CHHATRAPATI SHAHU MAHARAJ SHIKSHAN SANSTHA'S

DENTAL COLLEGE & HOSPITAL,

KANCHANWADI, PAITHAN ROAD, AURANGABAD

JOURNAL OF DENTOVISION 2022

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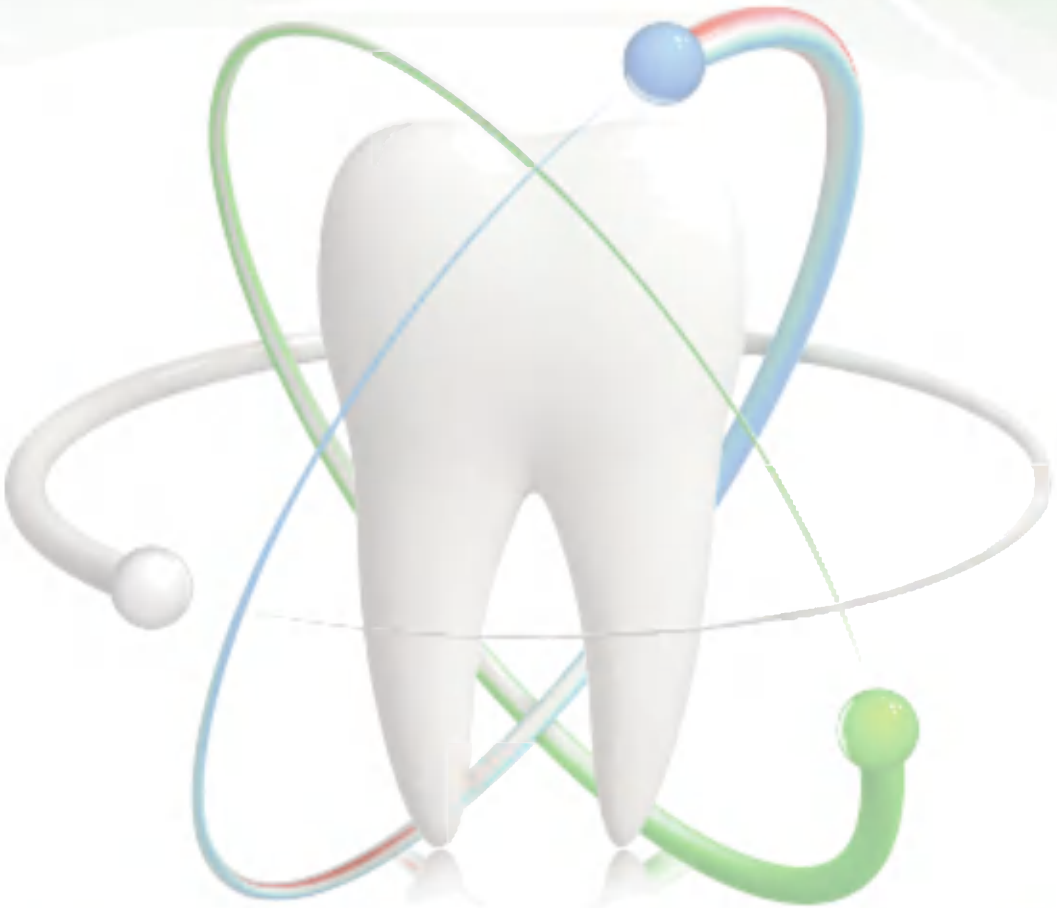
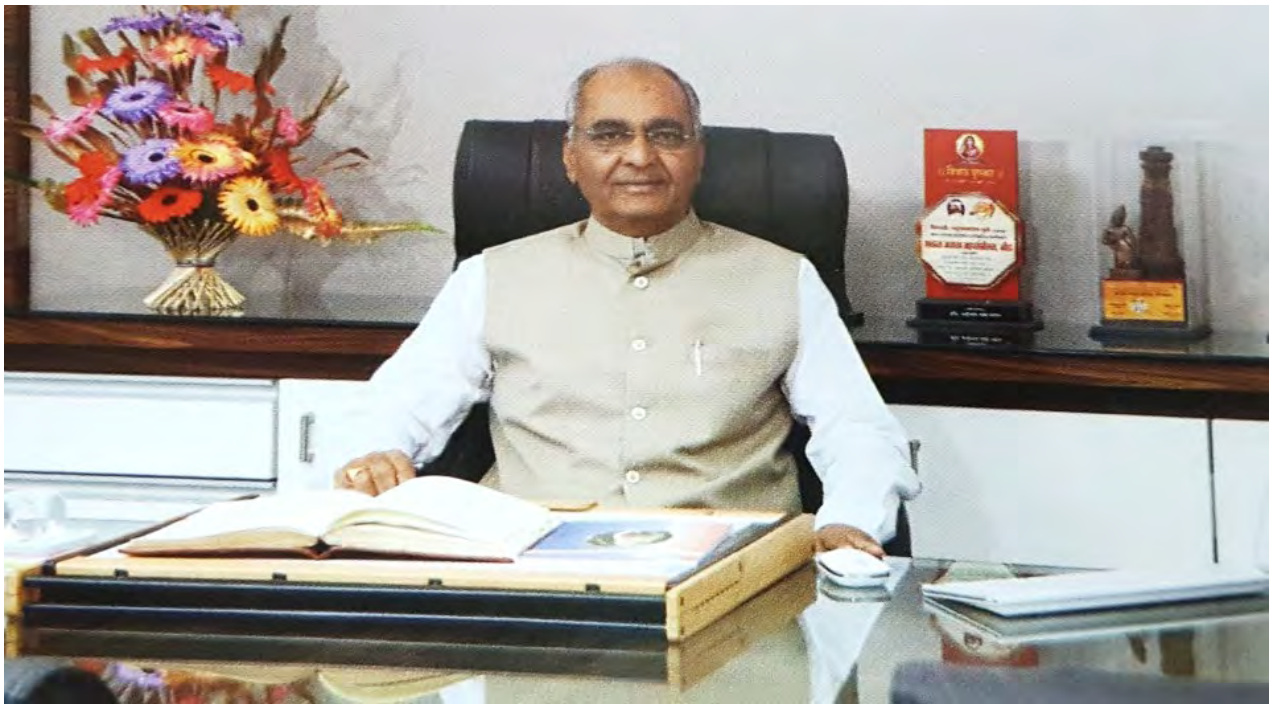


राजर्षी छत्रपती शाहू महाराज

धन्य धन्य तू शाहूराया, तुजसम राजा तुच एकला ।
तूच शिवाजी, बुध्द देव तू, तूच हरी सावळा ॥

OUR INSPIRATION



Hon. Shri. Padmakarji H. Mulay,

Hon. Secretary, CSMSS Sanstha, Aurangabad

MESSAGE FROM THE PRESIDENT

Chhatrapati Shahu Maharaj Shikshan Sanstha is one of the leading educational institutes. Since it was established, this sanstha is known for its massive academic development. This 'Dentovision' journal has always been an integral part of this development. This is the 4th issue of 'Dentovision' journal of CSMSS Dental College. The publication of this journal is a sign of immense hardwork & consistent efforts, shown by each & every person involved in its formulation. This journal will keep inculcating new & innovative ideas as it serves as a platform for the expression of every student's skill and talent. The journal will really prove as a guiding path for the future generations.

I congratulate A.O Sanstha, Director, Acting Dean, Faculty members, Ph.D, PG, UG students & Non teaching staff of CSMSS Dental College & Hospital for taking initiatives and carrying this noble task ahead.

Hon. Shri. Ranjeet P. Mulay
President, CSMS Sanstha
Aurangabad

MESSAGE FROM THE TRUSTEE

A journal reminds you of your goals and learnings in life. It offers a place where you can deliver a deliberate message & thoughtful ideas. I congratulate CSMSS Dental College & Hospital for their success in publishing this scientific journal 'Dentovision' for it's 4th issue.

I was very much gratified to see the previous issues of this publication. This journal truly is a combination of diligence, coherence & comprehensive ideas. The journal is formulated by the collective efforts of Dentovision team. I appreciate the immense hard work by everyone related to this journal and give my best wishes for its success.

Hon. Shri. Sameer P. Mulay
Trustee, CSMS Sanstha
Aurangabad

MESSAGE FROM THE ADMINISTRATIVE OFFICER

From 1986 CSMS Sanstha has always nurtured the skills and talents of the students, providing an invaluable platform for betterment of their carriers. This college has always maintained top quality healthcare for patients under guidance of highly qualified staff in each faculty. We have always encouraged the youth in expression of their ideas in scientific activities, lectures and research oriented programmes. The publishing of scientific journals has been an integral part of this Sanstha.

I appreciate all the hardwork that has been put in the formulation of this journal under superior guidance that has made this issue a great success. I congratulate and give my best wishes to the Director, Acting Dean, Editorial board members, Teaching staff Ph.D, PG & UG students of CSMSS Dental College & Hospital for this effort .

Dr. Shrikant Deshmukh
A.O. CSMS Sanstha,
Aurangabad

MESSAGE FROM THE DIRECTOR

Being a part of CSMS Sanstha, a leading educational institution for academics in India is really a proud feeling for me. Publication of journal is a vital part of academic development which promotes research activities, empowering youth in betterment of their skills & talents in dentistry. Dentovision journal entering its next issue is truly a sign of dynamic approach by all students both under graduates & post graduates and of our teaching staff.

I wish all the luck & success, and give my best wishes to the Dentovision journal team as well as to our teaching & non teaching staff & students for their enormous efforts in publishing this scientific journal.

Dr. S. C. Bhoyar
Director,
CSMSS Dental College & Hospital

MESSAGE FROM ACTING DEAN

It’s a great pride, enthusiasm to invite you to read the scientific journal ‘DENTOVISION’ fourth issue.

Our mission is to develop the students in all capacities, also to motivate the students to write the scientific article and be aware about the total process of publication.

Dentovision represents the collective thinking group of innovative individuals.

The success of Dentovision is totally due to all faculty members who encouraged the participants to pursue scientific activities, also students who participated and worked hard to give the journal final shape.

I appreciate the hard work by the team of CSMSS for Dentovision.

Hope you will appreciate the efforts taken for Dentovision while going through it.

BEST REGARDS!

Dr. Lata Kale
HOD, Prof. & Acting Dean
Oral Medicine & Radiology

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Editorial

Research at Young Minds

Research discovers, elucidates and evaluates new knowledge, ideas and technologies essential in driving the future of society and humanity. To shape the ideas of research among youngsters, there is a need to inculcate attractive researches, methods, techniques and innovative approaches.

The young mind is fertile and receptive to ingenuity and inventiveness. In developing countries original research is in downfall because their research are done for the sake of interview marks, academic positions etc., but very few people have other real goals from their research, so it is a need of the hour to propagate true picture & purpose of research.

To make research more attractive for academicians, it needs to be incentivised with adequate financial support, advanced lab equipments. and highly qualified Experienced faculty members. They also need a well established library having adequate books, journals, & easy access to worldwide digital library.

The young mind and the would be researcher should know that research is not an exam based on narrowly defined programmed modules which are often bitter tasting pills to swallow. Rather, it is a way of thinking where your hypothesis reaches a logical end. In truth, your innovative ideas are initially hypothetically programmed and later it ends in a sweet way.

They should believe that it is always rewarding & respect it as a responsibility assigned to them for a great cause. They should be encouraged to assimilate the inner beauty of the research & instill in them, that it is actually a service to humanity across the globe, in whichever way they believe.

Once again Journal 'Dentovision' is being acclaimed by one and all for its unique presentations and publications. Dentovision invites innovative reviews, original research papers and case reports from various fields of dental sciences for its upcoming issue.

I thank our Management, Administrative officer, Director, Acting dean, Editorial board members and all supporting staff members for their consistent support in the 4th issue publication of Dentovision Journal.

Dr. Maya Mhaske
Professor & Head of Department
Department of Periodontology
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Kanchanwadi, Paithan Road, Aurangabad.

Author Guidelines

- Authors : Maximum 6 authors for Original research and 5 authors for Case reports and Reviews.
- Font size : Title : 16 – Times New Roman Bold – 1.15 Spacing
- Text : 12 – Times New Roman
- Images : 3-4, Colored, Resolution 300dpi and 5 mb size with Arabic number.
- Keywords should be 3-4, mentioned in bold.
- Abstract should be 75-100 words.
- Tables should have proper legends.
- When a trade name is used for a product or material, the manufacture's name and details must appear in the article and references (if any).
- Article should not exceed 8 pages including the references, images and tables
- References should not exceed 40 in number, They should be mentioned in superscript in the article with font size 9 and font Times New Roman.
- Vancouver style should be followed for References.

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CONTENTS

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Bioethics : Health Care Practice and Policy With Ethics and Professional Code of Conduct

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All human beings are born with equal rights and equal dignity. What is correct medically and technically may not be correct / right morally"

Gone are those days, when medical doctors were considered as family friends, family members, and trusted person next to the God.

But with developing civilization with advancement in knowledge and technology and with increase medical awareness by the society the gap between doctors and patient has increased and the trust is lost.

With the growing incidences / cases of medical negligence, financial exploitation, professional misconducts, unfair medical practices by our own few medical colleagues and with the growing demands and complaints from the society the hon. Supreme Court of India has Legally formulated the Act known as "Consumer Protection Act 1986" for all health care providers.

As per this CPA Act, all patients should be considered as "Consumers" and all doctors / hospitals should be considered as medical service providers (shop act) who should provide their best services with best knowledge, skill and with latest technology, in a most ethical and moral way.

Any kind of mishap, misconduct, error is now no more tolerated by the patient, society and the concerned professional bodies.

The erring doctor / hospital now can be sued legally in the court of law which may be.

Criminal, Civil or Consumer Court depending upon the severity of complaints, for getting appropriate compensation and punishment to the doctor which may be serious in nature to spoil your further professional carrier permanently.

Hence friends, mind you, while doing your Medical or Dental practice or Research activities or Clinical Experiment etc, always follow all the codes of

professional conduct / ethics given by Council / MUHS and obtain the verbal / written informed consent of the patient and family, maintain professional secrecy about patients medical condition i.e. patients autonomy, maintain good medical records make good communication, remain updated professionally in knowledge & skill, remain honest with profession and with patient and then

You need not to worry and fear for anything. Sky will be the limit for your progress.

Do your Medical / Dental practice with full of dignity, honours & satisfaction. Mind you, money will follow you if you are a good doctor professionally but never follow the money in your carrier else you will fail in your life.

If you follow all these codes of conduct with dignity, the day is not for off to get back same kind of medical glory with honour which will be given by the society.

Thanking You!!

AlL the best!!!

Overview

Periodontal Therapy : Non Surgical to Surgical

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Abstract:

The main goal of Non-Surgical Periodontal Therapy is to alter or eliminate the microbes and other predisposing factors that contribute in gingivitis and periodontitis. It also halts the progression of the disease thus restoring normal or healthy dentition. Treatment of periodontitis is directly related to the reduction of pathogens embedded in the subgingival biofilm . Non-Surgical periodontal therapy has shown improve probing pocket depths and clinical attachment levels in mild to moderate periodontitis cases with probing pocket depths of less than 6mm.

Key Words: Host modulation , ND:YAG , Er: YAG

Introduction:

Periodontal disease is an infectious disease characterized by inflammation of the tooth-supportive tissues, which can lead to destruction of the periodontal ligament and alveolar bone and possibly also to tooth loss (1). Periodontal health is a component of overall health and is therefore a fundamental human right. Treatment of periodontitis aims to prevent further disease progression, to minimize symptoms and perception of the disease, possibly to restore lost tissues and to support patients in maintaining a healthy periodontium.

Periodontal treatment utilizes aplethora of therapeutic interventions to achieve these goals, including behavioural-change techniques, such as: individually tailored oral-hygiene instructions (2) smoking-cessation support (3) dietary intervention (4) subgingival instrumentation to remove plaque and calculus (5) local and systemic pharmacotherapy (6) and various types of surgery (7) Management of chronic periodontal disease requires a combination of therapeutic modalities and a lifelong commitment to periodontal self-care

Several treatment modalities are available to achieve these goals & they are broadly classified as surgical & non-surgical. Nonsurgical and surgical periodontal therapies have, for several decades, been and remain the basis of periodontal treatment concepts. We now have a greater understanding of the etiologic factors associated with periodontitis, the mechanisms involved in periodontal wound

healing and the inter-relationship between patient factors (such as smoking and diabetes) and treatment outcomes. Technological advances have provided clinicians with a range of options for instrumentation. Furthermore, greater emphasis has been placed on the importance of patient- centered outcomes in clinical research.

Non -surgical therapy includes plaque control, supra & sub gingival scaling & root planning and adjunctive use of chemotherapeutic agents. Surgical therapy can be divided into either resective or regenerative procedures. The aim of this paper is to compare surgical & mechanical non surgical periodontal therapy in terms of efficacy, clinical applicability, and ability to meet the stated goals of periodontal therapy.

Indications

1. Gingivitis and mild chronic periodontitis
2. Severe chronic periodontitis control will require non-surgical periodontal therapy.
3. All chronic periodontitis cases should undergo non-surgical periodontal therapy. They reduce the need for surgical procedures.

