



**YENEPOYA**

(DEEMED TO BE UNIVERSITY)

Recognized under Sec 3(A) of the UGC Act 1956

Accredited by NAAC with 'A' Grade

**YENEPOYA (DEEMED TO BE UNIVERSITY)**

**Deralakatte, Mangaluru -575018**

**REGULATIONS AND CURRICULUM GOVERNING**

**UNDERGRADUATE PROGRAM (BDS) IN**

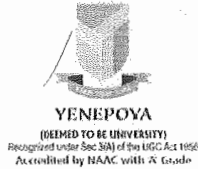
**DENTAL SURGERY**

**(REVISED CURRICULUM – AMENDED UP TO 2019)**

**ATTESTED**

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Registrar  
Yenepoya(Deemed to be University)  
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Mangalore-575 018, Karnataka

## Notification



Office of the Registrar  
University Road  
Deralakatte  
Mangalore - 575018  
Ph: 0824-2204667/68/69/71  
Fax: 0824-2203943

### **NOTIFICATION – 34-ACM/2019 dtd. 20.03.2019**

Sub: Addition of the topics in Periodontics for BDS curriculum

Ref: Resolution of the Academic Council at its 34<sup>th</sup> meeting held on 08.02.2019  
vide Agenda - 7

\*\*\*\*\*

The Academic council at its 34<sup>th</sup> meeting held on 08.02.2019 and the Board of Management at its 45<sup>th</sup> meeting has approved the addition of the topics for 3<sup>rd</sup> & 4<sup>th</sup> Year (Part-I) in Periodontics for BDS curriculum as follows:-

Existing	Now Amended
Existing syllabus is lacking in newer advancements in the field of Periodontics	Addition of the following topics for the UG curriculum Yenepoya University : <ul style="list-style-type: none"><li>• Laser</li><li>• Plasma Concentrates</li><li>• Piezo Surgery</li><li>• Halitosis (for 3<sup>rd</sup> BDS)</li><li>• Periodontal Medicine</li></ul>

The approved amendments may be incorporated in the UG syllabus and the amended copy may be provided to this office for filing.


  
**REGISTRAR**  
mj 20/3

To:

The Principal, Yenepoya Dental College

Copy to:

1. Professor & HoD, Department of Periodontics
2. Controller of Examinations
3. File copy

  
**DEAN / PRINCIPAL**  
Yenepoya Dental College  
Yenepoya Deemed to be University  
University Road, Deralakatte  
Mangalore - 575018

# Notification



Office of the Registrar  
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## **NOTIFICATION – 09/33-ACM/2018 Dtd. 19.11.2018**


Sub: Incorporation of new course content/amendment to the syllabus/teaching & Evaluation methodology in UG curriculum (Dental)

Ref: Resolution of the Academic Council at its 33<sup>rd</sup> meeting held on 26.10.2018, vide Agenda – 21

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The Academic Council at its 33<sup>rd</sup> meeting held on 26.10.2018 and subsequently the 44<sup>th</sup> Board of Management have approved the recommendation of the Faculty of Dentistry for incorporating new course content/amendment to the syllabus/teaching & evaluation methodology to the U.G. curriculum of Oral Pathology as follows to be implemented.

<b>Existing</b>	<b>Now Amended</b>
<b><u>U.G. Curriculum I BDS Dental Anatomy:</u></b> There is no specific chapter for clinical application of dental anatomy, physiology and occlusion.	To add a chapter on clinical application of dental anatomy, physiology and occlusion of 2 hours duration.
<b><u>U.G. Curriculum III BDS</u></b> A chapter on Forensic Odontology of 4 hours duration  There is no practical demonstration of Forensic Odontology techniques.	To increase the number of hours of teaching on Forensic Odontology to 6 hours as per the modified DCI requirement.  To include practical demonstration of Forensic Odontology techniques as enhancement in curriculum.

  
**REGISTRAR**  
mj

To:  
The Principal - YDC

Copy to:

1. Controller of Examinations
  2. Professor & HoD, Department of Oral Pathology
  3. File copy
- 

**NOTIFICATION – 03/32-ACM/2018 dtd. 03.09.2018**

Sub: Incorporation of new course content/amendment to the syllabus/teaching & evaluation methodology in UG curriculum (Dental)  
Ref: Resolution of the Academic Council at its 32<sup>nd</sup> meeting held on 11.08.2018 vide Agenda -5

\*\*\*\*\*

The Academic Council at its 32<sup>nd</sup> meeting held on 11.08.2018 and subsequently the Board of Management have approved the recommendation of the Faculty of Dentistry for incorporating new course content/amendment to the syllabus/teaching & evaluation methodology to the U.G curriculum of Public Health Dentistry as follows to be implemented.

Existing	Now Amended
<u>UG Curriculum</u> Practical/clinical programme: Oral health status assessment of the community using indices and WHO basic Oral health survey methods (Case history recording and Oral health assessment using indices)	1. Case history quota to be increased to 10 from the present number (2) with 5 cases each to be recorded in III <sup>rd</sup> BDS and IV BDS-Part I. In these patients, after case history and relevant indices are recorded, comprehensive treatment to be done (scaling, filling, etc).
<u>Extension activities:</u> Collection of statistical data (demographic) on population in India, birth rates, morbidity and mortality, literacy, per capita income  In the Family Adoption Programme (under the RHCDC), demographic characteristics and oral hygiene practices are recorded by Undergraduate (III <sup>rd</sup> BDS) and Postgraduate students.	Oral Health Education component will be added into the Family Adoption Programme for Undergraduate (III <sup>rd</sup> BDS) and Postgraduate students.

The approved amendments may be incorporated in the respective UG curriculum and the amended copy may be provided to this office for filing.

  
**(Dr. G. Shreekumar Menon)**  
**REGISTRAR**  
mj

To:  
The Principal – YDC  
Copy to:  
1. Controller of Examinations  
2. Professor & HoD, Public Health Dentistry  
3. Academic Section

mail sent  
15/9/2018



Ref. No. YU/REG/ACA/ACM-30/2017

04.10.2017

**NOTIFICATION**

Sub: Incorporation of new course content/amendment to the syllabus/teaching & evaluation methodology

Ref: Proceedings of the 30<sup>th</sup> Minutes of Academic Council meeting held on 20.10.2017, vide Agenda - 12

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The Academic Council at its 30<sup>th</sup> meeting held on 20.10.2017 approved the recommendation of the Faculty of Dentistry for incorporating new course content/amendment to the syllabus/teaching & evaluation methodology to the U.G. curriculum as follows to be implemented prospectively from the admission batch of 2017-18.

**Department of Oral & Maxillofacial Surgery**

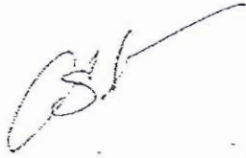
Existing	Proposed Amendment
At present Laser and cryo surgery topics are not included in the syllabus	UG Curriculum: Introduction of laser and cryo surgery in UG Syllabus

**Department of Public Health Dentistry**

Existing	Proposed Amendment
<u>Extension activities:</u> UG students are a part of Rural Health Development Centre extension activities conducted by department of community medicine YMC and Public health dentistry YDC	School health program will be started for Undergraduates, enforcing on health education and preventive protocols in schools in Dakshina Kannada district.

Existing	Proposed Amendment
Evaluation  Presently in the Final Year BDS University exam students have to answer all the given short answers	Suggestion to introduce Options in short essay and short answers categories in the University examinations in all the year B.D.S. subjects

The approved amendments may be incorporated the respective U.G. curriculum and the amended copy may be provided to this office for filing.

  
(Dr. G. Shreekumar Menon)  
REGISTRAR

mj

*All*

Copy to:

- Principal – YDC
- HoD, Department of Oral & Maxillofacial Surgery
- HoD, Department of Public Health Dentistry
- Controller of Examinations
- Academic Section

*Notification from University*

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## 1. Admission to the Dental Course – Eligibility Criteria

No Candidate shall be allowed to be admitted to the Dental Curriculum of first Bachelor of Dental Surgery (BDS) Course until:

1. He/She shall complete the age of 17 years on or before 31<sup>st</sup> December, of the year of admission to the BDS Course :
2. He/ She has passed qualifying examination as under :-
  - a. The higher secondary examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years of study comprising of physics, chemistry, biology (minimum marks as prescribed in Section II below) or any other elective subjects with English at a level not less than the core course for English as prescribed by the National Council for Educational Research and Training after the introduction of the 10+2+3 years educational structure as recommended by the National Committee on education;  

Note: Where the course content is not as prescribed for 10+2 education structure of the National Committee, the candidates will have to undergo a period of one year pre-professional training before admission to the dental college;

Or
  - b. The intermediate examination in science of an Indian University/Board or other recognised examining body with Physics, Chemistry and Biology which shall include a practical test in these subjects and also English as a compulsory subject;  

Or
  - c. The pre-professional/pre-medical examination with Physics, Chemistry and Biology, after passing either the higher secondary school examination, or the pre-university or an equivalent examination. The pre-professional/pre-medical examination shall include a practical test in Physics, Chemistry and Biology and also English as a compulsory subject;  

Or
  - d. The first year of the three years degree course of a recognized university, with Physics, Chemistry and Biology including a practical test in three subjects provided the examination is a "University Examination" and candidate has passed 10+2 with English at a level not less than a core course (with PCB aggregate marks as above);  

Or
  - e. B.Sc examination of an Indian University, provided that he/she has passed the B.Sc examination with not less than two of the following subjects Physics, Chemistry, Biology (Botany, Zoology) and further that he/she has passed the earlier qualifying examination with the following subjects-Physics, Chemistry, Biology and English.  

Or
  - f. Any other examination which, in scope and standard is found to be equivalent to the intermediate science examination of an Indian University/Board, taking Physics, Chemistry and Biology including practical test in each of these subjects and English. In case of doubt, it is the onus of the student to get clarification from Association of Indian Universities.

### Note:

From the Academic Year 2016-17, a candidate seeking admission to Bachelor of Dental Surgery shall have to qualify NEET Examination of the respective year of admission and shall abide by the criteria stipulated by DCI/MHFW-GoI

## II. Selection of Students

The selection of students to dental college shall be based solely on merit of the candidate and for determining merit, the following criteria shall be adopted :

1. A competitive entrance examination is absolutely necessary in the cases of institutions of All India character;
2. Procedure for selection to BDS course shall be as follows :-
  - i. A candidate must have passed in the subjects of Physics, Chemistry, Biology and English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry and Biology at the **qualifying examination** and in addition must have come in the merit list prepared as a result of such **competitive all-India entrance examination** by securing not less than 50% marks in Physics, Chemistry and Biology taken together in the competitive examination. In respect of candidates belonging to reserved category, the marks obtained in Physics, Chemistry and Biology taken together in qualifying examination and competitive entrance examination should be a minimum of 40%.
  - ii. Provided that a candidate who has appeared in the qualifying examination the result of has not been declared, he may be provisionally permitted to take up the competitive entrance examination and in case of selection for admission to the BDS course, he shall not be admitted to that course until he fulfils the eligibility criteria as per above regulation.

## III. Duration of the Course :

The undergraduate dental training programme leading to BDS degree shall be of 5 years with a minimum of 240 teaching days in each academic year. During this period, the student shall be required to have engaged in full time study at a dental college recognised or approved by the Dental Council of India.

## IV. Migration :

- 1) Migration from one dental college to another is not a right of a student. However, migration of students from one dental college to another dental college in India may be considered by the Dental Council of India only in exceptional cases on extreme compassionate grounds\*, provided the following criteria are fulfilled. Routine migrations on other ground shall not be allowed.
- 2) Both the colleges, i.e. one at which the student is studying at present and one to which migration is sought, are recognised by the Dental Council of India.
- 3) The applicant candidate should have passed first professional BDS examination.
- 4) The applicant candidate submits his application for migration, complete in all respects, to all authorities concerned within a period of one month of passing (declaration of results) the first professional Bachelor of Dental Surgery (BDS) examination.
- 5) The applicant candidate must submit an affidavit stating that he/she will pursue 240 days of prescribed study before appearing at II professional Bachelor of Dental Surgery (BDS) examination at the transferee dental college, which should be duly certified by the Registrar of the concerned University in which he/she is seeking transfer. The transfer will be applicable only after receipt of the affidavit.

### Note 1 :

- (i) Migration is permitted only in the beginning of II year BDS Course in recognized Institutions.
- (ii) All applications for migration shall be referred to Dental Council of India by the college authorities. No Institution/University shall allow migration directly without the prior approval of the Council.
- (iii) Council reserves the right not to entertain any application which is not under the prescribed compassionate grounds and also to take independent decisions where applicant has been allowed to migrate without referring the same to the Council.

**Note 2 :** \*Compassionate ground criteria:

- (i) Death of supporting guardian.
- (ii) Disturbed conditions in the Dental College area as declared by Government.

**V. Attendance requirement, Progress and Conduct**

- (i) 75% in theory and 75% in practical/clinical in each year.
- (ii) In case of a subject in which there is no examination at the end of the academic year, attendance percentage shall not be less than 70%. However, at the time of appearing for the professional examination in the subject, the aggregate percentage of attendance in the subject should satisfy condition (i) above.

**VI. Subjects of Study :**

**First Year**

- i) General Human Anatomy including Embryology and Histology
- ii) General Human Physiology and Biochemistry, Nutrition and Dietetics
- iii) Dental Anatomy, Embryology and Oral Histology
- iv) Dental Materials
- v) Pre-clinical Prosthodontics and Crown & Bridge

**Second Year**

- i) General Pathology and Microbiology
- ii) General and Dental Pharmacology and Therapeutics
- iii) Dental Materials
- iv) Pre clinical Conservative Dentistry
- v) Pre clinical Prosthodontics and Crown & Bridge
- vi) Oral Pathology & Oral Microbiology

**Third Year**

- i) General Medicine
- ii) General Surgery
- iii) Oral Pathology and Oral Microbiology
- iv) Conservative Dentistry and Endodontics
- v) Oral & Maxillofacial Surgery
- vi) Oral Medicine and Radiology
- vii) Orthodontics & Dentofacial Orthopaedics
- viii) Paediatric & Preventive Dentistry
- ix) Periodontology
- x) Prosthodontics and Crown & Bridge
- xi) Public Health Dentistry

**Fourth Year (Part – I)**

- 1) Orthodontics & Dentofacial Orthopaedics
- 2) Oral Medicine & Radiology
- 3) Periodontology
- 4) Public Health Dentistry

## **Fourth Year (Part – II)**

- i) Oral & Maxillofacial Surgery
- ii) Prosthodontics and Crown & Bridge
- iii) Conservative Dentistry and Endodontics
- iv) Paediatric & Preventive Dentistry

## **VII. Examinations :**

These regulations shall be applicable for the B.D.S. degree examinations conducted by Yenepoya University.

### **1. Preface :**

**(A)** Evaluation is a continuous process and is based on criteria developed by the concerned authorities with certain objectives to assess the performance of the learner. This also indirectly helps in the measurement of effectiveness and quality of the concerned B.D.S. programme.

**(B)** Evaluation is achieved by two processes

- 1. Formative or internal assessment
- 2. Summative or University examinations.

Formative evaluation is done through a series of tests and examinations conducted periodically by the institution. Summative evaluation is done by the University through examinations conducted at the end of the specified course.

### **2. Methods of Evaluation :**

Evaluation may be achieved by the following tested methods :

- 1. Written test
- 2. Practicals
- 3. Clinical examination
- 4. Viva voce

## **INTERNAL ASSESSMENT EXAMINATION**

The continuing assessment examinations may be held frequently at least 3 times in a given academic year and the average marks of these examinations should be considered. Ten percent of the total marks in each subject separately for theory and practical/clinical examination separately is set aside for the internal assessment examinations. The student should have minimum 35% marks in their internal assessment examination to be eligible for University examination. (Applicable to students joined in 2014 and afterwards.)

## **SCHEME OF EXAMINATION :**

The scheme of examination for B.D.S. Course shall be divided into 1<sup>st</sup> B.D.S. examination at the end of the first academic year, 2<sup>nd</sup> B.D.S. examination at the end of second year, 3<sup>rd</sup> B.D.S. examination at the end of third, there is two examinations in the final year, designated as part 1 and part 2 of the respective examinations (regulation 1983).

The examination shall be open to a candidate who satisfies the requirements of attendance, progress and other rules laid down by the University. (75% attendance in all exams appearing subjects and 70% attendance in non-exam subjects is required)

**I B.D.S. Examination :**

1. General anatomy including embryology and histology
2. General human physiology and biochemistry
3. Dental Anatomy, Embryology and Oral Histology

Any student who does not clear the BDS Course in all the subjects within a period of 9 years, including one year Compulsory Rotatory paid Internship from the date of admission shall be discharged from the course. (applicable to students joined 2015 and afterwards.)

Any candidate who fails in one subject in an Examination is permitted to go to the next higher class and appear for the subject and complete it successfully before he is permitted to appear for the next higher examination.

**II B.D.S. Examination :**

A candidate who has not successfully completed the I B.D.S. examination can not appear in the II year Examination.

1. General pathology and Microbiology
2. General and dental pharmacology and therapeutics
3. Dental Materials
4. Pre Clinical Conservative - Only Practical and Viva Voce
5. Pre Clinical Prosthodontics - Only Practical and Viva Voce

**III B.D.S. Examination :**

A candidate who has successfully completed the 2<sup>nd</sup> B.D.S. examination can appear in the III B.D.S. Examination.

1. General Medicine
2. General Surgery
3. Oral Pathology and Oral Microbiology

**IV B.D.S. (Part – I) Examination :**

1. Oral Medicine and Radiology
2. Public Health Dentistry
3. Orthodontics & Dentofacial Orthopaedics
4. Periodontology

**IV B.D.S. (Part – II) Examination :**

1. Prosthodontics and Crown & Bridge
2. Conservative Dentistry and Endodontics
3. Oral and Maxillofacial Surgery
4. Pedodontics & Preventive Dentistry

### **WRITTEN EXAMINATION :**

1. The written examination in each subject shall consist of one paper of three hours duration and shall have maximum of 70 marks.
2. In the subjects of Physiology & Biochemistry and Pathology & Microbiology each paper will be divided into two parts, A and B of equal marks.
3. The question paper should contain different types of questions such as essays, short answer and objective type / M.C.Q's.
4. The nature of questions set, should be aimed to evaluate students of different standards, ranging from average to excellent.
5. The questions should cover as broad an area of the content of the course. The essay questions should be properly structured and the marks specifically allotted.
6. The University may set up a question bank
7. Options will be provided in short essay and short answer sections in the question papers.

### **PRACTICAL AND CLINICAL EXAMINATION :**

1. **Objective Structured Clinical Evaluation :** The clinical and practical examination should provide a number of chances for the candidate to express one's skills. A number of examination stations with specific instructions will be provided. This will include clinical procedures, laboratory experiments, spotters etc. Additionally, bedside/chairside clinical case presentations will be conducted wherever necessary.
2. **Records/ Log Books :** The candidate should be given credit for his records based on the scores obtained in the record. (Maximum of 10 marks for record book and to be included with practical marks)The marks obtained for the record in the first appearance can be carried over to the subsequent appearances if necessary.
3. **Scheme of clinical and practical examinations :** The specific scheme of clinical and practical examinations, the type of clinical procedures/ experiments to be performed and marks allotted for each are to be discussed and finalised by the Chairman and other examiners and it is to be published prior to the conduct of the examinations along with the publication of the time table for the practical examinations. This scheme should be brought to the notice of the external examiner as and when the examiner reports. The practical and clinical examinations should be evaluated by two examiners of which one shall be an external examiner appointed from other universities preferably outside the State. Each candidate should be evaluated by each examiner independently and marks computed at the end of the examination.
4. **Viva Voce :** Viva voce is an excellent mode of assessment because it permits a fairly broad coverage and it can assess the problem solving capacity of the student. An assessment related to the affective domain is also possible through viva voce. It is desirable to conduct the viva voce independently by each examiner. In order to avoid vagueness and to maintain uniformity of standard and coverage, questions can be pre-formulated before administering them to each student. Twenty marks are exclusively allotted for viva voce and that can be divided equally amongst the examiners, i.e., 10 marks per examiner.

**MARKS DISTRIBUTION IN EACH SUBJECT :**

Each subject shall have a maximum of 200 marks.

Theory	100
Practical/ Clinical	100

**Theory -100**

University written exam	70
Viva Voce	20
Internal Assessment (written)	10

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100  
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**Practicals / clinicals -100**

University Exam	90
Internal assessment (practical)	10

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100  
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Practical and Viva Voce Only in University Examination

Pre-Clinical Prosthodontics

Pre-clinical Conservative Dentistry

Practical	-	50
Record Book	-	10
Viva Voce	-	20
Internal assessment	-	20
		100

**Criteria for a pass :**

Fifty percent of the total marks in any subject computed as aggregate for theory, i.e., written, viva voce and internal assessment and practicals including internal assessment, separately is essential for a pass in all years of study.

For declaration of pass in a subject, a candidate shall secure 50% marks in the University examination both in Theory and Practical/ Clinical examinations separately, as stipulated below :

- Ø A candidate shall secure 50% marks in aggregate in University theory including Viva Voce and Internal assessment obtained in University written examination combined together.
- Ø In the University Practical/ clinical examination, a candidate shall secure 50% of University practical marks and Internal Assessment combined together.
- Ø In case of pre clinical Prosthodontics and Pre clinical Conservative Dentistry in II BDS, where there is no written examination, minimum for pass is 50% of marks in Practical and Viva voce combined together in University examination including Internal Assessment i.e. 50/100 marks.
- Ø Successful candidates who obtain 65% of the total marks or more shall be declared to have passed the examination in First Class. Other successful candidates will be placed in Second Class. A candidate who obtains 75% and above is eligible for Distinction. Only those candidates who pass the whole examination in the first attempt will be eligible for distinction or class.
- Ø First Class and Distinction etc. to be awarded by the University as per their respective rules.

**Grace Marks :** Grace marks upto a maximum of 5 marks may be awarded to students who have failed only in one subject but passed in all other subjects.

**Re-totalling :** The University on application and remittance of a stipulated fee to be prescribed by the university, shall permit a recounting or opportunity to recount the marks received for various questions in an answer paper/ papers for theory of all subjects for which the candidate has appeared in the university examination. Any error in addition of the marks awarded if identified should be suitably rectified.

### **Qualification and experience for eligibility for examinership in BDS examination**

1. M.D.S. Degree from a recognised Institution
2. Five years teaching experience in the subject in a dental college after MDS
3. Should be holding the post of a Reader or above in a Dental- Institution approved/recognised by the Dental Council of India for B.D.S.

#### **Note :**

1. In case of Public Health Dentistry, as there is an acute shortage of teachers one examiner from Public Health Dentistry and the second from Periodontics is permissible.
2. In case of Physiology and Biochemistry if Internal examiner is from Physiology, External examiner should be from Biochemistry or vice versa.
3. In case of Pathology and Microbiology if Internal examiner is from Pathology, External examiner should be from Microbiology or vice versa.
4. In case of Dental Materials, if internal is from Prosthodontics, external should be from Conservative Dentistry and vice versa.

Fifty percent of Examiners appointed shall be external from Dental Institutions approved/recognised by the Dental Council of India for B.D.S. Course, from another University, preferably outside the State.

Reciprocal arrangement of Examiners should be discouraged, in that, the Internal Examiner in a subject should not accept external examinership for a College from which External Examiner is appointed in his subject for the corresponding period.

External Examiner for not more than 3 consecutive years. However, if there is a break of one year the person can be re-appointed.

## **GOALS AND OBJECTIVES**

### **GOALS :**

The dental graduates during training in the institutions should acquire adequate knowledge, necessary skills and reasonable attitudes which are required for carrying out all activities appropriate to general dental practice involving prevention, diagnosis and treatment of anomalies and diseases of the teeth, mouth, jaws and associated tissues. The graduate also should understand the concept of community oral health education and be able to participate in the rural health care delivery programmes existing in the country.

### **OBJECTIVES :**

The objectives are dealt under three headings (a) Knowledge and Understanding (b) Skills and (c) Attitudes.



### **(A) KNOWLEDGE AND UNDERSTANDING :**

The graduate should acquire the following during the period of training.

1. Adequate knowledge of the scientific foundations on which dentistry is based and good understanding of various relevant scientific methods, principles of biological functions; ability to evaluate and analyse scientifically various established facts and data.
2. Adequate knowledge of the development, structure and function of the teeth, mouth and jaws and associated tissues both in health and disease and their relationship and effect on general state of health and also bearing on physical and social well being of the patient.
3. Adequate knowledge of clinical disciplines and methods which provide a coherent picture of anomalies, lesions and diseases of the teeth, mouth and jaws and preventive diagnostic and therapeutic aspects of dentistry.
4. Adequate clinical experience required for general dental practice.
5. Adequate knowledge of the constitution, biological function and behaviour of persons in health and sickness as well as the influence of the natural and social environment on the state of health in so far as it affect dentistry.

### **(B) SKILLS :**

A graduate should be able to demonstrate the following skills necessary for practice of dentistry.

1. Diagnose and manage various common dental problems encountered in general dental practice keeping in mind the expectations and the right of the society to receive the best possible treatment available wherever possible.
2. Prevent and manage complications if encountered while carrying out various surgical and other procedures.
3. Carry out certain investigative procedures and ability to interpret laboratory findings.
4. Promote oral health and help prevent oral diseases where possible.
5. Control pain and anxiety among the patients during dental treatment.

### **(C) ATTITUDES :**

A graduate should develop during the training period the following attitudes.

1. Willingness to apply the current knowledge of dentistry in the best interest of the patient and community.
2. Maintain a high standard of professional ethics and conduct and apply these in all aspects of professional life.
3. Seek to improve awareness and provide possible solutions for oral health problems and needs throughout the community.
4. Willingness to participate in the CPED Programmes to update knowledge and professional skill from time to time.
5. Help and participate in the implementation of the national oral health policy.

## **RECOMMENDATIONS**

### **GENERAL :**

1. The undergraduate course involves organisation of teaching programmes year-wise. However, this course, as a whole, should demonstrate integration of the basic sciences, clinical dentistry and practical or the laboratory skills. The course should be designed and integrated in such a way to permit smooth progression from the pre-clinical to clinical phase. Collaboration should be encouraged between teachers of basic sciences, dental sciences and clinical subjects.

2. The undergraduate dental course consists of three main components. The first component consists subjects common to medicine and dentistry like anatomy, physiology, biochemistry and behavioural science, leading to pharmacology, pathology, microbiology and then on to general medicine and general surgery. The second component runs concurrently with the first and deals with special aspects of oral and dental tissues, oral biology and oral pathology. Finally, the third component based on the foundations of the first two, deals with the clinical and technical aspects of dentistry as is required for general dental practice.
3. The first component of the course is intended to provide initially, an appreciation of normal human structure, development, function and behavior, leading to understanding of the diseases, its prevention and treatment. The main objective is to provide the student a broad knowledge of the normal structures and functions of the body, the alterations which take place in disease with particular reference to those conditions in which medical and dental co-operation is essential for proper management. At this stage, the student should also be made aware of the social and psychological aspects of patient care with special reference to the relationship between dentist and patient. The behavioral sciences including both sociology and psychology should be introduced at the initial stages of the training programme, much before the students actually deal with the patients.
4. The second component of dental undergraduate programme consists instruction in the subjects dealing with dental and oral aspects to ensure a detailed knowledge of the structure and function of the dental and oral tissues. This enables the student to diagnose, prevent and treat the dental and oral diseases and disorders which were not included in the first component. The subject of oral biology is to be introduced at this level to provide the students a comprehensive knowledge and application of oral physiology, microbiology, biochemistry and oral immunology. Students should be exposed to the basic aspects of forensic odontology at this stage of the course along with oral biology/oral pathology.
5. The third component of the course comprising the clinical and technical aspects of dentistry actually prepares the student to undertake total oral and dental health care of the patients of all ages. The emphasis at this stage should be on the prevention of the various dental diseases and how to preserve natural teeth with their supporting structures. The importance of the various preventive methods need to be stressed. The significance of diagnosis of various dental and oral problems needs to be emphasised along with treatment planning before actual treatment procedures are undertaken.

In addition to acquiring knowledge, the students need to gain adequate clinical hands-on-experience in extractions and other minor oral surgical procedures, all aspects of conservative dentistry, endodontics, crown and bridge, provision of partial and complete dentures, various periodontal therapeutic procedures and use of removable orthodontic appliances. Familiarity with various radiological techniques, particularly intra-oral methods and proper interpretation of radiographs is an essential part of this component of training and has application in clinical diagnosis, forensic identification and age estimation.

Towards the final stage of the clinical training, each student should be involved in comprehensive oral health care or holistic approach to enable them to plan and treat patients as a whole, instead of piecemeal treatment provided in each speciality. The Dental Council of India strongly recommends that all the dental colleges provide facilities and required infrastructure for this purpose.

