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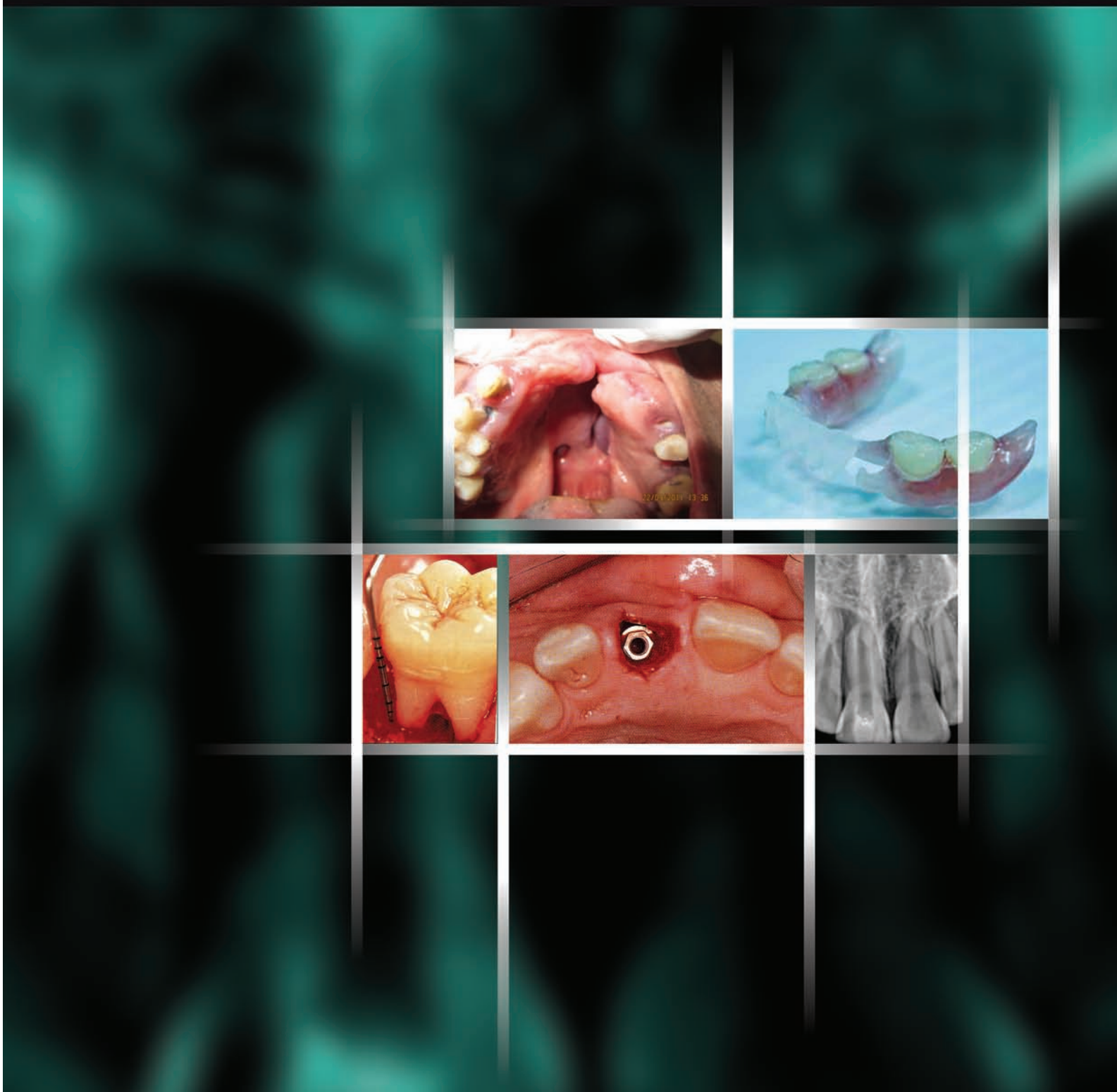

Indian Dental Association
Thiruvalla Branch

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Contents

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STATE IDA PRESIDENT'S MESSAGE

It is indeed a great pleasure to see that the first issue of the journal of IDA Thiruvalla branch, 'TIDA' is ready for publishing and I congratulate the editor, Dr.Annie Susan Thomas.

I am sure that this journal will up hold the status of our prestigious profession.

I am delighted to know that IDA Thiruvalla has conducted several CDE programmes and interactive sessions of high standard. Rendering of free dental checkup in health camps and orphanage visits is really commendable. The importance of early diagnosis and treatment of dental caries, oral cancer etc is stressed.

Congratulations to President Dr. Thomas George, Secretary Dr. Philip T. Mathew, CDE convener Dr. Reji Thomas, CDH convenor Dr. Eapen Cherian and all the office bearers of IDA Thiruvalla 2011 for their tireless work and dedication. Congratulations to all the members for their enthusiastic efforts.

I wish them every success in their future ventures.

Dr. SANTHOSH SREEDHAR
President
IDA Kerala State

President's Message

It is indeed a proud moment for all the members of IDA Thiruvalla, as the first edition of our journal goes to print.

In the last three years of its existence, IDA Thiruvalla has implemented various projects; be it in the academic front or social enrichment, ranging from CDE programs, interactive sessions, hands- on programs, free dental health camps and orphanage visits. The family get-together and onam celebrations were a huge success due to the enthusiastic participation of our members.

I am proud of the way our editor and team have put together this journal, a rich reserve of scientific information and I congratulate them for their commitment and effort.

I hope all our members will utilize this as an opportunity to publish as the adage says, "Publish or Perish". I earnestly desire that the journal will serve to encourage our members to document all the treatments, maintain records and to contribute to the betterment of the dental profession.

Dr. THOMAS GEORGE
President
IDA Thiruvalla Branch

Editorial

It is my great pleasure and privilege to introduce the very first edition of the journal of our reputed branch, IDA Thiruvalla. This is a momentous occasion which Thiruvalla IDA has been looking forward to. I greatly appreciate the hearty response put forth by our members towards the contribution of articles for the journal.

The authenticity of a journal lies in the professional standard of its scientific content. We are making every effort to ensure the quality of articles in this journal.

The future belongs to those who seize the advantages provided by every opportunity. We have just made a beginning……. Your constant support and valuable encouragement is solicited to ensure that this endeavour goes all the way and is a resounding success.

Dr. ANNIE SUSAN THOMAS
Editor

Message

I am very glad to know that the Indian Dental Association Thiruvalla Branch is publishing a journal for the dissemination of advances in Dental Science and regarding the activities of the Association.

I am sure this journal will be of great value to the members of the Association and to the Dental community at large.

Dr. OOMMEN AJU JACOB
Principal
Pushpagiri College of Dental Sciences
Thiruvalla

Prosthetic Rehabilitation of a patient with congenital oro-nasal defect with an interim palato-pharyngeal obturator - A Case Report

* Aby Mathews

Abstract:

The most common of all intraoral defects are in the maxilla, in the form of an opening into the antrum and nasopharynx which results from congenital malformation and acquired defects. The goals of prosthetic rehabilitation include separation of oral and nasal cavities to restore the functions of mastication, deglutition, speech and normal oro-facial appearance. This article describes a relatively easy and time saving two piece hollow bulb interim palato-pharyngeal obturator to rehabilitate a congenital maxillary defect.

Introduction

Defect of the maxilla which occurs as a result of tumor surgery or congenitally, may be closed with prosthesis in the form of a disc or plate which is termed as maxillary obturator[1]. It was Ambroise Pare' (1510-1590), the great surgeon of the 16th century used the word "obturateurs" which is derived from the Latin word "obturo" meaning to stop up[2].