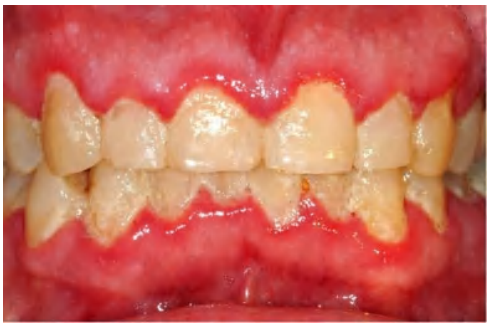

Fig 1: Marginal gingivitis

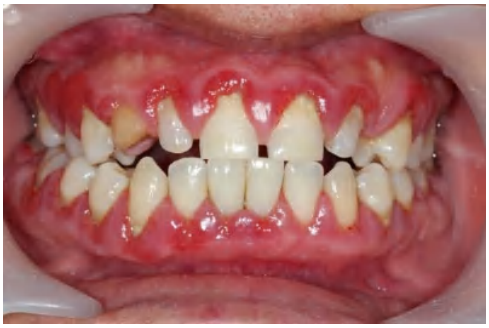

Fig 2: Diffuse gingivitis

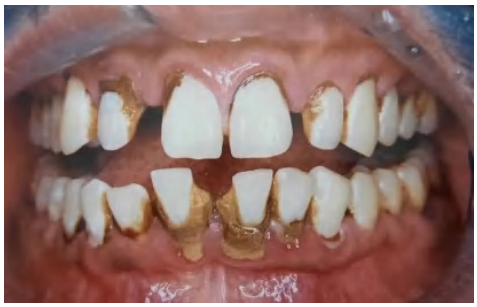

Fig 3: Mild Periodontitis with 4-6 mm pocket

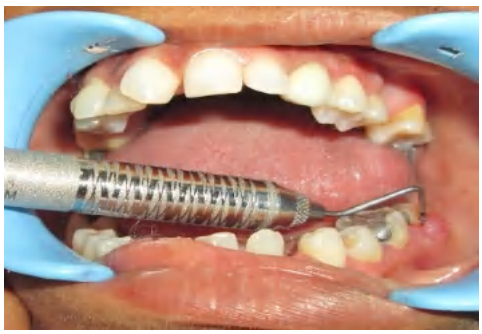

Fig 4: Single Tooth Pocket

The rationale of Non-Surgical Periodontal Therapy

1. Evaluation of tissue response
2. Evaluation of patient's attitude toward the periodontal disease
3. Long-term success of the periodontal treatment depends upon maintaining the results achieved with Phase -I therapy.
4. It may be the only treatment required for mild chronic periodontitis or gingivitis

Non-Surgical periodontal therapy includes mechanical as well as chemotherapeutic

measures to lower the microbial plaque related to periodontal tissues and oral cavity [8]

NON SURGICAL PERIODONTAL THERAPIES

1) Scaling (supra & subgingival) with hand and ultrasonic scaler
2) Gingival curettage
3) Chemotherapeutic agents (local + systemic)
4) Local drug delivery
5) Laser therapy
6) Photodynamic therapy
7) Host modulation
8) Probiotics
9) Perioprotect
10) Full mouth debridement

The above mentioned are the non surgical periodontal procedures

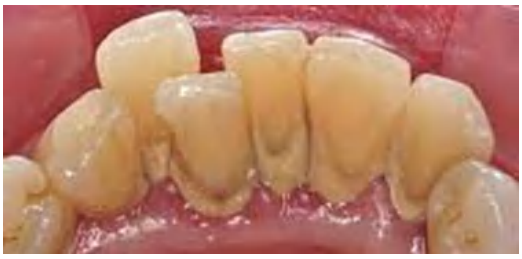

Fig:5 Before Scaling

Fig :6 After Scaling

Gingival Curettage

It is basically the removal of the inner surface of the soft tissue wall of the tissue by the curette. Scaling and root planing along with curettage has shown positive results within 4 weeks. After 5 weeks improvement in the periodontal health tissue can be observed with a reduction in gingival inflammation. It is performed to increase new attachment and tissue shrinkage leading to a reduction in pocket depth.

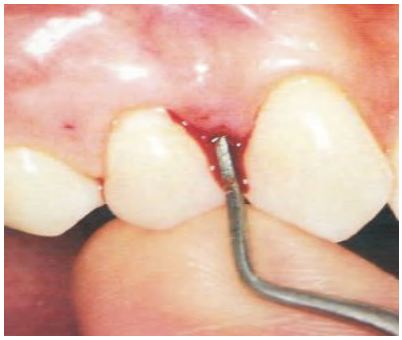

Fig: 7 Curettage with 14

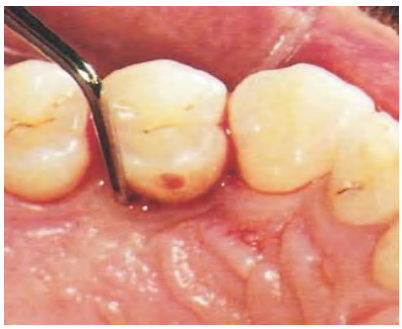

Fig 8 Curettage with 44

LASER (Light Amplification by Stimulated Emission of Radiation)

Lasers concentrate light energy, targeting tissue at an energy level much lower than natural light. The laser used as an adjunctive or alternate tool for mechanical periodontal therapy for its haemostatic, bacterial characteristics. The most commonly used lasers are argon, Nd: YAG, and Er: YAG (9). They have been successfully used within periodontal pockets for subgingival debridement, reduction of subgingival bacterial loads.

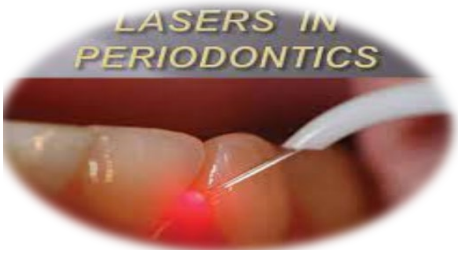

Fig: 9 Laser therapy

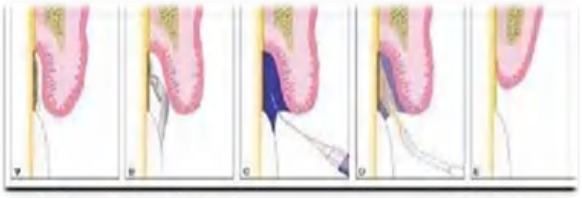

Fig: 10 Procedure of laser therapy

Photodynamic Therapy

It is a non-invasive method that involves photosensitizer agents known as (photosensitizers) in the presence of oxygen. Photodynamic therapy is based on the principle that the photosensitizer binds with the target cell and is activated with the light of a suitable wavelength. This leads to the production of free radicals that act on the microbial cell membrane leading to its toxic effects (10). It involves three components: Photosensitizers, Light, and Oxygen. Scaling and root planing combined with photodynamic therapy using methylene blue shows improvement in periodontal disease tissue. This has been successful in lowering redness, bleeding on probing and reducing the number of P. Gingivalis is bacteria.

Host Modulatory Therapy

Host Modulatory Therapy is a treatment concept that promotes the tissue regeneration of periodontium and reduces the tissue destruction by decreasing the destructive aspects of the host response and uplifting the protective responses. It includes the Inhibition of Matrix metalloproteinases released in the body through the use of Tetracyclines (CMTs), Inhibition of Arachidonic Acid metabolites through NSAIDs. Modulation of Bone metabolism, and Regulation of immune and inflammatory responses by Suppressing proinflammatory cytokines, Nitric Oxide inhibition, and Infusion/ supplementary anti-inflammatory cytokines IL-4 and IL-10 (11)

Chemotherapeutic agents

These are an antimicrobial agent that decreases the number of bacteria that can be specific targeting to a certain organism or reducing all bacteria. These are a chemical substance that provides a clinical therapeutic benefit. It is an anti-infective agent that works by destroying or inhibiting the growth of selective microorganisms, generally at low concentrations. It can be administrated either systemically or locally.

i} Systemic Antibiotic Therapy

They are used in the suppression of periodontal pathogens persisting in biofilms in deep pockets, root furcation, and concavities within the periodontal tissue where mechanical therapy alone may prove to be ineffective. They can be successfully used in cases such as acute infection, aggressive periodontitis, recurrent and refractory cases. Systemic antibiotic therapy includes the use of Monotherapy with metronidazole, tetracyclines, doxycycline, amoxicillin (with or without clavulanic acid, clindamycin and azithromycin (12).

ii} Local Drug Delivery

A Local Drug delivery system is a device that consists of two components that are a drug reservoir for the pathogenic microbes and a limiting element that controls the rate of medicament release to decrease the

number of microbes. The principle to use it is to disinfect pathogen reservoirs by delivering high concentration antibiotic or antimicrobial directly to the site of periodontal infection and facilitates the retention of a medicament for a required period of time to combat the microbial attack, simultaneously minimizing its undesirable effects on non-oral systemic/ body sites (13).

They are available in the form of gels, strips, fibers, films, microparticles, and nanoparticles. They can be used in isolated periodontal pockets but not more than 5mm of depth and as an adjunct to scaling and root planing. Local drug delivery systems include tetracycline fibers (Actisite), minocycline (Arestin), chlorhexidine (PerioCol CG), Doxycycline (Atridox) gel-based system, and Periodontal Plus AB.

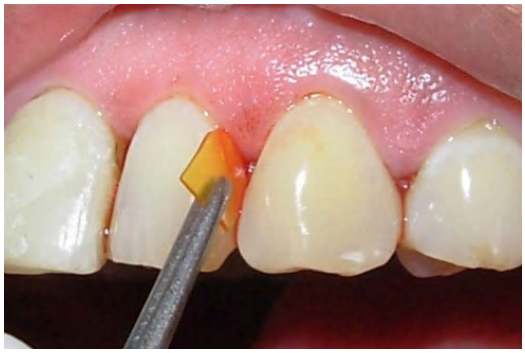

Fig: 11 Placement of LDD chip

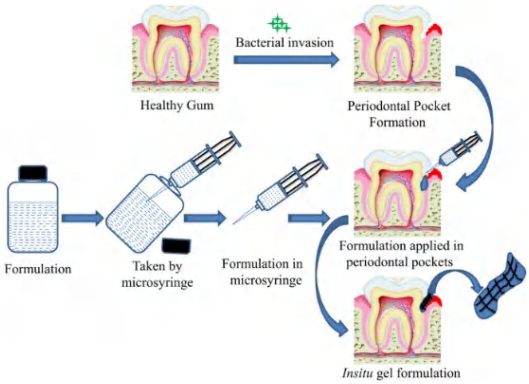

Fig 12: Procedure of LDD

Subgingival oral irrigations

It is subgingival pocket irrigation that uses agents such as chlorhexidine gluconate, 10% Povidone, 0.1% sodium hypochlorite. These show excellent results in antibacterial and antiviral properties in periodontal disease. It cannot be used as a standard therapy alone rather it is meant to be used as an adjustment to professional debridement. It is more effective in flushing out the bacteria and reducing gingivitis scores as it penetrates much deeper into the pocket when compared to mouth rinses or supragingival irrigations (14).

The conventional pushed oral irrigator (Water Pik) at high pressure may deliver an aqueous solution to approximately 50% of the distance between the free gingival margin and the most coronal connective tissue. Some clinical studies have stated that a pulsed oral irrigator at high pressure can disrupt the subgingival plaque to at least 6mm into periodontal pockets without inducing soft tissue injury.

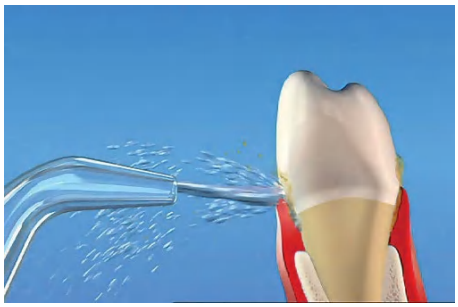

Fig: 13 Oral irrigation

Fig : 14 Oral irrigation

Probiotics

Probiotics are living microorganisms that are administrated in an adequate amount for the health benefit of the host. The mechanism of action: they are in direct interaction with the dental plaque, disrupting the biofilm owing to their antimicrobial products and competitive adhesion and indirect action by modulating the host's response (15). Lactobacillus, Streptococcus sanguinis, Streptococcus Uber is, Bifidobacterium species, and other species such as Bacillus can be used. They are used to improve the results of classic periodontal treatment, by successfully decreasing the number of bacteria and the expression of mediators of inflammation. They provide a safety benefit in clinical and biochemical parameters of chronic periodontitis.

Perioprotect

It is a comprehensive method that is customized for every patient to manage the rate of biofilm in the periodontal pocket. This method involves a combination of treatments that is a non-invasive chemical debriding therapy along with a traditional mechanical debridement. 1.7% of hydrogen peroxide gel is mostly used. The medicament and its delivery system generate a hyperbaric chamber-like state.

Fig: 15 Perioprotect (Perio gel)

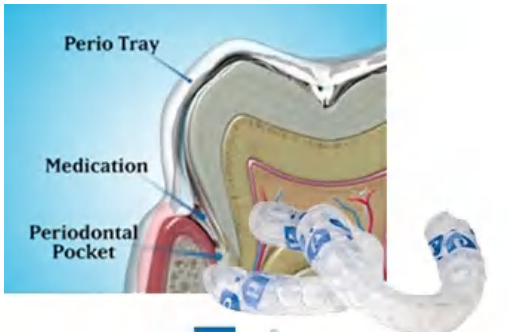

Fig : 16 Perio Tray

Full Mouth Debridement

It is a periodontal debridement or removal of all plaque and calculus in a single appointment or in two within 24 hours. In addition, at each of these visits, the tongue should be brushed with a 1% chlorhexidine gel for one minute, and the mouth rinsed with 0.2% chlorhexidine solution for two minutes. Moreover, subgingival chlorhexidine irrigation to be performed in all pockets. The re-colonization of the pockets retarded by oral hygiene and 0.2% chlorhexidine rinses during two weeks(16). Recently, full mouth debridement is combined with the use of topical antimicrobial therapy and this actually is contributed to the overall improved results.

Ozone Therapy

It is considered a boon to non-surgical periodontal therapy. Ozone is a powerful oxidizer that effectively kills bacteria, fungi, viruses and parasites that too at a very low concentration as compared to chlorine with none of the toxic effects.

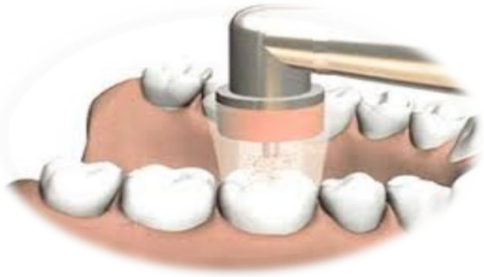

Fig :17 Ozone Therapy

Fig: 18 Ozone Therapy

Limitations of Nonsurgical Periodontal Therapy

1. Debridement technique and skill sensitive
2. Proper selection of instrument is highly important
3. Time-consuming as debridement of a single periodontally involved molar take approximately 10 minutes.
4. Difficult access at furcation areas.
5. Proper knowledge of root anatomy is required.
6. Residual calculus is likely to be left in deeper pockets.

Surgical Periodontal Therapy

Periodontal therapy is directed at disease prevention, slowing or arresting disease progression, regenerating lost periodontium, and maintaining achieved therapeutic objectives. A variety of different treatment techniques have been used including subgingival curettage, gingivectomy, modified Widman flap, and full- or split-thickness flap procedures with or without osseous recontouring. The best surgical approach remains controversial, although the results of longitudinal clinical trials has highlighted the advantages and disadvantages of each technique.

INDICATIONS:

Nonsurgical therapy is performed prior to surgical treatment for periodontitis. Surgery is indicated

where nonsurgical methods fail. In general, the success of nonsurgical treatment should be assessed following scaling and root planing but prior to the administration of antimicrobial agents or antibiotics. These medications tend to reduce inflammation and obscure sites where scaling and root planing has failed to resolve disease. Pocket reduction or elimination per se is not required in sites that respond to nonsurgical therapy and remain stable during maintenance. When surgery is required, however, shallower probing depths may be an appropriate goal to facilitate maintenance therapy and reduce the incidence of recurrence (17)

Advantages of periodontal surgery

1. Improved visualization of the root surface
2. More accurate determination of prognosis
3. Improved pocket reduction or elimination
4. Improved regeneration of lost periodontal structures
5. An improved environment for restorative dentistry

6. Improved access for oral hygiene and supportive periodontal treatment

SURGICAL PERIODONTAL THERAPY IS OF 3 TYPES:

1) Pocket reduction / elimination therapy
2) Regenerative therapy
3) Mucogingival surgery/Esthetic surgery

Indications for Pocket Therapy

1. Persistent gingival inflammation
2. Deep Periodontal pockets with vertical & Horizontal defect
3. Moderate to advance bone loss
4. Furcation Involvement
5. Gingival enlargement with periodontal pocket

Gingivectomy

This procedure is used to excise suprabony pockets, gingival enlargement , abscess and hyperplasia.