6. The commitment towards society as a whole needs to be stressed along with the knowledge and treatment skills gained. Instruction in public health dentistry should emphasise the sociological aspects of health care, particularly oral health care, including the reasons for the variation in oral and dental needs of different sections of the society. It is important to know the influence of the social, behavioural, environmental and economic factors on oral and dental health. Students should be made aware of the National oral health Policy and the importance of being a member of the Health care team delivering medical and oral health care, particularly among the rural population.
7. Scientific advancement of any profession is based largely on continuous research activities. Dentistry is no exception. It is important that in every dental college proper facilities should be provided for research and

the faculty members should involve themselves in such activities. Inter-disciplinary research should be encouraged to bring in integration among various specialities. The teaching and training methodology should be such that the students are motivated to think and indulge in self study rather than playing a passive role. Provision should be made in the daily schedules for adequate time for reading. Proper library facilities with adequate timings and seating capacity should be made available in all dental colleges. Adequate audio visual aids, like video tapes, computer assisted learning aids, Medline and internet facilities should be provided in all dental colleges to encourage self-study. Students should be encouraged to participate in simple research project work and the system of electives, spending some stipulated amount of time in another dental college within the country or outside should be given a serious consideration by all the dental institutions.

8. The society has a right to expect high standards and quality of treatment. Hence, it is mandatory and a social obligation for each dental surgeon to upgrade his or her knowledge and professional skills from time to time. The Dental Council of India strongly recommends that facilities and proper infrastructure should be developed to conduct the continuous professional education programmes in dentistry to enable the practitioners to update their knowledge and skills. The Council is of the opinion that the dental colleges by virtue of their infrastructural facilities will be ideal to conduct such courses and recommends establishment of a Department of continual dental education in each of the dental colleges. In addition, the practitioners should be encouraged to attend conferences at the state and national level, workshops, seminars and any other such activity which the Council feels is suitable to upgrade the knowledge and skills.
9. The undergraduate curriculum should stress the significance of infection and cross-infection control in dental practice. Aspects like sources of infection, measures to be adopted - both general and specific - for control particularly the HIV and hepatitis should be properly incorporated into the curriculum so that the graduates are aware of its significance and follow it in their practice.
10. The Council recommends that all undergraduates acquire minimum computer proficiency which will enable them to enhance their professional knowledge and skills.

#### **SPECIFIC :**

1. The undergraduate dental training programme leading to B.D.S. degree shall be a minimum of five years duration. During this period, the students shall be required to engage in full time study at a dental college recognised or approved by the Dental Council of India.  
During the five years undergraduate course, the instruction in clinical subjects should be at least for three years
2. Basic Medical & Dental Subjects :  
The basic medical and dental sciences comprise anatomy gross and microscopic, physiology, biochemistry, pharmacology, oral biology and science of dental materials. Subjects like behavioural sciences, which is useful to develop communication skills, should also be introduced in the first year itself and spread over the undergraduate course. An introduction to Public Health Dentistry & Preventive Dentistry also will be useful to develop the concept of commitment to community. The laboratory skills to be developed by the students like pre-clinical Prosthodontics, Crown Bridge, Aesthetic Dentistry and Oral Implantology exercises and studying dental morphology also is a part of initial training. The instruction in the above medical and dental sciences shall be for two years duration. At the end of this period the student should be in a position to understand and comprehend in general the development, structure and function of the human body in both health and disease.
3. The instruction in basic dental sciences should include theoretical and practical aspects of oral anatomy and physiology, to provide a detailed knowledge of the form and structure of teeth, associated tissues and occlusal relationships.

The study should also aim at development of a concept regarding physiological and biochemical processes relevant to oral cavity for better understanding of the changes which occur with the onset of disease in the oral cavity.

The student should be made aware of the importance of various dental tissues in forensic investigation.

4. Clinical, Medical and Dental subjects :

The students should be introduced to clinics in the initial stage, preferably in the first year, as an observer to familiarise with the clinical set-up and working. The period of instruction in the clinical subjects shall be not less than three years full time. During this period, the student shall attend a dental hospital, general hospital, community camps and satellite clinics, in order to obtain instruction and experience in the practice of dentistry. The main objective of training in clinical dental subjects is to produce a graduate able and competent to recognise or diagnose various dental and oral diseases, to undertake general dental treatment, advise on the provision of specialised treatment available and finally advise the patient on prevention. The student should also understand the relationship between oral and systemic diseases.

5. Training in general medicine and surgery should provide sufficient knowledge on human disease to enable the student to understand its manifestations as relevant to the practice of dentistry. This requires clinical teaching on patients and shall be carried out in in-patient and outpatient medical departments and specialist clinics.

This clinical instruction should enable the student to understand and perhaps diagnose common systemic diseases which have relevance to dental practice, by adopting a systematic approach of history taking and clinical examination. The student should also realise the significance of various general and special investigations in the diagnosis of diseases. The ability to recognise physical and mental illness, dealing with emergencies, effective communication with patients, interaction with various professional colleagues also become important aspects of this training.

6. The Dental Council of India considers it important for all dental students to receive instruction in first-aid and principles of cardio-pulmonary resuscitation. It is also desirable that the student spend time in an accident and emergency department of a general hospital.

7. The purpose of the clinical training is to provide sufficient practical skill in all aspects of clinical dentistry. The instruction should also include patient management skills, treatment of patients of all ages with special reference to children (paediatric), very elderly (geriatric), medically compromised and disabled patients.

8. During the three years clinical course, the students should receive thorough instruction which involves history taking, diagnosis and treatment planning in all aspects of dentistry and on graduation should be competent to carry out all routine general procedures.

In Oral & Maxillofacial Surgery and Oral Implantology, instruction should include the knowledge of various maxillofacial problems like injuries, infections and deformities of the jaws and associated structures. The clinical experience should include those procedures commonly undertaken in general practice like extraction of teeth, minor oral surgical procedure etc.

In Conservative, Dentistry, Prosthodontics & Crown Bridge and Periodontology students on graduation should be competent to carry out routine treatment like restorations of various kinds, endodontic procedures, removable and fixed prosthodontics, concept of osseointegration and finally various kinds of periodontal therapy. In addition, students should be aware of their limitations on graduation, need to refer patients for consultant opinion and/or treatment and also the need for postgraduate and continual education programmes.

In Orthodontics & Dento Facial Orthopedics, students should carry out simple appliance therapy for patients. Students should also be able to appreciate the role of dentofacial growth in the development and treatment of malocclusion.

In Paediatric dentistry, the students should concentrate on clinical management, efficacy of preventive measures, treatment needs particularly for children with disabilities. In Oral medicine and oral diagnosis, the student should receive instruction in various lesions, occurring in the oral cavity with particular reference to oral cancer.

9. The successful control and management of pain is an integral part of dental practice. Upon graduation the students should be competent to administer all forms of local anaesthesia. The value of behavioural methods of anxiety management should be emphasised. The students should also have the practical experience in the administration of intra-muscular and intra-venous injections. Knowledge of pain mechanisms and strategies to control post-operative pain is essential for practice of dentistry.
10. All students should receive instructions and gain practical experience in taking processing and interpretation of various types of intra and extra oral radiographs. They should be aware of the hazards of radiation and proper protective measures from radiation for the patient, operator and other staff.
11. Instruction should be given in dental jurisprudence, legal and ethical obligations of dental practitioners and the constitution and functions of Dental Council of India.
12. Infection and cross infection control assume significance in dental practice. The students should be made aware of the potential risk of transmission in the dental surgery, various infectious diseases particularly HIV and hepatitis. The students should be aware of their professional responsibility for the protection of the patients, themselves and their staff and the requirements of the health and safety regulations.
13. In recent times, the subjects of aesthetic dentistry, oral implantology, behavioural sciences and forensic odontology have assumed great significance. Hence, the Council recommends that these four specialities should be incorporated into the undergraduate curriculum. The instruction and clinical training in aesthetic dentistry shall be carried out by the departments of Conservative, Dentistry and Prosthodontics & Crown Bridge. Similarly, the instruction and clinical training in oral implantology shall be done by the departments of Oral & Maxillofacial Surgery, Prosthodontics & Crown Bridge and Periodontology. The instruction in behavioural sciences should ideally commence before the students come in contact with the patients and shall be carried out by the departments of Public Health Dentistry & Paedodontics & Preventive Dentistry. Forensic Odontology will be a part of Oral Pathology & Oral Microbiology and Oral Medicine and Radiology.

## **COMPETENCIES**

At the completion of the undergraduate training programme the graduates shall be competent in the following :

### **General Skills**

- Apply knowledge & skills in day to day practice
- Apply principles of ethics
- Analyse the outcome of treatment
- Evaluate the scientific literature and information to decide the treatment
- Participate and involve in professional bodies
- Self assessment & willingness to update the knowledge & skills from time to time
- Involvement in simple research projects
- Minimum computer proficiency to enhance knowledge and skills
- Refer patients for consultation and specialised treatment
- Basic study of forensic odontology and geriatric dental problems

## **Practice Management**

Evaluate practice location, population dynamics & reimbursement mechanism Co-ordinate & supervise the activities of allied dental health personnel

Maintain all records

Implement & monitor infection control and environmental safety programmes

Practice within the scope of one's competence

## **Communication & Community Resources**

Assess patients goals, values and concerns to establish rapport and guide patient care Able to communicate freely, orally and in writing with all concerned Participate in improving the oral health of the individuals through community activities.

## **Patient Care - Diagnosis**

Obtaining patient's history in a methodical way

Performing thorough clinical examination

Selection and interpretation of clinical, radiological and other diagnostic information

Obtaining appropriate consultation

Arriving at provisional, differential and final diagnosis

## **Patient Care - Treatment Planning**

Integrate multiple disciplines into an individual comprehensive sequence treatment plan using diagnostic and prognostic information

Ability to order appropriate investigations

## **Patient Care - Treatment**

Recognition and initial management of medical emergencies that may occur during dental treatment

Perform basic cardiac life support Management of

pain including post operative Administration of all

forms of local anaesthesia Administration of intra

muscular and venous injections

Prescription of drugs, pre operative, prophylactic and therapeutic

Requirements Uncomplicated extraction of teeth

Transalveolar extractions and removal of simple impacted teeth

Minor oral surgical procedures

Management of oro-facial infections

Simple orthodontic appliance therapy

Taking, processing and interpretation of various types of intra oral radiographs

Various kinds of restorative procedures using different materials available

Simple endodontic procedures

Removable and fixed prosthodontics

Various kinds of periodontal therapy

## **ORAL MEDICINE & RADIOLOGY**

- Ø Able to identify precancerous and cancerous lesions of the oral cavity and refer to the concerned speciality for their management.
- Ø Should have an adequate knowledge about common laboratory investigations and interpretation of their results.
- Ø Should have adequate knowledge about medical complications that can arise while treating systemically compromised patients and take prior precautions/ consent from the concerned medical specialist.
- Ø Have adequate knowledge about radiation health hazards, radiation safety and protection.

- Ø Competent to take intra-oral radiographs and interpret the radiographic findings
- Ø Gain adequate knowledge of various extra-oral radiographic procedures, TMJ radiography and sialography.
- Ø Be aware of the importance of intra- and extra-oral radiographs in forensic identification and age estimation.
- Ø Should be familiar with jurisprudence, ethics and understand the significance of dental records with respect to law.

#### **PAEDIATRIC & PREVENTIVE DENTISTRY**

- Ø Able to instill a positive attitude and behaviour in children towards oral health and understand the principles of prevention and preventive dentistry right from birth to adolescence.
- Ø Able to guide and counsel the guardian/parents with regard to various treatment modalities including different facets of preventive dentistry.
- Ø Able to treat dental diseases occurring in the child patient.
- Ø Able to manage physically and mentally challenged/disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.

#### **ORTHODONTICS & DENTOFACIAL ORTHOPAEDICS**

- Ø Understand about normal growth and development of facial skeleton and dentition.
- Ø Pinpoint aberrations in growth process both dental and skeletal and plan necessary treatment.
- Ø Diagnose the various categories of malocclusion.
- Ø Able to motivate and explain to the patient (and parent or guardian) about the necessity of treatment.
- Ø Plan and execute preventive orthodontics (space maintainers or space regainers)
- Ø Plan and execute interceptive orthodontics (habit breaking appliances)
- Ø Manage treatment of simple malocclusion such as anterior spacing using removable appliances.
- Ø Handle delivery and activation of removable orthodontic appliances.
- Ø Diagnose and appropriately refer patients with complex malocclusion to the specialist

#### **PERIODONTOLOGY**

- Ø Diagnose the patients periodontal problem, plan and perform appropriate periodontal treatment.
- Ø Competent to educate and motivate the patient.
- Ø Competent to perform thorough oral prophylaxis, subgingival scaling, root planning and minor periodontal surgical procedures.
- Ø Give proper post treatment instructions and do periodic recall and evaluation
- Ø Familiar with concepts of osseointegration and basic surgical aspects of implantology

#### **PROSTHODONTICS AND CROWN & BRIDGE**

- Ø Able to understand and use various dental materials.
- Ø Competent to carry out treatment of conventional complete and partial removable dentures and fabricate fixed partial dentures.
- Ø Able to carry out treatment of routine prosthodontic procedures.
- Ø Familiar with the concept of osseointegration and the value of implant-supported Prosthodontic procedures

### **CONSERVATIVE DENTISTRY AND ENDODONTICS**

- Ø Competent to diagnose all carious lesions.
- Ø Competent to perform Class I and Class II cavities and their restoration with amalgam.
- Ø Restore class V and Class III cavities with glass ionomer cement.
- Ø Able to diagnose and appropriately treat pulpally involved teeth (pulp capping procedures).
- Ø Able to perform RCT for anterior teeth.
- Ø Competent to carry out small composite restorations.
- Ø Understand the principles of aesthetic dental procedures

### **ORAL & MAXILLOFACIAL SURGERY**

- Ø Able to apply the knowledge gained in the basic medical and clinical subjects in the management of patients with surgical problems.
- Ø Able to diagnose, manage and treat patients with basic oral surgical problems.
- Ø Have abroad knowledge of maxillofacial surgery and oral implantology.
- Ø Should be familiar with legal, ethical and moral issues pertaining to the patient care and communication skills.
- Ø Should have acquired the skill to examine any patient with an oral surgical problem in an orderly manner.
- Ø Understand and practice the basic principles of asepsis and sterilisation
- Ø Should be competent in the extraction of the teeth under both local and general anaesthesia.
- Ø Competent to carry out certain minor oral surgical procedure under LA like trans-alveolar extraction, frenectomy, dento alveolar procedures, simple impaction, biopsy, etc.
- Ø Competent to assess, prevent and manage common complications that arise during and after minor oral surgery.
- Ø Able to provide primary care and manage medical emergencies in the dental office.
- Ø Familiar with the management of major oral surgical problems and principles involved in in-patient management.

### **PUBLIC HEALTH DENTISTRY**

- Ø Apply the principles of health promotion and disease prevention
- Ø Have knowledge of the organisation and provision of health care in community and in the hospital service
- Ø Have knowledge of the prevalence of common dental conditions in India.
- Ø Have knowledge of community based preventive measures
- Ø Have knowledge of the social, cultural and environmental factors which contribute to health or illness.
- Ø Administer oral hygiene instructions, topical fluoride therapy and fissure sealing.
- Ø Educate patients about the aetiology and prevention of oral disease and encourage them to assure responsibility for their oral health.



**MINIMUM WORKING HOURS FOR EACH SUBJECT OF STUDY  
(B.D.S COURSE)**

**IB.D.S**

Subject	Lecture Hours	Practical Hours	Clinical Hours	Clinical Hours
General Human Anatomy Including Embryology, Osteology and Histology	100	175		175
General Human Physiology	120	60		60
Biochemistry	70	60		60
Dental Anatomy Embryology, and oral Histology	105	250		250
Dental materials	20	40		40
Preclinical Prosthodontics & Crown & Bridge		100		100
<b>Total</b>	<b>415</b>	<b>685</b>		<b>685</b>

**IIB.D.S**

Subject	Lecture Hours	Practical Hours	Clinical Hours	Clinical Hours
General & Dental Pharmacology and therapeutics	70	20		90
General Pathology	55	55		110
Microbiology	65	50		115
Dental Materials	60	200		260
Oral Pathology and Oral Microbiology	25	50		75
Pre Clinical Prosthodontics & Crown & Bridge	25	200		225
Pre Clinical Conservative Dentistry	25	200		225
<b>Total</b>	<b>325</b>	<b>775</b>		<b>1100</b>

**III B.D.S**

Subject	Lecture Hours	Practical Hours	Clinical Hours	Clinical Hours
General Medicine	60		90	150
General Surgery	60		90	150
Oral Pathology and Oral Microbiology	120	80		200
Oral Medicine and Radiology	20		70	90
Paediatric and Preventive Dentistry	20		70	90
Orthodontics & Dentofacial Orthopaedics	20		70	90
Periodontology	30		70	100
Oral & Maxillofacial Surgery	20		70	90
Conservative Dentistry & Endodontics	30		70	100
Prosthodontics and Crown & Bridge	30		70	100
Public Health Dentistry	30		70	100
<b>Total</b>	<b>440</b>	<b>80</b>	<b>740</b>	<b>1260</b>

**IV BDS (Part -I)**

Subject	Lecture Hours	Practical Hours	Clinical Hours	Clinical Hours
Oral Medicine and Radiology	45		100	145
Orthodontics & Dentofacial Orthopaedics	30		100	130
Periodontology	50		100	150
Public Health Dentistry	60		200	260
<b>Total</b>	<b>185</b>		<b>500</b>	<b>685</b>

**IV BDS (Part -II)**

Subject	Lecture Hours	Practical Hours	Clinical Hours	Clinical Hours
Oral & Maxillofacial Surgery	50		200	250
Conservative Dentistry & Endodontics	80		300	380
Prosthodontics and Crown & Bridge	80		300	380
Paediatric & Preventive Dentistry	45		100	145
<b>Total</b>	<b>255</b>		<b>900</b>	<b>1155</b>

**Note :**

- Behavioural Sciences Classes shall commence in 1<sup>st</sup> Year.
- Forensic odontology shall be covered in the department of Oral pathology and Oral Medicine during 3<sup>rd</sup> Year.

- Aesthetic Dentistry shall be covered in the Departments of Conservative Dentistry and Prosthodontics during final Year.
- Oral Implantology shall be covered in the Department of Maxillofacial Surgery, Prosthodontics & Crown & Bridge and Periodontology during 4<sup>th</sup> and 5<sup>th</sup> Years.
- Ethics and dental jurisprudence shall be covered in Public Health Dentistry in 4<sup>th</sup> and 5<sup>th</sup> years.
- Electives / Research work should be encouraged during the last year lasting for a period of atleast one month to be spent in a different dental institution in India / overseas.
- All the institutions shall compulsorily make arrangements for Comprehensive oral health care training for atleast 3 months during last Year. The department of Public Health Dentistry may be utilised in case the institution does not have a separate department for this purpose. Qualified faculty members from the departments of Prosthodontics, Conservative Dentistry and Periodontics should guide the students along with faculty of Public Health Dentistry Department.
- The minimum working hours indicated each year of study does not include one month of university examination.

# SYLLABUS OF STUDY

## 1. HUMAN ANATOMY, EMBRYOLOGY, HISTOLOGY & MEDICAL GENETICS

### A) GOAL

The students should gain the knowledge and insight into the functional anatomy of the normal human head and neck, functional histology and an appreciation of the genetic basis of inheritance and disease, and the embryological development of clinically important structures, so that relevant anatomical & scientific foundations are laid down for the clinical years of the BDS course.

### B) OBJECTIVES:

#### a) KNOWLEDGE & UNDERSTANDING :

At the end of the 1<sup>st</sup> year BDS course in Anatomical Sciences the undergraduate student is expected to:

1. Know the normal disposition of the structures in the body while clinically examining a patient and while conducting clinical procedures.
2. Know the anatomical basis of disease and injury.
3. Know the microscopic structure of the various tissues, a pre-requisite for understanding of the disease processes.
4. Know the nervous system to locate the site of lesions according to the sensory and or motor deficits encountered.
5. Have an idea about the basis of abnormal development, critical stages of development, effects of teratogens, genetic mutations and environmental hazards.
6. Know the sectional anatomy of head neck and brain to read the features in radiographs and pictures taken by modern imaging techniques.
7. Know the anatomy of cardio-pulmonary resuscitation.

#### b) SKILLS

1. To locate various structures of the body and to mark the topography of the living anatomy.
2. To identify various tissues under microscope.
3. To identify the features in radiographs and modern imaging techniques.
4. To detect various congenital abnormalities.

### C INTEGRATION

By emphasising on the relevant information and avoiding unwanted details, the anatomy taught integrally with other basic sciences & clinical subjects not only keeps alive in the learner curious but also lays down the scientific foundation for making a better doctor, a benefit to the society.

This insight is gained in a variety of ways :

- 1) Lectures & small group teaching
- 2) Demonstrations
- 3) Dissection of the human cadaver
- 4) Study of dissected specimens
- 5) Osteology
- 6) Surface anatomy on living individual
- 7) Study of radiographs & other modern imaging techniques.
- 8) Study of Histology slides.
- 9) Study of embryology models
- 10) Audio-visual aids

Throughout the course, particular emphasis is placed on the functional correlation, clinical application & on integration with teaching in other bio dental disciplines.

#### **D) AN OUTLINE OF THE COURSE CONTENT**

1. General anatomy : Introduction of anatomical terms and brief outline of various systems of the body.
2. Regional anatomy of head & neck with osteology of bones of head & neck, with emphasis on topics of dental importance.
3. General disposition of thoracic, abdominal & pelvic organs.
4. The regional anatomy of the sites of intramuscular & intra vascular injections, & lumbar puncture.
5. General embryology & systemic embryology with respect to development of head & neck.
6. Histology of basic tissues and of the organs of gastrointestinal, respiratory, Endocrine, excretory systems & gonads.
7. Medical genetics.

#### **E) FURTHER DETAILS OF THE COURSE**

##### **I. INTRODUCTION TO :**

1. Anatomical terms.
2. Skin, superficial fascia & deep fascia
3. Cardiovascular system, portal system collateral circulation and arteries.
4. Lymphatic system, regional lymph nodes
5. Osteology - Including ossification & growth of bones
6. Myology - Including types of muscle tissue & innervation.
7. Syndesmology - Including classification of Joints.
8. Nervous system

##### **II. HEAD & NECK :**

01. Scalp, face & temple, lacrimal apparatus
02. Neck - Deep fascia of neck, posterior triangle, suboccipital triangle, anterior triangle, anterior median region of the neck, deep structures in the neck.
03. Cranial cavity - Meninges, parts of brain, ventricles of brain, dural venous sinuses, cranial nerves attached to the brain, pituitary gland.
04. Cranial nerves - III, IV, V, VI, VII, IX, XII in detail.
05. Orbital cavity - Muscles of the eye ball, supports of the eye ball, nerves and vessels in the orbit.
06. Parotid gland.
07. Temporomandibular joint, muscles of mastication, infratemporal fossa, pterygo-palatine fossa.
08. Submandibular region
09. Walls of the nasal cavity, middle ear, paranasal air sinuses
10. Palate
11. Oral cavity, Tongue
12. Pharynx (palatine tonsil and the auditory tube)
13. Larynx.
14. OSTEOLOGY - Foetal skull, adult skull, individual bones of the skull, hyoid bone and cervical vertebrae,
15. Parasympathetic ganglia.

##### **III. THORAX : Demonstration on a dissected specimen of**

1. Thoracic wall
2. Heart chambers
3. Coronary arteries
4. Pericardium
5. Lungs - surfaces; pleural cavity
6. Diaphragm

#### IV. ABDOMEN : Demonstration on a dissected specimen of

1. Peritoneal cavity
2. Organs in the abdominal & pelvic cavity.

#### V. CLINICAL PROCEDURES :

- a) Intramuscular injections : Demonstration on a dissected specimen and on a living person of the following sites of injection.
  1. Deltoid muscle and its relation to the axillary nerve and radial nerve.
  2. Gluteal region and the relation of the sciatic nerve.
  3. Vastus lateralis muscle.
- b) Intravenous injections & venesection: Demonstration of veins in the dissected specimen and on a living person. 1. Median cubital vein, 2. Cephalic vein, 3. Basilic vein, 4. Long saphenous vein.
- c) Arterial pulsations : Demonstration of arteries on a dissected specimen and feeling of pulsation of the following arteries on a living person.
  1. Superficial temporal, 2. Facial, 3. Carotid, 4. Axillary, 5. Brachial, 6. Radial, 7. Ulnar, 8. Femoral, 9. Popliteal, 10. Dorsalispedis
- d) Lumbar puncture: Demonstration on a dissected specimen of the spinal cord, cauda equina & epidural space and the inter vertebral space between L4 & L5 .

#### VI. EMBRYOLOGY :

Oogenesis, Spermatogenesis, Fertilisation, Placenta, Primitive streak, Neural crest, Bilaminar and trilaminar embryonic disc, Intra embryonic mesoderm - formation and fate, notochord formation & fate, Pharyngeal arches, pouches & clefts, Development of face, tongue, palate, thyroid gland, pituitary gland, salivary glands, and anomalies in their development, tooth development in brief.

#### VII. HISTOLOGY :

The Cell :

Basic tissues - Epithelium, Connective tissue including cartilage and bone, Muscle Tissue, Nervous tissue : Peripheral nerve, optic nerve, sensory ganglion, motor ganglion, Skin

Classification of Glands

Salivary glands (serous, mucous and mixed gland), Blood vessels, Lymphoid tissue Tooth, lip, tongue, hard palate, oesophagus, stomach, duodenum, ileum, colon, vermiform appendix Liver, Pancreas, Lung, Trachea, Epiglottis, Thyroid gland , para thyroid gland , supra renal gland and pituitary gland, Kidney, Ureter, Urinary bladder, Ovary and Testis.

#### VIII. MEDICAL GENETICS :

Mitosis, meiosis, Chromosomes, gene structure, Mendelism, modes of inheritance, Genetic disorders – Turner Syndrome, Klinefelter Syndrome & Down Syndrome

#### RECOMMENDED BOOKS :

1. SNELL (Richard S.) Clinical Anatomy for Medical Students, Ed.5, Little Brows & Company, Boston.
2. RJ LAST'S Anatomy - McMinn
3. ROMANES (G.J.) Cunningham Manual of Practical Anatomy : Head & Neck Ed. 15, Oxford Medical publication.
4. INDERBIR SINGH - Text Book of Histology
5. INDERBIR SINGH – Text Book of Embryology
6. AMES E ANDERSON, Grant's Atlas of Anatomy. Williams & Wilkins.
7. EMERY – Medical Genetics
8. A K DUTTA / INDERBIR SINGH - Text Book Anatomy – Head & Neck

## **2. HUMAN PHYSIOLOGY**

### **A) GOAL**

The broad goal of teaching undergraduate students Human Physiology is to provide the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and disease.

### **OBJECTIVES**

#### a) KNOWLEDGE

At the end of the course, the student will be able to:

1. Explain the normal functioning of all the organ systems and their interactions for well co-ordinated total body function.
2. Assess the relative contribution of each organ system towards the maintenance of the milieu interior.
3. List the physiological principles underlying the pathogenesis and treatment of disease.

#### b) SKILLS

At the end of the course, the student shall be able to :

1. Conduct experiments designed for the study of physiological phenomena.
2. Interpret experimental and investigative data
3. Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

#### c) INTEGRATION

At the end of the integrated teaching the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

### **B) COURSE CONTENTS THEORY**

#### 1. GENERAL PHYSIOLOGY

1. Homeostasis: Basic concept, feedback mechanisms
2. Structure of cell membrane, transport across cell membrane
3. Membrane potentials

#### 2. BLOOD;

Composition & functions of blood.

Specific gravity, Packed cell volume, factors affecting & methods of determination.

Plasma proteins - Types, concentration, functions & variations.

Erythrocyte - Morphology, functions & variations. Erythropoiesis & factors affecting erythropoiesis.

ESR- Methods of estimation, factors affecting, variations & significance.

Haemoglobin - Normal concentration, method of determination & variation in concentration.

Blood Indices - MCV, MCH, MCHC - definition, normal values, variation.

Anaemia - Definition, classification, life span of RBC's, destruction of RBC's, formation & fate of bile pigments, Jaundice - types.

Leucocytes : Classification, number, percentage, distribution morphology, properties, functions & variation. Role of lymphocytes in immunity, leucopoiesis life span & fate of leucocytes.

Thrombocytes - Morphology, number, variations, function & thrombopoiesis.

Haemostasis - Role of vasoconstriction, platelet plug formation in haemostasis, coagulation factors, intrinsic & extrinsic pathways of coagulation, clot retraction.

