,
Belgavi 590010 Karnataka India

Dear Ms. Gizare,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

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Professor, Obstetrics & Gynecology

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April 5, 2019

Ms. Nischita M Bellad
CTS No. 9282/11 & 12,
Opp. SBI Shivabasav Nagar Branch,
Ashok Nagar Extension,
Belgavi 590010
Karnataka India

Dear Ms. Bellad,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
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Professor, Obstetrics and Gynecology
Thomas Jefferson University

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Belagavi-590 010,Karnataka

KAHER K.L.E.VK Institute of Dental Sciences, Belagavi

Department of Orthodontics & Dentofacial Orthopaedics

PG exchange program

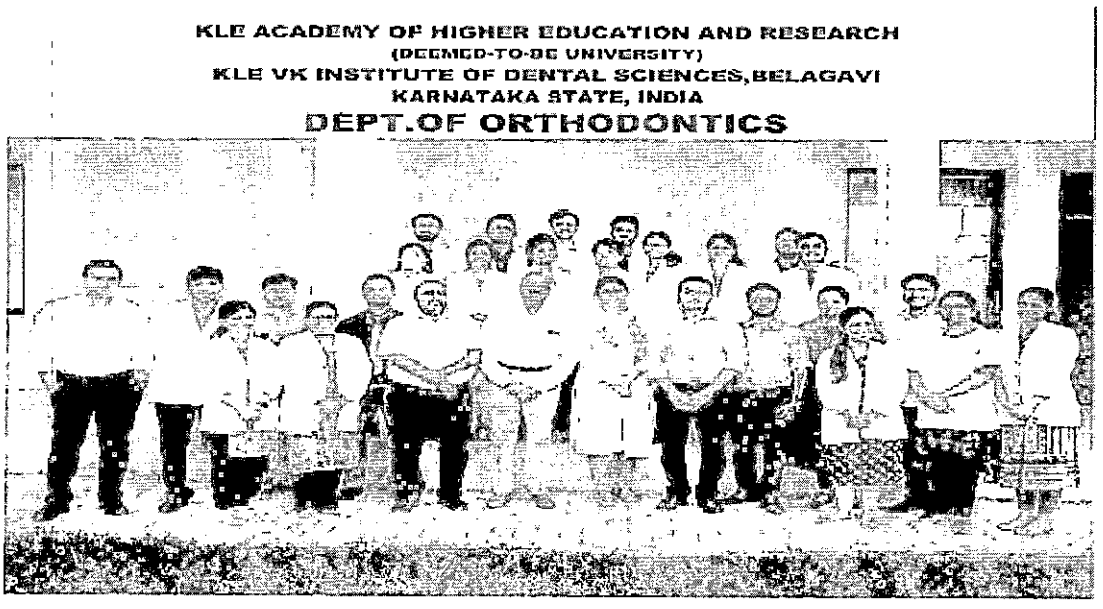
There was a student exchange program conducted from 28th November 2019 to 20th December 2019 this year by the Vishwanath Katti Institute of Dental Sciences KAHER university, Belgaum and the DJ college of Dental Sciences and Research, Gaziabad.

Three undergraduate final year students participated in this program- BabitaVerma, Monojit Dutta and Venkat Reddy

The programs which were conducted by the faculty are – lectures on the orthognathic surgery which included the diagnosis of the cases, objectives of treatment planning, treatment plan and its execution.

The students were allowed to observe various cases that came to our department and surgeries performed such as the bijaw surgery, implant placement etc

Various Seminars were conducted by the participants on Temporary Anchorage Devices, Bioprogressive Therapy and Orthognathic Surgery.



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KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

From: **principal kledental-bgm.edu.in** <principal@kledental-bgm.edu.in>
Date: Fri, 18 Oct, 2019, 16:09
Subject: Re:
To: Dr. Reena R. Kumar <djdental2014@gmail.com>
Cc: K M Keluskar <drkeluskar@gmail.com>, Dr. Rupa Jatti <rupa_md9@rediffmail.com>

Dear Dr Reena

This is to inform you, that we shall be happy to have your three final year postgraduate students of Orthodontics and Dentofacial Orthopaedics for an exchange programme to our institute. I had informed Dr Keluskar and Dr Roopa Jatti to prepare an academic calendar and time table for 20 to 25 days of stay of your students in our campus. I am sure this exchange programme shall be academically beneficial not only for your students, but for our students too.

Forward the details of PG students who shall be visiting our institute, with their full name, address and contact numbers.
The hostel facilities can be made available for the students. The tariff are as follows: i) Rs 2500/- per person for one month stay in double occupancy room **with** attached washroom, ii) Rs 2170/- per person for one month stay in double occupancy room **without** attached washroom. The mess charges shall be additional. For any further information regarding accommodation please ask PG students to contact Dr Prashant Karni on 9986497005 or on 08312444121.

Looking forward for this academic exchange.

Warm regards
Dr Alka Kale MDS, Ph.D
Principal
KLE VK Institute of Dental Sciences

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

On Mon, Oct 14, 2019 at 12:25 PM Dr. Reena R. Kumar <orgents2014@gmail.com> wrote:

Dear Dr. Alka,

Greetings!

Thank you for consenting to my request for academic exchange of postgraduate residents of orthodontics to KLE Belgaum. I am looking forward to deputing 3 students of Final year MDS for a period of 20 – 30 days. This exchange will enrich the learning experience of my students in interdisciplinary approach for CLP & orthognathic management of cases.

I request for hostel accommodation with use of mess facility on payment for them during the exchange program. The students will abide by the rules and regulations of the institution during their stay at KLE Belgaum. While they learn immensely by interaction with faculty and peer group, they will give back by being contributing members to the learning group by their team work, dedication and discipline.

The students will be attending the 54th IOC at Bhubaneshwar till 24th November. They could plan to leave for KLE Belgaum from Bhubaneswar directly.

I look forward to this win-win situation which will enhance the process of education

With kind regards,

Dr. REENA R. KUMAR
Principal & Dean
Divya Jyoti College of Dental Sciences & Research
Professor & HOD
Orthodontics & Dentofacial Orthopedics
Tel.: 01232-250883
+91-9811091415

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

B. V. V. Sangha's
P. M. N. M. DENTAL COLLEGE & HOSPITAL,
BAGALKOT - 587 101.
Karnataka State, INDIA
Affiliated to Rajiv Gandhi University of Health Sciences, Bangalore
and Recognised by Dental Council of India, New Delhi.

DEPARTMENT OF PEDODONTICS

☎ : 08354-220435 Extn 208, Fax : 221960
Website : dentalcollegebagalkot.org E-mail : bgkdentalcollege@rediffmail.com

To.

DATE : Date: 16-01-2019

Dr. Shivayogi Hugar
Professor & Head,
Department of Pediatric & Preventive Dentistry,
KLE V. K. Institute of Dental Sciences,
Belagavi.

Subject: Attendance certificate and regarding Post-Graduate and Faculty Exchange Programme

Respected Sir,

With respect to the above mentioned subject, I hereby certify that as per the MOU in regard to the Post-Graduate and Faculty Exchange Programme scheduled in the Department of Pediatric and Preventive Dentistry, P. M. N. M. Dental College and Hospital, Navanagar, Bagalkot on Wednesday, 16th January, 2019, the following faculty members and post-graduate students have attended the demonstration on transitional implants and the curriculum in the department:

1. Dr. Shweta Kajjari, Lecturer
2. Dr. Priya Meharwade, Lecturer
3. Dr. Madhura M, Post-Graduate Student
4. Dr. Shreyas Shah, Post-Graduate Student

I also kindly request you to chart out a schedule for us so that we can send our Post-Graduate students and faculty members for the same.

Thanking you,

Yours Faithfully,
16/01/19
Dr. Shivaprakash P. K.
Professor & Head,
Dept. of Pediatrics & Preventive Dentistry.

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

B. V. V. Sangha's

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BAGALKOT - 587 101.

Karnataka State, INDIA

Affiliated to Rajiv Gandhi University of Health Sciences, Bangalore
and Recognized by Dental Council of India, New Delhi.

DEPARTMENT OF PEDODONTICS.

☎ 08354-220455 Extn 206, Fax 221960

Website : dentalcollegebagalkot.org E-mail : bgkdentalcollege@rediffmail.com

To,

DATE : Date: 16-01-2019

Dr Shivayogi Hugar

Professor & Head,

Department of Pediatric & Preventive Dentistry,

KLE VK Institute of Dental Sciences,

Belagavi.

Subject: Attendance certificate and regarding Post-Graduate and Faculty Exchange Programme

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3. Dr. Madhura M, Post-Graduate Student
4. Dr. Shreyas Shah, Post-Graduate Student

I also kindly request you to chart out a schedule for us so that we can send our Post-Graduate students and faculty members for the same.

[illegible]

Yours Faithfully

16/01/19

Dr. Shivaprakash P. K.
Professor & Head,
Dept. of Pediatrics & Preventive Dentistry,
[illegible]

ATTESTED.

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

UNIVERSIDADE FEDERAL DE SANTA CATARINA
CENTRO DE CIÊNCIAS DA SAÚDE
CEP.: 88040-900 - FLORIANÓPOLIS –
SANTA CATARINA-BRASIL
Fone. (048) 3721-4910
nfr.ufsc.br
enfermagem.ufsc.br

Florianópolis, April 12th 2019.

Dear Dr B.S. Prasad Principal,

KAHER's Shri BMK Ayurveda Mahavidyalaya

Greetings to Your Excellency Mr. Dr B.S. Prasad

I recommend Mrs. Adriane Mocker Novaes, enrolled regularly under the number 15150430 in the Undergraduate Nursing Course of the Federal University of Santa Catarina (Brazil), for an extracurricular internship in Ayurvedic Internship Unit of KLE University, Belgaum, Karnataka-India. Mrs Adriane had shown and currently demonstrates a good academic performance, involved with dedication in the activities throughout the course, with initiative and interest in research. She has abilities to work in team and shows enthusiam in learning. I do declare that she had achieved a nice performance in the disciplines carried out throughout the course. Since the beginning of the Course, the student has shown an interest in Traditional Health Care Systems, Ayurveda being her main focus. The Ayurveda system is not avaiable in the Brazil health system, and that is why I recommend the academic to the extracurricular internship at KLE University in the Ayurveda department.

Best regards,

Professor Jeferson Rodrigues
Coordenador do Curso de Graduação em Enfermagem UFSC

JEFERSON RODRIGUES
Coordenador do Curso de
Graduação em Enfermagem - CCS/UFSC
Portaria 1604/2017/GR

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

94

NATIONAL INSTITUTE OF MENTAL HEALTH AND
NEURO SCIENCES (NIMHANS)
(INSTITUTE OF NATIONAL IMPORTANCE)
BENGALURU - 560 029

Certificate

This is to certify that Mr./Ms. UNNATI SHETTY

a student of KAHER INSTITUTE OF PHYSIOTHERAPY

has undergone CLINICAL TRAINING

from 01.03.2019 *to* 31.03.2019

Chief Physiotherapist

Medical Superintendent

This certificate is issued to the candidate after completion of posting / training mentioned. It is not a qualification and this certificate should not be used by the candidate for career advancement.

Dr. V A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH AND NEURO SCIENCES (NIMHANS)

(INSTITUTE OF NATIONAL IMPORTANCE)

BENGALURU - 560 029

PHYSIOTHERAPY

Certificate

This is to certify that Mr./Ms. VRUSHALI BHORE

a student of KAHER INSTITUTE OF PHYSIOTHERAPY

has undergone CLINICAL TRAINING

from 01.03.2019 *to* 31.03.2019

Chief Physiotherapist
Dr. PRADNYA DHARGAVE
Ph.D. in Neuro Rehabilitation, FIAP
Chief Physiotherapist
Physiotherapy Centre
NIMHANS, Bengaluru-560 02

Medical Superintendent

This certificate is issued to the candidate after completion of posting / training mentioned. It is not a qualification and this certificate should not be used by the candidate for career advancemen

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH AND
NEURO SCIENCES (NIMHANS)
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BENGALURU - 560 029

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Chief Physiotherapist

Medical Superintendent

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Dr. V.A Kotniwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi 590 010, Karnataka

97

NATIONAL INSTITUTE OF MENTAL HEALTH AND NEURO SCIENCES (NIMHANS)

(INSTITUTE OF NATIONAL IMPORTANCE)

BENGALURU - 560 029

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Certificate

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Chief Physiotherapist
Dr. PRADNYA DHARGAVE
Ph.D. in Neuro Rehabilitation, FIAP
Chief Physiotherapist
Physiotherapy Centre
NIMHANS, Bengaluru-560 029.

Medical Superintendent

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ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

TATA MEMORIAL CENTRE

Certificate

TATA MEMORIAL HOSPITAL CERTIFIES THAT

DR Anushka Pillai

HAS SATISFACTORILY COMPLETED CLINICAL OBSERVERSHIP / TRAINING

IN THE DEPARTMENT OF Physiotherapy

FROM 02 / 05 / 2019 TO 31 / 05 / 2019

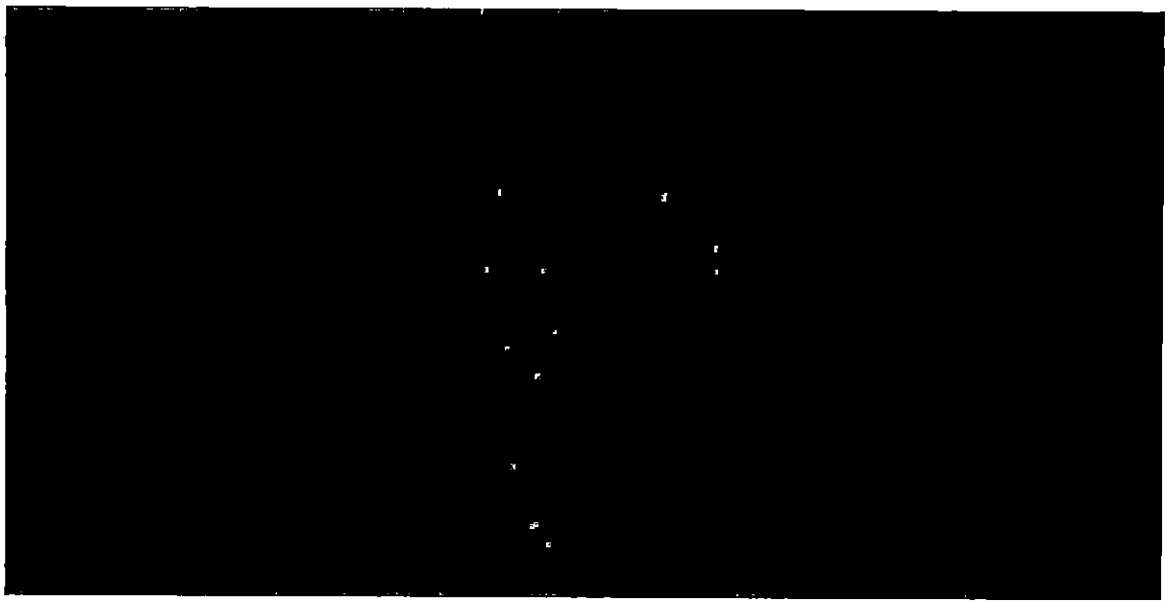
Authorized signatory
Observer Cell

Head of Unit / Department

Director Academics

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka



TATA MEMORIAL CENTRE

Certificate

TATA MEMORIAL HOSPITAL CERTIFIES THAT

DR. Priyanka Sagarookar

HAS SATISFACTORILY COMPLETED CLINICAL OBSERVERSHIP / TRAINING

IN THE DEPARTMENT OF Physiotherapy

FROM 02 / 05 / 2019 TO 05 / 2019

Authorized signatory
Observer Cell

Head of Unit / Department

Director Academics

Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

सत्यमेव जयते

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Government of Karnataka

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Certificate No.	:	IN-KA60496465982241Q
Certificate Issued Date	:	23-May-2018 12:01 PM
Account Reference	:	SHCIL (FI)/ ka-shcil/ SHCIL BELGAUM/ KA-BL
Unique Doc. Reference	:	SUBIN-KAKA-SHCIL658972683518430
Purchased by	:	KAHER INSTITUTE OF NURSING SCIENCES BELAGAVI
Description of Document	:	Article 4 Affidavit
Description	:	MEMORANDUM OF UNDERTAKING
Consideration Price (Rs.)	:	0 (Zero)
First Party	:	KAHER INSTITUTE OF NURSING SCIENCES BELAGAVI
Second Party	:	DEBRE BERHAN UNIVERSITY DEBRE BERHAN ETHIOPIA
Stamp Duty Paid By	:	KAHER INSTITUTE OF NURSING SCIENCES BELAGAVI
Stamp Duty Amount(Rs.)	:	100 (One Hundred only)

Authorised Signatory
For Stock Holding Corporation of India Ltd
No.1, Basavakrupa, Opp. Civil Hospital
Near Hansraju Super Market,
Club Road, BELGAUM 590001

Please write or type below this line

MEMORANDUM OF UNDERSTANDING

Between

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

A deemed to be university under u/s 3 of the UGC Act, 1956 vide
Government of India notification No. 9-19/2000-U.3A
Belagavi, Karnataka, India

AND

DEBRE BERHAN UNIVERSITY, Debre Berhan, Ethiopia

DBU established under the Federal Democratic Republic of Ethiopia,
Proclamation No. 691/2010, and
Article 5 (1) of the higher education proclamation No. 650/2009.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

MEMORANDUM OF UNDERSTANDING

Between

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

A deemed to be university under u/s 3 of the UGC Act, 1956 vide
Government of India notification No. 9-19/2000-U.3A
Belagavi, Karnataka, India

AND

DEBRE BERHAN UNIVERSITY, Debre Berhan, Ethiopia

DBU established under the Federal Democratic Republic of Ethiopia,
Proclamation No. 691/2010, and
Article 5 (1) of the higher education proclamation No. 650/2009.

The KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH (KAHER) Belagavi, Karnataka, India and Debre Berhan University, Debre Berhan Town, Ethiopia recognised the benefits to their respective universities from the establishment of collaborations and proceed to have a Memorandum of Understanding (MoU). Both the independent institutions are committed to mutual and common goals of generating new knowledge towards improvement of science to betterment of the society we serve.

PREAMBLE

KAHER, being the centre of excellence has been positioned as the 3rd Best University at State Level among the Universities in Karnataka by Karnataka State Universities Ranking Framework (K-SURF) and 14th rank among all Indian Universities under Teaching Learning & Resources (TLR) category. The University adjudged as the fourth cleanest campus in the country in a contest organized by the Ministry of Human Resource Development. The University is re-accredited with "A" grade by NAAC in 2015 and is placed in category "A" by MHRD, Govt. of India

The Institute of Nursing Sciences was established in May 1987 and recognized as one of the top institution in India. All the courses offered by institution are recognized by apex bodies like Indian Nursing Council, Karnataka Nursing Council and Govt. of Karnataka. The institution attached to the own parent hospital i.e. KLES Dr.Prabhakar Kore Hospital & MRC with 2400 bed strength and 256 ICU beds accredited with NABH safe 'I' & NABL accredited laboratories, KLES Belgaum Cancer Hospital & KLES Centenary Charitable Hospital.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

PREAMBLE of DBU

Debre Berhan University, which is a 10 year young university, was established in the 600 years old historical town- Debre Berhan – a town situated in North Shoa Zone, Amhara Region. It is 130 km away from Addis Ababa in the north. The foundation stone was laid down on 9th May 2005 G.C by her Excellency w/ro Genet Zewdie, the then Minister of Ministry of Education of the Federal Democratic Republic of Ethiopia. DBU stood 3rd in 2015, 1st in 2016, and 2nd in 2017 among the second generation universities, for its overall activities in the teaching-learning activities, research and community service. For the achievements done so far, certificates were given to the University for recognition of excellence form the Ministry of Education.

The enrolment has significantly increased to about 30,000 regular, extension, summer, and distance students who joined into 49 departments in the undergraduate /programs under 10 colleges, 2 institutes and on 34 post graduate programs, along with 2 PhD programs. Currently, the university is staffed with around 1262 (first degree to third degree) academic staffs (about 480 are on study leave), about 1154 administrative staffs including technical workers. The institute of Medicine and Health Science comprises medicine and health Science College. The institute was set up in 2008, and it has medicine, nursing, health officer, midwifery, anaesthesia, surgical nursing, paediatries' nursing, neonatal nursing programs, and master in public health.

PURPOSE / OBJECTIVE

The Primary purpose of this MoU is to **forge partnership so as to strengthen/complement one another in their efforts to deliver quality services in their areas of mandates and common interventions.**

The MoU shall formerly set out the term of cooperative relationship between the parties establish their respective roles and facilitate the function of each party in relation to collaborative research.

Both universities s agree to develop collaborative activities in academic areas of mutual interest and as equal partners with reciprocity. All educational events are expected to reflect the faculty member's areas of research and expertise.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

The development and implementation of specific activities based on this MoU shall be negotiated and agreed between individual faculty members through the Deans or Heads of Department.

The MOU is agreed on the basis of cooperation between the Universities and includes, but not limited to the following options:

1. Elective placement and exchanges of faculty and students
2. Co-author and collaborate in areas of research interest and community services
3. Conducting colloquiums, conferences, symposiums, workshops and seminars, etc.
4. Strengthen academic areas, namely nursing, midwifery, and public health practices by organization of hands on skill training programs
5. Exchange of academic/research information and related materials to facilitate joint publications by collaborating faculty members
6. Exchange of academic information, publications, best practices, pedagogical materials, library and documentations, etc.
7. Promoting any related academic activities based on mutual agreement
8. Any other collaborative efforts as may be determined by both parties.

Responsibilities of KAHER Institute of Nursing Sciences, Belagavi, Karnataka, India and Debre Berhan University, Debre Berhan Town, Ethiopia will:

1. Arrange local logistics and local travel, during student and faculty exchange program
2. Arrangement of food and accommodation for students and faculty within minimal cost
3. Coordinating with resource persons and participating Institution.
4. Providing technical inputs in all phases of MOU.
5. Flight costs will not be provided to faculty and students.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

TERMS OF AGREEMENT

Both Universities agreed to carry out the above mentioned activities in accordance with laws and regulations of respective countries after full consultation and approvals.

The term of this agreement shall be valid for the period of three years commencing from the date of signature hereof. The agreement can be extended for further terms on mutual agreement. This agreement may be terminated by giving 6 months prior notice from either parties.

In this witness whereof, the parties have excluded this documented on May 2018

Registrar
KLE Academy of Higher Education and Research
Belagavi, Karnataka, India

Witness 1: Sudha

Dean, Faculty of Nursing
Principal, Institute of Nursing Sciences,
KAHER, Belagavi

Dean, Faculty of Nursing & Principal
Institute of Nursing sciences, KAHER
Belagavi, Karnataka, India

Academic Vice President
Hailemariam Birke Tandarge (PhD)
Dr. Hailemariam Birke
Academic Vice President of
Debre Berhan University
Ethiopia

Witness 1:

Dr. Seid Mohammed, Ph.D.
Director of Foreign & Public Relations
Directorate

Dr. Seid Mohammed
Foreign & Public Relations
Director

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

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Government of Karnataka

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Certificate No.	:	IN-KA55028949384 69Q
Certificate Issued Date	:	15-May-2018 12:05 PM
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Purchased by	:	KAHER INSTITUTE OF NURSING SCIENCES BELAGAVI
Description of Document	:	Article 12 Bond
Description	:	MEMORANDUM OF UNDERSTANDING
Consideration Price (Rs.)	:	0 (Zero)
First Party	:	KAHER INSTITUTE OF NURSING SCIENCES BELAGAVI
Second Party	:	CHITWAN MEDICAL COLLEGE SCHOOL NSG CHITWAN NEPAL
Stamp Duty Paid By	:	KAHER INSTITUTE OF NURSING SCIENCES BELAGAVI
Stamp Duty Amount(Rs.)	:	100 (One Hundred only)

Authorised Signatory
For Stock Holding Corporation of India Ltd
No.1, Basavakrupa Opp Civil Hospital
Near Hanuman Super Market,
Club Road BELGAUM- 590001

Please write or type below this line

MEMORANDUM OF UNDERSTANDING

Between

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

A deemed to be university under u/s 3 of the UGC Act, 1956 vide Government of India notification No. 9-19/2000-U.3A

Belagavi, Karnataka, India

AND

CHITWAN MEDICAL COLLEGE, SCHOOL OF NURSING,

[Affiliated to Tribhuvan University], Kailashnagar, Bharatpur 5, Chitwan, Nepal

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

MEMORANDUM OF UNDERSTANDING

Between

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH

A deemed to be university under u/s 3 of the UGC Act, 1956 vide
Government of India notification No. 9-19/2000-U.3A
Belagavi, Karnataka, India

AND

CHITWAN MEDICAL COLLEGE, SCHOOL OF NURSING,

[Affiliated to Tribhuvan University], Kailashnagar, Bharatpur 5, Chitwan, Nepal

The KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH (KAHER) Belagavi, Karnataka, India and CHITAWAN MEDICAL COLLEGE SCHOOL OF NURSING, (Affiliated to Tribhuvan University), Kailashnagar, Bharatpur 5, Chitwan, Nepal, recognised the benefits to their respective universities from the establishment of collaborations and proceed to have a memorandum of understanding (MoU). Both the independent institutions are committed to mutual and common goals of generating new knowledge towards improvement of science to betterment of the society we serve.

PREAMBLE

KAHER. being the centre of excellence has been positioned as the 3rd Best University at State Level among the Universities in Karnataka by Karnataka State Universities Ranking Framework (K-SURF) and 14th rank among all Indian Universities under Teaching Learning & Resources (TLR) category. The University adjudged as the fourth cleanest campus in the country in a contest organized by the Ministry of Human Resource Development. The University is re-accredited with "A" grade by NAAC in 2015 and is placed in category "A" by MHRD, Govt. of India

The Institute of Nursing Sciences was established in May 1987 and recognized as one of the top institution in India. All the courses offered by institution are recognized by apex bodies like Indian Nursing Council, Karnataka Nursing Council and Govt. of Karnataka. The institution attached to the own parent hospital i.e. KLES Dr.Prabhakar Kore Hospital & MRC with 2400 bed strength and 256 ICU beds accredited with NABH safe 'I' & NABL accredited laboratories, KLES Belgaum Cancer Hospital & KLES Centenary Charitable Hospital.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

PREAMBLE of CMC

Chitwan Medical College (CMC) is situated in the heart of Chitwan District, Nepal. It was established in the year 2006. CMC is built over an area of 20 biga of land in Kailashnagar (approx. 8kms from city). The parent hospital is situated in Bharatpur city which is built as per international guidelines and achieved Best Teaching Hospital by ISO.

The School of Nursing Sciences was established in October 2006 under the affiliation to Tribhuvan University, Nepal and Nepal Nursing Council. The school started initially with PBBN program and then went on to start B.Sc. Nursing and Master Nursing programs subsequently. The institution attached to the own parent hospital i.e. Chitwan Medical College Teaching Hospital with 751 bed strength recognized by ISO 2001 certification.

The respective universities jointly recognize this MoU to mutually cooperate in the area of Health Education and Research including allied health sciences.

PURPOSE / OBJECTIVE

The Primary purpose of this MoU is for the **development of ongoing framework for student and staff elective placement and exchange program to promote effective, safe, skillful & knowledgeable nursing practice.**

The MoU shall formerly set out the term of cooperative relationship between the parties establish their respective roles and facilitate the function of each party in relation to collaborative research.

Both universities s agree to develop collaborative activities in academic areas of mutual interest and as equal partners with reciprocity. All educational events are expected to reflect the faculty member's areas of research and expertise.

The development and implementation of specific activities based on this MoU shall be negotiated and agreed between individual faculty members through the Deans or Heads of Department.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

The MOU is agreed on the basis of cooperation between the Universities and includes, but not limited to the following options:

1. Elective placement and exchanges of faculty and students
2. Co-author and collaborate in areas of research interest
3. Conducting colloquiums
4. Strengthen midwifery practices by organization of hands on skill training programs
5. As a pathway to Ph.D program – By facilitating student from Chitwan Campus to pursue Ph.D at KAHER campus.
6. Exchange of academic/research information and related materials to facilitate joint publications by collaborating faculty members
7. Promoting any related academic activities based on mutual agreement

Responsibilities of KAHER Institute of Nursing Sciences, Belagavi, Karnataka, India and Chitwan Medical College School of Nursing, [Affiliated to Tribhuvan University], Kailashnagar, Bharatpur 5, Chitwan, Nepal will:

1. Arrange local logistics and local travel, during student and faculty exchange program
2. Arrangement of food and accommodation for students and faculty within minimal cost
3. Organizing the lectures and clinical placements for students
4. Coordinating with resource persons and participating Institution.
5. Providing technical inputs in all phases of MOU.
6. Flight costs will not be provided to faculty and students.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

TERMS OF AGREEMENT

Both Universities agreed to carry out the above mentioned activities in accordance with laws and regulations of respective countries after full consultation and approvals.

The term of this agreement shall be valid for the period of three years commencing from the date of signature hereof. The agreement can be extended for further terms on mutual agreement. This agreement may be terminated by giving 6 months prior notice from either parties.

In this witness whereof, the parties have excluded this documented on May 2018

Registrar
KLE Academy of Higher Education and Research
KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI.

Prof. Dr. Harishchandra Nepane
Chairman & Managing Director
Chitwan Medical College
Bharatpur, Nepal

Witness 1:

Dean, Faculty of Nursing & Principal
Institute of Nursing Sciences, KAHER
Belagavi, Karnataka, India
KAHER, BELAGAVI

Witness 1:

Mr.Siddeshwar Angadi
Vice Principal & Associate Professor
School of Nursing
Bharatpur, Nepal.

VICE CHANCELLOR
KLE Academy of Higher Education and Research, BELAGAVI

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

INTRODUCTION

As a part of MoU between KAHER Institute of Nursing Sciences and Chitwan Medical College School of Nursing, we the students of M. Sc. Nursing 2nd year students got an opportunity to visit Chitwan Medical College School of Nursing. Under student exchange programme, total 13students of final year M. Sc. Nursing got participated.

We were posted in CMC for two weeks from 01/04/2019 to 13/04/2019. We went Nepal by bus and train. We left Belagavi on 28/03/2019 and reached Nepal on 31/03/2019. Transportation facility was provided by CMC from the boarder of Nepal.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed-to-be-University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category "A" by MHRD (GoI)
DEPARTMENT OF E.N.T & HEAD AND NECK SURGERY
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Extn. No:4094, 4072

Ref/ENT/ Date: 15/02/2019

To,
Dr.H.Vijayendra
Director,
Vijaya ENT Care Centre,
Bangalore.

(Through Proper Chanel)

Respected Sir,

As a part of KAHER requirements following Postgraduate students in ENT (MS) are posted to your Hospital as stipulated by KAHER, from **June 2019 to May 2020**. They will be under your guidance for the purpose of training.

Kindly monitor their learning progress & give the completion certificate at the end of the posting.

S.No	Name of the students	Month
1.	Dr. Keshavi	16.07.2019- to 30.07.2019
2.	Dr.Manasi B Manure	01-07-2019 to 15-07-2019
3.	Dr.Paramita Debnath	16.08.2019- to 31.08.2019
4.	Dr.Anshika Anand	01.08.2019- to 15.08.2019
5.	Dr. TVRK Prasad	16.09.2019- to 30.09.2019
6.	Dr.Akriti	01.09.2019- to 15.09.2019
7.	Dr.Indresh Chandra	16-10-2019 to 31-10-2019
8.	Dr. Vijay Y	01-10-2019 to 15-10-2019
9.	Sindhu N	01-11-2019 to 15-11-2019
10.	Dr.Padmavathy O	16.12.2019- to 31.12.2019
11.	Dr.Reshma Susan	1.1.2020- 15.1.2020

Thanking you,

Yours faithfully,

Dr. A.S. Harugop
Professor & Head,
Dept. of ENT & HNS,
J.N.Medical College, Belgaum

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed-to-be-University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category "A" by MHRD (GoI)
DEPARTMENT OF E.N.T & HEAD AND NECK SURGERY
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Extn. No:4094,4072

Ref/ENT/ Date: 15/02/2019

To,
The Director,
All India Institute of Speech & Hearing,
Mysore.

(Through Proper Chanel)

Respected Sir,

As a part of KAHER requirements following Postgraduate students in ENT (MS) are posted to your Hospital as stipulated by KAHER, from **June 2019 to May 2020**. They will be under your guidance for the purpose of training.

Kindly monitor their learning progress & give the completion certificate at the end of the posting.

S.No	Name of the students	Month
1.	Dr. Keshavi	01st to 15th July 2019
2.	Dr.Manasi B Manure	16th to 30th July 2019
3.	Dr.Paramita Debnath	01st to 15th August 2019
4.	Dr.Anshika Anand	16th to 31st August 2019
5.	Dr. TVRK Prasad	01st to15th September 2019
6.	Dr.Akriti	16th to 30th September 2019
7.	Dr.Indresh Chandra	01st to 15th October 2019
8.	Dr. Vijay Y	16th to 31st October 2019
9.	Sindhu N	16th to 30th November 2019
10.	Dr.Padmavathy O	01st to15th December 2019
11.	Dr.Reshma Susan	6th to 31st December 2019

Thanking you,

Yours faithfully,

Dr. A.S. Harugop
Professor & Head,
Dept. of ENT & HNS,
J.N.Medical College, Belgaum

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

JAWAHARLAL NEHRU MEDICAL COLLEGE

(A constituent unit of KLE Academy of Higher Education & Research Deemed-to-be University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category "A" by MHRD (GoI)
Nehru Nagar, Belagavi-590 010, Karnataka-India

Website : http/www.jnmc.edu
E-Mail : Principal@jnmc.edu

☎ Office :+91-(0)831 2471350
FAX :+91 (0)831-2470759

Ref. No. : MNC/PG/888

Date : 03/06/2019

To,

The Administrative Officer (A& E),
National Institute of Mental Health & Neurosciences,
Bangalore-560 029.

Sub: Request for Permission to undergo training.
Ref :Letter No. NIMH:A&E:TM:TRG-NEURO :2019/194 dated 12-02-2019.

Sir,

With reference to the above, this is to bring to your kind notice that, we thank you very much for considering our request and permitting our D.M. (Neurology) students to undergo training at your institution.

However, as per your letter, students have to attend their postings during 01-03-2019 to 30-04-2019. But unfortunately we received the letter late due to postal delay. Hence we request you to kindly allot new dates to the following students of our Institution and confirm the same well in advance, and also by email to the email id principal@jnmc.edu

So kindly consider our request and give our students future dates. Hence, we request you to kindly permit us to post the students as under.

Name of the Student	Period	Name of the Posting
1. Dr. Siddharth Singh	One month	Neurology
2. Dr. Shilpa.	15 days	Neuropathology
	15 days	Clinical Psychology (Neuropsychology

We once again request you to kindly consider our request and allot a new dates to our above students.

Thanking you,

Yours faithfully,

PRINCIPAL,
J. N. MEDICAL COLEGE, BELAGAVI.

Copy to : 1. The Hon'ble Vice Chancellor, National Institute of Mental Health & Neurosciences, Bangalore-560 029 for information.

2. The Professor & Head Department of Neurology, J. N. Medical College, Belagavi.

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH & NEUROSCIENCES
(INSTITUTE OF NATIONAL IMPORTANCE) BENGALURU - 560 029

NIMH:A&E:TM:TRG-NEURO:2019/857 Date: 27.06.2019

The Principal
Jawaharlal Nehru Medical College
Nehru Nagar, Belagavi – 590 010

Sir/Madam,

Sub: Request for Permission to undergo training at this institute – reg.
Ref: Your letter dated 03.06.2019

* * * * *

With reference to the above, I am directed to convey the permission of the Competent Authority for the students of your institute to undergo training at this Institution as follows:

1	Number of trainees	02
2	Name of the trainees	**Dr. Siddharth Singh** **Dr. Shilpa**
3	Department at which training permitted	**Duration**
	Neurology	01.08.2019 to 31.08.2019
	Neuropathology	01.02.2020 to 15.02.2020
	Clinical Psychology (Neuropsychology)	01.09.2019 to 15.09.2019
4	Training fee	Rs.10,000/- per month or part thereof per trainee

***Note:** Permission is subject to written assurance by Director/Dean/Principal/HOD of the above mentioned college/university that all the students who are posted will attend activity/duties of Neurology department everyday as per the timings of the department and will not take any planned leave during the period of posting.*

- The trainees should compulsorily carry their college ID cards while posted at NIMHANS
- One stamp size photo should be given at the time of joining for issue of temporary ID card. (ID card should be returned at the end of training without fail)
- Trainees should carry a copy of this letter without fail.
- ***The training fee for the whole duration of training has to be paid by Debit/Credit Card on the day of joining. The training fee once paid will not be refunded.***

I am also directed to inform you that the visiting students/trainees should make their own arrangement for accommodation. However all efforts will be made to provide hostel accommodation, but this will be subject to availability, ***based on Manager, Hostel report (080-26995095)***/Supervisor, Cauvery Hostel, (080-26995092) as on the date of joining and on payment of charges as below. **Accommodation will not be provided to the candidates coming earlier than the scheduled date of training.**

1. **Hostel Rent:** Rs.100/- per day

NOTE: ***In case of any damage of assets/property in the Hostels i.e., movable and immovable property of NIMHANS by the trainees, the college shall be directly responsible for such act of the trainees. The loss incurred has to be borne by the Institution/College deputing the trainees. Further, the attendance certificate for training of such trainees will be withheld.***

On arrival, the trainees must contact the undersigned for further needful.

Yours faithfully

ADMINISTRATIVE OFFICER (A&E)
Administrative Officer (A & E)
National Institute of Mental Health
Neuro Sciences, Bangalore - 560 029

Copy to. The HOD of Neurology, NIMHANS
The HOD of Neuropathology, NIMHANS
The HOD of Clinical Psychology, NIMHANS
The Manager/Supervisor, NIMHANS Hostels, NIMHANS

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed-to-be-University)
JAWAHARLAL NEHRU MEDICAL COLLEGE
Belagavi – 590 010, Karnataka (India)

DEPARTMENT OF PATHOLOGY

JNMC Office: 0831 – 2471350
Phone: 0831-2473777- Extn. 4051 / 4052
FAX NO. 91- 0831- 2470759
Website : http/www.jnmc.edu
Email : patho@jnmc.edu
Email : jnmc@sancharnet.in

O/C

Date: 02/01/2019

To,

Dr. N. Jayaram,
Anand Diagnostics Laboratory,
Bengaluru.

J.N. Medical College Dept. of Pathology 07 14/1/2019

Subject: Posting of PG students from J.N.Medical College to Anand Diagnostic Laboratory, Bengaluru

Dear Dr. Jayaram,

I, request you to kindly permit the following PG students in Pathology (M.D) from J.N.Medical College, Belagavi to attend a posting at the Anand Diagnostic Laboratory for a period of 15 days in the month of October 2019. (16^{th} – 30^{th} October 2019).

The names of the PG students are as follows:

1. Dr. Fatima Maniyar
2. Dr. Mahwash Jamil
3. Dr. Rohit Chaurasia
4. Dr. Vishrut Shah

Thank you for your co-operation.

With kind regards

Dr. Ramesh Chavan
Professor and Head,
Department of Pathology,
J. N. Medical College, Belagavi- 590010

Professor & Head
Department of Pathology
J.N. Medical College
Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

116

O/C

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed-to-be-University)
JAWAHARLAL NEHRU MEDICAL COLLEGE
Belagavi – 590 010, Karnataka (India)

DEPARTMENT OF PATHOLOGY

JNMC Office: 0831 - 2471350
Phone: 0831-2473777- Extn. 4051 / 4052
FAX NO. 91- 0831 - 2470759
Website : http/www.jnmc.edu
Email : patho@jnmc.edu
Email : jnmc@sancharnet.in

Date: 02/01/2019

To,

Dr. N. Jayaram,
Anand Diagnostics Laboratory,
Bengaluru.

Subject: Posting of PG students from J.N.Medical College to Anand Diagnostic Laboratory, Bengaluru

Dear Dr. Jayaram,

I, request you to kindly permit the following PG students in Pathology (M.D) from J.N.Medical College, Belagavi to attend a posting at the Anand Diagnostic Laboratory for a period of 15 days in the month of October 2019, (16^{th} – 30^{th} October 2019).

The names of the PG students are as follows:

1. Dr. Fatima Maniyar
2. Dr. Mahwash Jamil
3. Dr. Rohit Chaurasia
4. Dr. Vishrut Shah

Thank you for your co-operation.

With kind regards

Dr. Ramesh Chavan
Professor and Head,
Department of Pathology,
J. N. Medical College, Belagavi- 590010

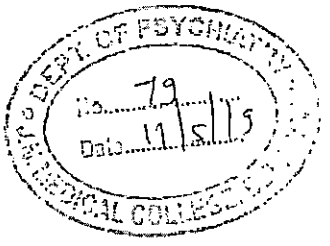
Professor & Head
Department of Pathology
J.N. Medical College
BELAGAVI

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

JAWAHARLAL NEHRU MEDICAL COLLEGE
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed – to be – University)
JNMC Campus, Nehru Nagar, Belagavi – 590 010, Karnataka, India
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
DEPARTMENT OF PSYCHIATRY
Website: http/www.jnmc.edu Email: dome@jnmc.edu domejnmc@sancharnet.in Dept.: 0831- 2473777 Ext. 1344, HOD: Ext. 1650

Date: 11.05.2019



From,

Dr. N. M. Patil M.D.,
Professor & Head
Department of Psychiatry
J. N. Medical College,
Belagavi-10.

To,

Administrative Officer (A & E)
National Institute of Mental Health & Neuro Science
Hosur Road, Bengaluru.- 560029

(Through Principal, J N Medical College, Belagavi)

Sub: Regarding the rotational posting of Psychiatry Post Graduate students to NIMHANS, Bengaluru.

Dear Sir,

As required by curriculum prescribed by our university, the post graduate students of Psychiatry department are posted to NIMHANS every year for a period of 45. days. We will be sending three Postgraduate students this year also, I request you to permit them to do their postings in NIMHANS. The details of the postings desired and the Postgraduate students are attached with this.

Kindly do the needful

Thanking You,

Yours Sincerely,

(Dr. N.M.Patil)
Dr. N. M. Patil
Professor & Head
Department of Psychiatry
J. N. Medical College
BELAGAVI-590010

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

JAWAHARLAL NEHRU MEDICAL COLLEGE
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed – to be – University)
JNMC Campus, Nehru Nagar, Belagavi – 590 010, Karnataka, India
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
DEPARTMENT OF PSYCHIATRY
Website: http/www.jnmc.edu Email: dome@jnmc.edu domejnmc@sancharnet.in Dept.: 0831- 2473777 Ext. 1344, HOD: Ext. 1650

From,

Dr. N. M. Patil M.D.,
Prof. & Head, Dept. of Psychiatry
J. N. Medical College, Belagavi-10.

Date: 11.05.2019

To,

Administrative Officer (A & E)
National Institute of Mental Health & Neuro Science
Hosur Road, Bengaluru. – 560 029

Sub: Rotation Posting of our Post Graduate Students in Psychiatry to NIMHANS, Bengaluru.

Respected Sir / Madam,

Department of Psychiatry of KAHER, J.N. Medical College, Belagavi is running Post Graduate course, M.D. (Psychiatry). As part of the curriculum students are posted during their rotation posting to NIMHANS Bengaluru. The postings are structured to give the students an exposure to these departments.

We thank you for permitting our students to be posted and trained in your esteemed institution since 2010.

We propose to send 3 post graduate students of Psychiatry this year also. I am providing below the details of the students and details of the training they are expected to undergo.

Proposed dates of posting: 16/08/2019 to 30/09/2019.

Name of the P.G. Students	1) Dr. Ankita Priydarshini	2) Dr. Dhruhin Grover	3) Dr. Shreyas Patil

Sl. No.	Details of the Posting	Duration	Proposed Period
1	Child Psychiatry	15 Days	16/08/2019 to 31/08/2019
2	Addiction Psychiatry / Medicine	10 Days	01/09/2019 to 10/09/2019
3	Behaviour Therapy & Biofeedback	10 Days	11/09/2019 to 20/09/2019
4	Forensic Psychiatry & Occupational / Rehabilitation Psychiatry	10 Days (5 Days Each)	21/09/2019 to 30/09/2019

I request you to permit them to do their rotation posting in NIMHANS as detailed above.

I am also sending a copy of this letter to the respective heads of the departments.

The students will pay the necessary fees and will abide by all the rules during the training. They may be given an attendance / completion certificate at the end of their posting by respective departments. We will appreciate an early confirmation/modification from you.

Thanking You,

Yours Sincerely,

(Dr N. M. Patil)
Professor & Head
Department of Psychiatry
J. N. Medical College
BELAGAVI-590 010

Principal
J.N. Medical College, Belagavi

Cc to:

The Director, National Institute of Mental Health & Neuroscience Hosur Road, Bengaluru.
Prof. & Head, Dept. of Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Child & Adolescent Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Addiction Psychiatry / Medicine, NIMHANS Bengaluru.
Prof. & Head, Dept. of Clinical Psychology, (Behaviour Therapy & Biofeedback), NIMHANS Bengaluru.
Prof. I/C of Forensic Psychiatry NIMHANS Bengaluru.
Prof. I/C of Occupational / Rehabilitation Psychiatry, NIMHANS Bengaluru.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH & NEUROSCIENCES
(INSTITUTE OF NATIONAL IMPORTANCE) BENGALURU - 560 029

NIMH:A&E:TM:TRG-PSY:2019/795 Date: 15.06.2019

The Professor and Head
Department of Psychiatry
Jawaharlal Nehru Medical College
A Constituent Unit of
KLE Academy of Higher Education and Research
JNMC Campus, Nehru Nagar
Belagavi – 590 010.

Sir/Madam,

Sub: Request for Permission to undergo training at this institute – reg.
Ref: Your letter dated 15.05.2019

* * * * *

With reference to the above, I am directed to convey the permission of the Competent Authority for the students of your Institution to undergo training at this Institution as follows:

1	Number of trainees	03
2	Name of the trainees	**Dr. Ankita Priydarshini and 02 others**
3	Department at which training permitted	Duration
	Child Adolescent Psychiatry Psychiatry (CAM) Clinical Psychology (BM Unit) Psychiatry (Forensic Psychiatry and psychiatric Rehabilitation)	16.08.2019 to 31.08.2019 01.09.2019 to 10.09.2019 11.09.2019 to 20.09.2019 21.09.2019 to 30.09.2019
4	Training fee	Rs.10,000/- per month or part thereof per trainee

- The trainees should compulsorily carry their college ID cards while posted at NIMHANS.
- One stamp size photo should be given at the time of joining for issue of temporary ID card. (ID card should be returned at the end of training without fail)
- Trainees should carry a copy of this letter without fail.
- ***The training fee for the whole duration of training has to be paid by Debit/Credit Card on the day of joining. The training fee once paid will not be refunded.***

I am also directed to inform you that the visiting student/trainee should make their own arrangement for accommodation. However all efforts will be made to provide hostel accommodation, but this will be subject to availability, ***based on Manager, Hostel report (080-26995095)***/**Supervisor, Cauvery Hostel, (080-26995092)** as on the date of joining and on payment of charges as below. **Accommodation will not be provided to the candidates coming earlier than the scheduled date of training.**

1. Hostel Rent: Rs.100/- per day

NOTE: ***In case of any damage of assets/property in the Hostels i.e., movable and immovable property of NIMHANS by the trainees, the college shall be directly responsible for such act of the trainees. The loss incurred has to be borne by the Institution/College deputing the trainees. Further the attendance certificate for training of such trainees will be withheld.***

On arrival, the trainees must contact the undersigned for further needful.

Yours faithfully

ADMINISTRATIVE OFFICER (A&E)

Copy to: The HOD of Child & Adolescent Psychiatry, NIMHANS
The HOD of Psychiatry, NIMHANS
The Manager/Supervisor, NIMHANS Hostels

HOD of Clinical Psychology

Administrative Officer (A & E)
National Institute of Mental Health & Neuro Sciences, Bangalore-560 029

ATTESTED

☎: 08026995015 Email: training@nimhans.ac.in Website : http://www.nimhans.ac.in

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

fective from1st April 2017 onwards:

The following points are to be observed when you are sending the request for training at this Institution.

- *The request letter(hard copy or soft copy of scanned letter) by post/email: training@nimhans.ac.in should reach the undersigned one month in advance to enable this office to process. Letters received with a shorter time span will not be entertained. Students coming with request letter without prior permission will not be entertained.*
- *Individual requests by the students not routed through their Institution/College will not be entertained.*
- *The department in which training is required at this Institution has to be clearly mentioned.*
- *Indicate the name of the student/students, date and duration of the training programme.*
- *For any queries related to training/visit, please call on working days between 2:30 pm and 4:00 pm only on 080-26995015.*

Revathi B K
ASST.ADMINISTRATIVE OFFICER(A&E)

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

JAWAHARLAL NEHRU MEDICAL COLLEGE
A Constituent Unit of
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JNMC Campus, Nehru Nagar, Belagavi – 590 010, Karnataka, India
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
DEPARTMENT OF PSYCHIATRY

Website: http/www.jnmc.edu
Email: dome@jnmc.edu domejnmc@sancharnet.in
Dept.: 0831- 2473777
Ext. 1344, HOD: Ext. 1650

DEPT. OF PSYCHIATRY J.N. MEDICAL COLLEGE, BELAGAVI
No. 75
Date: 16.05.20

From,

Dr. N. M. Patil M.D.,
Professor & Head
Department of Psychiatry
J. N. Medical College,
Belagavi-10.

To,

The Principal
J.N. Medical College,
Belagavi.

Sub: Regarding the rotational posting of Psychiatry Post Graduate students to NIMHANS. Bengaluru.

Dear Madam,

As per the curriculum prescribed by the University, the post graduate students of our department are posted to NIMHANS from 16/08/2018 to 30/09/2018 for a period of 45 days. (Details are mentioned in the letter attached).