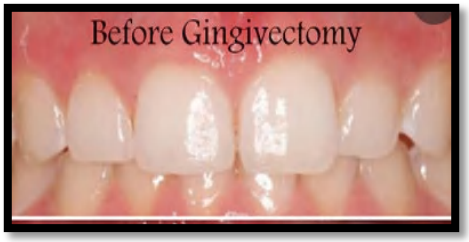

Fig: 19 Before gingivectomy

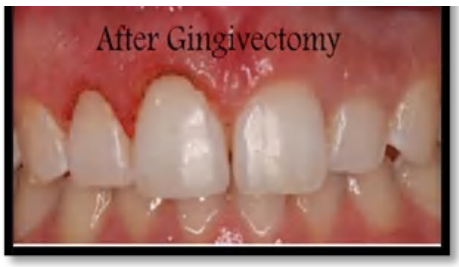

Fig: 20 After Gingivectomy

Gingivoplasty: (For esthetic purpose)

This is the process by which the gingiva are reshaped to correct deformities. It allows to create physiological gingival contours with the sole purpose of recontouring the gingiva in the absence of the pockets.

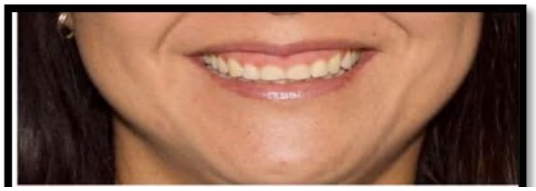

Fig 21: Before

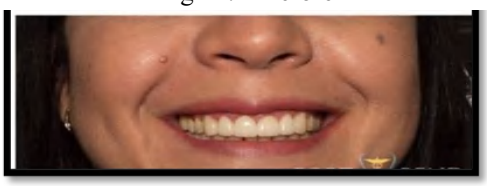

Fig 22: After

Periodontal Flap Surgery : for pocket reduction

Periodontal flap surgeries are done for reduction or elimination of periodontal pockets .There are different Flap surgical techniques as per the indications. Flap surgeries can be done with or without regenerative surgical procedures. The regenerative surgical procedures can be accomplished by using bone graft , GTR membrane , root conditioners & the newer technique i.e PRF- platelet rich fibrin.

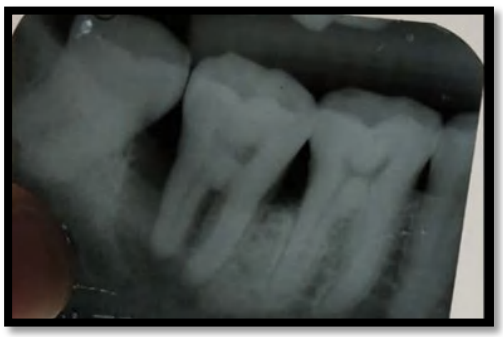

Fig 23 i) IOPA C 46

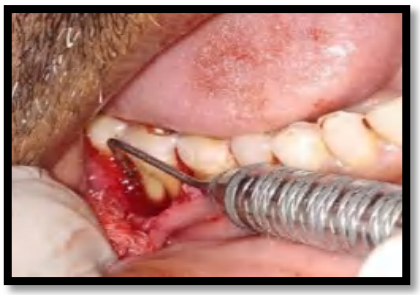

Fig 24 ii) Infrabony Defect

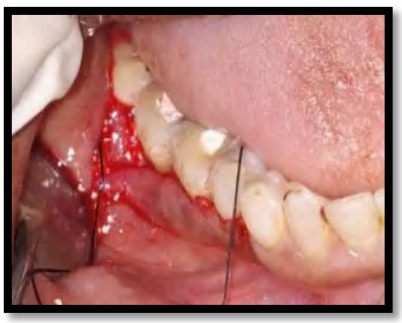

Fig 25 iii) bone graft+ PRF

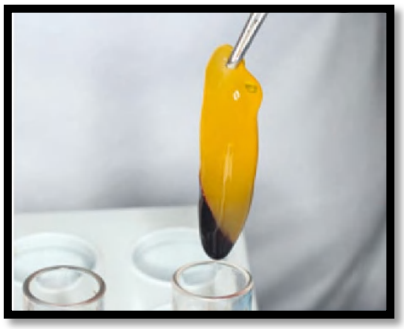

Fig 26 iv) PRF

Apically positioned flap & crown lengthening procedures

The objectives of this procedure are to reduce pockets by repositioning the flap apically, to provide access for root preparation, and to preserve or increase the zone of attached gingiva. An inverse bevel incision is used.

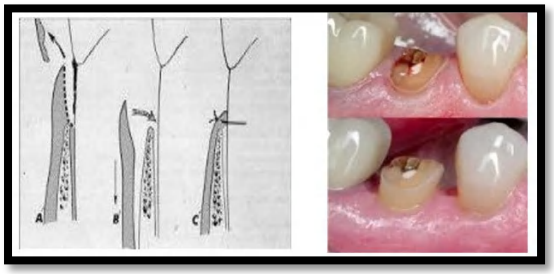

Fig: 27 Apically positioned flap & Crown lengthening procedure

Crown lengthening

Surgical crown lengthening is an appropriate procedure to: 1) facilitate caries removal; 2) provide additional restorative retention; 3) establish biological width; 4) improve aesthetics in cases of altered passive eruption. This procedure should only be considered when the remaining root is supported by a healthy periodontium and the post-surgery crown/root ratio will be favourable.

Root coverage procedures (gingival augmentation coronal to recession)

This procedure was developed to cover exposed roots, prevent root sensitivity and root caries. It should be performed when there is:

1) isolated recession;
2) an adequate band of keratinized gingiva on the adjacent donor tooth; and
3) adequate vestibular depth. Areas with multiple adjacent recession sites or secondary frenal pull at the donor site should be avoided

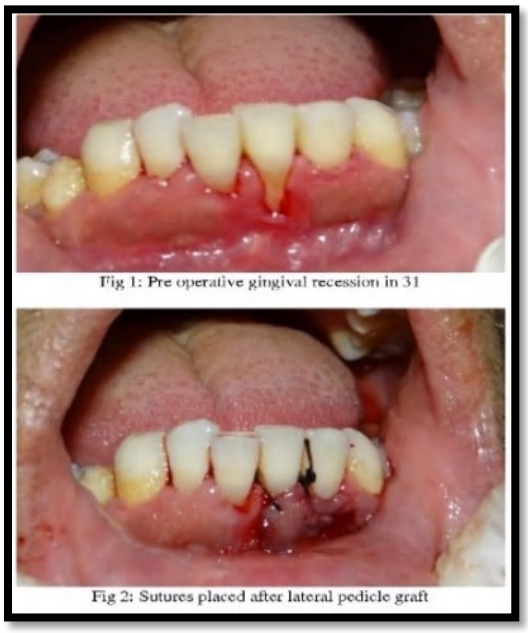

Fig: 28 Root Coverage 1

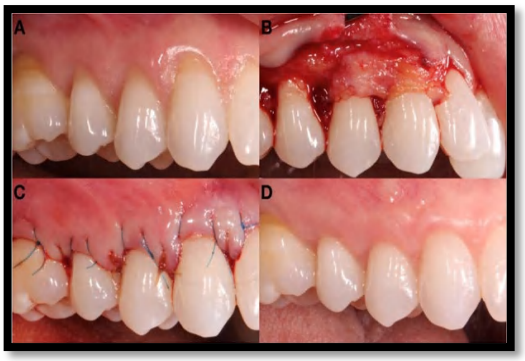

Fig 29 Root coverage 2

FUTURE DIRECTIVES

Gene Therapy: Replacing a mutated copy of gene causing disease with a healthy gene

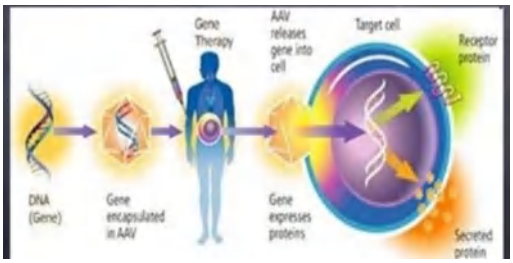

Fig 30 Gene therapy

RNA interferences:

RNAi works through small RNAs of approximately 20 to 30 nucleotides that guide the degradation of complementary or semi complementary molecules of messenger RNAs (posttranscriptional gene silencing) or interfere with the expression of certain genes at the promoter level (transcriptional gene silencing)

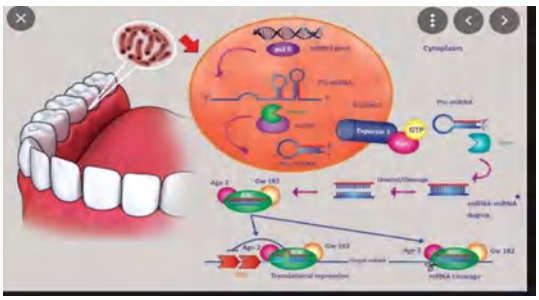

Fig 31: RNA interferences

CONCLUSION:

The field of periodontology is continually advancing. Non-Surgical periodontal therapy contributes to evolving and newer therapeutic modalities are being developed to make the outcomes more predictable and last longer. Non-Surgical periodontal therapy results in superior clinical outcomes as compared to surgical therapy in periodontitis patients with moderate pocket depth. Throughout mechanical periodontal therapy remained a gold standard resulting in significant resolution of periodontal inflammation leading to improvement in the clinical signs and symptoms of active disease.

Periodontal therapy has evolved from the days of scaling and root planing and/or gingivectomy to currently include a wide array of sophisticated plastic and regenerative procedures. Regeneration of osseous and furcation defects became possible with the advent of guided tissue regeneration techniques but have not yet become predictable. As growth factor therapy develops, regeneration will become predictable, and resection will likely disappear as a mode of periodontal treatment. Root coverage, which was not possible 20 years ago, is now routine. The development of new materials to eliminate the need for palatal donor tissue will increase the frequency of these procedures and reduce the prevalence of recession in aging patients. Thus, in the near future, periodontal surgery will probably increase as a modality of therapy; however, the goal of the procedures will be almost totally regenerative.

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Short Report

Clinical Evaluation And Diagnosis In Fixed Dental Prosthesis

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Abstract :

Many principles involved in the preparation of fixed prosthesis are still dominating, although more compatible and resilient materials have been introduced in recent years. FDP transmits forces through the abutment to the periodontium. Failures are due to use of improper materials, inadequate tooth preparation and faulty fabrications.

Key Words : Abutment, Fixed Dental Prosthesis, Implantology, Aesthetics.

Introduction :

Fixed partial denture is one of the most commonly preferred definitive treatment options for a single missing tooth[1.] Fixed prosthodontics treatment can range from the restoration of single tooth to the rehabilitation.[2] Single tooth can be restored to full function and improvement and missing teeth can be replaced with prosthesis that will improve patient comfort and masticatory efficiency maintain the health and integrity of dental arches. When designing and fabricating a FPD the forces would be absorbed by missing tooth are transmitted through the pontic, connectors the retainers.[2 3] It is significant to determine the absolute need to fill a space and not only in commercial terms but also in biological value to tooth structure and the surrounding tissues.[4 5]

Fixed prosthesis: the branch of prosthodontics concerned with the replacement and or restoration of teeth by artificial substitutes that cannot be removed from the mouth by the patient.[4]

Fixed partial denture: any dental prosthesis that is luted screwed or mechanically attached or otherwise securely retained to natural teeth and or implant or abutments that furnish the primary support for the dental prosthesis and restoring teeth in a partially edentulous arch, it cannot be removed by the patient.[4]

Classification of ridge defects according to Seibert's:

class 1 faciolingual loss of tissue width with normal ridge height

class 2 loss of ridge height with normal ridge width

class 3 defects—a combination of loss in both dimensions.[4]

Prosthodontic diagnostic index (PDI): Location and extent of edentulous areas, Condition of abutment teeth, Occlusal scheme, Residual ridge.[4]

Identification of patients' needs: Correction of existing disease, Prevention of future disease, Restoration of function, Improvement in appearance.[4]

Abutment evaluation: crown evaluation, root configuration, periodontal area.[4]

Special considerations: pier abutments, third molar abutments, canine replacement cantilever fixed partial dentures.[4]

Definition of Implant: An alloplastic material that is surgically inserted into hard & soft tissues, which bears superstructure for aesthetic & functional purposes.[6]

Types: Sub periosteal, Blade implants, Trans mandibular, Endosseous, Implant Treatment Planning.

It follows the following sequence: Designing the prosthesis, Determining the number of implants needed to support the prosthesis, Determining the location of Implant.

Medical Evaluation: History Medical, Vital Signs, Complete Blood Count, Sequential Multiple Analysis (SMA), Bleeding Disorder Test, Electrocardiogram, Chest X-ray, Urine Analysis.

Dental evaluation: Dental history, Clinical examination, Radiographic evaluation: Periapical view, Panoramic view, Computed tomogram (Denta-scan) Study cast, Photographic evaluation.

Diagnostic records: photographs, study models, radiographs, diagnostic wax up.

Radiographic evaluation: Most valuable diagnostic tool, Identification of adjacent vital structures, nasal & sinus floor, mental foramen & mandibular canal, Relationship with adjacent teeth, Quality & quantity of bone.

Periapical radiographic evaluation: Limited finding of vital Structure, Useful for single tooth implants Use aiming (positioning) device to minimize distortion.[6]

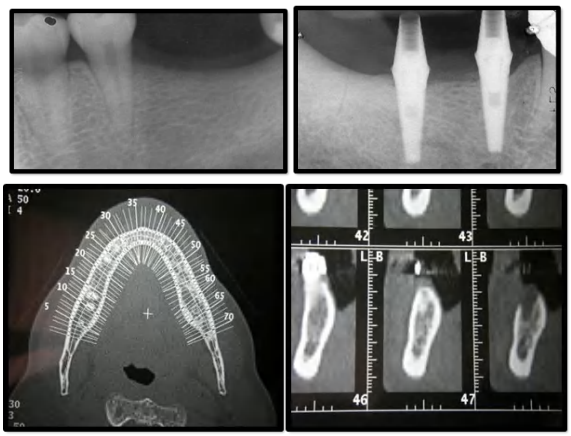

Fig. no. 1

Anatomical Consideration: Resorption Process of Bone, Soft tissue changes, Bone quality, Height of Bone, Width of Bone, Implant – Crown Relationship, Mandibular canal, Maxillary sinus.

REQUISITES FOR IMPLANTS:

Bone Quality according to:

Lekholm zarb: cortical vs cancellous

Misch: resistance to drilling

Nent Wig: manual drilling

Resorptive Process of Bone:

Highest resorption – first 3-6 months after extraction

Mandible – 0.2mm/year of rate of bone resorption

Intermaxillary discrepancy:

Anterior mandible – buccal resorption

Posterior mandible – lingual resorption

Maxilla – buccal resorption

Atwood's classification of bone resorption: D1 – Dense Cortical Bone(Misch, 1990) D2 –Dense-to-Thick Porous Cortical and Coarse Trabecular Bone (Misch, 1990) D3 - Porous Cortical and Fine Trabecular Bone D4 – Fine Trabecular Bone(Misch,1990)

Available Bone Height in Mandible:

Safety margin of 1-2mm from vital structure

Minimum height for threaded implant: 9mm

Minimum height for Endopore implant: 6mm

GBR or Bone graft (autografts, allografts, xenografts etc.)

Inferior alveolar nerve repositioning

Available Bone Height in Maxilla:

For Threaded implant: Minimum height: 9mm. Less than 7mm: Bone graft, sinus graft & osteotome

For Endopore implant: Minimum height:6mm – No sinus floor elevation required, Indirect sinus floor elevation: 3mm of bone required. Less than 3mm: future site development or sinus graft.

Width of the bone: Required width of Bone: 6mm

Þ implant (4mm)

Labial bone (1mm)

Lingual bone (1mm)

GBR or Bone graft (particulate grafts, block grafts etc)

Length of the bone: distance from axis to axis of implant: 7mm.

Minimum distance between implants: 3mm.

Minimum distance between tooth & implant: 2mm

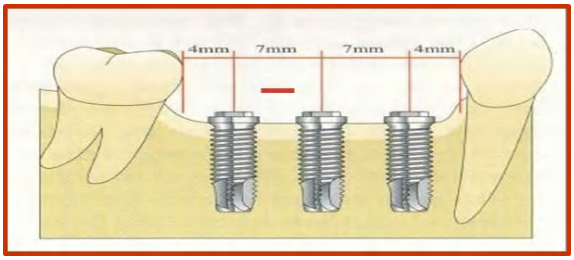

Fig. no. 2

Implant - Crown Relationship

Implant-crown ratio:1: 1 desirable for threaded implant

For Endopore implant unfavourable crown/root ratio is acceptable because of higher surface area of implant.[7]

Conclusion: Selection of prosthesis design, General decision criteria's, Comfort level of dentist & technician, Patients access to maintenance, Feasibility of repair, Patients' expectations should be considered. It is significant to determine the absolute need to fill a space and not only in commercial terms but also in biological value to tooth structure and the surrounding tissues.[4]

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Review

Salivary Biomarkers In Dentistry

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Abstract :

Saliva is a fluid rich in serum albumin and in antimicrobial and immunomodulary proteins, which contribute to mucosal lubrication, tooth-structure buffering and overall maintenance of the integrity of the oral cavity. For clinical applications such as monitoring health status, disease onset and progression, and treatment outcome, there are three necessary prerequisites: (i) a simple method for collecting biologic samples, ideally noninvasively; (ii) specific biomarkers associated with health or disease; and (iii) a technology platform to rapidly utilize the biomarkers. Saliva, often regarded as the 'mirror of the body', is a perfect surrogate medium to be applied for clinical diagnostics. Saliva is readily accessible via a totally noninvasive method. Salivary biomarkers, whether produced by healthy individuals or by individuals affected by specific diseases, are sentinel molecules that could be used to scrutinize health and disease surveillance. This review presents current salivary biomarker research and technology developmental efforts for clinical applications.