Tests of haemostatic function, platelet count, clotting time, bleeding time, prothrombin time - normal values, method & variations. Anticoagulants - mechanism of action. Bleeding disorders.

Blood groups : ABO & Rh system, method of determination, importance, Indications & dangers of blood transfusion, blood substitutes.

Blood volume : Normal values, variations.

Body fluids : distribution of total body water, intracellular & extracellular compartments, major anions & cations in intra and extra cellular fluid.

Tissue fluids & lymph : Formation of tissue fluid, composition, circulation & functions of Lymph. Oedema - causes.

Functions of reticulo endothelial system.

### 3. MUSCLE AND NERVE

Classification of nerves, structure of skeletal muscle - Molecular mechanism of muscle contraction, neuromuscular transmission. Properties of skeletal muscle. Structure and properties of cardiac muscle & smooth muscle.

### 4. DIGESTIVE SYSTEM :

Introduction to digestion : General structure of G.I. tract, Innervation.

Salivary glands : Structure of salivary glands, composition, regulation of secretion & functions of saliva. Stomach : Composition and functions of gastric juice, mechanism and regulation of gastric secretion. Exocrine Pancreas - Structure, composition of pancreatic juice, functions of each component, regulation of pancreatic secretion.

Liver : structure, composition of bile, functions of bile, regulation of secretion -

Gall bladder : structure, functions.

Small intestine - Composition, functions & regulation of secretion of intestinal juice.

Large intestine - Functions.

Motor functions of GIT: Mastication, deglutition, gastric filling & emptying, movements of small and large intestine, defecation.

### 5. EXCRETORY SYSTEM :

Structure & functions of kidney, functional unit of kidney & functions of different parts.

Juxta glomerular apparatus, renal blood flow.

Formation of Urine : Glomerular filtration rate - definition, determination, normal values, factors influencing G.F.R. Tubular reabsorption - Reabsorption of sodium, glucose, water & other substances. Tubular secretion - secretion of urea, hydrogen and other substances.

Mechanism of concentration & dilution of urine.

Role of kidney in the regulation of pH of the blood.

Micturition : anatomy & innervation of Urinary bladder, mechanism of micturition & abnormalities.

### 6. BODY TEMPERATURE & FUNCTIONS OF SKIN

### 7. ENDOCRINOLOGY

General endocrinology - Enumeration of endocrine glands & hormones - General functions; of endocrine system, chemistry, mechanism of secretion, transport, metabolism, regulation of secretion of hormones.

Hormones of anterior pituitary & their actions, hypothalamic regulation of anterior pituitary function. Disorders of secretion of anterior pituitary hormones.

Posterior pituitary : Functions, regulation & disorders of secretion.

Thyroid : Histology, synthesis, secretion & transport of hormones, actions of hormones, regulation of secretion & disorders, Thyroid function tests.

Adrenal cortex & Medulla -synthesis, secretion, action, metabolism, regulation of secretion of hormones & disorders. u''

Other hormones - Angiotensin, A.N.F. etc



## 8. REPRODUCTION

Sex differentiation, Physiological anatomy of male and female sex organs  
Female reproductive system : Menstrual cycle, functions of ovary, actions of oestrogen & Progesterone, control of secretion of ovarian hormones, tests for ovulation, fertilisation, implantation, maternal changes during pregnancy, pregnancy tests & parturition. Lactation, composition of milk, factors controlling lactation, milk ejection, reflex, Male reproductive system : spermatogenesis, semen and contraception.

## 9. CARDIO VASCULAR SYSTEM

Functional anatomy and innervation of heart Properties of cardiac muscle

Origin & propagation of cardiac impulse and heart block.

Electrocardiogram - Normal electrocardiogram. Two changes in ECG in myocardial infarction.

Cardiac cycle - Phases, Pressure changes in atria, ventricles & aorta.

Volume changes in ventricles. Jugular venous pulse, arterial pulse.

Heart sounds : Mention of murmurs.

Heart rate : Normal value, variation & regulation.

Cardiac output: Definition, normal values, one method of determination, variation, factors affecting heart rate and stroke volume.

Arterial blood pressure: Definition, normal values & variations, determinants, regulation & measurement of blood pressure.

Coronary circulation.

Cardio vascular homeostasis - Exercise & posture.

## 10. RESPIRATORY SYSTEM ;

Physiology of Respiration : External & internal respiration.

Functional anatomy of respiratory passage & lungs.

Respiratory movements: Muscles of respiration, Mechanism of inflation & deflation of lungs. Intra pleural & intra pulmonary pressures & their changes during the phases of respiration. Mechanics of breathing - surfactant, compliance & work of breathing.

Spirometry: Lung volumes & capacities definition, normal values, significance, factors affecting vital capacity, variations in vital capacity, FEV & its variations.

Pulmonary ventilation - alveolar ventilation & dead space - ventilation.

Composition of inspired air, alveolar air and expired air.

Exchange of gases: Diffusing capacity, factors affecting it.

Transport of Oxygen & carbon dioxide in the blood.

Regulation of respiration - neural & chemical.

Hypoxia, cyanosis, dyspnoea, periodic breathing.

Artificial respiration, pulmonary function tests.

## 11. CENTRAL NERVOUS SYSTEM

1. Organisation of central nervous system
2. Neuronal organisation at spinal cord level
3. Synapse receptors, reflexes, sensations and tracts
4. Physiology of pain
5. Functions of cerebellum, thalamus, hypothalamus and cerebral cortex.
6. Formation and functions of CSF
7. Autonomic nervous system

## 12. SPECIAL SENSES

Fundamental knowledge of vision, hearing, taste and smell.

## **PRACTICALS**

The following list of practical is minimum and essential. All the practical have been categorised as procedures and demonstrations. The procedures are to be performed by the students during practical classes to acquire skills. All the procedures are to be included in the University practical examination. Those categorised as demonstrations are to be shown to the students during practical classes. However these demonstrations would not be included in the University examinations but question based on this would be given in the form of charts, graphs and calculations for interpretation by the students.

## **PROCEDURES**

1. Enumeration of Red Blood Cells
2. Enumeration of White Blood Cells
3. Differential leucocyte counts
4. Determination of Haemoglobin
5. Determination of blood group
6. Determination of bleeding time and clotting time
7. Examination of pulse
8. Recording of blood pressure.

## **DEMONSTRATION :**

1. Determination of packed cell volume and erythrocyte sedimentation rate
2. Determination of specific gravity of blood
3. Determination of erythrocyte fragility
4. Determination of vital capacity and timed vital capacity
5. Skeletal muscle experiments.

Study of laboratory appliances in experimental physiology. Frog's gastrocnemius sciatic preparation. Simple muscle curve, effects of two successive stimuli, effects of increasing strength of stimuli, effects of temperature, genesis of fatigue and tetanus. Effect of after load and free load on muscle contraction, calculation of work done.

6. Electrocardiograph: Demonstration of recording of normal Electro cardiogram
7. Clinical examination of cardiovascular and respiratory system.

## **TEXT BOOKS :**

- Guyton - Text book of Physiology
- Ganong - Review of Medical Physiology
- Vander - Human physiology
- Choudhari - Concise Medical Physiology
- Chaterjee - Human Physiology
- A.K. Jain - Human Physiology for BDS students

## **BOOKS FOR REFERENCE :**

- i) Berne & Levey; Physiology
- ii) West-Best & Taylor's, Physiological basis of Medical Practice

## **EXPERIMENTAL PHYSIOLOGY :**

- i) Rannade; Practical Physiology
- ii) Ghai; a text book of practical physiology
- iii) Hutchison's; Clinical Methods

## BIOCHEMISTRY

### AIMS AND SCOPE OF THE COURSE IN BIOCHEMISTRY

The major aim is to provide a sound but crisp knowledge on the biochemical basis of the life processes relevant to the human system and to dental/medical practice. The contents should be organised to build on the already existing information available to the students in the pre-university stage and reorienting. A mere rehash should be avoided.

The chemistry portion should strive towards providing information on the functional groups, hydrophobic and hydrophilic moieties and weak valence forces that organise macromolecules. Details on structure need not be emphasised.

Discussion on metabolic processes should put emphasis on the overall change, interdependence and molecular turnover. While details of the steps may be given, the student should not be expected to memorise them. An introduction to biochemical genetics and molecular biology is a must but details should be avoided. The exposure to antivitamins, antimetabolites and enzyme inhibitors at this stage, will provide a basis for the future study of medical subjects. An overview of metabolic regulation is to be taught by covering hormonal action, second messengers and regulation of enzyme activities. Medical aspects of biochemistry should avoid describing innumerable functional tests, most of which are not in vogue. Cataloguing genetic disorders under each head of metabolism is unnecessary. A few examples which correlate genotype change to functional changes should be adequate.

At the end of the course the student would be able to acquire a useful core of information, which can be retained for a long time. Typical acid tests can be used to determine what is to be taught or what is to be learnt. A few examples are given below.

1. Need to know the structure of cholesterol. Should know why it cannot be carried free in plasma.
2. Mutarotation may be taught. Student should know why amylase will not hydrolyse cellulose.
3. Need not know the details of alpha - helix and beta - pleats in proteins.  
Should know why haemoglobin is globular and keratin is fibrous.
4. Need not know mechanism of oxidative phosphorylation.  
Should know more than 90 % of ATP is formed by this process.
5. Need not know details of the conversion of pepsinogen to pepsin.  
Should know hydrochloric acid cannot break a peptide bond at room temperature.
6. Need not remember the steps of glycogenesis.  
Should know that excess intake of carbohydrate will not increase glycogen level in liver or muscle.
7. Need not know about urea or creatinine clearance tests.  
Should know the basis of increase of urea and creatinine in blood in renal insufficiency.
8. Need not know the structure of insulin.  
Should know why insulin level in circulation is normal in most cases of maturity onset diabetes.
9. Need not know the structural details of ATP.  
Should know why about 10 g of ATP in the body at any given time meets all the energy needs.
10. Need not know the mechanism of action of prolylhydroxylase.  
Should know why the gum bleeds in scurvy.
11. Need not know the structure of Vitamin K.  
Should know the basis of internal bleeding arising due to its deficiency.
12. Need not remember the structure of HMGCoA.  
Should know why it does not lead to increased cholesterol synthesis in starvation.

## **BIOCHEMISTRY AND NUTRITION**

### **1. CHEMISTRY OF BIOORGANIC MOLECULES**

Carbohydrates : Definition, biological importance and classification. Monosaccharides - Isomerism, anomerism. Sugar derivatives, Disaccharides. Polysaccharides. Structures of starch and glycogen.

Lipids : Definition, biological importance and classification. Fats and fatty acids. Introduction to compound lipids. Hydrophobic and hydrophilic groups. Cholesterol. Bile salts. Micelle. Bimolecular leaflet.

Proteins : Biological importance.

Aminoacids : Classification. Introduction to peptides.

Proteins : Simple and conjugated; globular and fibrous. Charge properties. Buffer action .

Introduction to protein conformation . Denaturation.

Nucleic acids : Building units . Nucleotides. Outline structure of DNA and RNA.

High energy compounds : ATP, Thioesters, Enol phosphates.

### **2. MACRONUTRIENTS AND DIGESTION**

Energy needs: Basal metabolic rate. Dietary carbohydrates, fibres. Dietary lipids, essential fatty acids. Nitrogen balance. Essential amino acids. Protein quality and requirement (methods for evaluation of protein quality to be excluded). Protein calorie malnutrition. Balanced diet.

Enzymatic hydrolysis of dietary carbohydrates. Mechanism of uptake of monosaccharides. Digestion and absorption of triacylglycerols. Enzymatic hydrolysis of dietary proteins and uptake of amino acids.

### **3. MICRONUTRIENTS**

Vitamins : Definition, classification, daily requirement, sources and deficiency symptoms. Brief account of water-soluble vitamins with biochemical functions. Vitamins A functions including visual process. Vitamin D and its role in calcium metabolism. Vitamin E. Vitamin K and gamma carboxylation. Introduction to antivitamins and hypervitaminosis.

Minerals : Classification, daily requirement. Calcium and phosphate: sources, uptake, excretion, function. Serum calcium regulation. Iron: sources, uptake and transport. Heme and nonheme iron functions; deficiency. Iodine: Brief introduction to thyroxine synthesis. General functions of thyroxine. Fluoride : function, deficiency and excess. Indications of role of other minerals.

### **4. ENERGY METABOLISM**

Overview : Outlines of glycolysis, pyruvate oxidation and citric acid cycle. Beta oxidation of fatty acids. Electron transport chain and oxidative phosphorylation. Ketone body formation and utilisation. Introduction to glycogenesis, glycogenolysis, fatty acid synthesis, lipogenesis and lipolysis. Gluconeogenesis. Lactate metabolism . Protein utilisation for energy. Glucogenic and ketogenic amino acids. Integration of metabolism.

### **5. SPECIAL ASPECTS OF METABOLISM**

Importance of pentose phosphate pathway. Formation of glucuronic acid. Outlines of cholesterol synthesis and breakdown. Ammonia metabolism. Urea formation. Phosphocreatine formation. Transmethylation. Amines. Introduction to other functions of amino acids including one carbon transfer. Detoxication : Typical reactions. Examples of toxic compounds. Oxygen toxicity

### **6. BIOCHEMICAL GENETICS AND PROTEIN SYNTHESIS**

Introduction to nucleotides; formation and degradation. DNA as genetic material. Introduction to replication and transcription. Forms and functions of RNA. Genetic code and mutation. Outline of translation process. Antimetabolites and antibiotics interfering in replication, transcription and translation. Introduction to cancer, viruses and oncogenes.

## 7. ENZYME AND METABOLIC REGULATION

Enzymes : Definition, classification, specificity and active site. Cofactors. Effect of pH, temperature and substrate concentration. Introduction to enzyme inhibitors, proenzymes and isoenzymes. Introduction to allosteric regulation, covalent modification and regulation by induction/repression.

Overview of hormones. Introduction to second messengers, cyclic AMP, calcium ion, inositol triphosphate. Mechanism of action of steroid hormones, epinephrine, glucagon and insulin in brief. Acid base regulation. Electrolyte balance.

## 8. STRUCTURAL COMPONENTS AND BLOOD PROTEINS

Connective tissue: Collagen and elastin. Glycosaminoglycans. Bone structure. Structure of membranes. Membrane associated processes in brief. Exocytosis and endocytosis. Introduction to cytoskeleton. Myofibril and muscle contraction in brief.

Haemoglobin: functions. Introduction to heme synthesis and degradation. Plasma proteins: classification and separation. Functions of albumin. A brief account of immunoglobulins. Plasma lipoproteins: Formation, function and turnover.

## 9. MEDICAL BIOCHEMISTRY

Regulation of blood glucose. Diabetes mellitus and related disorders. Evaluation of glycemic status. Hyperthyroidism and hypothyroidism: Biochemical evaluation. Hyperlipoproteinemias and atherosclerosis, Approaches to treatment. Jaundice: Classification and evaluation. Liver function tests: Plasma protein pattern, serum enzymes levels. Brief introduction to kidney function tests and gastric function tests. Acid base imbalance. Electrolyte imbalance: evaluation. Gout. Examples of genetic disorders including lysosomal storage disorders, glycogen storage disorders, glucose 6- phosphate dehydrogenase deficiency, hemoglobinopathies, inborn errors of amino acid metabolism and muscular dystrophy ( one or two examples with biochemical basis will be adequate). Serum enzymes in diagnosis.

PRACTICALS : Contact hours 50

1. Qualitative analysis of carbohydrates
2. Colour reactions of proteins and amino acids
3. Identification of nonprotein nitrogen substance
4. Normal constituents of urine
5. Abnormal constituents of urine
6. Analysis of saliva including amylase
7. Analysis of milk Quantitative estimations
8. Titrable acidity and ammonia in urine
9. Free and total acidity in gastric juice
10. Blood glucose estimation
11. Serum total protein estimation
12. Urine creatinine estimation Demonstration
13. Paper electrophoresis charts/clinical data evaluation
14. Glucose tolerance test profiles
15. Serum lipid profiles
16. Profiles of hypothyroidism and hyperthyroidism
17. Profiles of hyper and hypoparathyroidism
18. Profiles of liver function
19. Urea, uric acid creatinine profile in kidney disorders
20. Blood gas profile in acidosis/ alkalosis

#### RECOMMEDED BOOKS :

1. Concise text book of Biochemistry (3<sup>rd</sup> edition) 2001, T.N. Pattabiraman
2. Essentials of Biochemistry -Satyanarayana
3. Biochemistry for Dental Students- Harbans Lal

### **3. DENTAL ANATOMY, EMBRYOLOGY AND ORAL HISTOLOGY & ORAL PHYSIOLOGY**

#### INTRODUCTION

Dental Anatomy including Embryology and Oral Histology - a composite of basic Dental Sciences & their clinical applications

#### SKILLS

The student should acquire basic skills in :

1. Carving of crowns of permanent teeth in wax.
2. Microscopic study of oral tissues.
3. Identification of Deciduous & Permanent teeth.
4. Age estimation by patterns of teeth eruption from plaster casts of different age groups.

#### OBJECTIVES

After a course on Dental Anatomy including Embryology and Oral Histology,

1. The student is expected to appreciate the normal development, morphology, structure & functions of oral tissues & variations in different pathological/non-pathological states.
2. The student should understand the histological basis of various dental treatment procedures and physiologic ageing process in the dental tissues.
3. The students must know the basic knowledge of various research methodologies.

#### I. TOOTH MORPHOLOGY

1. Introduction to tooth morphology :
  - § Human dentition, types of teeth, & functions, Palmer's & Binomial notation systems, tooth surfaces, their junctions - line angles & point angles, definition of terms used in dental morphology, geometric concepts in tooth morphology, contact areas & embrasures - Clinical significance.
2. Morphology of permanent teeth :
  - § Description of individual teeth, along with their endodontic anatomy & including a note on their chronology of development, differences between similar class of teeth & identification of individual teeth.
  - § Variations & Anomalies commonly seen in individual teeth.
  - § Clinical application of dental anatomy, physiology and occlusion.
3. Morphology of Deciduous teeth :
  - § Generalised differences between Deciduous & Permanent teeth.
  - § Description of individual deciduous teeth, including their chronology of development, endodontic anatomy, differences between similar class of teeth & identification of individual teeth.
4. Occlusion :
  - § Definition, factors influencing occlusion - basal bone, arch, individual teeth, external & internal forces & sequence of eruption.
  - § Inclination of individual teeth - compensatory curves.
  - § Centric relation & Centric occlusion - protrusive, retrusive & lateral occlusion.
  - § Clinical significance of normal occlusion.
  - § Introduction to & Classification of Malocclusion.

## II. ORAL EMBRYOLOGY

1. Brief review of development of face, jaws, lip, palate & tongue, with applied aspects.
2. Development of teeth :
  - § Epithelial mesenchymal interaction, detailed study of different stages of development of crown, root & supporting tissues of tooth & detailed study of formation of calcified tissues.
  - § Applied aspects of disorders in development of teeth.
3. Eruption of deciduous & Permanent teeth :
  - § Mechanisms in tooth eruption, different theories & histology of eruption, formation of dentogingival junction, role of gubernacular cord in eruption of permanent teeth.
  - § Clinical or Applied aspects of disorders of eruption.
4. Shedding of teeth :
  - § Factors & mechanisms of shedding of deciduous teeth.
  - § Complications of shedding.

## III. ORAL HISTOLOGY

1. Detailed microscopic study of Enamel, Dentine, Cementum & Pulp tissue. Age changes & Applied aspects (Clinical and forensic significance) of histological considerations -Fluoride applications, transparent dentine, dentine hypersensitivity, reaction of pulp tissue to varying insults to exposed dentine ; Pulp calcifications & Hypercementosis.
2. Detailed microscopic study of Periodontal ligament & alveolar bone, age changes, histological changes in periodontal ligament & bone in normal & orthodontic tooth movement, applied aspects of alveolar bone resorption.
3. Detailed microscopic study of Oral Mucosa, variation in structure in relation to functional requirements, mechanisms of keratinisation, clinical parts of gingiva, Dentogingival & Mucocutaneous junctions & lingual papillae. Age changes & clinical considerations
4. Salivary Glands :
  - § Detailed microscopic study of acini & ductal system.
  - § Age changes & clinical considerations.
5. TM Joint :
  - § Review of basic anatomical aspects & microscopic study & clinical considerations.
6. Maxillary Sinus :
  - § Microscopic study, anatomical variations, functions & clinical relevance of maxillary sinus in dental practice.
7. Processing of Hard & soft tissues for microscopic study :
  - § Ground sections, decalcified sections & routine staining procedures.
8. Basic histochemical staining patterns of oral tissues.

## IV. ORAL PHYSIOLOGY

1. Saliva :
  - § Composition of saliva - variations, formation of saliva & mechanisms of secretion, salivary reflexes, brief review of secretomotor pathway, functions, role of saliva in dental caries & applied aspects of hyper & hypo salivation.
2. Mastication :

§ Masticatory force & its measurement - need for mastication, peculiarities of masticatory muscles, masticatory cycle, masticatory reflexes & neural control of mastication.

3. Deglutition :

§ Review of the steps in deglutition, swallowing in infants, neural control of deglutition & dysphagia.

4. Calcium, phosphorous & fluoride metabolism :

§ Source, requirements, absorption, distribution, functions & excretion, clinical considerations, hypo & hypercalcemia & hyper & hypo phosphatemia & fluorosis.

5. Theories of Mineralisation :

§ Definition, mechanisms, theories & their drawbacks.

§ Applied aspects of physiology of mineralisation, pathological considerations - calculus formation.

6. Physiology of Taste :

• Innervation of taste buds & taste pathway, physiologic basis of taste sensation, age changes & applied aspects - taste disorders.

7. Physiology of Speech :

• Review of basic anatomy of larynx & vocal cords.

• Voice production, resonators, production of vowels & different consonants - Role of palate, teeth & tongue.

• Effects of dental prosthesis & appliances on speech & Basic speech disorders.

RECOMMENDED TEXT BOOKS

1. Orban's Oral Histology & Embryology - S.N.Bhaskar

2. Oral Development & Histology - James & Avery

3. Wheeler's Dental Anatomy, Physiology & Occlusion - Major. M.Ash

4. Dental Anatomy - its relevance to dentistry - Woelfel & Scheid

5. Applied Physiology of the mouth - Lavelle

6. Physiology & Biochemistry of the mouth – Jenkins

7. Essentials of Oral Biology – Maji Jose

8. Manual of Oral Histology & Oral Pathology – Colour Atlas & Text - Maji Jose

9. Tenca's Oral Histology - Antonio Nanci

4. **GENERAL PATHOLOGY**

AIM :

At the end of the course the student should be competent to :

Apply the scientific study of disease processes, which result in morphological and functional alterations in cells, tissues and organs to the study of pathology and the practice of dentistry.

OBJECTIVES :

Enabling the student

1. To demonstrate and analyze pathological changes at macroscopically and microscopical levels and explain their observations in terms of disease processes.

2. To Integrate knowledge from the basic sciences, clinical medicine and dentistry in the study of Pathology.

3. To demonstrate understanding of the capabilities and limitations of morphological pathology in its contribution to medicine, dentistry and biological research.



4. To demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes.

## COURSE CONTENT

### A. General Pathology -

#### 1. Introduction to Pathology

Terminologies

The cell in health

The normal cell structure

The cellular functions

#### 2. Aetiology and Pathogenesis of Disease

Cell Injury Types - Congenital

Acquired

Mainly Acquired causes of disease

(Hypoxic injury, chemical injury, physical injury, immunological injury)

#### 3. Degenerations

Amyloidosis

Fatty change

Cloudy swelling

Hyaline change, mucoid degeneration

#### 4. Cell death & Necrosis

Apoptosis

Def, causes, features and types of necrosis

Gangrene - Dry, wet, gas

Pathological Calcifications

(Dystrophic and metastatic)

#### 5. Inflammation

- Definition, causes types, and features

- Acute inflammation

a. The vascular response

b. The cellular response

c. Chemical mediators

d. The inflammatory cells

e. Fate

- Chronic inflammation

Granulomatous inflammation

#### 6. Healing

- Regeneration

- Repair

a) Mechanisms

b) Healing by primary intention

c) Healing by secondary intention

- d) Fracture healing
- e) Factors influencing healing process
- f) Complication

#### 7. Tuberculosis

- Epidemiology
- Pathogenesis (formation of Tubercle)
- Pathological features of Primary and secondary TB
- Complication and fate

#### 8. Syphilis

- Epidemiology
- Types and stages of syphilis
- Pathological features
- Diagnostic criteria
- Oral lesions

#### 9. Typhoid

- Epidemiology
- Pathogenesis
- Pathological features
- Diagnostic criteria

#### 10. Thrombosis

- Definition, pathophysiology
- Formation, Complications & Fate of a thrombus

#### 11. Embolism

- Definition
- Types
- Effects

#### 12. Ischaemia and Infarction

- Definition, etiology, types
- Infarction of various organs

#### 13. Derangements of body fluids

- Oedema - pathogenesis
- Different types

#### 14. Disorders of circulation

- Hyperaemia
- Shock

#### 15. Nutritional Disorders

- Common Vitamin Deficiencies

#### 16. Immunological mechanisms in disease

- Humoral & cellular immunity

- Hypersensitivity & autoimmunity
17. AIDS and Hepatitis.
  18. Hypertension
    - Definition, classification
    - Pathophysiology
    - Effects in various organs
  19. Diabetes Mellitus
    - Def, Classification, Pathogenesis, Pathology in different organs
  20. Adaptive disorders of growth
    - Atrophy & Hypertrophy, Hyperplasia, Metaplasia and Dysplasia
  21. General Aspects of neoplasia
    - a. Definition, terminology, classification
    - b. Differences between benign and malignant neoplasms
    - c. The neoplastic cell
    - d. Metastasis
    - e. Aetiology and pathogenesis of neoplasia, Carcinogenesis
    - f. Tumour biology
    - g. Oncogenes and anti-oncogenes
    - h. Diagnosis
    - i. Precancerous lesions
    - j. Common specific tumours, Squamous papilloma & Carcinoma, Basal cell Carcinoma, Adenoma & Adenocarcinoma, Fibroma & Fibrosarcoma, Lipoma and liposarcoma
  - B. Systemic Pathology –
  22. Anaemias
    - Classification & Lab Diagnosis
    - Iron Deficiency anaemia, Megaloblastic anaemia, Haemolytic anaemias ,
    - Aplastic Anaemia & their Lab investigations
  23. Leukaemias
    - Classification ,Acute and chronic leukaemias, Diagnosis and clinical Features
  24. Diseases of Lymph nodes
    - Hodgkin's disease, Non Hodgkins lymphoma,
  25. Diseases of oral cavity
    - Lichen planus, Stomatitis, Leukoplakia, Squamous cell Carcinoma, Dental caries, Dentigerous cyst, Ameloblastoma
  26. Diseases of salivary glands
    - Normal structure, Sialadenitis, Tumours
  27. Common diseases of Bones
    - Osteomyelitis, Metabolic bone diseases, Bone Tumours, Osteosarcoma, Osteocalstoma, Giant cell Tumour, Ewing's sarcoma, Fibrous dysplasia, Aneurysmal bone cyst
  28. Diseases of Cardiovascular system

- Cardiac failure
- Congenital heart disease - ASD, VSD, PDA
- Fallot's Tetralogy
- Infective Endocarditis
- Atherosclerosis
- Ischaemic heart Disease

## 29. Haemorrhagic Disorders

- Coagulation cascade
- Coagulation disorders
  - Platelet function
  - Platelet disorders

## Practical

1. Urine
  - Abnormal constituents
  - Sugar, albumin, ketone bodies
2. Urine
  - Abnormal constituents
  - Blood, bile salts, bile pigments
3. Haemoglobin (Hb) estimation
4. Total WBC count
5. Differential WBC Count
6. Packed cell volume(PCV), Erythrocyte Sedimentation Rate (ESR)
7. Bleeding Time & Clotting Time
8. Histopathology
  - Tissue Processing
  - Staining
9. Histopathology slides
  - Acute appendicitis, Granulation tissue, fatty liver
10. Histopathology slides
  - CVC lung, CVC liver, Kidney amyloidosis
11. Histopathology slides
  - Tuberculosis, Actinomycosis, Rhinosporidiosis
12. Histopathology slides
  - Papilloma, Basal cell Ca, Sq cell Ca
13. Histopathology slides
  - Osteosarcoma, osteoclastoma, fibrosarcoma
14. Histopathology slides
  - Malignant melanoma, Ameloblastoma
15. Histopathology slides
  - Mixed parotid tumour, metastatic carcinoma in lymph node

## List of Textbooks

1. Robbins – Basic Pathology
2. Harsh Mohan – Text Book of Pathology
3. deGruchy's Clinical Haematology in Medical Practice

## MICROBIOLOGY

### AIM :

To introduce the students to the exciting world of microbes. To make the students aware of various branches of microbiology, importance, significance and contribution of each branch to mankind and other fields of medicine. The objectives of teaching microbiology can be achieved by various teaching techniques such as :

- a) Lectures
- b) Lecture Demonstrations
- c) Practical exercises
- d) Audio visual aids
- e) Small group discussions with regular feedback from the students.