Kindly do the needful

Thanking You,

Yours Sincerely,

(Dr. N.M.Patil)

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

JAWAHARLAL NEHRU MEDICAL COLLEGE
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed – to be – University)
JNMC Campus, Nehru Nagar, Belagavi – 590 010, Karnataka, India
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
DEPARTMENT OF PSYCHIATRY
Website: http/www.jnmc.edu Email: dome@jnmc.edu domejnmc@sancharnet.in Dept.: 0831- 2473777 Ext. 1344, HOD: Ext. 1650

From,

Dr. N. M. Patil M.D.,
Prof. & Head, Dept. of Psychiatry
J. N. Medical College, Belagavi-10.

Date: 16.05.2018

To,

Administrative Officer (A & E)
National Institute of Mental Health & Neuro Science
Hosur Road, Bengaluru. – 560 029

Sub: Rotation Posting of our Post Graduate Students in Psychiatry to NIMHANS, Bengaluru.

Respected Sir / Madam,

Department of Psychiatry of KAHER, J.N. Medical College, Belagavi is running Post Graduate course, M.D. (Psychiatry). As part of the curriculum students are posted during their rotation posting to NIMHANS Bengaluru. The postings are structured to give the students an exposure to these departments.

We thank you for permitting our students to be posted and trained in your esteemed institution since 2010.

We propose to send 3 post graduate students of Psychiatry this year also. I am providing below the details of the students and details of the training they are expected to undergo.

Proposed dates of posting: 16/08/2018 to 30/09/2018.

Name of the P.G. Students	1). Dr. Punit P. Mutalik	2). Dr. Rama Krishna VM.	3). Dr. Akshay Naik

Sl. No.	Details of the Posting	Duration	Proposed Period
1	Child Psychiatry	15 Days	16/08/2018 to 31/08/2018
2	Addiction Psychiatry / Medicine	10 Days	01/09/2018 to 10/09/2018
3	Behaviour Therapy & Biofeedback	10 Days	11/09/2018 to 20/09/2018
4	Forensic Psychiatry & Occupational / Rehabilitation Psychiatry	10 Days (5 Days Each)	21/09/2018 to 30/09/2018

I request you to permit them to do their rotation posting in NIMHANS as detailed above.

I am also sending a copy of this letter to the respective heads of the departments.

The students will pay the necessary fees and will abide by all the rules during the training. They may be given an attendance / completion certificate at the end of their posting by respective departments. We will appreciate an early confirmation/modification from you.

Thanking You,

Yours Sincerely,

(Dr. N. M. Patil)
Professor & Head
Department of Psychiatry
J. N. Medical College
BELAGAVI-10

Principal
J.N. Medical College, Belagavi

Cc to:

The Director, National Institute of Mental Health & Neuroscience Hosur Road, Bengaluru.
Prof. & Head, Dept. of Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Child & Adolescent Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Addiction Psychiatry / Medicine, NIMHANS Bengaluru.
Prof. & Head, Dept. of Clinical Psychology, (Behaviour Therapy & Biofeedback), NIMHANS Bengaluru.
Prof. I/C of Forensic Psychiatry NIMHANS Bengaluru.
Prof. I/C of Occupational / Rehabilitation Psychiatry, NIMHANS Bengaluru.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH & NEUROSCIENCES
(INSTITUTE OF NATIONAL IMPORTANCE) BENGALURU - 560 029

NIMH:A&E:TM:TRG-PSY:2018/576

Date: 03.06.2018

Office of the J. N. MEDICAL COLLEGE BELAGAVI Received Dept 286 11 JUN 2018 Inward..... Sign.....

The Principal
JN Medical College
JNMC Campus.
Nehru Nagar
Belagavi – 590 010

Sir/Madam,

Sub: Request for Permission to undergo training at this institute – reg.
Ref: Your letter dated 16.05.2018

* * * * *

With reference to the above, I am directed to convey the permission of the Competent Authority for the student/students of your Institution to undergo training at this Institution as follows:

1	Number of trainees		03(Three) –PG students	
2	Name of the trainee		**Dr.Punit.P.Mutalik, Dr.Rama Krishna V.M and Dr.Akshay Naik**	
3	Training fee		Rs.10000/- per month or part thereof per trainee	
Dept.of Child & Adolescent Psychiatry		**Psychiatry (CAM)**	**Clinical Psychology (Behav. Therapy)**	**Psychiatry (Forensic OCC/Rehab Psychiatry)**
16.08.2018 to 31.08.2018		01.09.2018 to 10.09.2018	11.09.2018 to 20.09.2018	21.09.2018 to 30.09.2018

- The trainees should compulsorily carry their college ID cards while posted at NIMHANS.
- One stamp size photo should be given at the time of joining for issue of temporary ID card. (ID card should be returned at the end of training without fail)
- Trainees should carry a copy of this letter without fail.
- ***The Training fee for the whole duration of training has to be paid by Cash Debit/Credit Card on the day of joining. The Training fee once paid will not be refunded.***

I am also directed to inform you that the visiting students/trainees should make their own arrangement for accommodation. However all efforts will be made to provide hostel accommodation, but this will be subject to availability, ***based on Manager, Hostel report (080-26995095)***/**Supervisor, Cauvery Hostel, (080-26995092)** as on the date of joining and on payment of charges as below:-

1. **Hostel Rent:** Rs.100/- per day	2. **Caution Money Deposit:** Rs.1000/- (refundable)

Further, allotments, payment, check-outs, refunds and other official transactions are possible only on working days between 10 am to 3 pm. **Accommodation will not be provided to the candidates coming earlier than the scheduled date of training.**

On arrival, the trainee must contact the undersigned for further needful.

Yours faithfully,

ADMINISTRATIVE OFFICER I/c(A&E)
Administrative Officer (A & E)
National Institute of Mental Health & Neuro Sciences, Bangalore - 560 029

Copy to: The HOD of Psychiatry, NIMHANS
The HOD of Child & Adolescent Psychiatry, NIMHANS
The Manager/Supervisor, NIMHANS Hostels

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Effective from1st April 2017 onwards:

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- *The request letter(hard copy or soft copy of scanned letter) by post/email: training@nimhans.ac.in should reach the undersigned one month in advance to enable this office to process. Letters received with a shorter time span will not be entertained. Students coming with request letter without prior permission will not be entertained.*
- *Individual requests by the students not routed through their Institution/College will not be entertained.*
- *The department in which training is required at this Institution has to be clearly mentioned.*
- *Indicate the name of the student/students, date and duration of the training programme.*
- *For any queries related to training/visit, please call on working days between 2:30 pm and 4:00 pm only on 080-26995015.*

Renatti Rao

ASST.ADMINISTRATIVE OFFICER(A&E)

31.08.2018	10.09.2018	[illegible]

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Accredited 'A' Grade by NAAC
DEPARTMENT OF PSYCHIATRY

KLE ACADEMY

Website: http/www.jnmc.edu
Email: dome@jnmc.edu.domejnmc@sancharnet.in

Dept.: 0831-2473777
Ext. 1344, HOD: Ext. 1650

DEPT. OF PSYCHIATRY
No. 112
Date: 13.07.2017
J.N. MEDICAL COLLEGE, BELAGAVI

From,

Dr. N. M. Patil M.D.,
Professor & Head
Department of Psychiatry
J. N. Medical College,
Belagavi-10.

To,

The Principal
J.N.Medical College,
Belagavi.

Sub: Regarding the rotational posting of Psychiatry Post Graduate students to NIMHANS, Bengaluru.

Dear Madam,

As per the curriculum prescribed by the University, the post graduate students of our department are posted to NIMHANS from 16/08/2017 to 30/09/2017 for a period of 45 days. (Details are mentioned in the letter attached).

Kindly do the needful

Thanking You,

Yours Sincerely,

(Dr. N.M.Patil)

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Accredited 'A' Grade by NAAC
DEPARTMENT OF PSYCHIATRY

Website: http/www.jnmc.edu
Email: dome@jnmc.edu domejnmc@sancharnet.in

Dept.: 0831- 2473777
Ext. 1344, HOD: Ext. 1650

From,

Dr. N. M. Patil M.D.,
Prof. & Head, Dept. of Psychiatry
J. N. Medical College, Belagavi-10.

Date: 13.07.2017

To.

The Director,
National Institute of Mental Health & Neuroscience
Hosur Road, Bengaluru.

Sub: Rotation Posting of our Post Graduate Students in Psychiatry to NIMHANS, Bengaluru.

Respected Sir,

Department of Psychiatry of KLE University's J.N.Medical College is running Post Graduate course M D. (Psychiatry). As part of the curriculum Students are posted during their rotation posting to NIMHANS Bengaluru. The postings are structured to give the students an exposure to these departments.

We thank you for permitting our students to be posted and trained in your esteemed institution since 2010.

We propose to send 2 post graduate students of Psychiatry this year also. I am providing below the details of the students and details of the training they are requested to undergo.

Proposed dates of posting: 16/08/2017 to 30/09/2017.

Name of the P.G. Students	1) Dr. Swati Ravindran	2) Dr. Shweta Kiran

Sl.No.	Details of the Posting	Duration	Proposed Period
1	Child Psychiatry	15 Days	16/08/2017 to 31/08/2017
2	Addiction Medicine	10 Days	01/09/2017 to 10/09/2017
3	Behaviour Therapy & Biofeedback	10 Days	11/09/2017 to 20/09/2017
4	Forensic Psychiatry / Occupational – Rehabilitation Psychiatry	10 Days	21/09/2017 to 30/09/2017

I request you to permit them to do their rotation posting in NIMHANS as detailed above. I am also sending a copy of this letter to the respective Heads of the Departments.

The students will pay the necessary fees and will abide by all the rules during the training. They may be given an attendance / completion certificate at the end of their posting by respective departments. We will appreciate an early confirmation/modification from you.

Thanking You,

Yours Sincerely,

(Dr N M Patil)

Principal
J.N. Medical College, Belagavi

Cc to: Prof. & Head, Dept. of Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Child & Adolescent Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Addiction Medicine, NIMHANS Bengaluru.
Prof. & Head, Dept. of Clinical Psychology, (Behaviour Therapy & Biofeedback), NIMHANS Bengaluru.
Prof. & Head, Dept. of Forensic Psychiatry / Occupational – Rehabilitation Psychiatry, NIMHANS Bengaluru.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH & NEUROSCIENCES
(INSTITUTE OF NATIONAL IMPORTANCE) BENGALURU - 560 029

NIMH:ACA-B:TRG-PSY:2017/744 Date: 09.08.2017

The Professor & Head
Dept of Psychiatry
JN Medical College
Belgaum

Sir/Madam.

Sub: Request for Permission to undergo training at this institute – reg.
Ref: Your letter dated 13.07.2017

* * * * *

With reference to the above, I am directed to convey the permission of the Competent Authority for the student/students of your institution to undergo training at this Institution as follows:

1	Number of trainees	02(Two)
2	Name of Trainees	**Dr.Swati Ravindran, Dr.Shweta Kiran**
3	Training fee	Rs.5000/- per month/Per Trainee or part thereof
Dept.of Child & Adolescent Psychiatry		16.08.2017 to 31.08.2017
Dept. of Psychiatry (CAM)		01.09.2017 to 10.09.2017
Dept.of Cliniical Psychology (Behav. Therapy)		11.09.2017 to 20.09.2017
Dept of Psychiatry (Forensic, Occ-Rehab)		21.09.2017 to 30.09.2017

- The trainees should compulsorily carry their college ID cards while posted at NIMHANS.
- One stamp size photo should be given at the time of joining for issue of temporary ID card. (ID card should be returned at the end of training without fail)
- Trainees should carry a copy of this letter without fail.
- ***The Training fee for the whole duration of training has to be paid by Cash Debit/Credit Card on the day of joining. The Training fee once paid will not be refunded.***

I am also directed to inform you that the visiting students/trainees should make their own arrangement for accommodation. However all efforts will be made to provide hostel accommodation, but this will be subject to availability as on the date of joining and on payment of charges as below:-

1. **Hostel Rent:** Rs.100/- per day	2. **Caution Money Deposit:** Rs.1000/- (refundable)

Further, allotments, payment, check-outs, refunds and other official transactions are possible only on working days between 10 am to 5 pm. **Accommodation will not be provided to the candidates coming earlier than the scheduled date of training.**

On arrival, the trainee must contact the undersigned for further needful.

Yours faithfully

ADMINISTRATIVE OFFICER (A&E)

Copy to: The HOD of Child & Adolescent Psychiatry, NIMHANS
The HOD of Clinical Psychology, NIMHANS
The HOD of Psychiatry, NIMHANS

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

☎: 08026995015 Email: training@nimhans.ac.in Website : http://www.nimhans.ac.in

Effective from1st April 2017 onwards: Important instructions

The following points are to be observed when you are sending the request for training at this Institution.

- *The request letter(hard copy or soft copy of scanned letter) by post/email: training@nimhans.ac.in should reach the undersigned one month in advance to enable this office to process. Letters received with a shorter time span will not be entertained.* ***Students coming with request letter without prior permission will not be entertained.***
- *Individual requests by the students not routed through their Institution/College will not be entertained.*
- *The department in which training is required at this Institution has to be clearly mentioned.*
- *Indicate the name of the student students, date and duration of the training programme*

[illegible] between 2.30 pm and 4:00 pm only on [illegible]

[illegible]

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

KLE UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Accredited 'A' Grade by NAAC
DEPARTMENT OF PSYCHIATRY

Website: http/www.jnmc.edu
Email: dome@jnmc.edu,domejnmc@sancharnet.in

Dept.: 0831- 2473777
Ext. 1344, HOD: Ext. 1650

DEPT. OF PSYCHIATRY J.N. MEDICAL COLLEGE, BELAGAVI
No. 34
Date: 04.04.2016

From,

Dr. N. M. Patil M.D.,
Professor & Head
Department of Psychiatry
J. N. Medical College,
Belagavi-10.

To.

The Principal
J.N.Medical College,
Belagavi.

Sub: Regarding the rotational posting of Psychiatry Post Graduate students to NIMHANS, Bengaluru.

Dear Madam,

As per the curriculum prescribed by the University, the post graduate students of our department are posted to NIMHANS from 16/08/2016 to 30/09/2016 for a period of 45 days. (Details are mentioned in the letter attached).

Kindly do the needful

Thanking You,

Yours Sincerely,

(Dr. N.M.Patil)

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

KLE UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Accredited 'A' Grade by NAAC
DEPARTMENT OF PSYCHIATRY

Website: http/www.jnmc.edu
Email: dome@jnmc.edu.domejnmc@sancharnet.in

Dept.: 0831- 2473777
Ext. 1344, HOD: Ext. 1650

From,

Date: 04.04.2016

Dr. N. M. Patil M.D.,
Prof. & Head, Dept. of Psychiatry
J. N. Medical College, Belagavi-10.

To,

The Director,
National Institute of Mental Health & Neuroscience
Hosur Road, Bengaluru.

Sub: Rotation Posting of our Post Graduate Students in Psychiatry to NIMHANS, Bengaluru.

Respected Sir,

Department of Psychiatry of KLE University's J.N.Medical College is running Post Graduate course M.D. (Psychiatry). As part of the curriculum Students are posted during their rotation posting to NIMHANS Bengaluru. The postings are structured to give the students an exposure to these departments.

We thank you for permitting our students to be posted and trained in your esteemed institution since 2010.

We propose to send 3 post graduate students of Psychiatry this year also. I am providing below the details of the students and details of the training they are requested to undergo.

Proposed dates of posting: 16/08/2016 to 30/09/2016.

Name of the P.G. Students	1) Dr. Sritha S.Kovvuri	2) Dr. Deepthi P.T.	3) Dr. Kaustubh G.

Sl.No.	Details of the Posting	Duration	Proposed Period
1	Child Psychiatry	15 Days	16/08/2016 to 31/08/2016
2	Addiction Medicine	10 Days	01/09/2016 to 10/09/2016
3	Behaviour Therapy & Biofeedback	10 Days	11/09/2016 to 20/09/2016
4	Forensic Psychiatry / Occupational – Rehabilitation Psychiatry	10 Days	21/09/2016 to 30/09/2016

I request you to permit them to do their rotation posting in NIMHANS as detailed above. I am also sending a copy of this letter to the respective Heads of the Departments.

The students will pay the necessary fees and will abide by all the rules during the training. They may be given an attendance / completion certificate at the end of their posting by respective departments. We will appreciate an early confirmation/modification from you.

Thanking You,

Yours Sincerely,

Principal
J.N. Medical College, Belagavi

(Dr N M Patil)

Cc to: Prof. & Head, Dept. of Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Child & Adolescent Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Addiction Medicine, NIMHANS Bengaluru.
Prof. & Head, Dept. of Clinical Psychology, (Behaviour Therapy & Biofeedback), NIMHANS Bengaluru.
Prof. & Head, Dept. of Forensic Psychiatry / Occupational – Rehabilitation Psychiatry, NIMHANS Bengaluru.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH & NEUROSCIENCES
(INSTITUTE OF NATIONAL IMPORTANCE) BENGALURU - 560 029

NIMH:ACA-B:TRG-PSY:2016/393 Date: 05.05.2016

The Principal
Department of Psychiatry
Jawaharlal Nehru Medical College
Belagavi

Sir,

Sub: Request for permission to undergo training at this Institution – reg.
Ref: Your letter dated 04.04.2016

* * * * *

With reference to the subject cited above, I am directed to convey the permission of the Competent Authority for **Dr.Sritha.S.Kovvuri, Dr.Deepthi.P.T and Dr.Kaustubh Gosavi –PG students** of your Institution to undergo training in the departments of Child & Adolescent Psychiatry, Clinical Psychology and Psychiatry of this institution for the period mentioned below, subject to making payment of Rs.5000/- per month or part thereof per trainee towards training fee.

DEPT. OF CHILD & ADOLESCENT PSY.		- 16.08.2016 to 31.08.2016
DEPT. OF PSYCHIATRY	-De-Addiction Unit.	- 01.09.2016 to 10.09.2016
	-Forensic & Rehab. Psychiatry	- 11.09.2016 to 20.09.2016
DEPT. OF CLINICAL PSYCHOLOGY(Behav.Med.)		- 21.09.2016 to 30.09.2016

The training fee for the whole duration of training has to be paid by cash on the day of joining. The training fee once paid will not be refunded at any cost.

I am also directed to inform you that the visiting students/trainees should make their own arrangement for accommodation. However efforts will be made to provide hostel accommodation ***only in Men's Hostel for Men and Cauvery Hostel for Women***, but this will be subject to availability as on the date of joining and on payment of charges as below:-

Hostel Rent - Rs.100/- per day
Caution Money Deposit - Rs.1000/- (refundable)

Further, allotments, payment, check-outs, refunds and other official transactions are possible only on working days between 10 am to 3 pm.

On arrival, the trainee must contact the undersigned for further needful along with photo copy of this letter.

Yours faithfully,

ASST.ADMINISTRATIVE OFFICER (A&E)

Copy to: The HOD of Child & Adolescent Psychiatry, NIMHANS
The HOD of Psychiatry, NIMHANS
The HOD of Clinical Psychology, NIMHANS

☎: 26995012, 26995013, 26995014, 26995015 Email: academic@nimhans.kar.nic.in
Fax : 91-80-26564830, 91-80-26562121. Website : http://www.nimhans.kar.nic.in

ATTESTED

Dr. V.V.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Accredited 'A' Grade by NAAC
DEPARTMENT OF PSYCHIATRY

Website: http/www.jnmc.edu
Email: dome@jnmc.edu,domejnmc@sancharnet.in

Dept.: 0831- 2473777
Ext. 1344, HOD: Ext. 1340

DEPT. OF PSYCHIATRY J.N. MEDICAL COLLEGE, BELAGAVI
No. 113
Date. 19/6/15

From,

Dr. N. M. Patil M.D.,
Professor & Head
Department of Psychiatry
J. N. Medical College,
Belagavi-10.

To,

The Principal
J.N.Medical College,
Belagavi.

Sub: Regarding the rotational posting of Psychiatry Post Graduate students to NIMHANS, Bengaluru.

Dear Madam,

As per the curriculum prescribed by the University, the post graduate students of our department are posted to NIMHANS from 16/08/2015 to 30/09/2015 for a period of 45 days. (Details are mentioned in the letter attached).

Kindly do the needful

Thanking You,

Yours Sincerely,

(Dr. N.M.Patil)

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

KLE UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE, BELAGAVI
Accredited 'A' Grade by NAAC
DEPARTMENT OF PSYCHIATRY

Website: http/www.jnmc.edu
Email: dome@jnmc.edu.domejnmc@sancharnet.in

Dept.: 0831-2473777
Ext. 1344, HOD: Ext. 1650

No.MDC/Psy/896

Office of the J. N. MEDICAL COLLEGE BELAGAVI
02 JUL 2015
Inward.....
Sign.....

From,

Dr. N. M. Patil M.D.,
Prof. & Head, Dept. of Psychiatry
J. N. Medical College, Belagavi-10.

Date: 9.06.2015

To,

The Director,
National Institute of Mental Health & Neuroscience
Hosur Road, Bengaluru.

Sub: Rotation Posting of our Post Graduate Students in Psychiatry to NIMHANS, Bengaluru.

Respected Sir,

Department of Psychiatry of KLE University's J.N.Medical College is running Post Graduate course M.D. (Psychiatry). As part of the curriculum Students are posted during their rotation posting to NIMHANS Bengaluru. The postings are structured to give the students an exposure to these departments.

We thank you for permitting our students to be posted and trained in your esteemed institution since 2010.

We propose to send 3 post graduate students of Psychiatry this year also. I am providing below the details of the students and details of the training they are requested to undergo.

Proposed dates of posting: 16/08/2015 to 30/09/2015.

Name of the P.G. Students	1) Dr. Harsha Haridas	2) Dr. Shivam Gupta	3) Dr. Sushruth V.

Sl.No.	Details of the Posting	Duration	Proposed Period
1	Child Psychiatry	15 Days	16/08/2015 to 31/08/2015
2	Addiction Medicine	10 Days	01/09/2015 to 10/09/2015
3	Behaviour Therapy & Biofeedback	10 Days	11/09/2015 to 20/09/2015
4	Forensic Psychiatry / Occupational – Rehabilitation Psychiatry	10 Days	21/09/2015 to 30/09/2015

I request you to permit them to do their rotation posting in NIMHANS as detailed above. I am also sending a copy of this letter to the respective Heads of the Departments.

The students will pay the necessary fees and will abide by all the rules during the training. They may be given an attendance / completion certificate at the end of their posting by respective departments. We will appreciate an early confirmation/modification from you.

Thanking You,

Yours Sincerely,

(Dr.N.M.Patil)
Professor & Head
Department of Psychiatry
J. N. Medical College,
BELAGAVI-590010

Principal
J.N.Medical College, Belgavi.
PRINCIPAL
Jawaharlal Nehru Medical College
BELAGAVI

Cc to: Prof. & Head, Dept. of Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Child & Adolescent Psychiatry, NIMHANS, Bengaluru.
Prof. & Head, Dept. of Addiction Medicine, NIMHANS Bengaluru.
Prof. & Head, Dept. of Clinical Psychology, (Behaviour Therapy & Biofeedback), NIMHANS Bengaluru.
Prof. & Head, Dept. of Forensic Psychiatry / Occupational – Rehabilitation Psychiatry, NIMHANS Bengaluru.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH & NEUROSCIENCES
(INSTITUTE OF NATIONAL IMPORTANCE) BENGALURU - 560 029

NIMH:ACA-B:TRG-PSY:2015/673 Date: 28.07.2015

The Professor & Head
Department of Psychiatry
JN Medical College
Belagavi – 590 010

Sir,

Sub: Request for permission to undergo training at this Institution – reg.
Ref: Your letter dated 09.06.2015

*****

With reference to the subject cited above, I am directed to convey the permission of the Competent Authority for **Dr.Harsha Haridas, Dr.Shivam Gupta and Dr.Sushruth.V –PG students** of your Institution to undergo training in the departments of Clinical Psychology, Child & Adolescent Psychiatry and Psychiatry of this institution for the period mentioned below, subject to making a payment of Rs.5000/- per month or part thereof per trainee towards training fee.

DEPT. OF CHILD & ADOLESCENT PSY.	- 16.08.2015 to 31.08.2015
DEPT. OF PSYCHIATRY (Centre for Addition Medicine, Forensic & Occ.Rehab.)	- 01.09.2015 to 20.09.2015
DEPT. OF CLINICAL PSYCHOLOGY (Behavioural Medicine Unit)	- 21.09.2015 to 30.09.2015

The Training fee for the whole duration of training has to be paid by cash on the day of joining. The Training fee once paid will not be refunded at any cost.

I am also directed to inform you that the visiting students/trainees should make their own arrangement for accommodation. However efforts will be made to provide hostel accommodation, but this will be subject to availability as on the date of joining and on payment of charges as below:-

Hostel Rent - ***Rs.100/- per day***
Caution Money Deposit - ***Rs.1000/- (refundable)***

Further, allotments, payment, check-outs, refunds and other official transactions are possible only on working days between 10 am to 3 pm.

On arrival, the trainees must contact the undersigned for further needful along with photo copy of this letter.

Yours faithfully,

ADMINISTRATIVE OFFICER (A&E)

Read today, copy to concerned PGs
3/8/15

Copy to: The HOD of Child & Adolescent Psychiatry, NIMHANS
The HOD of Psychiatry, NIMHANS
The HOD of Clinical Psychology, NIMHANS

☎: 26995012, 26995013, 26995014; 26995015. Email: academic@nimhans.kar.nic.in
Fax : 91-80-26564830, 91-80-26562121 Website : http://www.nimhans.kar.nic.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

JAWAHARLAL NEHRU MEDICAL COLLEGE

(A constituent unit of KLE Academy of Higher Education & Research Deemed-to-be University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category "A" by MHRD (GoI)
Nehru Nagar, Belagavi-590 010, Karnataka-India

Website : http/www.jnmc.edu
E-Mail : Principal@jnmc.edu

☎ Office :+91-(0)831 2471350
FAX :+91 (0)831-2470759

Ref. No. : JNMC/PG/888 Date : 03/06/2019

To,

The Administrative Officer (A& E),
National Institute of Mental Health & Neurosciences,
Bangalore-560 029.

Sub: Request for Permission to undergo training.
Ref :Letter No. NIMH:A&E:TM:TRG-NEURO :2019/194 dated 12-02-2019.

Sir,

With reference to the above, this is to bring to your kind notice that, we thank you very much for considering our request and permitting our D.M. (Neurology) students to undergo training at your institution.

However, as per your letter, students have to attend their postings during 01-03-2019 to 30-04-2019. But unfortunately we received the letter late due to postal delay. Hence we request you to kindly allot new dates to the following students of our Institution and confirm the same well in advance, and also by email to the email id principal@jnmc.edu

So kindly consider our request and give our students future dates. Hence, we request you to kindly permit us to post the students as under.

Name of the Student	Period	Name of the Posting
1. Dr. Siddharth Singh	One month	Neurology
2. Dr. Shilpa.	15 days	Neuropathology
	15 days	Clinical Psychology (Neuropsychology

We once again request you to kindly consider our request and allot a new dates to our above students.

Thanking you,

Yours faithfully,

PRINCIPAL,
J. N. MEDICAL COLEGE, BELAGAVI.

Copy to : 1. The Hon'ble Vice Chancellor, National Institute of Mental Health & Neurosciences, Bangalore-560 029 for information.

2. The Professor & Head Department of Neurology, J. N. Medical College, Belagavi.

ATTESTED
Dr. V. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

NATIONAL INSTITUTE OF MENTAL HEALTH & NEUROSCIENCES
(INSTITUTE OF NATIONAL IMPORTANCE) BENGALURU - 560 029

NIMH:A&E:TM:TRG-NEURO:2019/857 Date: 27.06.2019

The Principal
Jawaharlal Nehru Medical College
Nehru Nagar, Belagavi – 590 010

Sir/Madam,

Sub: Request for Permission to undergo training at this institute – reg.
Ref: Your letter dated 03.06.2019

* * * * *

With reference to the above, I am directed to convey the permission of the Competent Authority for the students of your institute to undergo training at this Institution as follows:

1	Number of trainees	02
2	Name of the trainees	**Dr. Siddharth Singh** **Dr. Shilpa**
3	Department at which training permitted	Duration
	Neurology	01.08.2019 to 31.08.2019
	Neuropathology	01.02.2020 to 15.02.2020
	Clinical Psychology (Neuropsychology)	01.09.2019 to 15.09.2019
4	Training fee	Rs.10,000/- per month or part thereof per trainee

Note: *Permission is subject to written assurance by Director/Dean/Principal/HOD of the above mentioned college/university that all the students who are posted will attend activity/duties of Neurology department everyday as per the timings of the department and will not take any planned leave during the period of posting.*

- The trainees should compulsorily carry their college ID cards while posted at NIMHANS
- One stamp size photo should be given at the time of joining for issue of temporary ID card. (ID card should be returned at the end of training without fail)
- Trainees should carry a copy of this letter without fail.
- ***The training fee for the whole duration of training has to be paid by Debit/Credit Card on the day of joining. The training fee once paid will not be refunded.***

I am also directed to inform you that the visiting students/trainees should make their own arrangement for accommodation. However all efforts will be made to provide hostel accommodation, but this will be subject to availability, ***based on Manager, Hostel report (080-26995095)***/Supervisor, Cauvery Hostel, (080-26995092) as on the date of joining and on payment of charges as below. **Accommodation will not be provided to the candidates coming earlier than the scheduled date of training.**

1. **Hostel Rent:** Rs.100/- per day

NOTE: *In case of any damage of assets/property in the Hostels i.e., movable and immovable property of NIMHANS by the trainees, the college shall be directly responsible for such act of the trainees. The loss incurred has to be borne by the Institution/College deputing the trainees. Further, the attendance certificate for training of such trainees will be withheld.*

On arrival, the trainees must contact the undersigned for further needful.

Yours faithfully

ADMINISTRATIVE OFFICER (A&E)
Administrative Officer (A & E)
National Institute of Mental Health
Neuro Sciences, Bangalore - 560 029

Copy to: The HOD of Neurology, NIMHANS
The HOD of Neuropathology, NIMHANS
The HOD of Clinical Psychology, NIMHANS
The Manager/Supervisor, NIMHANS Hostels, NIMHANS

ATTESTED

☎ : 08026995015 Email: training@nimhans.ac.in Website : http://www.nimhans.ac.in

Dr. V. A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

Jefferson®

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

Richard Derman, MD, MPH
Associate Provost, Global Affairs
Director, Global Health Research
Professor, Obstetrics & Gynecology

1020 Walnut Street, Suite 518
Philadelphia, PA 19107
T. 215-955-2153
F. 215-503-4026

April 5, 2019

Ms. Shreya Anil Patted
Plot No. 664, Sector No. 5
"Sanskriti" Shree Nagar, MM Extension,
Belagavi 590016
Karnataka India

Dear Ms. Patted,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

We have designed a robust and well-aligned curriculum for your time here at Thomas Jefferson University. Parth Lalakia (parth.lalakia@jefferson.edu) will be your main point of contact.

Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Jefferson®

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

Richard Derman, MD, MPH
Associate Provost, Global Affairs
Director, Global Health Research
Professor, Obstetrics & Gynecology

1020 Walnut Street, Suite 518
Philadelphia, PA 19107
T. 215-955-2153
F. 215-503-4026

April 5, 2019

Mr. Pranav Adhyapak
H. No. 863, Acharya Galli,
Shahapur
Belagavi 590003
Karnataka India

Dear Mr. Adhyapak,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

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KLE Academy of Higher Education and Research,
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Belagavi-590 010,Karnataka

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Director, Global Health Research
Professor, Obstetrics & Gynecology

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Philadelphia, PA 19107
T. 215-955-2153
F. 215-503-4026

April 5, 2019

Mr. Cordeiro Kurt Sydney Francis
Flat No. 304, Classic Heights Apartments,
Ayodhya Nagar,
Belagavi 590003
Karnataka India

Dear Mr. Kurt,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

ATTESTED

Dr. M.V.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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Richard Derman, MD, MPH
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Director, Global Health Research
Professor, Obstetrics & Gynecology

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Philadelphia, PA 19107
T. 215-955-2153
F. 215-503-4026

April 5, 2019

Ms. Kiranmayi Vuthaluru
18-51 Gopal Nagar,
Hanumanpet, Malkajgiri,
Hyderabad 500047
Andhra Pradesh, India

Dear Ms. Vuthaluru,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

ATTESTED

Dr. M.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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Richard Derman, MD, MPH
Associate Provost, Global Affairs
Director, Global Health Research
Professor, Obstetrics & Gynecology

1020 Walnut Street, Suite 518
Philadelphia, PA 19107
T. 215-955-2153
F. 215-503-4026

April 5, 2019

Ms. Nischita M Bellad
CTS No. 9282/11 & 12,
Opp. SBI Shivabasav Nagar Branch,
Ashok Nagar Extension,
Belgavi 590010
Karnataka India

Dear Ms. Bellad,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

ATTESTED

V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

Richard Derman, MD, MPH
Associate Provost, Global Affairs
Director, Global Health Research
Professor, Obstetrics & Gynecology

1020 Walnut Street, Suite 518
Philadelphia, PA 19107
T. 215-955-2153
F. 215-503-4026

April 5, 2019

Ms. Tanvi D Gizare
'Janani', H. No. 4,
Havelock Road, Camp,
Belgavi 590010 Karnataka India

Dear Ms. Gizare,

We are pleased to extend an invitation for you to serve a one month "observership" at Thomas Jefferson from June 15th to July 14th 2019.

During this time, you will be able to observe and attend educational sessions such a lectures, case conferences, grand rounds, clinical rounds, and ambulatory care. The clinical experiences contemplated will be conducted at the Hospital and JUP physician offices. You will get an opportunity to explore various departments and interact with departments' chairs and faculty.

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Should you require any further information, please do not hesitate to contact me.

Sincerely,

Richard Derman, MD, MPH, FACOG
Associate Provost, Global Affairs,
Director, Global Health Research
Professor, Obstetrics and Gynecology
Thomas Jefferson University

RJD/PL

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Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

K L E VISHWANATH KATTI
INSTITUTE OF DENTAL SCIENCES
(A Constituent unit of KLE Academy of Higher Education & Research
(Formerly known as KLE University) Deemed-to-be-University u/s 3 of the UGC Act, 1956)
J.N.M.C. Campus, Nehru Nagar, Belagavi-590 010, Karnataka, India
Accredited 'A' grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
☎: 0831-2470362
FAX: 0831-2470640
Web: http://www.kledental-bgm.edu.in
E-mail:principal@kledental-bgm.edu.in

The Following Actions were conducted as the part of MOU with GSR for the year 2017-2018

Sl No	Post graduates	Date	Activity	No of cases Assisted
1	**DR.DESHPANDE ABHISHEK**	**2/7/19 To 22/7/19**	Posting for observation of Cleft & craniofacial defects	8
2	**DR.NOUREEN SHAIKH**	**3/5/19 To 24/5/19**	Posting for observation of Cleft & craniofacial defects	8
3	**DR.SOUMYASNATA MAITI**	**3/8/19 To 30/8/19**	Posting for observation of Cleft & craniofacial defects	8
4	**DR.SRISHTI DESHPANDE**	**4/6/19 To 25/6/19**	Posting for observation of Cleft & craniofacial defects	7

PRINCIPAL
KLE V. K. Institute of Dental Sciences
Nehru Nagar, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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J.N.M.C. Campus, Nehru Nagar, Belagavi-590 010, Karnataka, India
Accredited 'A' grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
☎: 0831-2470362 Web: http://www.kledental-bgm.edu.in
FAX: 0831-2470640 E-mail:principal@kledental-bgm.edu.in

The Following Activies were conducted as the part of MOU with KARNATAKA CANCER THERAPY, NAVNAGAR,HUBLI

for the year 2017-2018

Sl No	Post graduates	Date	Activity	No of cases Assisted
1	DR.DESHPANDE ABHISHEK	2/5/19 To 31/5/19	Posting for observation of Head & Neck Oncology	8
2	DR.NOUREEN SHAIKH	1/3/19 To 19/3/19	Posting for observation of Head & Neck Oncology	7
3	DR.SOUMYASNATA MAITI	3/4/19 To 24/4/19	Posting for observation of Head & Neck Oncology	8
4	DR.SRISHTI DESHPANDE	2/2/19 To 24/2/19	Posting for observation of Head & Neck Oncology	7

PRINCIPAL
KLE V. K. Institute of Dental Sciences,
Nehru Nagar, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Dr. Raghavendra S. Byakodi
MDS - Oral and Maxillofacial Radiologist

Dr. Arati G. Paranjpe
MDS - Oral and Maxillofacial Radiologist

Dr. Manishkumar D. Shete
MDS - Oral and Maxillofacial Radiologist

DENTA SCAN
CBCT CENTRE

CERTIFICATE

This is to certify that the one day CBCT training program was conducted for PG students of **KLE VK Institute of Dental Sciences Belgaum** at our **Dentascan CBCT Centre Vishrambag Chowk Sangli**

Sl .No	Date	Program Schedule	Time
1	14/01/2019	**Lecture :** Introduction to CONE BEAM COMPUTED TOMOGRAPHY	9.00 AM TO 10 AM
2	14/01/2019	**Lecture :** Application of CBCT in Dentistry	10.00 AM to 11.30 AM
		Tea Break	11.30 to 11.45
3	14/01/2019	**Demo and Hands on :** Training on CONE BEAM COMPUTED TOMOGRAPHY Software	11.45 AM to 12.45 PM
4	14/01/2019	**Hands on:** Mandibular Nerve Tracing	12. 45 PM to 1.30 PM
		Lunch Break	1.30 PM to 2.15 PM
5	14/01/2019	**Hands on :** Implant planning for both Maxilla and Mandible cases	2.15 PM to 3.15 PM
6	14/01/2019	**Hands on :** Endodontic Evaluation	3.15 PM to 4.30 PM
	14/01/2019	**High Tea and Valedictory function**	4.30 PM to 5.00 PM

ATTESTED

Dr. V.A.Kothivale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

146

Dr. Raghavendra S. Byakodi
MDS - Oral and Maxillofacial Radiologist

Dr. Arati G. Paranjpe
MDS - Oral and Maxillofacial Radiologist

Dr. Manishkumar D. Shete
MDS - Oral and Maxillofacial Radiologist

DENTA SCAN
CBCT CENTRE

ATTENDANCE CERTIFICATE

The following students attend the program

1) Roshni Mamdapur
2) Prabhavathi Wadeyar
3) Lidya Thomas

The students were eager and very interested in learning the subject. All students were well trained in reading the cone beam computed tomography scans and doing reporting of the scans.

Dr Raghavendra Byakodi MDS
Director,
Dentascan CBCT Centre Sangli
99751 85890

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act 1956)
Belagavi-590 010,Karnataka

Dr. Raghavendra S. Byakodi
MDS - Oral and Maxillofacial Radiologist

Dr. Arati G. Paranjpe
MDS - Oral and Maxillofacial Radiologist

Dr. Manishkumar D. Shete
MDS - Oral and Maxillofacial Radiologist

DENTA SCAN
CBCT CENTRE

CERTIFICATE

This is to certify that the one day CBCT training program was conducted for PG students of **KLE VK Institute of Dental Sciences Belgaum** at our **Dentascan CBCT Centre Vishrambag Chowk Sangli**

Sl .No	Date	Program Schedule	Time
1	18/02/2018	**Lecture :** Introduction to CONE BEAM COMPUTED TOMOGRAPHY	9.00 AM TO 10 AM
2	18/02/2018	**Lecture :** Application of CBCT in Dentistry	10.00 AM to 11.30 AM
		Tea Break	11.30 to 11.45
3	18/02/2018	**Demo and Hands on :** Training on CONE BEAM COMPUTED TOMOGRAPHY Software	11.45 AM to 12.45 PM
4	18/02/2018	**Hands on:** Mandibular Nerve Tracing	12. 45 PM to 1.30 PM
		Lunch Break	1.30 PM to 2.15 PM
5	18/02/2018	**Hands on :** Implant planning for both Maxilla and Mandible cases	2.15 PM to 3.15 PM
6	18/02/2018	**Hands on :** Endodontic Evaluation	3.15 PM to 4.30 PM
	18/02/2018	**High Tea and Valedictory function**	4.30 PM to 5.00 PM

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956),
Belagavi-590 010,Karnataka

Dr. Raghavendra S. Byakodi
MDS - Oral and Maxillofacial Radiologist

Dr. Arati G. Paranjpe
MDS - Oral and Maxillofacial Radiologist

Dr. Manishkumar D. Shete
MDS - Oral and Maxillofacial Radiologist

DENTA SCAN
CBCT CENTRE

ATTENDANCE CERTIFICATE

The following students attend the program

1) Dr. Ram
2) Dr. Deepthi
3) Dr. Harpreeth

The students were eager and very interested in learning the subject. All students were well trained in reading the cone beam computed tomography scans and doing reporting of the scans.

Dr Raghavendra Byakodi MDS
Director,
Dentascan CBCT Centre Sangli
99751 85890

ATTESTED

Dr. V. Kothiwale
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KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre
(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED-TO-BE-UNIVERSITY)
(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)
First AYUSH Institution having NAAC & NABH Accreditation

Ref: BMK/1283/2018-19 Dt: 12/12/18

To,

The Administrative Director
KLE Centenary Hospital
Yellur Road, Belagavi

Sub: **Posting of PG Scholars to your Hospital – reg.**

Greetings from KLE AYUR WORLD

Sir,

With refrence to the above, as a part of teaching and training program and to provide hands on training on **"Exposure to Maximum Surgery Patients"**, we are deputing three following PG Scholars of department of Shalakya Tantra of our institute to department of ENT & Opthamology of your hospital is as follows.

Sl. No.	Name of the PG Scholar	Posting Date		No. of Months
		From	To	
1	Dr. Rajeev Sharma	01/01/2019	28/02/2019	2 months
2	Dr. Alreeza Fernandes	01/04/2019	30/04/2019	1 month
3	Dr. Neha Rawat	01/07/2019	31/08/2019	2 months

This is for your kind information and to accommodate the scholar.

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Cc to:

1. HoD Department of Shalakya Tantra – for information
2. PG Coordinator – for information
3. Posting file – for documentation.
4. Above PG Scholars – for information and to act.

IMPARTING AYURVEDA EDUCATION SINCE 1933

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2424158 Fax: +91 831 2424157
Website: www. kleayurworld.edu.in, Email. bmkprincipal.kaher@kleayurworld.edu.in

ATTESTED

Dr. V.A. Kothiwale
Registrar

KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA
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A Constituent Unit of
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(DEEMED-TO-BE-UNIVERSITY)
(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)
First and the only AYUSH Institution having NAAC & NABH Accreditation

Ref - BMK/1856/18-19

30/03/19

To,
The Medical Director,
KLE Centenary Charitable Hospital,
Yellur Road,
Belagavi.

Sub: PG Scholar Posting –reg.

Sir,

With reference to the above subject, as a part of teaching & training program and to provide hands on training, we are posting 2nd Year Post graduate scholars of our college from the Dept. of Shalya Tantra (Surgery) to your hospital for the period of 5 months from 01-04-2019 to 31-08-2019.

Hence, we request you to permit our PG scholars to undergo the posting in your hospital. The names of the PG scholars are as follows.

S.No.	Name of the PG Scholars	Department	Mobile No.
01	Dr. Mandeep Singh	Shalya Tantra	7307374073
02	Dr. Vibhuti Mishra	Shalya Tantra	8788048624

This is for your information.

Thanking you.

Yours truly

PRINCIPAL
Shri B. M. Kankanwadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Copy to :
1) HoD Dept of Shalya Tantra for information.
2) PG Coordinator for information.

Posting file

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2486286 Fax: +91 831 2424157
Website: www.kleayurvedcollege.edu.in Email: bmkprincipal@gmail.com

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

KLE CENTENARY CHARITABLE HOSPITAL & MRC

KLE CENTENARY CHARITABLE HOSPITAL & MRC
YELLUR ROAD, BELAGAVI

REF.NO: KLE/CCH/ADM/2018-19/2540 DATE: 31/01/2019

TO,

PRINCIPAL
KLE University's
Shri B.M. Kankanwadi
Ayurved Mahavidyalaya
Shahapur – BELAGAVI – 03

Sir,

Sub: Relieving of PG Dr. Praveen K. Yadav
Ref : Letter No.BMK/1084/201819 dtd.03/11/2018

With reference to the above mentioned subject and reference, Dr. Praveen K. Yadav PG has been relieved on 31/01/2019 AN. He has completed training from Surgery Dept (01/11/2018 to 01/01/2019) and Orthopedics Dept (02/01/2019 to 31/01/2019).

This is for your kind information.

Thanking you

yours faithfully

Director (CS)
31/1/19

CWC To:
Director USM

Copies to:

- Dr. Ashok Pangi – HOD Surgery
- Dr. Putti - HOD Orthopedics
- Dr. Praveen K. Yadav
- Office Copy

OFFICE OF THE ASSURVED MAHAVIDYALAYA, SHAHAPUR, BELAGAVI-03.
DATE: 2/2/19
SIGN.
DIARY NO: 1180

PG coordinator
2/2/19

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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First AYUSH Institution having NAAC & NABH Accreditation

IMPARTING AYURVEDA EDUCATION SINCE 1933

BMK/1498/2018-19 DT:-31-1-2019

To,

The Administrative Director
KLE Centenary Hospital
Yellur Road, Belagavi

Sub: Posting of PG Scholars to your Hospital – reg.

Greetings from KLE AYUR WORLD

Sir,

With refrence to the above, as a part of teaching and training program and to provide hands on training on "Exposure_to Maximum Surgery Patients", we are deputing one of our PG Scholar Dr. Shivanarayan Gupta, Department of Shalya Tantra to your hospital to following departments.

Sl. No.	Name of the department	Duration	From	To
1	General Surgery	Three months	01/02/2019	30/04/2019
2	Urology	One Month	01/05/2019	31/05/2019
3	Orthopedics	One Month	01/06/2019	30/06/2019

This is for your kind information and to accommodate the scholar

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Cc to:
1. HoD Department of Shalya Tantra – for information
2. PG Coordinator – for information
3. Posting file – for documentation.

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2480255 Fax: +91 831 2424157
Website: www.kleayurworld.edu.in, Email: bmkprincipal.kaher@kleayurworld.edu.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

PG coordinator

KLES
DR.PRABHAKAR KORE HOSPITAL
CHIKKODI

Basava Circle, Chikkodi Dist : Belagavi-591 201
Karnataka-India Phone : 08338 - 274771 / 72 / 73 / 74
Email : klehospchikkodi@gmail.com

ಕೆ. ಎಲ್. ಇ. ಸಂಸ್ಥೆಯ
ಡಾ. ಪ್ರಭಾಕರ ಕೋರೆ ಆಸ್ಪತ್ರೆ -ಚಿಕ್ಕೋಡಿ

ಬಸವ ಸರ್ಕಲ್, ಚಿಕ್ಕೋಡಿ ಜಿ : ಬೆಳಗಾವಿ-591 201
ಕರ್ನಾಟಕ-ಇಂಡಿಯಾ ಫೋನ್ ನಂ.: 08338-274771/72/73/74
ಇಮೇಲ್ : klehospchikkodi@gmail.com

REF.NO.:KLES/DR.PKHOSP/ADM/HR/2019-20/243 Date: 14-05-2019

COMPLETION CERTIFICATE

This is to certify that Dr. Vivek has successfully completed Post Graduate Scholars Posting at KLES Dr. Prabhakar Kore Hospital Chikodi from 15-04-2019 to 14-05-2019.

We found him sincere, hardworking and result oriented. He worked well as part of a team during his tenure. We take this opportunity to thank him and wish him all the best for future.

PG Coordinator

ADMINISTRATOR
Administrator
K.L.E. Dr. Prabhakar Kore Hospital
Basava Circle, Chikodi-591 201

20/5/19

DATE - 20/5/19
135

Prashanth/ADM-HR/Completion Certificate

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA
Post-Graduate Studies & Research Centre
(Approved by Central Council of Indial Medicine, New Delhi & M/o AYUSH, GoI)
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED-TO-BE-UNIVERSITY)
(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)
First and the only AYUSH institution having NAAC & NABH Accreditation

Ref No. BMK/1456/2019-20 03/12/19

To,
The Medical Director,
KLE Centenary Charitable Hospital,
Yellur Road,
Belagavi.

Sub: PG Scholar Posting of Dr. Sudhanshu Sharma – reg.
Ref : Our letter No.BMK/733/2019-20, dated 03.09.2019

Sir,

With reference to the above subject, as a part of teaching & training program we have posted Dr. Sudhanshu Sharma to your hospital for the period of 5 months from 01-09-2019 to 31-01-2020. Due to some official reason Dr. Sudhanshu Sharma has been suspended from the academic activities and clinical activities from 12th December 2019 until further order. Hence, instead of him we are posting Dr. Sunny Roy.

S.No.	Name of the PG Scholars	Department	Mobile No.	From
01	Dr. Sunny Roy	Shalya Tantra	8497808206	14th Dec -2019 to till further order

This is for your information.

Thanking you.

Yours truly

PRINCIPAL
Shri B.M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI 590 003

Copy to :
1) HoD Dept of Shalya Tantra for information.
2) PG Coordinator for information.

Shahapur, Belagavi – 590 003, Karnataka, India

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre

(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)

A Constituent Unit of

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED-TO-BE-UNIVERSITY)

(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)

First AYUSH Institution having NAAC & NABH Accreditation

IMPARTING AYURVEDA EDUCATION SINCE 1933

Ref: BMK/1282/2018-19 Dt: 12/12/18

To,

The Chief Medical Officer
Sreedhareeyam Ayuredic Eye Hospital
& Research Centre
Kottatokulum, Kerala

Sub: Posting of PG Scholars to your Hospital – reg.

Greetings from KLE AYUR WORLD

Sir,

With refrence to the above, as a part of teaching and training program and to provide hands on training on **"Ophthalmic Diagnosis and Treatment"**, we are deputing three following PG Scholars of department of Shalakya Tantra of our institute to department of Opthamology of your hospital & Research Centre is as follows.