Pharyngeal obturator prosthesis can be used to achieve a number of objectives in many patients with congenital and acquired soft palate defects. Most pharyngeal obturators are used to separate the nasopharynx from the oropharynx during speech and deglutition[3].

Obturators are classified as solid, open hollow and closed hollow as to the nature of their extension into the defect site. A hollow bulb design is not necessary when the defect is of small to average size and the ridges are healthy. Hollow obturator reduces the weight, is hygienic, easy to fabricate and increases speech resonance. A closed hollow obturator which are usually fabricated with acrylic resin prevents fluid and food collection, reduces air space and allows maximum extension and comfort than single piece obturator[4] whereas an open hollow obturator is unhygienic, foul smelling and unpleasant for the patient.

Case report

A 45 year female patient reported to Department of Prosthodontics, Pushpagiri College of Dental Sciences, Thiruvalla, complaining of missing anterior teeth and difficulty in speech and deglutition. The patient had a history of congenital palatal defect with report of closure of the lip defect at the age of 3 years. Ever since then she had not gone for any treatment regarding the defect. Her major problem was difficulty in communication with other people and regurgitation of food and liquid through the nose.

Detailed examination revealed a thick scar on the lips indicating closure of the cleft lip. The defect extended posteriorly involving the premaxilla, the mid-palatine suture, the soft palate and the pharyngeal sphincter which is classified as class 3 according to Veau's cleft palate classification (fig. 1). Intraoral examination revealed missing teeth on relation to 11, 21, 22, 23, 24 and 26 associated with generalized periodontitis. Nasal resonance was examined with alternating closure of nose during the pronunciation of certain letters like f, v, s, z etc and hypernasility and nasal escape was noted. Limited movement of the lateral and posterior wall of the pharyngeal defect was noted during the pronunciation of ah!

Maxillary and mandibular impression was made with irreversible hydrocolloid (Algitex-DPI India) after

*Professor, Dept. of Prosthodontics, Pushpagiri College of Dental Sciences, Thiruvalla.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6 Prosthesis without speech bulb

blocking out the defect with dammed gauze and diagnostic cast was made. A special tray was fabricated with self cure acrylic resin and the impression of the palatal defect was recorded with addition silicone putty (Aquasil soft putty, Dentsply) material (fig. 2). The patient was instructed to flex and rotate the neck during the impression procedure. Final impression was made with light body addition silicone (Aquasil LV, Dentsply) performing all the previous movement. Trial was completed with the maxillary and mandibular partial denture and esthetics and occlusion was rechecked. The dentures were waxed up with a concavity seen on the palatal aspect which is the extension into the defect and retentive clasps on molars were made. The upper portion of the hollow bulb is reconstructed with two layers of modeling wax by adapting it over the palatal portion of the prosthesis. Both denture and the second portion are acrylised with heat cure acrylic resin (fig. 3).

The upper portion is sealed to the palatal portion of denture by sticky wax and inserted onto the patient and evaluated. The pharyngeal defect is recorded by adapting addition silicone putty material (Aquasil soft putty, Dentsply) over the posterior portion of the second part of the bulb and the patient is instructed to flex and rotate the head side to side to record the posterior and lateral wall of the defect (fig. 4). The impression is evaluated for peripheral seal by asking the patient to swallow water. The upper portion of the bulb along with the impression of the pharyngeal defect is processed with heat cure acrylic resin. The processed upper portion is now sealed to the palatal portion with self cure acrylic resin thus making the bulb hollow and the final prosthesis is finished and polished (fig. 5).

The prosthesis is inserted and evaluated for the hyper nasality by asking the patient to say the explosion consonants like p, g, t, b, d. Nasal regurtation was also evaluated by asking the patient to drink water. The patient was very happy with the marked difference which was seen.

Discussion

Palatopharyngeal insufficiency implies the presence of hyper nasality, inappropriate nasal escape and decreased air pressure during the production of oral speech sounds[5]. Surgical intervention in case of velopharyngeal insufficiency may be contraindicated for local or systemic reasons.

Figure 7 Prosthesis with speech bulb

Figure 8 Extra oral view

In order to obtain adequate velopharyngeal closure during speech and swallowing a posterior extension is added to the prosthesis. The extension must be positioned at the level of the hard palate during the most active movement of the pharyngeal sphincter. This extension must be in static contact with the soft tissues and must not affect the stability of the prosthesis. Patients for whom surgical intervention is contraindicated are candidates for prosthetic treatment[6].

A pressure resistant seal of the obturator bulb against the mucosal lining if placed restores the speech and swallowing function[7]. This paper discussed a very simple method of recording the extension of the pharyngeal defect with elastomers on a previously fabricated second part of the hollow bulb and converting this to heat cure acrylic resin[8, 9].

Conclusion:

The pharyngeal obturator is fabricated to separate the nasopharynx and oropharynx during speech and deglutition. A successful pharyngeal obturator depends on the detailed extension of the obturator, simplicity of construction and a multidisciplinary approach of prosthodontist and speech therapist in helping the patient to regain his personality physically and socially.

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Revascularization- An effective technique to re-establish vitality in nonvital tooth

* Josey Mathew

Abstract:

Regenerative endodontic procedures can be defined as biologically based procedures designed to create and deliver tissues to replace diseased, missing and traumatized pulp-dentin complex. In this article, the procedure for revascularization of a upper right central incisor of a 14 year old girl is discussed.

Introduction

Regenerative endodontic procedures can be defined as biologically based procedures designed to create and deliver tissues to replace diseased, missing and traumatized pulp-dentin complex.[1] The science of regenerative endodontics has a long history dating back to 1952 when Dr. B.W Hermann reported on the application of calcium hydroxide in a case report of vital pulp amputation. Presently, two concepts exist in regenerative endodontics to treat non-vital infected teeth - one is the active pursuit of pulp-dentine regeneration to implant or regrow pulp (tissue engineering technology), and the other in which new living tissue is expected to form from the tissue present in the teeth itself, allowing continued root development (revascularization).

The concept of revascularization was introduced by Ostby in 1961 and in 1966 Rule and Winter documented root development and apical barrier formation in cases of pulp necrosis in children. Occasional cases of regeneration of apical tissues after traumatic avulsion and replantation led to the search for the possibility of regeneration of the whole pulp tissue in a necrotic infected tooth.

Revascularization approach in young permanent infected teeth with immature root apex and apical periodontitis was first attempted in 1971[2], but it was not successful due to limitations in technologies, material and instruments available in those times. But with the currently available technologies, several case reports [3-4]have documented revascularization of necrotic root canal systems by disinfection followed by establishing bleeding into the canal system via overinstrumentation.

The revascularization method assumes that the root canal space has been disinfected and that the formation of blood clot yields a matrix (e.g., fibrin) that traps cells capable of initiating new tissue formation. It is different from apexification because not only the apex is closed but the canal walls are thickened as well. It is also different from apexogenesis which also accomplishes a closed apex and cemental growth but by the use of remaining vital pulp.

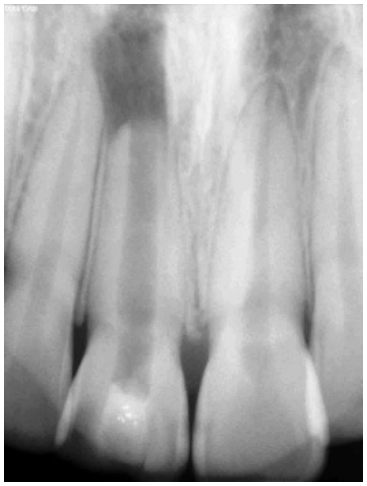
The revascularization employs the following prerequisites.