### OBJECTIVES :

#### A. KNOWLEDGE AND UNDERSTANDING

At the end of the Microbiology course the student is expected to :

1. Understand the basics of various branches of microbiology and be able to apply the knowledge relevantly.
2. Apply the knowledge gained in related medical subjects like General Medicine and General Surgery and Dental subjects like Oral Pathology, Community Dentistry, Periodontics, Oral Surgery, Paedodontics, Conservative Dentistry and Oral Medicine in higher classes.
3. Understand and practice various methods of sterilisation and disinfection in dental clinics.
4. Have a sound understanding of various infectious diseases and lesions in the oral cavity.

#### A. SKILLS

1. Student should have acquired the skill to diagnose and differentiate various oral lesions.
2. Should be able to select, collect and transport clinical specimens to the laboratory.
3. Should be able to carry out proper aseptic procedures in the dental clinic. A brief syllabus of Microbiology is given as follows :

#### A. GENERAL MICROBIOLOGY :

1. History, Introduction, Scope, Aims and Objectives.
2. Morphology and Physiology of bacteria.
3. Detail account of Sterilisation and Disinfection.
4. Brief account of Culture media and Culture techniques.
5. Basic knowledge of selection, collection, transport, processing of clinical Specimens and identification of bacteria.
6. Bacterial Genetics and Drug Resistance in bacteria.

#### B. IMMUNOLOGY :

1. Infection - Definition, Classification, Source, Mode of transmission and types of Infectious disease.
2. Immunity
3. Structure and functions of Immune system
4. The Complement System
5. Antigen
6. Immunoglobulins - Antibodies - General structure and the role played in defense mechanism of the body.
7. Immune response
8. Antigen - Antibody reactions - with reference to clinical utility.

9. Immunodeficiency disorders - a brief knowledge of various types of immunodeficiency disorders - A sound knowledge of immunodeficiency disorders relevant to dentistry.

10. Hypersensitivity reactions

11. Autoimmune disorders - Basic knowledge of various types - sound knowledge of autoimmune disorders of oral cavity and related structures.

12. Immunology of Transplantation and Malignancy

13. Immunehaematology

#### C. SYSTEMATIC BACTERIOLOGY

1. Pyogenic cocci - Staphylococcus, Streptococcus, Pneumococcus, Gonococcus, Meningococcus - brief account of each coccus - detailed account of mode of spread, laboratory diagnosis, Chemo therapy and prevention - Detailed account of Cariogenic Streptococci.

2. Corynebacterium diphtheriae - mode of spread, important clinical feature, Laboratory diagnosis, Chemotherapy and Active immunisation.

3. Mycobacteria - Tuberculosis and Leprosy

4. Clostridium - Gas gangrene, food poisoning and tetanus.

5. Non-sporing Anaerobes - in brief about classification and morphology, in detail about dental pathogens - mechanism of disease production and prevention.

6. Spirochaetes - Treponema pallidum - detailed account of Oral Lesions of syphilis, Borrelia vincentii.

7. Actinomycetes.

#### D. VIROLOGY

1. Introduction

2. General properties, cultivation, host - virus interaction with special reference to Interferon.

3. Brief account of Laboratory diagnosis, Chemotherapy and immuno prophylaxis in general.

4. A few viruses of relevance to dentistry.

- Herpes Virus
- Hepatitis B Virus - brief about other types
- Human Immunodeficiency Virus (HIV)
- Mumps Virus
- Brief - Measles and Rubella Virus

5. Bacteriophage - structure and significance

#### E. MYCOLOGY

1. Brief Introduction

2. Candidosis - in detail

3. Briefly on oral lesions of systemic mycoses.

#### F. PARASITOLOGY

1. Brief introduction - protozoans and helminths

2. Brief knowledge about the mode of transmission and prevention of commonly seen parasitic infection in the region.

#### RECOMMENDED BOOKS FOR REGULAR READING

1. Text book of Microbiology - R.AnanthaNarayan & C.K.Jayaram Paniker.

2. Medical Microbiology - David Greenwood et al.

#### BOOKS FOR FURTHER READING/REFERENCE :

- i) Microbiology - Prescott, et al.
- ii) Microbiology - Bernard D. Davis , et al.
- iii) Clinical & Pathogenic Microbiology - Barbara J Howard, et al.
- iv) Mechanisms of Microbial diseases - Moselio Schaechter, et al.
- v) Immunology an Introduction - Tizard
- vi) Immunology 3<sup>rd</sup> edition - Evan Roitt , et al.

### **5. GENERAL AND DENTAL PHARMACOLOGY AND THERAPEUTICS**

#### GOAL :

The broad goal of teaching undergraduate students in pharmacology is to inculcate rational and scientific basis of therapeutics keeping in view of dental curriculum and profession.

#### OBJECTIVES :

At the end of the course the student shall be able to:

- i) Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular,
- ii) List the indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason.
- iii) Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs.
- iv) Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immuno compromised patients.
- v) Integrate the rational drug therapy in clinical pharmacology.
- vi) Indicate the principles underlying the concepts of "Essential drugs".

#### SKILLS :

At the end of the course the student shall be able to;

1. Prescribe drugs for common dental and medical ailments.
2. Appreciate adverse reactions and drug interactions of commonly used drugs.
3. Observe experiments designed for study of effects of drugs.
4. Critically evaluate drug formulations and be able to interpret the clinical pharmacology of marketed preparations commonly used in dentistry.
5. INTEGRATION: Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments.

#### LECTURE :

##### I. GENERAL PHARMACOLOGY :

1. General principles of pharmacology; sources and nature of drugs dosage forms; prescription writing; pharmacokinetics (absorption, distribution, metabolism and excretion of drugs), mode of action of drugs, combined effects of drugs, receptor mechanism of drug action, factors modifying drug response, adverse drug reactions; drug interactions, implications of General Principles in clinical dentistry.
2. CNS drugs; General anaesthetics, hypnotics, analgesics psychotropic drugs, anti epileptics, muscle relaxants, local anaesthetics, Implications of these drugs in clinical dentistry.
3. Autonomic drugs; sympathomimetics, antiadrenergic drugs parasympathomimetics and parasympatholytics, Implications of Autonomic drugs in clinical dentistry.

4. Cardiovascular drugs; Cardiac stimulants ; antihypertensive drugs, vasopressor agents, treatment of shock, Antianginal agents and diuretics, Implications of these drugs in clinical dentistry.
5. Autocoids : Histamine, antihistamines, prostaglandins, leukotriens and bronchodilators, Implications of Autocoids in clinical dentistry.
6. Drugs acting on blood : coagulants and anticoagulants, hematinics, Implications of these drugs in clinical dentistry.
7. G.I.T. Drugs, Purgatives, anti-diarrhoeal, antacids, anti-emetics, Implications of these drugs in clinical dentistry.
8. Endocrines; Emphasis on treatment of diabetes and glucocorticoids, thyroid and antithyroid agents, drugs affecting calcium balance and anabolic steroids, Implications of these drugs in clinical dentistry.
9. Chemotherapy : Antimicrobial agents ( against bacteria, anaerobic infections, fungi, virus and broad spectrum). Infection management in dentistry. Pharmacotherapy of Tuberculosis, leprosy and chemotherapy of malignancy in general. Implications of Chemotherapy in clinical dentistry.
10. Vitamins : Water soluble vitamins, Vit. D, Vit.K. and Vit. E, Implications of Vitamins in clinical dentistry.
11. Pharmacotherapy of emergencies in dental office and emergency drugs tray Implications of Pharmacotherapy in clinical dentistry.
12. Chelating agents - BAL, EDTA and desferrioxamine

## II. DENTAL PHARMACOLOGY

1. Anti - septics, astringents, obtundents, mummifying agents, bleaching agents, styptics, disclosing agents, dentifrices, mouth washes, caries and fluorides.
2. Pharmacotherapy of common oral conditions in dentistry. Practicals and Demonstrations :  
To familiarise the student with the methodology : prescription writing and dispensing.  
Rationale of drug combinations of marketed drugs.

## LIST OF BOOKS RECOMMENDED FOR READING AND REFERENCE

1. Bertam G Katzung, Basic and Clinical pharmacology 6th ed. Appleton & Lange 1997.
2. Lawrence D.R. Clinical Pharmacology 8th ed. Churchill Livingstone 1997.
3. Satoskar R.S. & Bhandarkar S.D., Pharmacology and Pharmacotherapeutics part I & part 11, 13th Popular Prakashan Bombay 1993.
4. Tripathi K.D., Essentials of Medical Pharmacology 4<sup>th</sup> ed Jaypee Brothers 1999.

## 6. DENTAL MATERIALS

The science of Dental Material has undergone tremendous changes over the years. Continued research has led to new material systems and changing concepts in the dental field. Interlinked with various specialised branches of chemistry, practically all engineering applied sciences and biological characteristics, the science of dental material emerged as a basic sciences in itself with its own values and principles.

### INTRODUCTION

#### AIMS:

Aim of the course is to present basic chemical and physical properties of Dental materials as they are related to its manipulation to give a sound educational background so that the practice of the dentistry emerged from art to empirical status of science as more information through further research becomes available. It is also the aim of the course of Dental materials to provide with certain criteria of selection and which will enable to discriminate between facts and propaganda with regards to claims of manufactures.

#### OBJECTIVES :

To understand the evolution and development of science of dental materials.



To explain purpose of course in dental materials to personnel concerned with the profession of dentistry. Knowledge of physical and chemical properties. Knowledge of biomechanical requirements of particular restorative procedure. An intelligent compromise of the conflicting as well as co-ordinating factors into the desired result. Laying down standards or specifications of various materials to guide to manufacturers as well as to help professionals. Search for newer and better materials which may answer our requirements with greater satisfaction. To understand and evaluate the claims made by manufacturers of dental materials

#### NEED FOR THE COURSE :

The profession has to rise from an art to a science; the need for the dentist to possess adequate knowledge of materials to exercise his best through knowledge of properties of different types of materials. The growing concern of health hazards due to mercury toxicity, inhalation of certain vapour or dust materials, irritations and allergic reaction to skin due to contact of materials. Materials causing irritation of oral tissues, pH of restorative materials causing inflammation and necrosis of pulp which is a cause for the dentist to possess wider knowledge of physical, chemical and biological properties of materials being used. For the protection for the patient and his own protection certain criteria of selection are provided that will enable the dentist to discriminate between facts and propaganda, which will make a material biologically acceptable.

#### SCOPE :

The dental materials are employed in mechanical procedures including restorative dentistry such as Prosthodontics, endodontics, periodontal, orthodontics and restorative materials.

There is scarcely a dental procedure that does not make use of dental materials in one form or another and therefore the application of dental material is not limited to any one branch of dentistry. Branches such as minor surgery and periodontics require less use of materials but the physical and chemical characters of materials are important in these fields. The toxic and tissue reaction of dental materials and their durability in the oral cavity where the temperature is between 32 & 37 degree centigrade, and the ingestion of hot or cold food ranges from 0-70 degree centigrade. The acid and alkalinity of fluids show pH varies from 4 to 8.5. The load on 1 sq. mm of tooth or restorative materials can reach to a level as high as many kilograms. Thus the biological properties of dental materials cannot be separated from their physical and chemical properties.

#### 2) STRUCTURE OF MATTER AND PRINCIPLES OF ADHESION :

Change of state, inter atomic primary bonds, inter atomic secondary bonds, inter atomic bond distance and bonding energy, thermal energy, crystalline structure, non crystalline structures, diffusion, adhesion and bonding and adhesion to tooth structures.

#### 3) IMPORTANT PHYSICAL PROPERTIES APPLICABLE TO DENTAL MATERIALS

Physical properties are based on laws of mechanics, acoustics, optics, thermodynamics, electricity, magnetism, radiation, atomic structure or nuclear phenomena. Hue, value, chroma and translucency physical properties based on laws of optics, dealing with phenomena of light, vision and sight. Thermal conductivity & coefficient of thermal expansion are physical properties based on laws of thermodynamics. Stress, strain, proportional limit, elastic limit yield strength, modulus of elasticity, flexibility, resilience, impact, impact strength, permanent deformation, strength, flexure strength fatigue, static fatigue, toughness, brittleness, ductility & malleability, hardness, abrasion resistance, relaxation, rheology, Thixotropic, creep, static creep, dynamic creep, flow, colour, three dimensional colour - hue, values, chroma, Munsell system, metamersim, fluorescence, physical properties of tooth, stress during mastication

#### 4) BIOLOGICAL CONSIDERATIONS IN USE OF DENTAL MATERIALS.

Materials used are with the knowledge of appreciation of certain biological considerations for use in oral cavity. Requirement of materials with biological compatibility. Classification of materials from perspective of biological compatibility, eg. contact with soft tissues, affecting vitality of pulp, used for root canal fillings, affecting hard tissues of teeth, laboratory materials that could accidentally be inhaled or ingested during handling. Hazards

associated with materials: pH effecting pulp, polymers causing chemical irritation, mercury toxicity, etc. Microleakage, Thermal changes, Galvanism, toxic effect of materials. Biological evaluation for systemic toxicity, skin irritation, mutagenicity and carcinogenicity. Disinfection of dental materials for infection control.

#### 5) GYPSUM & GYPSUM PRODUCTS.

Gypsum - its origin, chemical formula, Products manufactured from gypsum.

Dental plaster, Dental stone, Die stone, high strength, high expansion stone.

Application and manufacturing procedure of each, macroscopic and microscopic structure of each . Supplied as and Commercial names.

Chemistry of setting, setting reaction, theories of setting, gauging water, Microscopic structure of set material.

Setting time : working time and setting time, Measurement of setting time and factors controlling setting time .

Setting expansion, Hygroscopic setting expansion - factors affecting each

Strength : wet strength, dry strength, factors affecting strength, tensile strength

Slurry - need and use.

Care of cast.

ADA classification of gypsum products

Description of impression plaster and dental investment

Manipulation including recent methods or advanced methods.

Disinfection : infection control, liquids, sprays, radiation

Method of use of disinfectants

Storage of material - shelf life

#### 6) IMPRESSION MATERIALS USED IN DENTISTRY

Impression plaster, Impression compound, Zinc oxide eugenol impression paste & bite registration paste incl., non eugenol paste, Hydrocolloids, reversible and irreversible, Elastomeric impression materials. Polysulphide, Condensation silicones, Addition silicones, Polyether, Visible light cure polyether urethane dimethacrylate, Historical background & development of each impression material, Definition of impression , Purpose of making impression, Ideal properties required and application of material, Classification as per ADA specification, general & individual impression material.

Application and their uses in different disciplines, Marketed as and their commercial names, Mode of supply & mode of application bulk/wash impression. Composition, chemistry of setting ,Control of setting time , Type of impression trays required, Adhesion to tray, manipulation, instruments & equipments required. Techniques of impression, storage of impression, (Compatibility with cast and die material). Any recent advancements in material and mixing devices. Study of properties: Working time, setting time, flow, accuracy, strength, flexibility, tear strength, dimensional stability, compatibility with cast & die materials incl., electroplating Biological properties: tissue reaction , Shelf life & storage of material, Infection control - disinfection, Advantages & disadvantages of each material.

#### 7) SYNTHETIC RESINS USED IN DENTISTRY

Historical background and development of material, Denture base materials and their classification and requirement Classification of resins Dental resins - requirements of dental resins, applications, polymerisation, polymerisation mechanism stages in addition polymerisation, inhibition of polymerisation, co-polymerisation, molecular weight, crosslinking, plasticisers, Physical properties of polymers, polymer structures types of resins.

##### ACRYLIC RESINS :

Mode of polymerisation: Heat activated, Chemically activated, Light activated, Mode of supply, application, composition, polymerisation reaction of each. Technical considerations: Methods of manipulation for each type of resin. Physical properties of denture base resin. Miscellaneous resins & techniques: Repair resins, Relining

and rebasing. Short term and long-term soft-liners, temporary crown and bridge resins, Resin impression trays, Tray materials, Resin teeth, materials in maxillofacial prosthesis, Denture cleansers, Infection control in detail, Biological properties and allergic reactions.

#### RESTORATIVE RESINS :

Historical background, Resin based restorative materials, Unfilled & filled, Composite restorative materials, Mode of supply, Composition, Polymerisation mechanisms: Chemically activated, Light activated, Dual cure: Degree of conversion, Polymerisation shrinkage Classification of Composites: Application, composition and properties of each Composites of posterior teeth, Prosthodontics resins for veneering. Biocompatibility -microleakage, pulpal reaction, pulpal protection Manipulation of composites: Techniques of insertion of Chemically activated, light activated, dual cure Polymerisation, Finishing and polishing of restoration, Repair of composites Direct bonding Bonding: Need for bonding, Acid - etch technique, Enamel bonding, Dentin bonding agents. Mode of bonding, Bond strength, Sandwich technique its indication and procedure. Extended application for composites: Resins for restoring eroded teeth, Pit and fissure sealing, Resin inlay system -Indirect & direct, Core build up, Orthodontic applications.

#### 8) METAL AND ALLOYS :

Structure and behaviour of metals, Solidification of metals, mechanism of crystallisation amorphous & crystalline. Classification of alloys, Solid solutions, Constitutes or equilibrium phase diagrams: Electric alloys, Physical properties, Peritectic alloys, Solid state reaction other binary systems: Metallography & Heat treatment. Tarnish and corrosion. Definition: causes of corrosion, protection against corrosion., Corrosion of dental restorations, clinical significance of galvanic current. Dental Amalgam.

#### HISTORY :

Definition of dental amalgam, application, Alloy classification, manufacture of alloy powder composition - available as.

Amalgamation : setting reaction & resulting structure , properties , Microleakage Dimensional stability, Strength, Creep, Clinical performance

Manipulation: Selection of alloy, proportioning, mechanism of trituration, condensation, carving & finishing. Effect of dimensional changes, Marginal deterioration., Repair of amalgam, mercury toxicity, mercury hygiene.

#### DIRECT FILLING GOLD :

Properties of pure gold, mode of adhesion of gold for restoration forms of direct filling gold for using as restorative material

Classification : Gold Foil, Electrolytic precipitate, powdered gold.

Manipulation: Removal of surface impurities and compaction of direct filling gold.

Physical properties of compacted gold, Clinical performance.

#### DENTAL CASTING ALLOYS :

Historical background, desirable properties of casting alloys.

Alternatives to cast metal technology : direct filling gold, amalgam, mercury free condensable intermetallic compound - an alternative to metal casting process. CAD-CAM process for metal & ceramic inlays - without need for impression of teeth or casting procedure, pure titanium, most bio compatible metal which are difficult to cast can be made into crowns with the aid of CAD- CAM technology . Another method of making copings - by copy milling (without casting procedures).

Classification of casting alloys : By function & description.

Recent classification, High noble (HN), Noble (N) and predominantly base metal (PB)

Alloys for crown & bridge, metal ceramic & removable partial denture. Composition, function, constituents and application, each alloy both noble and base metal. Properties of alloys : Melting range, mechanical properties, hardness, elongation, modulus of elasticity, tarnish and corrosion.

Casting shrinkage and compensation of casting shrinkage. Biocompatibility – Handling hazards & precautions of base metal alloys, casting investments used. Heat treatment : Softening & hardening heat treatment. Recycling of metals. Titanium alloys & their application , properties & advantages. Technical considerations In casting . Heat source, furnaces.

#### 9) DENTAL WAXES INCLUDING INLAY CASTING WAX

Introduction and importance of waxes. Sources of natural waxes and their chemical nature.

Classification of Waxes :

Properties : melting range, thermal expansion, mechanical properties, flow & residual stresses, ductility.

Dental Wax : Inlay wax : Mode of supply : Classification & composition, Ideal requirements: Properties of inlay wax : Flow, thermal properties Wax distortion & its causes.

Manipulation of inlay wax: Instruments & equipment required, including electrically heated instruments metal tips and thermostatically controlled wax baths.

Other waxes : Applications, mode of supply & properties.

Casting Wax, Base plate wax, Processing wax, Boxing wax, Utility wax, Sticky wax, Impression wax for corrective impressions, Bite registration wax.

#### 10) DENTAL CASTING INVESTMENTS.

Definition, requirements, classification

Gypsum bonded - classification. Phosphate bonded, Silica bonded

Mode of Supply: Composition, application, setting mechanism, setting time & factors controlling it.

Expansions :Setting expansion, Hygroscopic Setting expansion, & thermal expansion : factors affecting.

Properties: Strength, porosity, and fineness & storage. Technical considerations: For Casting procedure, Preparation of die, Wax pattern, spruing, investing, control of shrinkage compensation, wax burnout, and heating the invested ring, casting. Casting machines, source of heat for melting the alloy. Defects in casting.

#### 11) SOLDERING, BRAZING AND WELDING

Need of joining dental appliances, Terms & Definition

Solders : Definition, ideal requirement, types of solders - Soft & hard and their fusion temperature, application. Mode of supply of solders, Composition and selection, Properties. Tarnish & corrosion resistance mechanical properties, microstructure of soldered joint. Fluxes & Anti fluxes: Definition, Function, Types, commonly used fluxes & their selection Technique of Soldering & Brazing : free hand soldering and investment, steps and procedure. Welding: Definition, application, requirements, procedure, weld decay - causes and how to avoid it. Laser welding.

#### WROUGHT BASE METAL ALLOYS

Applications and different alloys used mainly for orthodontics purpose

1. Stainless steel
2. Cobalt chromium nickel
3. Nickel titanium
4. Beta titanium

Properties required for orthodontic wires, working range, springiness, stiffness, resilience, Formability, ductility, ease of joining, corrosion resistance, stability in oral environment, bio- compatibility

Stainless steels: Description, type, composition & properties of each type. Sensitisation & stabilisation, Mechanical properties - strength, tensile, yield strength, KHN. Braided & twisted wires their need , Solders for stainless steel, Fluxes, Welding

1. Wrought cobalt chromium nickel alloys, composition, allocation, properties, heat treatment, physical properties.

2. Nickel -Titanium alloys, shape, memory & super elastic
3. Titanium alloys, application, composition, properties, welding, Corrosion resistance

## 12) DENTAL CEMENTS

Definition & Ideal requirements :

Cements: Silicate, Glass ionomer, metal modified glass ionomer, resin modified glass ionomer, zinc oxide eugenol, modified zinc oxide eugenol, zinc phosphate, zinc silico phosphate, zinc poly carboxylate, Cavity liners and cement bases, Varnishes Calcium hydroxide, Gutta percha

Application, classification (general and individual ), setting mechanism, mode of supply, Properties, factors affecting setting, special emphasis on critical procedures of manipulation and protection of cement, mode of adhesion, biomechanism of caries inhibition. Agents for pulpal protection., Modifications and recent advances, Principles of cementation. Special emphasis on cavity liners and cement bases and luting agents.

## 13) DENTAL CERAMICS

Historical background & General applications.

Dental ceramics : definition, classification, application, mode of supply, manufacturing procedure, methods of strengthening. Properties of fused ceramic: Strength and factors affecting, modulus of elasticity, surface hardness, wear resistance, thermal properties, specific gravity, chemical stability, esthetic properties, biocompatibility, technical considerations.

Metal Ceramics (PFM) : Alloys - Types and composition of alloys. Ceramic - Type and Composition.

Metal Ceramic Bond - Nature of bond. Bonding using electro deposition, foil copings, bonded platinum foil, swaged gold alloy foil coping. Technical considerations for porcelain and porcelain fused metal restorations. Recent advances - all porcelain restorations, Manganese core, injection moulded, castable ceramics, glass infiltrated alumina core ceramic (In ceram), ceramic veneers, inlays and onlays, and CAD - CAM ceramic. Chemical attack of ceramic by fluoride. Porcelain furnaces.

## 14) ABRASION & POLISHING AGENTS

Definition of abrasion and polishing. Need of abrasion and polishing. Types of abrasives: Finishing, polishing & cleaning. Types of abrasives: Diamond, Emery, aluminium oxides garnet, pumice, Kieselgurh, tripoli, rouge, tin oxide, chalk, chromic oxide, sand, carbides, diamond, zirconium silicate, Zinc oxide

ABRASIVE ACTION :

Desirable characteristics of an abrasive, Rate of abrasion, Size of particle, pressure and speed.

Grading of abrasive & polishing agents. Binder, Polishing materials & procedures used. Technical consideration - Material and procedure used for abrasion and polishing, Electrolytic polishing and burnishing.

## 15) DIE AND COUNTER DIE MATERIALS INCLUDING ELECTROFORMING AND ELECTRO POLISHING.

Types - Gypsum products, Electroforming, Epoxy resin, Amalgam.

## 16) DENTAL IMPLANTS : Evolution of dental implants, types and materials.

## 17) MECHANICS OF CUTTING : Burs and points.

At the end of the course the student should have the knowledge about the composition, properties, manipulative techniques and their various commercial names. The student should also acquire skills to select and use the materials appropriately for laboratory and clinical use.

## RECOMMENDED BOOKS :

1. Science of Dental Materials and Clinical Applications – Shama Bhat. V.U & Nandish B.T C.B.S.Printers & Publishers-New Delhi
2. Phillips Science of Dental Materials - Kenneth J. Anusavice
3. Restorative Dental Materials - 10 edn. Robert G.Craig
4. Notes on Dental Materials - E.G. Combe

## 7. PRE-CLINICAL PROSTHODONTICS

### I. Introduction to Prosthodontics scope and definition.

#### A. Masticatory apparatus and function :

1. Maxilla & Mandible with or without teeth
2. Muscle of mastication and accessory muscles of mastication.
3. Brief anatomy of TMJ
4. Mandibular movements
5. Functions of teeth.

#### B. Various branches of Prosthodontics and prosthesis

1. Scope & limitation.
2. Appliances v/s prosthesis
3. Dental prosthesis v/s non dental prosthesis

#### C. Effect of loss of teeth :

1. On general health
2. On masticatory apparatus
3. Need to replace lost teeth

#### D. Outline of Prosthodontics

1. Types of prosthesis
2. Requirements of prosthesis – Physical, biological, esthetic considerations.

### II. Introduction to components of Prosthesis

#### A. Complete Denture Prosthesis

1. Various surfaces (border and surface anatomy)
2. Components – Base and Teeth

#### B. Removable Partial Denture

1. Classification
2. Major and minor connectors
3. Direct retainers
4. Rests
5. Indirect retainers
6. Denture base
7. Artificial teeth

#### C. Fixed Partial Denture :

1. Classification
2. Retainers

3. Pontics
4. Connectors

### III. All related definitions and terminologies from glossary

1. Model
2. Cast
3. Impression
4. Occlusal rims
5. Temporary denture base
6. Permanent denture base
7. Occlusion
8. Jaw relation – orientation, vertical and centric
9. Christensen's phenomenon
10. Key of occlusion
11. Balanced occlusion
12. Abutment etc

### IV. Introduction to mouth preparation – in brief

#### A. Complete Dentures

1. General considerations
2. Pre-prosthetic surgery

#### B. Removable partial dentures

1. General considerations
2. Occlusal rest preparation
3. Modifying contours of the abutments
4. Guide planes
5. Elimination of undercut

#### C. Fixed Partial Dentures

1. Principles of tooth preparation in brief
2. Retainers in brief

### V. Introduction of all steps involved in fabrication of Prosthesis

Clinical steps in brief and laboratory steps in detail

#### **Impression Making**

1. Definition and requirements and types of impressions
2. Various material used for different impressions
3. Different theories of impression making

#### **Impression Trays**

1. Definition, classification, materials, advantages & disadvantages
2. Selection of trays
3. Special trays
4. Spacer design

## **Introduction to jaw relation records**

1. Definition and type
2. Temporary denture base – Indications, Advantages, Disadvantages, materials used
3. Occlusion rims – materials, shape, dimensions
4. Clinical procedures of jaw relation recording (in brief)

## **Articulators and face bow**

1. Basic outline
2. Need for articulators
3. Definition, classification, parts, advantages, disadvantages of articulators
4. Definitions, classification, parts, advantage, disadvantages and purpose of face bow transfer
5. Demonstration of face bow transfer to an articulator on a dummy

## **Selection of Teeth**

1. Various guidelines for selection of teeth including dentogenic concept
2. Arrangement of teeth in detail with various factors of esthetics, overjet, overbite etc

## **Occlusion**

1. Balanced Occlusion – need and advantages
2. Various factors of balanced occlusion

## **Try in Procedures**

1. Anterior try – in
2. Posterior try – in
3. Waxing, carving, polishing and final try – in

## **Processing Procedures**

1. Flasking
2. Dewaxing
3. Packing
4. Curing
5. Finishing and polishing of acrylic dentures Recommended books
  1. Prosthodontic Treatment of Edentulous Patients - Boucher
  2. Syllabus of Complete Denture – Heatwell
  3. Theory and Practice of Fixed Prosthodontics – Tylman
  4. Removable Partial Denture – McCracken
  5. Science of Dental materials Anusavice
  6. Dental Materials, Properties and Manipulation – Craig

## **8. PRE CLINICAL CONSERVATIVE DENTISTRY**

### **Theory**

1. Introduction to Conservative Dentistry



2. Definition, Aim & Scope of Conservative Dentistry & Endodontics
3. Classification of Cavities
4. Nomenclature
5. Various Chair side positions
6. Tooth Numbering
7. Restoration – Definition & Objectives
8. Instruments – Classification ,Nomenclature, Design, Formula of hand cutting instruments, Care, Grasps & Rests
9. Rotary Cutting Instruments – Burs, Design & Use .Various Speeds in Cavity preparation
10. Principles of cavity / Tooth preparation for :
  1. Silver Amalgam
  2. Cast gold inlay
  3. Composit resins
  4. Glass Inomer
11. Matrices, Retainers, Wedges
12. Separators – different methods of separations
13. Finishing & polishing of restorations
14. Management of deep carious lesions – pulp capping & pulpotomy
15. Access cavity & brief introduction of root canal instruments

### **LABORATORY EXERCISES**

Identification and study of handcutting instruments chisles, gingival margin trimmers, excavators and hatchet.