Key Words : Salivary Biomarkers, GCF, Blood Serum

SALIVA VERSUS BLOOD

Like saliva, blood is a complex bodily fluid known to contain a wide range of molecular components, including enzymes, hormones, antibodies, and growth factors. While cells, tissues, stool, and other alternatives are routinely pursued, blood serum or plasma is traditionally and most frequently the source of measurable biomarkers. Although life-saving in many instances, the procedures required to collect and eventually analyze blood samples can often be expensive, problematic, and physically intrusive. Employing salivary fluids as a medium for biomarker development and evaluation lowers subject/patient discomfort through the provision of a noninvasive method of disease detection.[1-4] **There are five major diagnostic alphabets available in saliva namely, proteins, messenger RNAs, micro-RNAs (miRNAs), metabolic compounds and microbes which offer substantial advantages for salivary diagnostics because, the state of the disease may be associated with detectable changes in one, but not all, dimensions.** Comparatively, saliva carries

many advantages over blood, including the following:[5-6]

1. Collection is undemanding. While blood sampling requires highly trained personnel, saliva procurement can be done by anyone, including self-collection.

2. The procedure is noninvasive, economical, cost effective, painless, reducing the discomfort most individuals endure from biopsies and repeated blood draws, while encouraging others to participate in timely medical evaluations and screenings.

3. Samples are safer to handle, ship and store, does not clot , less manipulation. Salivary secretions contain factors that inhibit the infectivity of HIV, resulting in extremely low or negligible rates of oral transmission.

SALIVARY DIAGNOSTICS

Sample Collection : In order for a saliva-based diagnostic procedure to commence, one must first collect the necessary samples. Although simplistic in many ways, saliva collection can manifest unique issues within certain populations. These may include salivary flow rate, circadian rhythm, type of salivary gland, type of salivary stimulus, diet, age, physiological status, and method of collection.[7]

Draining Method: The subject is made to sit quietly with the head bent down and the mouth open to allow the saliva to drip passively from the lower lip into the graduated sterile tubes. (Fig. 1) Saliva collected by draining is without any stimulation and is more reliable.

Fig. 1: Draining Method Spitting

Fig 2 : Spitting Method

Spitting Method: Saliva is allowed to accumulate in the floor of the mouth and the subject spits it out it into the preweighed or graduated test tubes. (Fig. 2)
The advantage of this method is that it can be used when the flow rate is very low and where evaporation of saliva has to be minimised. The disadvantage is that it might have some stimulatory effect, and hence cannot be used for unstimulated saliva collection.

Suction Method: Saliva is allowed to accumulate in the floor of the mouth and aspirated is using micropipettes, syringes, saliva ejector or an aspirator.

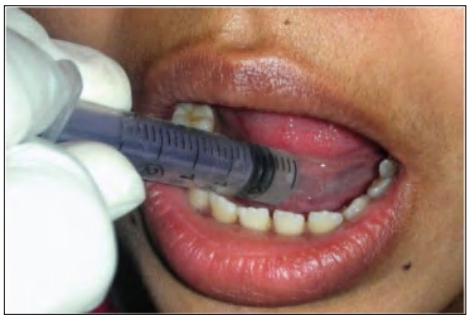

Fig. 3: Suction Method

Fig. 4: Swab Method

Swab Method: It is performed by introducing a synthetic gauze sponge, pre-weighed swab or cotton pad into the mouth, at the orifices of major salivary glands. The subjects are asked to chew such that the sponge gets soaked within the saliva. Saliva soaked sponge is removed and placed in a sterile test tubes. Though this method is less reliable, it helps in the assessment of the level of oral dryness. It is mainly used in the monitoring of drugs, hormones or steroids.

LASHLEY CUP

A Lashley cup, a noninvasive nickel-sized apparatus capable of accumulating fluids via suction, is occasionally employed to gather oral fluids from specific glands..[8-10]

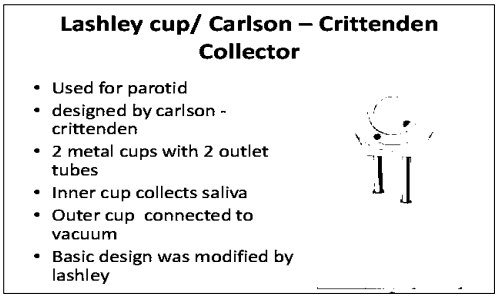

Table 1: Armamentarium required for collection of whole and gland specific saliva[1]

Whole saliva	**1)** 50 mL sterile tube and paper/styrofoam cup **2)** Crushed ice and container **3)** Distilled water
Parotid saliva	**1)** Lashley cup fitted with appropriate polyvinyl chlorate tubing. This device requires suction, which can be provided by a dental unit suction laboratory suction bulb or oil-free portable vaccum pump. **2)** Low-affinity conical plastic collection tubes on ice **3)** Approximately 5 mL of sterile 2% w/v aqueous citric acid solution, stored at room temperature.
Submandibular /Sublingual secretion	**1)** Submandibular and sublingual saliva collector fitted with a sterile 100 µL pipette tip and a low-affinity plastic conical collection tube. This device requires suction, which can be provided by a dental unit suction or oil-free portable vacuum pump **2)** Distilled water **3)** Sterile cotton sponges, dental mirror and forceps **4)** Approximately 5 mL of sterile 2% w/v aqueous citric acid solution.

➢ SALIVARY MICROBIAL DIAGNOSTICS

Microbial salivary diagnostics is not a novel concept. Over 20 years ago, saliva-based tests were developed for *Streptococcus mutans and Lactobacillus* spp., two known etiological agents of dental caries can be detected by culturing the saliva. There are different microbiological test such as

Dip slide tests for lactobacilli, **Cariescreen SM**, ***Dentocult SM*** *Strep* mutans, by Orion Diagnostica, quantifies *S. mutans by incubating* saliva-dipped test strips in selective broth media for 48 h.

A software program called **Cariogram,** it is to evaluate the host dietary habits, plaque amount, and fluoride use, to calculate the relative risk of developing dental caries.

Similarly **Caries Risk Test**, also used to evaluate the relative risk of caries by detection of *S. mutans and lactobacilli in saliva.* [11-13]

➢ MOLECULAR MICROBIAL DIAGNOSTICS

There is a clear rationale for using culture-based methods for risk assessment for dental caries. However, investigations drawing on culture-independent techniques are now producing evidence indicating the significance of **molecular microbial analysis in identifying oral pathologies.** Recent studies employing quantitative 16S rRNA gene sequencing found several reported pathogens in the saliva of periodontitis patients in comparison to healthy controls. Another investigation evaluating the synergy of microbial and molecular analyses found that biomarkers alone were insufficient discriminatory analytes, and only a combination of the microbial and molecular values could reasonably discern healthy from diseased subjects.

Further studies have identified malodorous (stinking) and caries-active subjects by using terminal restriction fragment length polymorphism (T-RFLP) analysis, deep sequencing, or human microbe identification microarrays (HOMIM), which are 16S rRNA-based microarrays capable of detecting 300 oral bacterial species, including those not yet cultivated.[13]

➢ SYSTEMIC DISEASE AND SALIVA

Infectious Disease

The diagnosis of systemic infectious diseases remains highly dependent upon the evaluation of blood and/or tissue samples. Although they are effective, these procedures are invasive and expensive and often require extensive time to obtain any meaningful diagnostic results. Furthermore, depending upon the practice setting, these types of tests may not be accessible for many patients and health care providers. While saliva may serve to alleviate some of the challenges associated with more traditional diagnostic methodologies, it could also prove to be effective in terms of its accessibility.[14]

For example, patients with suspected HIV infections can now be screened for HIV-1 and -2 via a saliva-based enzyme-linked immunosorbent assay (ELISA). Although positive results must be confirmed with a follow-up Western blot, this ELISA commonly generates accurate (99.3% sensitivity, 99.8% specificity) results rapidly (i.e., 20 min) and eliminates the necessity for invasive blood draws. More importantly, though, it has now become widely accessible, as the FDA recently approved an over-the-counter, point of- care ELISA kit, making HIV testing not only easy and increasingly available but also private. [15]

In consideration of the global health question, saliva-based diagnostics have been the primary focus of investigation for a variety of other infectious pathogens. Among these are several worldwide endemic microbes, including the malaria organism

(***Plasmodium falciparum), dengue virus, Ebola virus, and Mycobacterium tuberculosis,*** as well as a number of **herpes simplex virus (HSV)** family members, Epstein-Barr virus (EBV), cytomegalovirus (CMV), and human herpesvirus (HHV). For malaria, IgG antibodies directed against specific *Plasmodium falciparum antigens can be detected* in saliva and were found to correlate strongly with levels in plasma. Similarly, using antigen capture methods, IgA antibodies specific to dengue virus that correlate well with early secondary infection have been found in saliva.[16-18]

BIOMARKERS IN SALIVA

- **Transcriptomics**
  A number of investigations have reported the identification of salivary biomarkers for Sjogren's syndrome and a number of cancers.[19-21]

- **Proteomics**
  Discriminatory protein profiles for oral cancer, diabetes, periodontal disease, AIDS, and mammary gland carcinoma.[19-21]

- **Methylomics**
  Known to affect mammalian development, cellular differentiation, and carcinogenesis, DNA methylation induces cells to maintain or alter unique characteristics by controlling and modulating gene expression.[22]

- **Human Salivary Proteomics**
  Human salivary proteome is now available, increasing effort has been made to examine and compare the salivary proteomes of diverse diseases such as cancers, diabetes mellitus, and autoimmune diseases.[23]

- **Salivary Biomarkers in Peridontitis.**

When considering the periodontal pathogenic processes, periodontitis can be generally divided into three phases: inflammation; connective tissue degradation; and bone turnover. During each phase of the disease, specific host-derived biomarkers have been identified and therefore provide a general sense of what stage of pathologic breakdown the patient is currently experiencing. In the early inflammatory stage of the disease, numerous cytokines, such as prostaglandin E2, interleukin-1, interleukin-6 and tumor necrosis factor-alpha, are released from a variety of cells, such as junctional epithelia, connective tissue fibroblasts, macrophages and polymorphonuclear neutrophils.

As the disease progresses, powerful enzymes, such as matrix metalloproteinase-8, matrix metalloproteinase-9 and matrix metalloproteinase- 13, are released at the infected site, which leads to the destruction of connective tissue collagen and alveolar bone loss.

As the disease becomes more severe, the levels of tumor necrosis factor, interleukin- 1 and RANKL are elevated and ultimately mediate osteoclastogenesis and alveolar bone breakdown. Bone-specific biomarkers, such as pyridinoline cross-linked carboxyterminal telopeptide of type I collagen are dispersed into the surrounding tissue and subsequently transported via the gingival crevicular fluid into the periodontal pocket and finally into the oral cavity, becoming a component of saliva

Although individual biomarkers have been studied as indicators of periodontal disease progression, it is unlikely that one standalone biomarker will

present with sufficiently high sensitivity and specificity level to meet the criteria of a diagnostic tool. However, evidence points to panels of salivary biomarkers and putative periodontal pathogens that may offer promising applications for differential diagnosis, treatment planning and monitoring, as well as for identification of patients at risk for future tissue destruction.[29]

❖ Salivary Biomarkers in and Oral Disease

Human saliva proteins have direct diagnostic value for human oral disease. Oral cancer, predominantly oral squamous cell carcinoma (OSCC), is a high-impact local disease in the oral cavity affecting >300000 people worldwide annually. Elevated levels of salivary carcinoembryonic antigen (CEA), defensin-1, tumor necrosis factor-a (TNFa), interleukin (IL)-1, -6, and -8, and CD44 were detected in patients of oral cancer.[24]

Numerous studies have demonstrated that saliva from patients with OSCC contains informative proteins, such as **TNFa, IL-1, IL-6, IL-8, CD44, fibronectin, defensin-1, cytokeratin 19 fragment, tissue polypeptide antigen, endothelin- 1, Cyfra 21-1,** and the **cancer antigen CA125**, which are potentially useful for disease detection.

A concurrent analysis of multiple biomarkers can significantly increase the sensitivity and specificity of oral cancer detection. The levels of certain proangiogenic, proinflammatory cytokines, such as TNFa, IL-1a, IL-6, and IL-8, were significantly increased in the saliva of patients with oral premalignant lesions (OPMLs) hence these biomarkers can be detected in saliva. Sjogren syndrome (SS) is an autoimmune condition, characterized by xerostomia (dry mouth) and keratoconjunctivitis sicca (dry eyes), which causes chronic lymphocytic infiltration of the lacrymal and the salivary glands, leading to decreased secretion by destroying the exocrine glands. Other characteristics of the disease include oral burning, dysphagia, and hoarseness. Saliva autoantibodies, e.g. anti-Ro/SS-A, anti-La/ SS-B, and anti-a-fodrin, have been applied to SS detection in the clinical setting. In whole saliva of patients with SS, IL-6 and IL-2 were increased significantly, and IL-2 decreased significantly following pilocarpine therapy.[25-27]

Recently, parotid salivary markers were discovered for SS using surface enhanced laser desorption/ionization time-of-flight MS (SELDITOF- MS) and 2-D difference gel electrophoresis. Compared with non-SS subjects, parotid beta -2-microglobulin (B2MG), lactoferrin, IgG kappa light chain, polymeric immunoglobulin receptor, lysozyme C, and cystatin C were found to be significantly increased, whereas two proline-rich proteins, amylase and carbonic anhydrase VI, were found to be significantly decreased in the patient group.

Qualitative measurement of the salivary levels of host response indicators, including cathepsin G, elastase and its inhibitors, and CRP, indicates that their elevated concentrations are closely related to. These candidates remain to be validated, and ideal salivary markers would be capable of differentiating SS from other autoimmune diseases. A recent study showed that 16 whole saliva proteins were found to be down regulated and 25 whole saliva proteins were found to be upregulated in patients with primary SS compared with matched healthy control subjects. These proteins reflected the

damage of glandular cells and inflammation of the oral cavity system in patients with primary SS.[27-28]

Rapid Point-Of-Care Salivary Diagnostic Tools And Technologies - In 2002, the **National Institute of Dental and Craniofacial Research (**NIDCR) initiated a research effort in the area of salivary diagnostics, and progress is being made toward developing technologically viable systems that are suitable for commercialization. NIDCR funded seven awards for the development of **microfluidics** and **microelectromechanical systems** (MEMS) for salivary diagnostics. MEMS are integrated systems composed of mechanical elements, sensors, actuators, and electronics on a common silicon substrate developed through microfabrication technology. These systems use small sample and reagent volumes coupled with integrated detection methods to perform analyses of proteins, DNA, gene transcripts (mRNA), bacteria, electrolytes, and small molecules in saliva for POC applications of human diseases.[13,28]

➢ VISION AND CHALLENGES

The main advantages of salivary diagnostics are obvious:

(i) very low levels of a specific biomarker can be detected; and

(ii) it can be carried out easily and noninvasively.

Therefore, these are attractive approaches to detect diseases that are obscure from the clinical standpoint. Promising results of various studies have led to assays for evaluating biomarkers for a number of disease states. However, as yet, none of these tests are routinely employed in disease prediction and/or monitoring of patients. While many questions remain, the potential advantages of salivary analysis for the diagnosis of systemic disease suggest that further studies are warranted. There is a need for much additional research in this area before the true clinical value of saliva as a diagnostic fluid can be determined.

It is highly unlikely that a single biomarker will prove to be a standalone measure for clinical application. **A combined analysis of proteomic, genomic, microbial, and other indicators is proposed to identify the set of biomarkers** with the most favorable combination of sensitivity, specificity, correlation with established disease diagnostic criteria, and reproducibility.[30]

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Overview

Oral Biopsy Procedures In Dental Practice

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Abstract:

Biopsy is the removal of tissue from a living person for microscopic examination to confirm or to establish the diagnosis of a disease The purpose of this article is to review those skills, to discuss new developments in this area, and to highlight some of the potential pitfalls that may occur in taking a biopsy and methods available to avoid them. We feel it will be of value to both general dental practitioners and junior hospital staff. Problems related to specific areas will be covered including apical lesions and those associated with the dental hard tissues.

Key Words: Biopsy, Dental hard tissues

Introduction:

Biopsy is the removal of tissue from a living person for microscopic examination to confirm or to establish the diagnosis of a disease. The term was coined by Ernst Henry, a French dermatologist in 1879. This approach is used for all tissues of the body, including those of the oral cavity, where a wide spectrum of disease processes may present. Proper management of an oral mucosal lesion begins with diagnosis, and the gold standard for diagnosing disease, oral or otherwise, is tissue biopsy[1]. The oral environment, which is moist and confined, poses challenges for collecting a viable tissue sample that will be suitable for diagnosis. These challenges are further compounded by the myriad of biopsy techniques and devices now available. The dental clinician should be aware of the various biopsy techniques that are available for the oral tissues, as well as the challenges specific to these tissue. Whatever the method used, however, the aim is to provide a suitably representative sample for the clinician to interpret, while minimising

preoperative discomfort for the patient. An unsuitable, unrepresentative sample is of no use to the clinician or most importantly the patient who would be ill served by an unnecessary repeat procedure (fig 1)[2].