1. Revascularization occurs most predictably in teeth with open apices and non vital tooth secondary to trauma.
2. Open apex >1.5mm.
3. Bacteria should be removed from the canal using any one of the following methods; -'3-mix MP' triple antibiotic paste containing Ciprofloxacin Metronidazole, Minocycline[3] -Calcium hydroxide, Formocresol
4. Effective coronal seal.
5. Matrix into which new tissue can grow.
6. Patient should be young.
7. Use of anesthetic without adrenaline when inducing bleeding.[5]
8. No instrumentation of the canal.
9. 5.25% Sodium hypochlorite used as irrigant.
10. Formation of blood clot probably serves as a 3-Dimensional scaffold permitting in growth of tissue.

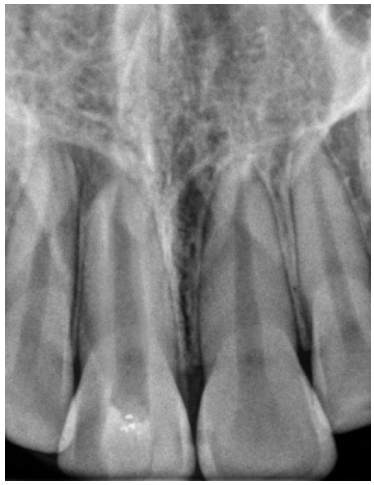
All studies indicate thickening of dentinal wall followed by apical closure. Root length is increased by deposition of cementum. Presence of periodontal tissue was also

*Asso. Professor, Dept. of Conservative Dentistry and Endodontics, Pushpagiri College of Dental Sciences, Thiruvalla

Preoperative Radiograph



2-months follow up



7-months follow up

found in the canal space.

Case report

A 14 year girl reported with complaint of fractured upper anterior tooth. On examination her upper right central incisor had class 4 fracture and it was brownish in colour compared to Left central incisor. Her history revealed an incident of trauma 5 year back. IOPA x-ray showed 11 with short root, canal with parallel walls, open apex and an associated periapical lesion 5mm x 5mm in size.

Considering the young age of the patient and the nature of canal it was decided to attempt revascularization of pulp space.

Access cavity was prepared in 11. The canal was disinfected with minimum instrumentation but with copious irrigation with 5.25% sodium hypochlorite and the use of triple antibiotic paste. The antibiotic paste was left in canal for 4 weeks.[3]

After 4 weeks antibiotic paste was removed with copious irrigation with normal saline and a blood clot was produced to the level of cementoenamel junction to provide a scaffold for the growth of new tissue followed by sealing of the access cavity with glass ionomer cement.[6] Bleeding was induced by pushing a sterile 23-guage needle beyond the working length. When frank bleeding was evident a tight dry cotton pellet was inserted to depth of 3-4 mm into the root canal and the pulp chamber and held there for 7-10 minutes to allow clot formation in the apical two-thirds of the canal.[7]

Patient was recalled after two months. Patient was asymptomatic. IOPA x-ray showed no significant improvement over the preoperative x-ray. Again the patient was recalled after 3 more months. Patient was still asymptomatic. The IOPA Xray showed significant dentin deposition in the root canals. Periapical lesion has almost disappeared. Still no response was elicited on electric pulp testing. Further periodic evaluation of the patient may be needed to evaluate any improvement in vitality of the tooth.

Discussion

The success of revascularization may be due to the following factors;

The immature teeth with open apex generally have short roots. Therefore the new tissue has an easy access into the root canal and relatively short distance for proliferation to reach the pulp horn. The ischemically necrotic pulp acts as a scaffold into which new tissues grows.[1]

The minimum instrumentation of the canal preserves any viable pulp tissue which contributes to root growth.

Young patients have better healing capacity and more stem cells with regenerative potential.

Advantages of root canal revascularization.

1. The reparative matrices become an integral part of the tooth, overcoming any of the problems of retention of a restoration and possible marginal bacterial microleakage.

2. This approach strengthens the root walls of an immature tooth.

The term regeneration of pulp should be used with caution in cases like this. Presently we can say that pulp space may be returning to a vital state. On the basis of research in avulsed tooth and infected tooth, it is more likely that tissue in the pulp space is similar

to periodontal ligament than to pulp tissue. It appears that there is 30% chance of pulp tissue reentering the pulp space.[8] Further research will be needed to stimulate pulp regeneration from the pluripotent cells in the periapical region.

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Removable partial dentures without metal clasps

* Sebastian Thomas

Abstract:

Metal clasps in removable partial dentures provide retention while causing gingival recession and mobility of the abutment teeth besides compromising esthetics. This paper dwells upon alternate removable options like flexible partial dentures (Sunflex, Bio-dentaplast, Breflex, Valplast) and precision attachment retained cast partial dentures.

Introduction

Every type of removable partial denture; Temporary Partial Denture or Cast Partial Denture, has to handle the problem of preventing gravitational and muscular forces from dislodging the partial denture during function.[1] To resist these forces many different mechanical aids have been developed. Unfortunately, while being retentive, these mechanisms inflict lateral stresses by torquing the abutment teeth during normal function. These lateral stresses may eventually harm the periodontal support of the abutment teeth and limit the longevity of the case (gingival recession, mobility of the abutment). Metal clasps also compromise esthetics and cause decalcification of the clasped area.[2](Fig: 1)

This paper dwells upon alternate options for metal clasp retained removable partial dentures.

I. Flexible partial Dentures

It was thought that removable partial dentures had to be rigid to be effective. The innovation of the Flexible Partial denture allows the restoration to adapt to the constant movement and flexibility in your mouth[3]. This is the thinking behind Flexible removable partial denture. The flexible partial is virtually invisible because there are no telltale metal clasps, and the material itself blends with the tissue in your mouth. The flexibility, combined with strength and light weight makes it a reasonable choice.

Additional Teeth and clasps can be added at a later time without demarcation lines.

Sunflex denture

Sunflex[4] is made of a pressure-injected, flexible denture base resin that is ideal for partial dentures and unilateral restorations (Fig: 2, 3, 4) The resin is a biocompatible nylon thermoplastic.

- Stain-resistant, than other materials, and do not discolor
- Do not warp or become brittle.
- Unbreakable under normal wear and tear.
- A natural tissue blend effect, with translucency that picks up the patient's natural tissue tone (Fig: 3)
- Thin, non-metal clasp designs- making the restoration practically unnoticeable when worn.

Breflex

Unbreakable denture base material[5] for partial dentures comparable to Sunflex

Bio Denta Plast

Clasps and attachments which are normally made of metal can be produced using tooth-colored Bio Dentaplast. [5] (Fig :5) The aesthetic appearance of teeth at which retaining clasps have been attached is improved.