1. Identification and use of rotary cutting instruments in contra angle hand pieces burs (Micromotor)
2. Preparation class I and extended class I and class II and MOD's and Class V amounting to 10 exercises in plaster models.
3. Ten exercises in mounted extracted teeth of following: class I, 4 in number; class I extended cavities 2; class II 4 in number and Class V 2 in number. Cavity preparation base application, matrix and wedge placement restoration with amalgam.
4. Exercises on phantom head models which includes cavity preparation base and varnish application matrix and wedge placement followed by amalgam restoration.
 

Class I	5
Class I with extension	2
Class II	10
Class II mods	2
Class V and II for glass ionomers	4
Class V for amalgam	2
5. Polishing of above restorations.
6. Demonstration of Class III and Class V cavity preparation. For composites on extracted tooth completing the restoration.
7. Polishing and finishing of the restoration of composites.
8. Identification and manipulation of varnish bases like Zinc Phosphate, Poly carboxylate, Glass Ionomers, Zinc Oxide, Eugenol cements.

9. Identification and manipulation of various matrices, tooth separators and materials like composites and modified glass ionomer cements.
10. Cast Restoration
  1. Preparation of Class II inlay cavity
  2. Fabrication of wax pattern
  3. Sprue for inner attachment investing
  4. Investing of wax pattern
  5. Finishing and cementing of class II inlay in extracted tooth.
12. Endodontics
  1. Identification of basic endodontic instruments
  2. Coronal access cavity preparation on extracted upper central incisors
  3. Determination of working length.
  4. Biomechanical preparation of root canal space of central incisor
  5. Obturation of root canal spaces. Absence of coronal access cavity.
  6. Closure of access cavity

**RECOMMENDED BOOKS :**

1. Sturdevant - The Art and Science of operative Dentistry - Mosby USA
2. Charbeneu - Principles and Practice of Operative Dentistry - Verghese Publication Bombay
3. Grossman - Endodontic Practice, Verghese Publication Bombay

**9. ORAL PATHOLOGY & ORAL MICROBIOLOGY**

**OBJECTIVES :**

At the end of the Oral Pathology & Oral Microbiology course, the student should be able to comprehend-

1. The different types of pathological processes that involve the oral cavity.
2. The manifestations of common diseases, their diagnosis & correlation with clinical pathological processes.
3. The oral manifestations of systemic diseases to help in correlating with systemic physical signs & laboratory findings.
4. The underlying biological principles governing treatment of oral diseases
5. The principles of certain basic aspects of Forensic Odontology.

**SKILLS**

1. Microscopic study of common lesions affecting oral tissues through microscopic slides & projection slides.
2. Study of the disease process by surgical specimens.
3. Study of teeth anomalies/ polymorphisms through tooth specimens & plaster casts.
4. Microscopic study of plaque pathogens.
5. Study of haematological preparations(blood films) of anaemias & leukemias.
6. Basic exercises in forensic Odontology such as histological methods of age estimation and appearance of teeth in injuries.

1. Introduction :

- A bird's eye view of the different pathological processes involving the oral cavity & oral cavity involvement in systematic diseases to be brought out. Interrelationship between General Medicine & General Surgery & Oral Pathology is to be emphasised.

2. Development disturbances of teeth, jaws and soft tissues of oral & paraoral region:
  - Introduction to development disturbances – Hereditary, Familial mutation, Hormonal etc. causes to be highlighted
  - Development disturbances of teeth- Aetiopathogenesis, clinical features, radiological features & histopathological features as appropriate.
  - The size shape number, structure & eruption of teeth & clinical significance of the anomalies to be emphasised.
  - **Forensic Odontology - Practical Demonstration Techniques**
  - Development disturbances of jaws-size & shape of the jaws.
  - Development disturbances of oral & paraoral soft tissues- tip & palate- clefts, tongue, gingival, mouth, salivary glands & face
3. Dental Caries
  - Aetiopathogenesis microbiology, clinical features, diagnosis, histopathology, immunology, prevention of dental caries & its sequelae.
4. Pulp & Periapical Pathology & Osteomyelitis
  - Aetiopathogenesis & interrelationship, clinical features microbiology, histopathology & radiological features (as appropriate) of pulp & periapical lesions & osteomyelitis.
  - Swquelaes of periapical abscess-\* summary of space infections, systemic complications & significance.
5. Periodontal Diseases :
  - Aetiopathogenesis, microbiology, clinical features, histopathology & radiological features (as appropriate) of gingivitis enlargements & periodontitis. Basic Immunological Mechanisms of periodontal disease to be highlighted.
6. Microbial infections of oral soft tissues :
  - Microbiology, defence mechanisms including immunological aspects, oral manifestations, histopathology and laboratory diagnosis of common bacterial , viral & fungal infections namely :
    - Bacterial : Tuberculosis syphilis ANUG & its Complications – Cancrum Oris
    - Viral : Herpes Simplex, Varicella Zoster, Measles, Mumps & HIV infections
    - Fungal : Candidal infection. Aphthous Ulcers.
7. Common non- inflammatory diseases involving the jaws
  - Aetiopathogenesis, clinical features, radiological & laboratory values in diagnosis of :
    - Fibrous dysplasia, Cherubism, osteogenesis imperfect, pagets disease, Cleidocranial dysplasia, Rickets, Achondroplasia, Marfan’s syndrome & Down’s syndrome.
8. Diseases of TM Joint :
  - Ankylosis, summary of different types of arthritis & other developmental, malformations, traumatic injuries & myofascial pain dysfunction syndrome.
9. Cysts of the Oral & Paraoral region :
  - Classification, eitopathogenesis, clinical feastures, histopathology, laboratory & radiological features (as appropriate) of Odontogenic cysts, Non-Odonotogenic cysts, Pseudocysts of jaws & soft tissue cysts of Oral paraoral region.
10. Tumours of the Oral cavity :
  - Calssification of Odontogenic , Non- Odontogenic & salivary Gland Tumours.

Aetiopathogenesis, clinical features, histopathology, radiological features & laboratory & diagnosis (as appropriate) of the following common tumours :

- a) Odonotogenic – all lesions
  - b) Non- Odonotogeniic
    - Benign Epithelial – Papilloma, Keratoa canthoma & Neevi
    - Benign Mesenchymal – Fibrima, Aggressive fibrous lesions, Lipoma, Haemangioma, Lymphangioma, Neurofibroma, Schwznnoma Chondrama, Osteoma & Tori
    - Malignant Epithelial – Basal Cell Carcinoma, Verrucous Carcinoma, Squamous Cell Carcinoma & Malignant Melanoma.
    - Malignant Mesenchymal – Fibrosarcoma, Osteosarcoma, Giant cell tumour, Chondrosarcoma, Angiosarcoma, Kaposi’s sarcoma, Lymphomas, Ewing’s Sarcoma & Other Reticuloendothelial tumours
  - c) Salivary Gland
    - Benign Epithelial neoplasms – Plemorphic Adenoma, Warthin’s tumour & Oncocytoma
    - Malignant Epithelial Neoplasms – Adenoid Cystic Carcinoma Mucoepidermoid Carcinoma, Acinic cell Carcinoma & Adenocarcinomas
  - d) Tumours of Disputed Origin – Congenital Epulis & Granmular Cell Myoblastoma
  - e) Metastatic tumours – Tumuors metastasizing to & from oral cavity & the routes of Metastasis
11. Traumatic, Reactive & Regressive lesions of Oral Cavity
    - Pyogenic & Giant cell Granuloma, Exostoses fibrous Hyperplasia, Traumatic Ulcer & Traumatic Neuroma
    - Attrition, Abrasion, Erosion, Bruxism Hypercementosis Dentinal changes, pulp clacifications & Resorption of teeth.
    - Radiation effects of oral cavity, summary of Physical & Chemical injuries including allergic reactions of the oral cavity
    - Healing of oral wounds & complications – Dry socket.
  12. Non neoplastic Salivary Gland Diseases :
    - Sialolithiasis , Sialosis Sialadenitis, Xerostomia & Ptyalism
  13. Syestemic Diseases involving Oral Cavity
    - Brief review & oral manifestations, diagnosis & significance of common blood Nutritional Harmonal & Metabolic diseases of oral cavity.
  14. Mucocutaneous lesions
    - Aetiopathogenesis clinical features & histopathology of the following common lesions  
Lichen planus lupus Erythematosus Permphigus & Pemphigod lesions Erythema Multiforma, Psoriasis, Scleroderma, Ectodermal Dysplasia Epidermolysis Bullosa & white spnge nevus.
  15. Diseases of the Nerves
    - Facial Neuralgias – Trigeminal & Glosspharyngeal. VII nerve paralysis Causalgia.
    - Psychogenic facial pain & Burning Mouth Syndrome
  16. Pigmentation of Oral & Paraoral region & Discolouration of teeth:
    - Causes & Clinical Manifestations
  17. Diseases of Maxillary Sinus
    - Traumatic injuries to sinus, sinusitis, cysts & Tumours involving antrum
  18. a) ORAL PRECCNCER- CANCER : Epidemiology aetiology clinical and histopathological features , TNM classification. Recent advances in diagnosis, management and prevention
  - b) Biopsy : Types of biopsy value of biopsy, cytology histo chemistry & frozen sections in diagnosis of oral diseases

19. Principals of Basic Forensic Odontology(Pre Clinical Forensic Odontology)
- Introduction definition aims & scope
  - Sex and ethnic (racial) differences in tooth morphology and histological age estimation
  - Determination of sex & blood groups from buccal mucosa / saliva
  - Dental DNA methods
  - Bite Marks, rugae patterns & lip prints
  - Dental importance of poisons and corrosives
  - Overview of forensic medicine and toxicology

20. Clinical application of Dental Anatomy, Physiology and occlusion.

**RECOMMENDED BOOKS**

- |                                                     |                                     |
|-----------------------------------------------------|-------------------------------------|
| 1. A text book of Oral Pathology                    | - Shafer, Hine & Levy               |
| 2. Oral Pathology- Clinical Pathologic correlations | - Regezi & Sciubba                  |
| 3. Oral Pathology                                   | - Soames & Southam                  |
| 4. Oral Pathology in the Tropics                    | -Prabhu, Wilsonm, Johnson & Daftary |

**10. GENERAL MEDICINE**

Guidelines :

Special emphasis should be given throughout on the importance of various diseases as applicable to dentistry.

1. Special precautions/contraindications of anaesthesia and various dental procedures in different systemic diseases.
2. Oral manifestations of systemic diseases.
3. Medical emergencies in dental practice.

A dental student should be taught in such a manner that he/she is able to record the arterial pulse, blood pressure and be capable of suspecting by sight and superficial examination of the body-diseases of the heart, lungs, kidneys, blood etc. He should be capable of handling medical emergencies encountered in dental practice.

**THEORY SYLLABUS**

CORE TOPICS (Must Know)	COLLATERAL TOPICS (Desirable to Know)
1. Aims of medicine Definitions of signs, symptoms, diagnosis, differential diagnosis treatment & prognosis.	
2. Infections Enteric fever, AIDS, herpes simplex, herpes zoster, syphilis diphtheria	Infectious mononucleosis mumps, measles, rubella, malaria
3. G.I.T. Stomatitis, gingival hyperplasia, dysphagia, acid peptic disease, jaundice, acute and chronic hepatitis, cirrhosis of liver ascites.	Diarrhoea Dysentery Amoebiasis Malabsorption
4. CVS Acute rheumatic fever rheumatic valvular heart disease, hypertension, ischemic heart disease, infective endocarditis, common arrhythmias, congenital heart disease, congestive cardiac failure.	
5. RS Pneumonia, COPD, Pulmonary TB, Bronchial asthma	Lung Abscess Pleural effusion

		Pneumothorax Bronchiectasis Lung cancers.
6.	Haematology Anaemias, bleeding & clotting disorders, leukemias, lymphomas, agranulocytosis, splenomegaly, oral manifestations of haematologic disorders, generalized lymphadenopathy.	
7.	Renal System Acute nephritis Nephrotic syndrome	Renal failure
8.	Nutrition Avitaminosis	Balanced diet PEM Avitaminosis
9.	CNS Facial palsy, facial pain including trigeminal neuralgia, epilepsy, headache including migraine.	- Meningitis - Examination of comatose patient - Examination of cranial nerves
10.	Endocrines Diabetes Mellitus Acromegaly, Hypothyroidism, Thyrotoxicosis, Calcium metabolism and parathyroids.	Addison's disease, Cushing's syndrome.
11.	Critical care Syncope, cardiac arrest, CPR, shock	Ac LVF ARDS

#### CLINICAL TRAINING :

The student must be able to take history, do general physical examination (including build, nourishment, pulse, BP, respiration, clubbing, cyanosis, jaundice, lymphadenopathy, oral cavity) and be able to examine CVS, RS and abdomen and facial nerve.

#### 11.GENERAL SURGERY

##### AIMS :

To acquaint the student with various diseases, which may require surgical expertise and to train the student to analyse the history and be able to do a thorough physical examination of the patient. The diseases as related to head and neck region are to be given due importance, at the same time other relevant surgical problems are also to be addressed. At the end of one year of study the student should have a good theoretical knowledge of various ailments, and be practically trained to differentiate benign and malignant diseases and be able to decide which patient requires further evaluation.

##### 1. HISTORY OF SURGERY :

The development of surgery as a speciality over the years, will give the students an opportunity to know the contributions made by various scientists, teachers and investigators. It will also enable the student to understand the relations of various specialities in the practice of modern surgery.

##### 2. GENERAL PRINCIPLES OF SURGERY :

Introduction to various aspects of surgical principles as related to orodental diseases. Classification of diseases in general. This will help the student to understand the various diseases, and their relevance to routine dental practice.

3. WOUNDS :

Their classification, healing, repair, treatment, medico-legal aspects of accidental wounds and complications of wounds.

4. INFLAMMATION :

Of soft and hard tissues. Causes of inflammation, varieties, treatment and sequelae.

5. INFECTIONS :

Acute and chronic abscess skin infections, cellulites, carbuncle, and erysipelas. Specific infections such as tetanus, gangrene, syphilis, gonorrhoea, tuberculosis, Actinomycosis, Vincent's angina, cancrum oris. Pyaemia, toxæmia and septicaemia.

6. TRANSMISSIBLE VIRAL INFECTIONS :

HIV and Hepatitis B with special reference to their prevention and precautions to be taken in treating patients in a carrier state.

7. SHOCK AND HAEMORRHAGE :

Classification, causes, clinical features and management of various types of shock. Syncope, Circulatory collapse. Haemorrhage – different types, causes, clinical features and management. Blood groups, blood transfusion, precautions and complications of blood and their products. Hemophilias, their transmission, clinical features and management especially in relation to minor dental procedures.

8. TUMOURS, ULCERS, CYSTS, SINUS AND FISTULAE :

Classifications, clinical examination and treatment principles in various types of benign and malignant tumours, ulcers, cysts, sinus and fistulae.

9. DISEASES OF LYMPHATIC SYSTEM :

Especially those occurring in head and neck region. Special emphasis on identifying diseases such as tubercular infection, lymphomas, leukaemias, metastatic lymph node diseases.

10. DISEASES OF THE ORAL CAVITY :

Infective and malignant diseases of the oral cavity and oropharynx including salivary glands with special emphasis on preventive aspects of premalignant and malignant diseases of the oral cavity.

11. DISEASES OF LARYNX, NASOPHARYNX :

Infections and tumours affecting these sites. Indications, procedure and complications of tracheostomy.

12. NERVOUS SYSTEM :

Surgical problems associated with nervous system with special reference to the principles of peripheral nerve injuries, their regeneration and principles of treatment. Detailed description of affections of facial nerve and its management. Trigeminal neuralgia, its presentation and treatment.

13. FRACTURES :

General principles of fractures, clinical presentation and treatment with additional reference to newer methods of fracture treatment. Special emphasis on fracture healing and rehabilitation.

14. PRINCIPLES OF OPERATIVE SURGERY :

Principles as applicable to minor surgical procedures including detailed description of asepsis, antiseptics, sterilisation, principles of anaesthesia and principles of tissue replacement. Knowledge of sutures, drains, diathermy, cryosurgery and use of Laser in surgery.

15. ANOMALIES OF DEVELOPMENT OF FACE :

Surgical anatomy and development of face. Cleft lip and cleft palate-principles of management.

16. DISEASES OF THYROID AND PARATHYROID:

Surgical anatomy, pathogenesis, clinical features and management of dysfunction of thyroid and parathyroid glands. Malignant diseases of the thyroid-classification, clinical features and management.

17. SWELLINGS OF THE JAW :

Differential diagnosis and management of different types of swellings of the jaw.

18. BIOPSY :

Different types of biopsies routinely used in surgical practice.

Skills to be developed by the end of teaching is to examine a routine swelling, ulcer and other related diseases and to perform minor surgical procedures such as draining an abscess, taking a biopsy etc.

**12. CONSERVATIVE DENTISTRY & ENDODONTICS**

**SECOND B.D.S. CURRICULUM**

**Theory**

- Definition, history & Scope of Operative Dentistry
- Nomenclature & tooth numbering system
- Caries definition, classification, features sequelae
- Caries diagnosis & treatment planning
- Principles of cavity preparation
- Armamentarium [hand instruments, rotary instruments, burs ]
- Sterilization of instruments
- Dental amalgam
- Cements Luting & Restorative, Calcium hydroxide
- Pulp protection
- Varnishes, Liners & Bases
- Composites & GIC
- Cavity preparation for amalgam class 1, 2, composites class 3, 4 & 5
- Amalgam cavities Conventional & conservative
- Contacts & Contours
- Matrices, wedges & separators
- Finishing & polishing of restorations

**Practicals**

- Preparation of plaster models [molars, premolars, anteriors]
- Cavity preparation conservative & conventional  
Class 1, 2 for amalgam molars & premolars  
restoration with wax, carving & polishing
- Class 1, 2 & MOD inlay with wax pattern
- Cavity preparation in Typhodont  
Class 1, 2 for amalgam molars & premolars  
Base, matrix filling, carving polishing  
Class 3, 4 & 5 for composites  
Class 1 & 2 inlay cavity preparation wax pattern



### **THIRD BDS CURRICULUM**

#### **Lecture classes**

- Examination , diagnosis , Treatment planning
- Caries diagnosis including recent trends
- Moisture control in operative dentistry
- Pain control in operative dentistry
- Deep caries management
- Hypersensitive dentin & management
- Pin retained restorations
- Non carious destruction of tooth
- Inlay Vs Amalgam cavity preparations
- Radio diagnosis IOPA, BW, Occlusal, R V G, OPG
- D F G including cavity preparation & restoration
- Pulp response to restorative materials & tooth preparations

#### **Clinical Training**

- Chair position, operator position etc
- Examination, Diagnosis & Treatment planning
- Case presentation & discussion
- Cavity preparation for Class 1 caries
- Pulp protection & restoration with amalgam
- Deep caries management
- Temporary restoration
- Pit & fissure sealing
- Non carious restoration with G I C

### **FOURTH BDS CURRICULUM**

- Gingival issue management
- Adhesion in dentistry
- Aesthetic dentistry
- Composite resin restorations
- Casting in detail
- Smear layer in operative dentistry
- Applied dental materials
  - 1 Cements , Varnishes , Liners & bases
  - 2 Amalgam
  - 3 Composites
  - 4 Direct filling Gold
  - 5 Ceramics
  - 6 Impression materials
  - 7 Biocompatibility of dental materials
- Finishing & polishing of restorative materials

#### **CLINICAL TRAINING**

- Class 1 & 2 cavity preparation for amalgam & restoration
- Deep caries management
- Temporary restorations
- Pit & fissure sealing
- Non carious lesion management
- Access cavity preparation in extracted tooth maxillary anteriors

- Cleaning & shaping
- Obturation

## **FINAL BDS CURRICULUM**

### **Endodontics**

- Definition, scope of endodontics
- Rationale of endodontics
- Endo emergencies, indications, contra indications
- Pulpal & peri apical pathology
- Diagnosis in endodontics
- Endo armamentarium
- Sterilization in endo
- Morphology of pulp space system
- Access cavity preparation
- Working length
- Intracanal irrigants & medicaments
- Shaping & Cleaning of canal system
- Obturating materials & sealers
- Obturation of the Canal system
- Smear layer in endo
- Radiology in endo
- Discolourations & management
- Traumatic injuries and management
- Reorption
- Endo surgery
- LASER s in Dentistry
- Microcopesin dentistry
- Recent advances in Endo

### **Clinicals**

- Ø Class 2 restorations for amalgam
- Ø Composite restoration for anteriors
- Ø GIC restorations
- Ø Endo for maxillary anterior tooth
- Ø Deep caries management
- Ø Case presentations
- Ø Sessional Examination

### **Recommended Books**

- I. Art & Science of
 

1. Operative Dentistry	Sturdevent
2. Operative Dentistry	Marzouk
3. Operative Dentistry	Charbenau
4. Operative Dentistry	Summit
5. Operative Dentistry	Remya Reghu
6. Operative Dentistry	Pickards
  
- II. Endodontics
  1. Louis Grossman
  2. Nicholl's Endodontics

3. Pathway of Pulp	Cohen
4. Endodontics	Ingle
5. Endodontic Therapy	Weine
6. Endodontic Clinical Practice	Flarty
7. Endodontic Practice	Mithra Hegde
8. Endodontics	Anil Kohli

### **13. ORAL & MAXILLOFACIAL SURGERY**

#### **AIMS :**

To produce a graduate who is competent in performing extraction of teeth under both local and general anaesthesia, prevent and manage related complications, acquire a reasonable knowledge and understanding of the various diseases, injuries, infections occurring in the Oral & Maxillofacial region and offer solutions to such of those common conditions and has an exposure into the in-patient management of maxillofacial problems.

#### **OBJECTIVES :**

##### **a. Knowledge & Understanding :**

At the end of the course and clinical training the graduate is expected to

1. Apply the knowledge gained in the related medical subjects like pathology, microbiology and general medicine in the management of patients with oral surgical problems.
2. Diagnose, manage and treat (understand the principles of treatment of) patients with oral surgical problems.
3. Gain knowledge of a range of surgical treatments.
4. Be able to decide the requirement of a patient to have oral surgical specialist opinion or treatment.
5. Understand the principles of in-patient management.
6. Understand the management of major oral surgical procedures and principles involved in patient management.
7. Know the ethical issues and have communication ability.

##### **b. Skills :**

1. A graduate should have acquired the skill to examine any patient with an oral surgical problem in an orderly manner, be able to understand requisition of various clinical and laboratory investigations and is capable of formulating differential diagnosis.
2. Should be competent in the extraction of teeth under both local and general anaesthesia.
3. Should be able to carry out certain minor oral surgical procedures under L.A like frenectomy, alveolar procedures & biopsy etc.
4. Ability to assess, prevent and manage various complications during and after surgery.
5. Able provide primary care and manage medical emergencies in the dental office.
6. Understand the management of major oral surgical problems and principles involved in inpatient management.

#### **DETAILED SYLLABUS**

1. Introduction, definition, scope, aims and objectives.
2. Diagnosis in oral surgery:
  - a. History taking
  - b. Clinical examination
  - c. Investigations
3. Principles of infection control and cross-infection control with particular reference to HIV/AIDS and Hapatitis.
4. Principles of Oral surgery
  - a. Asepsis: Definition, measures to prevent introduction of infection during surgery.

1. Preparation of the patient
  2. Measures to be taken by operator
  3. Sterilization of instruments - various methods of sterilization etc.
  4. Surgery set up
- b. Pain less surgery :
1. Local Anaesthesia (L.A)
    - Neurology of patient pain
    - Historical aspects, definition, types of L.A., Indications and Contra Indications, advantage & disadvantage
    - Local anaesthetic drugs, classification
    - Ideal requirements of L.A solutions, composition & mode of action
    - Use of vaso constrictors in Local Anaesthesia solution
    - Advantages contra indications in various vaso constrictor used
    - Complications of L.A, its prevention & Management
    - Anaesthesia of Mandible
    - Anatomical consideration
    - Pterygomandibular space- boundaries, contents etc.
    - Interior dental nerve block, various techniques, complications
    - Mental nerve block
    - Anaesthesia of Maxilla
    - Anatomical consideration, infiltration, infra – orbital block, posterior, superior Alveolar & grate palatine & naso palatine nerve block
    - Extra Oral blocks- indications & techniques
  2. General Anaesthesia
    - Concept of general anesthesia
    - Stages of G.A
    - Indications of general anesthesia in dentistry
    - Pre-anaesthetic evaluation of the patient
    - Pre-anaesthetic medication – advantages, drugs used
    - Commonly used anaesthetic agents
    - Complication during and after G.A
    - I.V. sedation with Diazepam and Medazolam
    - Indications, mode of action, technique etc.
    - Cardiopulmonary resuscitation
    - Use of oxygen and emergency drugs
    - Tracheostomy
- c. Access :
- Intra – oral: Mucoperiosteal flaps, principles, commonly used intra oral incisions
  - Bone removal: Methods of bone removal
  - Use of Burs: Advantages & precautions
  - Bone cutting instruments: Principles of using chisel & osteotome
  - Extra – oral : Skin incisions – principles, various extra – oral incision to expose facial skeleton.
    - a. Submandibular
    - b. Pre auricular
    - c. Incision to expose maxilla & orbit
    - d. Biocoronal incision

- d. Control of haemorrhage during surgery
    - Normal Haemostasis
    - Local measures available to control bleeding
    - Hypotensive anaesthesia etc.
  - e. Drainage & debridement
    - Purpose of drainage in surgical wounds
    - Types of drains used
    - Debridement : purpose, soft tissue & bone debridement
  - f. Closure of wounds
    - Suturing : principles, suture material, classification, body response to various materials etc
  - g. Post operative care
    - Post operative instructions
    - Physiology of cold and heat
    - Control of pain – antibiotics
    - Control of infection – analgesics
    - Control of infections – antibiotics
    - Control of swelling – anti-inflammatory drugs
    - Long term post operative follow up – significance
5. Exodontia: General considerations
- Ideal Extraction
  - Indications for extraction of teeth
  - Extractions in medically compromised patients
  - Methods of extraction –
    - a. Forceps or intra-alveolar or closed method
      - Principles, types of movement, force etc.
    - b. Trans –alveolar, surgical or open method, indications, surgical procedure.
      - Dental elevators: uses, classification, principles in the use or elevators, commonly used elevators
      - Complications of Exodontia
      - Complications during exodontia
      - Common to both maxilla and mandible
      - Post-operative complications
      - Prevention and management of complications
6. Impacted teeth :
- Incidence, definition, aetiology
    - a. Impacted mandibular third molar
      - Classification, reasons for removal
      - Assessment – both clinical & radiological
      - Surgical procedures for removal
      - Complications during and after removal
      - Prevention and management
    - b. Maxillary third molar,
      - Indications for removal, classification
      - Surgical procedure for removal
    - c. Impacted maxillary canine Reasons
      - for canine impaction Localization,
      - indications for removal,

Methods of management, labial and palatal approach,,  
Surgical exposure, transplantation, removal etc.