Rovin has made several observations on biopsy decisions[3]

1. Any lesion that persists for more than two weeks with no apparent etiological basis.
2. Any inflammatory lesion that does not respond to local treatment after 10 to 14 days that is, after removing local irritant.
3. Persistent hyperkeratotic changes in surface tissues.
4. Any persistent tumescence either visible or palpable beneath relatively normal tissue.
5. Inflammatory changes of unknown cause, that persists for long periods.
6. Lesions that interfere with local function. Eg. Fibroma.
7. Bone lesion not superficially identified by clinical and radiographic findings.
8. Any lesion that has characteristics of malignancy.

- Erythroplasia: Lesion is totally red or has a speckled red and white appearance.
- Ulceration: an ulcerated lesion
- Duration: Lesion has persisted more than 2 weeks.
- Growth rate: Lesion exhibits rapid growth.
- Bleeding: Lesion bleed on gentle manipulation.
- Induration: Lesion and surrounding tissue is firm to touch.
- Fixation: Lesion feels attached to adjacent structures.

9. To determine the nature of lesion which does not readily respond to conservative and simple therapy.
10. To establish the diagnosis where there is suspicion of neoplasia.
11. To determine the nature of all abnormal tissue removed from the oral cavity including cysts and granulomas.

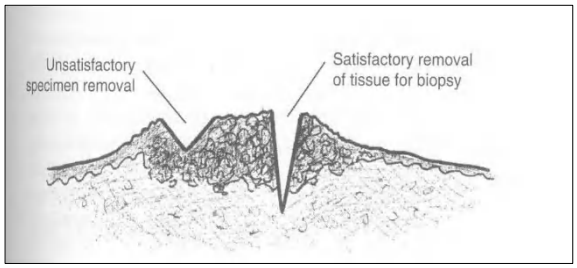

Fig 1

Various types of biopsies are as follows[3] –

1. Incisional Biopsy
2. Excisional Biopsy
3. Exploratory Biopsy
4. Punch Biopsy
5. Curettage Biopsy
6. Unplanned Biopsy
7. Needle Biopsy
8. Imprint Cytology
9. Shave Biopsy
10. Fine Needle Cutting Biopsy
11. Exfoliative cytology

1. **Incisional Biopsy**: An incisional biopsy is a technique that samples only a particular or representative part of the lesion. If the lesion is large or has different characteristics at different locations more than one area of the lesion may need to be sampled by this technique usually indicated if the area under investigation appears difficult to excise because of its extensive size (>1cm in diameter) or hazardous

location or whenever there is suspicion of malignancy[4]

Principles:
Representative areas of the lesion should be biopsied in wedge fashion. The biopsy site should be selected in an area that shows maximum tissue changes. Necrotic tissue should be avoided, as it is useless in diagnosis. The material should be taken from the edge of the lesion to include normal tissue. Care must be taken to include an adequate amount of abnormal tissue. It is better to take a deep, narrow biopsy, rather than a broad, shallow one, because superficial changes may be quite different from those deeper in the tissue. (fig.2) In incisional biopsy a pie shaped or elliptical wedge is removed. The incision on either side of the ellipse converges in a V to join in deeper sublesion tissue. In either instance a margin of normal tissue of at least 2- 3mm is required, except for the pigmented or vascular lesions, rapidly growing lesions with ill-defined borders which require margins of 5mm normal tissue. The length of the ellipse should be three times the width in all these instances, to assist in tissue closure and minimizing the possibility of wound dehiscence.

2. **Excisional Biopsy**:
   It implies removal of the entire lesion at the time the surgical diagnostic procedure is performed. A perimeter of normal tissue surrounding the lesion is also excised to ensure total removal[5]
   Indications: Excisional biopsy should be employed with smaller lesions (< 1 cm in diameter) that on clinical examination appears benign (Any lesion that can be removed completely without mutilating the patient is best treated by excisional biopsy. Pigmented and small vascular lesions should also be removed in their entirety. (fig.2)
   Principle:
   The entire lesion, along with 2-3mm of normal appearing surrounding tissue is excised.

3. **Exploratory Biopsy**:
   It is done for the investigation of an internal lesion. In this the removal of all portions of tissue exposed is done. This is commonly employed for the intra osseous lesion of mandible and maxilla.

4. **Punch Biopsy**:
   It can be either an incisional or excisional, but usually a variant of an incisional biopsy, which uses a special punch type forceps for the removal of a portion of the lesion[6].In this method the surgical instrument files out small segments of tissue from inaccessible lesion or from large lesion where excision is contraindicated. Since, distortion of the lesion is often encountered with this instrument; this method is rarely used in the oral cavity. Principle: In this method, the punch is held perpendicular to the skin and gently rotated with firm downward pressure. The punch is pushed down until the subcutaneous fat is reached. The incised column of tissue in the punch is lifted and the pedicle is cut. The tissue is then carefully removed from the punch. (Fig 3)[7]

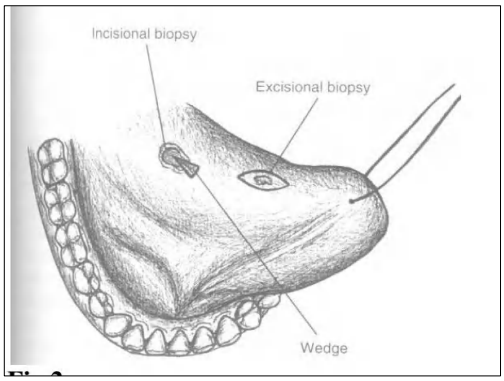

Fig 2

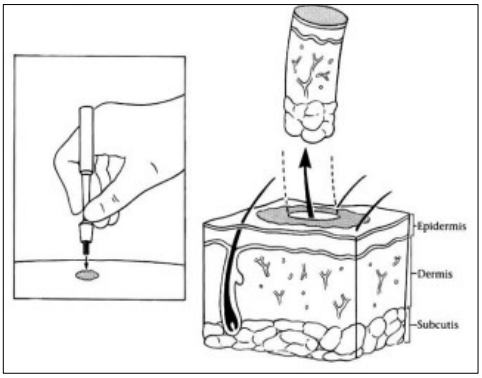

Fig 3

5. **Curettage Biopsy**:
   It is used primarily for intra osseous lesion and very friable cellular lesions, where only small amounts of surface material are necessary for evaluation. Extremely small tissues are centrifuged and the sedimentary segments are placed in agar media and are then sectioned as tissue blocks. This can be used successfully on lesions like Actinic keratosis, superficial squamous cell carcinoma, superficial basal cell carcinoma and Warts, not helpful for inflammatory dermatoses and pigmented lesions.
6. **Unplanned Biopsy**:
   It is the result of a surgical procedure, where suspicious tissue is obtained unexpectedly.
7. **Needle Biopsy**:
   Technically it is an incisional/punch biopsy and is used mainly for obtaining materials from deep seated lesions such as from within the bone or from an inaccessible location.
8. **Imprint Cytology**:
   In this technique, the biopsied tissue is cut in to two halves and the cut surface is touched to the slide and the slide is stained later to see the exfoliated cells.
9. **Shave Biopsy**:
   When a lesion is raised, a shave biopsy can be obtained for selected lesions using either a scalp blade or a double edge razor blade, the lesion is cut fresh with the surrounding skin(fig.4). Excessive traction on an exophytic lesion must be avoided, as this may result in depression at biopsy site, which can be permanent. This technique provides specimens that are less deep, and wound often heals with less obvious cosmetic defects.

This type of biopsy is indicated for:

- Benign exophytic lesions
- Superficial inflammatory lesions.

It is contraindicated in suspected melanomas

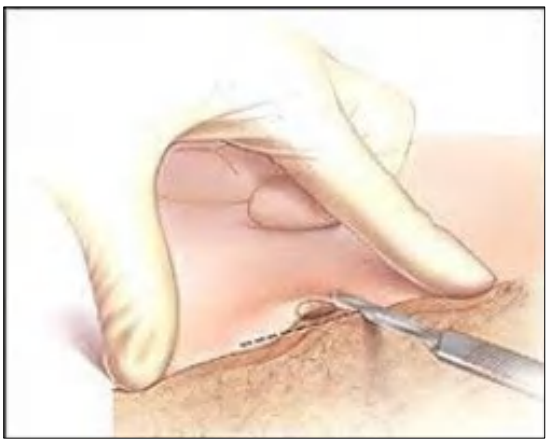

Fig 4

10. **Fine Needle Cutting Biopsy**:
    Here a 12 or 16- gauge needles with a trocar are used to obtain cores of tissue.

Such a tissue is examined by routine histological methods[8].

Advantages:

- It is a simple outpatient procedure associated with a minimal infection risk and rapid healing.
- It is well tolerated by patients many of whom had already experienced major head and neck surgeries.
- This technique may allow surgeon to obtain tissue for histological diagnosis limited to a surgical biopsy.
- Its advantage over FNAC is that interpretation of the results is easier for most practicing pathologists who have limited experience of cytopathology.

Disadvantages:

- False negative reports.
- Possible tumour dissemination.

Indications:

- The main clinical indication for using FNCB in head and neck surgery is to distinguish between reactive changes and recurrent malignancy. Conformation by FNCB of a cervical metastasis from a previously treated oral carcinoma does not prejudice the success of subsequent surgery in the way that a surgical biopsy may do.
- It may also be used for the initial investigation of an isolated symptomless swelling in the neck which could be inflammatory or neoplastic.
- Its use in initial investigation of salivary gland swellings is more controversial but the evidence from the literature suggests the risk of tumor dissemination is minimal.
- It is helpful in the management of salivary gland tumors to know prior to surgery whether, for example, the tumor is a pleomorphic adenoma or a malignant salivary gland tumor.

11. Exfoliative cytology

- Exfoliative cytology is the microscopic study of cells obtained from the surface of an organ or lesion after suitable staining.
- The neoplastic cells are less cohesive than the other normal cells and usually they shed on the surface of the lesion or into secretion.
- The shed neoplastic cells are obtained from the lesion by scrapping its surface and are then evaluated for possible changes like dysplasia. (fig.5)[9]

Technique:

- Firstly, all the surface of lesion is cleaned by removing all the debris and mucins etc.
- After that, gentle scrapping is done on the surface of the lesion with metal cement spatula or a moistened tongue blade for several times.
- Thus, the materials present on the surface of the lesion are adhered or collected at border of the instrument.
- The collected material is then evenly spread over a microscopic slide and is fixed immediately with either 95% alcohol.
- The slide is then air dried and is stained by a special stain called PAP stain (Papanicolaou stain)

Indications: Exfoliative cytology can be helpful for the diagnosis of the following oral lesions: -Herpes Simplex -Herpes Zoster -Pemphigus Vulgaris -Pemphigoid -Squamous Cell Carcinoma -Aphthous Ulcer -Candidiasis

Advantages:

- Anaesthesia is not required in this technique and it is most useful for detection of virally infected cells, acantholytic cells and candidal hyphae etc.
- It is quick, simple, painless and blood-less procedure.
- Special procedures like immunohisto-chemistry can be performed in exfolia-tive cytology samples.

Disadvantages:

It is unreliable for confirmatory diagnosis of cancers as large numbers of false negative test results are often found

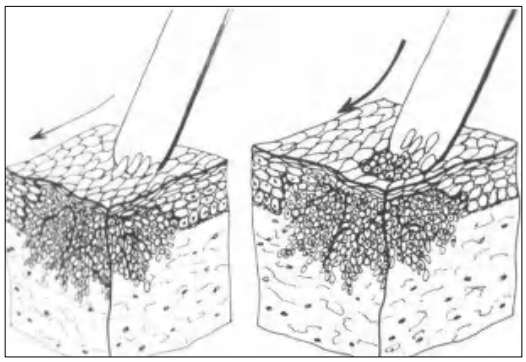

Fig 5

Conclusion:

- When considering biopsy, a little forward planning and thought can greatly improve the diagnostic value obtained.
- Biopsies of different tissue types and sites require specific techniques.
- The chosen site for a mucosal biopsy is dependent upon the disease/lesion.
- Careful handling of the tissue and prompt appropriate fixation will enable a confident histological diagnosis to be reached.
- Inadequate care at any stage could result in a non-diagnostic biopsy and may necessitate the patient having a repeat procedure with its ensuing physical and psychological morbidity.
- Written consent is advised for all biopsies.

More than proper surgical technique is required to facilitate the proper diagnosis of an oral biopsy specimen. The proper orientation of the tissue for microscopic analysis depends on steps taken by the surgeon, assistant, and technician to reduce the inclusion of artefacts. There are many ways that the exact interpretation of tissues specimens can be compromised. Unfortunately, many surgeons seem to be unaware of the extent of this problem as well as how easily artefacts can be prevented.

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Short Report

Depressor of Mandible And Its Clinical Considerations

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Abstract:

The lateral pterygoid muscle makes a unique contribution to jaw movement by the virtue of its attachment to the temporomandibular disc and condyle. The peculiarity of this muscle is that it originates from cranium and is inserted in mandible. The lateral pterygoid muscle is one of the important muscle of the infratemporal fossa. There are three muscles to elevate the mandible, but lateral pterygoid is the only depressor. This article aims to highlight the anatomy and clinical considerations of lateral pterygoid muscle. Knowledge of the anatomy and function of this muscle have an important influence on aspects of dental clinical practice.

Key Word : Lateral Pterygoid Muscle, Pterygoideus Externusor, Temporomandibular Joint.

Introduction :

The lateral pterygoid muscle is the key muscle of the infratemporal fossa. It is also known as Pterygoideus Externusor and External Pterygoid Muscle. It is active during mastication and mandibular movements. It works particularly during speaking, singing and chewing.

The lateral pterygoid muscle has two heads or bellies; the inferior belly and the superior belly. The inferior belly is three times larger than the superior belly. Among all the masticatory muscles, lateral pterygoid muscle is the only muscle with horizontally arranged fibres.[1,2]

Anatomy, Origin and Insertion :

The lateral pterygoid muscle is roughly triangular, whose base is directed anteriorly and the apex, that is the insertion, directed posteriorly**.** The upper head arises from the infratemporal surface and part of greater wing of sphenoid. The lower head arises from lateral surface of lateral pterygoid plate. The muscle has its insertion in pterygoid fovea. The lateral pterygoid muscle is supplied by anterior division of mandibular nerve.[3,4]

Relations:

Superficial (from outside inwards): Masseter , ramus of mandible, tendon of temporalis, maxillary artery;

Deep: Mandibular nerve and its branches, chord tympani nerve, middle meningeal

artery, sphenomandibular ligament and deep part of medial pterygoid muscle

Upper border : Through the upper border emerges the deep temporal and massetric nerve

Lower border : The lingual nerve, inferior alveolar nerve, sphenomandibular ligament, middle meningeal artery pass beneath the lower border.

Between the two heads, passes the maxillary artery (junction of second and third parts) and the buccal branch of mandibular nerve.[1]

The lateral pterygoid muscle is located deep in the masticatory system, so digital palpation of this muscle is difficult to perform and is also non reliable.[5]

Action of the lateral pterygoid muscle:

Depression of mandible, that is, opening of mouth is the most important action of this muscle. Lateral and medial pterygoid muscle works simultaneously to bring the protrusion of mandible. The lateral pterygoid muscle of one side pushes the mandible to the opposite side and the combined action of the two muscles keeps the chin in midline.[3] This muscle plays an important role in movement of temporomandibular joint, mainly in side to side movement like grinding and chewing.[2]

Clinical considerations:

1. Testing the function of lateral pterygoid muscle is done by asking the subject to open mouth widely but slowely against resistance. In normal case, the chin moves down in the midline. If the chin deviates to one side, it indicates the paralysis of the lateral pterygoid muscle of the side to which the chin deviates.[3]
2. The spasm of the lateral pterygoid muscle results in lock jaw, also called as trismus which is a very painful condition.[2]
3. Physiological Variant: The lateral pterygoid muscle is generally two headed muscle (95.5%). Very rarely, three heads are found which are: superior, middle and inferior heads.[2]
4. The lateral pterygoid muscle (both upper and lower fibres) play an important role in maintaining the mandible at its new position which can be observed in long term completely edentulous patients. This should be taken into consideration during prosthodontics treatment (like full mouth rehabilitation or complete dentures etc)[2]
5. Since the digital palpation of the lateral pterygoid muscle is difficult, it is a challenging task for the clinicians to diagnose the myalgic disorders of this muscle.[5]

The lateral pterygoid muscle plays an important role in mandibular movements, and is the only depressor of mandible, though there are three muscles to elevate the mandible.[2] So it is important to know its clinical anatomy, and its normal functions as well as its responses to alterations (like occlusal changes, mandibular advancements etc). This paper was a brief attempt towards the same.

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Overview

Diagnosing and Treating Gingival Recession: What To Do, and What Treatments are Available: An Overview

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Abstract:

Gingival recession is a common finding in daily clinical practice. The management of gingival recession defects using root coverage procedures is an important aspect of periodontal regenerative therapy. Although it seldom results in tooth loss, tissue recession is associated with thermal and tactile sensitivity, esthetic complaints, and a tendency towards root caries. This review is for how to treat exposed root surfaces, and the current available surgical procedures for the coverage of exposed root surfaces.

Key Words: Gingival Recession, Root Coverage

Introduction

Gingival recession in its localized or generalized form is an undesirable condition resulting in root exposure[1]. Gingival margin migrates apical to the cementoenamel junction. Although it rarely results in tooth loss, marginal tissue recession is associated with thermal and tactile sensitivity, esthetic complaints, and a tendency towards root caries[2].