Valplast

- Unbreakable under normal wear and tear.[6]
- Multiple shades available (Fig: 6)
- Disadvantage - it is highly stainable

*Reader, Dept of Prosthodontics, Pushpagiri College of Dental Sciences, Thiruvalla

Figure 1: Decalcification on maxillary right first premolar at occlusal rest seat of the clasp assembly

Figure 2: Maxillary Sunflex Partial Denture

Figure 3: Maxillary Sunflex Partial Denture, intraoral view

Figure 4: Sunflex Partial Denture Flexed

Figure 5: Bio Dentaplast

Figure 6: Onlay Technique using Multiple Shades of Valplast

II. Precision attachment retained cast partial denture

The Academy of Denture Prosthetics defines a precision attachment as "a retainer, used in fixed and removable partial denture construction, consisting of a metal receptacle and a closely fitting part; the former is usually contained within the normal or expanded contours of the crown of the abutment tooth and the latter is attached to a pontic or the denture framework."[7] When used in conjunction with an RPD, the attachment substitutes for the clasp as the direct retainer.

When serving as a direct retainer, one component of the semiprecision or precision attachment is incorporated in the RPD while the other is placed in the expanded contours of a cast restoration.[8,9] The resilient attachments are designed to provide a defined amount and direction of movement of the RPD relative to the attachment, permitting controlled movement of the RPD denture base tissueward while minimizing the amount of unfavorable stress transfer to the abutment tooth.(Fig:7,8,9)

Diagnostic mounting

A diagnostic mounting of diagnostic casts, along with the setting of replacement denture teeth helps to determine the proposed restorative result. The dentist and dental laboratory technician can then determine if sufficient space in all appropriate dimensions is available before the treatment of the patient is planned and begun.[8,9]

Contraindications

- Presence of insufficient vertical space for attachment use
- Inadequate manual dexterity on part of patient, as attachment-retained RPDs require significant skill to insert and withdraw

Disadvantages

- High cost
- Technique sensitive
- Abutment tooth preparation towards cast crown.

Adherence to precision techniques, proper diagnosis and periodic recall preventive therapy will result in successful preservation of the patient's existing teeth for many years with maintainable periodontal health.[1]

Figure7: Male part of the extracoronal Precision attachment attached to joined Metal-ceramic crowns

Figure 8: Unilateral Cast Partial Denture with 'O'ring female receptor part of the precision attachment inside

Figure 9: Unilateral Cast Partial Denture – claspless- retained using precision attachment

Conclusion

Metal clasps for retaining removable partial dentures have inherent disadvantages. Precision attachment retained dentures avoid clasps but require preparation of abutment teeth. Flexible dentures use tooth/ gum colored clasps and also by their flexible nature reduce the detrimental effects of metal clasps.

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6. http://www.valplast.com/

To evaluate the importance of periodic review in complete denture patients – a survey

* Prameetha George Ittycheria, ** Sebastian Thomas

Abstract:

To evaluate the most common post-insertion complication in complete denture wearers a study was conducted in 40 patients; 5 days after denture insertion and 6 months after denture insertion at Pushpagiri College Of Dental Sciences. The study highlighted the importance of periodic review in managing the post insertion complications seen in complete denture wearers

Introduction

The major post insertion complications are

1. Pathological lesions caused by prosthesis
2. Lack of retention, stability, and Support
3. Prosthetic intolerance especially gag reflex
    1. Masticatory problems.
    2. Problems in phonetics and esthetics.

Objectives of the Study

1. To evaluate the different post insertion complications in complete denture patients.
2. To highlight the importance of periodic review in complete denture patients.

Materials and Methods

Questionnaires were given to patients 5 days after the insertion. This questionnaire contained 26 questions. Data was collected. Same questionnaires were given to these patients 6 months after denture insertion

Clinical factors considered in this study were

1. Pain
2. Ulcer (symptomatic/asymptomatic).
3. Cheek bite.
4. Tongue bite.
5. Retention of upper & lower denture.
6. Esthetics
7. Burning sensation.
8. Paresthesia of lips.
9. Gag reflex.

Grading was given to these clinical factors.

Grade 0- asymptomatic

Grade 1- symptomatic

- To check pain - pressure was applied to the denture, using index and middle finger. If the patient was having pain, it was graded as 1.
- To check esthetics – labial inclination, incisal plane, adequate lip support, and whether the size and shape of teeth were matching with the patient's face.
- Test for retention of upper denture - After drying the patient's mouth with gauze the upper denture was inserted and the denture was pulled vertically downwards from the anterior region, If the denture was easily dislodged grade 1 was given.
- Test for retention of lower denture - Patient was asked to make the tongue contact with the lingual flange on the lateral and anterior region. With the index figure, denture is pulled upward from the labial surface, if the denture was dislodged, grade 1 was given.

Results

- After grading all factors the results were follows:

1. Age of the patients ranged from 40-77yrs.
2. Complaints of female patients were more when compared with male patients. Out of 40patients 28 were females, 12 were males.
3. Regarding pain-after 5 days -60% of patients got pain.
4. Regarding ulcer

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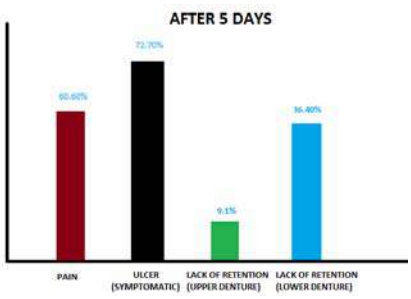

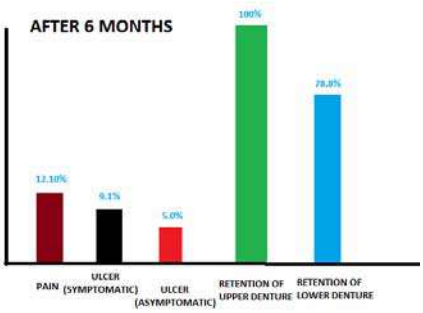

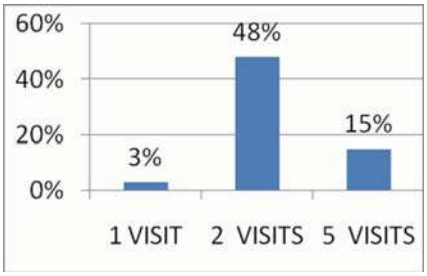

No. of Visits

After 5 days -72%of patients got symptomatic ulceration.

After 6 months only 9.1% of patients got ulceration.

5. About 5% of patients had asymptomatic ulcer which were not noticed by themselves. This emphasizes the importance of periodic review and patient evaluation.
6. Regarding retention

   After 5 days - for upper denture -90% got retention.

   After 6 months -100% got retention.

   After 5 days for lower denture -63% got retention.

   After 6 months -78.80% got retention.
7. 3 % of patients made only 1- visit.

   48% of patients made 2 visits. 15% of patients made 5 visits

- 93% of patients were satisfied and 6.1% were not. High success rate was due to the periodic review and corrections.

Discussion

1. According to survey the most common complications are stated in the decreasing order

   a) Pain

   b) Ulcer

   c) Lack of retention

None of these patients complained about color change of denture or the underlying tissues, and burning sensation.

2. No significant relationship was observed between patient's age or gender with denture complications.

Conclusion

Survey suggests the importance of periodic review & evaluation. Some patients mentally adjust with their denture, even though they have ulceration & difficulty in mastication, thinking that over a period of time these complaints will vanish. Those complaints would not be noticed, if the patients were not reviewed.

Clinicians should evaluate the denture during the time of insertion for errors in denture base, extension of denture borders, and for any occlusal interferences. So, periodic post insertion review is a mandatory step for successful treatment and patient satisfaction.