7. BIOPSY :  
Types, indications & contra indications
8. Pre-prosthetic Surgery :  
Definition, classification of procedures
  - a. Corrective procedures: alveoloplasty.  
Reduction of maxillary tuberosities,  
Frenectomies and removal or tori
  - b. Ridge extension or sulcus extension procedures  
Ridge augmentation procedures.  
Indications, use of bone grafts, Hydroxyapatite
  - c. Oral implantology  
Implants – concept of osseointegration  
Knowledge of various types of implants and  
Surgical procedure to place implants.
9. Diseases of the maxillary sinus  
Surgical anatomy of the sinus  
Sinusitis both acute and chronic  
Surgical approach of sinus – Caldwell luc procedure  
Removal of root from the sinus  
Oro-antral fistula – etiology, clinical features and various surgical methods for closure
10. Disorders of T.M Joint  
Applied surgical anatomy of the joint  
Dislocation and subluxation, types, aetiology, clinical features and management  
Ankylosis – definition, aetiology, clinical features and management  
Myofascial pain dysfunction syndrome, aetiology, clinical features, management -Non surgical and surgical  
Internal derangement of the joint  
Arthritis of T.M. Joint  
Inability to open the mouth (trismus)
11. Infections of the Oral cavity  
Introduction, factors responsible for infection, course of odontogenic  
Infections, spread of odontogenic infections through various facial spaces  
Dento – alveolar abscess-aetiology, clinical features and management.  
Osteomyelitis of the jaws – definition, aetiology, predisposing factors,  
Classification, clinical features and management  
Ludwigs angina –definition, aetiology, clinical features, management and complications
12. Benign cystic lesions of the jaws  
Definition, classification, pathogenesis  
Diagnosis- clinical features, radiological, aspiration biopsy, use of contrast media and histopathology,,  
Management – types of surgical procedures, rationale of the techniques, indications, procedures,  
complications etc.
13. Tumours of the Oral cavity –  
General considerations

Non odontogenic benign tumours occurring in oral cavity – fibroma, papiloma, lipoma, ossifying fibroma, myxoma etc.

Odontogenic tumours - classification

Ameloblasoma –clinical features, radiological appearance and methods of management.

Oral malignancies.

TNM classification

Outline of management of squamous

Cell carcinoma, surgery, radiation and chemotherapy

Role of dental surgeons in the prevention and early detection of oral cancer

14. Fractures of the jaws

General considerations, types of fractures, aetiology, clinical features and general principles of management

Mandibular fractures – applied anatomy, classification

Diagnosis clinical and radiological

Management reduction closed and open

Fixation and immobilisation methods

Outline of rigid and semi-rigid internal fixation

Fractures of the condyle – aetiology, classification, clinical features, principles of management.

Fractures of the middle third of the face

Definition of the mid face, applied surgical anatomy, classification, clinical features and outline of management

Fractures of the Zygomatic complex

Fractures of orbital floor.

Fractures of the naso ethmoidal complex.

Classification, clinical features, indications for treatment, various methods of reduction and fixation

Complications of fractures – delayed union, non-union and malunion

15. Salivary gland diseases –

Classification

Diagnosis of salivary gland diseases

Sialography, contrast media, procedure

Infections of the salivary glands

Sialolithiasis – sub mandibular duct and gland and parotid duct

Clinical features, management

Salivary fistulae

Common tumors of salivary glands like Pleomorphic adenoma including the malignant tumours of both major and minor salivary glands

16. Jaw deformities –

Basic forms - prognathism, retrognathism and open bite.

Reasons for correction

Outline of the pre- surgical evaluation and surgical methods carried out on mandible and maxilla

Distraction Osteogenesis.

17. Neurological disorders –

Trigeminal neuralgia – definition, aetiology, clinical features and methods of management including surgical

Facial paralysis (bells palsy) – aetiology, clinical features

Nerve injuries – classification, diagnosis and surgical repair etc

18. Cleft lip and Palate  
Aetiology of the clefts, incidence, classification, role of dental surgeon in the management of cleft patients. Outline the timing and surgical procedures in cleft patients.
19. Medical Emergencies in dental practice  
Primary care of medical emergencies in dental practice particularly –  
a. Cardio vascular            b. Respiratory            c. Endocrine  
d. Anaphylactic reaction    e. Epilepsy
20. Emergency drugs, Intra muscular I.V. Injections  
Applied anatomy, Ideal location for giving these injections, techniques etc.
21. Oral Implantology  
RECOMMENDED BOOKS:  
1. Impacted teeth, Alling John R et al  
2. Principles of oral and maxillofacial surgery, Vol 1,2, &3 Pererson LJ et al.  
3. Text book of oral & maxillofacial surgery , Srinivasan B  
4. Handbook or medical emergencies in the dental office, Malamed SF  
5. Killeys Fractures of the mandible ; Banks P  
6. Killeys fractures of the middle 3<sup>rd</sup> of the facial skeleton; Banks P  
7. The maxillary sinus and its dental implications ; Mc Govanda  
8. Killey and Kays outline of oral surgery – part 1, Seward GR et al  
9. Essentials of safe dentistry for the medically compromised patients, Mc Carthy FM  
10. Oral & maxillofacial surgery, Laskin DM  
11. Extraction of teeth , Howe, GI  
12. Minor Oral Surgery, Howe, GI  
13. Contemporary oral and maxillofacial surgery Peterson I J et al  
14. Oral and maxillofacial infections, Topzaian RC & Gold berg MH
22. Cryo Surgery & Laser

#### **14. ORAL MEDICINE AND RADIOLOGY**

##### **AIMS :**

- (1) To train the students to diagnose the common disorders of Orofacial region by clinical examination and with the help of such investigations as may be required and medical management of oro-facial disorders with drugs and physical agents.
- (2) To train the students about the importance, role, use and techniques of radiographs/digital radiograph and other imaging methods in diagnosis.
- (3) To train the students in, the principles of the clinical and radiographic aspects of Forensic Odontology.

##### **COURSE CONTENT**

- (1) Emphasis should be laid on oral manifestations of systemic diseases and ill effects of oral sepsis on general health.
- (2) To avoid confusion regarding which lesion and to what extent the student should learn and know, this elaborate syllabus is prepared. As certain lesions come under more than one group, there is repetition.

#### **Part-I ORAL MEDICINE AND DIAGNOSTIC AIDS**

##### **SECTION (A) – DIAGNOSTIC METHODS.**

- (1) Definition and importance of Diagnosis and various types of diagnosis
- (2) Method of clinical examinations.
  - (a) General Physical examination by inspection.



- (b) Oro-facial region by inspection, palpation and other means
  - (c) train the students about the importance, role, use of saliva and techniques of diagnosis of saliva as part of oral disease
  - (d) Examination of lesions like swellings, ulcers, erosions, sinus, fistula, growths, pigmented lesions, white and red patches
  - (e) Examination of lymph nodes
  - (f) Forensic examination – Procedures for post-mortem dental examination; maintaining dental records and their use in dental practice and post-mortem identification; jurisprudence and ethics.
- (3) Investigations
- (a) Biopsy and exfoliative cytology
  - (b) Hematological, Microbiological and other tests and investigations necessary for diagnosis and prognosis

**SECTION (B) – DIAGNOSIS, DIFFERENTIAL DIAGNOSIS**

While learning the following chapters, emphasis shall be given only on diagnostic aspects including differential diagnosis

- (1) Teeth: Developmental abnormalities, causes of destruction of teeth and their sequelae and discoloration of teeth
- (2) Diseases of bone and Osteodystrophies: Development disorders: Anomalies, Exostosis and tori, infantile cortical hyperostosis, osteogenesis imperfecta, Marfans syndrome, osteopetrosis. Inflammation – Injury, infection and spread of infection, fascial space infections, osteoradionecrosis.  
Metabolic disorders – Histiocytosis  
Endocrine – Acro-megaly and hyperparathyroidism  
Miscellaneous – Paget’s disease, Mono and polyostotic fibrous dysplasia, Cherubism
- (3) Temporomandibular joint: Developmental abnormalities of the condyle. Rheumatoid arthritis, Osteoarthritis, Sub-luxation and luxation
- (4) Common cysts and Tumors:  
CYSTS : Cysts of soft tissue: Mucocele and Ranula  
Cysts of bone: Odontogenic and nonodontogenic  
TUMORS :  
Soft Tissue :  
Epithelial: Papilloma, Carcinoma, Melanoma  
Connective tissue : Fibroma, Lipoma, Fibrosarcoma  
Vascular: Haemangioma, Lymphangioma  
Nerve Tissue : Neurofibroma, Traumatic Neuroma, Neurofibromatosis  
Salivary Glands : Pleomorphic adenoma, Adenocarcinoma, Warthin’s Tumor, Adenoid cystic carcinoma  
  
Hard Tissue :  
Non Odontogenic: Osteoma, Osteosarcoma, Osteoclastoma, Chondroma, Chondrosarcoma, Central giant cell tumor, and Central haemangioma  
Odontogenic: Enameloma, Ameloblastoma, Calcifying Epithelial Odontogenic tumor, Adenomatoid Odontogenic tumor, Periapical cemental dysplasia and odontomas
- (5) Periodontal diseases: Gingival hyperplasia, gingivitis, periodontitis, pyogenic granuloma
- (6) Granulomatous diseases: Tuberculosis, Sarcoidosis, Midline lethal granuloma, Crohn’s Disease and Histiocytosis X
- (7) Miscellaneous Disorders: Burkitt lymphoma, Sturge – Weber syndrome, CREST syndrome, Rendu-Osler-Weber disease

## **SECTION (C) : ORAL MEDICINE AND THERAPEUTICS.**

The following chapters shall be studied in detail including the etiology, pathogenesis, clinical features, investigations, differential diagnosis, management and prevention

1. Infections of oral and paraoral structures :  
Bacterial: Streptococcal, tuberculosis, syphilis, Vincent's, leprosy, actinomycosis, diphtheria and tetanus  
Fungal : Candida albicans  
Virus : Herpes simplex, herpes zoster, Ramsay Hunt syndrome, measles, herpangina, mumps, infectious mononucleosis, AIDS and hepatitis-B
2. Important common mucosal lesions :  
White lesions: Chemical burns, leukoedema, leukoplakia, Fordyce spots, stomatitis nicotina palatinus, white sponge nevus, candidiasis, lichen planus, discoid lupus erythematosus  
Vesiculo-bullous lesions: Herpes simplex, herpes zoster, herpangina, bullous lichen planus, pemphigus, cicatricial pemphigoid erythema multiforme.  
Ulcers : Acute and chronic ulcers  
Pigmented lesions: Exogenous and endogenous  
Red lesions : Erythroplakia, stomatitis venenata and medicamentosa, erosive lesions and denture sore mouth.
3. Cervico-facial lymphadenopathy
4. Facial pain :
  - (i) Organic pain: Pain arising from the diseases of orofacial tissues like teeth, pulp, gingival, periodontal tissue, mucosa, tongue, muscles, blood vessels, lymph tissue, bone, paranasal sinus, salivary glands etc.,
  - (ii) Pain arising due to C.N.S. diseases:
    - (a) Pain due to intracranial and extracranial involvement of cranial nerves. (Multiple sclerosis, cerebrovascular diseases, Trotter's syndrome etc.)
    - (b) Neuralgic pain due to unknown causes: Trigeminal neuralgia, glossopharyngeal neuralgia, sphenopalatine ganglion neuralgia, periodic migrainous neuralgia and atypical facial pain
  - (iii) Referred pain: Pain arising from distant tissues like heart, spine etc.,
5. Altered sensations: Cacogeusia, halitosis
6. Tongue in local and systemic disorders : (Aglossia, ankyloglossia, bifid tongue, fissured tongue, scrotal tongue, macroglossia, microglossia, geographic tongue, median rhomboid glossitis, depapillation of tongue, hairy tongue, atrophic tongue, reactive lymphoid hyperplasia, glossodynia, glossopyrosis, ulcers, white and red patches etc.)
7. Oral manifestations of :
  - (i) Metabolic disorders :
    - (a) Porphyria
    - (b) Haemochromatosis
    - (c) Histiocytosis X diseases
  - (ii) Endocrine disorders :
    - (a) Pituitary: Gigantism, acromegaly, hypopituitarism
    - (b) Adrenal cortex: Addison's disease (Hypofunction)  
Cushing's syndrome (Hyperfunction)
    - (c) Parathyroid glands: Hyperparathyroidism.
    - (d) Thyroid gland: (Hypothyroidism) Cretinism, myxedema
    - (e) Pancreas : Diabetes
  - (iii) Nutritional deficiency : Vitamins: riboflavin, nicotinic acid, folic acid Vitamin

B12, Vitamin C (Scurvy)

(iv) Blood disorders 3:

(a) Red blood cell diseases

Deficiency anemias : (Iron deficiency, Plummer – Vinson syndrome, pernicious anemia)

Haemolytic anemias : (Thalassemia, sickle cell anemia, erythroblastosis fetalis)

Aplastic anemia

Polycythemia

(b) White Blood cell diseases

Neutropenia, cyclic neutropenia, agranulocytosis, infectious mononeucleosis and leukemias

(c) Haemorrhagic disorders :

Thrombocytopenia, purpura, hemophillia, christmas disease and von willebrand's disease

8. Disease of salivary glands :

(i) Development disturbances : Aplasia, atresia and aberration

(ii) Functional disturbances : Xerostomia, ptyalism

(iii) Inflammatory conditions : Nonspecific sialadenitis, mumps, sarcoidosis heerdfort's syndrome (Uveoparotid fever), Necrotising sialometaplasia

(iv) Cysts and tumors: Mucocele, ranula, pleomorphic adenoma, mucoepidermoid carcinoma

(v) Miscellaneous: Sialolithiasis, sjogren's syndrome, mikuliez's disease and sialosis

9. Dermatological diseases with oral manifestations :

(a) Ectodermal dysplasia (b) Hyperkerotosis palmarplantaris with periodontopathy

(c) Scleroderma (d) Lichen planus including ginspan's syndrome (e) Lupus

erythematosus (f) Pemphigus (g) Erythema multiforme (h) Psoriasis

10. Immunological diseases with oral manifestations

(a) Leukemia (b) Lymphomas (c) Multiple myeloma (d) AIDS clinical manifestations, opportunistic infections, neoplasms (e) Thrombocytopenia (f) Lupus erythematosus (g) Scleroderma (h) dermatomyositis (I) Submucous fibrosis (j) Rheumatoid arthritis (k) Recurrent oral ulcerations including Behcet's syndrome and Reiter's syndrome

11. Allergy : Local allergic reactions, anaphylaxis, serum sickness (local and systemic allergic manifestations to food drugs and chemicals)

12. Foci of oral infection and their ill effects on general health

13. Management of dental problems in medically compromised persons:

(i) Physiological changes: Puberty, pregnancy and menopause

(ii) The patients suffering with cardiac, respiratory, liver, kidney and bleeding disorders, hypertension, diabetes and AIDS. Post-irradiated patients.

14. Precancerous lesions and conditions

15. Nerve and muscle diseases :

(i) Nerves: (a) Neuropraxia (b) Neurotemesis (c) Neuritis (d) Facial nerve paralysis including Bell's palsy, Heerfordt's syndrome, Melkerson Rosentel syndrome and ramsay hunt syndrome (e) Neuroma (f) Neurofibromatosis (g) Frey's syndrome

(ii) Muscles: (a) Myositis ossificans (b) Myofascial pain dysfunction syndrome (c) Trismus

16. Forensic odontology:

(a) Medicolegal aspects of orofacial injuries

- (b) Identification of bite marks
  - (c) Determination of age and sex
  - (d) Identification of cadavers by dental appliances, Restorations and tissue remnants
17. Therapeutics: General therapeutic measures – drugs commonly used in oral medicine viz., antibiotics, chemotherapeutic agents, anti-inflammatory and analgesic drugs, astringents, mouth washes, styptics, demelucents, local surface anaesthetic, sialogogues, antisialogogues and drugs used in the treatment of malignancy

**Part – II ORAL RADIOLOGY**

- (1) Scope of the subject and history of origin
- (2) Physics of radiation: (a) Nature and types of radiations (b) Source of radiations (c) Production of X-rays (d) Properties of X-rays (e) Compton effect (f) Photoelectric effect (g) Radiation measuring units
- (3) Biological effects of radiation
- (4) Radiation safety and protection measures
- (5) Principles of image production
- (6) Radiographic techniques:
  - (i) Intra-Oral: (a) Periapical radiographs (Bisecting and parallel techniques) (b) Bite wing radiographs (c) Occlusal radiographs
  - (ii) Extra-oral: (a) projections of skull and jaw bones and paranasal sinuses (c) Cephalograms (d) Orthopantomograph (e) Projections of temporomandibular joint and condyle of mandible (f) Projections for Zygomatic arches
  - (iii) Specialized techniques: (a) Sialography (b) Xeroradiography (c) Tomography
- (7) Factors in production of good radiographs :
  - (a) kVP and mA of X-ray machine (b) Filters (c) Collimations (d) Intensifying screens (e) Grids (f) X-ray films (g) Exposure time (h) Techniques (i) Dark room (j) Developer and fixer solutions (k) Film processing
- (8) Radiographic normal anatomical landmarks
- (9) Faulty radiographs and artifacts in radiographs
- (10) Interpretation of radiographs in various abnormalities of teeth, bones and other orofacial tissues
- (11) Principles of radiotherapy of oro-facial malignancies and complications of radiotherapy
- (12) Contrast radiography
- (13) Radiography in Forensic Odontology - Radiographic age estimation and post-mortem radiographic methods
- (14) Advanced radiography.

**PRACTICALS / CLINICALS :**

- 1. A Student is trained to arrive at proper diagnosis by following a scientific and systematic procedure of history taking and examination of the Orofacial region. Training is also imparted in management wherever possible. Training also shall be imparted in various radiographic procedures and interpretation of radiographs.
- 2. In view of the above each student shall maintain a record of work done, which shall be evaluated for marks at the time of university examination
- 3. The following is the minimum of prescribed work for recording
  - (a) Recording of detailed case histories of interesting cases ..... 20
  - (b) Intra-oral radiographs (Periapical, bitewing, occlusal ) ..... 25
  - (c) Routine investigative procedure

### **BOOKS RECOMMENDED :**

- a) Oral Diagnosis, Oral Medicine & Oral Pathology
  - 1. Burket's – Oral Medicine: Diagnosis & Treatment – J.B. Lippincott Company
  - 2. Coleman – Principles of Oral Diagnosis – Mosby Year Book
  - 3. Jones – Oral Manifestations of Systemic Diseases – W.B. Saunders company
  - 4. Mitchell – Oral Diagnosis & Oral Medicine
  - 5. Kerr – Oral Diagnosis
  - 6. Miller – Oral Diagnosis & Treatment
  - 7. Hutchinson – clinical Methods
  - 8. Oral Pathology – Shafers
  - 9. Sonis.S.T., Fazio.R.C. and Fang.L - Principles and practice of Oral Medicine
- b) Oral Radiology
  - 1. White & Goaz – Oral Radiology – Mosby year Book
  - 2. Weahrman – Dental Radiology – C.V. Mosby Company
  - 3. Stafne – Oral Roentgenographic Diagnosis – W.B.Saunders Co.,
  - 4. Whaites Eric – Essentials of oral radiography and oral radiology
- c) Forensic Odontology
  - 1. Derek H.Clark – Practical Forensic Odontology - Butterworth-Heinemann
  - 2. C Michael Bowers, Gary Bell – Manual of Forensic Odontology - Forensic Pr

## **15. ORTHODONTICS & DENTOFACIAL ORTHOPAEDICS**

### **COURSE OBJECTIVE :**

Undergraduate programme in Orthodontics is designed to enable the qualifying dental surgeon to diagnose, analyse and treat common orthodontic problems by preventive, interceptive and corrective orthodontic procedures. The following basic instructional procedures will be adopted to achieve the above objectives.

- 1. Introduction, Definition, Historical Background, Aims and Objectives of Orthodontics and need for Orthodontic care.
- 2. Growth and Development :
  - a. Definition
  - b. Growth spurts and Differential growth
  - C. Factors influencing growth and Development
  - d. Methods of measuring growth
  - e. Growth theories (Genetic, Sicher's, Scotts, Moss's, Petrovics, Multifactorial).
  - f. Genetic and epigenetic factors in growth
  - g. Cephalocaudal gradient in growth
- 3. Morphologic Development of Craniofacial Structures
  - a. Methods of bone growth
  - b. Prenatal growth of craniofacial structures
  - b. Postnatal growth and development of cranial base, maxilla, mandible, dental arches and occlusion
- 4. Functional Development of Dental Arches and Occlusion
  - a. Factors influencing functional development of dental arches and occlusion
  - b. Forces of occlusion
  - c. Wolf's law of transformation of bone
  - d. Trajectories of forces
- 5. Clinical Application of Growth and Development

6. Malocclusion
  - a. Concept of normal occlusion
  - b. Definition of malocclusion
  - c. Description of different types of dental, skeletal and functional malocclusion.
7. Classification of Malocclusion  
Principle, description, advantages and disadvantages of classification of malocclusion by Angle, Simon, Lischer and Ackerman and Proffitt
8. Normal and Abnormal Function of Stomatognathic System
9. Etiology of Malocclusion
  - a. Definition, importance, classification, local and general etiological factors
  - b. Etiology of following different types of malocclusion:
    - 1) Midline diastema
    - 2) Spacing
    - 3) Crowding
    - 4) Cross-Bite : Anterior / Posterior
    - 5) Class III Malocclusion
    - 6) Class II Malocclusion
    - 7) Deep Bite
    - 8) Open bite
10. Diagnosis and Diagnostic Aids
  - a. Definition, Importance and classification of diagnostic aids
  - b. Importance of case history and clinical examination in orthodontics
  - c. Study models: - Importance and uses. Preparation and preservation of study models
  - d. Importance of intraoral X-rays in orthodontics
  - e. Panoramic radiographs : - Principles, Advantages, disadvantages and uses
  - f. Cephalometrics : Its advantages, disadvantages
    1. Definition
    2. Description and use of cephalostat
    3. Description and uses of anatomical landmarks lines and angles used in cephalometric analysis
    4. Analysis – Steiner’s, Down’s, Tweed’s, Ricket’s E-line
  - g. Electromyography and its use in orthodontics
  - h. Wrist X-rays and its importance in orthodontics
11. General Principles in Orthodontic Treatment Planning of Dental and Skeletal Malocclusions
12. Anchorage in Orthodontics – Definition, Classification, Types and Stability of Anchorage
13. Biomechanical Principles in Orthodontic Tooth Movement
  - a. Different types of tooth movement
  - b. Tissue response to orthodontic force application
  - c. Age factor in orthodontic tooth movement
14. Preventive Orthodontics
  - a. Definition
  - b. Different procedures undertaken in preventive orthodontics and their limitations
15. Interceptive Orthodontics

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- a. Definition
  - b. Different procedures undertaken in interceptive orthodontics
  - c. Serial extractions: Definition, indications, contra-indication, technique, advantages and disadvantages
  - d. Role of muscle exercises as an interceptive procedure
16. Corrective Orthodontics
- a. Definition, factors to be considered during treatment planning
  - b. Model analysis: Pont's, Ashley Howe's, Bolton, Careys, Moyer's Mixed Dentition Analysis
  - c. Methods of gaining space in the arch : Indications, relative merits and demerits of proximal stripping, arch expansion and extractions
  - d. Extractions in Orthodontics indications and selection of teeth for extraction
17. Orthodontic Appliances : General
- a. Requisites for orthodontic appliances
  - b. Classification, indications of removable and functional appliances
  - c. Methods of force application
  - d. Materials used in construction of various orthodontic appliances – use of stainless steel, technical considerations in curing of acrylic, Principles of welding and soldering, fluxes and antfluxes
  - e. Preliminary knowledge of acid etching and direct bonding

## **REMOVABLE ORTHODONTIC APPLIANCES**

- 1) Components of removable appliances
- 2) Different types of clasps and their use
- 3) Different types of labial bows and their use
- 4) Different types of springs and their use
- 5) Expansion appliances in orthodontics:
  - i) Principles
  - ii) Indications for arch expansion
  - iii) Description of expansion appliances and different types of expansion devices and their uses
  - iv) Rapid maxillary expansion

## **FIXED ORTHODONTIC APPLIANCES**

1. Definition, Indications & Contraindications
2. Component parts and their uses
3. Basic principles of different techniques : Edgewise, Begg, straight wire

## **EXTRAORAL APPLIANCES.**

1. Headgears
2. Chincup
3. Reverse pull headgears

## **MYOFUNCTIONAL APPLIANCES**

1. Definition and principles
  2. Muscle exercises and their uses in orthodontics
  3. Functional appliances
    - i) Activator, Oral screens, Frankels function regulator, bionator, twinblocks, lip bumper
    - ii) Inclined planes – upper and lower
18. Orthodontic Management of Cleft lip and Palate

19. Principles of Surgical Orthodontics  
Brief knowledge of correction of :
- Mandibular Prognathism and Retrognathism
  - Maxillary Prognathism and Retrognathism
  - Anterior open bite and deep bite
  - Cross bite
20. Principles of Differential Diagnosis & Methods of Treatment of
- Midline diastema
  - Cross bite
  - Open bite
  - Deep bite
  - Spacing
  - Crowding
  - Class II - Division 1, Division 2
  - Class III Malocclusion – True and Pseudo Class III

21. Retention and Relapse

Definition, Need for retention, Causes of relapse, Methods of retention, Different types of retention devices, Duration of retention, Theories of retention.