Sl. No.	Name of the PG Scholar	Posting Date		No. of Months
		From	To	
1	Dr. Alreeza Fernandes	01/01/2019	28/02/2019	2 months
2	Dr. Neha Rawat	01/04/2019	30/04/2019	1 month
3	Dr. Rajeev Sharma	01/07/2019	31/07/2019	1 month

This is for your kind information and to accommodate the scholar.

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Cc to:

1. HoD Department of Shalakya Tantra – for information
2. PG Coordinator – for information
3. Posting file – for documentation.
4. Above PG Scholars – for information and to act.

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2486265 Fax: +91 831 2424157
Website: www.kleayurworld.edu.in, Email: bmkprincipal.kaher@kleayurworld.edu.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act 1956)

To

The Principal

KAHER'S

Shri BMK Ayurveda Mahavidyalaya

Shahapur Belagavi

Through

The HOD

Department of Shalakya Tantra

Sub- Regarding out posting to Shreedhareyam Kerala,K.C.G Hospital Bangalore, ,Yellur KLE Ggm and AIISH Mysore

Respected Sir,

We under signed 2nd year PG scholars kindly request you to give permission for out house posting (to Shreedhareyam Kerala, K.C.G Hospital Bangalore, Yellur KLE Ggm and AIISH Mysore).

Kindly do the needful and oblige. So, tentative schedule was enclosed.

Thanking you

Yours faithfully

Date- 10/12/18

Place- Belagavi

Dr. Neha

Dr. Alreeza fernandes

Dr. Rajeev Sharma

10/12/18
Forwarded for
kindly Approval

ATTESTED

Dr. V.K.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

PG.Coordinator

Posting File

KLE CENTENARY CHARITABLE HOSPITAL & MRC

KLE CENTENARY CHARITABLE HOSPITAL & MRC
YELLUR ROAD, BELAGAVI

REF.NO: KLE/CCH/ADM/2019-20/3050 DATE: 30/04/2019

TO,

PRINCIPAL
KLE University's
Shri B.M. Kankanwadi
Ayurveda Mahavidyalaya
Shahapur – BELAGAVI – 03

Sir,

Sub: Relieving of PG Dr. Alreeza Fernandes
Ref: Letter No.BMK/1283/201819 dtd.12/12/2018

With reference to the above mentioned subject and reference, **Dr. Alreeza Fernandes PG** has been relieved on 30/04/2019 AN. She has completed training from ENT (01/04/19 to 15/04/19) and Optholmology Dept (15/04/19 to 30/04/2019).

This is for your kind information.

Thanking you

yours faithfully

Director (CS)
30/4/19

CWC to:

- Director USM

Copies to:

- Dr. R.N Patil – HOD ENT
- Dr. Padmaja Hanji - HOD Opthol
- Dr. Alreeza Fernandes
- Office Copy

DATE - 03-05-19

95

PG Coordinator
Roo AC
HOD Shalakya

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Tel : 0485-2253007
0485-2276000 (30 lines)
0485-2251578
CIN : U85110KL2003PTC016141

SREEDHAREEYAM
Ayurvedic Eye Hospital & Research Centre (Pvt.) Ltd.

NABH accredited and ISO 9001-2008 certified Ayurvedic Hospital

IX/218, Nelliakkattu Mana, Kizhakombu P.O., Koothattukulam, Ernakulam Dist., Kerala, India - 686 662
E-mail : mail@sreedhareeyam.com, customercare@sreedhareeyam.com, Website : www.sreedhareeyam.com

SAEH/HRD/TRG/07 17.02.19

To

The Principal
KAHER's BMK Ayurveda Mahavidyalaya
Belagavi, Karnataka

Sub : Relieving Order.

Sir,

This is to inform you that Dr.Alreeza Fernandes, P G student of your college has been relieved from our hospital on 17.02.19 on completion of training from 01.01.2019 to 17.02.2019.

Thanking you

For Sreedhareeyam Ayurvedic Eye Hospital & Research Centre Pvt. Ltd

Maya George
Manager- HR

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre
(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)
A Constituent Unit of
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(DEEMED-TO-BE-UNIVERSITY)
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First AYUSH Institution having NAAC & NABH Accreditation

BMK-1470 | 2018-19 Date 30/1/19

IMPARTING AYURVEDA EDUCATION SINCE 1933

To,

Dr. Anand Pandit MD, FRCPCH
HON Professor & Director
Dept of Pediatrics, Neonatology
KEM Hospital, Pune

Sub: **Posting of PG Scholars to your Hospital – reg.**

Greetings from KLE AYUR WORLD

Sir,

With refrence to the above, as a part of teaching and training program and to provide hands on training on **"Pediatrics & Neonatology"**, we are deputing one of our PG Scholar **Dr. Mohit**, Department of Kumarabhritya to your hospital for **four months** from **20/02/2019 to 20/06/2019.**

This is for your kind information and to accommodate the scholar

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Cc to:

1. HoD Department of Kumarabhritya – for information
2. PG Coordinator – for information
3. Posting file – for documentation.

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2486286 Fax: +91 831 2424157
Website: www.kleayurworld.edu.in. Email: bmkprincipal.kaher@kleayurworld.edu.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010 Ka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA
Post Graduate Studies & Research Centre
(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED-TO-BE-UNIVERSITY)
(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)
First AYUSH Institution having NAAC & NABH Accreditation

BMK/1169/2018-19 Date 30/1/19

To,

Dr. Anand Pandit MD, FRCPCH
HON Professor & Director
Dept of Pediatrics, Neonatology
KEM Hospital, Pune

Sub: **Posting of PG Scholars to your Hospital – reg.**

Greetings from KLE AYUR WORLD

Sir,

With refrence to the above, as a part of teaching and training program and to provide hands on training on **"Pediatrics & Neonatology"**, we are deputing one of our PG Scholar **Dr. Archana B. Byahatti,** Department of Kumarabhritya to your hospital for **four months** from **15/02/2019 to 15/06/2019.**

This is for your kind information and to accommodate the scholar

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Cc to:

1. HoD Department of Kumarabhritya – for information
2. PG Coordinator – for information
3. Posting file – for documentation.

ATTESTED

Dr. V.A.Kothiwale
Registrar

KLE Academy of Higher Education and Research,
(Deemed-to-be University u/s 3 of UGC Act, 1956)
Shahapur, Belagavi – 590 003, Karnataka, India
Belagavi-590 010, Karnataka
Phone: +91 831 2486286 Fax: +91 831 2424157
Website: www. kleayurworld.edu.in, Email: bmkprincipal.kaher@kleayurworld.edu.in

To,

Date:24/01/2019

THE PRINCIPAL,

KAHERS's Shri B.M.K Ayurveda Mahavidyala PG Studies and Research Centre.

Shahapur, Belagavi-590003

Through,

PG CO-ORDINATOR,

KAHERS's Shri B.M.K Ayurveda Mahavidyala PG Studies and Research Centre.

Shahapur, Belagavi-590003

From,

Head Of Department

Dept of P G Studies in Kaumarbhritya,

KAHERS's Shri B.M.K Ayurveda Mahavidyala PG Studies and Research Centre.

Shahapur, Belagavi-590003

Respected Sir,

SUBJECT: Peripheral postings-Reg.

Sir, this is to request you to post **Dr. Archana B Byahatti** 2nd Year PG Scholar at KEM Hospital Pune. With regards to this subject we have **contacted them personally through telephone** and they have readily accepted to train her in pediatrics specialty. Hence I request you to consider our request and post her from **15th February 2019** for a period of four months.

Please consider the same and kindly do the need full.

Yours Sincerely,

Dr. Azizahmed I Arbar 24.1.2019

From: PG Scholar Department of PG Studies in Kaumarbhritya (2017 batch)

Recommended: forwarded to principal sir for consideration

28/1/2019.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre

(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)

A Constituent Unit of

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED-TO-BE-UNIVERSITY)

(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)

First AYUSH Institution having NAAC & NABH Accreditation

Ref: BMK/1279/2018-19 Dt: 12/12/18

IMPARTING AYURVEDA EDUCATION SINCE 1933

To,

The Medical Superintendent
9, 5th Cross Rd,
Behind Police Station,
Malleshwaram West,
Bengaluru – 560 003

Sub: **Posting of PG Scholars to your Hospital – reg.**

Greetings from KLE AYUR WORLD

Sir,

With refrence to the above, as a part of teaching and training program and to provide hands on training on **"Ophthalmic Diagnosis and Treatment"**, we are deputing two following PG Scholars of department of Shalakya Tantra of our institute to your hospital is as follows.

Sl. No.	Name of the PG Scholar	Posting Date		No. of Months
		From	To	
1	Dr. Neha Rawat	01/05/2019	30/06/2019	2 months
2	Dr. Rajeev Sharma	01/05/2019	30/06/2019	2 months

This is for your kind information.

Thanking you,

Yours truly,

PRINCIPAL
Shri B.M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Cc to:

1. HoD Department of Shalakya Tantra – for information
2. PG Coordinator – for information
3. Posting file – for documentation.
4. Above PG Scholars – for information and to act.

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2486288 Fax: +91 831 2424157
Website: www. kleayurworld.edu.in. Email: bmkprincipal.kaher@kleayurworld.edu.in

ATTESTED

Dr. V.A.Kothiwale
Registrar

KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre

(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)

A Constituent Unit of

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED-TO-BE-UNIVERSITY)

(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)

First AYUSH Institution having NAAC & NABH Accreditation

Ref: BMS/1280/2018-19

07:12/12/18

IMPARTING AYURVEDA EDUCATION SINCE 1933

To,

The Director
Department of AYUSH
Dhanwantri Road,
Bengaluru.

Sub: **Posting of PG Scholars to your Hospital – reg.**

Greetings from KLE AYUR WORLD

Sir,

With reference the above cited subject, as a part of curriculum activities and clinical exposure, we would like to post following two P.G. Scholars to Department of Shalakya Tantra (ENT) to K.C. General Hospital Bengaluru.

Sl. No.	Name of the PG Scholar	Posting Date		No. of Months
		From	To	
1	Dr. Neha Rawat	01/05/2019	30/06/2019	2 months
2	Dr. Rajeev Sharma	01/05/2019	30/06/2019	2 months

Hence, we request you to permit and issue the letter to the Medical Supertiendent K.C. General Hospital to undergo the posting in KC General Hospital Bengaluru.

This is for your kind information.

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03

Cc to:

1. HoD Department of Shalakya Tantra – for information
2. PG Coordinator – for information
3. Posting file – for documentation.
4. Above PG Scholars – for information and to act.

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2486286 Fax: +91 831 2424157
Website: www.kleayurworld.edu.in, Email: principal.kaher@kleayurworld.edu.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

164

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre
(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)
A Constituent Unit of
KLE ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED-TO-BE-UNIVERSITY)
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First AYUSH Institution having NAAC & NABH Accreditation

TSmed 2018-19/1280

12/12/2018

To,

The Director
Department of Medical Education
Ananda Rao Circle
Bengaluru

Sub: **Posting of PG Scholar to your Hospital – reg.**

Greetings from KLE AYUR WORLD

Sir,

With reference to the above cited subject, as part of curriculum activities and clinical exposure, we would like to post following PG scholar to Department of Shalakya Tantra (ENT/Ophtal) to K.C. General Hospital Bengaluru.

Sl. No.	Name of the PG Scholar	Posting Date		No. of Months
		From	To	
1	Dr. Neha Rawat	01/05/2019	30/06/2019	2 months

Hence, we request you to permit and issue the letter to the Medical Superintendent K.C. General Hospital to undergo the posting in KC General Hospital Bengaluru.

This is for your kind information.

Thanking you,

Yours truly,

PRINCIPAL
Shri B.M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

Cc to:

1. HoD Department of Shalakya Tantra – for information
2. PG Coordinator – for information
3. Posting file – for documentation.
4. Above PG Scholar – for information and to act.

Shahapur, Belagavi - 590 003, Karnataka, India
Phone: +91 831 2426286 Fax: +91 831 2424157
Website: www.kleayurworld.edu.in Email: bmkprincipal.kaher@kleayurworld.edu.in

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI B M KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre

(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)

A Constituent Unit of

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED-TO-BE-UNIVERSITY)

(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)

First AYUSH Institution having NAAC & NABH Accreditation

Ref: BMK/154/2018-19 Date: 9/5/2018

IMPARTING AYURVEDA EDUCATION SINCE 1933

To,

Dr Ravishankar Pervaje
Susrutha Ayurveda Hospital
Bolwar, Puttur, Karnataka -574201

Sir,

Sub: Posting of PG Scholars to your Hospital reg.

Greetings from KLE AYUR WORLD

With reference to the above, as a part of teaching & training program and to provide hands on training on **"Exposure to Maximum Surgery Patients''**, we are deputing the one of our PG Scholar **Dr Anuruddh Gupta**, Department of Shalya Tantra to your Hospital for **Three months** from 20/05/2018 to 20/08/2018.

This is for your kind information and to accommodate the scholar.

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanawadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03

Cc to:

1. HOD Dept of Shalya Tantra - for infn
2. PG Co-ordinator-for infn
3. Posting file-for Documentation

Received
17.05.18

Shahapur, Belagavi - 590 003, Karnataka, INDIA
Ph. No. : +91 831 2486286, Fax : +91 831 2424157 Website : www.kleayurworld.edu.in Email : bmkprincipal@gmail.com

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

The Karnatak Cancer Therapy & Research Institute
Padmashree Dr. R.B. Patil Cancer Hospital
Navanagar, HUBLI 580 025, Karnataka State, India. Phone: 0836 2228217, 2222885
Fax 0836-2323167 - 2322063 Website www.cancerinstitutehubli.org E-mail: kctrihubli@gmail.com

KCH/CRT/SDM/LM-01/2019 Date: 16/04/2019

CERTIFICATE

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Dr. Lima Mol Mathew, fellowship student in the Department of Ayuroncology, KLE'S Shri. B.M.Kankanwadi Ayurved Mahavidyalaya, BELGAUM has attended posting in Department of Radiation Oncology, Medical Oncology and surgical oncology from 10-01-2019 to 16/04/2019.

She has examined various Cancer patients, observed different techniques of Radiation like Conventional RT, 3DCRT, IMRT, IGRT/VMAT, Radiation planning and treatment execution and followup of post RT cases and Medical and Surgical Oncology cases management.

She was regular and sincere

We wish her all the best for her future endeavours.

Dr. Sai Kumari
Chief Consultant
Radiation Oncologist
Dr. SAIKUMARI. R. T.
Reg. No: 71344
Consultant Radiation Oncologist
KCTRI, Navanagar, Hubli-580025

Dr. Basavaraj
Consultant
Radiation Oncologist
Dr. BASAVARAJ. H.
Reg. No: 93345
Consultant Radiation Oncologist
KCTRI, Navanagar, Hubli-580025

Dr. Kiran Kattimani
Consultant
Medical Oncologist
Consultant Medical & Haemato Oncologist
KCTRI, Navanagar, Hubli-580025

Dr. Santosh Chikaraddi
Consultant Surgical Oncologist
Dr. SANTOSH CHIKARADDI
Reg. No: 71185
Consultant Surgical Oncologist
KCTRI Navanagar, Hubli-580025

HUBBALLI 580 025

Dr. Manjula Huggi
Administrator
Dr. Manjula Huggi
Administrator NABH Co-ordinator
KCTRI Navanagar, Hubli

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

The Karnataka Cancer Therapy & Research Institute

Padmashree Dr. R.B. Patil Cancer Hospital

Navanagar, HUBLI - 580 025 Karnataka State, India Phone : 0836 2228217, 2227665

Fax : 0836-2323167 2322063 Website www.cancerinstitutehubli.org Email kctrihubli@gmail.com

KCHCRT/SDM/LM-01/2019

Date: 16/04/2019

CERTIFICATE

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Dr. Lima Mol Mathew , fellowship student in the Department of Ayuroncology, KLE'S Shri. B.M.Kankanwadi Ayurved Mahavidyalaya, BELGAUM has attended posting in Department of Radiation Oncology, Medical Oncology and surgical oncology from 10-01-2019 to 16/04/2019.

She has examined various Cancer patients, observed different techniques of Radiation like Conventional RT, 3DCRT, IMRT, IGRT/VMAT, Radiation planning and treatment execution and followup of post RT cases and Medical and Surgical Oncology cases management.

she was regular and sincere.

We wish her all the best for her future endeavours.

Dr.Sai Kumari
Dr. SAIKUMARI. R. T.
MBBS, DMRT, DNB., Radiotherapy
Reg. No: 71344
Consultant Radiation Oncologist
KCTRI, Navanagar, Hubli-580025

Dr.Basavaraj
Dr. BASAVARAJ. H.
MBBS, DMRT, DNB.,(RT)
Reg. No: 80805
Consultant Radiation Oncologist
KCTRI, Navanagar, Hubli-580025

Dr.Kiran Kattimani
Dr. Kiran Kattimani
MD (Gen Med), DM (Med Oncol)
Reg. No: 51644 (K.M.C.)
Consultant Medical & Haemato Oncologist
KCTRI, Navanagar, Hubli-580025

Dr.Santosh Chikaraddi
Consultant Surgical Oncologist
Dr. SANTOSH CHIKARADDI
MBBS MS Mch.
Reg. No: 71185
Consultant Surgical Oncologist
KCTRI Navanagar, Hubli-580025

Dr.Manjula Huggi
Administrator
Dr. Manjula Huggi
Administrator NABH Co-ordinator

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

The Karnatak Cancer Therapy & Research Institute

Padmashree Dr. R.B. Patil Cancer Hospital

Navanagar, HUBLI - 580 025, Karnataka State, India Phone: 0836 2228217, 2222865
Fax: 0836 2323167 - 2322063 Website: www.cancerinstitutehubli.org E mail: kctrihubli@gmail.com

KCH CRT/SDM/GM-01/2019

Date: 04/05/2019

CERTIFICATE

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Dr. Ganesh Pandurang Malwade**, fellowship student in the Department of Ayuroncology, KLE'S Shri. B.M.Kankanwadi Ayurved Mahavidyalaya, BELGAUM has attended posting in Department of Radiation Oncology, Medical Oncology and surgical oncology from 10-01-2019 to 04/05/2019.

He has examined various Cancer patients, observed different techniques of Radiation like Conventional RT, 3DCRT, IMRT, IGRT/VMAT, Radiation planning and treatment execution and followup of post RT cases and Medical and Surgical Oncology cases management.

He was regular and sincere.

We wish him all the best for his future endeavours.

Dr. ... Chief ... Radiation Oncologist
Dr. ... R. T.
Reg. No: ...1344
Consultant Radiation Oncologist
KCTRI, Navanagar, Hubli-580025

Dr. Basavaraj
Radiation Oncologist
Dr. BASAVARAJ. H.
MBBS, DMRT, DNB (RT)
Reg. No: 90595
Consultant Radiation Oncologist
KCTRI, Navanagar, Hubli-580025

Dr. Kiran Kattimani
Medical Oncologist
Dr. Kiran Kattimani
MD (Gen Med), DM (Med Onco)
Reg. No: 51644 (K.M.C.)
Consultant Medical & Haemato Oncologist
KCTRI, Navanagar, Hubli-580025

Dr. Santosh Chikaraddi
Consultant Surgical Oncologist
Dr. SANTOSH CHIKARADDI
MBBS MS Mch

Dr. Manjula Hugar
Administrator

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

SHRI B M KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre

(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)

A Constituent Unit of

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED-TO-BE-UNIVERSITY)

(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)

First AYUSH Institution having NAAC & NABH Accreditation

Ref- BmK\51\19-20 Date: 9-04-2019

To,

Dr C D Sahadevan.
Dhanwanthari Vaidyasala
Thodupuzha (IP Hospital)
H.O Thodupuzha, Idukki, Kerala, India

Sub: Posting of Ayurveda Oncology Fellowship scholars- Reg

Dear Sir,

Shri B. M. Kankanawadi Ayurveda Mahavidyalaya, PG Studies and Medical Research Centre, A constituent unit of K L E Academcy of Higher Education and Research, Belagavi, Karnataka has started Fellowship course in Ayurveda Oncology from the academic year 2017 with an objectives of exploring Ayurveda in cancer and creating human resources to aid & extend alternate therapies for Cancer.

Importance of integrated approach to cancer patients was conceived much earlier by Institute, which has become need of hour by keeping patient centric therapies, Institute has taken a step in this regards and started various activities from organising regular free cancer camps to start a special Fellowship course in Ayurveda Oncology (Duration 2 years) In collaboration with Rasayu Cancer Clinic, PUNE which is dedicated Ayurveda cancer centre since two decade. Presently we have two batches (2017 and 2018) and four scholars, who have been deliberated about concepts & principles of Ayurveda in relation to cancer. They have also been trained in conventional diagnostics at multiple cancer centres.

As per our formal conversation in NIRVISHA 2018 held on 25-27 October 2018, Institute would also like to post the Fellowship scholars to your esteemed Institute's special cancer care centre for acquiring and enhancing clinical acumen in Ayurveda oncology for a period of two months. We hope you extend your assistance to our course. Awaiting for your valuable response.

Thanking you

Yours Truly,

PRINCIPAL
Shri B. M. Kankanwadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03.

IMPARTING AYURVEDA EDUCATION SINCE 1933

Shahapur, Belagavi - 590 003, Karnataka, INDIA
Ph. No. : +91 831 2486286, Fax : +91 831 2424157 Website : www.kleayurworld.edu.in Email : bmkprincipal@gmail.com

ATTESTED

Dr. V.N.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI B M KANKANAWADI AYURVED MAHAVIDYALAYA

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First AYUSH Institution having NAAC & NABH Accreditation

IMPARTING AYURVEDA EDUCATION SINCE 1933

Ref no BMK/132/2019-20 Date: 6-5-2019

To,

Dr C D Sahadevan.
Dhanwanthari Vaidyasala
Thodupuzha (IP Hospital)
H.O Thodupuzha, Idukki, Kerala,

Sub: Ayurveda Oncology Fellowship Scholars Posting- Reg.

Dear Sir,

As per our email communication dated on 3-5-2019 regarding posting of Ayurveda Oncology fellowship scholars, we are thankful to you and extend our gratitude for approval to provide Ayurveda clinical acumen to them and helping in creating human resource to serve cancer patients. We are posting following scholars for a period of two months from 6-5-2019 to 5-7-2019 as per your message.

1. Dr Lima Mathew MD
2. Dr Ganesh Malwade MD
3. Dr Abhishek Shukla MD [will be posted for only fifteen days in may 2019]

Thanking you.

Yours Truly

PRINCIPAL
Shri B. M. Kankanwadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03

Shahapur, Belagavi - 590 003, Karnataka, INDIA
Ph. No. : +91 831 2486286, Fax : +91 831 2424157 Website : www.kleuniworld.edu.in Email : bmkprincipal@gmail.com

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)

KLES
DR.PRABHAKAR KORE HOSPITAL
CHIKKODI

Basaya Circle, Chikkodi Dist : Belagavi-591 201
Karnataka-India Phone : 08338 - 274771 / 72 / 73 / 74
Email : klehospchikkodi@gmail.com

ಕೆ. ಎಲ್. ಇ. ಸಂಸ್ಥೆಯ
ಡಾ. ಪ್ರಭಾಕರ ಕೋರೆ ಆಸ್ಪತ್ರೆ -ಚಿಕ್ಕೋಡಿ

ಬಸವ ವರ್ತುಲ, ಚಿಕ್ಕೋಡಿ ಜಿ : ಬೆಳಗಾವಿ-591 201
ಕರ್ನಾಟಕ-ಇಂಡಿಯಾ ಫೋನ್ ನಂ.: 08338-274771/72/73/74
ಇಮೇಲ್ : klehospchikkodi@gmail.com

REF.NO.:KLES/DR.PKHOSP/ADM/HR/2019-20/236 **Date:** 14-04-2019

COMPLETION CERTIFICATE

This is to certify that ***Dr. Arbaz Mudhnal*** *has successfully completed* ***Post Graduate Scholars Posting*** *at KLES Dr. Prabhakar Kore Hospital Chikodi from 15-03-2019 to 14-04-2019.*

We found him sincere, hardworking and result oriented. He worked well as part of a team during his tenure. We take this opportunity to thank him and wish him all the best for future.

Medical Director I/C

Prashanth ADM HR Completion Certificate

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

PG coordinator

KLES
DR.PRABHAKAR KORE HOSPITAL
CHIKKODI

Basava Circle, Chikkodi Dist : Belagavi-591 201
Karnataka-India Phone : 08338 - 274771 / 72 / 73 / 74
Email : klehospchikkodi@gmail.com

ಕೆ. ಎಲ್. ಇ. ಸಂಸ್ಥೆಯ
ಡಾ. ಪ್ರಭಾಕರ ಕೋರೆ ಆಸ್ಪತ್ರೆ -ಚಿಕ್ಕೋಡಿ

ಬಸವ ಸರ್ಕಲ್, ಚಿಕ್ಕೋಡಿ ಜಿ : ಬೆಳಗಾವಿ-591 201
ಕರ್ನಾಟಕ-ಇಂಡಿಯಾ ಫೋನ್ ನಂ.:08338-274771/72/73/74
ಇಮೇಲ್ : klehospchikkodi@gmail.com

REF.NO.:KLES/DR.PKHOSP/ADM/HR/2019-20/243 Date: 14-05-2019

COMPLETION CERTIFICATE

This is to certify that Dr. Vivek has successfully completed Post Graduate Scholars Posting at KLES Dr. Prabhakar Kore Hospital Chikodi from 15-04-2019 to 14-05-2019.

We found him sincere, hardworking and result oriented. He worked well as part of a team during his tenure. We take this opportunity to thank him and wish him all the best for future.

PG Coordinator

ADMINISTRATOR
Administrator
K.L.E. Dr. Prabhakar Kore Hospital
Basava Circle, Chikodi-591 201

DATE - 20/5/19

ATTESTED

D.V.A.Kothivale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA

Post Graduate Studies & Research Centre
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(Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)
First AYUSH Institution having NAAC & NABH Accreditation

Ref: BMK/1085/2018-19 Dt: 3/11/18

IMPARTING AYURVEDA EDUCATION SINCE 1933

To,

Dr. Ravishankar Pervaje
Susrutha Ayurveda Hospital
Bolwar, Puttur, Karnataka – 574201

Sub: **Posting of PG Scholars to your Hospital – reg.**

Greetings from KLE AYUR WORLD

Sir,

With refrence to the above, as a part of teaching and training program and to provide hands on training on **"Exposure to Maximum Surgery Patients"**, we are deputing the one of our PG Scholar **Dr. Praveen K. Yadav**, Department of Shalya Tantra to your Hospital for **Two months** from **03-02-2019 to 03-04-2019.**

This is for your kind information and to accommodate the scholar.

Thanking you,

Yours truly,

PRINCIPAL
Shri B. M. Kankanwadi
Ayurved Mahavidyalaya
A Constituent Unit of KAHER
Shahapur, BELAGAVI-03

Cc to:

1. HoD Department of Shalya Tantra – for information
2. PG Coordinator – for information
3. Posting file – for documentation.

Shahapur, Belagavi – 590 003, Karnataka, India
Phone: +91 831 2486286 Fax: +91 831 2424157
Website: www. kleayurworld.edu.in. Email: bmkprincipal.kaher@kleayurworld.edu.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

MEMORANDUM OF UNDERSTANDING

BETWEEN

KLE Academy of Higher Education and Research's Dr. Prabhakar Kore Basic Science Research Centre, Belagavi, herein represented by

Deputy Director

KLE Academy of Higher Education and Research's Dr. Prabhakar Kore Basic Science Research Centre, Belagavi, Karnataka, India

AND

Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa, herein represented by

Principal

Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

Ref

This MoU is executed on Date 06.06.2019 between "Dr. Prabhakar Kore Basic Science Research Center", a premier centre of Excellence, which expression shall mean and include unless repugnant to context hereof, it's successor-in-interest, administrators and assigns.

"Dr. Prabhakar Kore Basic Science Research Centre"is one of the research centres with a built up area of 10,000 Sq. ft. hosting five labs that engage in basic research with state-of-the-art facilities for staff and research scholars. The research centre is focused on the key areas of Molecular Biology, Medical Microbiology, Pharmaceutical Analysis, Natural Product Research, and Cell Culture. The centre is located at IIIrd floor, V. K. Institute of Dental Sciences Campus, KLE Academy of Higher Education and Research, Nehru Nagar, Belagavi, - 590010, Karnataka, India.

AND

Dnyanprassarak Mandal's College and Research Centre, as permanently affiliated to Goa University on 20th June 1988 and further the Department of Chemistry was granted permanent affiliation on 21st April 2005, having its office at Assagao, Khorlim, Bardez, Goa - 403507.

"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa", is a premier institution, engaged in higher education and research & development and knowledge intensive consulting organization, working on fundamental science and developing state-of-the art technologies and providing training to the students for their post graduate and doctorate (hereinafter called "DM's College and Research Centre"), which expression shall, where the context so admits, include its successors and permitted assigns of the other part.

Whereas,

The parties have discussed and deliberated on various items of mutual interest and benefits and have deemed expedient to execute this memorandum of understanding so as to mutually co-operate in the field of curricula, research, training programs, and joint publications etc.

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

1. **Agreement on Sharing of Facilitates**

1.1 Both the organizations have agreed to share their respective R & D facilities in order to promote academic and research interaction.

1.2 There will be provision for mutual sharing of experts from **"Dr. Prabhakar Kore Basic Science Research Centre"**and resource persons from **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa".**

2. **Agreement on Joint R & D Projects**

2.1 Research projects in the identified areas will be jointly undertaken by **"Dr. Prabhakar Kore Basic Science Research Centre"** and from **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa".** Both the organizations will submit collaborative research projects to various National and International funding agencies. Both the organizations would ensure the successful completion of the funded research projects.

2.2 For all the matters concerned a coordination committee overseeing the issues consisting of four members (two members from **"Dr. Prabhakar Kore Basic Science Research Centre"** and two members from **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa"**) for identifying the issues in joint R & D projects to be carried out under this MoU. The ethical approval of the projects undertaken would be granted by Ethics sub committees of **"Dr. Prabhakar Kore Basic Science Research Centre"** and **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa",** as registered under law.

3. **Agreement on Technology transfer:**

3.1 Both **"Dr. Prabhakar Kore Basic Science Research Centre"** and **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa".** agree mutually to share the technology transfer benefits whenever feasible.

4. **Agreement on Joint Seminar/conference/Workshops/Hands on training programmes.**

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

4.1 Both **"Dr. Prabhakar Kore Basic Science Research Centre"** and **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa"** agree to hold/conduct events (joint Conference/Workshop/Hands on training programmes) whenever feasible in **"Dr. Prabhakar Kore Basic Science Research Centre" or "Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa".**

5. Agreement on Industrial visits:

5.1. Both **"Dr. Prabhakar Kore Basic Science Research Centre"** and **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa"**, agree to organize industrial visits whenever feasible, for the students, staff and delegates and also during the Conference / Workshop/ Hands on training programmes.

6. Agreement on Industrial training:

6.1 Both **"Dr. Prabhakar Kore Basic Science Research Centre"** and **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa"** agree to train the students and staff by organizing industrial training programmes whenever feasible related to technology, analytical development, validation and documentation etc.

7. Agreement on Placements:

7.1 Both **"Dr. Prabhakar Kore Basic Science Research Centre"** and **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa"**, agree to provide summer internships to students. This helps in motivating the students, understanding industry environment and practices, job profiles, projects they can undertake besides facilitating them to earn some money to be spent usefully in the next academic year / semester.

8. Agreement on Duration, Amendment and Termination of MoU

8.1 This MoU shall be valid for a period of five years from the date of its signing. During the period of the validity, the MoU can be amended any time by mutual consent of both the parties in writing. The MoU can also be terminated by either

ATTESTED

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Registrar
KLE Academy of Higher Education and Research,
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Belagavi-590 010,Karnataka

party giving the order a written notice of its desire to terminate the MoU by giving three months notice in advance. In the event of such termination both the parties shall cooperate in good spirit for the completion of the ongoing researchers.

8.2 In witness whereof of the two parties have signed this memorandum of understanding by the hand of, on behalf of **"Dr. Prabhakar Kore Basic Science Research Centre"** and by the hand on behalf of **"Dnyanprassarak Mandal's College and Research Centre, Assagao-Goa"** on the date, month and year referred to above.

Deputy Director

KAHER's Dr. Prabhakar Kore Basic Science Research Center, Nehru Nagar, Belagavi -10, Karnataka, INDIA

Principal

Dnyanprassarak Mandal's College and Research Centre, Assagao – Goa, INDIA

Witness:

1. **Dr. Sanjay Mishra**

3. **Dr. Vidya Desai**

2. **Dr. Suneel Dodamani**

4. **Dr. Rajesh Pednekar**

ATTESTED

Dr. V.A.Kothiwale

ATTESTED

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KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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Belagavi-590 010,Karnataka

ATTESTED

Dr. V A Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of UGC Act 1956)
Belagavi-590 010, Karnataka

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA.
(Formerly known as KLE University) (Deemed to be University u/s 3 of the UGC Act, 1956)
DR. PRABHAKAR KORE BASIC SCIENCE RESEARCH CENTER [BSRC], BELAGAVI, KARNATAKA.
III Floor, V. K. Institute of Dental Sciences Campus, Nehru Nagar, Belagavi - 590 010, Karnataka – INDIA
E-mail: research@kledeemeduniversity.edu.in; Web: www.klepkbsrc.org, Phone: 0831- 2444444, Extn. 4122

Ref.No: KAHER/BSRC/19-20/20 Date: 1st June 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Pooja Palni,** [M.Sc. in Pharmaceutical Chemistry Final Year at Dnyanprassarak Mandal's College and Research Center, Assagao, Goa] worked in laboratories viz. Microbiology, Cell Culture, Molecular Biology, Biopharmaceutics/Instrumentation and Natural Product Research at KLE Academy of High Education and Research's [KAHER] University's Dr. Prabhakar Kore Basic Science Research Centre [BSRC], Belagavi, Karnataka. She worked for practical experience from 27th May 2019 to 1st June 2019.

We wish her all the best in her future endeavor.

Dr. Prabhakar Kore Basic Science Research Center (BSRC) * KLE Academy of Higher Education and Research, Belagavi.

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10, Karnataka, India.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA.
(Formerly known as KLE University) (Deemed-to-be-University u/s 3 of the UGC Act, 1956)
DR. PRABHAKAR KORE BASIC SCIENCE RESEARCH CENTER [BSRC], BELAGAVI, KARNATAKA.
III Floor, V. K. Institute of Dental Sciences Campus, Nehru Nagar, Belagavi - 590 010, Karnataka – INDIA
E-mail: research@kledeemeduniversity.edu.in; Web: www.klepkbsrc.org, Phone: 0831- 2444444, Extn. 4122

Ref.No: KAHER/BSRC/19-20/26

Date: 1st June 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Harsha Pangam,** [M.Sc. in Pharmaceutical Chemistry Final Year at Dnyanprassarak Mandal's College and Research Center, Assagao, Goa] worked in laboratories viz. Microbiology, Cell Culture, Molecular Biology, Biopharmaceutics/Instrumentation and Natural Product Research at KLE Academy of High Education and Research's [KAHER] University's Dr. Prabhakar Kore Basic Science Research Centre [BSRC], Belagavi, Karnataka. She worked for practical experience from 27th May 2019 to 1st June 2019.

We wish her all the best in her future endeavor.

Dr. Prabhakar Kore Basic Science Research Centre (BSRC) KLE Academy of Higher Education and Research, Belagavi.

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10. Karnataka. India.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA.
(Formerly known as KLE University) (Deemed-to-be-University u/s 3 of the UGC Act, 1956)
DR. PRABHAKAR KORE BASIC SCIENCE RESEARCH CENTER [BSRC], BELAGAVI, KARNATAKA.
III Floor, V. K. Institute of Dental Sciences Campus, Nehru Nagar, Belagavi - 590 010, Karnataka – INDIA
E-mail: research@kledeemeduniversity.edu.in, Web: www.klepkbsrc.org, Phone: 0831- 2444444, Extn. 4122

Ref.No: KAHER/BSRC/19-20/25

Date: 1st June 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Sneha Birodkar,** [M.Sc. in Organic Chemistry Final Year at Dnyanprassarak Mandal's College and Research Center, Assagao, Goa] worked in laboratories viz. Microbiology, Cell Culture, Molecular Biology, Biopharmaceutics/Instrumentation and Natural Product Research at KLE Academy of High Education and Research's [KAHER] University's Dr. Prabhakar Kore Basic Science Research Centre [BSRC], Belagavi, Karnataka. She worked for practical experience from 27th May 2019 to 1st June 2019.

We wish her all the best in her future endeavor.

Dr. Prabhakar Kore Basic Science Research Center (BSRC) KLE Academy of Higher Education and Research, Belagavi.

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10. Karnataka. India.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA.
(Formerly known as KLE University) (Deemed-to-be-University u/s 3 of the UGC Act, 1956)
DR. PRABHAKAR KORE BASIC SCIENCE RESEARCH CENTER [BSRC], BELAGAVI, KARNATAKA.
III Floor, V. K. Institute of Dental Sciences Campus, Nehru Nagar, Belagavi - 590 010, Karnataka – INDIA
E-mail: research@kledeemeduniversity.edu.in; Web: www.klepkbsrc.org, Phone: 0831- 2444444, Extn. 4122

Ref.No: KAHER/BSRC/19-20/24

Date: 1st June 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Yadika Fadte,** [M.Sc. in Organic Chemistry Final Year at Dnyanprassarak Mandal's College and Research Center, Assagao, Goa] worked in laboratories viz. Microbiology, Cell Culture, Molecular Biology, Biopharmaceutics/Instrumentation and Natural Product Research at KLE Academy of High Education and Research's [KAHER] University's Dr. Prabhakar Kore Basic Science Research Centre [BSRC], Belagavi, Karnataka. She worked for practical experience from 27th May 2019 to 1st June 2019.

We wish her all the best in her future endeavor.

Dr. Prabhakar Kore Basic Science Research Centre (BSRC) KLE Academy of Higher Education and Research, Belagavi.

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10, Karnataka, India.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA.
(Formerly known as KLE University) (Deemed to be University u/s 3 of the UGC Act, 1956)
DR. PRABHAKAR KORE BASIC SCIENCE RESEARCH CENTER [DSRC], BELAGAVI, KARNATAKA.
III Floor, V. K. Institute of Dental Sciences Campus, Nehru Nagar, Belagavi - 590 010, Karnataka – INDIA
E-mail: research@kledeemeduniversity.edu.in; Web: www.klepkbsrc.org, Phone: 0831-2444444, Extn: 4122

Ref.No: KAHER/BSRC/19-20/22 Date: 1st June 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Nikita Dhuri,** [M.Sc. in Organic Chemistry Final Year at Dnyanprassarak Mandal's College and Research Center, Assagao, Goa] worked in laboratories viz. Microbiology, Cell Culture, Molecular Biology, Biopharmaceutics/Instrumentation and Natural Product Research at KLE Academy of High Education and Research's [KAHER] University's Dr. Prabhakar Kore Basic Science Research Centre [BSRC], Belagavi, Karnataka. She worked for practical experience from 27th May 2019 to 1st June 2019.

We wish her all the best in her future endeavor.

Dr. Prabhakar Kore Basic Science Research Center (DSRC) KLE Academy of Higher Education and Research, Belagavi.

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10, Karnataka India.

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA.
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Ref.No: KAHER/BSRC/19-20/21

Date: 1st June 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Suvidha Natekar,** [M.Sc. in Organic Chemistry Final Year at Dnyanprassarak Mandal's College and Research Center, Assagao, Goa] worked in laboratories viz. Microbiology, Cell Culture, Molecular Biology, Biopharmaceutics/Instrumentation and Natural Product Research at KLE Academy of High Education and Research's [KAHER] University's Dr. Prabhakar Kore Basic Science Research Centre [BSRC], Belagavi, Karnataka. She worked for practical experience from 27th May 2019 to 1st June 2019.

We wish her all the best in her future endeavor.

Dr. Prabhakar Kore Basic Science Research Centre BSRC KLE Academy of Higher Education and Research, Belagavi.

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10. Karnataka. India.

ATTESTED

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KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA.
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DR. PRABHAKAR KORE BASIC SCIENCE RESEARCH CENTER [BSRC], BELAGAVI, KARNATAKA.
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E-mail: research@kledeemeduniversity.edu.in, Web: www.kaher.org, Phone: 0831-2444444, Extn: 4122

Ref.No: KAHER/BSRC/19-20/23 Date: 1st June 2019

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Akshika Raikar, [M.Sc. in Organic Chemistry Final Year at Dnyanprassarak Mandal's College and Research Center, Assagao, Goa] worked in laboratories viz. Microbiology, Cell Culture, Molecular Biology, Biopharmaceutics/Instrumentation and Natural Product Research at KLE Academy of High Education and Research's [KAHER] University's Dr. Prabhakar Kore Basic Science Research Centre [BSRC], Belagavi, Karnataka. She worked for practical experience from 27th May 2019 to 1st June 2019.

We wish her all the best in her future endeavor.

Dr. Prabhakar Kore Basic Science Research Center (BSRC) KLE Academy of Higher Education and Research, Belagavi

Dr. Sunil S. Jalalpure
DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10, Karnataka, India.

ATTESTED

Dr. V.A.Kothiwale
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KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

Dnyanprassarak Mandal's
College and Research Centre
Assagao, Bardez - Goa 403 507
Inspiring, Igniting and Transforming to Excel
(Affiliated to Goa University and recognised by U.G.C. under sections 2f and 12B of the UGC Act of 1956)
Accredited by NAAC with 'A' Grade (3rd cycle)
✆ (O): (0832) 2268488 Fax : (0832) 2268683

DMCRC/CC/2018-19/3857 [illegible] Chemistry Date: 15/5/2019

Dear Dr. Mishra

The Research Centre of the Department of Chemistry of our college is conducting a one week short term certificate course on " Research Training and Technical Writing in Chemical Sciences" for undergraduate and post-graduate students of chemistry from 6th June 2019 onwards.

In view of this, I would like to request you to conduct a session for the course on 6th June 2019. With your vast experience and expertise in this field of research it will benefit the participants of this course to a great extent.

Thanking you,

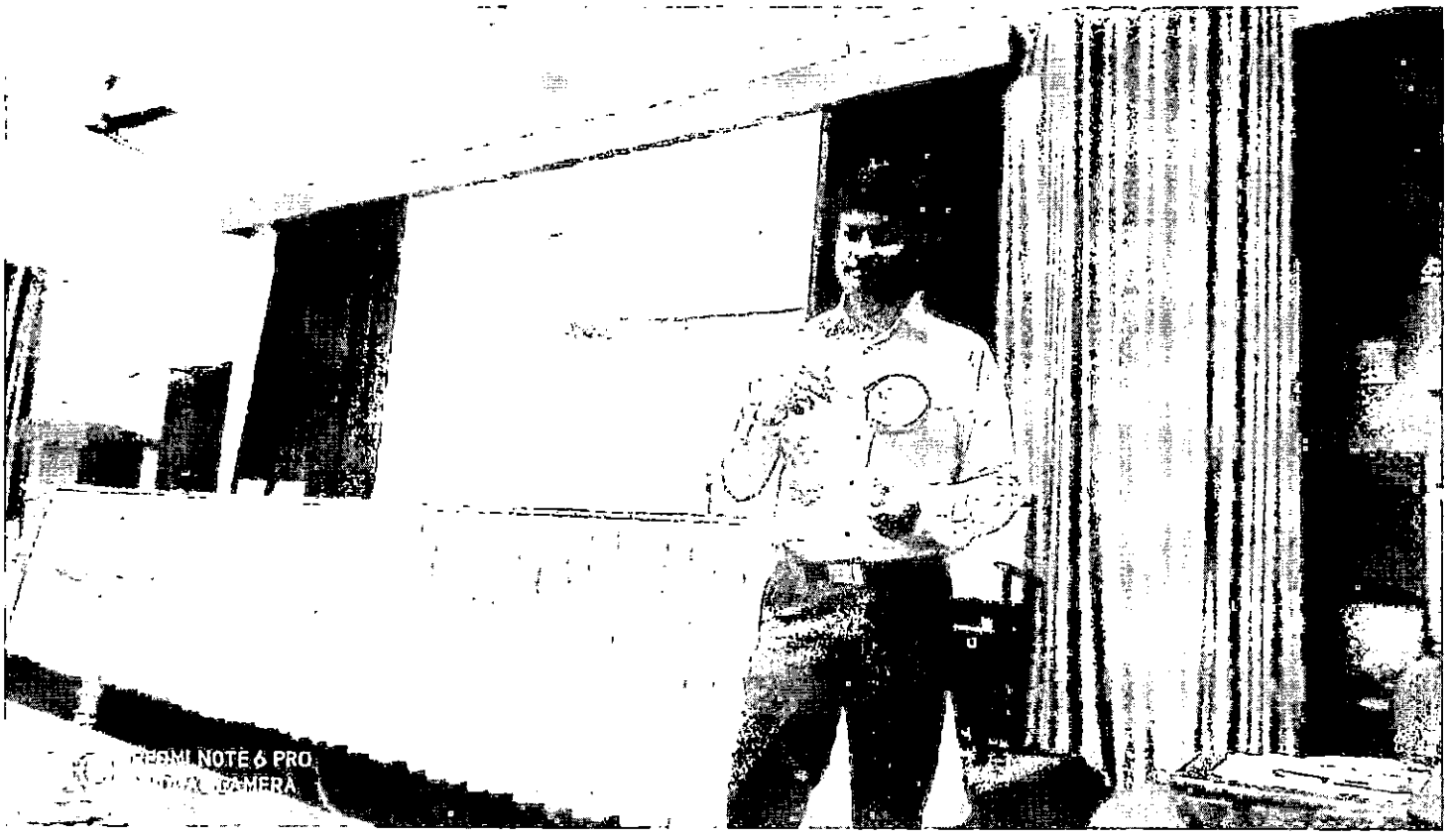
Yours sincerely,

(Dr. D. B. Arolkar)
Principal

Dnyanprassarak Mandal's College And Research Centre Assagao, Bardez, Goa 403 507

To
Dr. Sanjay Mishra,
Scientist - Grade II,
Dr. Prabhakar Kore Basic Science Research Centre,
KLE Academy of Higher Education and Research,
Belagavi.

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka



ATTESTED

Dr. V.A.Kothiwale
Registrar
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Belagavi-590 010,Karnataka

INSTITUTE OF PUBLIC HEALTH
BENGALURU

31st May 2019

IPH/2019 - 20/I /93

To Whom It May Concern

This is to certify that Jagadeesh Mathpati has completed internship programme with the Institute of Public Health (IPH), Bengaluru from 1st April 2019 to 31st May 2019.

During his internship, he has assisted the PI and other members on fieldwork and survey on Kyasanur Forest disease in and around Tirthahalli.

He has completed all the requirements of his internship suitably and his work quality was along the high standards expected out of this internship. His conduct and attitude towards work was professional.

We wish him success in all his future endeavors.

Yours sincerely

Dr. Prashanth N.S,
Faculty and Wellcome Trust DBT India Alliance Fellow,
Institute of Public Health,
Bengaluru.

Indian Society of Health Administrators (ISHA).
3009, II-A Main, 17th Cross, Banashankari II Stage, K.R. Road, Bengaluru-560 070
Contact : 080 26611... mail@iphindia.org, www.iphindia.org

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Belagavi-590 010,Karnataka

INSTITUTE OF PUBLIC HEALTH
BENGALURU
Strengthening health systems since 2007

IPH/2019 - 20/173

To Whom It May Concern

This is to certify that Gururaj Ajagol has completed internship programme with the Institute of Public Health (IPH), Bangalore from 1st April 2019 to 31st May 2019.

During his internship he has worked with the cluster lead in the cluster, Chronic Health Conditions & Public Policy. He worked in a project that aimed to understand concerns of elected leaders regarding tobacco in India. He used qualitative data analysis techniques doing document analysis. He participated in academic events, including seminars at IPH and presented a seminar at IPH based on his internship work.

He has completed all the requirements of the internship suitably and his work quality was along the high standards expected out of this internship. His conduct and attitude towards work was professional.

We wish her success in all her future endeavors.

Yours sincerely,

Dr.Upendra Bhojani
Assistant Director (Policy)
Institute of Public Health.
Bengaluru.

Indian Society of Health Administrators (ISHA).
3009, II-A Main, 17th Cross, Banashankari II Stage, K.R. Road, Bengaluru-560 070
Contact : 080 26761322, mail@iphindia.org, www.iphindia.org

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MODEL RURAL HEALTH RESEARCH UNIT
DEPARTMENT OF HEALTH RESEARCH, MINISTRY OF HEALTH & FW, GOVT OF INDIA
SIRWAR, RAICHUR (DIST), KARNATAKA

MRHRU/2019-20/TRNG/05

07/06/19

Certificate

This is to certify that **Dr. Veeresh B Biradar, student of the Masters in Public Health course of KLE Academy of Higher Education and Research, Belagavi (Registration No. FL0117013)** *has carried out Internship project at MRHRU Sirwar, Raichur on Nutritional assessment of 1-5-year old children, adolescent girls, infants, and pregnant women in 10 villages of Manvi and Devadurga talukas of Raichur District from 1st April to 24th May 2019.*

07/06/19

Dr.Subarna Roy
Scientist F and Nodal Officer, MRHRU

मुख्य अन्वेषी / NODAL OFFICER
आदर्श ग्रामीण स्वास्थ्य अनुसंधान इकाई
Model Rural Health Research Unit
Department of Health Research, Govt. of India
Sirwar, Dist. Raichur

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

...L RURAL HEALTH RESEARCH UNIT
DEPARTMENT OF HEALTH RESEARCH, MINISTRY OF HEALTH & FW, GOVT OF INDIA
SIRWAR, RAICHUR (DIST), KARNATAKA

MRHRU/2019-20/TRN6/04 07/06/19

Certificate

This is to certify that Mr.Prakash Gouda Patil, student of the Masters in Public Health course of KLE Academy of Higher Education and Research, Belagavi (Registration No. FL0117010) has carried out Internship project at MRHRU Sirwar, Raichur on Nutritional assessment of 1-5-year old children, adolescent girls, infants, and pregnant women in 10 villages of Manvi and Devadurga talukas of Raichur District from 1st April to 24th May 2019.