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Biologic width and restorative margin placement

* Annie Kitty George

Abstract:

A clinician is presented with three options for margin placement: Supragingival, equigingival and subgingival. From a periodontal view point both supragingival and equigingival margins are well tolerated. The greatest biologic risk occurs when placing sub-gingival margins.[1] Infringement of the biologic width may result in persistent gingival inflammation or alveolar bone loss of an predictable nature along with gingival tissue recession.[2]

Biologic Width

The biologic width is defined as the physiologic dimension of the junctional epithelium and connective tissue attachment. In the average human, the connective tissue attachment occupies 1.07mm above the crest of alveolar bone and the junctional epithelium occupies another 0.97mm (just below the base of the gingival sulcus). Together these two measures sum up to 2.04mm. The healthy gingival sulcus has shown an average depth of 0.69mm.[3] (Fig. 1). It is important for the restorative dentist to ensure provision for biologic width while establishing restorative margins. Assessment of biologic width can be done clinically by using a sterile periodontal probe. After securing adequate anesthesia, the probe is pushed through the epithelium at the base of sulcus, the connective tissue and to the crest of alveolar bone. Although the average width is found to be 2mm, biologic width as narrow as 0.75mm and as long as 4.3mm have been reported. Therefore specific biologic width assessment should be done for each patient.

Biologic width = Total distance from gingival margin to the alveolar bone crest – the sulcus depth (Sulcus depth is distance from the gingival margin to the base of the sulcus)

This measurement must be done on teeth with healthy gingival tissue and should be repeated on more than one tooth for accuracy. This information obtained is used for definite diagnosis of biologic width violations extent of correction needed and parameter for placement of future restorations. At the interproximal area, the biologic width is same as the facial and lingual margins. However the interproximal area will have sulcus depth 1-1.5mm deeper than the facial surface. The sulcus depth at the interproximal region in health ranges from 2-2.5mm

Margin placement guidelines

When determining where to place restorative margins relative to the periodontal attachment, it is recommended that the patient's existing sulcular depth be used as a guideline in assessing the biologic width requirement for that patient. The base of the sulcus can be viewed as the top of the attachment, and therefore the clinician accounts for variations in attachment height by ensuring that the margin is placed in the sulcus and not in the attachment. The variations in sulcular probing depth are then used to predict how deep the margin can safely be placed below the gingival crest. With shallow probing depths (1.0–1.5mm), extending the preparation more than 0.5mm subgingivally will risk violating the attachment. This assumes that the periodontal probe will penetrate into the junctional epithelial attachment in healthy gingival an average of 0.5mm. With shallow probing depths, future recession is unlikely because the free gingival margin is located close to the top of the attachment. Deeper sulcular probing depths probing depths provide more freedom in locating restoration margins farther below the gingival crest. In most circumstances, however, the deeper the gingival sulcus, the greater is the risk of gingival recession.

The first step in using sulcus depth as a guide in margin placement is to manage gingival health. Once the tissue is healthy the following three rules can be used to place intracrevicular margins.

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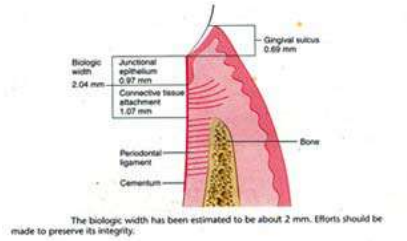
Rule 1. If the sulcus probes 1.5mm or less, place the restoration margin 0.5mm below the gingival tissue crest. This is specially important on he facial aspect and will prevent a biological width violation in patient who is at high risk in that regard.

Rule 2. If the sulcus probes more than 1.5mm, place the margin half the depth of the sulcus below the tissue crest. This places the margin far enough below tissue so that it will still be covered if the patient is at higher risk of recession.

Rule 3. If a sulcus greater than 2mm is found, especially on the facial aspect of the tooth, evaluate to see if a gingivectomy could be performed to lengthen the teeth and create a 1.5-mm sulcus. Then the patient can be treated using Rule 1.



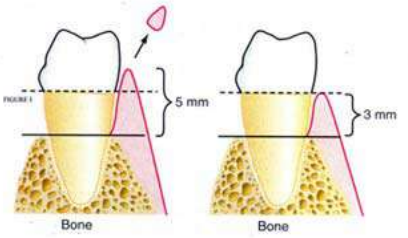


FIGURE 2 Greater than 3 mm of soft tissue between the bone and gingival margin, with adequate attached gingiva, allows crown lengthening by gingivectomy.

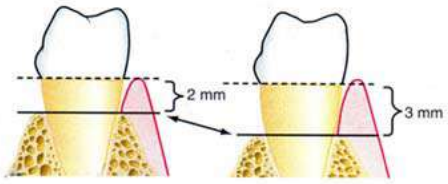


FIGURE 3 With less than 3 mm of soft tissue between the bone and gingival margin, or less-than-adequate attached gingiva, a flap procedure and osseous recontouring are required for crown lengthening.

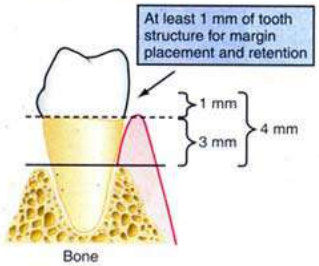


FIGURE 4 In the case of caries or fracture, at least 1 mm of sound tooth structure should be provided above the gingival margin for proper restoration.

The rationale for Rule 3 is that deep margin placements is more difficult and the stability of the free gingival margin is less predictable when a deep sulcus exists. Reducing the sulcus depth will create a more predictable situation in which to place in intracrevicular margin. The clinician cannot be sure that the tissue will remain at the corrected level, however, because some gingival rebound can occur after gingivectomy. However, sulcular depth reduction ensures that the restorative margins will not be exposed and visible in the patient's mouth.

Surgical crown lengthening:

Surgical crown lengthening may include the removal of soft tissue or both soft tissue and alveolar bone. Reduction of soft tissue alone is indicated if there is adequate attached gingiva and more than 3mm of tissue coronal to the bone crest. This may be accomplished by either gingivectomy or flap technique. Inadequate attached gingiva and less than 3 mm of soft tissue require a flap procedure and bone recontouring. In the case of caries or tooth fracture, to ensure margin placement on sound tooth structure and retention form, the surgery should provide at least 4mm from the apical extent of the caries or fracture to the bone crest. (Figure 2,3,4).

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Occlusion in Implant – supported prosthesis

* Suja Mathew Jude

Abstract:

This article reviews the different types of osseointegrated prosthesis and the importance of their occlusal concepts for success of the implant supported prosthesis

Key Words: Occlusion, Implant supported prosthesis, Occlusal concepts

Introduction

Occlusion is an important variable in the success or failure of most prosthodontic rehabilitations. The purpose of understanding the concepts of occlusion is to protect the implants against the transmission of stress and for being aware of destructive forces acting against them. The status of the occlusion must be properly diagnosed, corrected or compensated for, and properly integrated into the design of the definitive restoration.

Prosthetic considerations for patients requiring implant placement should include evaluation of [1]:

1. Number and location of missing teeth.
2. Interarch distance.
3. Number, type, and location of implants to be placed.
4. Existing and proposed occlusal scheme.
5. Design of planned restoration.