**CLINICALS AND PRACTICALS IN ORTHODONTICS.**

- Basic wire bending exercises Gauge 22 or 0.7 mm
  - Straightening of wire ( 4 Nos)
  - Bending of a equilateral triangle
  - Bending of a rectangle
  - Bending of a square
  - Bending of a circle
  - Bending of U.V
- Construction of Clasps (Both sides upper / lower) Gauge 22 or 0.7 mm
  - 3/4 Clasp (C-Clasp)
  - Full Clasp (Jackson's Crib)
  - Adam's Clasp
  - Triangular Clasp
- Construction of Springs (on upper both sides) Gauge 24 or 0.5 mm
  - Finger Spring
  - Single Cantilever Spring
  - Double Cantilever Spring (Z-spring)
  - T-Springs on premolars
- Construction of Canine retractors Gauge 23 or 0.6 mm
  - U-Loop canine retractor  
(Both sides on upper & lower)
  - Helical canine retractor  
(Both sides on upper & lower)
  - Buccal canine retractor - Self supported buccal canine retractor with
    - Sleeve – 5 mm wire or 24 gauge
    - Sleeve – 19 gauge needle on any one side
  - Palatal canine rtractor on upper both sides. Gauge 23 or 0.6 mm



- V. Labial Bow
  - Gauge 22 or 0.7 mm
  - One on both upper and lower

**CLINICAL TRAINING DURING III YEAR B.D.S.**

**NO. EXERCISE**

- 01. Making upper Alginate impression
- 02. Making lower Alginate impression
- 03. Study Model preparation
- 04. Model Analysis
  - a. Pont's Analysis
  - b. Ashley Howe's Analysis
  - c. Carey's Analysis
  - d. Bolton's Analysis
  - e. Tweed's Analysis

**CLINICAL TRAINING DURING Final YEAR B.D.S.**

**NO. EXERCISE**

- 01. Case History taking
- 02. Case discussion
- 03. Discussion on the given topic
- 04. Cephalometric tracings
  - a. Down's Analysis
  - b. Steiner's Analysis
  - c. Tweed's Analysis

**PRACTICAL TRAINING DURING FINAL YEAR B.D.S.**

- 1. Adam's Clasp on Anterior teeth Gauge 0.7 mm
- 2. Modified Adam's Clasp on upper arch Gauge 0.7 mm
- 3. High Labial bow with Apron spring on upper arch  
(Gauge of Labial bow – 0.9 mm, Apron spring – 0.3mm)
- 4. Coffin spring on upper arch Gauge 1 mm

**Appliance Construction in Acrylic**

- 1. Upper & Lower Hawley's Appliance
- 2. Upper Hawley's with Anterior bite plane
- 3. Upper Habit breaking Appliance
- 4. Upper Hawley's with Posterior bite plane with 'Z' Spring
- 5. Construction of Activator
- 6. Lower inclined plane /Catalan's Appliance
- 7. Upper Expansion plate with Expansion Screw

**RECOMMENDED REFERENCE BOOKS.**

- |                                                                         |                    |
|-------------------------------------------------------------------------|--------------------|
| 1. CONTEMPORARY ORTHODONTICS.                                           | WILLIAM R. PROFFIT |
| 2. ORTHODONTICS FOR DENTAL STUDENTS.                                    | WHITE AND GARDINER |
| 3. HANDBOOK OF ORTHODONTICS.                                            | MOYERS             |
| 4. ORTHODONTICS – PRINCIPLES AND PRACTICE.                              | GRABER             |
| 5. DESIGN, CONSTRUCTION AND USE OF REMOVABLE<br>ORTHODONTIC APPLIANCES. | C. PHILIP ADAMS    |
| 6. CLINICAL ORTHODONTICS : VOL. 1 & 2.                                  | SALZMANN           |

## **COMPETENCIES**

### **ORTHODONTICS AND DENTOFACIAL ORTHOPAEDICS.**

- To understand normal growth and development of facial skeleton and dentition
- Pinpoint aberrations in growth process both dental and skeletal and plan necessary treatment
- Diagnose the various categories of malocclusion
- Able to motivate and explain to the patient (and parent or guardian) about the necessity of treatment
- Plan and execute preventive orthodontics (space maintainers or space regainers)
- Plan and execute interceptive orthodontics (habit breaking appliances.)
- Manage treatment of simple malocclusion such as anterior spacing using removable appliances
- Handle delivery and activation of removable orthodontic appliances
- Diagnose and appropriately refer patients with complex malocclusion to the specialist

## **16. PAEDIATRIC & PREVENTIVE DENTISTRY**

### **THEORY :**

1. INTRODUCTION TO PAEDODONTICS & PREVENTIVE DENTISTRY
  - Definition, Scope, Objectives and Importance.
2. GROWTH & DEVELOPMENT:
  - Importance of study of growth and development in Paedodontics
  - Prenatal and Postnatal factors in growth & development
  - Theories of growth & development
  - Development of maxilla and mandible and related age changes
3. DEVELOPMENT OF OCCLUSION FROM BIRTH THROUGH ADOLESCENCE.
  - Study of variations and abnormalities
4. DENTAL ANATOMY AND HISTOLOGY:
  - Development of teeth and associated structures
  - Eruption and shedding teeth
  - Chronology of eruption of teeth
  - Differences between deciduous and permanent teeth
  - Importance of first permanent molar
5. DENTAL RADIOLOGY RELATED TO PAEDODONTICS.
6. ORAL SURGICAL PROCEDURES IN CHILDREN
  - Indications and contraindications of extractions of primary and permanent teeth in children
  - Knowledge of Local Anesthesia/General Anesthesia
7. DENTAL CARIES :
  - Historical background
  - Definition, aetiology & pathogenesis.
  - Caries pattern in primary, young
  - Rampant caries, early childhood caries and extensive caries:
    - \* Definition, aetiology, Pathogenesis, Clinical features, Complications & Management
    - Role of diet and nutrition in Dental Caries.
    - Dietary modifications & Diet counseling
    - Caries activity, tests, caries prediction, caries susceptibility & their clinical application
8. GINGIVAL & PERIODONTAL DISEASES IN CHILDREN
  - Normal gingival & periodonium in children
  - Definition, aetiology & Pathogenesis

- Prevention & Management of gingival & Periodontal diseases
9. CHILD PSYCHOLOGY :
- Definition
  - Theories of child psychology
  - Psychological development of children with age
  - Principles of psychological growth & development
  - Factors affecting child's reaction to dental treatment
10. BEHAVIOUR MANAGEMENT :
- Definitions
  - Types of behavior encountered in the dental clinic
  - Non-pharmacological & pharmacological methods of Behavior Management
11. PAEDIATRIC OPERATIVE DENTISTRY:
- Principles of Pediatric Operative Dentistry
  - Modifications required for cavity preparation in primary and young permanent teeth
  - Various Isolation Techniques
  - Children using various restorative materials like Glass Ionomer, Composites & Silver Amalgam
  - Stainless steel, Polycarbonate & Resin Crowns
12. PAEDIATRIC ENDODONTICS
- Principles & Diagnosis.
  - Classification of Pulpal Pathology in primary, young permanent & permanent teeth.- Management of Pulpally involved primary, young permanent & permanent teeth.
    - Pulp capping – direct & indirect
    - Pulpotomy
    - Apexogenesis
    - Apexification
13. TRAUMATIC INJURIES IN CHILDREN:
- Classifications & Importance
  - Sequelae & reaction of teeth to trauma
  - Management of Traumatized teeth.
14. PREVENTIVE & INTERCEPTIVE ORTHODONTICS
- Definitions
  - Problems encountered during primary and mixed dentition phases & their management.
  - Serial extractions
  - Space management.
15. ORAL HABITS IN CHILDREN :
- Definition, Aetiology & Classification
  - Clinical features of digit sucking, tongue thrusting, mouth breathing & various other secondary habits.
  - Management of oral habits in children.

16. DENTAL CARE OF HANDICAPPED CHILDREN AND SPECIAL PATIENTS

- Definition, Aetiology, Classification, behavioral and Clinical features & Management of children with:
  - Physically handicapping conditions.
  - Mentally compromising conditions.
  - Medically compromising conditions.
  - Genetic disorders.

17. CONGENITAL ABNORMALITIES IN CHILDREN :

- Definition, Classification, Clinical features & Management

18. DENTAL EMERGENCIES IN CHILDREN & THEIR MANAGEMENT.

19. DENTAL MATERIALS USED IN PEDIATRIC DENTISTRY

20. PREVENTIVE DENTISTRY :

- Definition
- Principles & Scope
- Types of prevention
- Different preventive measures used in Pediatric Dentistry - pit and fissure Sealants, caries vaccine, etc.

21. DENTAL HEALTH EDUCATION & SCHOOL DENTAL HEALTH PROGRAMMES

22. FLUORIDES :

- Historical background
- Systemic & topical fluorides
- Mechanism of action
- Defluoridation techniques

23. CASE HISTORY RECORDING :

- Outline of principles of examination, diagnosis & treatment planning.

24. SETTING UP OF PEDIODONTICS CLINIC

25. **PRACTICALS :**

Following is the recommended clinical quota for under-graduate students in the subject of pediatric & preventive dentistry.

1. Restorations ( silver amalgam, glass ionomer) -10 each.
2. Preventive measures e.g. Oral Prophylaxis -10 cases.
3. Fluoride application -10 cases
4. Extractions -25 cases
5. Case History Recording & Treatment Planning -10 patients
6. Education & motivation of the patients using disclosing agents. educating patients about oral hygiene measures like tooth brushing, flossing etc.-10 patients
7. Removable space maintainers -2 nos
8. Composite restorations – 5 nos.

### **BOOKS RECOMMENDED & REFERENCES :**

1. Pediatric Dentistry (Infancy through Adolescence)-Pinkham.
2. Kennedy's Pediatric Operative Dentistry –Kennedy & Curzon.
3. Occlusal guidance in Pediatric Dentistry –Stephen H.Wei.
4. Clinical Use of Fluorides-Stephen H. Wei.
5. Pediatric Oral & Maxillofacial Surgery –Kaban.
6. Pediatric Medical Emergencies- P.S Whatt.
7. Understanding of Dental Caries –Niki Foruk.
8. An Atlas of Glass Ionomer cements-G.J Mount.
9. Clinical Pedodontics –Finn.
10. Textbook of Pediatric Dentistry – Braham Morris.
11. Primary Preventive Dentistry –Norman O. Harris.
12. Handbook of Clinical Pedodontics –Kenneth D.
13. Preventive Dentistry-Forrester.
14. The Metabolism and Toxicity of Fluoride-Garry M. Whitford.
15. Dentistry for the Child and Adolescent – Mc Donald.
16. Pediatric Dentistry- Damle S.G.
17. Behavior Management –Wright.
18. Traumatic Injuries –Andreason.
19. Occlusal guidance in Pediatric Dentistry –Nakata.
20. Pediatric Drug Therapy- Tomare.
21. Contemporary Orthodontics – Profit.
22. Preventive Dentistry-Depaola.
23. Metabolism & Toxicity of Fluoride-Whitfor, G.M.
24. Endodontic Practice – Grossman.
25. Principles of Endodontics-Munford.
26. Endodontics –Ingle.
27. Pathways of Pulp-Cohen.
28. Management of Traumatized anterior Teeth-Hargreaves.

### **COMPETENCIES**

At the completion of the undergraduate training programme the graduates shall be competent in the following.

#### **Paediatric & Preventive Dentistry**

- Ø Able to instill a positive attitude and behaviour in children towards oral health and understand the principles of prevention and preventive dentistry right from birth to adolescence.
- Ø Able to guide and counsel the guardian/parents with regard to various treatment modalities including different facets of preventive dentistry.
- Ø Able to treat dental diseases occurring in the child patient.
- Ø Able to manage physically and mentally challenged/ disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions

## SYLLABUS

### A. Public Health :

1. Introduction to public health Dentistry: Definition, History, Concepts, Scope , Aims and Objectives of public health dentistry
2. Health and Disease – Concepts, Philosophy, Definition and Characteristics
3. General Epidemiology – Definition, epidemiological triad, aims, epidemiological methods, uses
4. Environmental Health – Concepts, sources of water and purification of water, methods of waste disposal, role of dentist in mass disaster
5. Health Education- Definitions, principles, methods and barriers of communication
6. Nutrition and oral health
7. Behavioural science –Definition of sociology, anthropology and psychology and their relevance in dental practice and community programmes
8. Health care delivery system in India – oral health care delivery system, primary health care, National health care programmes, Health organizations

### B. Dental Public Health :

1. Introduction to Dental Public Health Definition , Difference between public health dentist and private practitioner.
2. Epidemiology of oral diseases - Epidemiology of dental caries, Epidemiology of periodontal diseases, Epidemiology of oral cancer.
3. Survey procedure- Definition, steps in survey, different types of survey
4. Planning and evaluation - oral health care planning, planning of prevention of oral diseases ,dental manpower planning, planning oral health education for the community, steps of evaluation
5. Delivery of dental care- dental auxiliary, incremental dental care, comprehensive dental care
6. School dental health programme- Aims , Principles , Different school dental health programme
7. Payment plans in dental care -Methods of payment, Dental insurance, Third party payment plans, Post payment plans
8. Indices- Definition, ideal requisites, classification, various indices used in measurement of oral diseases, criteria, advantages , limitations of indices

### C. Preventive Dentistry

1. Definitions
2. Levels of prevention
3. Prevention at individual, community and professional levels
4. Diet and Dental caries
5. Plaque control programme
6. Fluorides in dentistry  
History, sources, mechanism of action ,Systemic fluoride, Water fluoridation  
Salt fluoridation, Milk fluoridation, Fluoride tablets, fluoride drops, Topical fluorides  
Fluoride toxicity, Defluoridation

### D. Research Methodology and Biostatistics

1. Definition

2. Types of research
3. Defining and writing a protocol  
Biostatistics –Introduction, collection of data, presentation of data  
Measures of central tendency, Measures of dispersion, Normal curve,  
Tests of significance, Sampling methods, Bias, Blind trials, Calibration

#### **E. General Topics**

1. Dentist act of India with amendment
2. DCI composition and responsibility
3. Indian Dental Association
4. Practice management- Place and locality, premises and layout, Selection and equipments, Maintenance of the records, accounts, audit.

#### **PRACTICALS/CLINICALS/ FIELD PROGRAMME IN COMMUNITY DENTISTRY**

These exercises designed to help the IV year students :

1. Understand the community aspects of dentistry
2. Take up leadership role in solving community oral health problems

#### **Exercises :**

- a) Collection of statistical data (demographic) on population in India ,birth rates ,morbidity and mortality, literacy, per capita income- coordinating with Family adoption program of Community medicine and collecting additionally oral health data using proforma
- b) Incidence and prevalence of common oral disease like dental caries, periodontal diseases, oral cancer, fluorosis at national and international levels
- c) Preparation of oral health education material –posters, models, slides, lectures, play acting skits etc.
- d) Oral health status assessment of the community using indices, Oral hygiene index-simplified, DMFT/DMFS, CPITN, CPI and WHO basic Oral health survey methods-10 cases with proper history recordings
- e) Exploring and planning setting of private dental clinics in rural, semi urban and urban locations, availment of finances for dental practices-preparing project report
- f) Visit to primary health centre to acquaint with activities and primary health care delivery
- g) Visit to water purification plant/public health laboratory/centre for treatment of waste and sewage water
- h) Visit to schools -to assess the oral health status of school children ,emergency treatment and health education including possible preventive care at school (tooth brushing technique, demonstration and oral rinse programme)
- i) Visit to institution for the care of handicapped, physically, mentally or medically compromised patients
- j) Preventive Dentistry : in the department application of pit and fissure sealants, fluoride gel application procedure, A.R.T , Comprehensive oral health care for 5 patients.

The colleges are encouraged to involve in the N.S.S programme for college students for carrying out social work in rural areas

#### **SUGGESTED INTERNSHIP PROGRAMME IN COMMUNITY DENTISTRY**

##### **1. AT THE COLLEGE**

Students are posted to the department to get training in dental practice management

- a) Total oral health care approach in order to prepare the new graduates in their approach to diagnosis, treatment planning , cost of treatment ,prevention of treatment on schedule, recall maintenance of records etc at least 10 patients (both children and adults of all types posting for at least one month)
- b) The practice of chair side preventive dentistry including oral health education





## II. **AT THE COMMUNITY ORAL HEALTH CARE CENTRE (ADOPTED BY THE DENTAL COLLEGE IN RURAL AREAS)**

Graduates posted for at least one month to familiarize in :

- a) Survey methods, analysis and presentation of oral health assessment of school children and community independently using WHO basic oral health survey methods
- b) Participation in rural oral health education programmes
- c) Stay in the village to understand the problems and life in rural areas

III. **DESIRABLE** : Learning use of computers at least basic programme

### **EXAMINATION PATTERN**

1. Case history recording

Oral health assessment using following indices

OHI-S –Green and Vermillion

CPITN

CPI

DMFT, DMFS, def

W H O oral health assessment form (latest)

II **Health Education**

1. Make one –audio visual aid/poster
2. Delivering health education talk

III **Practical work**

1. Pit and fissure sealant application
2. Topical fluoride application

### **BOOKS RECOMMENDED AND REFERENCE**

1. Dentistry Dental Practice and the Community By David F Striffler and Brian A. Burt, W.B. Saunders company.
2. Principles of Dental Public Health by James Morse Dunning
3. Dental public health and community dentistry edited. by Anthony Jong, pub. by the C.V. Mosby company
4. Community Oral Health - A system approach by Patricia P. Corneir & Joyce I. Levy, Published by Appleton-Century-Crofts/New York
5. Community Dentistry – A problem oriented approach by P.C. Dental Hand Book series by Stephen L. Silverman, Ames F Tryon. Series editor -Alvin F. Gardner.PSG publishing comp. any Inc. Littleton Massachusetts
6. Dental Public Health – An introduction to Community Dentistry edited by Geoffrey L. Slack and Brian Burt, Published. by John Wright & sons Bristol
7. Oral Health Surveys - Basic methods  
Available at the regional office, New Delhi
8. Preventive Medicine and Hygiene – by Maxcy and Rosenau. Published by Appleton Century Crofts, 1986
9. Preventive Dentistry by J. O. Forrest published. By John Wright & sons Bristol, 1980
10. Preventive Dentistry – by Murray
11. Preventive and Social Medicine by Park and Park
12. Community dentistry by Dr. Soben Peter
13. Introduction to Biostatistics by B.K Mahajan

14. Research Methodology and Biostatistics – Visheshwar Rao
15. Introduction to Statistical Methods by Grewal
16. Textbook of Preventive and Community Dentistry by SS Hiremath 2007

## **18. PERIODONTOLOGY**

### **OBJECTIVES**

The student shall acquire the skill to perform dental scaling, diagnostic tests of periodontal diseases; to use the instruments for periodontal therapy and maintenance of the same.

The student shall develop attitude to impart the preventive measures namely, the prevention of periodontal diseases and the prevention of the progress of the disease. The student shall also develop an attitude to perform the treatment with full aseptic precautions; shall develop an attitude to prevent iatrogenic diseases; to conserve the tooth to the maximum possible time by maintaining periodontal health and to refer the patients who require specialist's care.

1. Introduction: Definition of Periodontology, Periodontics, Periodontia, Brief historical background, Scope of Periodontics.
2. Development of periodontal tissues, microstructural anatomy and biology of periodontal tissues in detail Gingiva, Junctional epithelium, Epithelial- mesenchymal interaction, Periodontal ligament, Cementum, Alveolar bone.
3. Defensive mechanisms in the oral cavity: Role of epithelium, Gingival fluid, Saliva and other defensive mechanisms in the oral environment.
4. Age changes in teeth and periodontal structures and their association with periodontal diseases.
5. Classification of Periodontal diseases: Need for classification, Scientific basis for classification, Classification of gingival and Periodontal diseases as described in World Workshop 1989

### **Gingivitis :**

Plaque associated, ANUG, Steroid hormone influence, Medication influenced, Desquamative gingivitis, other forms of gingivitis as in nutritional deficiency, bacterial and viral infections etc.

### **Periodontitis :**

Adult Periodontitis, Rapidly progressive Periodontitis A & B, Juvenile Periodontitis (localized, generalized and post juvenile) Prepubertal Periodontitis, Refractory Periodontitis.

6. Gingival diseases: Localized and Generalized gingivitis, Papillary, marginal and diffuse gingivitis. Etiology, pathogenesis, clinical signs, symptoms and management of:
  - i) Plaque associated gingivitis
  - ii) Systemically aggravated gingivitis (sex hormones, drugs and systemic diseases)
  - iii) ANUG
  - iv) Desquamative gingivitis – gingivitis associated with lichen planus, pemphigoid, pemphigus and other vesiculobullous lesions
  - v) Allergic gingivitis
  - vi) Infective gingivitis- Herpetic, bacterial and candidal
  - vii) Pericoronitis
  - viii) Gingival Enlargement (classification and differential diagnosis)
7. Epidemiology of Periodontal diseases :

- Definition of Index, Incidence, prevalence, Epidemiology, endemic, epidemic, and pandemic.
  - Classification of Indices (Reversible and Irreversible)
  - Deficiencies of Earlier Indices used in Periodontics.
  - Detailed understanding of Silness and Loe Plaque index, Loe and Silness gingival Index, CPITN & CPI
  - Prevalence of Periodontal diseases in India and other countries.
  - Public health significance. All these topics are covered at length in community dentistry. Hence the topics may be discussed briefly. However, questions may be asked from the topics for examination
8. Extension of inflammation from gingiva :
- Mechanism of spread of inflammation from gingival area to deeper periodontal structures.
  - Factors that modify the spread
9. Pocket :
- Definition, signs and symptoms, classification, pathogenesis, histopathology, root surface changes and contents of the pocket
10. Etiology :
- Dental plaque biofilm
  - Definition, new concept of biofilm
  - Types, composition, bacterial colonization, growth, maturation & disclosing agents
  - Role of dental plaque in Periodontal diseases
  - Plaque microorganisms in detail and bacteria associated with periodontal diseases.
  - Plaque retentive factors
  - 1 concepts about cells, Mast cells, Neutrophils, macrophages, lymphocytes, immunoglobulins, complement system, immune mechanisms and cytokines in brief.
  - Stages in gingivitis- Initial, Early, Established & Advanced
  - Periodontal disease activity, continuous paradigm, random burst & asynchronous multiple burst hypothesis.
13. Periodontitis :
- Etiology, histopathology, clinical signs and symptoms, diagnosis and treatment of adult Periodontitis
  - Periodontal abscess; definition, classification, pathogenesis, differential diagnosis and treatment
  - Furcation involvement, Glickmans classification, prognosis and management
  - Rapidly progressive Periodontitis
  - Juvenile Periodontitis: Localized and Generalized
  - Post- Juvenile Periodontitis
  - Periodontitis associated with systemic diseases.
  - Refractory Periodontitis
14. Diagnosis :
- Routine procedures, methods of probing, types of probes ( according to case history)
  - Halitosis : Etiology and treatment
  - Mention advanced diagnostic aids and their role in brief
15. Prognosis :
- Definition, types, purpose and factors to be taken in to consideration

16. Treatment plan :

- Factors to be considered

17. Periodontal therapy :

A. General principles of periodontal therapy. Phase I, II, III, IV therapy Definition of Periodontal regeneration, repair, new attachment and reattachment

B. Plaque control

- i. Mechanical toothbrushes, interdental cleaning aids, Dentrifrices
- ii. Chemical: classification and mechanism of action of each & pocket irrigation

18. Pocket eradication procedures :

- Scaling and root planning
- Indications
- Aims & objectives
- Healing following root planning
- Hand instruments, sonic, ultrasonic & piezo- electric scalers
- Curettage & present concepts
- Definition
- Indications
- Aims & objectives
- Healing following root planning
- Hand instruments, sonic, ultrasonic & piezo- electric scalers
- Curettage & present concepts
- Definition
- Indications
- Aims & objectives
- Procedures and healing response
- Flap surgery
- Definition
- Types of Flaps, Design of flaps, papilla preservation flap
- Indication & contraindication
- Armamentarium
- Surgical procedure and healing response

19. Osseous surgery :

Osseous defects in Periodontal disease

- Definition
- Classification
- Surgery: resective, additive osseous surgery (osseous grafts with classification of grafts)  
**Plasma Concentrates**
- Healing responses
- Other regenerative procedures; root conditioning
- Guided tissue regeneration

20. Mucogingival surgery & periodontal plastic surgeries:

- Definition

- Mucogingival problems: etiology, classification of gingival recession (P.D. Miller Jr. & Sullivan and Atkins)
  - Indications & Objectives
  - Gingival extension procedures: lateral pedicle graft, frenectomy, frenotomy
  - Crown lengthening procedures
  - Periodontal microsurgery in brief
21. Splints :
- Periodontal splints
  - Purpose & classification
  - Principles of splinting
22. Hypersensitivity :
- Causes, Theories& management
23. Implants :
- Definition, types, scope & biomaterials used. Periodontal considerations : such as implant- bone interface, implant- gingiva interface, implant failure, peri-implantitis & management
24. Maintenance phase (SPT) :
- Aims, objectives and principles
  - Importance
  - Procedures
  - Maintenance of implants
25. Pharmaco-therapy
- Periodontal dressings
  - Antibiotics & anti-inflammatory drugs
  - Local drug delivery system
26. Periodontal management of medically compromised patients :
- Topics concerning periodontal management of medically compromised patients
27. Interdisciplinary care :
- Pulpo-periodontal involvement
  - Routes of spread of infection
  - Simon's classification
  - Management
28. **Periodontal Medicine** :Systemic effects of periodontal diseases in brief :
- Cardiovascular diseases, Low birth weight babies etc.
29. Infection control protocol :
- Sterilisation and various aseptic procedures
30. Ethics
31. Microsurgery
32. **Lasers**

### 33. Piezo Surgery

#### **TUTORIALS DURING CLINICAL POSTING**

1. Infection control
2. Periodontal instruments
3. Chair position and principles of instrumentation
4. Maintenance of instruments (sharpening)
5. Ultrasonic, Piezoelectric and sonic scaling- demonstration of technique
6. Diagnosis of Periodontal diseases and determination of prognosis
7. Radiographic interpretation and lab investigation
8. Motivation of patients- oral hygiene instructions

Students should be able to record a detailed periodontal case history, determine diagnosis, prognosis and plan treatment. Student should perform scaling, root planning, local drug delivery and SPT. Shall be given demonstration of all periodontal surgical procedures.

#### **DEMONSTRATIONS**

1. History taking and clinical examination of the patients
2. Recording different indices
3. Methods of using various scaling and surgical instruments
4. Polishing the teeth
5. Bacterial smear taking
6. Demonstration to patients about different oral hygiene aids
7. Surgical procedures- gingivectomy, gingivoplasty and flap operations
8. Follow- up procedures, post operative care and supervision

#### **REQUIREMENTS**

1. Diagnosis, treatment planning and discussion and total periodontal treatment- 25 Cases
2. Dental scaling, oral hygiene instructions – 50 complete cases
3. Assistance in periodontal surgery- 5 cases
4. A work record should be maintained by all the students and should be submitted at the time of examination after due certification from the head of the department.

Students should have to complete the work prescribed by the concerned department from time to time and submit a certified record for evaluation.

#### **PRESCRIBED BOOK :**

1. Glickman's Clinical Periodontology- Carranza

#### **REFERENCE BOOKS**

1. Essentials of Periodontology and Periodontics- Torquil Macphee
2. Contemporary Periodontics- Cohen
3. Periodontal therapy- Goldman
4. Orbans' Periodontics- orban
5. Oral health survey - W. H. O
6. Preventive Periodontics- Young and Stiffler
7. Public health dentistry- Slack
8. Advanced Periodontal disease – John Prichard

- 9. Preventive Dentistry- Forrest
- 10. Clinical Periodontology- Jan Lindhe
- 11. Periodontics – Baer & Morris

## **19. PROSTHODONTICS AND CROWN & BRIDGE**

### **Complete Dentures**

- A. Applied Anatomy and Physiology
  - 1. Introduction
  - 2. Biomechanics of the edentulous state
  - 3. Residual ridge resorption
- B. Communicating with the patient
  - 1. Understanding the patient's mental attitude
  - 2. Instructing the patient
- C. Diagnosis and treatment planning for patients-
  - 1. With some teeth remaining
  - 2. With no teeth remaining
    - a) Systemic status
    - b) Local factor
    - c) The geriatric patient
    - d) Diagnostic procedures
- D. Articulators- discussion
- E. Improving the patient's denture foundation and ridge relation -an overview.
  - a) Pre-operative examination
  - b) Initial hard tissue & soft tissue procedure
  - c) Secondary hard & soft tissue procedure
  - d) Implant procedure
  - e) Congenital deformities
  - f) Postoperative procedure
- F. Principles of Retention, Support and Stability G. Impressions - detail.
  - a) Muscles of facial expression.
  - b) Biologic considerations for maxillary and mandibular impression including anatomical landmarks and their interpretation
  - c) Impression objectives
  - d) Impression materials
  - e) Impression techniques
  - f) Maxillary and mandibular impression procedures
    - i. Preliminary impressions
    - ii. Final impressions
  - g) Laboratory procedures involved with impression making (Beading & Boxing, and cast preparation)
- H. Record bases and occlusion rims - in detail
  - a) Materials & techniques
  - b) Useful guidelines and ideal parameters
  - c) Recording and transferring bases and occlusal rims
- I. Biological consideration in jaw relation & jaw movements - craniomandibular relations
  - a) Mandibular movements

- b) Maxillo -mandibular relation including vertical and horizontal jaw relations
  - c) Concept of occlusion- discuss in brief
- J. Relating the patient to the articulator
- a) Face bow types & uses– discuss in brief
  - b) Face bow transfer procedure - discuss in brief
- K. Recording maxillo mandibular relation
- a) Vertical relations
  - b) Centric relation records
  - c) Eccentric relation records
  - d) Lateral relation records
- L. Tooth selection and arrangement
- a) Anterior teeth
  - b) Posterior teeth
  - c) Esthetic and functional harmony
- M. Relating inclination of teeth to concept of occlusion- in brief
- a) Neurocentric concept
  - b) Balanced occlusal concept
- N. Trial dentures
- O. Laboratory procedures
- a) Wax contouring
  - b) Investing of dentures
  - c) Preparing of mold
  - d) Preparing & packing acrylic resin
  - e) Processing of dentures
  - f) Recovery of dentures
  - g) Lab remount procedures
  - h) Recovering the complete denture from the cast
  - i) Finishing and polishing the complete denture
  - j) Plaster cast for clinical denture remount procedure
- P. Denture insertion
- a) Insertion procedures
  - b) Clinical errors
  - c) Correcting occlusal disharmony
  - d) Selective grinding procedures
- R. Treating problems with associated denture use – discuss in brief (tabulation/flow-chart form)
- S. Treating abused tissues - discuss in brief
- T. Relining and rebasing of dentures- discuss in brief
- V. Immediate complete dentures construction procedure- discuss in brief
- W. The single complete denture- discuss in brief
- X. Overdentures denture- discuss in brief
- Y. Dental implants in complete denture - discuss in brief



Note : It is suggested that the above mentioned topics be dealt with wherever appropriate in the following order so as to cover –

1. Definition
2. Diagnosis (of the particular situation /patient selection /treatment planning)
3. Types / Classification
4. Materials
5. Methodology – Lab /Clinical
6. Advantages & disadvantages
7. Indications, contraindications
8. Maintenance Phase

### **Removable Partial Dentures**

1. Introduction  
Terminologies and scope
2. Classification
3. Examination, Diagnosis & Treatment planning & evaluation of diagnostic data.
4. Components of a removable partial denture  
Major connectors  
Minor connectors  
Rest and rest seats
5. Components of a Removable Partial Denture  
Direct retainers  
Indirect retainers  
Tooth replacement
6. Principles of Removable Partial Denture Design
7. Survey and design – in brief  
Surveyors  
Surveying  
Designing
8. Mouth preparation and master cast
9. Impression materials and procedures for removable partial dentures
10. Preliminary jaw relation and esthetic try-in for some anterior replacement teeth
11. Laboratory procedures for framework construction-in brief
12. Fitting the framework - in brief
13. Try-in of the partial denture - in brief
14. Completion of the partial denture - in brief
15. Inserting the Removable Partial Denture - in brief
16. Post insertion observations
17. Temporary Acrylic Partial Dentures
18. Immediate Removable Partial Denture
19. Removable Partial Dentures opposing Complete denture

Note : it is suggested that the above mentioned be dealt with wherever appropriate in the following order so as to cover-

1. Definition
2. Diagnosis and treatment planning
3. Types / Classification
4. Materials
5. Methodology – Lab /Clinical
6. Advantages & disadvantages

7. Indications, contraindications
8. Maintenance Phase

### **Fixed Partial Dentures**

#### **Topics To Be Covered In Detail -**

1. Introduction
2. Fundamentals of occlusion – in brief
3. Articulators – in brief
4. Treatment planning for single tooth restorations
5. Treatment planning for the replacement of missing teeth including selection and choice of abutment teeth
6. Fixed partial denture configurations
7. Principles of tooth preparations
8. Preparations for full veneer crowns – in detail
9. Preparations for partial veneer crowns – in brief
10. Provisional Restorations
11. Fluid Control and Soft Tissue Management
12. Impressions
13. Working Casts and Dies
14. Wax Patterns
15. Pontics and Edentulous Ridges
16. Esthetic Considerations
17. Finishing and Cementation

#### **Topics To Be Covered In Brief -**

1. 1.Solder Joints and Other Connectors
2. All - Ceramic Restorations
3. Metal - Ceramic Restorations
4. Preparations of intracoronal restorations.
5. Preparations for extensively damaged teeth.
6. Preparations for periodontally weakened teeth
7. The Functionally Generated Path Technique
8. Investing and Casting
9. Resin - Bonded Fixed Partial Denture

Note : The above mentioned topics be dealt with wherever appropriate in the following order so as to cover

1. Definition
2. Diagnosis(of the particular situation /patient selection /treatment planning)
3. Types / Classification
4. Materials
5. Methodology – Lab /Clinical
6. Advantages & disadvantages
7. Indications, contraindications
8. Maintenance Phase

#### **Recommended Books**

1. Boucher's Prosthodontic Treatment for edentulous patients
2. Syllabus of Complete Dentures/Heartwell
3. Text book of complete Denture/Prothodontics/Winkler
4. Dental laboratory procedures/Rhoads Vol. I, II & III

5. Mastering of the art of complete dentures/Halperin et al
6. Clinical removable partial prosthodontics/Stewart
7. Tylman's theory and practice of fixed prosthodontics/Malone
8. Fundamentals of tooth preparation for cast metal and porcelain Restoration/Shillingburg
9. Fundamentals of fixed prosthodontics/Shillingburg
10. McCrackens/Removable partial prosthodontics
11. Macgregor/Clinical dental prosthetics
12. Contemporary fixed prosthodontics/Rosential
13. Contemporary implant dentistry/Misch
14. Tissues intergrated Prosthetics/Branmark
15. Occlusion/Ramfjord and Ash
16. Overdentures/Brewer
17. Maxillo facial prosthetics/John Beumer
18. Implant Dentistry/Babbush
19. Maxillofacial Prosthetics - William Laney
20. Removable Partial Prosthodontics-Ernest L. Miller and Joseph e. Grasso

## **20. AESTHETIC DENTISTRY**

1. Introduction and scope of aesthetic dentistry
2. Anatomy and physiology of smile
3. Role of the color in aesthetic dentistry
4. Simple procedures (Enhancing aesthetic appearance)
5. Bleaching of teeth
6. Veneers with various materials
7. Preventive and interceptive aesthetics
8. Ceramics
9. Simple clinical procedures for BDS students
10. Simple gingival contouring

### **Recommended books :**

1. Esthetic guidelines for restorative dentistry; Scharer & others
2. Esthetics of anterior fixed prosthodontics; Chiche (GJ) & Pinault (Alain)
3. Esthetic & the treatment of facial form, Vol 28; Mc Namara (JA)

## **21. FORENSIC ODONTOLOGY (30 hrs of instruction)**

### **Definition**

Forensic is derived from the Latin word forum, which means 'court of law.' Odontology literally implies 'the study of teeth.' Forensic odontology, therefore, has been defined by the Fédération Dentaire Internationale (FDI) as "that branch of dentistry which, in the interest of justice, deals with the proper handling and examination of dental evidence, and with the proper evaluation and presentation of dental findings."