07/08/19

Dr.Subarna Roy
Scientist F and Nodal Officer, MRHRU

मुख्य अधिकारी / NODAL OFFICER
आदर्श ग्रामीण स्वास्थ्य अनुसंधान इकाई
Model Rural Health Research Unit
स्वास्थ्य अनुसंधान विभाग, भारत सरकार
Department of Health Research, Govt of India
सिरवार, पो. सायबुर, Sirwar, Dist. Raichur

ATTESTED

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Belagavi-590 010,Karnataka

MRHRU/2019-20/TRN6/03

07/06/19

Certificate

This is to certify that Dr.Nagaraj S Sattigeri, student of the Masters in Public Health course of KLE Academy of Higher Education and Research, Belagavi (Registration No. FL0117009) has carried out Internship project at MRHRU Sirwar, Raichur on Nutritional assessment of 1-5-year old children, adolescent girls, infants, and pregnant women in 10 villages of Manvi and Devadurga talukas of Raichur District from 1st April to 24th May 2019.

07/06/19

Dr.Suparna Roy
Scientist F and Nodal Officer, MRHRU

नोडल अधिकारी / NODAL OFFICER
आदर्श ग्रामीण स्वास्थ्य अनुसंधान इकाई
Model Rural Health Research Unit
रामरा अनुसंधान विभाग, भारत सरकार
Department of Health Research, Govt. of India
सिरवार, रायचूर, कर्नाटक Sirwar, Dist. Raichur

ATTESTED

Dr. V.A Kothiwale
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Belagavi-590 010,Karnataka

ICMR-National Institute of Traditional Medicine, Belagavi.

INTERNSHIP COMPLETION CERTIFICATE

Date: 31.05.2019

This is to certify that **Ms. Krupa Pawar** from KLE Academy of Higher Education and Research Institute, Belagavi has carried out an internship on the topic **"Pharmacoepidemiological Study of Selected Traditional Medicine in Patient with Liver Disorders: A Prospective, Observational, Pre-Post Study"** from 01.04.2019 to 31.05.2019 under the guidance of **Dr. Banappa S. Unger, Scientist-D, Pharmacology & Toxicology Division, ICMR - National Institute of Traditional Medicine.**

Signature of the guide
Dr. Banappa S. Unger,
Scientist-D.

ATTESTED
Dr. V.A.Kothiwale
Registrar
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Belagavi-590 010,Karnataka

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ICMR-National Institute of Traditional Medicine, Belagavi.

INTERNSHIP COMPLETION CERTIFICATE

Date: 31.05.2019

This is to certify that **Dr. Afifa Nadaf** from KLE Academy of Higher Education and Research Institute, Belagavi has carried out an internship on the topic **"Pharmacoepidemiological Study of Selected Traditional Medicine in Patient with Liver Disorders. A Prospective, Observational, Pre-Post Study"** from 01.04.2019 to 31.05.2019 under the guidance of **Dr. Banappa S. Unger, Scientist-D, Pharmacology & Toxicology Division, ICMR - National Institute of Traditional Medicine.**

Signature of the guide
Dr. Banappa S. Unger,
Scientist-D.

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
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Healthcare Technologies Society
Somdutt Chamber-2, Bhikaji Cama place, New Delhi-110066
+91-8288004161/+91-8447292004 Website: ihts.asia
Registration No: S/877/SDM/NW/2012

Certificate of Internship Completion

This is to certify that Arundhati Garud,student of MPH, KLE *University* has done her internship at Foundation of Healthcare Technologies Society, New Delhi; from *1st April'19 to 30th May'19.*

This also certifies that she has performed all the assigned duties for work and community outreach activities successfully with best of her potential.

Foundation of Healthcare Technologies Society wishes her success in all her future endeavours.

Dr. Sangeeta Sharma
President

Foundation of Healthcare Technologies Society

Date: 30th May'19
Place: New Delhi, India

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

India
Association of India
Mr. Umesh R. Aradhya

FPA India BELAGAVI Branch
768/1, Corporation Building,
Vadagaon Road, Hindwadi,
BELAGAVI - 590 011, Karnataka
Tel : 0831-2480688
Email . belagavi@fpaindia.org

Certificate of Internship Completion

This is to certify that, Dr. Namrata D. Misale, student of MPH; KLE University, Belagavi has done her internship at Family Planning Association of India, Belagavi Branch from 01st April, 2019 to 31st May, 2019.

This also certifies that, she has performed all the assigned duties for work and community outreach activities successfully with best of her potential.

Smt. Anita A. Pagad
President,
FPAI, Belagavi Branch

Date: 03/06/2019
Place: Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
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200

Comparative evaluation of fracture resistance of endodontically treated teeth restored with two different bulk fill composites.

ABSTRACT :

Aim: The aim of the present study is to evaluate fracture resistance of two bulk fill composite as postendodontic restorations .

Materials and Methods:-34single rooted mandibular premolar teeth will be selected for the study. Class II MOD cavities will be prepared using standard cavity preparation protocol.Endodontic access cavities will be prepared followed by working length determination using 15 k file.Cleaning and shaping of the root canals will be done using Pro Taper rotary instruments upto master apical size of F3 ,in conjunction with 2 ml of 3% sodium hypochlorite irrigation between each file .Final rinse will be done with 5 ml of 17 % EDTA, followed by 5 ml of distilled water. The root canals will be filled with Pro Taper F3 guttapercha and AH plus sealer. 3mm of coronal guttapercha will be removed using heated fingerplugger and canal orifices will be sealed with resin modified glass ionomer cement .The samples will be kept in the incubator for 7 days .The tooth samples will be randomly divided into 2 groups

Group 1: Filtek (3M) bulk fill (n=17)

Group 2:Tetric Evoceram (Ivoclar) bulk fill (n=17)

Core- buildup will be done as per the manufacturer's instructions.

Final finishing and polishing will be done.The root surfaces will be covered with a thin coat of polyvinyl siloxane impression material and teeth will be stabilized on a block of self cure acrylic resin .The fracture resistance will be evaluated under universal testing machine . A compressive force of cross head speed of 1mm/min will be applied with a 6 mm diameter metal indenter until fracture of the teeth .The force at which the fracture will occur will be recorded in Newtons.

Statistical analysis will be done.

RESULTS- Awaited

Dr. Shruthika Satkar : Shruthi Ks

Dr Chaitra Bakare : CB

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences,
Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
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(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

INFLUENCE OF TWO DIFFERENT ANTIOXIDANTS ON MICROLEAKAGE OF COMPOSITE RESTORATION AFTER NON VITAL BLEACHING

AIM- To evaluate and compare the effect of 10% Sodium Ascorbate (SA) and 10% α-Tocopherol(AT) gels on microleakageof composite restoration after non vital bleaching using a Confocal Laser Scanning Microscope.

MATERIALS AND METHODS- 30 intact human permanent maxillary central incisors will be selected for the study. The teeth will be sectioned 3mm below the Cemento Enamel Junction (CEJ). Standard Endodontic Access cavity will be prepared following which Light cure Glass Ionomer Cement will be placed as a barrier below the CEJ. Non vital bleaching will be carried out for a period of 1 week using Sodium perborate mixed with distilled waterafter which the bleaching agent will be removed and 30 teeth will be randomly divided into 3 groups (n=10) depending on the antioxidant treatment prior to composite restoration as follows-

GROUP 1-no antioxidant treatment (control group)

GROUP 2- 10%SA for 15min

GROUP3- 10%AT for 15min

Following this the teeth will be restored with Nanohybrid composite resin using a total etch technique. Samples will be stored at 37 C and 100% humidity for a period of 24 hrs.

The samples will then immersed in 0.1% Rhodamine B dye for 7 days and tested for microleakage using the Confocal laser Scanning Microscope.

Results- Awaited

SIGNATURE OF AUTHORS

DR NEHA DESHPANDE

DR PRATIK HALDANKAR

Signature

Head of Department

Conservative Dentistry and Endodontics

KLE VK Institue of Dental Sciences, Belgavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

ABSTRACT

COMPARATIVE EVALUATION OF APICALLY EXTRUDED DEBRIS DURING ROOT CANAL PREPARATION USING ProTaper NEXT, ProTaper GOLD and Hyflex EDM. AN INVITRO STUDY

AIM:

Extrusion of any debris during endodontic treatment may potentially cause post-operative complications such us flare ups, post-operative inflammation, short term or long term failures. This study is to evaluate and compare the amount of apically extruded debris during root canal preparation using three different file systems.

MATERIALS AND METHODS

In this study 45 human single rooted teeth will be randomly assigned to three groups (n=15).The root canals were then instrumented using ProTaper Gold , ProTaper NEXT and Hyflex EDM. Preweighed Eppendorf tubes will be used to collect the apically extruded debris during instrumentation. An incubator will be used to store these Eppendorf tubes at 37 °C for 10 days. Then these eppendorf tubes were weighed to obtain the final weight of the eppendorf tubes plus extruded debris .Three consecutive weights were obtained for each tube.

Statistics:

Data will be statistically analysed by Wilcoxon Signed Ranks Test and Mann -Whitney U Test.

RESULTS:

AWAITED

Preeti K Dodwad

Professor and Head
Dept. of Conservative Dentistry
K.L.E. V. K. Institute of Dental Sciences
Belagavi

ATTESTED

Dr. V. A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

ABSTRACT

INTRODUCTION

Endodontic regeneration has been introduced as a treatment option for immature permanent teeth with necrotic pulps (Thibodeau 2009, Lenzi & Trope 2012). The technique has been suggested to reduce the risk of fracture associated with traditional apexification .One of the essential elements for a successful endodontic regeneration protocol is the creation of a bacteria-free biological environment inside the root canal space through the use of intracanal medicaments. The most widely used intracanal medicament in endodontic regeneration is the triple antibiotic paste (TAP) described by Hoshino et al.(1996), which is a mixture of metronidazole, ciprofloxacin and minocycline.Due to the combination of antibacterial drugs it aids in the disinfection of oral infectious lesions, including dentinal, pulpal, and periradicular lesions. Several authors have proposed associations of triple antibiotic paste with different vehicles such as polyethylene glycol, propylene glycol and distilled water to maximize its qualities (substantivity and dentinal tubule penetration).Recently chitosan and chlorhexidine have proved to be effective in invitro studies. However studies have also shown that aqueous and viscous vehicles affect the mechanical properties of radicular dentin as constituent of endodontic pastes. The comparison between TAP and their vehicles may evidence if the effect is due to the mixture or particularly to the vehicle itself. The aim of this *in vitro* study will be to evaluate the effect of TAP and their vehicles on mechanical properties of the root canal dentin and to evaluate the antimicrobial effect of triple antibiotic paste with 3 different vehicles

Aims and Objectives:

The purpose of this study was

1. To evaluate the effect of Triple antibiotic paste and their vehicles on fracture resistance of root canal dentin at 2 time intervals 1 week and 1 month.

MATERALS AND METHODS

90 extracted, human permanent single rooted premolar teeth will be selected. Teeth will be randomly divided into 3 groups – GROUP 1 TAP & SALINE , GROUP 2 TAP & POLYETHLENE GLYCOL , GROUP 3 TAP & CHITOSAN. Cleaning and shaping will be done. After each storage period, 15 teeth will be selected randomly from each group. Thus , there will be two treatment subgroups at each time interval. The teeth will be decoronated at the level of 0.5 mm radicular to the facial cementoenamel junction with diamond disc under water cooling. The root cylinders will than be horizontally sectioned from each root and the cervical 5-mm root cylinder will be used for fracture resistance testing with the universal testing machine.

RESULTS- AWAITED

Preeti K Doodwad

Professor and Head
Dept. of Conservative Dentistry
(KLE V. K. Institute of Dental Sciences)
Belagavi

Signature of head of the department

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Application for Research Work

Dr. Prabhakar Kore Basic Science Research Centre [BSRC]

III Floor, V. K. Institute of Dental Sciences [V.K.I.D.S.] Campus, KAHER, Belagavi - 590 010

Date: 11/03/2019

Name of the Student: Dr/Mr/Mrs/Ms...... Neha S. Dhaded ....

Institution / University [complete address]: ...... KLE University ....

Contact No ... 9449651005 ....

E-mail ID: ... dhadedneha@gmail.com

Research Work: Masters / Doctorate Dissertation / Short study [if related to others please specify]

Name of Research Guide: Dr/Mr/Mrs/Ms...... Neha S. Dhaded ....

Name of Research Co-guide [if any]: Dr/Mr/Mrs/Ms ....

Brief for Research Work [not more than 250 words, please attach separate sheet].

Requirements for Research Work at BSRC: 1. ....
2. ....
3. ....

Publication of the research results:

In research work, publication BSRC name shall be acknowledged — Yes / No

Intellectual property arising from the research work [if any]:

Mutual agreement between research guide and BSRC

Sig. of the Student	Sig. of Research Guide/Co-Guide	Sig. of Head, Institution

Institute/Department Seal:

Dr. Prabhakar Kore Basic Science Research Centre (BSRC) — KLE Academy of Higher Education and Research, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Application for Research Work

Dr. Prabhakar Kore Basic Science Research Centre [BSRC]

Date:

Name of the Staff Student: Dr. Niraj Godbole, Dr. Vaishali Dhopavka, Dr. Olivia Banarjee

Institution / University: KLE V.K. Institute of Dental Science

9964713160

niraj.godbole@gmail.com

Research Work:

Name of Research Guide:

Name of Research Co-guide: Prasanjeet Bhatkal.

Brief for Research Work: Attached

Requirements for Research Work at BSRC: 1. Instruments

2. Microbiology consumables

3.

Publication of the research results

Yes No

Intellectual property arising from the research work

Sig. of the Student | Sig. of Research Guide / Co-Guide | Sig. of Head, Institution

(Institution Seal)

ATTESTED

Dr. V.A.Kothiwale
Registrar
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Belagavi-590 010,Karnataka

KLE College of Pharmacy
A Constituent Unit of
KLE Academy of Higher Education and Research
(Deemed-to-be University established u/s 3 of the UGC Act, 1956)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JNMC Campus, Nehru Nagar, Belagavi - 590 010, Karnataka, India
E-mail: principal@klepharm

COLLABORATIVE RESEARCH FORM

Date. 12/7/19.

Name of the Student: DR. SHEFALI PEDNECAR

Collaboration Institution University: KAHER'S VK Institute of Dental Sciences and KLE College of Pharmacy

Research Work Masters/Doctorate Dissertation/ Short Study: Effect of various combinations of irrigants on the push out bond strength & dentinal tubule penetration of a root canal sealer - An in-vitro study.

Name of Research Guide:

DR. BOLMAL

Summary of Research Work:
The push-out bond strength and dentinal tubule penetration of AH Plus sealer was tested after using various combinations of irrigants, i.e., Sodium hypochlorite & EDTA; Calcium hypochlorite; and Calcium hypochlorite & EDTA.

Requirements for Research Work: Preparation of 5.25% Calcium hypochlorite solution.

Principal	Head of the Department	Research Guide	Student

PRINCIPAL
KLE College of Pharmacy
BELAGAVI - 10.

KLE COLLEGE OF PHARMACY BELAGAVI 590 010.

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE College of Pharmacy
A Constituent Unit of
KLE Academy of Higher Education and Research
(Deemed-to-be University established u/s 3 of the UGC Act, 1956)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JNMC Campus, Nehru Nagar, Belagavi – 590 010, Karnataka, India
(Recognized by PCI, AICTE)
Phone: 0831-2471399 Fax: 0831-2472387 Web: http://www.klepharm.edu E-mail: principal@klepharm

COLLABORATIVE RESEARCH FORM

25/02/20

Name of the Student : PRIYANKA KORE

Collaboration Institution/University: KLE VKIDS And KLE Pharmacy College

Research Work Masters/Doctorate Dissertation/ Short Study : Comparative evaluation of effect of 17% EDTA & 0.2% Chitosan used as final rinse on the Push out bond strength of 2 different Root canal sealer.

Name of Research Guide :

DR BOLMAL

Summary of Research Work: To check the Adhesion of sealer after using two different irrigants i.e 17% EDTA & 0.2% Chitosan on the root canal dentin.

Requirements for Research Work: 0.2% Chitosan, 17% EDTA.

Principal	Head of the Department	Research Guide	Student

PRINCIPAL
KLE College of Pharmacy
BELAGAVI - 10.

BELAGAVI 590 010.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

To,
Head of the Department
Department of Conservative Dentistry & Endodontics,
KAHER'S VK Institute of Dental Sciences,
Belagavi.

22nd July 2020

Subject : To ask for permission to conduct research at Head & Neck CBCT imaging centre, Belagavi.

Respected Madam,

I, Dr Abhijit Sajo Sebastian, a post graduate student of the Department of Conservative Dentistry and Endodontics, am doing a study with the title, "Canal centering, canal transportation and canal volume change after using different rotary systems: A CBCT study" at the Head and Neck CBCT imaging centre, Belagavi. I kindly request you to grant permission for the same.

Thanking you,

Yours sincerely,

Abhijit Sajo Sebastian

(ABHIJIT SAJO SEBASTIAN)

Preeti

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences,
Belagavi

PRINCIPAL
KLE K. I. Institute of Dental Sciences
Nehru Nagar, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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(Recognized by PCI, AICTE)
Phone: 0831-2471399 Fax 0831-2472367 Web: http://www.klepharm.edu E-mail: principal@klepharm

COLLABORATIVE RESEARCH FORM

26/02/20

Name of the Student : MAHIMA GUPTA

Collaboration Institution/University: KLE VKIDS And KLE Pharmacy College.

Research Work Masters/Doctorate Dissertation/ Short Study : Effect of Sodium Ascorbate on the fracture resistance of teeth undergoing post-endodontic bleaching using two different intra-orifice barriers.

Name of Research Guide :

DR. BOLMAL SIR

Summary of Research Work: Fracture resistance of the teeth will be evaluated & compared in post endodontic bleached teeth after using 2 different Intraorifice barriers ie Lention-N & GIC with & without Application of Sodium Ascorbate gel.

Requirements for Research Work: Preparation of Sodium Ascorbate Gel (10%)

Principal | Head of the Department | Research Guide | Student

PRINCIPAL
KLE College of Pharmacy
BELAGAVI - 10.

COLLEGE OF PHARMACY BELAGAVI 590 010.

ATTESTED

Dr. V.A.Kothivale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Application for Research Work

Dr. Prabhakar Kore Basic Science Research Centre [BSRC]

III Floor V. K. Institute of Dental Sciences [V.K.I.D.S] Campus, KAHER, Belagavi – 590 010

Date: 07/8/19

Name of the Student: Dr./Mr./Mrs./Ms. Mahima Gupta

Institution / University [complete address]: KAHER's VK Institute of Dental Sciences

Contact No.: 9899411836

E-mail ID: mahima.gupta2013@gmail.com

Research Work: Masters / Doctorate Dissertation / Short study [if related to others please specify]

Comparative evaluation of cytotoxicity of combination of NAC & levofloxacin with Triple antibiotic paste in Regenerative Endodontics

Name of Research Guide: Dr./Mr./Mrs./Ms. Rituha Patil

Name of Research Co-guide [if any]: Dr./Mr./Mrs./Ms.

Brief for Research Work [not more than 250 words, please attach separate sheet]:

Requirements for Research Work at BSRC: 1. Evaluation of cytotoxicity of

2. two medicaments

3.

Publication of the research results:

In research work publication BSRC name shall be acknowledged: ✓ Yes / No

Intellectual property arising from the research work [if any]

Mutual agreement between research guide and BSRC

Sig. of the Student | Sig. of Research Guide/Co-Guide | Sig. of Head, Institution

Institute/Department Seal:

DEPUTY DIRECTOR
Dr. Prabhakar Kore Basic Science Research Center
KLE Academy of Higher Education and Research
Belagavi-10, Karnataka

Dr. Prabhakar Kore Basic Science Research Centre (BSRC) * KLE Academy of Higher Education and Research, Belagavi.

ATTESTED

Dr. V. A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

To,

The Head of Department.
Department of conservative dentistry & Endodontics
V.K. Institute of Dental sciences,
Belagavi.

22nd July 2020,

Subject:- Permission to conduct research at a private laboratory

Respected ma'am,

I, Ashish. Ramakrishnan, (post-graduate student) am doing a study titled - 'Comparative evaluation of the effect of Double antibiotic paste with Chitosan as the vehicle on the push out bond strength of epoxy resin based sealers to radicular dentin - An Invitro study'. The study would be done in Praj Mettalurgical lab, a private lab in Pune. I kindly request you to grant permission for the same.

Thanking You,

Yours sincerely.

Ashish. Ramakrishnan

Signature of head of Department

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences
Belagavi

PRINCIPAL
V. K. Institute of Dental Sciences
Nehru Nagar, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

To

THE HEAD OF THE DEPARTMENT
DEPARTMENT OF CONSERVATIVE DENTISTRY & ENDODONTICS
VK INSTITUTE OF DENTAL SCIENCES.
BELAHAVI.

22nd JULY 2020

SUBJECT: Permission to conduct research at KLE's Engineering College.

Respected Ma'am,

We Dr Ashish Ramakrishnan, Dr. Felbin Tomy. Post graduate students of department of Conservative Dentistry and Endodontics are doing a study titled "Comparitive evaluation of the effect of Triple Antibiotic Paste with chitosan as a vehicle on the pushout bond bistrengths of epoxy resin based sealer to the radicular dentin - An invitro study". we would be conducting the study at KLE's Engineering College. we kindly request you to grant permission for the same.

Thanking you.

Yours sincerely

Ashish Ramakrishnan

Felbin Tomy

Signature of Head of the department

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences,
Belagavi

Signature of Principal

PRINCIPAL,
KLE V. K. Institute of Dental Sciences
Nehru Nagar, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

to

The Head of Department
V.K. Institute of Dental Sciences
Belagavi

SUB: PERMISSION TO CONDUCT STUDY IN SHIVAJI UNIVERSITY

Respected Madam,

We, Dr Shrutika Sarkar and Dr Chaitra Bakare are doing a Short Study titled "Comparative evaluation of smear layer removal using conventional and endodontic microbrush cleaning on two different working solutions" A scanning electron microscopic study.

We Request you to grant us permission to conduct SEM study in the Physics department, Shivaji University Kolhapur.

Thanking you,

Yours sincerely,

Dr Shrutika Sarkar

Dr. Chaitra Bakare

Sign of HOD

Preeti

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences,
Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

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RASHTREEYA SIKSHANA SAMITHI TRUST
D. A. PANDU MEMORIAL R. V. DENTAL COLLEGE
- Affiliated to Rajiv Gandhi University of Health Sciences, Karnataka
- Recognised by Dental Council of India, New Delhi
- Accredited by National Assessment Accreditation Council (NAAC) "A" Grade
- Included under section 2 (f) of the UGC ACT-1956

Ref : DAPMRVDC/ 35/19-20 Date :

11.04.2019

From,
Dr. Suchetha A
Professor and Head
Department of Periodontics
D.A.P.M.R.V. Dental college and hospital
Bengaluru.

Through
Dr. Asha Iyengar
Professor and principal
D.A.P.M.R.V. Dental college and hospital
Bengaluru.

To,
Dr.H.N. Sauvakumar
Professor & Head
Dept. of Pharmaceutics
KLE College of Pharmacy

Dear sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project.

This is to state that we are planning for a research collaboration with your kind self and Mrs. Rekha.U Assistant professor of your departmentfor the next one year on the below mentioned project at your laboratory.

1. Development and Evaluation of 1.2% Simvastatin and 1% Alendronate gel, which will be used in the study as mentioned below:
2. Clinical and Radiographic comparison of 1.2% Simvastatin and 1% Alendronate gel as a local drug delivery system in the treatment of chronic periodontitis: a split mouth study.

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking You,

Yours faithfully,

Dr. Suchetha A
Head, Department of periodontology

Dr. Asha R Iyengar
Principal

No. CA 37, 24th Main, 1st Phase, J.P. Nagar, Bengaluru - 560 078. INDIA
Phone : +91 (80) 2654 7053 / 2244 5753, Fax : +91 (80) 2665 8411, 2665 1188
E-mail: principalrvdc@yahoo.com / principalrvdc@gmail.com
Website : www.rvdentalcollege.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

RASHTREEYA SIKSHANA SAMITHI TRUST

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- Accredited by National Assessment Accreditation Council (NAAC) "A" Grade
- Included under section 2(f) of the UGC ACT-1956

Ref.: DAPM RVDC / 25/ 18-23 Date:

11.03.2019

From,
Dr. Suchetha A.
Professor and Head
Department of Paridontics
D.A.P.M.R.V Dental college and hospital
Bengaluru.

Through,
Dr. Asha Iyengar
Professor and principal
D.A.P.M.R.V. Dental college and hospital
Bengaluru.

To,
Dr.H.N. Shivakumar
Professor & Head
Dept. of Pharmaceutics
KLE College of Pharmacy
Bengaluru.

Dear sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project.

This is to state that weare planning for a research collaboration with your kind self and Mrs. Shwetha Baliga B., Assistant professorof your department for the next one year on the below mentioned project at your laboratory.

1. Development and Evaluation of 0.05% Zoledronate and 1%Alendronate gel, which will be used in the study as mentioned below:
2. Clinical and Radiographic comparison of 0.05% Zoledronate and 1% Alendronate gel as a local drug delivery system in the treatment of chronic periodontitis: a split mouth study

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you

Yours faithfully,

Dr. Suchetha A
Head, Department of periodontology

Dr. Asha R Iyengar
Principal

No. CA 37, 24th Main, 1st Phase, J.P. Nagar, Bengaluru - 560 078. INDIA
Phone : +91 (80) 2654 7053 / 2244 5754, Fax : +91 (80) 2665 8411, 2655 1188
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Website : www.rvdentalcollege.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

RASHTREEYA SIKSHANA SAMITHI TRUST
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- Accredited by National Assessment Accreditation Council (NAAC) "A" Grade
- Included u/s section 2 (f) of the UGC ACT-1956

Ref. DAPMRVDC/35/19-20 Date :

11.04.2019

From,
Dr. Suchetha A.
Professor and Head
Department of Periodontics
D.A.P.M.R.V. Dental college and hospital
Bengaluru

Through,
Dr. Asha Iyengar
Professor and principal
D.A.P.M.R.V. Dental college and hospital
Bengaluru

To,
Dr H.N. Shivakumar
Professor & Head
Dept. of Pharmaceutics
KLE College of Pharmacy
Bangalore.

Dear Sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project.

This is to state that we are planning for a research collaboration with your kind self & Mrs. Deepa B.P., Assistant professor of your department for the next one year on the below mentioned project at your laboratory.

1. Development and Evaluation of 0.2% Thymoquinone gel, which will be used in the study as mentioned below.
2. Comparative evaluation of efficacy of 0.2% Thymoquinone gel as local drug delivery in chronic periodontitis patients with and without type 2 diabetes mellitus.

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you

Yours faithfully,

Dr.Suchetha A
Head, Department of Periodontology

Dr. Asha R Iyengar
Principal

No. CA 37, 24th Main, 1st Phase, J.P. Nagar, Bengaluru - 560 078. INDIA
Phone : +91(80) 2654 7053 / 2244 5754, Fax : +91 (80) 2665 8411, 2665 1188
Email : principalrvdc@yahoo.com / principalrvdc@gmail.com
Website : www.rvdentalcollege.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

CHRIST
(Deemed to be University)
BANGALORE - INDIA

Date: 30/7/18

To,
The Principle & BSRC Project Manager
KLE University's College of Pharmacy
Bangalore – 560010

Respected Sir,

Ms. Nidhi Girish (Reg. No. 1747717) is a Postgraduate student in the Department of Life Sciences at Christ (Deemed to be University). Plant extracts of *Basella alba, Hemidesmus indicus* and *Simarouba glauca* were prepared and its thrombolytic activity was evaluated as a part of her internship at your esteemed institute, under the guidance of Dr. Mamatha A, Associate Professor, Department of Pharmacognosy.
We thank Dr. Mamatha A and your institution for timely support and mentoring throughout the tenure of this internship.

Thanking you,
Yours faithfully,

Fr. Jobi Xavier
Head, Department of Life Science
Christ (Deemed to be University)
Hosur Road, Bengaluru – 560029

ATTESTED
Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Department of Biochemistry
Indian Institute of Science
Bangalore 560012 INDIA

TO WHOM IT MAY CONCERN

This is to state that Ms. Safnaz UK worked with us under the close supervision of Prof. Purnima Ashok, Professor, College of Pharmacy, KLE University, on a collaborative project to study the pharmacological effect of a drug combination for Type-2 diabetes. Her work involved initial acute and chronic toxicity studies of the drug combination as well as pharmacological profiling using standard biochemical and *in vivo* parameters in a rat model of Type-2 Diabetes. I understand that this work formed a part of her M.Pharm research training, which she completed successfully. This letter is issued at her request.

Sincerely,

Nagasuma Chandra, PhD
Professor
Department of Biochemistry
Indian Institute of Science
Bangalore 560012, India
E-mail: nchandra@iisc.ac.in
Homepage: proline.biochem.iisc.ernet.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

DEPARTMENT OF BIOCHEMISTRY
Indian Institute of Science
Bangalore 560 012, India

Tel +91-80-2293 2814
Fax +91-80-2360 0814 / 2360 0836
e-mail [illegible]

Sathees C Raghavan

TO WHOMSOEVER IT MAY CONCERN

The Department of Biochemistry in Indian Institute of Science (IISc) finds a place in the history of India by being one of the oldest Departments in the country. It conducts quality research in the area of biological sciences and boasts of producing eminent scientists from India.

KLE University's College of Pharmacy, Bangalore affiliated to KLE University, Belgaum, is under the dynamic leadership of Dr. Prabhakar B. Kore, MP. The KLE society that runs a strong network of over 211 educational and health care institutions spread in Karnataka, parts of Maharashtra and Delhi.

We have set up a MOU between Dr. Sathees C. Raghavan, Assistant Professor, Department of Biochemistry, Indian Institute of Science, Bangalore and Dr. Subhas S. Karki, Professor, Department of Pharmaceutical Chemistry, Bangalore, to carry out collaborative research involving synthesis of heterocyclic compounds and their screening for potential anticancer activity in human and murine cancer cell lines.

Dr. Sathees C Raghavan

Dr. Subhas S. Karki

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

RASHTREEYA SIKSHANA SAMITHI TRUST
D. A. PANDU MEMORIAL R. V. DENTAL COLLEGE
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- Accredited by National Assessment Accreditation Council (NAAC) "A" Grade
- Included under section 2 (f) of the UGC ACT-1956

Ref.: DAPMRVDC/ 35/19-20 Date

11.01.2019

From,
Dr. Suchetha A
Professor and Head
Department of Periodontics
D A P M R V Dental college and hospital
Bengaluru.

Through,
Dr. Asha Iyengar
Professor and principal
D A.P.M R V. Dental college and hospital
Bengaluru.

To,
Dr H.N. Shivakumar
Professor & Head
Dept, of Pharmaceutics
KLE College of Pharmacy

Dear sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project.

This is to state that we are planning for a research collaboration with your kind self and Mrs. Rekha.B Assistant professor of your departmentfor the next one year on the below mentioned project at your laboratory.

1. Development and Evaluation of 1.2% Simvastatin and 1% Alendronate gel. which will be used in the study as mentioned below;
2. Clinical and Radiographic comparison of 1.2% Simvastatin and 1% Alendronate gel as a local drug delivery system in the treatment of chronic periodontitis: a split mouth study.

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you.

Yours faithfully,

Dr. Suchetha A
Head, Department of periodontology

Dr. Asha R Iyengar
Principal

No. CA 37, 24th Main, 1st Phase, J.P. Nagar, Bengaluru - 560 078. INDIA
Phone : +91 (80) 2654 7053 / 2244 5754 Fax : +91 (80) 2665 8411, 2665 1188
E-mail : principalrvdc@yahoo.com / principalrvdc@gmail.com
Website : www.rvdentalcollege.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

RASHTREEYA SIKSHANA SAMITHI TRUST
D. A. PANDU MEMORIAL R. V. DENTAL COLLEGE

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- Included under section 2 (f) of the UGC ACT-1956

Ref : DAPM RVDC / 35/19-20 Date :

11.01.2019

From,
Dr. Suchetha A
Professor and Head
Department of Periodontics
D A P M R V Dental college and hospital
Bengaluru

Through,
Dr. Asha Iyengar
Professor and principal
D A P M R V. Dental college and hospital
Bengaluru.

To,
Dr.H.N. Shivakumar
Professor & Head
Dept. of Pharmaceutics
KLE College of Pharmacy

Dear sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project

This is to state that we are planning for a research collaboration with your kind self and Mrs. Rekha.U Assistant professor of your departmentfor the next one year on the below mentioned project at your laboratory

1. Development and Evaluation of 1.2% Simvastatin and 1% Alendronate gel, which will be used in the study as mentioned below;
2. Clinical and Radiographic comparison of 1.2% Simvastatin and 1% Alendronate gel as a local drug delivery system in the treatment of chronic periodontitis: a split mouth study.

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you,

Yours faithfully,

Dr. Suchetha A.
Head, Department of periodontology

Dr. Asha R Iyengar
Principal

No. CA 37, 24th Main, 1st Phase, J.P. Nagar, Bengaluru - 560 078. INDIA
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E-mail : principalrvdc@yahoo.com / principalrvdc@gmail.com
Website : www.rvdentalcollege.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

RASHTREEYA SIKSHANA SAMITHI TRUST
D. A. PANDU MEMORIAL R. V. DENTAL COLLEGE
* Affiliated to Rajiv Gandhi University of Health Sciences, Karnataka
* Recognised by Dental Council of India, New Delhi
* Accredited by National Assessment Accreditation Council (NAAC) "A" Grade
* Included under section 2 (f) of the UGC ACT-1956

Ref : DAPM RVDC : 35/19-20 Date :

11.04.2019

From
Dr. Suchetha A
Professor and Head
Department of Periodontics
D.A.P.M.R.V. Dental college and hospital
Bengaluru

Through,
Dr. Asha Iyengar
Professor and principal
D.A.P.M.R.V. Dental college and hospital
Bengaluru.

To,
Dr.H.N. Shivakumar
Professor & Head
Dept. of Pharmaceutics
KLE College of Pharmacy

Dear sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project

This is to state that we are planning for a research collaboration with your kind self and Mrs. Rekha.U Assistant professor of your departmentfor the next one year on the below mentioned project at your laboratory.

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2. Clinical and Radiographic comparison of 1.2% Simvastatin and 1% Alendronate gel as a local drug delivery system in the treatment of chronic periodontitis: a split mouth study.

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you.

Yours faithfully,

Dr. Suchetha A
Head, Department of periodontology

Dr. Asha R Iyengar
Principal

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E-mail : principalrvdc@yahoo.com / principalrvdc@gmail.com
Website : www.rvdentalcollege.org

ATTESTED
Dr. M.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

RASHTREEYA SIKSHANA SAMITHI TRUST
D. A. PANDU MEMORIAL R. V. DENTAL COLLEGE
Affiliated to Rajiv Gandhi University of Health Sciences, Karnataka
Recognised by Dental Council of India, New Delhi
Accredited by National Assessment Accreditation Council (NAAC) "A" Grade
Included under section 2(f) of the UGC ACT 1956

Ref.: DAPM RVDC : 3?/19-20 Date:

11.04.2019

From,
Dr. Suchetha A
Professor and Head
Department of Periodontics
D.A.P.M.R.V. Dental college and hospital
Bengaluru

Through,
Dr. Asha Iyengar
Professor and principal
D.A.P.M.R.V. Dental college and hospital
Bengaluru

To,
Dr.H.N. Shivakumar
Professor & Head
Dept. of Pharmaceutics
KLE College of Pharmacy
Bengaluru

Dear sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project.

This is to state that weare planning for a research collaboration with your kind self and Mrs. Shwetha Baliga B., Assistant professorof your department for the next one year on the below mentioned project at your laboratory.

1. Development and Evaluation of 0.05% Zoledronate and 1%Alendronate gel, which will be used in the study as mentioned below:
2. Clinical and Radiographic comparison of 0.05% Zoledronate and 1% Alendronate gel as a local drug delivery system in the treatment of chronic periodontitis: a split mouth study

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you

Yours faithfully,

Dr. Suchetha A
Head, Department of periodontology

Dr. Asha R Iyengar
Principal

No. CA 37, 24th Main, 1st Phase, J.P. Nagar, Bengaluru - 560 078. INDIA
Phone : +91 (80) 2654 7053 / 2244 5754, Fax : +91 (80) 2665 8411, 2665 1188
E-mail : principalrvdc@yahoo.com / principalrvdc@gmail.com
Website : www.rvdentalcollege.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

RASHTREEYA SIKSHANA SAMITHI TRUST
D. A. PANDU MEMORIAL R. V. DENTAL COLLEGE
* Affiliated to Rajiv Gandhi University of Health Sciences, Karnataka
* Recognised by Dental Council of India, New Delhi
* Accredited by National Assessment Accreditation Council (NAAC) "A" Grade
* Included under section 2(f) of the UGC ACT-1956

Ref: DAPM RVDC/ 35/19-20

Date: 11.04.2019

From,
Dr. Suchetha A
Professor and Head
Department of Peridontics
D.A.P.M.R.V. Dental college and hospital
Bengaluru

Through,
Dr. Asha Iyengar
Professor and principal
D.A.P.M.R.V. Dental college and hospital
Bengaluru

To,
Dr.H.N. Shivakumar
Professor & Head
Dept. of Pharmaceutics
KLE College of Pharmacy
Bangalore.

Dear Sir,

Subject- *Collaboration with KLE college of pharmacy for dissertation project.*

This is to state that we are planning for a research collaboration with your kind self & Mrs. Deepa B.P., Assistant professor of your department for the next one year on the below mentioned project at your laboratory.

1. Development and Evaluation of 0.2% Thymoquinone gel, which will be used in the study as mentioned below:
2. Comparative evaluation of efficacy of 0.2% Thymoquinone gel as local drug delivery in chronic periodontitis patients with and without type 2 diabetes mellitus.

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you

Yours faithfully,
Dr.Suchetha A
Head, Department of Periodontology

Dr. Asha R Iyengar
Principal

No. CA 37, 24th Main, 1st Phase, J.P. Nagar, Bengaluru - 560 078. INDIA
Phone: +91 (80) 2654 7053 / 2244 5754, Fax : +91 (80) 2665 8411, 2665 1188
E-mail : principalrvdc@yahoo.com / principalrvdc@gmail.com
Website : www.rvdentalcollege.org

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

CHRIST
(Deemed to be University)
BANGALORE · INDIA

Date: 30/7/18

To,
The Principle & BSRC Project Manager
KLE University's College of Pharmacy
Bangalore – 560010

Respected Sir,

Ms. Nidhi Girish (Reg. No. 1747717) is a Postgraduate student in the Department of Life Sciences at Christ (Deemed to be University). Plant extracts of *Basella alba*, *Hemidesmus indicus* and *Simarouba glauca* were prepared and its thrombolytic activity was evaluated as a part of her internship at your esteemed institute, under the guidance of Dr. Mamatha A, Associate Professor, Department of Pharmacognosy.
We thank Dr. Mamatha A and your institution for timely support and mentoring throughout the tenure of this internship.

Thanking you,
Yours faithfully,

Fr. Jobi Xavier
Head, Department of Life Science
Christ (Deemed to be University)
Hosur Road, Bengaluru – 560029

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

Department of Biochemistry
Indian Institute of Science
Bangalore 560012, INDIA

NAGASUMA CHANDRA

TO WHOM IT MAY CONCERN

This is to state that Ms. Safinaz UK worked with us under the close supervision of Prof. Purnima Ashok, Professor, College of Pharmacy, KLE University, on a collaborative project to study the pharmacological effect of a drug combination for Type-2 diabetes. Her work involved initial acute and chronic toxicity studies of the drug combination as well as pharmacological profiling using standard biochemical and *in vivo* parameters in a rat model of type-2 Diabetes. I understand that this work formed a part of her *M.Pharm* research training, which she completed successfully. This letter is issued at her request.

Sincerely,

Nagasuma Chandra, PhD
Professor
Department of Biochemistry
Indian Institute of Science
Bangalore 560012, India
E-mail: nchandra@iisc.ac.in
Homepage: proline.biochem.iisc.ernet.in

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

DEPARTMENT OF BIOCHEMISTRY
Indian Institute of Science
Bangalore - 560 012, India

Sathees C. Raghavan, Ph.D.

TO WHOMSOEVER IT MAY CONCERN

The Department of Biochemistry in Indian Institute of Science (IISc) finds a place in the history of India by being one of the oldest Departments in the country. It conducts quality research in the area of biological sciences and boasts of producing eminent scientists from India.

KLE University's College of Pharmacy, Bangalore affiliated to KLE University, Belgaum, is under the dynamic leadership of Dr. Prabhakar B. Kore, MP. The KLE society that runs a strong network of over 214 educational and health care institutions spread in Karnataka, parts of Maharashtra and Delhi

We have set up a MOU between Dr. Sathees C. Raghavan, Assistant Professor, Department of Biochemistry, Indian Institute of Science, Bangalore and Dr. Subhas S. Karki, Professor, Department of Pharmaceutical Chemistry, Bangalore, to carry out collaborative research involving synthesis of heterocyclic compounds and their screening for potential anticancer activity in human and murine cancer cell lines

Dr. Sathees C. Raghavan

Dr. Subhas S. Karki

ATTESTED

Dr. [illegible] Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Comparative evaluation of fracture resistance of endodontically treated teeth restored with two different bulk fill composites.

ABSTRACT :

Aim: The aim of the present study is to evaluate fracture resistance of two bulk fill composite as postendodontic restorations .

Materials and Methods:-34single rooted mandibular premolar teeth will be selected for the study. Class II MOD cavities will be prepared using standard cavity preparation protocol.Endodontic access cavities will be prepared followed by working length determination using 15 k file.Cleaning and shaping of the root canals will be done using Pro Taper rotary instruments upto master apical size of F3 ,in conjunction with 2 ml of 3% sodium hypochlorite irrigation between each file .Final rinse will be done with 5 ml of 17 % EDTA, followed by 5 ml of distilled water. The root canals will be filled with Pro Taper F3 guttapercha and AH plus sealer. 3mm of coronal guttapercha will be removed using heated fingerplugger and canal orifices will be sealed with resin modified glass ionomer cement .The samples will be kept in the incubator for 7 days .The tooth samples will be randomly divided into 2 groups

Group 1: Filtek (3M) bulk fill (n=17)

Group 2:Tetric Evoceram (Ivoclar) bulk fill (n=17)

Core- buildup will be done as per the manufacturer's instructions.

Final finishing and polishing will be done.The root surfaces will be covered with a thin coat of polyvinyl siloxane impression material and teeth will be stabilized on a block of self cure acrylic resin .The fracture resistance will be evaluated under universal testing machine . A compressive force of cross head speed of 1mm/min will be applied with a 6 mm diameter metal indenter until fracture of the teeth .The force at which the fracture will occur will be recorded in Newtons.

Statistical analysis will be done.

RESULTS- Awaited

Dr. Shruthika Salkar: Shruthi Ks

Dr Chaitra Bakare: CB

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences,
Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

INFLUENCE OF TWO DIFFERENT ANTIOXIDANTS ON MICROLEAKAGE OF COMPOSITE RESTORATION AFTER NON VITAL BLEACHING

AIM- To evaluate and compare the effect of 10% Sodium Ascorbate (SA) and 10% α-Tocopherol(AT) gels on microleakageof composite restoration after non vital bleaching using a Confocal Laser Scanning Microscope.

MATERIALS AND METHODS- 30 intact human permanent maxillary central incisors will be selected for the study. The teeth will be sectioned 3mm below the Cemento Enamel Junction (CEJ). Standard Endodontic Access cavity will be prepared following which Light cure Glass Ionomer Cement will be placed as a barrier below the CEJ. Non vital bleaching will be carried out for a period of 1 week using Sodium perborate mixed with distilled waterafter which the bleaching agent will be removed and 30 teeth will be randomly divided into 3 groups (n=10) depending on the antioxidant treatment prior to composite restoration as follows-

GROUP 1-no antioxidant treatment (control group)

GROUP 2- 10%SA for 15min

GROUP3- 10%AT for 15min

Following this the teeth will be restored with Nanohybrid composite resin using a total etch technique. Samples will be stored at 37 C and 100% humidity for a period of 24 hrs.

The samples will then immersed in 0.1% Rhodamine B dye for 7 days and tested for microleakage using the Confocal laser Scanning Microscope.

Results- Awaited

SIGNATURE OF AUTHORS

DR NEHA DESHPANDE Ndeshpande

DR PRATIK HALDANKAR

Signature

Head of Department

Conservative Dentistry and Endodontics

KLE VK Institue of Dental Sciences, Belgavi

ATTESTED

Dr V.A Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

ABSTRACT

COMPARATIVE EVALUATION OF APICALLY EXTRUDED DEBRIS DURING ROOT CANAL PREPARATION USING ProTaper NEXT, ProTaper GOLD and Hyflex EDM. AN INVITRO STUDY.

AIM:

Extrusion of any debris during endodontic treatment may potentially cause post-operative complications such us flare ups, post-operative inflammation, short term or long term failures. This study is to evaluate and compare the amount of apically extruded debris during root canal preparation using three different file systems.

MATERIALS AND METHODS

In this study 45 human single rooted teeth will be randomly assigned to three groups (n=15).The root canals were then instrumented using ProTaper Gold , ProTaper NEXT and Hyflex EDM. Preweighed Eppendorf tubes will be used to collect the apically extruded debris during instrumentation. An incubator will be used to store these Eppendorf tubes at 37 °C for 10 days. Then these eppendorf tubes were weighed to obtain the final weight of the eppendorf tubes plus extruded debris .Three consecutive weights were obtained for each tube.

Statistics:

Data will be statistically analysed by Wilcoxon Signed Ranks Test and Mann -Whitney U Test.

RESULTS:

AWAITED

Preeti K Dodwad

Professor and Head
Dept. of Conservative Dentistry
KLE V. S. Institute of Dental Sciences
Belagavi

ATTESTED

Dr. [illegible] Kothiwale
Registrar
KLE Academy of Higher Education and Research
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010,Karnataka

ABSTRACT

INTRODUCTION

Endodontic regeneration has been introduced as a treatment option for immature permanent teeth with necrotic pulps (Thibodeau 2009, Lenzi & Trope 2012). The technique has been suggested to reduce the risk of fracture associated with traditional apexification .One of the essential elements for a successful endodontic regeneration protocol is the creation of a bacteria-free biological environment inside the root canal space through the use of intracanal medicaments. The most widely used intracanal medicament in endodontic regeneration is the triple antibiotic paste (TAP) described by Hoshino et al.(1996), which is a mixture of metronidazole, ciprofloxacin and minocycline.Due to the combination of antibacterial drugs it aids in the disinfection of oral infectious lesions, including dentinal, pulpal, and periradicular lesions. Several authors have proposed associations of triple antibiotic paste with different vehicles such as polyethylene glycol, propylene glycol and distilled water to maximize its qualities (substantivity and dentinal tubule penetration).Recently chitosan and chlorhexidine have proved to be effective in invitro studies. However studies have also shown that aqueous and viscous vehicles affect the mechanical properties of radicular dentin as constituent of endodontic pastes. The comparison between TAP and their vehicles may evidence if the effect is due to the mixture or particularly to the vehicle itself. The aim of this *in vitro* study will be to evaluate the effect of TAP and their vehicles on mechanical properties of the root canal dentin and to evaluate the antimicrobial effect of triple antibiotic paste with 3 different vehicles

Aims and Objectives:

The purpose of this study was

1. To evaluate the effect of Triple antibiotic paste and their vehicles on fracture resistance of root canal dentin at 2 time intervals 1 week and 1 month.

MATERALS AND METHODS

90 extracted, human permanent single rooted premolar teeth will be selected. Teeth will be randomly divided into 3 groups – GROUP 1 TAP & SALINE , GROUP 2 TAP & POLYETHLENE GLYCOL , GROUP 3 TAP & CHITOSAN. Cleaning and shaping will be done. After each storage period, 15 teeth will be selected randomly from each group. Thus , there will be two treatment subgroups at each time interval. The teeth will be decoronated at the level of 0.5 mm radicular to the facial cementoenamel junction with diamond disc under water cooling. The root cylinders will than be horizontally sectioned from each root and the cervical 5-mm root cylinder will be used for fracture resistance testing with the universal testing machine.

RESULTS- AWAITED

Preeti K Hoodwad

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences
Belagavi

Signature of head of the department

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Application for Research Work

Dr. Prabhakar Kore Basic Science Research Centre [BSRC]

III Floor, ... [KLE] Campus, KAHER, Belagavi - 590 010

Date: 11/0./2019

Name of the Student: Dr. Mr. Mrs. Ms. Neha S Dhadde

Institution / University [complete address] KLE University

Contact No. 74-1965 ...

E-mail ID: dhaddeneha@gmail.com

Research Work: Masters · Doctoral · Dissertation · Short Study

Name of Research Guide: Dr. Mr. Mrs. Ms. Neha S Dhadde

Name of Research Co-guide: Dr. Mr. Mrs.

Brief for Research Work

Requirements for Research Work at BSRC: 1. ...

2. ...

3. ...

Publication of the research results:

... BSRC ... Dr. ... Kore ... Yes No

Intellectual property arising from the research work ...

... BSRC

Sig. of the Student   Sig. of Research Guide/Co-Guide   Sig. of Head, Institution

Institute Department Seal

Dr. Prabhakar Kore Basic Science Research Centre (BSRC), KLE Academy of Higher Education and Research, Belagavi

ATTESTED

Dr. V.A. Kotniwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Application for Research Work

Dr. Prabhakar Kore Basic Science Research Centre [BSRC]

Date:

Name of the Student/staff: Dr Niraj Godbole, Dr Vaidehi Dhopavkar, Dr Himan Banerjee

Institution / University [...]: KLE VK Institute of Dental Sciences

Contact: 9964779160

E-mail: nirajgodbole@gmail.com

Research Work: Masters / Doctoral Dissertation / Short study / [illegible] (please specify)

Name of Research Guide: Dr./Mr./Mrs./Ms.