Treatment of recession defects is indicated for the prevention of root caries, reducing root hypersensitivity, enhancing esthetics, augmenting keratinized tissue, eliminating inconsistency of the gingival margin, and to enhance plaque control. Assessing periodontal support, including bone levels and the height of soft tissue, including papilla, are essential for obtaining a successful result.

THE ETIOLOGY OF GINGIVAL RECESSION:

The etiology of the condition is multifactorial and may include plaque-induced inflammation, calculus and restorative iatrogenic factors, trauma from improper oral hygiene practices, tooth malpositions, improper periodontal treatment procedures, and uncontrolled orthodontics movements[3]. Additional

anatomical predisposing factors include frenal pull and a lack of adequate keratinized gingiva[04].

Although lack of oral hygiene and subsequent inflammation are precipitating factors in gingival recession, overzealous oral hygiene can also have negative effects on gingiva. The results of traumatic toothbrushing most commonly present as recession on the facial aspect of teeth prominent in the arch[4].

CLASSIFICATION OF GINGIVAL RECESSION:

Dr P.D. Miller[5] has classified gingival recessions to correlate treatment prognosis with anatomical features

Class I: Marginal tissue recession that does not extend to the mucogingival junction, with no periodontal loss in the interdental area, and the tooth is well-aligned in the arch. With sophisticated and carefully performed treatment, one hundred percent root coverage can usually be anticipated.

Class II: Marginal tissue recession that extends to or beyond the mucogingival junction, with no periodontal loss in the interdental area, and the tooth is well-aligned in the arch. One hundred percent root coverage can usually be anticipated.

Class III: Marginal tissue recession that extends to or beyond the mucogingival junction, bone or soft tissue loss in the interdental area is present, or there is malpositioning of the teeth. Partial root coverage can be expected.

Class IV: Marginal tissue recession that extends to or beyond the mucogingival junction. The loss of soft tissue and bone in the interdental area and/or malpositioning of the teeth is so severe that root coverage should not be attempted.

TREATMENT: The first step in an effective management and prevention of recession is to identify the susceptibility factors and modifiable conditions associated with gingival recession[6].

Non-surgical treatment options for gingival recession defects include establishment of optimal plaque control, removal of overhanging subgingival restorations, behaviour change interventions, and use of desensitising agents[6].

The ultimate goal of a root coverage procedure is complete coverage of the recession defect, with an esthetic appearance related to the adjacent soft tissues, and minimal probing depth following healing.

Early diagnosis of gingival recession is critical to early intervention and successful outcomes. Although not every case of recession warrants treatment[7].

There are two methods to treat root coverage which are as follows:

1] **Gingival Augmentation apical to the recession:** includes the techniques: Free gingival autograft,
Free connective tissue autograft,
Apically Positioned flap.

2] Gingival Augmentation coronal to the recession: includes the techniques:
1.Free gingival autograft,
2.Free connective tissue autograft,
3.Pedicle soft tissue grafts: includes, **Rotational flaps**: Laterally positioned flap, Double papilla flap.
Advanced flaps: Coronally positioned flap Semilunar flap.
4.Subepithelial connective tissue graft
5. Guided tissue regeneration (Non resorbable membrane barriers, Resorbable membrane barriers)[8].
6. Pouch and tunnel technique.

7. PRP used with CAF.
8.Platelet Rich fibrin.

DISCUSSIONS: The selection of the surgical technique, based on the patient's esthetic concern and a reproducible patient esthetic outcome assessment (taking into account complete root coverage and soft-tissue variables), should be introduced[9].

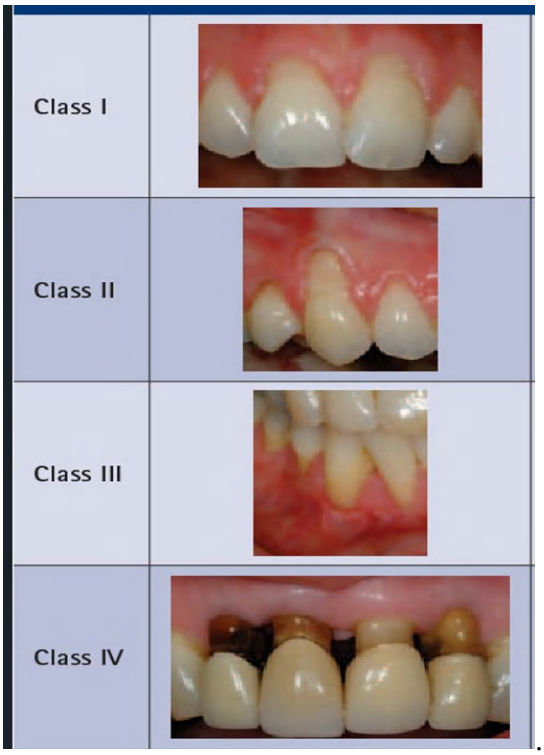
Surgical coverage of gingival recession is very predictable, at least for a single type of defect. The gold standard is the bilaminar technique, which mainly consists of a coronally advanced flap covering a connective tissue graft because the adjunctive use of connective tissue grafts increases the likelihood of achieving complete root coverage, with respect to the use of the coronally advanced flap alone, especially in long-term follow-up[10].

The localized gingival recession treated using CAF and GTR membrane showed 100% coverage compared to CAF alone, showing the efficacy of this type of treatment[11].

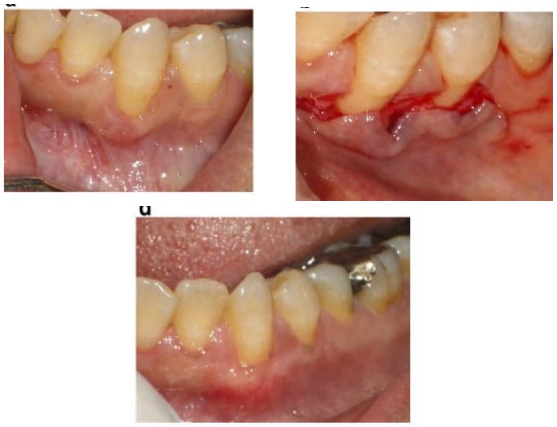
Platelet-rich fibrin (PRF), is a concentrated suspension of the growth factors found in platelets. These growth factors are involved in wound healing and postulated as promoters of tissue regeneration. It is both nontoxic and non immunoreactive[12].

Placement of PRF membrane in recession defects can be used to restore the functional properties of the labial gingiva of the mandibular anterior teeth by repairing gingival defects and re-establishing the continuity and integrity of the zone of keratinized gingiva[12].

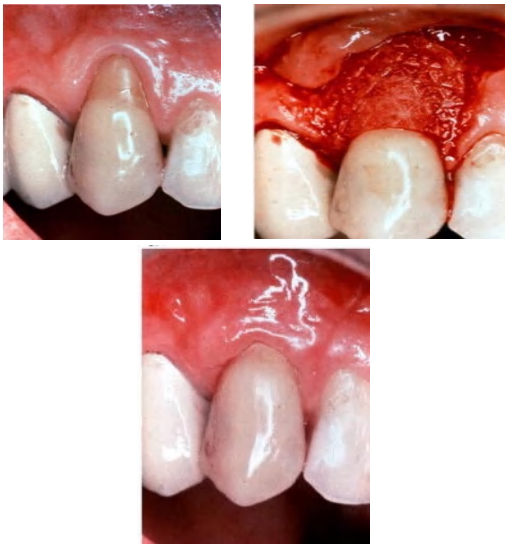
CONCLUSION: There are many mucogingival grafting techniques to correct recession defects. These procedures are quite predictable with minimal postoperative trauma, and produce satisfactory solutions to the problems presented by gingival recessions. Selection of the appropriate procedure, and precise, meticulous surgical technique, will provide successful and highly predictable results in the treatment of gingival recessions.



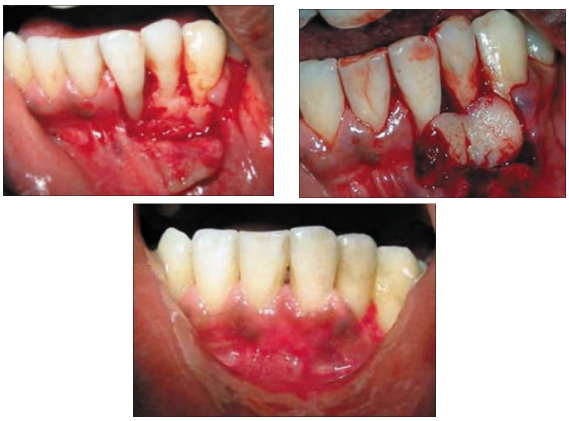
Millers classification of gingival recession.



Coronally Advanced Flap.



Guided tissue regeneration



Platelet Rich Fibrin in root coverage procedure.

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Review

Prosthodontic Rehabilitation in Mucormycosis: A review

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Abstract:
A fungal infection commonly known to affect the immunocompromised patients, Rhinocerebral mucormycosis, now seen with COVID-19. Early diagnosis surgical intervention are the critical factors. Ignoring leads to hard and soft tissue loss, leaving behind a huge orofacial defect, along with certain morbidities and psychological trauma, necessitating surgical and prosthodontic rehabilitation. This is a review on role of prosthodontist in various stages of multidisciplinary approach for treatment for mucormycosis patients.

Keywords: Mucormycosis, Rehabilitation, Reconstruction, Maxillofacial prosthesis

Introduction :

Mucormycosis an uncommon opportunistic infection, often associated with immunocompromised states. It is one of the most common incursive fungal infection after aspergillosis and candidiasis.[1]

Certain opportunistic bacterial and fungal infections have accompanied Coronavirus disease 2019, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[2]

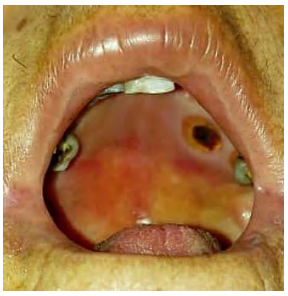

Fig: Oral mucormycosis in post-covid patients

Severe COVID-19 infection causes activation of the immune system which raises ferritin levels in the blood picture and

it is noted that COVID-19 is usually aligned with lymphopenia.[3]

These organisms proliferate rapidly, as they gain access to the mucous membranes and invade the nearby blood vessels causing vascular thrombosis and subsequent necrosis, thereby leading to tissue destruction and non-healing necrotic ulcers with underlying bony destruction.[4]

Surgical considerations

Therapy for Rhinocerebral Mucormycosis necessitates an integrated approach that includes, Antifungal agents mainly intravenous Amphotericin, Surgical debridement, and Control of the underlying disease that leads to infection. The swift progression of the Mucormycosis infection creates a high necessity of early aggressive surgical intervention. Also, the fact that a clear-cut extent of excision cannot be decided prior to surgery based on radiological imaging unlike in tumor cases of benign and malignant origin. Presurgical prosthodontic planning may not be possible in all the cases[5]

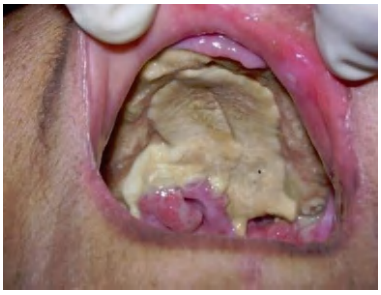

Fig: Total Denudation of the Entire Palate with Extensive Necrosis of Overlying Mucosa.

Prosthodontic considerations

Definitive prosthodontic treatment should only be considered once the healing is complete since the presentation of the permanent defect is decided based on the healing process and scar contraction.[5]

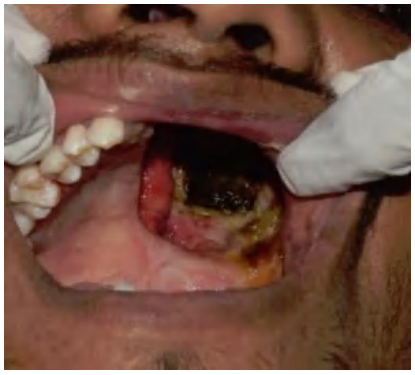

Fig: Rhinocerebral maxillary mucormycosis

Phases of Prosthodontic Treatment for Mucormycosis

Prosthodontic therapy for patients with acquired surgical defect after maxillary resection are rehabilitated in three phases by an obturator prosthesis that supports the patients through different stages of healing. The phases of treatment are arbitrarily divided as follows:

1:Surgical obturation-Immediate surgical obturation grants the placement of prosthesis at surgery. It is retained for about six days post-surgery. The obturator acts as an arrangement on which surgical dressing may be placed. Prior to surgery, impressions are made, and the casts are mounted on the articulator. Later, the outline of surgical margins is discussed by the operating surgeon and prosthodontist on the cast and accordingly, the maxillary cast is altered and the prosthesis is fabricated.

It is advised to reduce the time duration between impression making and obturator delivery, as the time lag would result in tissue contraction and edema, making it uncomfortable to the patient during obturator insertion. An additional advantage of delayed surgical obturator is that it can be readily converted to an interim obturator wherein the margins of the obturator are not

compromised till the final prosthesis is fabricated.[6]

2. Interim obturation -Interim obturator is advised in cases with large defects, where appropriate function and comfort cannot be maintained until fabrication of a new prosthesis. The surgical and definitive obturators are intervened by the interim obturator.[6]

3. Definitive obturation - A definitive obturator is usually indicated on an average, three months after the surgery. The dimensional changes occurring due to structuring of the wound and scar contracture is extended for at least one year and are fundamentally related to the lining soft tissues rather than the underlying bony area, thereby demanding periodic follow up.[7]

Implants

Osseointegrated endosseous and maxillofacial implants such as zygomatic and pterygoid implants have dramatically raised the potential for reconstruction of the patients with varied soft and hard tissue maxillofacial defects. Implants contribute to the retention, support and enhance the stability of the prosthesis. Moreover, placement of implants along with staged surgical reconstruction of the extensive hard tissue defects facilitates prosthodontic rehabilitation with fixed prosthesis.[8]

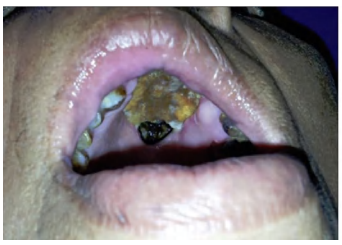

Fig: Intraoral photograph showing black discolouration of the palate and necrosis of maxilla

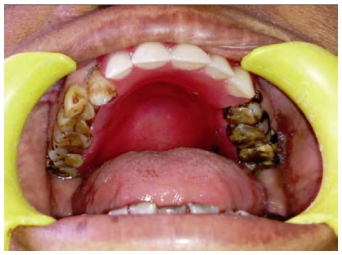

Fig: Intraoral view of the patient with obturator in place

Recent advances

The introduction of **3-D computer aided designing (CAD)** and **computer aided manufacturing (CAM)** also known as rapid prototyping (RP) has transformed the field of maxillofacial prosthodontics. Ever since the digital technology has arrived, it has made it possible to record oral morphology devoid of traditional impression materials and methods. CAD/CAM technologies are capable of palliating most of the limitations of conventional techniques such as risk of impression material dislodgement into the surgical site, loss of impression accuracy due to nasal mucosal secretion on impression material, difficulty caused by severe trismus and the inconvenience caused to the patient.

Cone beam computed tomography (CBCT) grants volumetric data which is convertable to standard tessellation language (STL) files that further can be used for rapid prototyping procedures such as stereolithography (SLA) 3D printing to fabricate accurate anatomic casts.

By utilizing this model, maxillofacial prosthesis can be fabricated by conventional method.[9,10]

However, the unavailability of equipment in the clinic and that it is high-priced, limits their practical application. To overcome these constraints, the technology is stepped higher by introducing an in-house and also economical smartphone-integrated stereophotogrammetry (SPINS) 3D scanner.

The palatal defects can be scanned using SPINS and the prosthesis can be designed and fabricated by utilizing the 3D models obtained with SPINS. [11]

Adopting customized tissue-engineered biodegradable scaffolds, such as polycaprolactone (PCL), fabricated using the patient's computed tomography data and an extrusion-based 3D printing system have been documented and confirmed to promote regeneration of the deficient tissue for maxillofacial bone reconstruction in patients with complex maxillary defects.[12]

Thus, future developments in the field of tissue engineering will have a significant influence on managing postsurgical defects.

Conclusion

Mucormycosis has captured the attention of health care providers, during this COVID-19 pandemic situation due to its deleterious pathogenesis. It is not only life threatening but also leads to loss of critical maxillofacial structures post-surgery, thereby causing huge psychological trauma to the patients. Hence, the role of a prosthodontist has to be emphasized, especially the Rhinocerebral Mucormycosis in which there exists a great demand of maxillofacial rehabilitation Postsurgery.