### **Objectives of the undergraduate curriculum**

At the end of the programme, the dental graduate should :

1. Have sound knowledge of the theoretical and practical aspects of forensic odontology.
2. Have an awareness of ethical obligations and legal responsibilities in routine practice and forensic casework.
3. Be competent to recognise forensic cases with dental applications when consulted by the police, forensic pathologists, lawyers and associated professionals.
4. Be competent in proper collection of dental evidence related to cases of identification, ethnic and sex differentiation, age estimation and bite marks.

5. Be able to assist in analysis, evaluation, and presentation of dental facts within the realm of law.

### **Curriculum for forensic odontology**

#### **1. Introduction to forensic dentistry**

- § Definition and history
- § Recent developments and future trends

#### **2. Overview of forensic medicine and toxicology**

- § Cause of death and postmortem changes
- § Toxicological manifestations in teeth and oral tissues

#### **3. Dental identification**

- § Definition
- § Basis for dental identification
- § Postmortem procedures
- § Dental record compilation and interpretation
- § Comparison of data, and principles of report writing
- § Identification in disasters and handling incinerated remains
- § Postmortem changes to oral structures

#### **4. Maintaining dental records**

- § Basic aspects of good record-keeping
- § Different types of dental records
  - Dental charts
  - Dental radiographs
  - Study casts
  - Denture marking
  - Photographs
- § Dental notations
- § Relevance of dental records in forensic investigation

#### **5. Age estimation**

- § Age estimation in children and adolescents
  - Advantages of tooth calcification over 'eruption' in estimating age
  - Radiographic methods of Schour & Massler, Demirjian et al
- § Age estimation in adults
  - Histological methods – Gustafson's six variables and Johanson's modification, Bang & Ramm's dentine translucency
  - Radiographic method of Kvaal et al
- § Principles of report writing

#### **6. Sex differentiation**

- § Sexual dimorphism in tooth dimensions (Odontometrics)

#### **7. Ethnic variations ('racial' differences) in tooth morphology**

- § Description of human population groups
- § Genetic and environmental influences on tooth morphology
- § Description of metric and non-metric dental features used in ethnic differentiation

#### **8. Bite mark procedures**

- § Definition and classification
- § Basis for bite mark investigation

- § Bite mark appearance
- § Macroscopic and microscopic ageing of bite marks
- § Evidence collection from the victim and suspect of bite mark
- § Analysis and comparison
- § Principles of report writing
- § Animal bite investigation

## **9. Dental DNA methods**

- § Importance of dental DNA evidence in forensic investigations
- § Types of DNA and dental DNA isolation procedures
- § DNA analysis in personal identification
- § Gene-linked sex dimorphism
- § Population genetics

## **10. Jurisprudence and ethics**

- § Fundamentals of law and the constitution
- § Medical legislation and statutes (Dental and Medical Council Acts, etc)
- § Basics of civil law (including torts, contracts and consumer protection act)
- § Criminal and civil procedure code (including expert witness requirement)
- § Assessment and quantification of dental injuries in courts of law
- § Medical negligence and liability
- § Informed consent and confidentiality
- § Rights and duties of doctors and patients
- § Medical and dental ethics (as per Dentists' Act)

## **Theory sessions and practical exercises**

Total hours for the course

- § Didactic – 10-12 hours
- § Practical – 20-25 hours

Detailed didactic sessions for the above components, either in the form of lectures or as structured student-teacher interactions, is essential. Specialists from multiple disciplines, particularly from legal and forensic sciences, can be encouraged to undertake teaching in their area of expertise.

An interactive, navigable and non-linear (INN) model may also be utilised for education.

Practical exercises (real-life casework and/or simulated cases) must complement didactic sessions to facilitate optimal student understanding of the subject. Mandatory practical training in dental identification methods, dental profiling (ethnic and sex differences, radiographic age estimation), and bite mark procedures, is of paramount importance. In addition, practical exercises/demonstrations in histological age estimation, comparative dental anatomy, DNA methods, medical autopsy, court visits, and other topics may be conducted depending on available expertise, equipment and feasibility.

## **Approach to teaching forensic odontology**

Forensic odontology could be covered in two separate streams. The divisions include a preclinical stream and a clinical stream.

### **Preclinical stream**

- § Introduction to forensic odontology
- § Sex differences in odontometrics
- § Dental DNA methods

- § Bite marks procedures
- § Overview of forensic medicine and toxicology

It could prove useful to undertake the preclinical stream in II or III year under Oral Biology/Oral Pathology since these aspects of forensic odontology require grounding in dental morphology, dental histology and basic sciences, which, students would have obtained in I and/or II BDS.

#### **Clinical stream**

- § Dental identification
- § Maintaining dental records
- § Radiographic age estimation
- § Medical jurisprudence and ethics

It would be suitable to undertake these topics as part of Oral Medicine and Radiology, since students require reasonable clinical exposure and acumen to interpret dental records, perform dental postmortems and analyse dental radiographs for age estimation.

- § Ethnic variations in tooth morphology
- § Histological age estimation

#### **Reference Books :**

Text book of oral pathology by, NEVILLE  
 Text book of oral pathology by, SHAFER  
 SHAFER'S Text book of oral pathology by, RAJENDRAN

#### **22. ORAL IMPLANTOLOGY (30 hrs of instruction)**

Topics in Oral Implantology shall be covered in association with dept. of Oral and Maxillofacial Surgery. The following topics shall be taught after the surgical phase is covered by Oral Surgery dept.

1. General considerations in prosthodontic reconstruction & biomechanics
2. Prosthodontic components of the Branemark system as a role model
3. Impression procedures & preparation of master cast
4. Jaw relation records and construction of superstructure with special emphasis on occlusion for osseointegrated prosthesis
5. Management of prosthodontic complications & failures
6. Recall & maintenance phase
7. Criteria for success of osseointegrated implant supported prosthesis

#### **Suggested books for reading :**

1. Contemporary Implant Dentistry —Carl E. Misch, Mosby, 1993, I edition
2. Osseointegration and Occlusal Rehabilitation.....Hobo S, Ichida, E, Garcia L.T.
3. Quintessence Publishing Company, 1989, I edition

#### **Other curricular activities**

The following curricular activities should be encouraged in addition to regular lectures and practicals/clinicals

1. Seminars
2. Problem based learning
3. Chair side assisting the teaching staff
4. Class tests at regular intervals
5. Group discussions/ Forum discussions
6. Tutorials

### **23. BEHAVIOURAL SCIENCES (20 hrs of instruction)**

#### **Goal :**

The aim of teaching behavioural sciences to undergraduate student is to impart such knowledge & skills that may enable him to apply principles of behaviour-

- a) For all round development of his personality
- b) In various therapeutic situations in dentistry

The student should be able to develop skills of assessing psychological factors in each patient, explaining stress, learning simple counseling techniques and improving patients compliance behaviour.

#### **Objectives :**

##### A) Knowledge & Understanding :

At the end of the course, the student shall be able to :

- 1) Comprehend different aspects of normal behavior like learning, memory, motivation, personality & intelligence.
- 2) Recognise difference between normal and abnormal behavior.
- 3) Classify psychiatric disorders in dentistry.
- 4) Recognise clinical manifestations of dental phobia, dental anxiety, facial pain, orofacial manifestations of psychiatric disorders and behavioural problems in children. Addictive disorders, psychological disorders in various dental departments.
- 5) Have understanding of stress in dentistry and knowledge of simple counseling techniques.
- 6) Have some background knowledge of interpersonal, managerial and problem solving skills which are an integral part of modern dental practice.
- 7) Have knowledge of social context of dental care.

##### B) Skills :

The student shall be able to :

- 1) Interview the patient and understand different methods of communication skills in dentist – patient relationship.
- 2) Improve patient compliance behaviour.
- 3) Develop better interpersonal, managerial and problem solving skills.
- 4) Diagnose and manage minor psychological problems while treating dental patients.

#### **Integration :**

The training in Behavioural sciences shall prepare the students to deliver preventive, promotive, curative and rehabilitative services to the care of the patients both in family and community and refer advanced cases to specialised psychiatric hospitals.

Training should be integrated with all the departments of Dentistry, Medicine, pharmacology, Physiology and Biochemistry.

#### **Psychology :**

1. Definition & Need of Behavioural Science. Determinants of Behaviour. Scope of Behavioural Science.
2. Sensory process & perception perceptual process – clinical applications.
3. Attention – Definition – factors that determine attention. Clinical application.
4. Memory – Memory process – Types of memory, Forgetting.
5. Definition – Laws of learning  
Type of learning. Classical conditioning, operant conditioning, cognitive learning, Insight learning, social learning, observational learning, principles of learning – Clinical application.
6. Intelligence – Definition: Nature of intelligence stability of intelligence Determinants of intelligence, clinical application

7. Thinking – Definition: Types of thinking, delusions, problem solving
8. Motivation – Definition: Motive, drive, needs classification of motives
9. Emotions – Definition differentiation from feelings – Role of hypothalamus, Cerebral cortex, adrenal glands  
ANS. Theories of emotion, Types of emotions.  
Personality. Assessment of personality: Questionnaires, personality inventory, rating scales,  
Interview projective techniques – Rorshach ink blot test, RAT, CAT

**Sociology :**

Social class, social groups – family, types of family, types of marriages, communities and nations and institutions.

**Reference Books :**

1. General Psychology – S.K. Mangal
2. General Psychology – Hans Raj, Bhatia
3. General Psychology – Munn
4. Behavioural Sciences in Medical practice – Manju Mehta
5. Sciences basic to Psychiatry – Basanth Puri & Peter J. Tyrer

**24. ETHICS (20 hrs. of instruction)**

**INTRODUCTION**

There is a definite shift from the traditional patient and doctor relationship and delivery of dental care. With advances in science and technology and the increasing needs of the patient, their families and community, there is a concern for the health of the community as a whole. There is a shift to greater accountability to the society. Dental specialists like other health professionals are confronted with many ethical problems. It is therefore absolutely necessary for each and every one in health care delivery to prepare themselves to deal with these problems. To accomplish this and develop human values the Council desires that all the trainees undergo ethical sensitisation by lectures or discussion on ethical issues, discussion of cases with an important ethical component.

**COURSE CONTENT**

**Introduction to Ethics -**

- What is Ethics?
- What are values and norms?
- How to form a value system in one's personal and professional life?
- Hippocratic Oath
- Declaration of Helsinki, WHO declaration of Geneva, International code of ethics, DCI Code of ethics.

**Ethics in Dentistry -**

- Right to be respected
- Truth and confidentiality
- Code of conduct
- Contract and confidentiality
- Charging of fees
- Prescription of drugs
- Malpractice and negligence

**Ethics in Research-**

- Animal and experimental research
- Human experimentation
- Human volunteer research- informed consent
- Drug trials

**RECOMMENDED READING**

Medical Ethics, Francis C.M, 1 ED 1993, Jaypee Brothers, New Delhi



## **CURRICULUM OF DENTAL INTERNSHIP PROGRAMME**

1. The duration of Internship shall be one year
2. All parts of Internship shall be done in a Dental College duly recognized / approved by the Dental Council of India for the purpose of imparting education and training to Dental graduates in the country
3. The Interns shall be paid stipendiary allowance during the period of an internship not extending beyond a period of one year
4. The internship shall be compulsory and rotating as per the regulations prescribed for the purpose.
5. The degree – BDS shall be granted after completion of Internship

### **Determinants of Curriculum for internship for Dental Graduates :**

The curricular contents of Internship training shall be based on

- i. Dental health needs of the society
- ii. Financial, material and manpower resources available for the purpose
- iii. National Dental Health Policy
- iv. Socio-economic conditions of the people in general
- v. Existing Dental as also the primary health care concept for the delivery of health services.
- vi. Task analysis of what graduates in Dentistry in various practice settings, private and government service actually perform.
- vii. Epidemiological studies conducted to find out prevalence of different dental health problems, taking into consideration the magnitude of dental problems, severity of dental problems and social disruption caused by these problems.

### **Objectives**

- A. To facilitate reinforcement of learning and acquisition of additional knowledge:
  - a) Reinforcement of knowledge
  - b) Techniques and resources available to the individual and the community; social and cultural setting
  - c) Training in a phased manner, from a shared to a full responsibility
- B. To facilitate the achievement of basic skills, attaining competence Vs. maintaining competence in:
  - I. History taking
  - II. Clinical examination
  - III. Performance and interpretation of essential laboratory data
  - IV. Data analysis and inference
  - V. Communication skills aimed at imparting hope and optimism in the patient
  - VI. Attributes for developing working relationship in the Clinical setting and community team work.
- C. To facilitate development of sound attitudes and habits
  - i. Emphasis on individual and human beings and not on disease/symptoms
  - ii. Provision of comprehensive care, rather than fragmentary treatment
  - iii. Continuing Dental Education and learning of accepting the responsibility
- D. To facilitate understanding of professional and ethical principles:
  - Right and dignity of patients
  - Consultation with other professionals and referral to seniors / Institutions

- Obligations to peers, colleagues, patients, families and community
  - Provision of free professional services in an emergent a situation
- E. To initiate individual and group action, leading to disease prevention and dental health promotion at the level of individuals families and the community

**Content (subject matter)**

The compulsory rotating paid Dental Internship shall include training in Oral Medicine & Radiology; Oral & Maxillofacial Surgery; Prosthodontics; Periodontics, Conservative Dentistry, Pedodontics; Oral Pathology& Microbiology; Orthodontics and Public Health Dentistry.

**General Guidelines :**

1. It shall be task-oriented training. The Interns should participate in various Institutional and field programmes and be given due responsibility to perform the activities in all departments of the Dental Colleges and associated Institutions.
2. To facilitate achievement of basic skills and attitudes the following facilities should be provided to all dental graduates.
  - I. History taking, examination, diagnosis, charting and recording treatment plan of cases
  - II. Presentation of cases in a group of Seminar
  - III. Care and sterilization of instruments used
  - IV. Performance and interpretation of essential laboratory tests and other relevant investigations
  - V. Data analysis and inference
  - VI. Proper use of antibiotics, anti-inflammatory and other drugs, as well as other therapeutic modalities.
  - VII. Education of patients, their relatives and community on all aspects of dental health care while working in the Institution as also in the field.
  - VIII. Communication aimed at inspiring hope, confidence and optimism.
  - IX. Legal rights of patients and obligations of dental graduate under forensic jurisprudence.

**1. Oral Medicine & Radiology :**

1. Standardized examination of patients 25 cases
2. Exposure to clinical pathological laboratory procedure  
And biopsies 5 cases
3. Effective training in taking of Radiographs : 2 Full Mouth  
(Intra – oral) I,O (Extra oral) E.O 1  
Cephalogram 1
4. Effective management of cases in wards 2 cases

**2. Oral and Maxillofacial Surgery**

A. The Interns during their posting in oral surgery shall perform the following procedures:

1. Extractions 50
2. Surgical extractions 2
3. Impactions 2
4. Simple Intra Maxillary Fixation 1
5. Cysts enucleations 1
6. Incision and drainage 2
7. Alveoloplasties, Biopsies & Frenectories, etc. 3

B. The Interns shall perform the following on Cancer patients :

1. Maintain file work

2. Do extractions for radiotherapy cases
  3. Perform biopsies
  4. Observe varied cases of oral cancers
- C. The Interns shall have 15 days posting in emergency services of a dental/general hospital with extended responsibilities in emergency dental care in the wards. During this period they shall attend to all emergencies under the direct supervision of oral surgeon during any operation.:
1. Emergencies
    - (i) Toothache, (ii) Trigeminal neuralgia; (iii) Bleeding from mouth due to trauma, post extraction, bleeding disorder or haemophilia; (iv) Airway obstruction due to fracture mandible and maxilla; dislocation of mandible, syncope or vasovagal attacks; Ludwig's angina; tooth fracture; post intermaxillary fixation after general anaesthesia.
  2. Work in I.C.U with particular reference to resuscitation procedures.
  3. Conduct tutorials on medico- legal aspects including reporting on actual cases coming to casualty. They should have visits to law courts.

### 3. Prosthodontics and Crown & Bridge

The dental graduates during their internship posting in Prosthodontics shall make:

- |                                                                                   |   |
|-----------------------------------------------------------------------------------|---|
| 1. Complete denture (upper & lower)                                               | 2 |
| 2. Removable Partial denture                                                      | 4 |
| 3. Fixed Partial denture                                                          | 1 |
| 4. Planned cast partial denture                                                   | 1 |
| 5. Miscellaneous like relines / overdentures/ repairs of Maxillofacial Prosthesis | 1 |
| 6. Learning use of Face bow and Semi anatomic articulator technique               |   |
| 7. Crowns                                                                         |   |
| 8. Introduction of Implants                                                       |   |

### 4. Periodontics

A. The Interns shall perform the following procedures

- |                     |          |
|---------------------|----------|
| 1. Prophylaxis      | 15 cases |
| 2. Flap Operation   | 2 cases  |
| 3. Root Planning    | 1 case   |
| 4. Curettage        | 1 case   |
| 5. Gingivectomy     | 1 case   |
| 6. Perio-Endo cases | 1 case   |

B. During their one week posting in the community health centers, the Interns shall educate the public in prevention of Periodontal diseases.

### 5. Conservative Dentistry & Endodontics

To facilitate reinforcement of learning and achievement of basic skills, the interns shall perform at least the following procedures independently or under the guidance of supervisors:

- |                                               |         |
|-----------------------------------------------|---------|
| 1. Restoration of extensively mutilated teeth | 5 cases |
| 2. Inlay and onlay preparations               | 1 case  |

- |    |                                                                         |         |
|----|-------------------------------------------------------------------------|---------|
| 3. | Use of tooth coloured restorative materials                             | 4 cases |
| 4. | Treatment of discoloured vital and non- vital teeth                     | 1 case  |
| 5. | Management of dento alveolar fracture                                   | 1 case  |
| 6. | Management of pulpless, single – rooted teeth without periapical Lesion | 4 cases |
| 7. | Management of acute dento alveolar infections                           | 2 cases |
| 8. | Management of pulpless, single – rooted teeth with periapical Lesion.   | 1 case  |
| 9. | Non surgical management of traumatized teeth during formative Period.   |         |

**6. Pediatric Pedodontics and Preventive Dentistry :**

During their posting in Pedodontics the Interns shall perform :

- |    |                                                               |          |
|----|---------------------------------------------------------------|----------|
| 1. | Topical application of fluorides including varnish            | 5 cases  |
| 2. | Restorative procedures of carious deciduous teeth in children | 10 cases |
| 3. | Pulpotomy                                                     | 2 Cases  |
| 4. | Pulpectomy                                                    | 2 Cases  |
| 5. | Fabrication and Insertion of space maintainers                | 1 Case   |
| 6. | Oral Habit breaking appliances                                | 1 Case   |

**7. Oral pathology and microbiology**

The Interns shall perform the following

- |    |                                              |         |
|----|----------------------------------------------|---------|
| 1. | History – recording and clinical examination | 5 cases |
| 2. | Blood and Sputum examination                 | 5 cases |
| 3. | Exfoliative Cytology and smears study        | 2 case  |
| 4. | Biopsy – Laboratory Procedure & reporting    | 1 case  |

**8. Orthodontics**

A. The Interns shall observe the following procedures during their posting in Orthodontics

- |    |                                                                                                                               |  |
|----|-------------------------------------------------------------------------------------------------------------------------------|--|
| 1. | Detailed diagnostic procedures for 5 patients                                                                                 |  |
| 2. | Laboratory techniques including wire-bending for removable appliances, soldering and processing of myo functional appliances. |  |
| 3. | Treatment of plan options and decisions                                                                                       |  |
| 4. | Making of bands, bonding procedures and wire insertions                                                                       |  |
| 5. | Use of extra oral anchorage and observation of force values                                                                   |  |
| 6. | Retainers                                                                                                                     |  |
| 7. | Handling of patients with oral habits causing malocclusions                                                                   |  |

B. The Interns shall do the following laboratory work

- |    |                                                                                                             |         |
|----|-------------------------------------------------------------------------------------------------------------|---------|
| 1. | Wire bending for removable appliances and space maintainers Including welding and heat treatment procedures | 5 cases |
| 2. | Soldering exercises, banding & bonding procedures                                                           | 2 cases |
| 3. | Cold – cure and heat –cure acryllsation of simple orthodontic Appliances                                    | 5 cases |

## 9. Public Health Dentistry :

1. The Interns shall conduct Health education sessions for individuals and groups on oral health public health nutrition, behavioral sciences, environmental health, preventive dentistry and epidemiology.
2. They shall conduct a short term epidemiological survey in the community or in the alternative, participate in the planning and methodology.
3. They shall arrange effective demonstrations of:
  - a) Preventive and Intercepted producers for prevalent dental diseases 5 cases
  - b) Mouth-rinsing and other oral hygiene demonstrations 5 cases
  - c) Tooth brushing techniques
4. Conduction of oral health education programmes at
  - A. School setting 2
  - B. Community setting 2
  - C. Adult education programmes 2
5. Preparation of Health Education materials 5
6. Exposure to team concept and National Health Care systems:
  - a) Observation of functioning of health Infrastructure.
  - b) Observation of functioning of health case team including multipurpose workers male and female, health educators and other workers
  - c) Observation of at least one National Health Programme
  - d) Observation of inter linkages of delivery of oral health care with Primary Health care  
Mobile dental clinics, as and when available, should be provide for this teachings.

## 10. Elective Posting

The Interns shall be posted for 15 days in any of the dental departments of their choice mentioned in the foregoing.

### Organisation of content :

The Curriculum during the 4 years of BDS training is subject based with more emphasis on learning practical skills. During one year Internship the emphasis will be on competency-based, community oriented training. The practical skills to be mastered by the Interns along with the minimum performance level are given under the course content of different departments of Dental Education.

### Specification of teaching activities

Emphasis shall be on chair-side teaching, small group teaching and discussions, tutorials, seminars, ward posting, laboratory posting, field visits and self learning.

### Use of Resource Materials :

Overhead projectors, slide projectors, film projectors charts diagrams, photographs, posters, specimens, models and other audiovisual aids shall be provided in all the Dental Colleges and attached institutions and field area. If possible, television, video and tapes showing different procedures and techniques to be mastered by the Interns should be provided.

### Evaluation

#### 1. Formative Evaluation :

Day-to-day assessment of the Interns during their internship posting should be done. The objective that as the Interns must acquire necessary minimum skills required for carrying out day-to-day professional work competently.

This can be achieved by maintaining records and performance data book by all Interns. This will not only provide a demonstrable evidence of the processes of training but more importantly of the Interns own acquisition of competencies as related to performance. It shall form a part of formative evaluation and shall also constitute a component of final grading of Interns.

## **2. Summative Evaluation :**

It shall be based on the observation of the supervisors of different departments and the records and performance data book maintained by the Interns. Grading shall be done accordingly.

### **11. Rural Services**

In the rural services, the student will have to participate in -

1. Community Health Monitoring programmes and services which include Preventive, Diagnostic and corrective procedures
2. To create educational awareness about dental hygiene and diseases
3. Conduction of Oral Health Education Programme at -
  - a. School setting - 5
  - b. Community Setting - 5
  - c. Adult Education Programme - 5
4. Compulsory setup of satellite clinics in remote areas - 1
5. Lectures to create awareness and education in public forums about the harmful effects of tobacco consumption and the predisposition to oral cancer – two Lectures per student

### **Period of Postings :**

- |                                             |   |            |
|---------------------------------------------|---|------------|
| 1. Oral Medicine & Radiology                | - | 1 month    |
| 2. Oral & Maxillofacial Surgery             | - | 1 ½ months |
| 3. Prosthodontics & Crown & Bridge          | - | 1 ½ months |
| 4. Periodontics                             | - | 1 month    |
| 5. Conservative Dentistry                   | - | 1 Month    |
| 6. Pedodontics                              | - | 1 month    |
| 7. Oral Pathology & Microbiology            | - | 15 days    |
| 8. Orthodontics                             | - | 1 month    |
| 9. Public Health Dentistry / Rural Services | - | 3 months   |
| 10. Elective                                | - | 15 days    |

## Summary of amendments

### Periodontics

Amendment - Addition of the following topics to the UG Curriculum

Laser - Page No. 85

Plasma Concentrates- Page No. 84

Plezo Surgery Page No. 86

Halitosis (for 3rd BDS) - Page No. 83

Periodontal Medicine - Page No. 85

### Oral Pathology

#### Amendment

Clinical Application of Dental Anatomy, Physiology and occlusion - Page No. 53

### Public Health Dentistry

#### Amendment

Case history quota increased to 10 - Page No. 79

Oral health education component added into family adoption problem - Page No. 79