Name of Research Co-guide [illegible]: Abhijeet Bhalkar

Brief for Research Work [illegible]: Attached

Requirements for Research Work at BSRC: ... Facilities ...

... Microbiology consumables ...

Publication of the research results

[illegible] Yes / No

Intellectual property arising from the research work

Sig. of the Student | Sig. of Research Guide/Co-Guide | Sig. of Head, Institution

Institute Principal Seal

ATTESTED

Dr. V. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE

KLE College of Pharmacy

A Constituent Unit of

KLE Academy of Higher Education and Research

(Deemed-to-be University established u/s 3 of the UGC Act, 1956)

[illegible] 'A' Grade by NAAC [illegible] Placed in Category 'A' by MHRD (GoI)

[illegible] Belagavi [illegible] Karnataka, India

[illegible]

[illegible] Fax [illegible] E-mail: principal [illegible]

COLLABORATIVE RESEARCH FORM Date. 12/7/19.

Name of the Student: Dr. Shefali Pednekar

Collaboration with Institution/University: KAHER'S VK Institute of Dental Sciences and KLE College of Pharmacy

Research Work/Masters/Doctorate Dissertation/Short Study: Effect of various combination of irrigants on the push out bond strength & dentinal tubule penetration of a root canal sealer – An in-vitro study.

Name of Research Guide:

DR. BOLMAL

Summary of Research Work:

The push-out bond strength and dentinal tubule penetration of AH Plus sealer was tested after using various combination of irrigants, i.e, Sodium hypochlorite & EDTA; Calcium hypochlorite; and Calcium hypochlorite & EDTA.

Requirements for Research Work: Preparation of 5.25% Calcium hypochlorite solution.

Principal	Head of the Department	Research Guide	Student
(signed)	(signed)	(signed)	(signed)

(signed)

PRINCIPAL
KLE College of Pharmacy
BELAGAVI - 10.

KLE COLLEGE OF PHARMACY BELAGAVI 590 010.

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE College of Pharmacy
A Constituent Unit of
KLE Academy of Higher Education and Research
(Deemed-to-be University established u/s 3 of the UGC Act, 1956)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JNMC Campus, Nehru Nagar, Belagavi - 590 010, Karnataka, India
(Recognized by PCI, AICTE)
Phone 0831-2471397 Fax: 0831-2472387 Web: http://www.klepharm.edu E-mail: principal@klepharm

COLLABORATIVE RESEARCH FORM

24/02/20

Name of the Student : PRIYANKA KORE

Collaboration Institution/University: KLE VKIDS And KLE Pharmacy College

Research Work Masters/Doctorate Dissertation/ Short Study : Comparative evaluation of effect of 17% EDTA & 0.2% Chitosan used as final rinse on the Push out bond strength of 3 different Root canal sealer.

Name of Research Guide :

DR BOLMAL

Summary of Research Work: To check the Adhesion of sealer after using two different irrigants i.e 17% EDTA & 0.2% Chitosan on the root canal dentin.

Requirements for Research Work: 0.2% Chitosan, 17% EDTA.

Principal | Head of the Department | Research Guide | Student

PRINCIPAL
KLE College of Pharmacy
BELAGAVI-10.

BELAGAVI 590 010.

ATTESTED

Dr. V. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

To,
Head of the Department
Department of Conservative Dentistry & Endodontics,
KAHER'S VK Institute of Dental Sciences,
Belagavi.

22nd July 2020

Subject : To ask for permission to conduct research at Head & Neck CBCT imaging centre, Belagavi.

Respected Madam,

I, Dr Abhijit Sajo Sebastian, a post graduate student of the Department of Conservative Dentistry and Endodontics, am doing a study with the title, "Canal centering, canal transportation and canal volume change after using different rotary systems: A CBCT study" at the Head and Neck CBCT imaging centre, Belagavi. I kindly request you to grant permission for the same.

Thanking you,

Yours sincerely,

Abhijit Sajo Sebastian

(ABHIJIT SAJO SEBASTIAN)

Preeti

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences,
Belagavi

PRINCIPAL
KLE's V.K. Institute of Dental Sciences
Nehru Nagar, Belagavi

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

KLE College of Pharmacy

A Constituent Unit of

KLE Academy of Higher Education and Research

(Deemed-to-be University established u/s 3 of the UGC Act, 1956)

Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)

JNMC Campus, Nehru Nagar, Belagavi – 590 010, Karnataka, India

(Recognized by PCI, AICTE)

Phone: 0831-2471399 Fax: 0831-2477387 Web: http://www.klepharm.edu E-mail: principal@klepharm

COLLABORATIVE RESEARCH FORM

26/02/20

Name of the Student : MAHIMA GUPTA

Collaboration Institution/University: KLE VKIDS And KLE Pharmacy College.

Research Work Masters/Doctorate Dissertation/ Short Study : Effect of Sodium Ascorbate on the fracture resistance of teeth undergoing post-endodontic bleaching using two different intra-orific barriers.

Name of Research Guide :

DR. BOLMAL SIR

Summary of Research Work: Fracture resistance of the teeth will be evaluated & compared in post endodontic bleached teeth after using 2 different intraorific barriers ie Cution-N & GIC with & without Application of Sodium Ascorbate gel.

Requirements for Research Work: Preparation of Sodium Ascorbate Gel (10%)

Principal | Head of the Department | Research Guide | Student

PRINCIPAL
KLE College of Pharmacy
BELAGAVI - 10.

KLE COLLEGE OF PHARMACY BELAGAVI 590 010.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

Application for Research Work

Dr. Prabhakar Kore Basic Science Research Centre [BSRC]

III Floor, V. K. Institute of Dental Sciences [V. K. I. D. S.] Campus, KAHER, Belagavi – 590 010

Date: 07/8/19

Name of the Student: Dr./Mr./Mrs./Ms. Mahima Gupta

Institution / University [complete address]: KAHER's VK Institute of Dental Sciences

Contact No.: 9899411836

E-mail ID: mahima.gupta2013@gmail.com

Research Work: Masters / Doctorate Dissertation / Short study [if related to others please specify]

Comparative evaluation of cytotoxicity of combination of NAC & levofloxacin with Triple antibiotic paste in Regenerative Endodontics

Name of Research Guide: Dr./Mr./Mrs./Ms. Rituha Patil

Name of Research Co-guide [if any]: Dr./Mr./Mrs./Ms. .....

Brief for Research Work [not more than 250 words, please attach separate sheet]:

Requirements for Research Work at BSRC: 1. Evaluation of cytotoxicity of

2. two medicaments

3. .....

Publication of the research results:

In research work publication BSRC name shall be acknowledged: ✓ Yes / No

Intellectual property arising from the research work [if any]

Will be decided between research guide and BSRC

Sig. of the Student | Sig. of Research Guide/Co-Guide | Sig. of Head, Institution

Institute/Department Seal:

DEPUTY ... Dr. Prabhakar Kore Basic Science Research Center KLE Academy of Higher Education and Research Belagavi-10, Karnataka, India.

Dr. Prabhakar Kore Basic Science Research Center (BSRC) KLE Academy of Higher Education and Research, Belagavi.

ATTESTED

Dr. V.A.Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1956)
Belagavi-590 010,Karnataka

To,

The Head of Department.
Department of conservative dentistry & Endodontics
V.K. Institute of Dental sciences,
Belagavi.

22nd July 2020,

Subject:- Permission to conduct research at a private laboratory

Respected ma'am,

I, Ashish. Ramakrishnan, (post-graduate student) am doing a study titled - 'Comparative evaluation of the effect of Double antibiotic paste with Chitosan as the vehicle on the push out bond strength of epoxy resin based sealers to radicular dentin - An Invitro study'. The study would be done in Praj Mettalurgical lab, a private lab in Pune. I kindly request you to grant permission for the same.

Thanking You,

Yours sincerely.

Ashish. Ramakrishnan

Signature of head of Department

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences
Belagavi

PRINCIPAL
V.K. Institute of Dental Sciences
Nehru Nagar, Belagavi

ATTESTED

Dr. [illegible] Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act,1960)
Belagavi-590 010,Karnataka

240

To

THE HEAD OF THE DEPARTMENT
DEPARTMENT OF CONSERVATIVE DENTISTRY & ENDODONTICS
VK INSTITUTE OF DENTAL SCIENCES.
BELAHAVI.

22nd JULY 2020

SUBJECT: Permission to Conduct Research at KLE's Engineering College.

Respected Maam,

We Dr Ashish Ramakrishnan, Dr. Felbin Tomy. Post graduate students of department of conservative Dentistry and Endodontics are doing a study titled - "comparitive evaluation of the effect of Triple Antibiotic Paste with chitosan as a vehicle on the pushout bond bistrengths of epoxy resin based sealer to the radicular dentin - An invitro study". we would be conducting the study at KLE's Engineering College. we kindly request you to grant permission for the same.

Thanking you.

Yours sincerly

Ashish Ramakrishnan

Felbin Tomy

PRINCIPAL,
KLE V. K. Institute of Dental Sciences,
Nehru Nagar, Belagavi

Signature of Head of the department

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences
Belagavi

ATTESTED

Dr. V.A. Kothiwale
Registrar
KLE Academy of Higher Education and Research,
(Deemed-to-be-University u/s 3 of the UGC Act, 1956)
Belagavi-590 010, Karnataka

241

To

The Head of the Department
K.L.E. Institute of Dental Sciences
Belagavi

SUB: PERMISSION TO CONDUCT STUDY IN SHIVAJI UNIVERSITY

Respected Madam,

We, Dr Shantika Sarkar and Dr Chaitra Bakare are doing a Short Study titled "Comparative evaluation of smear layer removal using conventional and endodontic microbrush devices on two different irrigating solutions" A scanning electron microscopic Study.

We Request you to grant us permission to conduct SEM Study in the Physics department, Shivaji University Kolhapur.

Thanking you,

Yours sincerely,

Dr Shantika Sarkar

Dr Chaitra Bakare.

Sign of HOD

Preeti

Professor and Head
Dept. of Conservative Dentistry
KLE V. K. Institute of Dental Sciences,
Belagavi

ATTESTED

Dr. V.A. Kothiwale
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11.04.2019

From,
Dr. Suchetha A
Professor and Head
Department of Periodontics
D A P M R V Dental college and hospital
Bengaluru

Through,
Dr. Asha Iyengar
Professor and principal
D.A.P.M.R.V. Dental college and hospital
Bengaluru.

To,
Dr.H.N. Shivakumar
Professor & Head
Dept of Pharmaceutics
KLE College of Pharmacy

Dear sir,

Subject- Collaboration with KLE college of pharmacy for dissertation project

This is to state that we are planning for a research collaboration with your kind self and Mrs. Rekha.A Assistant professor of your department for the next one year on the below mentioned project at your laboratory.

1. Development and Evaluation of 1.2% Simvastatin and 1% Alendronate gel, which will be used in the study as mentioned below.
2. Clinical and Radiographic comparison of 1.2% Simvastatin and 1% Alendronate gel as a local drug delivery system in the treatment of chronic periodontitis: a split mouth study.

We are happy to continue the collaboration on the ongoing project and future projects if any. We would assure that we shall share the authorship in case we disseminate the research outcomes of the project in the form of a research publication.

Thanking you,

Yours faithfully,

Dr. Suchetha A
Head, Department of periodontology

Dr. Asha R Iyengar
Principal

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ARTICLE

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Evaluation of Chemical, Antipsoriatic and Antiangiogenic Properties of Salt from Lonar Crater Lake Water

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ABSTRACT

Lonar Crater lake was created by the impact of a massive meteor during the Pleistocene Epoch. Being a hypersaline and hyperalkaline soda lake, rich microbial diversity is reported earlier. Lonar lake water is used by local people and tribals against skin diseases. These observations prompted us to investigate the therapeutic potential of lake water against skin diseases. In this context, we conducted pilot study to assess the antipsoriatic and antiangiogenic activity of the salt obtained from lake water using THP1 cell line by MTT assay and antiangiogenic activity by *in vivo* chick chorioallantoic membrane (CAM) assay, as there is a close relation between psoriasis and angiogenesis. The results revealed that salt possess remarkable antipsoriatic and antiangiogenic activity.

KEYWORDS

Lonar crater, Psoriasis, Angiogenesis, THP1, Chorioallantoic membrane.

INTRODUCTION

Owing to the interesting physico-chemical and biological properties, study of soda lakes is the most captivating aspect of ecological science [1]. Lonar crater (latitude 19°58′, longitude 76°36′) is a near circular depression formed in Buldhana district, Maharashtra state, India during Pleistocene epoch by the impact of massive hypervelocity meteor that descended on the earth from space [2]. The crater has a diameter of around 1.88 km with a depth of 135 meters and is confined from all the sides by raised rims [3]. The crater encompasses worlds third largest natural saline lake formed due to accumulation of water through rain, ground water seepage and the springs situated in the cliffs at the edge of crater [4]. The Lonar crater lake is the world's only hypersaline and hyperalkaline soda lake in basaltic rock. The lake water is highly alkaline with pH in the range of 9.5-10.5 owing to the presence of large concentration of salts [5]. One of the striking features of crater lakes is the remarkable colour of their waters [6]. A remarkable feature of Lonar lake water is presence of massive algal blooms that result the lake to appear green. Fluctuations in physico-chemical parameters of brackish water with time play a major role in establishing the bio-distribution and dynamics of the quality of the water [7]. The lake depicts fascinating biodiver-

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sity with haloalkaliphilic microbial flora and fauna [8-10]. The fascinating features of Lonar crater lake has attracted attention of researchers from different domains of science for revealing various aspects of lake ecosystem. In addition, because of the presence of hypersaline conditions on Mars, studies of biodiversity in terrestrial saline environments like Lonar crater lake may have implications for the possibility of life on Mars [11]. An interesting feature of Lonar crater lake is myth in local and tribal people that showers from Lonar crater lake water (LCLW) helps to eradicate skin diseases. The lake finds citation in historical document Ain-i-Akbari indicating LCLW was used for making soaps in 16th century in India. These observations prompted us to investigate the therapeutic potential of LCLW salt against skin diseases.

Psoriasis is a chronic inflammatory skin disease characterized by the loss of normal cellular homeostasis, enhanced epidermal proliferation, altered rates of differentiation with parakeratosis and inflammation [12]. The increased rates of cell proliferation and abnormal differentiation of keratinocytes is a consequence of the over expression of growth factors, their receptors, cytokines and angiogenic peptides [13,14]. Dithranol and acitretin are common drugs employed in antipsoriasis therapy [15]. Psoarisis has high correlation with angiogenesis. It is driven by several angiogenic factors with the change in the microvasculature during psoriasis. Pro-angiogenic mediators, such as tumor necrosis factor (TNF), vascular endothelial growth factor (VEGF), hypoxia inducible factor (HIF), IL-8 or angiopoietins and other angiogenic peptides are enriched in psoriatic skin [16]. Currently, wide variety of antiangiogenic drugs are available for treatment of psoriasis. Methotrexate is the most commonly used drug in systemic therapy for psoriasis that inhibits dihydrofolate reductase and therefore inhibits proliferation of immune tissue [17]. The immune suppressants like cyclosporine inhibit calcineurin whereas corticosteroids inhibit cytokine [18]. Other antiangiogenic drug used in psoriatic treatment are: Vitamin D3 analog [19], anti-TNF antibodies [20] and fumaric acid esters [21] are well established. Though several antiangiogenic drugs are well established in practice [22], many of them suffer from adverse drug reactions (ADRs) [23]. In addition, current drugs have several drawbacks in terms of efficacy, toxicity and undesirable side-effects and lead to poor patient compliance [24]. In view of these drawbacks, there remains a distinctive need to develop new agents for the more efficient treatment of psoriasis.

In view of myth regarding skin disease curing ability of LCLW and looking at need to develop more efficient antipsoriasis agents, we report herein our pilot study on the evaluation of therapeutic potential of salt obtained from LCLW (acronymed as LCLW salt) against psoriasis. Besides, vascular proliferation and angiogenesis being a key factor in psoriasis, we also report herein the antiangiogenesis effect of the LCLW salt.

EXPERIMENTAL

Dulbecco's modified Eagle medium (DMEM), fetal bovine serum (FBS) and pen strep (a mixture of penicillin and streptomycin) were procured from Gibco Life Technologies (Auckland, New Zealand); MTT reagent, gentamycin (4 mg/mL) and amphotericin B (5 mg/mL) were purchased from Hjmedia Pvt. Ltd., Mumbai, India. Human monocytic leukemia (THP-1) cell line was procured from the National Center for Cell Science, Pune, India. X-ray photoelectron spectroscopy (XPS) analysis was performed in a Kratos AXIS Supra model instrument under 10^{-9} torr. The measurements were carried out with monochromatic Al Kα photons (1486.6 eV). The power of the X-ray source was kept constant at 600 W. The infrared spectrum was recorded on a Bruker ALPHA ECO-ATR spectrometer.

Isolation of LCLW salt: Water samples were collected from sampling site of Lonar crater (Kamaljamata temple) in 5 L air tight polythene container following APHA guidelines [25] and carried to the laboratory. The physical and chemical parameters were analyzed as per standard methods. Sampling was done in May 2015 at morning. The pH, temperature, hardness, alkalinity, turbidity and TDS were determined at the spot rest of the parameters. The pH of the LCLW was 8.72 and the temperature was 29 °C. The LCLW was evaporated at 100 °C to obtain desired LCLW salt. The salt concentration was approximately 2.5 %.

MTT cell proliferation assay: Human monocytic leukemia (THP-1) cells were counted by tryphan blue dye exclusion assay using a hemocytometer. The cells were seeded to 96 well plate at the density of 1×10^4 cells per well per 0.1 mL medium and were allowed to adhere by incubating for 24 h at 37 °C and 95 % humidity in CO_2 incubator (Eppendorf, New Brunswick, Galaxy 170R, Germany). The LCLW salt and methotrexate (1000, 500, 250, 125, 62.6 and 31.25 µg/mL) were seeded followed by incubation at 37 °C and 5 % CO_2. Cytotoxicity was evaluated at time intervals of 24, 48 and 72 h. After incubation, 20 µL of MTT solution (5 mg/mL in phosphate buffer saline) was added to each well and the plate was incubated in dark for 4 h at 37 °C. On completion of 4 h, supernatant was discarded and DMSO (100 µL) was added to each well to dissolve formazan crystals and absorbance was recorded at 492 nm filter using ELISA plate reader (Lisa Plus, India). The absorbance was calculated for percent cell viability filter using ELISA plate reader (Lisa Plus, India). The absorbance was calculated for percent cell viability [26,27].

Chick chorioallantoic membrane assay: The chick chorioallantoic membrane assay was performed by using zero hour black australorp fertilized eggs (N = 60 including YSM and CAM model) procured from Central Egg Hatching Centre, Kolhapur. The eggs were disinfected with 70 % ethanol and incubated in an incubator at 37 °C and 70 % relative humidity (monitored by hygrometer) until experiment. The LCLW salt concentration ranging from 100 µg/mL to 300 µg/mL was injected by window method on day 4 (Yolk sac membrane) and day 8 (chorioallantoic membrane) of incubation; window was closed with sterile surgical tape and was returned to the incubator for further development. Eggs were opened and the CAM was carefully dissected out of the eggs after 48 h of injection to assess angiogenesis, macroscopically. Untreated eggs were maintained as normal group, whereas 0.9 % saline injected eggs were used as control [28].

Macroscopic analysis: The eggs were broken off and antiangiogenic effect was assessed on all eggs after 48 h of injection. CAM was surgically removed from eggs in a bowl. Photographs of the developing CAM and its vasculature of both control

and treated eggs were obtained with a digital camera and exported to a computer for image analysis. The CAM area and the number of blood vessels were assessed.

Histology: The CAM was surgically removed and fixed in 10 % buffered formaldehyde for 10 h, dehydrated in graded alcohol, cleared in xylene and embedded in paraffin. Thick sections (5 µm) were cut in a plane parallel to the surface of the CAM and stained by haematoxylin-eosin which was observed under a light photomicroscope.

RESULTS AND DISCUSSION

Initially, the LCLW sample was collected following APHA guidelines. Various physico-chemical parameters of LCLW were studied and are summarized in Table-1. The results reveal high concentration values of most of studied physical and chemical properties.

TABLE-1
PHYSICO-CHEMICAL PARAMETERS OF LONAR CRATER LAKE WATER

Parameter	Result	Parameter	Result
pH	8.72	Alkalinity	6200 ppm
Temperature	27 °C	Salinity	7546 mg/L
Odour	Grouty	Turbidity	2.57 NTU
Colour	Dark green	CO_2	5.3 mg/L
Conductivity	21.6 µS/cm	Chlorides	4650 ppm
TDS	7561 ppm	Sulphate	180 ppm
Total hardness	640 ppm	–	–

Next, LCLW was evaporated to get the desired LCLW salt. The X-ray photoelectron spectroscopy (XPS) analysis was performed to identify the composition of LCLW salt (Fig. 1). The XPS survey scan shows the presence of various salts such as phosphates (133 eV), sulphides (161.5 eV), sulphates (169 eV), chlorides (199 eV), carbonate (344 eV) and phosphate (349 eV) of calcium. Further, the survey spectrum of LCLW salt shows the presence of salts of calcium, potassium, manganese, iron, cobalt, barium, nickel, copper, sodium and zinc. Moreover, the peaks for KCl and KBr appeared at 291 eV and 293 eV. Additionally, the peak at 780 eV appeared due to the presence carbonates of barium while peaks at 856 eV and 934 eV indicated the hydroxides of nickel and copper. The peak at 1071 eV appears for sodium due to auger electrons [29-33]. The LCLW salt was further subjected to FTIR analysis (Fig. 2). The FTIR spectrum indicated prominent peaks for sodium nitrate (1424 cm^{-1}), magnesium phosphate (1155 cm^{-1}), calcium carbonate (876 cm^{-1}), sodium carbonate (700 cm^{-1}) and calcium sulphate (639 cm^{-1}). After characterization, the LCLW salt was used for further studies without purification.

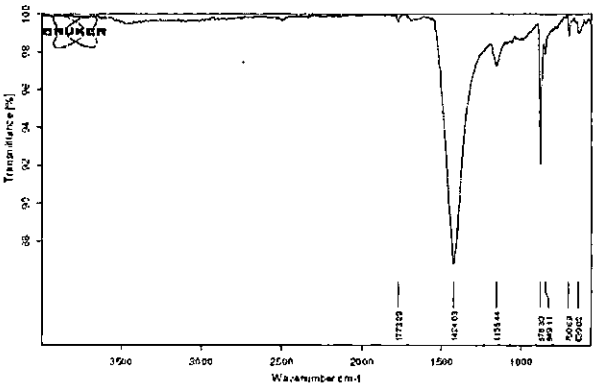


Fig. 2. FTIR spectrum of LCLW salt

The antipsoriatic activity of LCLW salt was evaluated against human monocytic leukemia (THP-1) cells using MTT assay. The cells were seeded with different doses of LCLW salt and methotrexate and incubated at 37 °C. After 24, 48 and 72 h of incubation, cell viability was measured following general procedure. To focus the activity, the half maximal inhibitory concentration (IC_{50}) was calculated as the concentration required to inhibit the growth of THP-1 cells in culture by 50 % compared to the untreated cells. The IC_{50} values for LCLW salt and methotrexate are listed in Table-2. The results demonstrated inhibition of cell proliferation of THP-1 in a concentration dependent manner. At 24 h, LCLW salt was found to show no inhibitory effect on cell proliferation at concentrations greater than 1000 µg/mL but exhibited a concentration dependent cytotoxic effect with IC_{50} values 436.8 and 318.6 µg/mL at 48 and 72 h respectively.

TABLE-2
IC_{50} VALES OF LONAR CRATER LAKE WATER (LCLW) SALT AND METHOTREXATE

Time interval (h)	IC_{50} values (µg/mL)	
	LCLW salt	Methotrexate
24	< 1000	547.4
48	436.8	319.4
72	318.6	> 31.25

It is noteworthy to mention that IC_{50} value of methotrexate at 48 h is 319.4 µg/mL which is close to LCLW salt. These results indicate that LCLW salt exhibits remarkable antipsoriatic activity (Fig. 3). The results further revealed that LCLW salt is more selective to THP-1 cells than normal cells as there was low cytotoxic effect observed towards vero cell lines.

There is a close relationship between psoriasis and angiogenesis as the treatment of antiangiogenic agents may be the promising way in treating psoriasis. Physiological angiogenesis

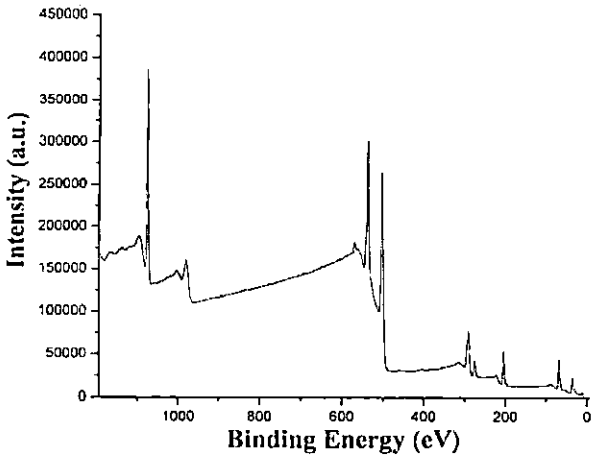


Fig. 1. XPS survey spectrum of LCLW salt

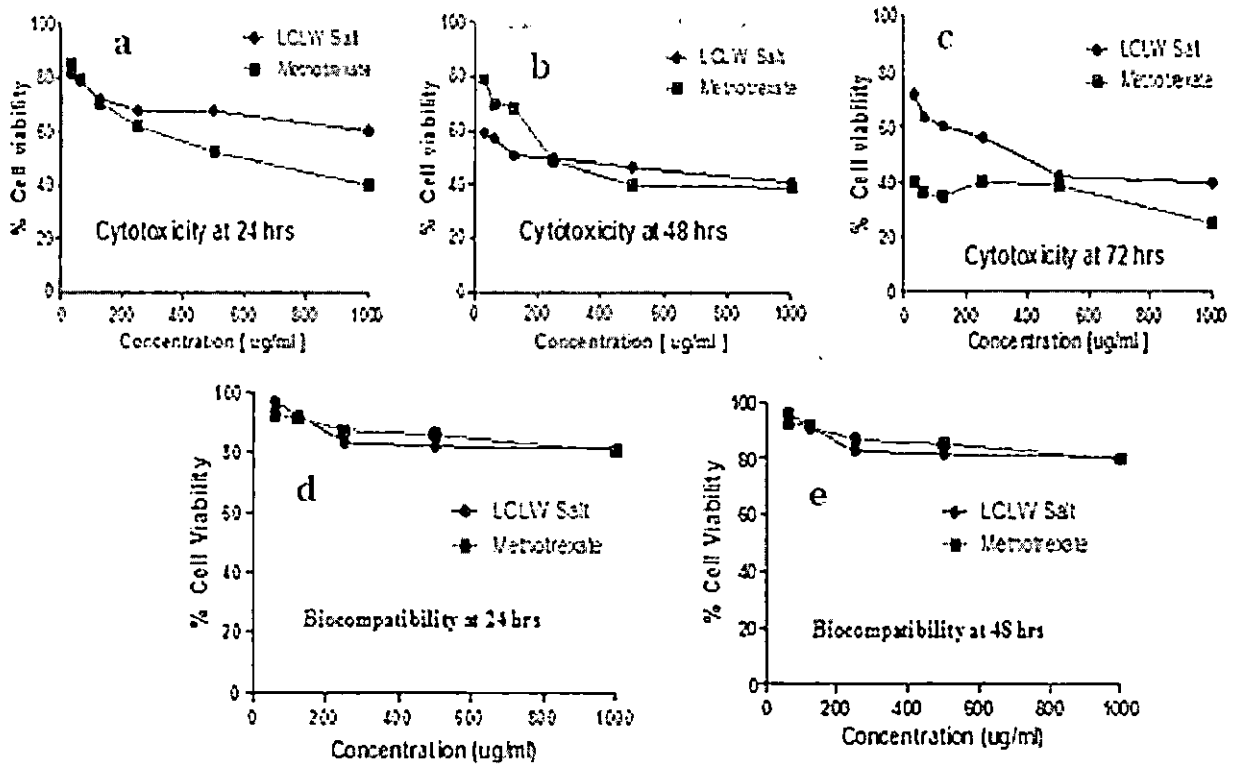
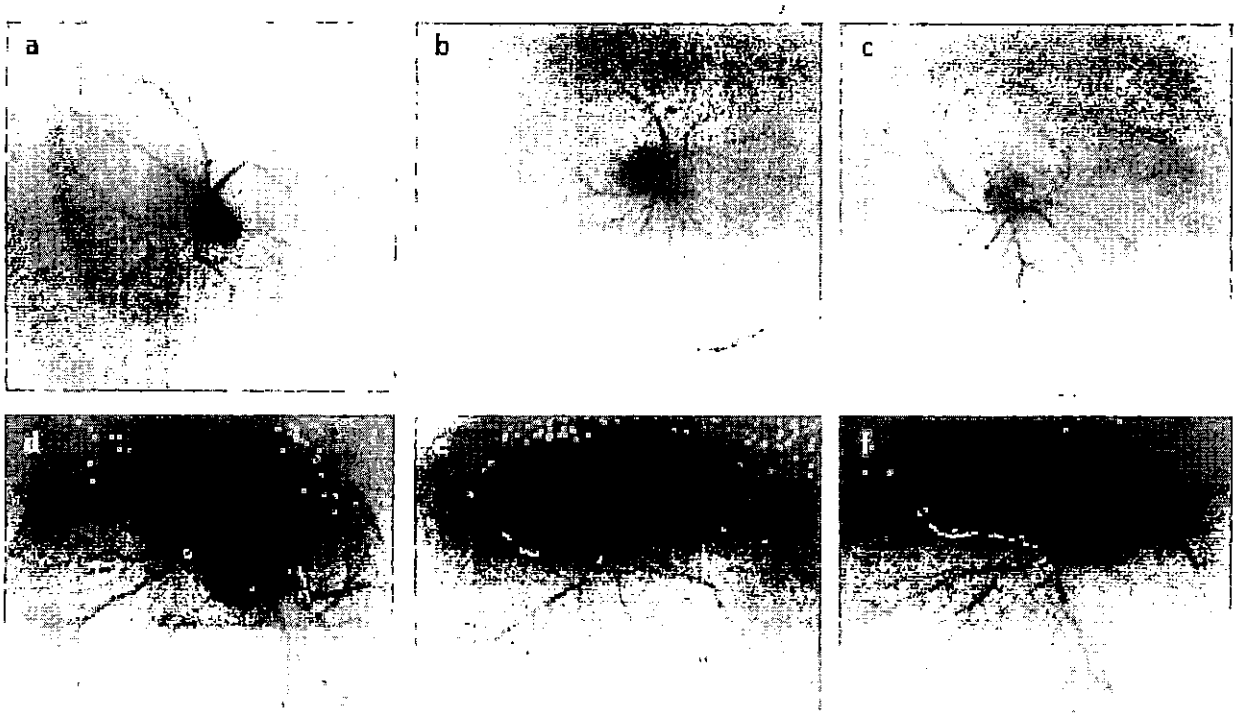


Fig. 3. Cytotoxicity of LCLW salt at 24, 48 and 72 h incubation on THP-1 Cells (a-c) and biocompatibility against vero cells at 24 h and 48 h (d-e)



(a & d) Control, (b & e) 200 µg/mL, (c & f) 300 µg/mL (on 6th and 8th day of incubation resp.)

Fig. 4. Effect of LCLW salt on yolk sac model (a-c) and CAM (d-f)

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is induced only transiently during processes such as wound healing, pregnancy or in the corpus luteum formation during female reproductive cycle. However, pathological angiogenesis occurs under conditions such as tumor growth, retinopathy and chronic inflammation, as observed during rheumatoid arthritis or psoriasis [34,35]. This created inquisitiveness to study the antipsoriatic and antiangiogenic activity of LCLW salt. The chick chorioallantoic membrane (CAM) assay was undertaken to study antiangiogenic effect of LCLW salt similar to other antiangiogenic drugs reported [36]. After treating the chick CAM with LCLW salt, the vascular network presented several macroscopic changes as compared to the control group. Antiangiogenic effect was seen at both 200 and 300 µg/mL, with significant result obtained at 300 µg/mL (Fig. 4). Inhibition of blood vessel formation and branching pattern was evident at 48 h of treatment. Hemorrhagic areas were observed between modified capillaries. Dilated, irregular vessels with stasis coupled with short capillaries as compared to control were significantly observed at 300 µg/mL. Sterile 1X PBS which is used as vehicle solution (negative control), did not show any antiangiogenic effect. There was apparent reduction in the number of tertiary vessels in LCLW salt treated CAM as compared to control (Table-3, Fig. 5). However, unlike 200 µg/mL, there were apparent differences in number of primary and secondary vessels seen at 300 µg/mL.

Evaluation for microscopic specimens confirmed the macroscopic observations. CAM treated with control, appeared well vascularized where the blood vessels were well formed with distinct capillary plexus beneath the ectoderm. However, the CAM treated with LCLW salt was hemorrhagic and extra-

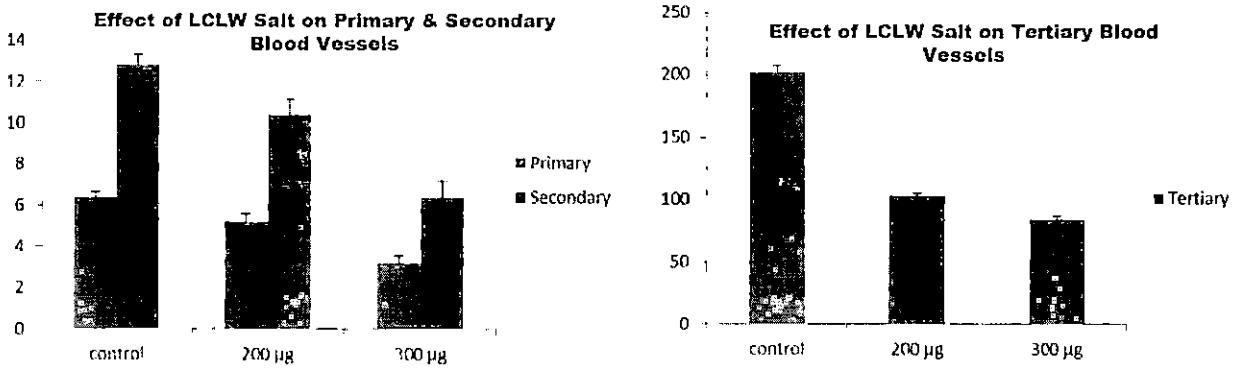
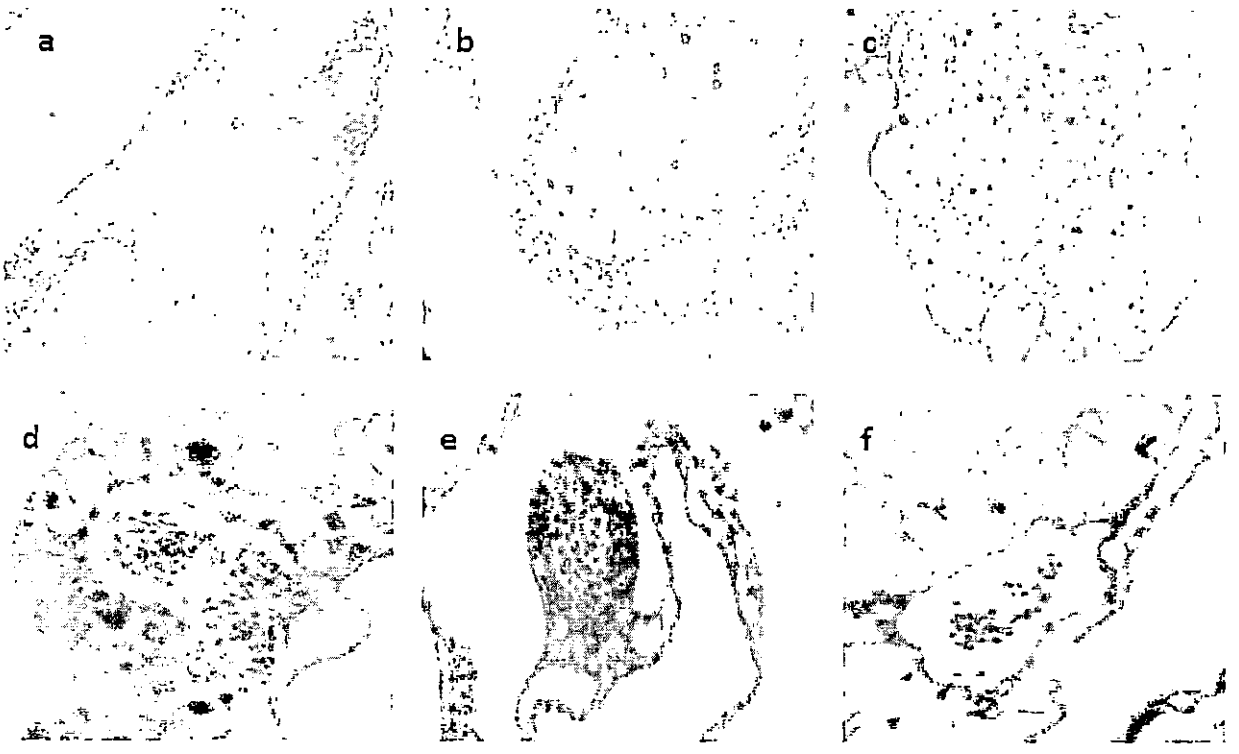


Fig. 5. Effect of LCLW Salt on primary, secondary and tertiary blood vessels



(a & d) Control, (b & e) 200 µg/mL, (c & f) 300 µg/mL (on 6th and 8th day of incubation resp.)

Fig. 6. Antiangiogenic effect of LCLW salt on chick CAM

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TABLE-3
AVERAGE NUMBER OF BLOOD VESSELS OF NORMAL AND LONAR CRATER LAKE WATER (LCLW) SALT TREATED CHICK CHORIOALLANTOIC MEMBRANE (CAM)

Experimental group	Number of blood vessels		
	Primary	Secondary	Tertiary
Control	6.4 ± 0.24	12.8 ± 0.49	202.2 ± 5.65
200 µg	5.2 ± 0.37	10.4 ± 0.75	103 ± 2.19
300 µg	3.2 ± 0.37	6.4 ± 0.75	84.6 ± 2.52

vasations of RBCs in the mesenchyme tissue of the CAM are seen. Besides, unlike the vehicle control, the LCLW salt treated CAM showed no distinct and well differentiated germ layers as shown in Fig. 6.

Conclusion

In conclusion, the present study reveals remarkable anti-psoriatic and antiangiogenic activity of salt obtained from Lonar crater lake water. We believe that after further intense investigations, LCLW salt could emerge as an ideal source of therapeutics in treating profused angiogenesis as well as an ideal source towards psoriasis treatment. Further in-depth study in this regard, would create a leap towards formulating a novel composition with LCLW salt in treating psoriasis successfully in the nearby future.

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Review article

Local drug delivery systems in the management of periodontitis: A scientific review

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ABSTRACT

Periodontitis (PD) is a microbial disease of tooth supporting tissues that results in progressive destruction of surrounding soft and hard tissues with eventual tooth mobility and exfoliation. Perioceutics, which includes the delivery of therapeutic agents via systemic and local means as an adjunct to mechanical therapy has revolutionized the arena of periodontal therapy. Selection of a right antimicrobial agent with appropriate route of drug administration is the key to successful periodontal therapy. Irrigating systems, fibers, gels, strips, films, microparticles, nanoparticles and low dose antimicrobial agents are some of the local drug delivery systems (LDDS) available in the field, which aims to deliver antimicrobial agents to sub-gingival diseased sites with minimal or no side-effects on other body sites. The present review aim to summarize the current state-of-the-art technology on LDDS in periodontal therapy ensuring the the practitioners are able to choose LDD agents which are custom made for a specific clinical condition.

1. Introduction

Periodontal disease [PD] is an immuno-inflammatory destructive disease of periodontal tissues characterised by loss of soft tissue attachment and alveolar bone resorption caused by pathogenic microorganisms resulting in pocket formation and or gingival recession [1]. According to the Global Burden of Disease Study (GBD-2015), the total number of people affected by oral diseases has increased from 2.5 billion in 1990 to 3.5 billion in 2015, with a rise in disability-adjusted life year by 64% [2]. Periodontitis is the sixth ubiquitous chronic disease affecting > 743 million people worldwide, having undesirable impact on oral functions, self-confidence, systemic health and overall well-being of an individual [3]. Owing to the chronic nature of the disease, most of the patients report to the dentist only when the disease has reached the established destructive stage, thus requiring a comprehensive treatment procedure which is time consuming and the outcome may not be promising in most of the cases. It is worth mentioning that the deleterious effects of PD are not limited to the oral cavity, but extends its clutches to gain ready access to the systemic circulation through the pocket epithelium, eliciting host immuno-inflammatory response, eventually resulting in systemic complications [4–6]. The mechanisms by which the PD affects the systemic conditions such as pregnancy, diabetes mellitus and cardio-vascular systems is described in Fig. 1.

PD starts as an inflammatory reaction confined to the gingival tissue (gingivitis), but when left untreated it progresses to involve the periodontal ligament, cementum and supporting alveolar bone, resulting in pocket formation which provides a favourable environment for the growth of pathogenic anaerobic microorganisms (*Porphyromonas gingivalis* [Pg.], *Prevotella intermedia* [Pi.], *Aggregatibacter actinomycetumcomitans* [Aa.], and *Fusobacterium nucleatum* [Fn.] etc) [7,8]. Gingivitis is a reversible stage, which responds to the conventional nonsurgical periodontal treatment. In contrast, periodontitis requires sequential therapy that involves nonsurgical therapy eg. scaling and

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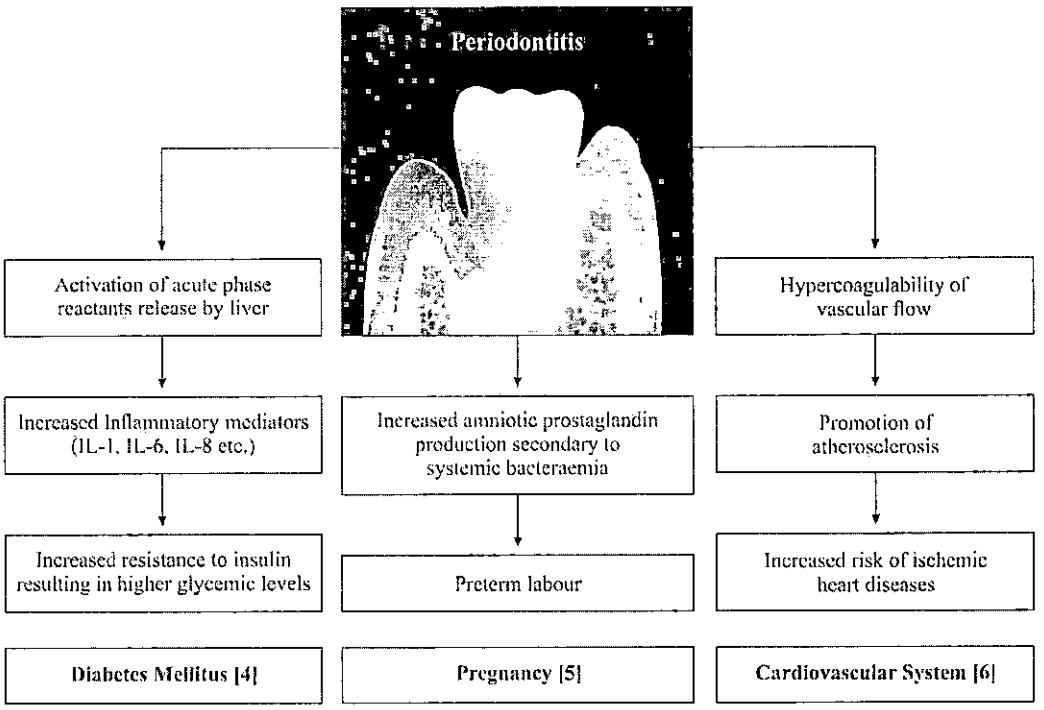

Fig. 1. Schematic representation of interrelation between periodontal disease and systemic diseases (IL: Interleukins).

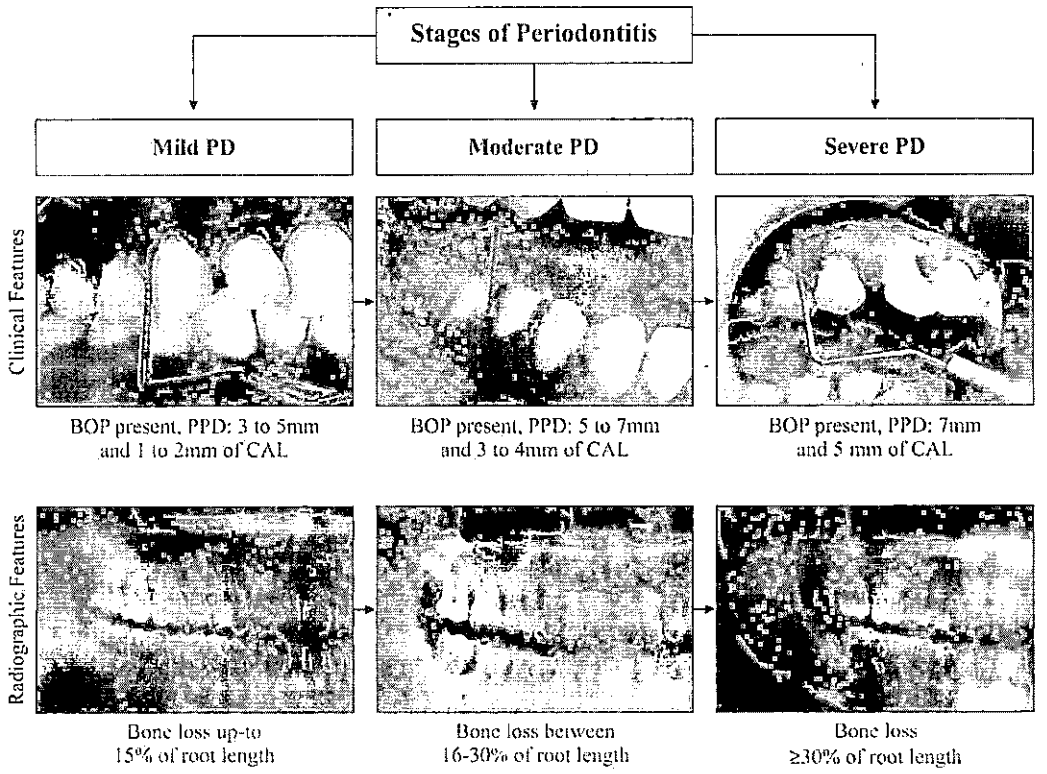

Fig. 2. Clinical photographs demonstrating the severity of the disease (BOP: Bleeding on probing; PPD: probing pocket depth; CAL: Clinical attachment loss).

root planing (SRP) followed by surgical intervention [9]. If left unaddressed, it results in tooth migration, hyper mobility, tooth loss and eventually increases the masticatory dysfunction, resulting compromised nutrition and health [10]. In most of the human infections, perpetual turn-over of human epithelial cells play a natural defensive role by inhibiting the adhesion and colonization of pathogenic microorganisms. In contrast, human tooth remains constant throughout the lifetime without any further turn-over or remodelling, providing a non-shedding surface for an intense and continuous colonization of microorganisms making periodontal treatment challenging [11]. Irrespective of the severity of the PD (Fig. 2), the rationale of periodontal treatment is to regenerate the lost periodontal tissue and frame a

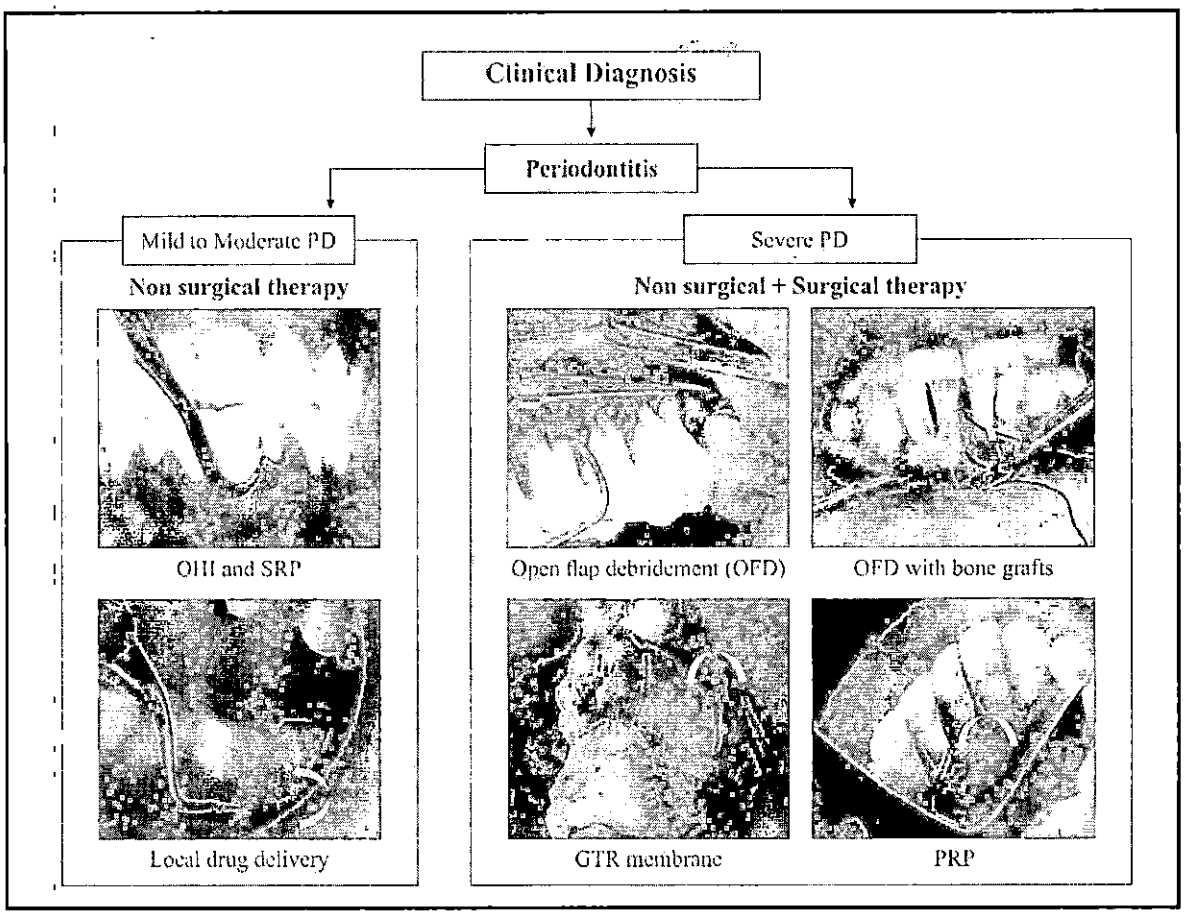

Fig. 3. Clinical decision tree for management of PD (OHI: Oral hygiene instructions; SRP: Scaling and root planning; GTR: Guided tissue regeneration; PRP: Platelet rich plasma).

clinical state that is favourable to maintain the gingival health throughout life. Although nonsurgical approach of mechanical tooth and root debridement (Fig. 3) is effective in gingivitis and mild periodontitis, it remains ineffective specifically in cases of severe PD due to the limited visibility and accessibility to root, furcation, and underlying bone defects. Such scenarios demand surgical approaches such as open flap debridement (OFD) with or without bone graft materials (autogenous, allografts, and alloplasts), guided tissue regeneration membranes, biological mediators (platelet rich plasma, platelet rich fibrin, and enamel matrix proteins) and advanced engineered biomaterials like stem cell and nano-technology mediated regeneration [12–16].