Through a collaborative approach, in which the maxillofacial prosthodontist plays an important role in every step of management to improve the patients' comprehensive quality of life. Therefore, it demands thorough knowledge of course and nature of the disease, to critically analyze the available anatomic structures and prostheses designs to attain maximum retention, stability, and esthetics. Maxillofacial prosthesis not only rehabilitates the defect but also rejuvenates self-confidence to lead life to the fullest

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Short Report

Prioritizing Oral Health in Pregnancy

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Abstract:

Periodontal disease has been linked with a number of conditions, such as cardiovascular disease, stroke, diabetes, and adverse pregnancy outcomes, all likely through systemic inflammatory pathways. It is common in women of reproductive age and gum conditions tend to worsen during pregnancy. Patients, physicians, and dentists are cautious, often avoiding treatment of oral health issues during pregnancy. This problem is compounded by a lack of clinical guidelines for the prevention and management of common oral conditions in pregnancy. Periodontitis is associated with preterm birth and low birth weight, and high levels of cariogenic bacteria in mothers can lead to increased dental caries in the infant. Other oral lesions, such as gingivitis and pregnancy tumors, are benign and require only reassurance and monitoring. Dental procedures such as diagnostic radiography, periodontal treatment, restorations, and extractions are safe and are best performed during the second trimester. Xylitol and chlorhexidine may be used as adjuvant therapy for high-risk mothers in the early postpartum period to reduce transmission of cariogenic bacteria to their infants. Appropriate dental care and prevention during pregnancy may reduce poor prenatal outcomes and decrease infant caries.

Key Words : Oral lesions, Caries, Pyogenic granuloma, Gingivitis, Periodontitis.

Background: Pregnancy is a delicate condition involving complex physical and physiological changes.

Introduction :

Pregnancy constitutes a special physiological state characterized by a series of temporary adaptive changes in body structure, as the result of an increased production of various hormones such as oestrogens, progesterone, gonadotropins, and relaxin. The oral cavity is also affected by such endocrine actions, and may present both transient and irreversible changes as well as modifications that are considered

pathological.[1]

Pregnant women are particularly susceptible to gingival and periodontal disease. Even when an oral problem occurs, only one half of pregnant women attend to it.[2] This problem is compounded by a lack of national clinical guidelines for the management of common oral conditions in pregnancy. The American Dental Association and the American College of Obstetricians and Gynaecologists provide only advisory brochures on oral health for pregnant patients.In the absence of practice guidelines, fear of medicolegal action based on negligent or substandard treatment of oral conditions during pregnancy abounds, but it is largely unfounded.[3] In addition to a lack of practice standards, barriers to dental care during pregnancy include inadequate dental insurance, persistent myths about the effects of pregnancy on dental health, and concerns for fetal safety during dental treatment.[4] Patients, physicians, and dentists are cautious, often avoiding treatment of oral health issues during pregnancy.

Common Oral Problems in Pregnancy-

ORAL LESIONS

Morning sickness is a common cause in early pregnancy; later, a lax esophageal sphincter and upward pressure from the gravid uterus can cause or exacerbate acid reflux. Patients with hyperemesis gravidarum can have enamel erosions.[5] Management strategies aim to reduce oral acid exposure through dietary and lifestyle changes, plus the use of antiemetics, antacids, or both. Rinsing the mouth with a teaspoon of baking soda in a cup of water after vomiting can neutralize acid.[6] Pregnant women should be advised to avoid brushing their teeth immediately after vomiting and to use a toothbrush with soft bristles when they do brush to reduce the risk of enamel damage. Fluoride mouthwash can protect eroded or sensitive teeth.[7]

CARIES

The reasons for the pregnant women at higher caries risk are as follows: (i) increased pH in the oral cavity due to frequent vomiting, (ii) expectant mothers have cravings towards sugary snacks and (iii) less attention towards oral health. Active dental caries if left untreated can lead to local as well as systemic complications. One fourth of women of reproductive age have dental caries, a disease in which dietary carbohydrate is fermented by oral bacteria into acid that demineralizes enamel (Figure 1). Early caries appears as white, demineralized areas that later break down into brownish cavitations. Pregnant patients should decrease their risk of caries by brushing twice daily with a fluoride toothpaste and limiting sugary foods. Patients with untreated caries and associated complications should be referred to a dentist for definitive treatment.

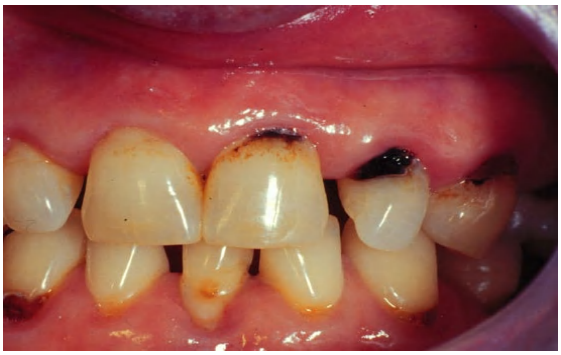

Fig. 1

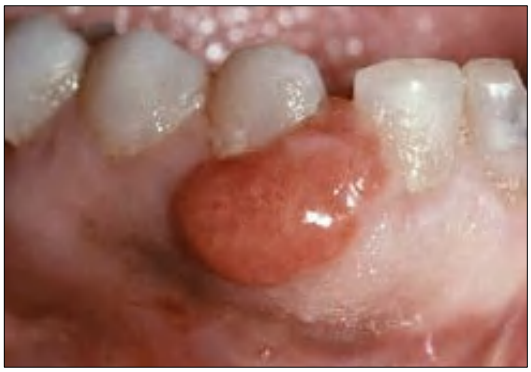

Fig. 2

PREGNANCY TUMOR

Pregnancy tumor (pyogenic granuloma) (Figure 2) occurs in up to 5 percent of pregnancies and is indistinguishable from pyogenic granuloma. This vascular lesion is caused by increased progesterone in combination with local irritants and bacteria. Lesions are typically erythematous, smooth, and lobulated; They are located primarily on the gingiva. Pregnancy tumors are most common after the first trimester, grow rapidly, and typically recede after delivery. Management is usually observational unless the tumors bleed, interfere with mastication, or do not resolve after delivery. Lesions surgically removed during pregnancy are likely to recur.[7]

LOOSE (MOBILE) TEETH

Due to increased levels of hormones such as progesterone and oestrogen, which affects the periodontium (periodontal and gingival fibres and the alveolar bone), the teeth become loose even in the absence of gingival and periodontal infections.[7] In such instances, the Gynaecologists or the Physicians can assure the patients that it is a transient condition and would return to normal soon after delivery.

GINGIVITIS

Gingivitis (Figure 3) is the most common oral disease in pregnancy, with a prevalence of 60 to 75 percent. Approximately one half of women with pre-existing gingivitis have significant exacerbation during pregnancy.[7] Gingivitis is inflammation of the superficial gum tissue. During pregnancy, gingivitis is aggravated by fluctuations in oestrogen and progesterone levels in combination with changes in oral flora and a decreased immune response. Thorough oral hygiene measures, including tooth brushing and flossing, are recommended. Patients with severe gingivitis may require professional cleaning and need to use mouth rinses such as chlorhexidine (Peridex).

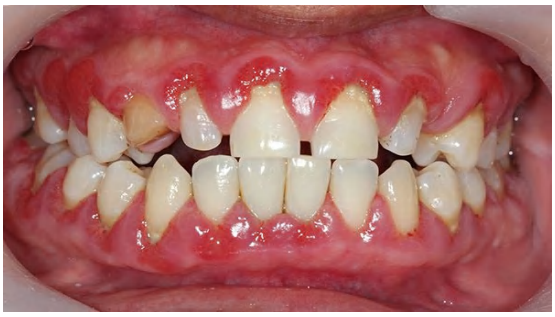

Fig. 3

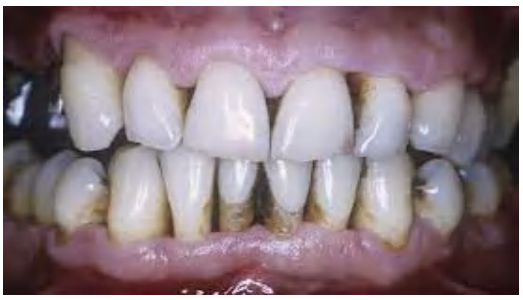

Fig. 4

PERIODONTITIS

Periodontitis is a (Figure 4) affecting approximately 30 percent of women of childbearing age.[6] The process involves bacterial infiltration of the periodontium. Toxins produced by the bacteria stimulate a

chronic inflammatory response, and the periodontium is broken down and destroyed, creating pockets that become infected. Eventually, the teeth loosen. This process can induce recurrent bacteremia, which indirectly triggers the hepatic acute phase response, resulting in production of cytokines, prostaglandins (i.e., PGE2), and interleukins (i.e., IL-6, IL-8), all of which can affect pregnancy.[3]

Elevated levels of these inflammatory markers have been found in the amniotic fluid of women with periodontitis and preterm birth compared with healthy control patients.[4] In one study, researchers found minimal oral bacteria in the amniotic fluid and placenta of women with preterm labor and periodontitis. It seems probable that this inflammatory cascade alone prematurely initiates labor. The mechanism is thought to be similar for low birth weight; the release of PGE2 restricts placental blood flow and causes placental necrosis and resultant intrauterine growth restriction.[1]

Periodontitis and Poor Pregnancy Outcomes

Periodontitis has been associated with several poor pregnancy outcomes, although the mechanism by which this occurs remains unclear and controversy exists. Preterm birth is the leading cause of neonatal morbidity in the United States, costing approximately $26.2 billion per year.[7] Studying the direct effect of any risk factor on the outcomes of preterm birth and low birth weight is extremely difficult because of the many confounding variables that may affect the same outcome. In a systematic review of mainly cross-sectional, case-control, and cohort studies conducted between 1996 and 2006 in 12 countries and three states, investigators identified 24 studies demonstrating a positive relationship between periodontitis and preterm birth, low birth weight, or both.[7] These studies involved approximately 15,000 mothers. Three of the studies were randomized controlled trials (RCTs). Conversely, 14 studies reported no relationship between periodontitis and poor pregnancy outcomes.

A recent, large, U.S.-based RCT found no association between periodontitis and preterm birth and low birth weight. Some of the study authors have postulated that racial differences in how periodontitis affects pregnancy outcomes may explain many of the varying results. Studies that involved more black patients had participants with more periodontal-related preterm labor. Another possible explanation is that treating periodontitis during pregnancy is too late to achieve a positive result. The focus should be on improving the condition before pregnancy.

The management of periodontitis in pregnancy is based on early diagnosis and deep root scaling. The silk h et al in 2008 of one RCT suggested that deep root scaling reduced the risk of birth before 37 weeks' gestation (preterm birth).For birth before 35 week gestation (very preterm birth), the risk reduction was 0.2 (CI, 0.02 to 1.4) for women with periodontitis. It is also suggested that if deep root scaling combined with patient education, regular plaque removal, and routine mouth rinses, researchers also found a reduction in the incidence of preterm low birth weight. Women with preexisting periodontal disease can reduce the risk of recurrence or worsening disease during pregnancy through proper oral hygiene.

Dental Care During Pregnancy

SCREENING AND PREVENTION

Every pregnant woman should be assessed for dental hygiene habits, access to fluoridated water, oral problems (e.g., caries, gingivitis), and access to dental care. Oral examination should include the teeth, gums, tongue, palate, and mucosa. Patients should be checked by recalled visits to perform routine brushing and flossing, to avoid excessive amounts of sugary snacks and drinks, and to consult a dentist. Status of and plans for oral health should be documented.

CARIES RISK REDUCTION IN CHILDREN

Xylitol and chlorhexidine lower maternal oral bacterial load and reduce transmission of bacteria to infants when used late in pregnancy and/or in the postpartum period. Both topical agents are safe in pregnancy (U.S. Food and Drug Administration [FDA] pregnancy category B) and during breastfeeding.25-27 Studies have used different dosing levels, and the optimal dose for consistent prevention is unclear.

DIAGNOSIS

Dental radiography may be performed in pregnancy for acute diagnostic purposes. When possible, radiography should be delayed until after the first trimester. Screening radiography should be deferred until after delivery. Modern fast film, avoidance of retakes, and use of lead aprons and thyroid shields all limit risk. The teratogenic risk of radiation exposure from oral films is 1,000 times less than the natural risk of spontaneous abortion or malformation.

ROUTINE DENTAL TREATMENT

Second trimester is the best time to treat in pregnancy as oragenesis is completed. Urgent dental care can be performed at any gestational age. The third trimester presents the additional problems of positional discomfort and the risk of venacaval compression. Propping a woman on her left side, repositioning often, and keeping visits brief can reduce problems.[4]

MEDICATIONS FOR DENTAL PROCEDURES

Local anaesthetic solutions such as lidocaine (Xylocaine) and prilocaine (Citanest) mixed with epinephrine are safe for procedures when dosed appropriately.[1] Sedatives such as benzodiazepines (e.g., midazolam), lorazepam (Ativan) and triazolam (Halcion) should be avoided. Use of Nitrous oxide during pregnancy is still not rated but its use is controversial. [**MANAGEMENT OF ACUTE DENTAL CONDITIONS]**

In conditions such as mild cellulitis, first-line antibiotics such as penicillin, amoxicillin, and cephalexin are the drugs of choice. In case of patients allergic to penicillin, erythromycin base (not erythromycin estolate, which is associated with cholestatic hepatitis in pregnancy) or clindamycin (Cleocin) can be used. Various types of dental procedures that can be undertaken during each trimester are summarized as follows:

First trimester: It is the most crucial period for growth of the foetus. Only emergency dental treatment should be undertaken in consultation with the patients Gynaecol-ogist/Physician when organogenesis is in-complete. If the expectant mother complains of dental pain, the dentist can do an emer-

gency access opening, extirpate the inflamed pulp (or) drain the pus and relieve pain. Intra-canal medicaments such as chlorhexidine / metronidazole, calcium hydroxide can be used. Plaque diet control programmes are initiated for the mother throughout pregnancy.

Second trimester: This phase is considered the most safest to treat patients among the three trimesters. Emergency as well as elective dental treatment can be provided in the second trimester. Treatment such as emergency dental extractions, periodontal surgeries, completion of root canal can be performed.

Third Trimester: If patient develops dental pain, an emergency treatment can be performed and definitive treatment can be postponed until after the birth, if possible. There is a positional discomfort in the third trimester and the risk of compression of the vena cava. This can be overcome by repositioning them frequently and propping on their left side and most importantly, reducing the timings of appointments can minimize complications.

Postponing dental treatment until delivery can be problematic because mothers are more focused on the care of their newborn child than their own health and may not have dental insurance after delivery.[1]

Conclusion

Dental treatment is an important aspect for good oral health that should extend even during pregnancy. Regular dental visit can include the use of x-rays, oral prophylaxis, restorations, interventional treatments like root canal treatments, periodontal surgeries and extractions because using local anaesthetics during pregnancy do not have any adverse effects to the developing foetus. Conversely, complications of pregnancy, such as preterm birth, low birth weight and preeclampsia, occur in women who had not received any dental treatment. Nevertheless, pregnancy is a time when women may be more motivated to make healthy changes. Gynaecologists and Physicians can address maternal oral health issues, probably reducing the risk of adverse pregnancy outcomes through available preventive measures, early diagnosis, and appropriate management by referring to a Dentist.

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Case Report

Laser Excision of Focal Fibrous Hyperplasia: A Case Report

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Abstract:

The focal fibrous hyperplasia appears as a nodular growth mainly on buccal mucosa along the occlusal plane. Other sites are gingiva, palate, lips, and tongue. The management of this lesion can be done through conservative surgical approach. The effects of chronic local irritation have been seen commonly in the form of fibroma or mucocele in children. We report a case of 12-year-old girl with the chief complaint of swelling in the lower lip which was diagnosed both clinically and histologically as focal fibrous hyperplasia. Diode laser excision was done under local anesthesia with no post-operative complications. The wound healing of the soft tissue was satisfactory.

Key Words : Focal fibrous hyperplasia, Irritational fibroma, Diode laser

Introduction :

Inflammatory hyperplastic lesion may be defined as "an increase in the size of an organ or tissue due to an increase in the number of constituent cells, as a local response of tissue to injury. The traumatic irritants include calculi, overhanging margins, restorations, foreign bodies, chronic biting, margins of caries and sharp spicules of bones and overextended borders of appliances.[1]

Focal fibrous hyperplasia presents as a overgrowth which is painless, round or ovoid, sessile or pedunculated (in some cases), smooth surface, pinkish in color similar to surrounding mucosa, and rubbery to firm in consistency due to its collagen content. When treatment is required, surgical excision is the choice. The

prognosis of these lesions is good overall. They do not have malignant potential and recurrences. The soft-tissue diode laser can be more effective than conventional surgery, electrosurgery, and cryosurgery in reduction of bleeding and pain.[2]

The laser surgery can be used for ablation of lesions, incisional and excisional biopsies, gingivectomies, gingivoplasties, soft tissue tubersosity reductions, and certain crown lengthening procedure.[3]

Few studies have comprehensively reported the incidence of oral soft tissue lesions:

Of the 1290 soft-tissue reactive lesions of the oral cavity, 193 were confirmed histologically as FFH, a prevalence of 15%. The most common affected sites were the buccal mucosa, lower lip and dorsal tongue.[4]

From a total of 412 records evaluated, 197 (48%) of the lesions were reactive hyperplasia. Of these, 124 (62.8%) cases were females (mean age, 39.35 ± 18.37) and 73 (37.2%) cases were males.[5]

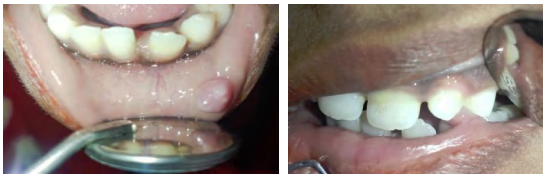
Case Report:

A 12-year-old girl had come to Department of Oral Medicine and Radiology CSMSS Dental College and Hospital Aurangabad with chief complaint of small painless overgrowth on the lower lip. Patient also complained of discomfort associated with overgrowth. Patient gave history of overgrowth being small at first with gradual enlargement.