Factors to be considered in implant occlusion [2]

A. Increase support area by:

a. Bone quality

- Extended healing time
- Progressive loading

b. Bone quantity

- Implant number
- Implant diameter
- Implant length
- Implant surface

B. Improve force direction by:

Occlusal morphology

- Flat central fossa
- Decreased cusp inclination
- Decreased occlusal table
- Along implant axis
- Centered contacts

C. Reduce force magnification by:

a. Occlusal contacts

- Position
- Distribution

b. Types of Prosthesis

- Less cantilever length
- Cross bite
- Splinting

c. Implant position

Comparison between tooth and implant (table: 1)

The mobility and shock absorption of a natural tooth versus an implant is vastly different. The fibrous interface surrounding the natural teeth acts as a viscoelastic shock absorber serving to decrease the magnitude of stress to the bone at the crest. The implant does not have such an apparatus and therefore cannot dissipate stresses and strains. The width of almost every tooth is greater than the width of the implant to replace that tooth. The greater the width of

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the implant, the less the magnitude of stress that is transmitted to the surrounding bone.

Wide-diameter implants are limited in their ability to fit in bone receptor sites that are narrow buccolingually, and there have been reports of greater crestal bone loss compared to standard-diameter implants. Additionally, most single-implant restorations on wider implants still tend to loosen, resulting in component failure.[3] In the posterior region of the oral cavity, bone volume and density are often compromised. Occlusal forces are greater in this region and, with or without parafunctional habits, can easily compromise the stability of the restorations [4]

Principles of occlusion in implant- supported prosthesis

Occlusal goals for implant prosthodontics [5]

(1) Bilateral stability in centric (habitual) occlusion,

(2) Evenly distributed occlusal contacts and force,

(3) No interferences between retruded position and centric (habitual) position,

(4) Wide freedom in centric (habitual) occlusion,

(5) Anterior guidance whenever possible

(6) Smooth, even, lateral excursive movements without working/non- working interferences.

Bilateral simultaneous contact is the accepted standard of an ideal occlusion. It is the most important factor in the rehabilitation of occlusion and is of particular importance for implant prostheses. In addition to the potential for neuromuscular dysfunction that premature contacts can create, occlusal force is increased when a high or premature contact is present.

Along with evenly distributed occlusal contacts, bilateral occlusal stability provides stability of the masticatory system and a proper force distribution [6]. This can reduce the possibility of premature contacts and decrease force concentration on individual implants.

Wide freedom in centric can accomplish more favorable vertical lines of force and thus minimize premature contacts during function. Weinberg [7] recommended continuous 1.5mm flat fossa area for wide freedom in centric in the prosthesis based on his clinical experience.

Gibbs et al [8] (1981) found that anterior or canine guidance decreased chewing force compared with posterior guidance. Quirynen [9] et al. reported that lack of anterior contacts in an implant-supported cross-arch bridge created excessive marginal bone loss in posterior implants.

The anterior or canine guidance could minimize potentially destructive forces in posterior implants. In addition to the advantage of the anterior guidance, smooth and even lateral working contacts without cantilever contacts in the posterior region may be preferred to provide proper force distribution and to protect the anterior region. It was suggested that working-side contacts should be placed as anteriorly as possible to minimize the bending moment [10].

Optimum occlusion for osseointegrated implants

Lekholm [11] stated that when loads and stresses are distributed unevenly results in bone resorption and fixture mobility in poor occlusion. To distribute the loads and stress, a balanced occlusion has been used in osseointegrated prosthesis. The working and non working contacts in balanced occlusion generate lateral loads on posterior teeth and these lateral loads, affect the rigid components of the implant system, especially the fixture bone interface. Therefore, a balanced occlusion is not suggested as occlusal scheme of choice for a fully bone anchored prostheses.

Jemt [12] described that when osseointegrated implant are used in short span FPD and single tooth replacement, the occlusion should be distributed in maximum intercuspation and all cusp interferences should be eliminated in eccentric positions. This is accepted for natural dentition and can be applied for osseointegrated prosthesis.

To avoid destructive lateral forces, the occlusal forces should be shared by anterior teeth; the occlusal force on canine is approx $1/8^{th}$ less the force on 2^{nd} molar. The stress generated on the fixture in the anterior region is less even with applied horizontal loads. Therefore occlusion for osseointegrated implant prosthesis should be similar to optimum occlusion in natural dentition[13].

Carlson T E[14] stated that occlusal factors and details of occlusion are in general of minor importance for the outcome of implant restorations. Occlusion can be managed successfully by using simple methods for jaw registration and different occlusal concepts.

Classification of different types of osseointegrated prosthesis and their occlusion

According to Hobo [15] it is classified as:
Fully bone anchored bridge
Overdenture

- ❖ Freestanding bridge
  - · Kennedy class I
  - · Kennedy class II
  - · Kennedy class III
  - · Kennedy class IV
- ❖ Bridge connected to the natural teeth
- ❖ Single tooth replacement

Three occlusal concepts (balanced, group function and mutually protected occlusion) have been established throughout clinical trials and conceptual theories for implant occlusion [16]. Mutual protection and anterior disclusion have come to be considered as acceptable treatment modalities for occlusal restorations of natural dentition. These concepts have been transferred to restoration of implant supported restoration.[17] All of the concepts may have maximum intercuspation during habitual and/or centric occlusion. Guichet [18] proposed that there is no one ideal occlusal pattern for all individuals. Accepted ideal occlusion schemes include balanced occlusion, mutually protected and group function.

Fully bone anchored bridge

The occlusion recommended for fully bone anchored bridge is mutually protected occlusion. Fig.1 In centric, it is necessary to have a 30um clearance at the anterior region and to have centric stops on posterior teeth. In order to eliminate harmful horizontal stress, the disclusion should be employed. This anterior guidance must be made slightly flatter than that of the natural teeth to avoid overstress of the fixture. This produces a smaller amount of disclusion. Recommended amounts of disclusion for fully bone anchored bridges are as follows: protrusive 1.0mm, non-working side 0.8mm, working side 0.3mm.. For full-arch fixed implant prostheses, bilateral balanced occlusion has been successfully utilized for an opposing complete denture, while group-function occlusion has been widely adopted for opposing natural dentition.

Mutually protected occlusion with a shallow anterior guidance was also recommended for opposing natural dentition [19,20]. Bilateral and anterior–posterior simultaneous contacts in centric relation and MIP should be obtained to evenly distribute occlusal force during excursions regardless of the occlusion. In addition, smooth, even, lateral excursive movements without working/non-working occlusal contacts on cantilever should be obtained [10]. For occlusal contacts, wide freedom (1–1.5mm) in centric relation and MIP can accomplish more favorable vertical lines of force and thus minimize premature contacts during function[6]. Also, anteriorly placed working contacts were advocated to avoid posterior overloading.

When a cantilever is utilized in full-arch fixed implant prosthesis, infraocclusion (100 microns) on a cantilever unit was suggested to reduce fatigue and technical failure of the prosthesis.[10]

Occlusal conception of complete dentures

The main objective of implants in the edentulous jaw is either 1) to avoid removable complete dentures by placement of implant-supported fixed prostheses or 2) to stabilize complete dentures by placement of implant-retained overdentures.

There exist two basic principles of occlusion that apply to an occlusal scheme of either complete dentures (i.e. bilateral guidance and lingualized occlusion) or fixed prostheses (i.e. freedom in centric, with lateral guidance on the working side and no balancing contacts; the lateral guidance is a canine-protected guidance or a group function).

Indications for a bilaterally balanced occlusion are a combination of mandibular overdentures supported by a few implants occluding with a complete denture in the opposing jaw, or mandibular overdentures occluding with maxillary overdentures. This type of balanced occlusion provides for primary stability of the dentures during functional loading. It also permits an even distribution of load between implants and denture-bearing tissues.