Irrespective of these efforts, it is important to know that neither non-surgical methods nor extensive osseous flap surgical techniques can eliminate the periodontal micro-organisms (*Pg, Pi.* and *Aa*) completely due to the robust potential of the pathogens to invade the gingival epithelium and connective tissue via pocket epithelium and dentinal tubules [17]. Hence, a concerted effort must be made by the clinician to consider the microbial origin of the disease and treat it with appropriate antimicrobial agents as an adjunct to the standard mechanical therapy and this assistance acquired from antimicrobial agents in treatment of PD is termed as Perioceutics [18].

Selection of a right antimicrobial agent with appropriate route of administration of the drug is the key to successful periodontal therapy. Dosage form and the route of administration have positive impact on the overall clinical outcome of the therapy. Systemic antimicrobials therapy is effective only when given in sufficient doses to achieve desired concentration in the pocket area [19]. Clinicians choose local drug delivery systems (LDDS/LDD) over systemic antimicrobials especially in cases of moderate, localised periodontitis as increased drug concentration is made available at the site of infection with minimal adverse reactions [20]. With this background, the present review aims to summarize the current state-of-the-art technology on LDDS in periodontal therapy and highlight the burgeoning technologies that could improve future treatment for PD.

2. Rationale of LDDS in periodontal disease management

With the growing understanding about microbial etiopathogenesis of PD, the need for development of novel technologies has resulted in the evolution of multiple advanced systemic or local/intra pocket antimicrobial delivery systems. The past half-century has witnessed a tremendous expansion in the successful treatment of oral infections with systemic antibiotics. Nevertheless, most of the systemic antimicrobials are associated microbial resistance with its inadvertent use, failure to reach the site of infection and attain adequate concentration and poor tissue penetration [21]. Owing to these limitations, systemic antimicrobial delivery systems are now recommended only in patients with severe and generalized type of PD. These conspicuous curbs have led to a keenness in initializing periodontal treatment with LDDS. In LDDS, the therapeutic goal is achieved by placing the antimicrobial agents directly in the sub gingival sites/periodontal pocket, which releases the active drug in an immediate or controlled/sustained fashion to combat the microbial attack, simultaneously minimizing its undesirable effects on non-oral systemic/body sites [22].

LDDS have several advantages over systemic antimicrobial agents, which include minimally invasive and direct application at the site of infection, avoidance of gastro-intestinal issues and first pass metabolism, reduction in the dose and frequency of drug administration,

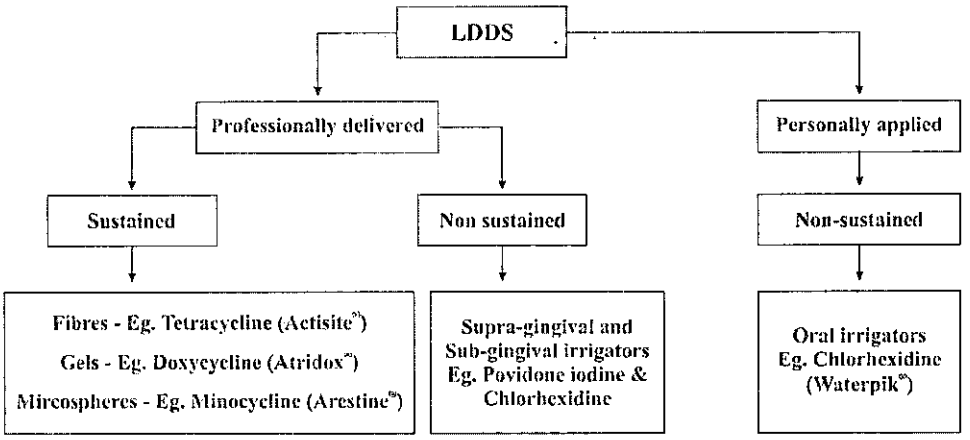

Fig. 4. Classification of Local drug delivery systems.

improved patient compliance and serves as ideal means to incorporate agents, which are not suitable for systemic administration eg. Chlorhexidine [23]. An ideal LDDS must be easy to administer, release the drug in a controlled fashion, sustain the drug concentration for prolonged period, should be biodegradable, biocompatible and not cause any irritation to the tissues [19]. LDDS are available in the form of irrigating systems, fibers, gels, strips, films, microparticles and nanoparticles [21] (Fig. 4 demonstrates the classification of LDDS in periodontal therapy). Placement of LDDS is aided by the presence of periodontal pocket, which acts as natural reservoir in which gingival crevicular fluid (GCF) provides hydrated environment that boosts distribution of the drug throughout the pocket [22].

3. Irrigating systems

Oral irrigation (OI) is a generic term used to describe an irrigating system employed professionally in the dental clinic as well as personally applied by the patient at home to prevent and treat the PD. In 1962, a Colorado dentist Gerald Moyer in collaboration with an Engineer John Mattingly introduced the OI system as an alternative to dental flossing to enhance patients' oral hygiene [24]. OI is therefore called as dental water jet and water flosser. Irrigation flushes away the bacteria from the tooth and periodontal tissue surface causing non-specific reduction of plaque bacteria. OI systems comprise two components, the device and the irrigating solution in which the effectiveness is governed by the irrigation pressure, stream characteristics, and jet type [25]. Mono-jet/multi-streamed jet tips are available for supra-gingival irrigation, and blunt cannulae with end or side ports are available for subgingival irrigation as demonstrated in Fig. 5A. Though, both end port and side port cannula achieve similar depth of penetration, the side port cannulas eject solution at a low pressure as the velocity of the irrigating agents are reduced by the resistance created at the closed end point as compared to the open end port where there is patency to the irrigating solutions without any resistance [25]. Water flossing action of the flosser includes an integration of pulsation and pressure with subsequent shear hydraulic force that disrupts the plaque and expels subgingival bacteria effectively [25].

The compressive force causes steady water flow leading to constant pressure on the tissue promoting the escape of bacteria and its by-products while the phase of decompression facilitates further displacement of debris and bacteria. Waterpik®, is one such OI device with a reservoir and a handle with replaceable tips. Studies have shown that Waterpik® is effective in removing the bacterial biofilm from the crest of marginal gingiva to a distance of approximately 50% at a moderate to high pressure setting of 50–90 psi and pulsation rate of 1200–1400 per min[26].

Success of the locally delivered antimicrobial agents in irrigation system depends on its depth of penetration, complexity of infection, GCF flow, drug concentration, and available amount of drug for sufficient duration of time at the pocket region. Diffusion of the drug into deeper levels of the pocket and the duration of exposure to the antimicrobial agent also determines the proficiency of irrigation devices [26]. In supragingival irrigation devices, the irrigating agent penetrates to the depth of 29–71% of shallow pockets and 44–68% in case of moderately deep and deep pockets, whereas subgingival irrigation has better penetrability with the range of 75–93% into the deep pocket [25]. Effectiveness also depends on the ecosystem of bacteria in the pocket, for example, planktonic *Streptococcus sanguis* is inhibited by 0.2% of chlorhexidine (CHX) and 0.05% cetylpyridinium within 5 min, whereas a complex bacterial biofilm structure resists and survives for > 4 h of exposure to the same [27]. The antimicrobial activity of the drug is also hampered by the presence of blood components, serum proteins and pus in the pocket [26]. In addition, the rate of GCF flow is also one of the key factors that determines the contact time between antimicrobial agents and subgingival bacteria [28].

Several clinical studies have been done till date in which 0.2% CHX, saline solution, sterile water, and SRP were used as controls in comparison to 10 mg/mL of tetracycline [29], povidone iodine (2–10%) [30], ozonated water [31], 0.25% sodium hypochlorite [32], essential oils [33], mixture of 1% povidone and 3% hydrogen peroxide [34,35]. These irrigating agents showed comparatively better therapeutic results than the standard controls when used as an adjunctive therapy to SRP. Results of the study were assessed based on significant reduction in clinical variables such as BOP, PPD scores and CAL gain. In another study, povidone iodine (10%) was used as an irrigating agent adjuvant to full mouth ultrasonic debridement (FMUD) as compared to FMUD with saline irrigation in generalized aggressive periodontitis patients. The two groups presented reduction of full mouth bleeding score, plaque score and had statistically significant PD reduction, CAL gain and improvement in level of gingival recession ($p < .05$) from baseline. Both therapies reduced the microbial count of *Pg* levels in deep pockets ($p < .05$). However, inter-group comparison in terms of clinical, immunological and microbiological parameters demonstrated non-significant difference ($p > .05$). [30]. In a clinical scenario, it is important to note that soon after the SRP, the microbial adhesion on tooth surface starts within the nanoseconds and it generally takes 12 h for the bacteria to repopulate in the pocket area and initiate disease process in the oral cavity [8]. Irrigating agents have transient action but when used on a regular basis helps to prevent re-population of the bacterial flora in the periodontal pocket. Hence, it is suggested that the irrigating system when used as an adjuvant to mechanical plaque control, plays an important role to prevent the occurrence of PD. Though irrigating systems are effective in clearing the bacteria from subgingival sites, the results are not long lasting due to limitations such as restricted

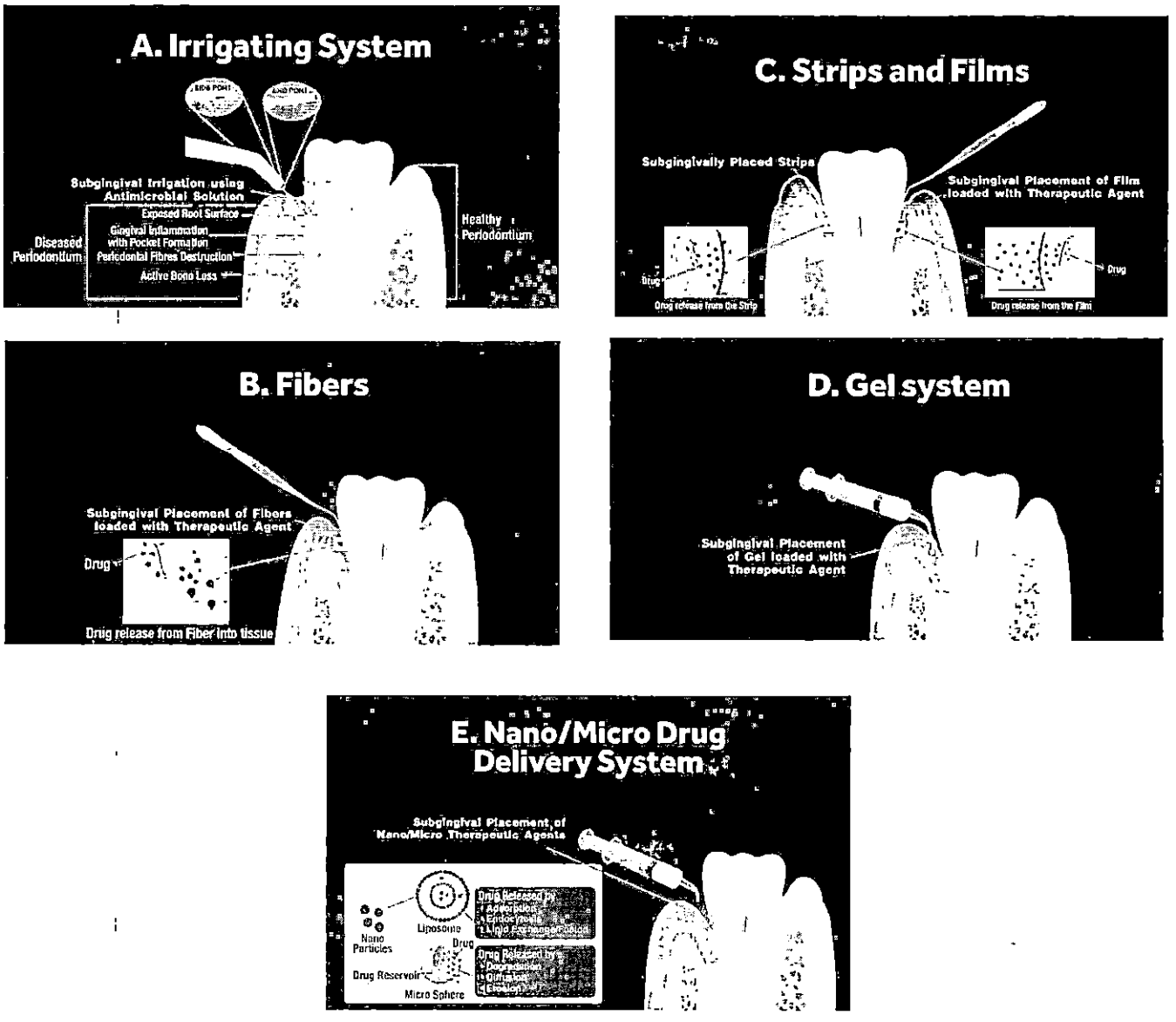

Fig. 5. Diagrammatic representation of LDDS in Periodontics. A: Oral irrigation system, B: Fibers, C: Strips and films, D: Gels, E: Nano/Micro delivery system.

penetration into the deepest point of the pocket, requirement of high manual dexterity in personally applied devices, lack of sustained release of drug and rapid clearance by GCF [36]. These limitations have resulted in the evolution of advanced drug delivery systems such as fibers, films, strips, microsphere and nanoparticles.

4. Fibers

The term fiber is derived from a Latin word 'Fibra' which means a natural or a synthetic substance whose length is significantly greater than its width. Fibers are reservoir type of therapeutic formulation system that are placed circumferentially into the periodontal pocket using an applicator (as represented in the Fig. 5B) and sealed with a cyanoacrylate adhesive or a periodontal dressing [37,38]. Electro spinning is one of the most frequently used methods of fabrication of fibers, which provide unique characteristics such as surface to volume ratio, drug loading efficiency and ease of administration. Polymers used are either naturally occurring such as chitosan, zein and gelatin or synthetic in origin like poly (lactide-*co*-glycolide) (PLGA) or poly (−caprolactone) (PCL) both of which are biodegradable in nature [19]. Further, non-biodegradable polymers such as ethylene vinyl acetate (EVA), cellulose acetate are also used in the fabrication of fibers [19]. Loading of the active drug is one of the key steps in the fabrication of fibers, which is carried out either passively by the process of physical adsorption or through surface immobilization by direct loading into the polymer solution [39]. Both active and passive loading is achieved by melting, drying, wet spinning or advanced methods such as coaxial electro spinning and tri-axial spinning [40]. Efficiency of drug loading depends on the physico-chemical properties of the drug, method of formulation, and the polymer used. In this manner, fibers encapsulating the drug provide protection from the external environs and allow a slow release of the therapeutic agent with respect to time [41].

Following the placement of fibers into the periodontal pocket, drug release occurs through either/combination of the three mechanisms: diffusion, swelling, and degradation [42]. The drug release rate is governed by the degradation of polymer which in-turn relies on their surface properties (hydrophobicity/hydrophilicity), melting point, molecular weight, distribution, roughness, crystallinity, and rigid behavior of the polymer and solubility and stability of the encapsulated drug [40]. Typically, resorbable polymer such as chitosan and its derivatives are degraded by lysozymes present in the tissue and the degradation rate can be altered by manipulating the molecular weight and

degree of deacetylation [42]. Based on the site of application, zein being a protein is degraded by various enzymes such as pepsin and pancreatic enzymes. In the oral cavity, zein is digested by protein degrading enzymes such as collagenase and trypsin like enzymes, present in saliva and GCF [43,44]. Other natural resorbable polymer like gelatin resorbs through hydrolytic degradation by the penetration of body fluids [45]. On the other hand, synthetic biodegradable PLGA polymer undergoes degradation by the process of hydrolysis to release lactic and glycolic acid as byproducts. PLGA is a USFDA approved polymer whose degradation can be critically modulated by its crystallinity, glass transition temperature, viscosity and molecular weight [45].

With respect to research studies, fibers get the credit for being extensively investigated in the field of periodontics to evaluate the efficacy of various antimicrobial agents and their substantivity when encapsulated within the fiber system. A clinical study evaluating the antimicrobial efficacy of tetracycline loaded hollow fibers prepared by using synthetic cellulose acetate displayed rapid burst release (95% of drug release in first 2 h) with acceptable improvement in sub gingival micro-flora comparable to SRP alone [46]. However, these hollow fibers made of cellulose acetate failed to provide drug concentration for prolonged period that made them clinically less effective. Furthermore, to overcome the limitation of non-degradable polymers which calls for a second visit to remove the fibers, studies were conducted focusing on the fabrication of bio-degradable based polymers such as fibrillar collagen loaded with tetracycline. These systems revealed sustained drug release by diffusion for up to 8 weeks with pocket depth reduction and attachment level gain within 4 weeks as compared to SRP alone [47]. All these polymer-based fibers have very clearly demonstrated marked improvement in the plaque scores, gingival status, PPD and levels of clinical attachment. Periodontal status of patients improved considerably with time wherein there was a clear evidence of reduction in the colony count of sub-gingival micro flora of *Aa.*, *Pg.* and *Pi* [48,49]. In addition, availability of tetracycline at the treatment site for longer duration could be attributed to its property of binding to the pocket walls following its diffusion. These clinical data are further supported by well documented in-vitro studies which are described in Table 1.

In the year 1994, the first ever USFDA approved tetracycline hydrochloride loaded fiber, Actisite® with an extended drug release pattern was introduced commercially for the treatment of periodontal disease. Actisite® is a non-resorbable, inert fiber consisting of ethylene/vinyl acetate copolymer measuring 23 cm (9 in.) long, 0.5 mm diameter, with evenly dispersed tetracycline hydrochloride weighing 12.7 mg, USP [49]. Clinical studies evaluating the effectiveness of Actisite demonstrated that the system maintained constant concentration of > 1000 μg/mL for a period of 10 days [49]. The tetracycline has demonstrated good anti-microbial potential against periodontal pathogens and unique anti-collagenase properties which is absent in other antimicrobials. Despite the clinical benefits, Actisite system is now discontinued which could be because of the non-biodegradable behaviour of the polymer. Overall, though fibers have wide range of sound clinical benefits, they present their own challenges and limitations. Placement of fibers requires approximately > 10 min; which requires considerable learning curve to gain proficiency at placement. Further, if the polymer used in fiber is non-degradable, it calls for a second appointment after 10 days for the removal of these fibers which often cause discomfort to patient, resulting in local erythema, further interfering with healing of pocket area, limiting its acceptance by the patients and the periodontists [50].

5. Matrix system: strips and films

Strips and films (SF) are polymer based thin bands of matrix system designed to deliver the active therapeutic agents in a controlled and sustained fashion when precisely placed in the interproximal periodontal pocket space (Fig. 5C) [55]. A Japanese periodontist Noguchi, demonstrated the application of these systems in the year 1984 [56]. Direct milling or solvent casting method are primary methods of fabrications of films using various polymers, while other techniques include hot melt extrusion, rolling solid dispersion extrusion, and semi-solid casting [57]. An array of polymers are used in the synthesis of these systems which are either biodegradable in nature such as polylactic acid, polyglycolic acid, poly-caprolactone and poly hydroxyl butyric acid (PHBA) or non-biodegradable polymers such as ethyl cellulose, cellulose acetate, and ethyl methacrylate etc. [58,59]. SF are evaluated for thickness (ideal range of 5–200 μm), dryness, tensile strength, tear resistance and folding endurance. Release pattern and the biodegradable nature of SF system depends on the polymer and cross-linking agents used. In general, drug release from SF critically depends on their biodegradable property of the polymer which occurs either by diffusion of drug and/or matrix dissolution or erosion. Drug release from films made using non-degradable polymers takes place by the process of diffusion alone whereas those made using biodegradable polymers releases drug by diffusion or erosion [59]. SF has the advantage of being easily manipulated for desired shape and size to match the pocket dimensions that allows for easy insertion with minimal discomfort to the patient [60].

Initially, SF were made up of acrylic material with the thickness range of 0–2 mm loaded with various antimicrobials such as tetracycline or metronidazole, which exerted desirable effects on sub gingival micro-flora, thereby suppressing the clinical signs of periodontal disease. Based on the thickness of the polymer, SF demonstrated a significant drug release on the first day with subsequent sustained release over 4–5 days after its placement [61]. Such SF readily soften in the presence of GCF making its removal cumbersome, which in turn evoke an inflammatory response when left behind in the pocket space [62]. Hydroxyl propyl cellulose, a natural bio-absorbable polymer was one of the earliest polymers used in the fabrication of SF to deliver drugs such as chlorhexidine [63], tetracycline [64] and metronidazole [65]. A study with PHBA strips loaded with 25% tetracycline showed significant burst release of drug delivery on day 1 followed by sustained release for 4–5 days whereas, 25% tetracycline loaded PLGA strips (25 TTC–PLGA) showed drug release at therapeutic doses for 10 days [66]. These biodegradable strips have better biocompatibility over non-biodegradable ones and studies have demonstrated that ethyl cellulose-based chlorhexidine strips showed a desirable clinical treatment outcome in terms of reduced pocket depth in 11 weeks with a clear reduction in the count of spirochetes and motile rods [67]. Similarly, metronidazole loaded strips proved to be effective in reduction of plaque and gingival index scores, pocket depth scores and alteration in periodontal microflora with apparent fall in spirochetal count when compared to SRP alone [68] which was considerably more effective than strips loaded with chlorhexidine or tetracycline [69]. In another study, matrix of hydroxypropyl cellulose and methacrylic acid copolymer loaded with 10% ofloxacin suppressed the periodontal microflora for a period of 7 days in GCF with an effective reduction in spirochetes and motile rods colony counts [70]. With the growing popularity of use of medicinal herbal products, it has also inspired periodontists to use them as local drug delivery agents. Green tea catechin embedded in hydroxypropylcellulose matrix when used adjunct to mechanical treatment showed bactericidal effect against black pigmented rods with effective improvement in the periodontal status [71]. In conclusion, several studies in literature have used combination of these polymers to deliver antimicrobials such as doxycycline, tetracycline, metronidazole and chlorhexidine. Results of these studies proved that SF loaded with drugs were effective in reducing clinical variables such as plaque index, gingival index, PPD scores and improved CAL with reduction in colony count of *Aa.*, *Pg.*, and *Fusobacterium* species. Though SF and fibers share similar range of polymers used in formulation, the key difference lies in its release rates based on its dimensions and its clinical application. Fibers have an advantage as they can be used in pocket present in an inaccessible region such as distal most surface of the last tooth in the dentition, whereas SF owing to its wider dimension, placement is better

Table 1
Studies investigating role of various LDDS for the periodontal therapy.

LDDS	Polymer	Drug	Method of formulation	Inferences	Reference
Fibers	Poly(lactic acid)	Chlorhexidine (0.5%–1.0% w/w)	Electrospinning	Sustained release was observed for 650 h in pre-encapsulating chlorhexidine particles with polyelectrolyte multilayers. The formulation demonstrated antibacterial activity against *E. coli* and biocompatibility against human fibroblasts.	2017 [51]
	poly(L-lactide-co-d/L-lactide)	Ampicillin and metronidazole (20/20 m%)	Multijet electrospinning	The formulation demonstrated drug release in a concentration dependent manner with an effective antimicrobial activity against *Aa. Fn, Pg.* and *Enterococcus faecalis* and non-toxic against human gingival fibroblasts.	2016 [52]
	Sodium alginate	Ciprofloxacin (200 mg), Diclofenac sodium (500 mg)	Syringe-extrusion technique using barium chloride as crosslinking agent.	The formulation exhibited zero-order drug release with antimicrobial activity against E. *coli, E. faecalis* and S. *mutans* for 10 days.	2013 [53]
	Poly(L-lactide-co-d/L-lactide) 3–5% (w/w)	Metronidazole (0.1–40%)	Electrospinning	The formulation exhibited sustained drug release for period of 28 days. Fibers showed effective antimicrobial activity against F. *nucleatum Pg* and *Aa* and was cyto-compatible against human gingival fibroblasts.	2012 [54]
Strips and films	2% chitosan (from crab shells), Glycerine (0.5%) as plasticizer and Glutaraldehyde solution for cross linking	Metformin hydrochloride	Casting method	The film showed sustained release of metformin over a period of 11 days. Further metformin film showed desirable antibacterial and bone regenerating potential in periodontitis induced animal model.	2018 [73]
	sodium alginate (4%w/v), gelatin (4%w/v), diammonium hydrogen phosphate calcium hydroxide, calcium chloride as crosslinking agent	Tetracyclines	Solvent casting method	The composite film demonstrated significant stability and ease of handling. Drug release was observed for > 10 days.	2018 [74]
	Gelatin (2.58–5.41% w/v)	Curcumin (2 mg)	Solvent casting technique.	Developed film efficiently released curcumin for period of 7 days with promising effect in management of periodontitis.	2018 [75]
	Non-amidated low methoxy pectin	Metronidazole (5%)	Casting or modified ionotropic gelation techniques.	The developed films showed desirable mechanical and radial swelling properties. Antimicrobial activity observed against *Pg* and *Aa*. Film demonstrated preliminary burst release with subsequent slow release for 7 days.	2018 [76]
	Carboxy methyl cellulose sodium (CMC) or sodium alginate (ALG) 6% and Thiolated sodium alginate (2 or 4%w/v)	Metformin (0.6% w/w)	Double casting technique	An in-vitro and clinical study of the developed multiple layer film was carried out. Invitro study suggested that the developed film had good mechanical properties, enhanced mucoadhesion and a controlled form of drug release. The clinical results suggested an improvement in all the clinical parameters in the management of moderate periodontitits.	2017 [77]
	poly(lactic-coglycolic acid), methoxypoly (ethyleneglycol) (MePEG) and [poly(D,L-lactic acid)-*block*-methoxypoly(ethyleneglycol)] at final concentration of 10% w/v	Tetracycline and tetracycline hydrochloride (5% w/w)	Solvent casting method	Tetracycline HCl loaded film demonstrated rapid release as compared to tetracycline. The addition of MePEG/ diblock resulted in concentration dependent increase in release of the drugs.	2010 [78]
Gels	Water-soluble: Chitosan (2% (*w/v*) in distilled water), base chitosan (2% concentration in dilute lactic acid (1% *v/v*))	Atorvastatin (2% (*w/v*)) in polyethylene glycol 400 (PEG 400).	Conventional gel followed by acetylation	The chitosan-based atorvastatin gel displayed desirable viscosity and syringe ability properties. It provided adequate bio-adhesion to hold the system at the application site. The release of the drug was found to be slower as compared to that atorvastatin gel prepared in PEG 400.	2018 [96]
	Cinnamon oil (oil phase) tween 80 and Carbitol® (surfactant- cosurfactant mixture), poloxamer 407 (23% w/v)	Quercetin (125 µg/200 µL)	Thermoreversible gel	Quercetin loaded nano-emulgel displayed complete release of quercetin over 6 h.	2018 [97]
	Low-viscosity chitosan (20 mg)	Thymol	Conventional gel with acetylation	Thymol-chitosan hydrogels showed burst release within the first 48 h with antimicrobial activity against *S. aureus* and *S. mutans* for 72 h.	2017 [98]
	Poloxamer (Pluronic 127) (30% w/v), carbapol P 934 (1% w/v) and polyethylene glycol (PEG-400) (140 mg/mL)	Curcumin (2%w/w)	In-situ, thermoreversible gel	In-situ gel containing 2% curcumin showed desirable rheology with optimum spread ability and was effective in the treatment of experimental periodontitis in rats	2017 [99]
	Poloxamer 407, carbopol 934	Cranberry juice	Poloxamer and Carbopol based Thermoreversible gel	Thermoreversible gel of cranberry juice displayed gelation temperature of ≤ 32 °C, ideally acceptable for subgingival application in periodontitis. In addition, (50% w/v) cranberry juice in gel showed similar zone of inhibition when compared with commercially available chlorhexidine gel (0.2%) against panel of micro-organisms associated with periodontal infections	2017 [100]

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Table 1 (*continued*)

LDDS	Polymer	Drug	Method of formulation	Inferences	Reference
	Bleached shellac (BS) 15–30% w/w was dissolved in *N*-methyl pyrrolidone.(NMP)	Doxycycline hyclate (DH), Metronidazole (MT), Benzoyl peroxide (BP) (5% w/w each)	Solvent exchange-induced in situ forming gel	In situ gel was formulated in simulated gingival crevicular fluid loaded with DH, MT and BP showed drug release over the period of 48 h. Drug loaded-BS systems showed significant inhibition of *S. aureus*, E. *coli*, S. *mutans* and Pg.	2016 [101]
	Medium molecular weight chitosan (0.5% w/v), beta-glycerophosphate (1.8% w/v)	Minocycline (2% w/v)	Novel Chitosan based thermoreversible gel	Formulated thermoresponsive gel of MCL with chitosan/b-glycerophosphate showed drug release 92–99% and the pH of 5.6–6.2. The gelation temperature of the in situ gels was found to be 37 °C with stability over a period of 90 days.	2016 [102]
	Poloxamer 407 (19% w/v), Carbopol 934P (0.2% w/v)	Chlorhexidine hydrochloride (0.1% w/v)	Thermoreversible gel	Chlorhexidine hydrochloride, in situ temperature-sensitive gel was successfully formulated and the assessed parameters were found to be satisfactory with sustained drug release for a period of 6 h.	2013 [103]
	Eudragit RS (35%w/w), *N*-methyl pyrrolidone (NMP), polyethylene glycol (PEG) 1500 (2.5–10%) and peppermint oil (5–15%)	Benzoyl peroxide (BPO) (1–20%)	Thermoreversible gels	The viscosity and syringe ability of the prepared systems was directly proportional to the amount of BPO, peppermint oil or PEG 1500. Prepared gels caused sustained BPO release for at least 96 h. All gels followed the Newtonian flow which revealed decrease in the viscosity with increase in the temperature.	2013 [104]
	Gellan gum (0.6–1.0% w/v), lutrol F127 (14–18% w/v)	Ornidazole (1% w/v)	Thermoreversible gel	Gel were found to be dependent in the polymeric concentration for optimization of gelation temperature. Likewise, drug release was decreased as increase in each polymer component. Gel formulated with 0.8% w/v of gellan gum and 16% w/v of lutrol F127 revealed optimised physical characteristics.	2010 [105]
Microparticles	Dextran sulfate (DS), $CaCl_2$	Minocycline (2 mg/mL)	Ion pairing-complexation/	The ion pairing/complexation of minocycline, Ca^{2+}, and sulfonate/ sulfate-bearing biopolymers, achieved sustained release for 9 days. The antimicrobial activity was effective against *Aa* and *Sm*.	2018 [117]
	Polylactic-*co*-glycolic acid	Phenytoin, Nifedipine, Cyclosporine	O/W emulsion	Phenytoin, nifedipine or cyclosporine-loaded PLGA microspheres showed control release and the clinical study conferred the therapeutic benefits toward gingival recession and alveolar bone loss.	2018 [118]
	Chitosan, Sodium tripolyphosphate, ethyl cellulose	Doxycycline hyclate (200 mg)	Coacervation-solvent displacement	Positively charged, bio/mucoadhesive Chitosan/sodium tripolyphosphate microparticles showed sustained release of Doxycycline hycylate and exhibited a high mucoadhesive property.	2018 [119]
	Variants of polyhydroxyalkanoates (PHA)	Tetracycline (40% w/w)	Double emulsion-solvent evaporation	The tetracycline loaded PHA microspheres in micro and nanoscale showed slow release behavior. The release rate of drug was influenced by the PHA and showed efficient killing activity against periodontitis-causing bacteria.	2016 [120]
	Poly (L-lactide-co-glycolide)	Doxycycline 20% (w/w)	Double emulsion solvent evaporation	Locally-delivered Doxycycline loaded Poly L-lactide-*co*-glycolide microspheres in the periodontal pocket of patients with chronic periodontitis showed sustained release after administration.	2015 [121]
	Chitosan solution (1% (w/v))	Clindamycin phosphate (0.25–4% w/w)	Spray-drying method	Biodegradable spray-dried chitosan microparticles loaded with clindamycin phosphate with encapsulation efficiency of > 80%. It showed initial burst release due to the water solubility of the drug, but the increased amount of chitosan decreased the drug release rates.	2014 [122]
	Chitosan solution (1%w/w), Tween20/ Tween80, Span80, Glutaraldehyde	Metronidazole (20 mg)	Emulsion cross-linking process	Metronidazole-loaded chitosan microparticles produced using 1% of Span80 in soybean oil, 5% glutaraldehyde based on chitosan solution with 1:1 drug: chitosan ratio, showed prolonged release property.	2013 [123]
	PLGA and zien from maize	Tetracycline (0.125%)	Spray drying method	Suitable drug release profile in the range of 5–7 days was obtained from different hydrogels containing metronidazole loaded microparticles. The release was mainly dependent, on the concentration of zien.	2012 [124]
Nanoparticles	Silver nitrate ($AgNO_3$) (5 mM) in collagen	Silver nanoparticles suspensions in collagen	Simple reduction method	Synthesized nanoparticles demonstrated dose dependent antibacterial activity against periodontal pathogens and were found to be biocompatible against human gingival fibroblasts	2018 [146]
	PLGA copolymers and Chitosan (1% w/w)	Metronidazole or N-phenacylthiazolium bromide	Oil- in- water emulsion solvent evaporation	Formulation demonstrated initial rapid drug release at pH 5.5 whereas the drug was completely released in 7 days. It reduced subgingival inflammation in experimental periodontitis in rats.	2018 [147]

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Table 1 (*continued*)

LDDS	Polymer	Drug	Method of formulation	Inferences	Reference
	Chitosan chloride, Sodium alginate and pectin	Crosslinker	Ionotropic gelation	Effect of pure and Nano formulations of chitosan, alginates and pectin nanoparticles is demonstrated. Alginate nanoparticles remained stable at salivary environment. However, it was found to be cytotoxic at in-vitro experiments. And, chitosan nanoparticles were found to be Cyto-compatible.	2017 [148]
	Sodium alginate: ZnCl2	Cetylpyridiniumchloride (CPC)	Ionotropic gelation	Particles with diameters < 200 nm, polydispersity index < 0.2, negative zeta potential and spherical morphology were formulated. The entrapment efficiency was 94% with loading capacity > 50% and prolonged release over 7 days. The formulations with noted charge ratios resulted in stable CP-alginate nanoparticles with a potential of treating periodontal disease.	2016 [149]
	Poly-ε-caprolactone, Pluronic F-68	Eugenol	Solvent displacement method	Eugenol-loaded Nano capsules (NCs) was found to follow a biphasic pattern and followed Michaelis–Menten like model. In-vitro cell viability assay indicated that the NCs are not cytotoxic and in vivo performance of the eugenol-loaded NCs using ligature-induced periodontitis model in rats indicated that eugenol-loaded NCs could prevent septal bone resorption in periodontitis.	2016 [150]
	2-hydroxyethyl, methacrylate, (HEMA), O-carboxymethyl chitosan (O-CMC) $CaCl_2$	Beads of Calcium sulfate incorporated with Tetracycline nanoparticles	Ionic gelation method	Tetracycline nanoparticles with entrapment efficiency of 89% showed a cumulative release of 27% at the end of 10 days following a sustained release pattern. The antibacterial activity and cytocompatible nature of developed nanoparticles could be beneficial in periodontal management to reduce the bacterial load at the infection site.	2014 [151]
	Poly -ε-caprolactone (50-70 mg) Pluronic F-68 (0.2-1%)	Triclosan (5-10 mg)	Solvent displacement method	Optimised triclosan loaded Poly-caprolactone NPs with particle size of 180-230 nm showed 91% entrapment efficiency and *in-vitro* release of 97% for 3h. NPs were stable with the shelf life of 17 months and demonstrated cyto-compatibility against L929 cell lines.	2013 [152]
	PLGA	Minocycline	Single and double emulsion solvent evaporation emulsion, ion pairing, and nanoprecipitation)	Novel minocycline-PEGylated PLGA nanoparticles prepared by the ion pairing method had the best drug loading and entrapment efficiency compared with other nanoparticles. They also showed higher in vitro antibacterial activity than the free drug.	2012 [153]
	Different grades of chitosan, ethyl-3-(3-dimethylaminopropyl) carbodiimide hydrochloride, thioglycolic acid, bis-acrylamide (cross-linking agent) and methacrylic acid	Metronidazole benzoate	Emulsion solvent evaporation technique	The retention time of MET at its absorption site was found to be increased by formulating it into nanoparticles using thiolated chitosan (TCS)–poly (methacrylic acid) (PMAA). The nanoparticles of MET prepared from TCS–PMAA may represent a useful approach for targeting its release at its site of absorption, sustaining its release and improving its oral availability.	2011 [154]
Liposomes	Lipoid S75 for liposomes, glycerol for glycerosomes and propylene glycol for penetration enhancer containing vesicles	*Citrus limon* (L.) extract (80 mg)	Thin film hydration method	Freeze-dried extract loaded liposomes, glycerosomes, and penetration-enhancer-containing vesicles prepared with propylene glycol prevented oxidative damage and inhibited bacterial proliferation.	2018 [161]
	HSPC and cholesterol (molar ratio, 2:1)	Minocycline hydrochloride (5 mg/mL)	Extrusion method	Minocycline hydrochloride loaded nanoliposomes inhibit the proliferation of murine macrophages and achieve the anti-inflammatory effects by suppressing the TNF-α mRNA expression with a reduced dose.	2012 [162]
	POPC, PGDO, Cholesterol polyethylene glycol $FeCl_2$, $FeCl_3$	Magnetite nanoparticle	Thin film hydration method	Magnetic PEG-ylated liposomes (average size 286 nm) on exposure to external magnetic field demonstrated deeper penetration in to the dentinal tubules compared to PEG-ylated liposomes (average size 204.3 nm).	2012 [163]

achieved in cases of broader pocket area to reach maximum clinical benefits [19].

Periochip (Perio Products Ltd., Jerusalem, Israel) is a US FDA approved brownish orange coloured rectangular chip containing chlorhexidine gluconate (2.5 mg) embedded in a matrix of biodegradable polymer – gelatin. It is available in dimensions of 5 × 4 × 0.3 mm weighing about 7.4 mg (drug and polymer). Post-delivery, chlorhexidine (40%) was released (by diffusion) in the first 24 h showing an initial burst effect, following which constant drug release was noted for 7 days [72]. SF allows for its placement in periodontal pocket without any adverse effects for longer time. Thus, SF plays a crucial role in improving the periodontal status when used in combination with mechanical therapy with its unique physical and mechanical properties. These clinical data are further supported by well documented in-vitro studies which are described in Table 1. However, with the advent of micro and nano sized drug delivery systems, research has diversified toward use of gels, microspheres and nanoparticles for effective local drug delivery.

6. Gels

Gels are dilute, cross-linked semisolid systems in which liquid particles/ the active drug molecules are uniformly dispersed in a solid medium that exhibits no flow when in the steady-state [79,80]. Gels get the maximum credit in the general dental practise for being used ubiquitously as a carrier system to deliver therapeutic agents in a wide range of oral diseases such as oral ulcers, denture stomatitis and desquamative gingival lesions. These wide applications are made possible owing to the properties such as ease of preparation and administration, sustained drug release pattern, minimum dose frequency and drug toxicity [81,82]. In periodontics, gels with active therapeutic agents are delivered into subgingival pocket gently by using wide port needle syringes to ensure a uniform distribution throughout the diseased site (Fig. 5D).

Gels are formulated using various polymers such as carbopol, xanthan, carboxy methyl cellulose and Chitosan [59,83] and are loaded with wide range of therapeutic agents such as antimicrobials [84], bisphosphonates (alendronates [85], zoledronates [86]) and statins (simvastatin) [87]. All these formulations when used as an adjuvant to non-surgical periodontal therapy have shown significant reduction in PPD levels, gain in periodontal attachment levels and improvement in other clinical parameters like gingival index. A study demonstrated that Chlosite, a xanthan gum-based gel containing 1.5% chlorhexidine, degraded gradually in 10–30 days after placement in the periodontal pocket while maintaining a minimum inhibitory concentration of chlorhexidine in the local site for minimum 15 days [88].

Polymer science has progressed exponentially over the years and has resulted in the development of novel gel formulations that are transformed from liquid state to semisolid gel state depending on the type of stimulus such as pH change, magnetic field and temperature [89]. For example, thermo-reversible gel is one such smart hydrogel system that is formulated by using a specialized polymer called poloxamer-407, which retains the formulation in liquid state at < 25 °C (regulated room temperature) and solidifies at physiological temperature. The thermo-reversible nature of the system makes it a suitable candidate to deliver the accurate dose of antimicrobials easily in a syringable form with minimal resistance and the agent gradually transforms itself into gel at predetermined body temperature [90]. These gels are soft, hydrophilic, biodegradable, and biocompatible in nature. They also possess the property of super-absorbency [91]. In a study Thermo-reversible green tea gel prepared using poloxamer 407 has demonstrated reduction in pockets and gingival inflammation [92].

Atridox is a US-FDA approved two syringe mixing system for local drug delivery of doxycycline hyclate into the subgingival site. One of the syringes contain Atrigel delivery system which has 36.7% poly (DL-lactide) (PLA) as solute and 63.3% *N*-methyl-2-pyrrolidone (NMP) as solvent and the second syringe consists of 50 mg of doxycycline hyclate. Mixing the components of the two syringes results in the formation of a viscous liquid (10% doxycycline hyclate), which solidifies to achieve controlled release for 7 days in subgingival site. Clinical studies demonstrated that Doxycycline levels in GCF attained maximum concentration of 1500–2000 μg/mL in 2 h and maintained effective antimicrobial concentrations for a minimum of 7 days, and the major part of the polymer (approximately 95%) was biologically metabolised and expelled from the pocket in 1 month [93]. A study on Atrigel containing 10% doxycycline hyclate demonstrated the presence of 10–20 mg/mL of drug in GCF [94]. Another commercially available matrix-based minocycline HCL (2%) formulation is available as Dentomycin in European Union and Periocline in Japan. This Minocycline is incorporated in a matrix composed of hydroxyethyl cellulose, eudragit, triacetine and magnesium chloride. In the GCF, minocycline concentration of 1300 μg/mL is achieved 1 h after application of 0.05 mL ointment; however, it is reduced to 90 μg/mL after 7 h [95]. From the assessment of the evidence obtained from literature (Table 1), it can be stated that, local delivery of drugs in the form of Gels as an adjunct to SRP has a potential role in improving the clinical parameters associated with periodontitis.

7. Microparticulate system

Microparticles are solid spherical polymeric structures with a diameter range of 1–1000 μm designed to contain active therapeutic agents, dispersed uniformly throughout the polymeric matrix, which allows protection of drugs from the external environment, elimination of incompatibility, or masking of unpleasant taste, enhance bioavailability and sustained therapeutic activity [106]. The polymers utilized for microencapsulation include biodegradable synthetic polymers like polyesters, polyanhydrides, and natural polymers like chitosan, hyaluronic acid, and alginic acid. Water soluble polymers like gelatin, starch and insoluble polymers like ethyl cellulose, polyethylene are also used for microencapsulation. Enteric coating polymers like polymethacrylates, cellulose esters, polyvinyl derivatives are other polymers used for microencapsulation [106–109]. Microparticles can be delivered via various carrier systems like chips, dental pastes/ gel systems and direct injection into the pocket (Fig. 5E) [109]. Various methods of formulation of microparticles include solvent evaporation method (single and double emulsion), coacervation and phase separation and spray drying method [109–111].

Several clinical studies have demonstrated the use of drug loaded microparticles for application in periodontitis. Lycopene encapsulated solid lipid microparticles has shown positive clinical results when it is used along with SRP [112]. Doxycycline loaded biodegradable microspheres (mean particle size between 90 and 200 μm) prepared by double emulsion technique using a combination of PLGA and PCL in different concentrations showed that the drug and polymers were stable with in-vitro release up-to 11 days. The formulation demonstrated significant improvement in the clinical and microbiological parameter upto 3 months compared to commercial doxycycline gel [113]. Another study of metronidazole benzoate loaded micro-particles with diameter of 31.0 and 74.5 μm incorporated in chitosan/PCL films showed suitable release of 64% for 7 h with significant mucoadhesive strength [114]. Study on doxycycline hyclate loaded microsphere prepared by solvent diffusion method of spherical crystallization technique showed burst release of 24% on day 1 and had 52.25% of release maintained for 7 days and demonstrated significant reduction in probing pocket depth and *P.g.* cell count compared to SRP [115].

Arestin™ is an USFDA approved PGLA based minocycline hydrochloride (1 mg/unit dose cartridge) microsphere designed for sustained subgingival delivery in periodontal pocket [116]. Owing to clinical advantages like controlled release and increased bioavailability etc., the microspheres can be considered as an efficient drug delivery system in periodontics. Analysis of clinical samples (saliva and GCF)

demonstrated that desirable concentrations (> 1 μg/mL) of minocycline was achieved at the periodontal site which provided sustained effect up to 14 days without significant serum concentration. This concentration was found to be sufficient to provide bactericidal activity. These clinical data are further supported by well documented in-vitro studies which are described in Table 1.

8. Nanoparticulate drug delivery (NP) system

In the recent years, nanoparticles (dimension less ≤100 nm) are gaining extensive attention in the biomedical field owing to their ability to accurately deliver the active therapeutic agents to the target site [125,126]. These NP are delivered to the site of action either directly or after loading with active drugs for sustained and controlled release as demonstrated in the Fig. 5E. Silver, gold, titanium dioxide and copper NP are some of the most widely researched metallic nanoparticles in dentistry and other biomedical field due to their antimicrobial, anticancer, and bone regeneration potential [127–131]. Further, functionalized superparamagnetic NP have been investigated in diagnostics and treatment of human cancers [132]. Other NP include liposomes, polymeric NP, polymeric micelles and solid lipid NP [127]. Improved transport across cell membranes, more surface area-to-volume ratios which results in improving drug loading capability, and biocompatibility as the size of the particles simulate the structure of the biological tissues are some of the key advantages of NP [133].

In periodontics, metallic and polymeric NP, nanofibers, liposomes, quantum dots, and nanocomposites/nanogels have been studied in various in-vitro and clinical studies [132]. Metallic NP are synthesized by reducing the metallic salts into NP by using either chemical reducing agents or through green chemistry method by incorporating plant materials rich in antioxidants. Other biological means include exploring the algae, fungi, bacteria, and viruses' potential to reduce the metallic salts to NP [134,135]. The nanofiber-based scaffolds are prepared by electrospinning, emulsion method, blending, coaxial process and surface modification to incorporate therapeutic agents to achieve desired clinical outcomes in dentistry [136]. The diameters of fibers, drug diffusion rate, polymer degradation/erosion rates, drug dissolution rates and drug physical desorption rates determines the drug release from the nanofibers. Smart electro spun nanofibers have components undergoing physicochemical changes in response to factors such pH value, temperature, light, electrical and magnetic field, which can modify the drug release rate [137].