Clinically - Solitary, nodular, pink colored overgrowth seen on lower left labial mucosa around size of 1 × 1 cm approximately. [Figure 1 (a), (b)]

On palpation - nodular, movable, firm in consistency, pedunculated, non-tender, non-comresible, non fluctriant, non reducible, absence of any discharge. No submental or submandibular lymph nodes were palpable.

Considering history and clinical findings, provisional diagnosis of focal fibrous hyperplasia was noted



(a) (b)

Figure 1: Preoperative pictures

Pre-operative CBC showed all blood counts to be within normal limits. Excision biopsy was planned and patient's consent was taken.

Management - laser diode excision with laser stop LX 16 laser (diode laser at wavelength 940 nm and fibroma excision mode) was done under LA. Lesion was held with help of tissue forceps for convenient handling and was separated from base with help of diode laser. (Figure 2)

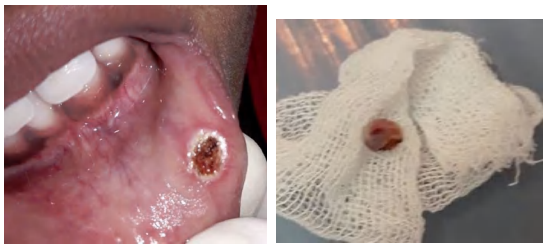


Fig. 2 Fig.3

Figure 2: Postoperative picture

Figure 3: Excised tissue

Specimen (Figure 3) was stored in formalin and sent to oral pathology department for histopathology.

Histopathology - reveals surface showing shortening of stratified squamous epithelium and interlacing collagenous fibers suggestive of focal fibrous hyperplasia. (Figure 4)

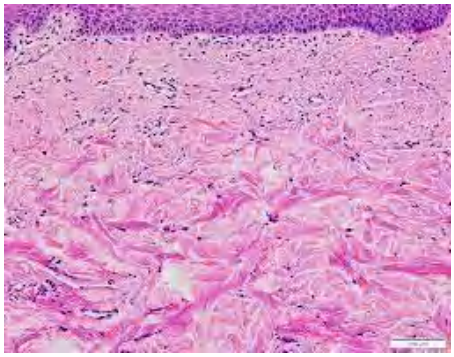


Figure 4: Histopathology

Follow up done after 1 week. (Figure 5)

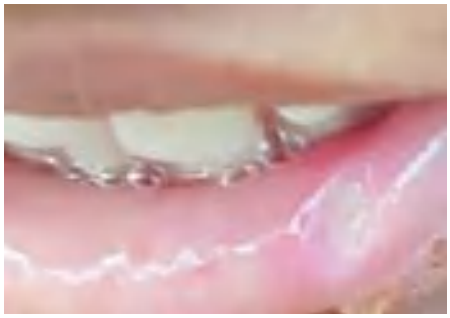


Figure 5: 1 week follow up

Discussion:

Focal fibrous hyperplasia is the most common benign soft tissue tumor in the oral cavity. Most fibromas represent reactive focal fibrous hyperplasia due to trauma or local irritation. An interesting point to be noted is that the focal fibrous hyperplasia is a neoplasm of connective tissue origin and microscopically similar to inflammatory hyperplasia. Hyperplasia is a self-limiting process unlike neoplasia and hyperplastic cells sometimes show regression after removal of the stimulus. Neoplastic tissue sometimes resembles that of hyperplastic tissue that do not regress; hence, it can be said that neoplasm can also occur from chronic irritation.[6] The general literatures have cited the reason for a few of the oral lesions like irritation fibroma and mucocele, arising as a result of oral habits such as lip biting/sucking.[7] Unhealthy habits, when repeated excessively become harmful, contributing to orofacial muscular imbalance associated with alterations in bone growth, dental malposition, and dentofacial abnormalities. Biting, licking, or sucking of lips and cheeks is frequently accompanied by chapping, dryness, erosion, irritation of one of both lips and/or vermilion borders.[8] Diode laser radiation is an excellent, simple, and safe form of treatment of oral lesions. This procedure is virtually bloodless, postoperative edema, and discomforts are minimal. With laser irradiation, there is less damage to adjacent tissues and better visibility. Compared to conventional methods, laser surgery is less time consuming, less painful, more precise in the treatment of soft tissue lesions, produces less scar-tissue contraction, and maintains the elastic tissue properties.[9]

According to Zarei et al., the lesion is mostly found on the gingiva. The lesion is usually symptomless, most common in the fourth to sixth decade of life, and the male to female ratio is almost 1:2.[5]

According to Thiago de et al., mechanical trauma is closely related to the development of FFH indicating that it is a true neoplasm.[4]

Conclusions:

Focal fibrous hyperplasia in most cases are benign and self-limiting conditions, diagnosed based on clinical and pathological examination.

Complete excision has been the choice of treatment and recurrence has been associated with incomplete removal of the lesion. Our patient reported good prognosis and an uneventful post-operative recovery.

Diode laser treatment was highly effective. Diode laser is used according to the protocol, is a relatively simple and safe method.

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Short Report

Stem Cells : A New Horizon In Periodontal Regeneration

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Abstract:

A ‘‘stem cell’’ refers to a clonogenic, undifferentiated cell capable of self-renewal & multi-lineage differentiation. It is capable of propagating and generating additional stem cells, while some of its progeny can differentiate and commit to maturation along multiple lineages giving rise to a range of specialized cell types. Types of stem cells are dental pulp stem cells, pdl derived, SHED etc. Future perspectives include trans-differentiation of somatic cells to generate induced pluripotent stem cells, homing procedures, the use of exogenous stem cells, and 3D-printed scaffolds. The indications, advantages, disadvantages & future perspectives will be discussed. The purpose of this paper is to review the health benefits of stem cells in regeneration.

Key Words : 3D-printed scaffolds, cell sheet engineering, SHED

Introduction :

Chronic periodontitis is a disease of the periodontium characterized by irreversible damage in connective tissue attachment and supporting alveolar bone[1]. This destruction will lead to a functionally and esthetically questionable dentition. National surveys have shown that around 35% of adults suffer from moderate periodontitis, while 15% are affected by severe generalized periodontitis at some point[2]. These statistical results show the severity of periodontal disease and its impact on general health of the world population. Hence there has been an increased interest in the management of periodontal disease and as a result, improve the patient’s quality of life[3]. However, conventional treatment modalities like scaling, curettage and open flap debridement result in control of inflammation and formation of a long junctional epithelium and hence only periodontal repair and no regeneration[4].

The ultimate goal of periodontal therapy is to achieve periodontal regeneration with the re-formation of all components of the periodontium, including periodontal ligament, gingival connective tissue, cementum and alveolar bone[5]. Furthermore, appropriate

connections need to be formed between the newly regenerated tissues, including connections (Sharpeys fibers) between the periodontal ligament and the tooth root, as well as between the alveolar bone and the periodontal ligament. Current treatment strategies for periodontitis fail to completely and reliably reconstitute all tissue and connections damaged through periodontal disease Procedures to achieve periodontal regeneration have included root surface conditioning, bone graft placement, guided tissue regeneration and growth factor application. However, current regenerative procedures have limitations in attaining complete and predicable regeneration, especially in advanced periodontal defects[6]. For successful perio-dontal regeneration, formation of a functional epithelial seal, insertion of new connective tissue fibers into the root, reformation of a new acellular cementum on the tooth sur-face and restoration of alveolar bone height are required. The complex events associated with periodontal regeneration involve recruitment of locally-derived progenitor cells that can differentiate into periodontal ligament cells, mineral-forming cementoblasts, or bone-forming osteoblasts[7,8]. Advances in stem cell biology and regenerative medicine have presented opportunities for tissue engineering and gene-based approaches in periodontal therapy[9,10]. These new approaches, offers interesting alternatives to existing therapies for the repair and regeneration of the periodontium. We here review current understanding of stem cells, their potential application in regenerative periodontal therapy, and discuss the challenges of translating stem cell research into clinical practice.

TYPES OF STEM CELLS

Stem cells are the foundation cells for every organ and tissue in the body, including the periodontium. They have two defining characteristics: the ability for indefinite self-renewal to give rise to more stem cells, and the ability to differentiate into a variety of specialized daughter cells to perform specific functions. When a stem cell divides asymmetrically, one daughter cell retains the stem cell characteristics, while the other is destined for specialization under specific conditions. A pluripotent stem cell can differentiate into all cell types of the body, whereas a multipotent stem cell can differentiate into many different cell types. The two types of stem cells – embryonic and adult – are classified according to their origin and differentiation potential. Human embryonic stem cells are pluripotential and differentiate into all types of specialized body cells. Their use for clinical therapy is a relatively new endeavor. Adult, or tissue specific, stem cells are found in the majority of fetal and adult tissues. They are derived from tissues that continually replenish themselves (peripheral blood, dermis and gastrointestinal epithelium). They are multipotential and are thought to function by replacing cells that are injured or loss. Their most common source is the bone marrow (hematopoietic stem cells) or bone marrow stromal cells (mesenchymal stromal stem cells). These last can be potential candidates for perio-dontal regeneration. They can differentiate into endothelial, perivascular, neural, bone or muscle cells. Mesenchymal stem cells can effectively regenerate destroyed periodontal tissue. Those derived from bone marrow or adipose tissue have been used in experimental animal models. to form cementum, periodontal ligament and alveolar bone in vivo after implantation into periodontal defects in beagle dogs. Mesenchymal stem cells have also been identified in adipose tissue. As adipose

tissue requires less-invasive methods and is abundant, it is very appealing as a source of cells for regenerative periodontal therapy.[11]

STEM CELLS IN DENTAL & PERIODONTAL TISSUES [12]

Dental pulp stem cells (DPSCs) : isolated from adult human dental pulp a clonogenic, rapidly proliferative population of cells which were found to be similar to BMSCs.

Periodontal Ligament stem cell (PDLSC): Periodontal ligament is a specialized connective tissue that connects cementum and alveolar bone, to maintain and hence support the teeth in sight also preserve tissue homeostasis.

Stem cells from apical papilla (SCAP): Apical papilla is the soft tissue present at the apices of developing roots of permanent teeth. It is responsible for the formation of the radicular pulp hence SCAP resemble DPSCs however, they are comparatively more immature hence superior for tissue regeneration .

Dental Follicle Stem Cells (DFSC): Dental follicle is an ectomesenchyme derived loose connective tissue sac surrounding the developing tooth bud from which arises the alveolar bone, cementum and periodontal ligament. DFSCs are relatively easy to harvest as can be procured from the follicles of unerupted third molars.

Stem cells from Human Exfoliated Deciduous teeth (SHED):
They have a higher proliferation rate as compared to BMMSC and PDLSC, also result in increased bone formation

Gingival Mesenchymal stem cells (GMSC): Oral MSCs derived from human gingiva (GMSCs) also have been considered as a promising alternative cell source for periodontal regeneration

Epithelial Cell Rests of Malassez (ECRM): These are remnants of the Hertwig's epithelial root sheath from which arise, all the periodontal structures.

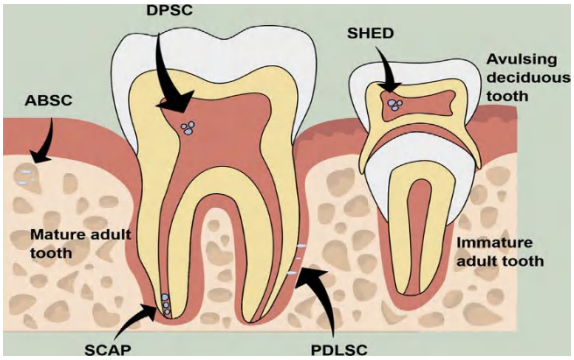


Fig 1 : Stem Cell in Dental & Periodontal Tissues

LIMITATIONS IN THE APPLICATION OF DENTAL MSC FOR PERIODONTAL REGENERATION[13]

Biological: Molecular pathways responsible for stem cell proliferation and differentiation are unknown

Technical: Culture mediums are not well developed enough to mimic in vivo conditions to ensure safe and consistent stem cell proliferation and differentiation. Stem cell line production for human trials could be hampered by the use of xenogenic products in culture mediums as they could be a potential source of pathogens. Mesenchymal stem cells have a limited life span unlike embryonic stem cells which are immortal. An ideal biocompatible scaffold and transport mechanism is still under research.

Clinical: Integration of the human stem cell derivatives with the recipient tissue and their ability to carry out the desired functions in humans is still under speculation

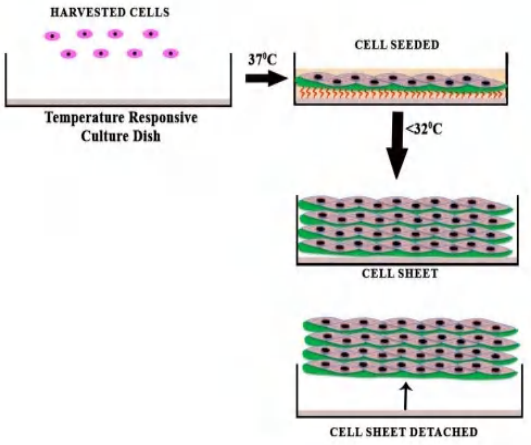
CELL SHEET ENGINEERING

Although stem cells may be a promising source of periodontal regeneration, for better results they need to be transferred to the target site with appropriate scaffold and the correct signaling molecules for them to differentiate into the desired tissues.Conventionally, tissue engineering involved the incorporation of cells, growth factors and scaffold separately into the defect. Over the years, researchers attempted at culturing cells in vitro under ideal conditions resulting in formation of cell sheets which were separated from the substratum by enzymatic treatment, and placed at the target site. This however was found to impair cell functions, since the proteolytic enzymes used hydrolyze various membrane associated proteins resulting in damage to the cell membrane. Pioneering work carried out by Okano, et al. in the field of cell sheet engineering helped in overcoming this issue and making it a viable mode of periodontal regeneration.Okano, et al.[14] incorporated a temperature responsive polymer poly (N-isopropylacrylamide) (PIPAAm) in the culture dishes to detach the cell sheets[15].

Since this polymer is hydrophilic at temperatures greater than 32°C and hydrophobic when temperature is reduced below 32°C, also cells adhere to hydrophobic surfaces, therefore it is a useful aid in detaching the cells from the culture dishes.Cell sheet engineering with the help of temperature responsive dishes can act as an effective means for periodontal regeneration. These temperature responsive cell sheets can be grafted to recipient site without suturing[16]. Figure 2 describes the technique of carrying out cell sheet engineering in temperature responsive culture dishes. To increase the strength and number of cells, a 3D culture model of multi-layered cell sheet have so been developed.

Also more recently cell sheet fragments and cell sheet pellets have been developed to increase the efficacy of the cells transplanted especially in cases where the target sit is too small for the entire cell sheet. Further Co-culturing and micro-patterning of different types of cells are under trials for creation of more tissue-like materials which would give better results than single cell-sheets[17]. Also several researchers have attempted to incorporate biocompatible scaffolds like hyaluronic acid, fibrin gel and ceramic bovine bone to the fragile cell sheets also referred to as scaffold based cell sheet technology to improve the results following cell sheet engineering[18]. Hence cell sheets of the following types have been manufactured till date

1. Monolayered Cell Sheets (MCS)
2. Multi-Layered cell-Sheet (MLS)
3. Cell Sheet Fragments (CSF)
4. Cell Sheet Pellets (CSP)
5. Co-culturing and micropatterning
6. Scaffold based CST



(Fig : 2 Schematic representation of cell sheet engineering)

Periodontal applications of cell sheet engineering.

Periodontium is a complex tissue comprising of 2 hard tissues (alveolar bone and cementum) and 2 soft tissues (periodontal ligament and gingiva). Complete regeneration implies the simultaneous production of all these tissues. To be able to achieve this extracellular matrix in the target site should generate the correct signals at the appropriate time for all the tissues to form.Some authors have suggested the use of allogeneic MSC. However, further investigations need to be carried out to assess the feasibility of this approach, considering that in the clinical environment, complete regeneration needs to occur in a diseased environment containing inflammatory cytokines. Further on various interactions between the different types of cells in the periodontium need to be assessed and also the effect of mechanical stress on periodontal regeneration needs to be examined in detail.

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7th May on occasion of Birthday of Hon. Shri. Padmakarji Mulay Sir
Blood Donation Camp was organised

Editorial Board of Dentovision 2022

31st May No Tobacco Day Rally by PHD dept.

22 Jan 2022 Prosthetic Day Celebrated

12 Feb. 2022 Screening of Oral Cancer free
checkup camp by INNER WHEEL Club Members

Biostar Demonstration in Dept. of Orthodontics

8 March Women's Day Celebrated by Oral Path Dept.

World Oral Health Day celebrated by Dept. of Periodontology

Quiz Competition organised by Dept. of Perio on occasion of WOHD

8th May 2022 World Thalassemia Day celebrated by PHD Dept.

Satellite Center activity conducted by Dept. of PHD

Free Oral Cancer & Pre-Cancer Screening conducted by Inner Wheel Club
President Hon. Shreemati Lata Mulay Madam & Members on the occasion of Oral & Maxillofacial Surgeon's Day

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