The characteristics are:

- · cusp-to-fossa contacts in centric occlusion;
- · lingualized occlusion;
- · bilateral guidance, i.e. simultaneous guidance on working and non-working sides.

Lingualized integration represents an occlusal scheme using specific tooth molds designed to improve the likelihood of maximum intercuspation and an

absence of deflective occlusal contacts, provide cusp height for selective occlusal reshaping, and achieve a natural and pleasing appearance in occlusal rehabilitation for edentulous implant patients. Based on the requirements of fixed rehabilitation, the concept of lingualized occlusion with anterior guidance is presented as an ideal occlusal scheme for many implant cases. It embodies the established requirements for fixed implant prosthesis, eases fabrication, and simplifies intraoral adjustment procedures.[21]

Occlusion for overdentures

For the occlusion on overdenture, it has been suggested to use bilateral balanced occlusion with lingualized occlusion on a normal ridge. On the other hand, monoplane occlusion was recommended for severely resorbed ridge [22,20].

An overdenture is most often used for the maxillary edentulous cases. Fig 2a&2b. Usually, it is possible to place fixtures in this areas and by connecting two fixtures, it can support an overdenture. The function of the overdenture makes this prosthesis suitable for the maxillary arch because it gives good phonetic function, facial support and esthetics. In this regard, an overdenture is often recommended for the maxillary arch rather than a fully bone anchor bridge. The mandibular overdenture is usually used for the patient who cannot afford many fixtures or for those who want to have natural cheek support.

The occlusal concept choices for the mandibular overdenture supported by oral implants with respect to are (1) the condition of the maxilla, (2) the location of the implants, and (3) the design of the overdenture into consideration. The occlusion recommended for the overdenture is the fully balanced occlusion with lingualized occlusion. In cases of an edentulous maxillary overdenture and a mandibular fully bone anchored bridge in centric a small clearance is recommended in the anterior teeth while the posterior teeth contact simultaneously. The amount of disclusion in protrusive and lateral nonworking and working side is 0 mm. Concepts normally used for natural teeth and concepts suggested for edentulous situations have been recommended.

Occlusion for free standing bridges

For the Kennedy class I situation, both sides of the arch are restored by osseointegrated bridges and they maintain the vertical height. Fig 3. The clearance of the anterior teeth should be smaller than the one given to natural teeth. The amount of disclusion required is the same as in the natural dentition because anterior guidance is provided by the natural dentition : protrusive 1.1mm, nonworking side 1.0mm, working side 0.5 mm.

The Kennedy class II unilateral cases is ideal for the osseointegrated freestanding bridges because the contralateral side will maintain the vertical height, while the other side is restored by osseointegrated bridge. Fig 4. It induces less stress to the implant while it holds centric. In centric the posterior osseointegrated bridge should have 30 um open contact, while anterior teeth also have 30 um openings and it begins to contact under strong bite pressure. In the Kennedy class II situation, because the anterior teeth are natural teeth they can bear the occlusal load safely. The amount of disclusion suggested for this case is the same as for the natural dentition. : protrusive 1.1mm, nonworking side 1.0mm, working side 0.5 m.

The Kennedy class III situation is ideal for the osseointegrated implants, because vertical height is maintained by natural teeth. Fig 5. In centric, the osseointegrated bridge only contact under strong bite pressure. Eccentric movement is guided by the natural dentition. The amount of disclusion suggested for this case is the same as for a natural dentition: protrusive 1.1mm, nonworking side 1.0mm, working side 0.5 mm.

The Kennedy class IV case requires an anterior freestanding bridge and it is another indication for the osseointegrated bridge. Fig 6. In Kennedy class IV case, such as missing the eight teeth from first premolar to first premolar, restoration with a regular fixed bridge is contraindicated because it produces a fulcrum and introduces tremendous torque to the abutment teeth. Anterior eight unit bridge can be supported by four fixtures without creating a fulcrum.

In Kennedy class IV case, posterior disclusion is guided by osseointegrated bridge. In order to minimize the horizontal load introduced to the implant site, group function occlusion is preferred. During lateral movement, posterior teeth on the working side can help bear the horizontal load while the nonworking side is discluded. In order to minimize the load induced to the fixtures during protrusive movement, anterior guidance

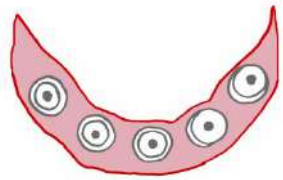
Figure 1a


Figure 1b

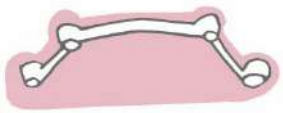
Figure 2a


Figure 2b


Figure 3


Figure 4

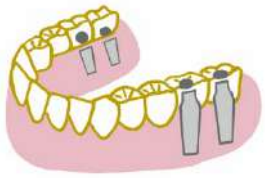
Figure 5

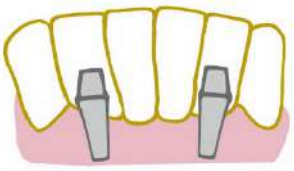
Figure 6

should be flatter than the natural teeth. The amount of disclusion suggested for this case is: protrusive 0.8 mm, nonworking side 0.4mm, working side 0.0 mm. Because an anterior bridge does not sink like natural teeth, the clearance of anterior teeth must be greater than the one given to natural anterior teeth, >30um.

Occlusion on posterior fixed prostheses

Anterior guidance in excursions and initial occlusal contact on natural dentition will reduce the potential lateral force on osseointegrated implants. Group-function occlusion should be utilized only when anterior teeth are periodontally compromised[5, 23, 24]. During lateral excursions, working and non-working interferences should be avoided in posterior restorations[25]. Moreover, reduced inclination of cusps, centrally oriented contacts with a 1–1.5mm flat area, a narrowed occlusal table, and elimination of cantilevers have been proposed as key factors to control bend overload in posterior restorations.

Connection for natural teeth

When single fixtures are used to restore the bridge in order to prevent loosening of the screw by the rotation of the bridge, the mesial end of the bridge must be connected to the natural teeth. If the osseointegrated implant prosthesis and the natural teeth are connected rigidly, under the occlusal loads the implant receives the majority of the stress and is overloaded. A non-rigid connector may compensate for dissimilar mobility between implant and natural teeth under axial loading forces.[26] The natural tooth can be depressed freely without interference of the osseointegrated fixed prosthesis.

Occlusion in a single implant

The occlusion in a single implant should be designed to minimize occlusal force onto the implant and to maximize force distribution to adjacent natural teeth[24,25,27]. Any anterior and lateral guidance should be obtained in natural dentition. In addition, working and non-working contacts should be avoided in a single restoration. Light contacts at heavy bite and no contact at light bite in MIP are considered a reasonable approach to distribute the occlusal force on teeth and implants. Like posterior fixed prostheses, reduced inclination of cusps, centrally oriented contacts with a 1–1.5mm flat area, and a narrowed occlusal table can be utilized for the posterior single tooth implant restoration [28]. It is claimed that centrally oriented occlusal contacts in single molar implants were critical to reduce bending moments attributable to mechanical problems and implant fractures. Increased proximal contacts in the posterior region may provide additional stability of restorations[29].