Several studies are conducted to assess the efficacy of nanoparticles against oral microbiota. A study evaluated the influence of size of the particle on the antimicrobial efficacy of silver NP in which, the most significant effect was demonstrated by 5 nm diameters against periodontal pathogens like *Aa, F. nuceatum, S. mitis, S. mutans and S. sanguis*. The anaerobic oral pathogens had a lesser susceptibility to the silver NP when compared to aerobes [138]. Though metallic nanoparticles have demonstrated potential antimicrobial properties, their cyto-toxic effects on living cells have led to the concern in clinical practise. For example, silver NP, which is well known for its potent anti-biofilm activity can cross the intercellular spaces and consequently accumulate in tissues to cause potential damage [139]. The toxic effects of silver NP are proportional to the activity of free Ag^+ ions released by the NP. A study demonstrated a dose dependent oxidative damage and inflammatory lesion in human gingival fibroblast cells when exposed to silver NP. In the same study, a synergistic cytotoxic activity of silver NP with sodium fluoride (most common anti-caries agent used in dentistry) was observed [140]. Hence, clinician and biomedical researchers need to take utmost care to assess the biocompatibility of metallic nanoparticles at the in-vitro and in-vivo stage before planning to translate the research to clinical setup. To overcome the drawbacks of non-degradable metallic nanoparticles, polymeric nanoparticles have come to picture with better biocompatibility properties. A clinical study has shown that methylene blue encapsulated PLGA nanoparticles can target specific oral pathogens and release reactive oxygen species on activation by photodynamic therapy. These reactive oxygen species mediated killing of microorganisms may be an efficient treatment strategy in periodontics [141]. Increased retention on the mucosa has also been shown with the use of polymeric nanoparticles coated with immunotherapeutic ganglioside containing Satranidazole. This increased retention of the agent is due to its mucoadhesive nature resulting in prolonged drug exposure. The clinical trial using this agent showed an improved gingival index (GI) and pocket depth (PD) as compared to the control group [142]. In another study, biodegradable tinidazole loaded electro spun chitosan/PCL hybrid nanofiber membrane maintained drug release up to 18 days and effectively inhibited bacterial growth [143] In an in vivo-study in rats, it was observed that the tinidazole loaded nanofiber membrane can improve continuity of epithelium and trans-septal fibers of interdental papilla in comparison to tinidazole gel [144]. Another in-vivo study in rats showed that clinical status of periodontitis improved with the use of Doxycycline liposome slow release gel by decreasing MMP-8 level [145]. These clinical data are further supported by well documented in-vitro studies which are described in Table 1.

The term liposome (LP) is derived from Greek words; 'Lipos' means fat and 'Soma' means body. LP was first described by a British Hematologist Dr. Alec D Bangham in 1964, at the Babraham Institute in Cambridge [155]. Structurally, LP are nanoparticles with spherical lipid bilayers of 50–1000 nm diameter and when present as single layer they are called as micelles. Each lipid layer contains a hydrophilic polar head and hydrophobic tails like that of bio-membranes and because of a similarity they possess biocompatible nature and hence extensively used in biomedical applications. Amphiphilic nature of the LP makes them an ideal candidate to effectively entrap drugs of both hydrophobic and hydrophilic nature and release them at the desired target sites [156]. Based on the mechanism of intra-cellular delivery of its contents, LP are broadly categorized into conventional LP, pH sensitive LP, cationic LP, immune LP and long circulating LP also known as stealth LP. Based on the number of lipid layers, LP are further classified into multi-lamellar vesicles, small uni-lamellar and large uni-lamellar vesicles [157]. Conventionally LP are synthesized by thin film hydration technique, which includes drying down lipids from organic solvent, dispersing the lipid in aqueous media, purification and analysis of resultant liposome [157]. Cholesterol, nontoxic surfactants, sphingolipids, glycolipids, long-chain fatty acids, and membrane proteins are some of the substrates used in the synthesis of LP [158]. Hydrophobic drugs (Eg. amphotericin B) loading are carried out passively during the synthesis of LP by mechanical dispersion, solvent dispersion or detergent removal methods whereas hydrophilic drugs are actively loaded by pH gradient method [157]. LP have been extensively used in the biomedical research and in clinical application as a potential carrier of wide range of therapeutic agents such as anti-cancer drugs, antimicrobial agents, DNA, proteins and many more [156]. Advantages of using LP include improved solubility of drugs of both hydrophobic and hydrophilic nature, sustained drug release pattern on systemic or local administration, and enhanced site-specific targeting and tissue penetrance.

Several in-vivo and in-vitro studies have been conducted in periodontics owing to the exceptional drug entrapment and sustained release profile of LP. A study was conducted where pH-responsive quaternary ammonium chitosan-liposome loaded with doxycycline inhibited biofilm formation and alveolar bone loss in experimental periodontitis in animal model and was also found to be bio-compatible when assessed against periodontal fibroblasts [158]. Another study demonstrated effective delivery of plasmid gene to gingival tissue using bubble liposomes and ultrasound [159]. In an experimental periodontitis in beagle dogs, liposome loaded with superoxide dismutase and catalase demonstrated greatest reduction in PPD, CAL gain and minimal connective tissue inflammatory infiltrate on histological examination. On radiographic examination, the test group demonstrated better bone formation compared to control group exposed to only SRP [160].

Although liposomes have been used in clinical trials in medical field, in periodontics clinical evidence investigating its efficacy is scarce. Additional studies evaluating the role of liposomes for oral application are tabulated in Table 1. Further, despite the wide range of advantages of LP, there are still some drawbacks, which hold them back from being brought into clinical practice easily. These include high cost, which affects large-scale productions, lack of stability of the formulations, and sometime the phospholipids undergo oxidation and hydrolysis-like reactions [157].

9. Host modulation therapy (HMT)

Though microbial attack is the pre-requisite for the initiation of PD, Kornman in his classical model of periodontal pathogenesis has well explained the role of host in the severity of the disease. In this regard, to regulate the hyperactive host response to the microbial attack, Golub et al. introduced the concept of HMT in 1992 [164,165]. Bisphosphonates, non-steroidal anti-inflammatory drugs (NSAID's), tetracycline and their analogues are some of the key host modulating agents that have gained significant attention in periodontics [166]. These agents, when administered acts at various levels of inflammatory process and inhibits productions of key mediators involved in tissue destruction (Fig. 6). Bisphosphonates (bone sparing agent) primarily acts by binding to the hydroxyapatite crystals of alveolar bone and inhibit prostaglandin mediated bone resorption [167]. A study evaluated the clinical efficacy of locally delivered 1% Alendronate (ALN) gel compared to a placebo gel in adjunct to SRP for the treatment of intra-bony defects in chronic periodontitis. Significant reduction of PD and gain in CAL was observed in ALN group compared to the placebo group after 2 and 6 months. Further, the mean percentage of bone fill was significantly greater in ALN group (40.4% ± 11.71%) than in the placebo group (2.5% ± 1.02%) [168]. Though bisphosphonates produce desirable clinical outcomes, its therapeutic benefits are being hindered because of its major drawbacks such as bisphosphonates related osteonecrosis of the jaws (BRONJ), bioavailability and poor absorption [169]. NSAIDs act by inhibiting cyclooxygenase (CO) and lipooxygenase (LO) enzymes involved in inflammation and hence limit the production of eicosanoids such as prostaglandins, thromboxanes, and leukotrienes etc. Clinical and animal studies have showed that NSAIDs favours the periodontal healing by limiting the clinical inflammation, and alveolar bone resorptions when compared to placebo [170]. The role of systemic and local administration of selective cyclooxygenase (COX) 1 and 2 inhibitors was assessed in an experimental periodontitis in rats. It was observed that, local administration of COX inhibitors resulted in the significant reduction in the attachment and alveolar bone loss similar to that of systemic administration. Furthermore, the inflammatory cell (leukocyte) infiltration to the gingival tissues reduced in both the test groups compared to placebo [171]. Though NSAIDs have good clinical benefits in terms of periodontal parameters, serious adverse effects like renal and hepatic functional impairment especially on systemic administration has precluded its use as an adjunct to periodontal treatment [172].

Currently, SDD also called as Periostat is the only commercially available USFDA approved host modulating agent which is prescribed as 20 mg doxycycline to be taken orally twice daily for 3 months and in some cases, it is continued for up to 9 months [173]. The mechanism by which the SDD acts on the host to modulate the periodontal disease process is demonstrated in the Fig. 7 [165]. Several clinical trials have suggested that SDD effectively reduces probing depth and gain in attachment levels when compared to placebo and as an adjunct to periodontal therapy [174,175]. Chemically modified tetracyclines (CMT) are a unique class of tetracyclines having inhibitory actions on collagenolytic activity and metalloproteinase – mediated alveolar bone loss. CMTs are distinctfrom conventional tetracyclines in that they are advantageous as they do not cause gastrointestinal upsets and its beneficial effects can be attained with decreased number of doses [176,177]. A group of other anti-inflammatory agents namely lipoxins, resolvins and protectins have also been shown to reduce clinical signs of inflammation when used adjuvant to mechanical therapy [178]. The main advantage of these resolving mediators is that these molecules are produced in response to the normal inflammatory response and are natural physiological resolution agonists.

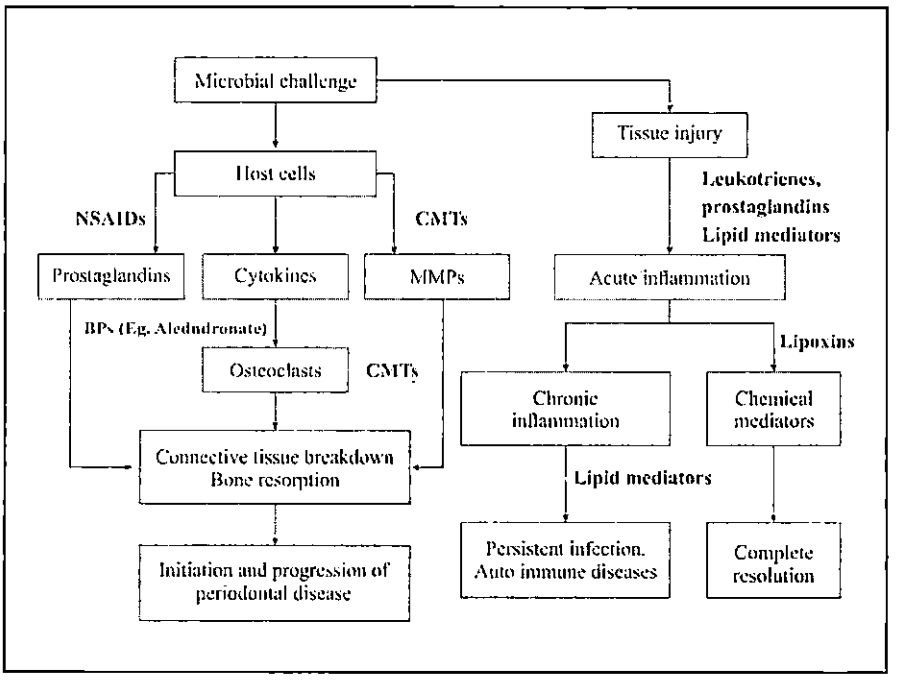

Fig. 6. Role of bisphosphonates (BPs), NSAIDs, Chemically modified tetracycline (CMT) and agents for resolution of inflammation in host modulation [166,168].

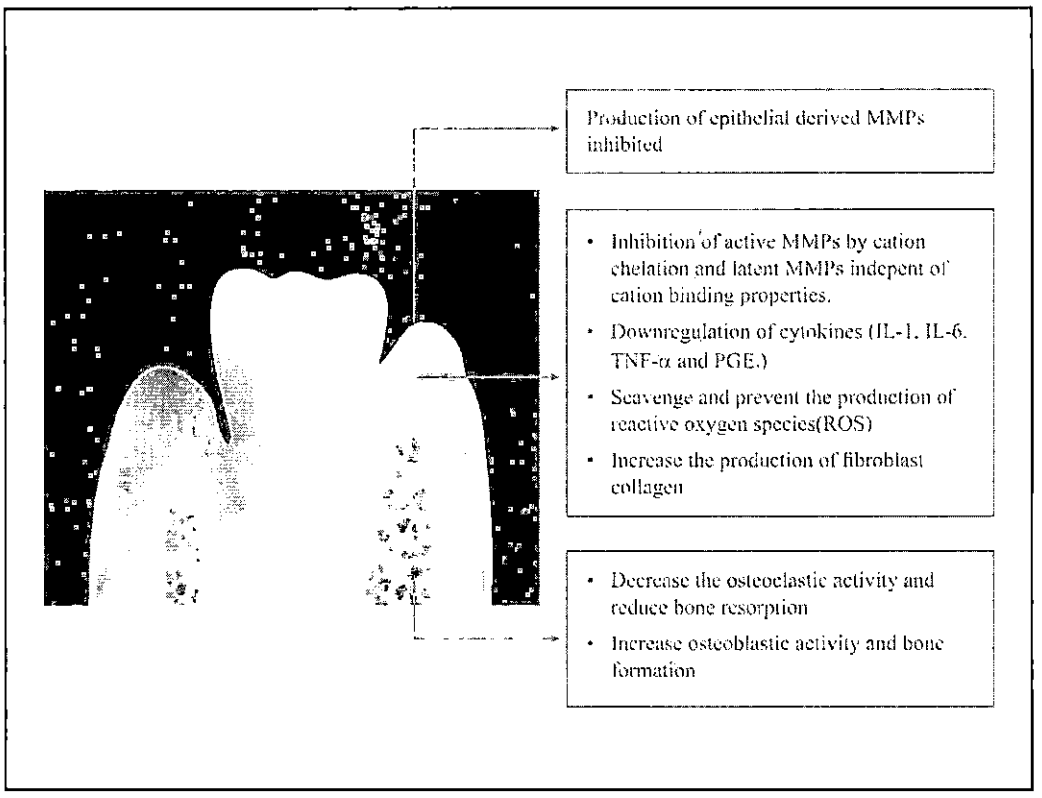

Fig. 7. Mechanism of action of SDD in the treatment of PD (IL: Interleukin, TNF; Tumour necrosis factor, PGE_2: Prostaglandin E_2) [165].

10. Conclusion

With the growing advances in the understanding of the etio-pathogenesis of periodontitis there is also an increasing interest in the researchers and the clinicians to hunt for a novel treatment strategy to combat the tissue destruction caused by the intricate interaction between the pathogenic micro-organisms and the host defence mechanisms. It is worth mentioning that the mere mechanical debridement of the root surface and the diseased soft and hard tissue surfaces may not be sufficient to prevent further tissue loss and facilitate regeneration of the lost tissue owing to the tissue invasive nature of pathogens. It is therefore important for the clinician to consider pharmacological agents as an adjuvant to conventional periodontal therapy through appropriate delivery systems to achieve best clinical results.

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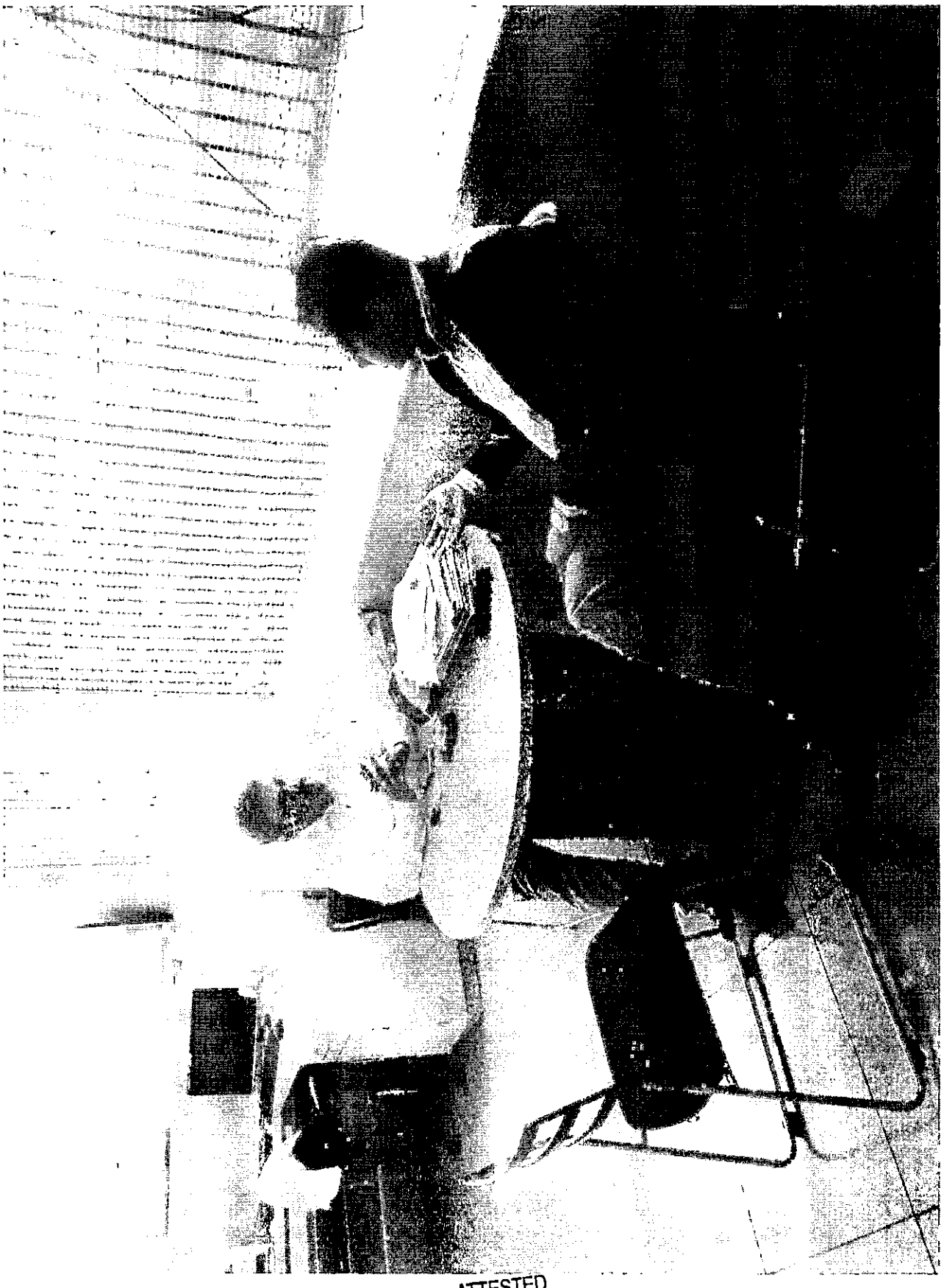

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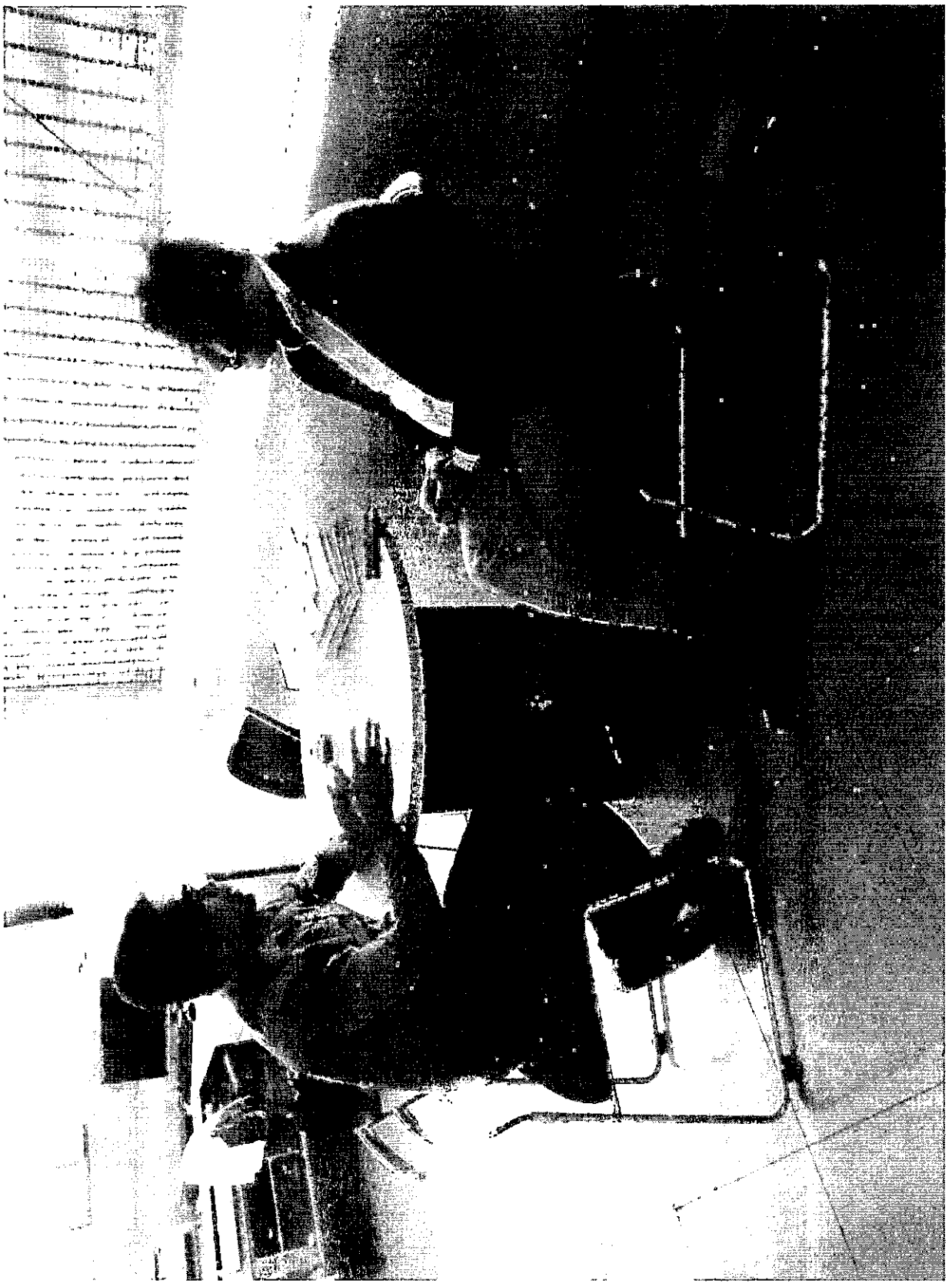

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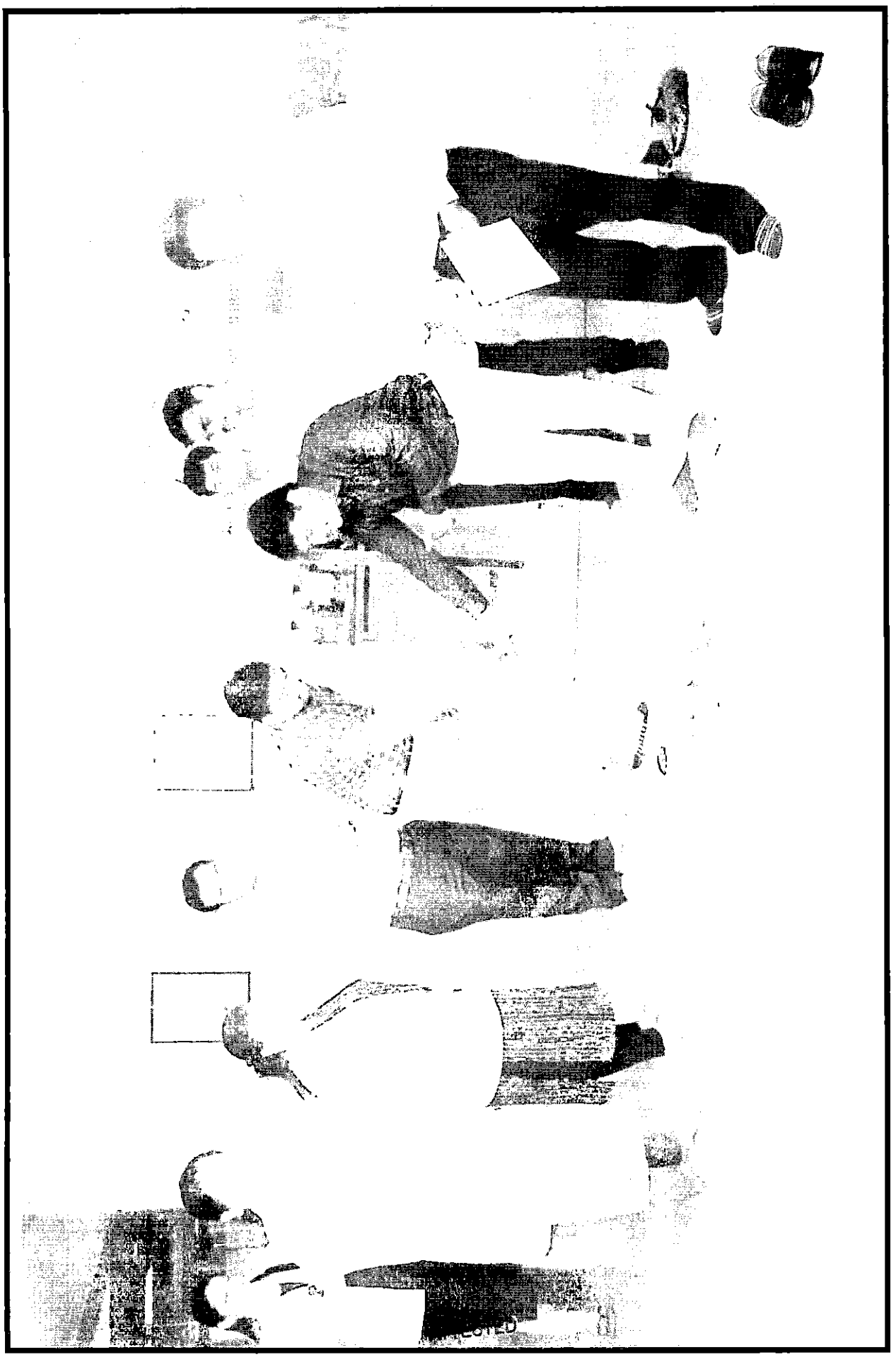

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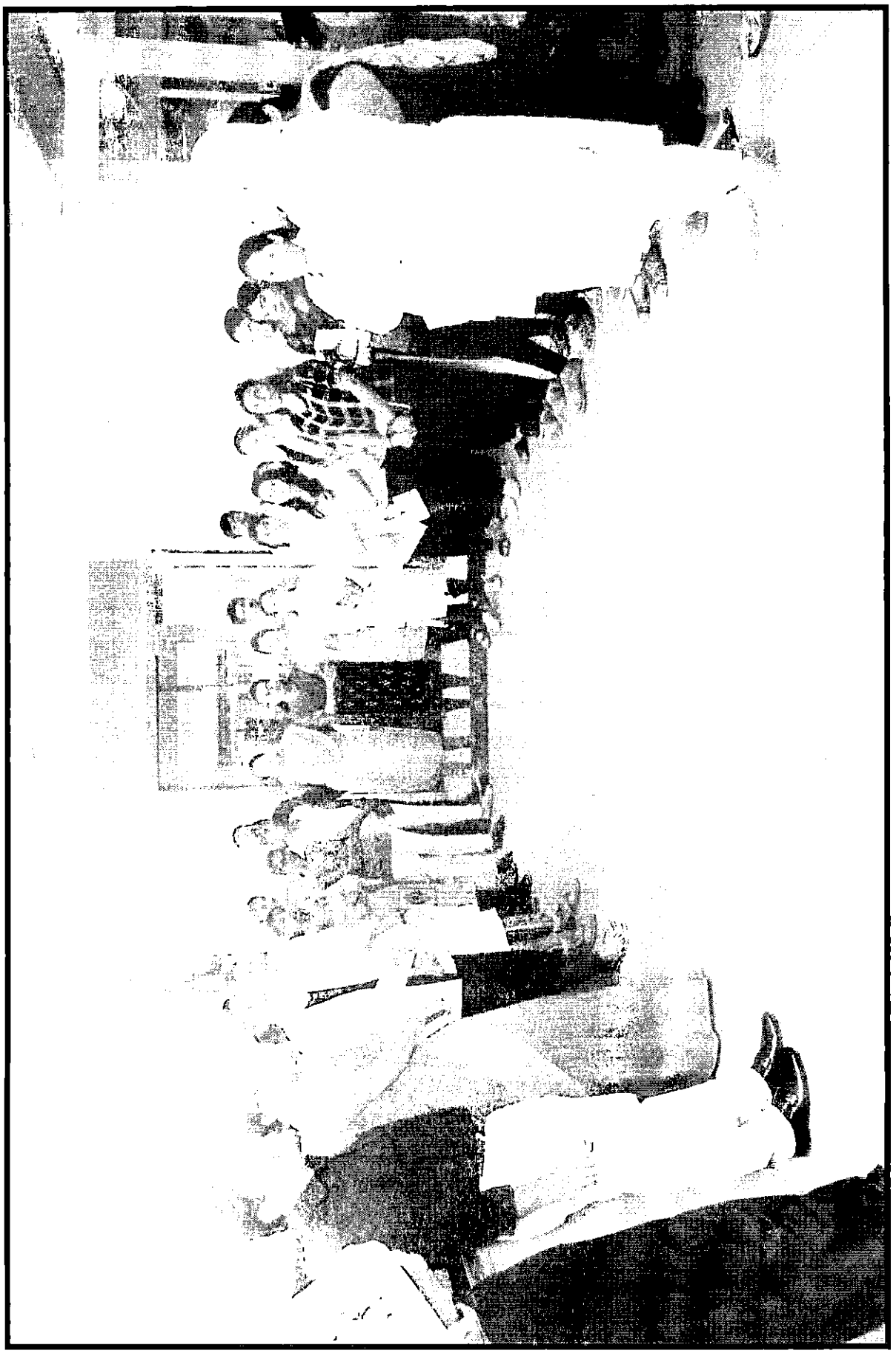

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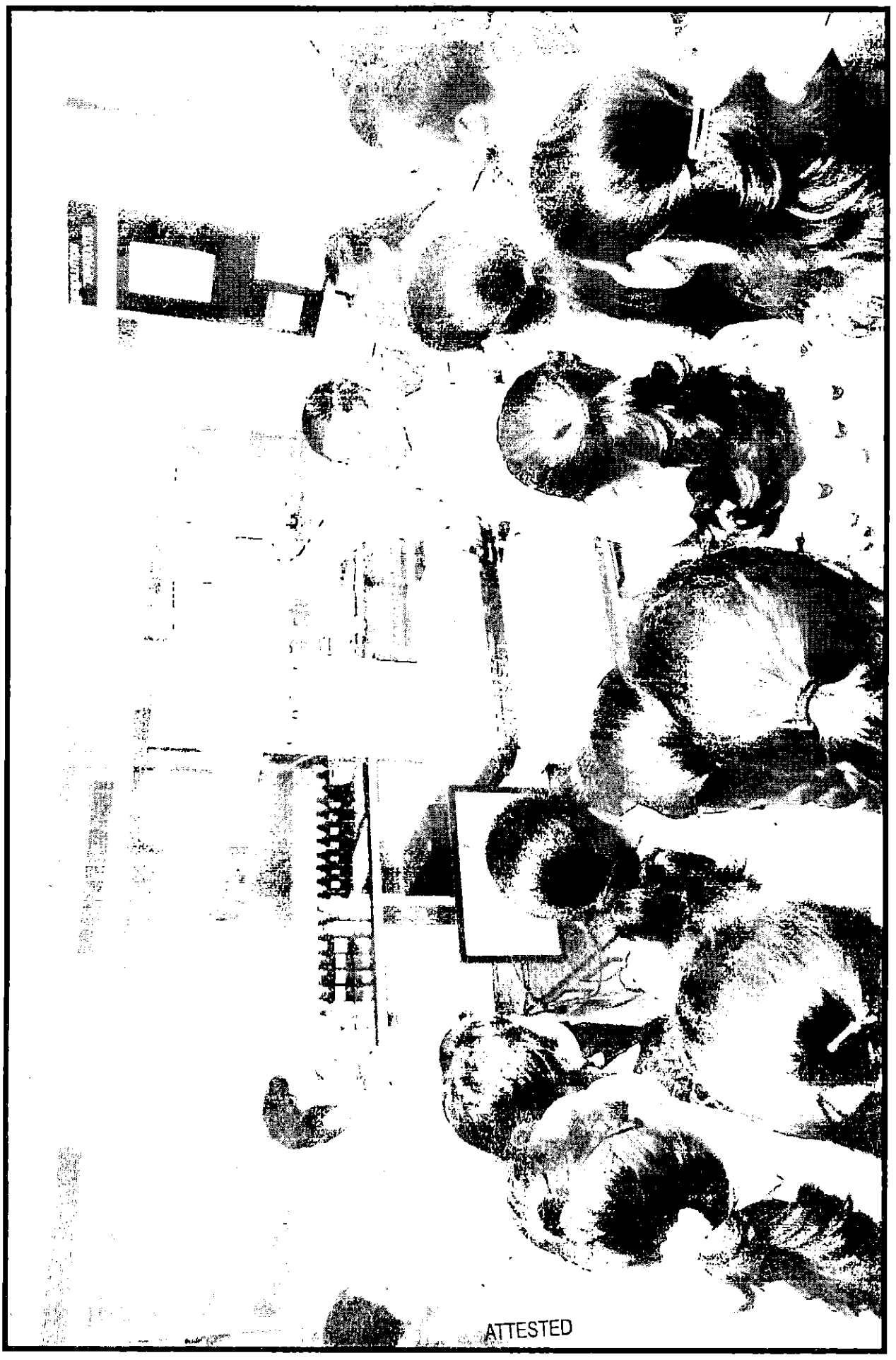

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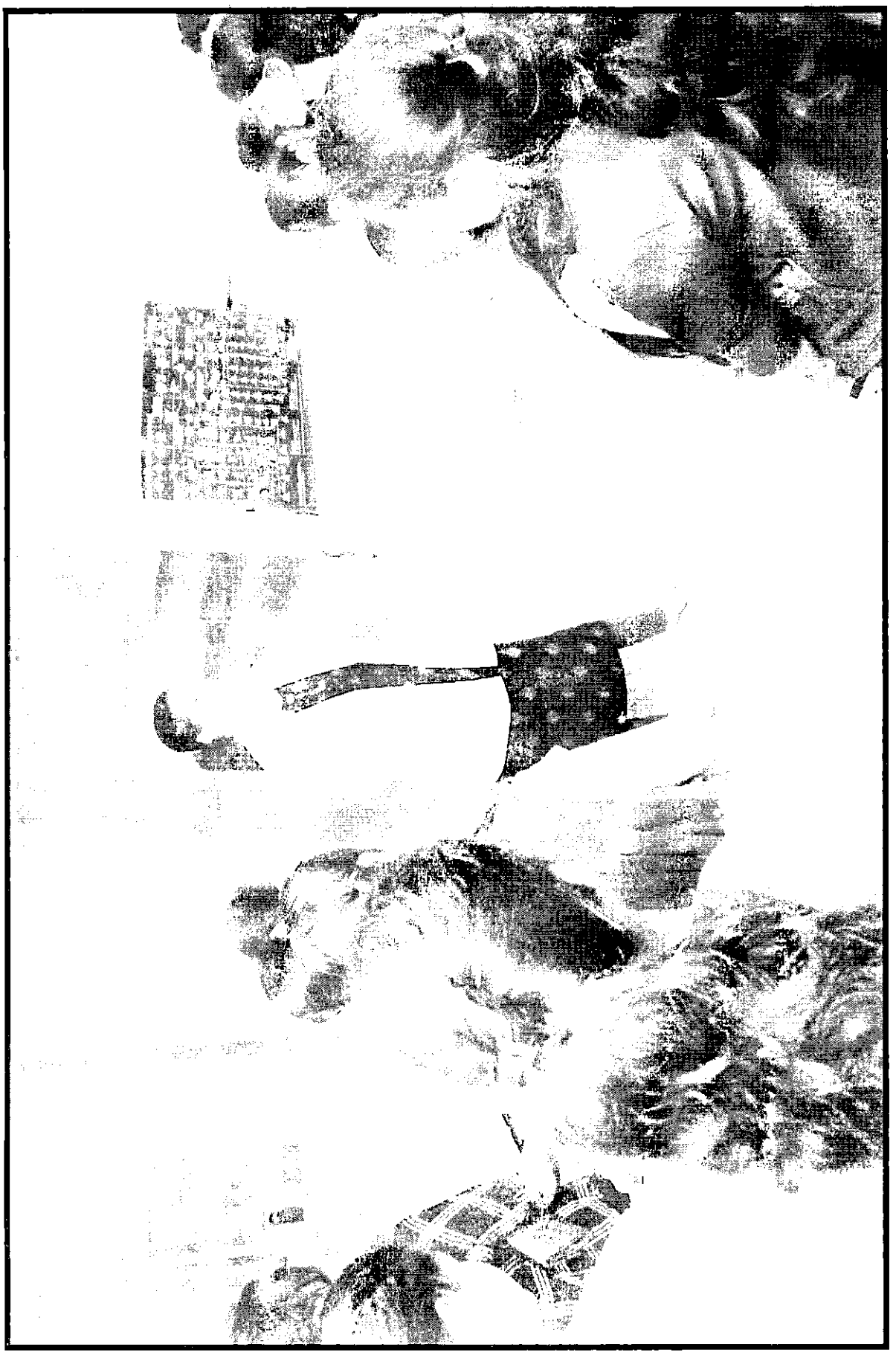

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ARTICLE

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Evaluation of Chemical, Antipsoriatic and Antiangiogenic Properties of Salt from Lonar Crater Lake Water

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ABSTRACT

Lonar Crater lake was created by the impact of a massive meteor during the Pleistocene Epoch. Being a hypersaline and hyperalkaline soda lake, rich microbial diversity is reported earlier. Lonar lake water is used by local people and tribals against skin diseases. These observations prompted us to investigate the therapeutic potential of lake water against skin diseases. In this context, we conducted pilot study to assess the antipsoriatic and antiangiogenic activity of the salt obtained from lake water using THP1 cell line by MTT assay and antiangiogenic activity by *in vivo* chick chorioallantoic membrane (CAM) assay, as there is a close relation between psoriasis and angiogenesis. The results revealed that salt possess remarkable antipsoriatic and antiangiogenic activity.

KEYWORDS

Lonar crater, Psoriasis, Angiogenesis, THP1, Chorioallantoic membrane.

INTRODUCTION

Owing to the interesting physico-chemical and biological properties, study of soda lakes is the most captivating aspect of ecological science [1]. Lonar crater (latitude 19°58′, longitude 76°36′) is a near circular depression formed in Buldhana district, Maharashtra state, India during Pleistocene epoch by the impact of massive hypervelocity meteor that descended on the earth from space [2]. The crater has a diameter of around 1.88 km with a depth of 135 meters and is confined from all the sides by raised rims [3]. The crater encompasses worlds third largest natural saline lake formed due to accumulation of water through rain, ground water seepage and the springs situated in the cliffs at the edge of crater [4]. The Lonar crater lake is the world's only hypersaline and hyperalkaline soda lake in basaltic rock. The lake water is highly alkaline with pH in the range of 9.5-10.5 owing to the presence of large concentration of salts [5]. One of the striking features of crater lakes is the remarkable colour of their waters [6]. A remarkable feature of Lonar lake water is presence of massive algal blooms that result the lake to appear green. Fluctuations in physico-chemical parameters of brackish water with time play a major role in establishing the bio-distribution and dynamics of the quality of the water [7]. The lake depicts fascinating biodiver-

sity with haloalkaliphilic microbial flora and fauna [8-10]. The fascinating features of Lonar crater lake has attracted attention of researchers from different domains of science for revealing various aspects of lake ecosystem. In addition, because of the presence of hypersaline conditions on Mars, studies of biodiversity in terrestrial saline environments like Lonar crater lake may have implications for the possibility of life on Mars [11]. An interesting feature of Lonar crater lake is myth in local and tribal people that showers from Lonar crater lake water (LCLW) helps to eradicate skin diseases. The lake finds citation in historical document Ain-i-Akbari indicating LCLW was used for making soaps in 16th century in India. These observations prompted us to investigate the therapeutic potential of LCLW salt against skin diseases.

Psoriasis is a chronic inflammatory skin disease characterized by the loss of normal cellular homeostasis, enhanced epidermal proliferation, altered rates of differentiation with parakeratosis and inflammation [12]. The increased rates of cell proliferation and abnormal differentiation of keratinocytes is a consequence of the over expression of growth factors, their receptors, cytokines and angiogenic peptides [13,14]. Dithranol and acitretin are common drugs employed in antipsoriasis therapy [15]. Psoarisis has high correlation with angiogenesis. It is driven by several angiogenic factors with the change in the microvasculature during psoriasis. Pro-angiogenic mediators, such as tumor necrosis factor (TNF), vascular endothelial growth factor (VEGF), hypoxia inducible factor (HIF), IL-8 or angiopoietins and other angiogenic peptides are enriched in psoriatic skin [16]. Currently, wide variety of antiangiogenic drugs are available for treatment of psoriasis. Methotrexate is the most commonly used drug in systemic therapy for psoriasis that inhibits dihydrofolate reductase and therefore inhibits proliferation of immune tissue [17]. The immune suppressants like cyclosporine inhibit calcineurin whereas corticosteroids inhibit cytokine [18]. Other antiangiogenic drug used in psoriatic treatment are: Vitamin D3 analog [19], anti-TNF antibodies [20] and fumaric acid esters [21] are well established. Though several antiangiogenic drugs are well established in practice [22], many of them suffer from adverse drug reactions (ADRs) [23]. In addition, current drugs have several drawbacks in terms of efficacy, toxicity and undesirable side-effects and lead to poor patient compliance [24]. In view of these drawbacks, there remains a distinctive need to develop new agents for the more efficient treatment of psoriasis.

In view of myth regarding skin disease curing ability of LCLW and looking at need to develop more efficient antipsoriasis agents, we report herein our pilot study on the evaluation of therapeutic potential of salt obtained from LCLW (acronymed as LCLW salt) against psoriasis. Besides, vascular proliferation and angiogenesis being a key factor in psoriasis, we also report herein the antiangiogenesis effect of the LCLW salt.

EXPERIMENTAL

Dulbecco's modified Eagle medium (DMEM), fetal bovine serum (FBS) and pen strep (a mixture of penicillin and streptomycin) were procured from Gibco Life Technologies (Auckland, New Zealand); MTT reagent, gentamycin (4 mg/mL) and amphotericin B (5 mg/mL) were purchased from Himedia Pvt. Ltd., Mumbai, India. Human monocytic leukemia (THP-1) cell line was procured from the National Center for Cell Science, Pune, India. X-ray photoelectron spectroscopy (XPS) analysis was performed in a Kratos AXIS Supra model instrument under 10^{-9} torr. The measurements were carried out with monochromatic Al Kα photons (1486.6 eV). The power of the X-ray source was kept constant at 600 W. The infrared spectrum was recorded on a Bruker ALPHA ECO-ATR spectrometer.

Isolation of LCLW salt: Water samples were collected from sampling site of Lonar crater (Kamaljamata temple) in 5 L air tight polythene container following APHA guidelines [25] and carried to the laboratory. The physical and chemical parameters were analyzed as per standard methods. Sampling was done in May 2015 at morning. The pH, temperature, hardness, alkalinity, turbidity and TDS were determined at the spot rest of the parameters. The pH of the LCLW was 8.72 and the temperature was 29 °C. The LCLW was evaporated at 100 °C to obtain desired LCLW salt. The salt concentration was approximately 2.5 %.

MTT cell proliferation assay: Human monocytic leukemia (THP-1) cells were counted by tryphan blue dye exclusion assay using a hemocytometer. The cells were seeded to 96 well plate at the density of 1×10^4 cells per well per 0.1 mL medium and were allowed to adhere by incubating for 24 h at 37 °C and 95 % humidity in CO_2 incubator (Eppendorf, New Brunswick, Galaxy 170R, Germany). The LCLW salt and methotrexate (1000, 500, 250, 125, 62.6 and 31.25 µg/mL) were seeded followed by incubation at 37 °C and 5 % CO_2. Cytotoxicity was evaluated at time intervals of 24, 48 and 72 h. After incubation, 20 µL of MTT solution (5 mg/mL in phosphate buffer saline) was added to each well and the plate was incubated in dark for 4 h at 37 °C. On completion of 4 h, supernatant was discarded and DMSO (100 µL) was added to each well to dissolve formazan crystals and absorbance was recorded at 492 nm filter using ELISA plate reader (Lisa Plus, India). The absorbance was calculated for percent cell viability filter using ELISA plate reader (Lisa Plus, India). The absorbance was calculated for percent cell viability [26,27].

Chick chorioallantoic membrane assay: The chick chorioallantoic membrane assay was performed by using zero hour black australorp fertilized eggs (N = 60 including YSM and CAM model) procured from Central Egg Hatching Centre, Kolhapur. The eggs were disinfected with 70 % ethanol and incubated in an incubator at 37 °C and 70 % relative humidity (monitored by hygrometer) until experiment. The LCLW salt concentration ranging from 100 µg/mL to 300 µg/mL was injected by window method on day 4 (Yolk sac membrane) and day 8 (chorioallantoic membrane) of incubation: window was closed with sterile surgical tape and was returned to the incubator for further development. Eggs were opened and the CAM was carefully dissected out of the eggs after 48 h of injection to assess angiogenesis, macroscopically. Untreated eggs were maintained as normal group, whereas 0.9 % saline injected eggs were used as control [28].

Macroscopic analysis: The eggs were broken off and anti-angiogenic effect was assessed on all eggs after 48 h of injection. CAM was surgically removed from eggs in a bowl. Photographs of the developing CAM and its vasculature of both control

and treated eggs were obtained with a digital camera and exported to a computer for image analysis. The CAM area and the number of blood vessels were assessed.

Histology: The CAM was surgically removed and fixed in 10 % buffered formaldehyde for 10 h, dehydrated in graded alcohol, cleared in xylene and embedded in paraffin. Thick sections (5 μm) were cut in a plane parallel to the surface of the CAM and stained by haematoxylin-eosin which was observed under a light photomicroscope.

RESULTS AND DISCUSSION

Initially, the LCLW sample was collected following APHA guidelines. Various physico-chemical parameters of LCLW were studied and are summarized in Table-1. The results reveal high concentration values of most of studied physical and chemical properties.

TABLE-1
PHYSICO-CHEMICAL PARAMETERS OF LONAR CRATER LAKE WATER

Parameter	Result	Parameter	Result
pH	8.72	Alkalinity	6200 ppm
Temperature	27 °C	Salinity	7546 mg/L
Odour	Grouty	Turbidity	2.57 NTU
Colour	Dark green	CO_2	5.3 mg/L
Conductivity	21.6 μS/cm	Chlorides	4650 ppm
TDS	7561 ppm	Sulphate	180 ppm
Total hardness	640 ppm	–	–

Next, LCLW was evaporated to get the desired LCLW salt. The X-ray photoelectron spectroscopy (XPS) analysis was performed to identify the composition of LCLW salt (Fig. 1). The XPS survey scan shows the presence of various salts such as phosphates (133 eV), sulphides (161.5 eV), sulphates (169 eV), chlorides (199 eV), carbonate (344 eV) and phosphate (349 eV) of calcium. Further, the survey spectrum of LCLW salt shows the presence of salts of calcium, potassium, manganese, iron, cobalt, barium, nickel, copper, sodium and zinc. Moreover, the peaks for KCl and KBr appeared at 291 eV and 293 eV. Additionally, the peak at 780 eV appeared due to the presence carbonates of barium while peaks at 856 eV and 934 eV indicated the hydroxides of nickel and copper. The peak at 1071 eV appears for sodium due to auger electrons [29-33]. The LCLW salt was further subjected to FTIR analysis (Fig. 2). The FTIR spectrum indicated prominent peaks for sodium nitrate (1424 cm^{-1}), magnesium phosphate (1155 cm^{-1}), calcium carbonate (876 cm^{-1}), sodium carbonate (700 cm^{-1}) and calcium sulphate (639 cm^{-1}). After characterization, the LCLW salt was used for further studies without purification.

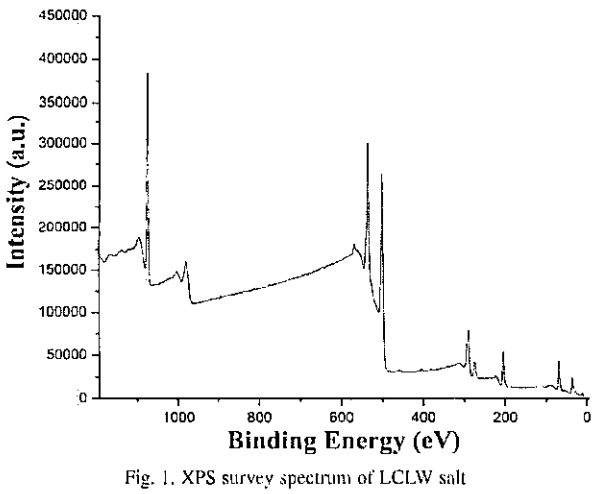


Fig. 1. XPS survey spectrum of LCLW salt

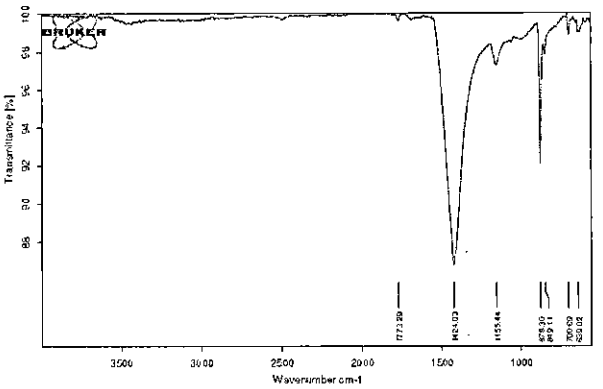


Fig. 2. FTIR spectrum of LCLW salt

The antipsoriatic activity of LCLW salt was evaluated against human monocytic leukemia (THP-1) cells using MTT assay. The cells were seeded with different doses of LCLW salt and methotrexate and incubated at 37 °C. After 24, 48 and 72 h of incubation, cell viability was measured following general procedure. To focus the activity, the half maximal inhibitory concentration (IC_{50}) was calculated as the concentration required to inhibit the growth of THP-1 cells in culture by 50 % compared to the untreated cells. The IC_{50} values for LCLW salt and methotrexate are listed in Table-2. The results demonstrated inhibition of cell proliferation of THP-1 in a concentration dependent manner. At 24 h, LCLW salt was found to show no inhibitory effect on cell proliferation at concentrations greater than 1000 μg/mL but exhibited a concentration dependent cytotoxic effect with IC_{50} values 436.8 and 318.6 μg/mL at 48 and 72 h respectively.

TABLE-2
IC_{50} VALES OF LONAR CRATER LAKE WATER (LCLW) SALT AND METHOTREXATE

Time interval (h)	IC_{50} values (μg/mL)	
	LCLW salt	Methotrexate
24	< 1000	547.4
48	436.8	319.4
72	318.6	> 31.25

It is noteworthy to mention that IC_{50} value of methotrexate at 48 h is 319.4 μg/mL which is close to LCLW salt. These results indicate that LCLW salt exhibits remarkable antipsoriatic activity (Fig. 3). The results further revealed that LCLW salt is more selective to THP-1 cells than normal cells as there was low cytotoxic effect observed towards vero cell lines.

There is a close relationship between psoriasis and angiogenesis as the treatment of antiangiogenic agents may be the promising way in treating psoriasis. Physiological angiogenesis

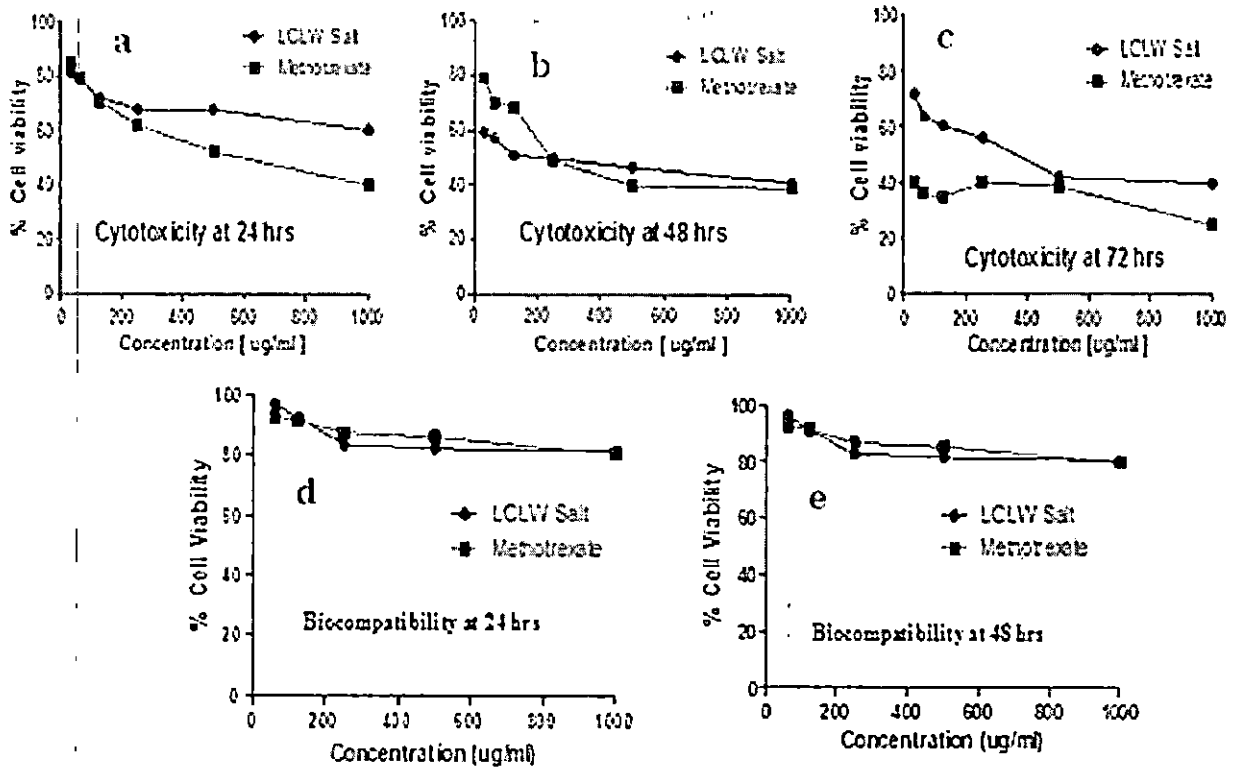
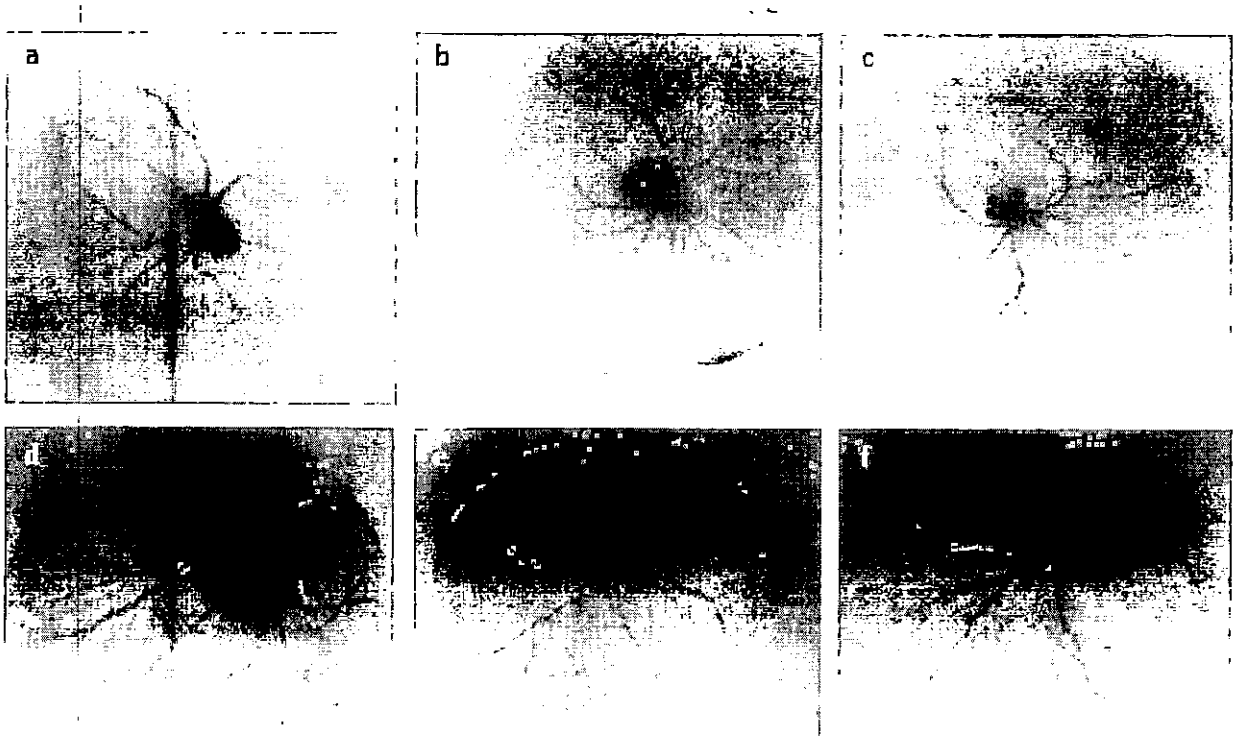


Fig. 3. Cytotoxicity of LCLW salt at 24, 48 and 72 h incubation on THP-1 Cells (a-c) and biocompatibility against vero cells at 24 h and 48 h (d-e)



(a & d) Control, (b & e) 200 µg/mL, (c & f) 300 µg/mL (on 6th and 8th day of incubation resp.)

Fig. 4. Effect of LCLW salt on yolk sac model (a-c) and CAM (d-f)

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is induced only transiently during processes such as wound healing, pregnancy or in the corpus luteum formation during female reproductive cycle. However, pathological angiogenesis occurs under conditions such as tumor growth, retinopathy and chronic inflammation, as observed during rheumatoid arthritis or psoriasis [34,35]. This created inquisitiveness to study the antipsoriatic and antiangiogenic activity of LCLW salt. The chick chorioallantoic membrane (CAM) assay was undertaken to study antiangiogenic effect of LCLW salt similar to other antiangiogenic drugs reported [36]. After treating the chick CAM with LCLW salt, the vascular network presented several macroscopic changes as compared to the control group. Antiangiogenic effect was seen at both 200 and 300 µg/mL, with significant result obtained at 300 µg/mL (Fig. 4). Inhibition of blood vessel formation and branching pattern was evident at 48 h of treatment. Hemorrhagic areas were observed between modified capillaries. Dilated, irregular vessels with stasis coupled with short capillaries as compared to control were significantly observed at 300 µg/mL. Sterile 1X PBS which is used as vehicle solution (negative control), did not show any antiangiogenic effect. There was apparent reduction in the number of tertiary vessels in LCLW salt treated CAM as compared to control (Table-3, Fig. 5). However, unlike 200 µg/mL, there were apparent differences in number of primary and secondary vessels seen at 300 µg/mL.

Evaluation for microscopic specimens confirmed the macroscopic observations. CAM treated with control, appeared well vascularized where the blood vessels were well formed with distinct capillary plexus beneath the ectoderm. However, the CAM treated with LCLW salt was hemorrhagic and extra-

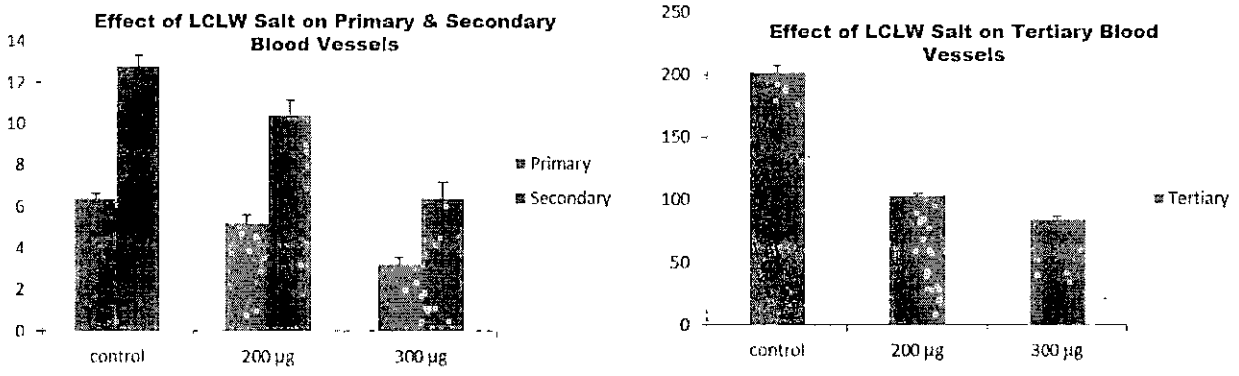
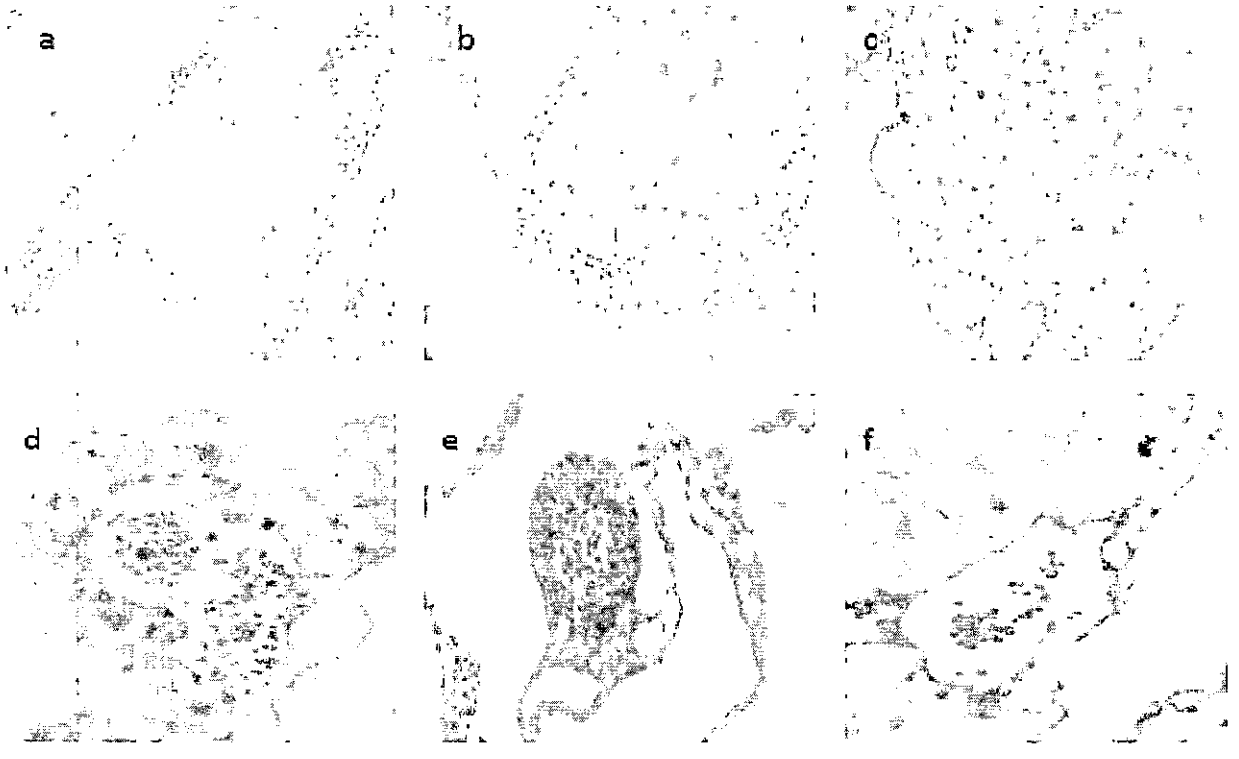


Fig. 5. Effect of LCLW Salt on primary, secondary and tertiary blood vessels



(a & d) Control, (b & e) 200 µg/mL, (c & f) 300 µg/mL (on 6th and 8th day of incubation resp.)

Fig. 6. Antiangiogenic effect of LCLW salt on chick CAM

TABLE-3
AVERAGE NUMBER OF BLOOD VESSELS OF NORMAL AND LONAR CRATER LAKE WATER (LCLW) SALT TREATED CHICK CHORIOALLANTOIC MEMBRANE (CAM)

Experimental group	Number of blood vessels		
	Primary	Secondary	Tertiary
Control	6.4 ± 0.24	12.8 ± 0.49	202.2 ± 5.65
200 µg	5.2 ± 0.37	10.4 ± 0.75	103 ± 2.19
300 µg	3.2 ± 0.37	6.4 ± 0.75	84.6 ± 2.52

vasations of RBCs in the mesenchyme tissue of the CAM are seen. Besides, unlike the vehicle control, the LCLW salt treated CAM showed no distinct and well differentiated germ layers as shown in Fig. 6.

Conclusion

In conclusion, the present study reveals remarkable anti-psoriatic and antiangiogenic activity of salt obtained from Lonar crater lake water. We believe that after further intense investigations, LCLW salt could emerge as an ideal source of therapeutics in treating profused angiogenesis as well as an ideal source towards psoriasis treatment. Further in-depth study in this regard, would create a leap towards formulating a novel composition with LCLW salt in treating psoriasis successfully in the nearby future.

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K.L.E. SOCIETY'S
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ಕೆ.ಎಲ್.ಇ. ಸಂಸ್ಥೆಯ
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DEPARTMENT OF BOTANY 23-01-2019

To,

The Deputy Director,
Dr Prabhakar Kore Basic Science
Research Centre,
KLE University,
Belagavi.

Sub: Regarding seeking the permission to visit your Research Centre

Respected Sir

As B.Sc. VI Semester Students of Life science need exposure to the recent developments in research and working mechanism of advanced equipments, kindly permit our staff and 90 students to visit your esteemed Research Center.

A kind request to you to make arrangements for the demonstration of Agarose gel Electrophoresis and explanation of the equipments like Laminar Air flow, PCR, UV Spectrophotometer,Colorimeter,Centrifuge,etc.

Hope you will consider and do the needful

Thanking you sir,

H.O.D of Botany

PRINCIPAL

Science Institute ISO 9001 BELAGAVI

Office of the
Dr. Prabhakar Kore Basic
Research Centre (BSRC)

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Our Slogan Adapt and Excel

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ACCREDITED WITH 'A' GRADE BY NAAC (3RD CYCLE)
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Date:13-02-2019

K.L.E.Society's

R.L.Sc Institute (Autonomous) Belagavi

Department of Botany

To

Dr. Sanjay Kumar Mishra,

Scientist Grade II,

KAHER's Dr.Prabhakar Kore

B.S.R.C., Nehru Nagar,

Belgavi.

Respected Sir

Greetings to you....

We feel delighted and honoured to invite you as a Guest Speaker on 14th February 2019 at 12.30 pm. in Sir C.V.Raman Auditorium of our College. Sir, we request you to address our students on the topic **"Intellectual Property Rights - With special reference to Indian Patent Law"**.

Hope you will do the needful

Thanking You,

With regards

R. L. Science Institute 590 001 BELAGAVI

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ORIGINAL ARTICLE

Survey on Pesticides Used by Farmers in Belagavi Taluka and Analysis of Pesticide Residues in Commonly Used Vegetables

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Abstract

Background: Fruits and vegetables are important components of the human diet since they provide essential nutrients that are required for most of the reactions occurring in the body. However, indiscriminate and overuse of pesticides damage agriculture and environment, but the pesticide residues on food products affect the health. *Aim and Objective:* The present study aimed to assess the Knowledge, Attitude and Practices (KAP) among the farmers of Belagavi taluka, regarding the pesticide use and to determine pesticide residues in commonly used vegetables. *Materials and Methods:* The present cross-sectional study included a total of 200 farmers selected randomly from 4 divisions of Belagavi taluka. Questionnaire was developed to assess the KAP. Fresh tomatoes and chilies were used as samples, fine homogenized sample (200 g) was extracted with ethyl acetate and analyzed using gas chromatography-mass spectrometry. *Results:* Most of them were aware of the precautions to be taken during pesticide use. However, not all farmers followed the measures. Maximum of them used pesticides (n=150), followed recommended method (n=130) and concentration (n=152). Pesticide residues found in chili and tomato samples exceeded the maximum residue limit. *Conclusion:* Chlorpyrifos and ethion in tomato sample, and chlorpyrifos and cypermethrin in chillies sample were the pesticide residues. Protective measures followed by the farmers was poor. Therefore, the knowledge of the farmers should be upgraded and, camps should be conducted periodically to monitor pesticide residues and health of the farmers.

Keywords: Belgaum Farmers, Pesticides, Vegetables, Knowledge, Attitude and Practice

Introduction:

Pesticides are widely used in the agricultural practice to control pests, diseases, weeds, and other plant pathogens to ensure high agriculture productivity [1-2]. Easy application, rapid action, and low production of toxins by the food-infecting organisms have increased the use of pesticides than other pest control methods [3]. In India, the utilization of pesticides in agriculture has gradually increased since 1950-51 [4]. However, indiscriminate and overuse of pesticides may spoil the health of both farmers and general consumers. In addition, the applied pesticides and their degradation products or metabolites remain as residues on vegetables and fruits potentially causing health disorders [1].

Health-related concerns with pesticides range from short-term impacts such as nausea, headaches, skin, and respiratory problems to chronic impacts such as birth defects, endocrine disruption, neurological problems, infertility, and various cancers [5]. Previous studies reported that inadequate knowledge, lack of information and training on pesticide safety, inappropriate spraying practices, and inadequate personal protection during pesticide use are the contributing factors for morbidity and mortality

among farmers [6]. In addition, pesticides contribute to biodiversity losses, deterioration of natural habitats and environmental pollution [7].

Numerous techniques have been developed for the analysis of pesticide residues in vegetables, which include Gas Chromatography (GC) and Liquid Chromatography (LC) coupled to Mass Spectrometry (GC; GC-MS, LC-MS) and tandem mass spectrometry (GC-MS/MS, LC-MS/MS), and further on. However, GC coupled with MS is the widely used technology due to its high selectivity towards the nonpolar compounds [8].

Many researchers in different countries and different regions around the world assessed the farmer's Knowledge, Attitude and Practices (KAP) regarding pesticide use [6, 9-10]. Also, many studies were conducted to screen the residue of pesticides and their metabolites in the commonly used vegetables and fruits [1, 3, 11]. However, to the best of our knowledge, no study has been conducted in Belgavi, Karnataka; therefore, the current study was undertaken. Moreover, understanding farmer's knowledge, safety practices, and attitude towards the use of pesticides is important to provide information for reducing the health risks as well as environmental risks associated with the pesticides. The present study was thus aimed to assess the KAP among the farmers of Belagavi taluka, Karnataka regarding the pesticide use and their residues in commonly used vegetables and fruits.

Material and Methods:

Sampling and study design

A cross-sectional study was conducted for one and half year (September 2014-January 2016) in four divisions of Belagavi taluka, Karnataka namely, Belagavi, Bagewadi, Kakati, and Uchagaon. From each division five villages were selected randomly and from each village 10 farmers were selected randomly. Altogether, a total of 200 farmers were selected for the study. Multistage random sampling method was used to select the villages, farms, and farmers. Farmers involved in farming for more than 1 year and using pesticides in their farms in the selected regions of Belagavi taluka were selected for the study. While farmers who were not willing to participate were excluded from the study. Ethical clearance was obtained from Institutional Ethics Committee and written informed consent was obtained from the eligible farmers.

Data Collection

The farmers were interviewed using predesigned and pretested questionnaire (Supplementary Material 1) to record the sociodemographic and socioeconomic status (categorized according to B.G. Prasad's classification) [12] pesticide use and practices, applicator precautions/averting behavior, and health/environment effects. KAP regarding pesticide use, economic expenditure, wages, and awareness on scheme provided by the government. Collected data were analyzed using SPSS 20.0. Descriptive data were analyzed using percentage and proportion

Gas Chromatography-Mass Spectrometry (GC-MS)

Sample collection and preparation

Fresh tomatoes and chilies weighing 1 kg and 250 g, respectively, were randomly collected for the study. All the samples were collected using gloves, packed in sterilized plastic bags, transported to the laboratory, and stored at -20°C in refrigerator until analysis, to avoid degradation between sampling and analysis. The samples were chopped into tiny pieces and mixed thoroughly. A portion of the chopped sample weighing 200 g

was blended in a high-speed blender to obtain a fine homogenized representative sample.

Sample extraction and clean-up

An aliquot (25 g) of the fine homogenized sample was added in a 250-ml Erlenmeyer flask along with 37-ml ethyl acetate and 12-g anhydrous sodium sulfate, which were shaken in a horizontal shaker (Orbital shaking incubator) for 2 h at the speed of 220 cycles/min. The ethyl acetate extract was filtered through Whatman (No. 4) filter paper. After cleaning, the extracts were collected in a 100-ml round-bottom flask and were concentrated in a rotary evaporator. The extract was evaporated to dryness under a stream of nitrogen and then was dissolved in exactly 5 ml of methanol. Extracts were filtered using 0.2 µm filter paper before conducting the chromatographic analysis.

GC-MS/MS analysis

Samples prepared as per analysis procedure were submitted for GC-MS/MS acquisition to NABL Accredited Laboratory 'Center for Food Testing, Pune, Maharashtra. A Varian 3800 gas chromatograph coupled with a Saturn 2200 mass spectrometer with auto-injector CP-8410 were used for the analysis. The mass spectrometer was auto-turned using perfluorotributylamine. Helium (99.999%) at a flowrate of 1 ml/min was used as a carrier and collision gas at 9.6 psi pressure. Sample injection (1 µL) was done in split-less mode, with an injector temperature of 280°C. The computer that controlled the system also held a GC-MS library, specially created for the target analysts under the experimental conditions. The mass spectrometer was calibrated weekly with perfluorotributylamine.

Data acquisition was carried out by GC-MS software and data interpretation and quantification were carried out by using Mass Hunter software (Agilent Technologies, USA). Samples were analyzed in multiple-reaction monitoring modes in GC-MS/MS. Results of individual pesticides were compared with multilevel calibration of pesticide standards ranging between 0.01 PPM and 0.2 PPM.

Results:

Characteristics of the study respondents

Table 1 shows sociodemographic characteristics of study respondents. More than three-fourths of the study respondents were men (n = 173) aged between 36–45 years (n = 82). Most of the farmers completed primary education (n = 97), were married (n = 143), living in a joint family (n = 123), belonging to socioeconomic class IV status (n = 175), and owed open agricultural fields (n = 155). Most of the farmers gained knowledge from pesticide sellers (n = 66) and ministry of agriculture (n = 64).

Table 1: Sociodemographic Data of the Respondents

Variables		n	Percent
Gender	Female	27	13.5
	Male	173	86.5
Age (years)	≤25	8	4.0
	26-35	68	34.0
	36-45	82	41.0
	46-55	42	21.0
Literacy	Illiterate	19	7.5
	Primary	97	48.5
	High school	8	4.0
	Higher Secondary	76	38

Continued...

Variables		n	Percent
Marital status:	Married	143	71.5
	Single	15	7.5
	Widowed	32	16.0
	Divorced	10	5.0
Type of family:	Nuclear	31	15.5
	Joint	123	61.5
	Broken	28	14.0
	Extended	18	9.0
Socioeconomic status:	Class I	0	0
	Class II	0	0
	Class III	25	12.5
	Class IV	175	87.5
	Class V	0	0
	Open	155	77.5
	Closed	7	3.5
	Mixed	38	19.0
	By experience	23	1.5
	Product label	12	6.0
	From a specialist	35	17.5
	From a pesticide seller	66	33.0
	Ministry of agriculture	64	32.0

Knowledge, attitude, and practice regarding pesticide use

Knowledge

The response of farmers towards the knowledge of pesticide use is as given in Table 2. All the respondents had knowledge about pesticide and majority (n = 145) knew about the pesticides they used. Only one-fourth (n = 57) of the respondents were aware of other ways of pest control, however most (n = 171) of them knew about the impact of the pesticide on human health. The majority were aware that pesticides enter the body through the skin (n = 191) and causes skin rashes (n = 197) followed by skin irritation/itching (n = 195). Most of them had lack of knowledge regarding the pesticides that were banned, guidelines for pesticide use, and pesticides accepted internationally. All the farmers (n = 200) had knowledge regarding the use of gloves during pesticide use. The majority did not know about any toxicological or medical center (n = 90) and the eKutir scheme (n = 106) launched by the government.

Attitude

The response of farmers towards the attitude of pesticide use is as given in Table 3. Almost, 172 respondents thought pesticides are necessary to prevent diseases. More than half (n = 107) of the respondents followed instructions of labels on the pesticide bottles. Nearly three-fourths (n = 134) of the respondents believed that pesticides enter the vegetables and fruits that they grow. Almost, 110 and 143 respondents have updated information on pesticide and schemes launched by the government, respectively. Most of the respondents never ate, drank, and smoked during the pesticide use. Most (n = 159) of the respondents washed their hands after pesticide application.

Table 2: Response of Farmers towards the Knowledge Questionnaire

Knowledge question	Yes, n (%)	No, n (%)	Don't know, n (%)
Do you know what a pesticide is?	200 (100.0)	0	0
Do you know the name of the pesticides you use?	145 (72.5)	55 (27.5)	0
Do you know any other ways for pest control rather than pesticide use?	57 (28.5)	143 (71.5)	0
Does exposure to the pesticide have an adverse health effect or impact on the human health?	171 (85.5)	9 (4.5)	20 (10.0)
According to your knowledge, do the adverse health effects of the pesticides include the following on the consumers?			
Headache/Migraine	182 (91.0)	5 (2.5)	13 (6.5)
Watering/Sore eyes	135 (67.5)	28 (14.0)	37 (18.5)
Cough/Cold/Chest pain/Breathlessness	55 (27.5)	90 (45.0)	55 (27.5)
Dizziness	122 (61.0)	48 (24.0)	30 (15.0)
Weakness	174 (87.0)	13 (6.5)	13 (6.5)
Burning sensation in eyes/on face	192 (96.0)	7 (3.5)	1 (0.5)
Skin rash	197 (98.5)	3 (1.5)	0
Itching/Skin irritation	195 (97.5)	3 (1.5)	2 (1.0)
Salivation/Nausea/Vomiting	36 (18.0)	84 (42.0)	80 (40.0)
Abdominal pain/Diarrhea	19 (9.5)	97 (48.5)	84 (42.0)
Fever/Rise in temperature	20 (10.0)	108 (54.0)	72 (36.0)
Forgetfulness	14 (7.0)	110 (55.0)	76 (38.0)
Do all the pesticides have the same adverse health effects on the human health?	46 (23.0)	68 (34.0)	86 (43.0)
Do pesticides enter human body through the following?			
Inhalation	60 (30.0)	44 (22.0)	96 (48.0)
Skin	191 (95.5)	2 (1.0)	7 (3.5)

Continued...

Knowledge question	Yes, n (%)	No, n (%)	Don't know, n (%)
Which organs are affected by pesticides?			
Lungs	59 (29.5)	141 (70.5)	0
Eyes	191 (95.5)	9 (4.5)	0
Skin	190 (95.0)	10 (5.0)	0
Do pesticides remain after using it in the following?			
In Air	39 (19.5)	40 (20.0)	121 (60.5)
Soil	98 (49.0)	32 (16.0)	70 (35.0)
Ground water	122 (61.0)	24 (12.0)	54 (27.0)
Fruits, seeds, and leaves of vegetables and fruits	169 (84.5)	9 (4.5)	22 (11.0)
Do you know if any pesticides are banned?	35 (17.5)	68 (34.0)	97 (48.5)
Do you know if any guidelines regarding pesticide use in India?	0	96 (48.0)	104 (52.0)
Do you know how much amount of pesticides is accepted internationally?	0	99 (49.5)	101 (50.5)
Which of the following do you think can protect farm workers from the harmful effects of pesticides?			
Wearing gloves	200 (100.0)	0	0
Using goggles	198 (99.0)	2 (1.0)	0
Wearing wide brimmed hat	147 (73.5)	38 (19.0)	15 (7.5)
Putting on nasal masks	200 (100.0)	0	0
Wearing special boots	183 (91.5)	11 (5.5)	6 (3.0)
Eye mask	197 (98.5)	2 (1.0)	1 (0.5)
Face mask	198 (99.0)	1 (0.5)	1 (0.5)
Special cloths	106 (54.0)	58 (29.0)	36 (18.0)
Do you know if there is any toxicological or medical center in your area, which provides medical services to farm workers?	68(34.0)	42 (21.0)	90 (45.0)
Are you aware of eKutir scheme launched by the government?	38 (19.0)	56 (28.0)	106 (53.0)

Table 3: Response of Farmers towards Attitude Questionnaire

Attitude question	Always, n (%)	Sometimes, n (%)	Never, n (%)
Are pesticides necessary to prevent the vegetables and fruits from diseases?	172 (86.0)	27 (13.5)	1 (0.5)
Is it necessary to follow instructions of labels on pesticide bottles?	107 (53.5)	91 (45.5)	2 (11.0)
Can pesticides enter vegetables and fruits that you grow?	56 (28.0)	134 (67.0)	10 (5.0)
Do pesticides harm those who eat it?	62 (31.0)	132 (66.0)	6 (3.0)
Do pesticides are harmful to the health?	73 (36.5)	123 (61.5)	4 (2.0)
Is it necessary to stay updated with information on pesticide	80 (40.0)	110 (55)	10 (5.0)
Is scheme launched by government are useful?	23 (11.5)	143 (71.5)	34 (17.0)
Is washing hands after application useful?	159 (79.5)	41 (20.5)	0
Do you think that whether you should do the following during pesticide application?			
Eating	1 (0.5)	9 (4.5)	190 (95.0)
Drinking	1 (0.5)	23 (11.5)	176 (88.0)
Smoking	3 (1.5)	52 (26.0)	145 (72.5)

Practice

The response of farmers towards the practice of pesticide use is as given in Table 4. Nearly half (n = 95) of the respondents practiced pesticide use for > 5 years. Only one respondent worked with pesticides for > 6 hours per day. Nearly three-fourth (n = 130) of the patients followed the instructions on the pesticide bottle. Occasionally, about 126 respondents sprayed two or more mixed pesticides at a time. Almost, 152 respondents used the pesticides in the recommended concentration while only two respondents used more than the recommended concentration. Most (n = 156) of them stored empty pesticide bottles or cans in a specific area in the farm site. Almost, 147 respondents prepared pesticides in the field. The empty pesticide bottle was buried or burnt after use by most of the respondents (n = 128). Most of them sprayed pesticides by wearing gloves (n = 185), goggles (n = 184), and face mask (n = 174). Almost, three-fourths (n = 158) showered after spraying. Only 13 respondents entered the field after spraying pesticide. Only 27 respondents placed first aid kit in the farm. Most of them (n = 156) had never participated in seminars or training courses related to the health impact and use of pesticides. Nearly three-fourths (n = 136) committed to the safety period. Almost, 144 respondents suffered from skin rashes; most of them (n = 182) consulted a doctor on exposure to pesticides.

Table 4: Response of Farmers towards Practice Questionnaire

Practice	Always, n (%)	Sometimes, n (%)	Never, n (%)
Do you use pesticide?	150 (75.0)	50 (25.0)	0
Do you follow the instructions of label on the pesticide bottles?	130 (75.0)	67 (33.6)	3 (1.5)
Do you spray two or more mixed pesticides?	6 (3.0)	126 (63.0)	68 (34.0)
The concentration of pesticides you use are?			
The recommended	152 (76.0)	46 (23.0)	2 (1.0)
More than the recommended	2 (1.0)	137 (68.5)	61 (30.5)
Less than the recommended	0	134 (67.0)	66 (33.0)
Not committed with the specific concentration	2 (1.0)	67 (33.5)	131(60.5)
Where do you store empty pesticide bottles or cans?			
In the specific farm site	156 (78.0)	43 (22.5)	1 (0.5)
At home	3 (1.5)	141 (71.5)	56 (28.5)
What are the pesticide preparation places?			
Home kitchen	13 (6.5)	138 (69.0)	49 (28.5)
Home garden	19 (9.5)	153 (76.5)	28 (14.0)
The field	147 (73.5)	48 (24.0)	5 (2.5)
What are you doing with the empty pesticide bottles or cans?			
For the home uses (storage water)	21 (10.5)	140 (70.0)	39 (19.5)
For the home uses (storage food stuff)	22 (11.0)	137 (67.5)	41 (20.5)
For storing other pesticide types	26 (13)	136 (68.0)	38 (19.0)
For burying and burning	128 (64.0)	66 (33.0)	6 (3.0)
Do you apply pesticide by spraying?	166 (83.0)	33 (16.5)	1 (0.5)

Continued...

Practice	Always, n (%)	Sometimes, n (%)	Never, n (%)
Which of the following do you practice during preparing or spraying of pesticides?			
Gloves	185 (92.5)	12 (6.0)	3 (1.5)
Goggles	184 (92.0)	10 (5.0)	6 (3.0)
Face mask	174 (87.0)	25 (12.5)	1 (0.5)
Special shoes	42 (21.0)	94 (47.0)	64 (32.0)
Do you take shower after spraying?	158 (79.0)	42 (21.0)	0
Do you keep any first aid in the farm?	27 (13.5)	137 (68.5)	36 (18.0)
Participation in seminars or training courses related to the health impact and minimizing use of pesticide.	3 (1.5)	41 (20.5)	156 (78.0)
Do you commit to the safety period?	136 (68.0)	63 (31.5)	1 (0.5)
Do you suffer from any of the following symptoms?			
Skin rash	144 (72.0)	55 (27.5)	1 (0.5)
Headache	134 (67.0)	65 (32.5)	1 (0.5)
Excessive sweating	14 (7.0)	127 (63.5)	59 (29.5)
Redness of skin	85 (42.5)	102 (51.0)	13 (6.5)
Abdominal pain	0	98 (49.0)	102 (51.0)
Itching of eyes	99 (49.5)	85 (42.5)	16 (8.0)
Vomiting	0	58 (29.0)	142 (71.0)
Shortness of breath	3 (1.5)	106 (53.0)	91 (45.5)
Muscle cramps	15 (7.5)	160 (80.0)	25 (12.5)
What are the actions taken if anybody becomes sick following exposure to pesticides?			
Patient taken to health center	21 (10.5)	163 (81.5)	16 (8.0)
Consult local doctor	182 (91.0)	18 (9.0)	0
Patient taken to Panchayat Pradhan	0	89 (44.5)	111 (55.5)

Economic expenditure on pesticides and usage of government services

Most of the respondents (n = 194) spent out-of-pocket on pesticide purchase. Almost 194 respondents purchased pesticides based on the cost of pesticide. Nearly three-fourths (n = 156) were unaware of the services provided by the government or private sectors. Only 32 respondents used the services offered by the government more frequently.

Analysis of pesticide residues in commonly used vegetables

Pesticides detected in analyzed samples comprised of chlorpyrifos, cypermethrin, dichlorvos, ethion, bifenthrin, lambda-cyhalothrin, and endosulphan (Supplementary material 2). Chillli sample contained residues of chlorpyrifos [Maximum Residue Limit (MRL) value = 0.05 mg/kg] and ethion (MRL value = 0.3 mg/kg) are above MRL value i.e. 1.668 mg/kg and 7.094 mg/kg, respectively. Bifenthrin (MRL value = 0.5 mg/kg), Dichlorvos (MRL value = 0.1 mg/kg) and lambda-cyhalothrin (MRL value = 0.5 mg/kg) are below MRL value i.e. 0.01 mg/kg, 0.012 mg/kg, and 0.147 mg/kg, respectively. Tomato sample contained residues of chlorpyrifos and cypermethrin (MRL value = 0.03 mg/kg) above MRL value i.e. 1.668 mg/kg and 1.96 mg/kg, respectively, and residues of bifenthrin, lambda-cyhalothrin and endosulfan (MRL value = 0.5 mg/kg) are below MRL value i.e. 0.06 mg/kg, 0.02 mg/kg, and 0.06 mg/kg, respectively.

Discussion:

Studies have reported that farmers had misconceived notions concerning the pesticide use [13]. Therefore, the survey was conducted to determine the KAP among the farmers of Belagavi taluka, Karnataka towards pesticide use and analysis of their residues in commonly used vegetables.

Sociodemographic characteristics found in the present study are comparable to other studies in the literature. A study conducted among 200 farmers in Gaza trip reported that majority were men (81%) aged between 40 and 53 years (36%), and 31.2% possessed open agricultural fields [9]. A study conducted in Thailand among 330 farmers showed majority were men (53%) aged between 31 and 50 years; 71.2% completed primary education, and 87.9 % were married [13]. Source of information regarding pesticide use in this study is similar to other studies [13-14], wherein they attained maximum knowledge from different sources such as agricultural officers, television, articles, and salespersons.

The overall response of farmers towards the questionnaire was high, indicating their wholesome participation in the study. Knowledge about the names of the pesticides used was high, while knowledge about other ways of pest control (natural, biological, and agricultural ways of pest control) was relatively low. This demands to launch an extension of educational programs on pesticide substitutes among farmers of Belagavi taluka. A high proportion of farmers were aware of dermal absorption of pesticides than other routes, this is in agreement with other similar researches [15]. Farmers had moderate knowledge regarding the fate of pesticides in air, groundwater, soil, seeds, leafy vegetables, and fruits, which might affect the farmers when they get in contact with these after spraying.

Many were aware of the adverse effects of pesticides on human health, however, few of them did not follow the precautions unless they were aware of the measures. The reason for negligence

might be due to the carelessness, cost, discomfort, or unavailability of protective measures [9]. This is quite similar to studies conducted in different countries [9, 16]. Consistent with another study, low proportion of farmers placed pesticides at home [10], nevertheless, this might also pose as a potential risk for children and adults at home [6]. Improper use or disposal of empty containers of pesticides might lead to pesticide toxicity in humans, animals, and the environment [17]. However, in our study, many of the farmers discarded empty pesticide containers in a proper way. In contrast, other studies [6, 18] reported that farmers disposed empty containers in streets and used empty containers for different purposes. Farmers believed that taking shower might remove contaminants from body surfaces after preparing/spraying pesticides [9], which is comparable to our study.

Consistent with other studies [7, 9, 19] the use of mixed pesticides was quite high among the farmers. The synergistic effect of different chemicals in the pesticides may result in toxicity among farmers [9]. Although pesticides used in the study were within the recommended concentration, nearly three-fourths of the farmers used higher concentrations than recommended. This also might be one of the reasons for toxicity symptoms reported by the farmers.

In our study, farmers had lack of knowledge regarding pesticides banned, guidelines followed during pesticide use, amount of pesticide accepted internationally, medical or toxicological centers and schemes launched by the government. The practice of maintaining first-aid kits, attending seminars or training courses to upgrade the knowledge regarding pesticide use, and actions taken on exposure to pesticides were not implemented in this region. Hence, an extension of the programs regarding the pesticide management and regulation, public awareness, and reinforcement of safety should be implemented to educate the farmers [10].

Long-term consumption of pesticide-contaminated foods, even at moderate levels, deposits in the tissues and shows a negative impact on the human health [20]. Although many harmful pesticides such as organochlorine pesticides are banned in many countries, these residues are still found in vegetables and fruits [21-22]. Hence, in our study, the presence of synthetic pesticide residues in the tomato and chilli samples were tested. Synthetic pesticides under many classes, including organochlorine, organophosphorus, pyrethroids, acylamino acid fungicide, triazoles, phthalimide, substituted thioureas, strobilurin, and phenyl pyrazole were analyzed. Chlorpyrifos and ethion in the chilli sample and chlorpyrifos and cypermethrin in the tomato sample contained pesticide residues above the recommended MRL values. In Kuwait, residues of cypermethrin exceeded the MRL values in the tomato sample [1]. In Lahore, pesticide residues were absent in 83% of vegetable samples analyzed, whereas 50% of the tomato samples analyzed had detectable residue levels [11]. In Bangalore, chlorpyrifos and quinalphos contamination was absent in the tomato samples [23]. A study conducted in Haveri district, Karnataka reported, pesticide residues (acetamiprid, thiodicarb, flubendiamide, mancozeb, carbosulfan and spinosad) with exceeded MRL values in 11 out of 30 chilli samples analyzed using Ultra-performance liquid chromatography [24].

The present study has noteworthy limitations. The adverse health effects reported by the farmers

might be like symptoms of other diseases, therefore, the farmers' medical history should be recorded, to avoid the bias. As the pesticide residues were detected in single sample, studies in more samples in these vegetables are needed to authenticate the current discoveries.

Conclusion:

Farmers in the Belagavi taluka widely used pesticides. Chlorpyrifos and ethion in tomato sample, and chlorpyrifos and cypermethrin in chilli sample were the pesticide residues exceeded the MRL. Protective measures followed by the farmers, during pesticide use, was poor. Farmers were unaware of the pesticides banned, guidelines of pesticide use, toxicological centers, and schemes launched by the government. Therefore, knowledge of the farmers should be upgraded regarding alternative measures of pest control. Also, camps should be conducted periodically to monitor pesticide residues and health of the farmers.

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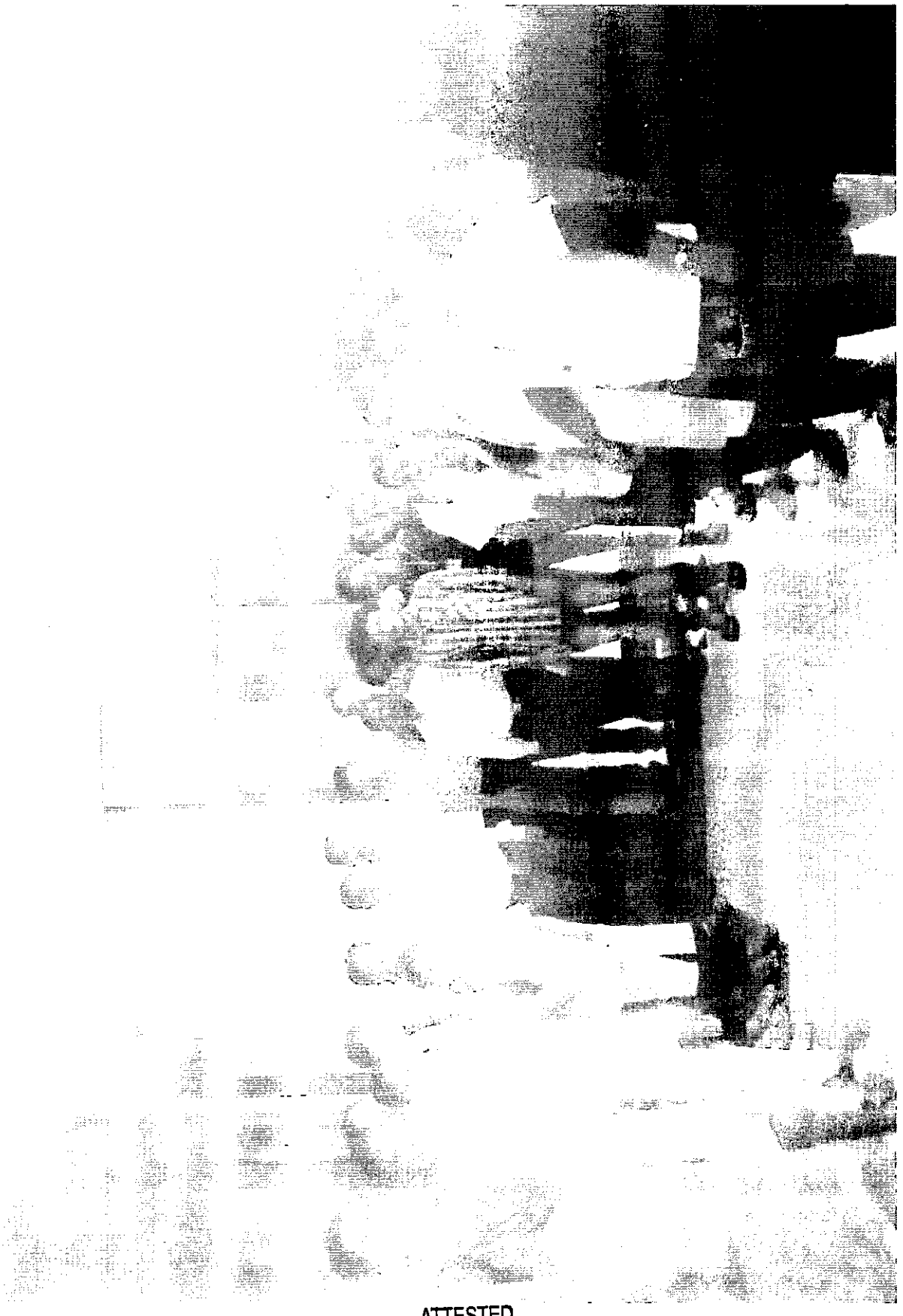

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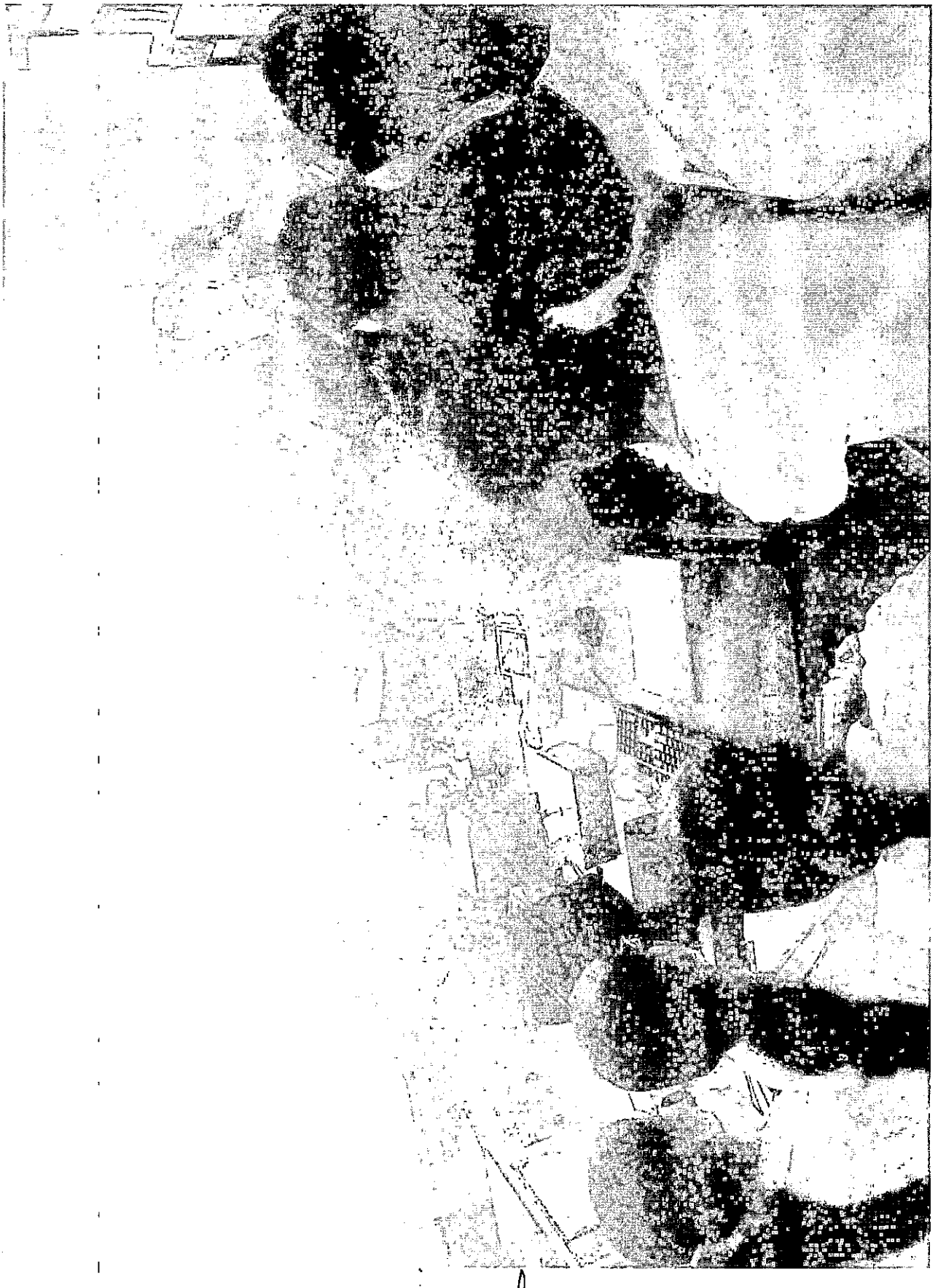

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