Implant-protected occlusion has been proposed strictly for implant prostheses[30]. This concept is designed to reduce occlusal force on implant prostheses and thus to protect implants. For this, several modifications from conventional occlusal concepts have

TABLE: 1

	TOOTH	IMPLANT
Connection	Periodontal ligament (PDL)	Osseointegration functional ankylosis[31]
Proprioception	Periodontal mechanoreceptors	Osseoperception
Tactile sensitivity	High	Low
Axial mobility[32]	25–100 mm	3–5 mm
Movement phases	Two phases Primary: non-linear and complex Secondary: linear and elastic	One phase Linear and elastic
Movement patterns	Primary: immediate movement Secondary: gradual movement	Gradual movement
Fulcrum to lateral	Apical third of root	Crestal bone force
Load-bearing Characteristics	Shock absorbing function Stress distribution	Stress concentration at crestal bone
Signs of overloading	PDL thickening, mobility, wear facets, fremitus, pain	Screw loosening or fracture,abutment or prosthesis fracture, bone loss, implant fracture [33]

been proposed, which include providing load sharing occlusal contacts, modifications of the occlusal table and anatomy, correction of load direction, increasing of implant surface areas, and elimination or reduction of occlusal contacts in implants with unfavorable biomechanics. Also, occlusal morphology guiding occlusal force to the apical direction, utilization of cross-bite occlusion, a narrowed occlusal table, reduced cusp inclination, and a reduced length of cantilever in mesio-distal and bucco-lingual dimension have all been suggested as factors to consider when establishing implant occlusion.

Conclusion

It can be concluded that the quality of the bone and the amount of stress determines the implant longevity. Occlusal overloading, possibly resulting from large cantilevers, excessive premature contacts, parafunctional activities, improper occlusal designs, and/or osseointegrated full fixed prostheses in both jaws, can be a limiting factor for implant longevity. Even distribution of occlusal contacts avoiding occlusal interferences and increasing number of implants may significantly reduce occlusal overload on implants and implant prostheses. Poor quality bone may be more vulnerable to occlusal overloading, which can be reduced by extended healing time and carefully monitored loading.

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Designing Successful Removable Partial Dentures - A Simple Approach

* Haeigin Tom Varghese

Abstract:

To outline a simple but logical approach for designing a removable partial denture using least complicated clinical and laboratory procedures.

Introduction

In today's busy dental offices, removable partial denture design is often abdicated by dentists, both as a result of a lack of experience and consensus of design. The result is delegation of the clinical design process to the lab technician. The lack of clinical data provided to the dental technician jeopardizes the quality of care. This article will focus on a logical and simple approach to this problem, making removable partial denture design simple and predictably achievable. The clinical evidence related to removable partial denture design will be described, along with a checklist to simplify the process and make it practical and applicable to everyday clinical practice.

The most logical approach to determine the design of any removable partial denture (RPD) is to focus on a clinical approach based on clinical evidence, rather than a laboratory decision-making approach. The following checklist will simplify the process and make it predictable.

1. Analyze the total oral environment.
2. Draw the RPD design.
3. Survey the cast and modify the design.

STEP 1: Analyze the Total Oral Environment;

Designing of an RPD starts with a complete analysis of the total oral environment. The dentist must determine how to establish an optimum plane of occlusion, occlusal vertical dimension, occlusal scheme, and esthetics for a proper prosthetic restoration. To do so, adequate prosthodontic data must be collected, including personal, medical, dental, and prosthetic histories; necessary radiographs; articulated dental casts; and a visual and digital extraoral and intraoral clinical examination. The treatment plan should include restoring the plane of occlusion and the vertical dimension, and what type of occlusal scheme is needed for an optimum clinical result.

The dentist should note whether the patient has an anterior edentulous space in addition to a posterior edentulous space. Anterior edentulous spaces are best treated with fixed prosthodontics because it is easier to achieve adequate esthetics, and it will decrease the leverage effect of the forces generated during function on the RPD. In a case where soft tissue is lost, anterior edentulous spaces are best replaced with an RPD if surgical correction is contraindicated. The presence of anterior replacement teeth for RPDs was found to be a significant positive influence on denture wearing.

Next, the dentist must determine if the clinical situation is tooth-borne, tooth/tissue-borne or tissue-borne. When the extension base of a tooth/tissue- borne RPD with no guiding plains is subjected to occlusal forces, many fulcrum lines comes into play. A tooth-borne prosthesis can be considered a "removable fixed bridge" because it is the easiest to design, most accepted by patients, and has a longer survival rate than the tooth/tissue-borne prosthesis.

Dentists can turn a tooth/tissue-borne situation into a tooth-borne situation by the use of a dental implant on the edentulous side away from the abutment tooth, The amount of bone loss of the distal edentulous area is reduced as a result of the physiological stimulation by the implant.

At least 3 abutments should be selected and set as wide apart as possible. At least 3 positive rests must be placed on 3 sound abutments. However, using more than 5 abutments compromises the accuracy and fit

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Figure 1 and 2 placing at least one dental implant in the distal extension area will transform the RPD from a tooth / tissue bone to tooth bone (implant bone) prosthesis.


Figure 3 and 4 RPD design is drawn on the cast in 3 steps (1) rest and minor connectors (2) Major and denture base connectors (3) Direct retainers.

Figure 5, 6 and 7 Maxillary major connector not covering the anterior rugae area and mandibular RPD with lingual bar major connector.

Figure 8 and 9 Preparation guide

of the prosthesis. If one of the RPD abutments is compromised, it is wise to consider creating a contingency design.

Step 2: Draw the RPD Design

After thoroughly analyzing the oral environment, the optimal design should be drawn on the preliminary cast First the rests and minor connectors are drawn followed by the major and denture base connectors, and finally the clasps or attachments

Rests and Guiding Minor Connectors: A minimum of 3 positive rests are selected on good abutments as widely apart as possible. A positive rest is defined as:

- one that directs the occlusal forces parallel to the long axis of the abutment tooth.
- one that is strong enough to resist breakage.

Positive rests and guiding plates will keep the RPD from moving and exerting excess pressure on the edentulous ridges. Common rests used in modern RPD design are cingulum rests and occlusal rests A strong rest is when it is thick enough,(at least 1 mm, for chrome-cobalt alloy framework). There should be a rounded line angle between the rest and minor connector. And excessive rest inclination must be avoided. Minor connectors, or guiding plates, are strong and are rigid parts of an RPD framework. Their role is to guide the RPD during placement and removal, and to connect other units, such as rests, with the major connector or the denture base connectors. The buttressing action of well-fitted multiple opposing guiding surfaces, in conjunction with positive occlusal rests, provides support, stability, and retention for the prosthesis. An objective in RPD design is to maximize the number of opposing surfaces.

Major and Denture Base Connectors: Cross arch stabilization is provided by a rigid major connector. A main requirement for adequate major connectors is rigidity. Also, they must be placed in proper location to minimize the impingement on the oral tissues. The maxillary major connector if possible should not cover the anterior rugae, "the playground of the tongue," or the posterior soft palate. The broad central palatal connector or strap is most accepted by patients. An anterior-posterior (A-P) palatal connector is indicated when a palatal torus is present and its surgical removal is contraindicated. Mechanically speaking, the double strap A-P connector provides maximum rigidity for the least amount of metal bulk present. Its major disadvantage is that it has 4 borders that the patient can feel with the tongue inside the mouth. Whenever possible, the border of the anterior strap of the A-P major connector should end in the valleys of the rugae.

Selecting a major connector for the mandibular arch is limited to either a lingual bar or a lingual plate, the lingual bar is the better choice because it covers

the minimum amount of soft tissues. A lingual plate or a sublingual bar is acceptable alternatives to a lingual bar when the vertical lingual space is minimal as a result of the common presence of lingual gingival recession, high lingual frenum, and/or periodontally treated anterior teeth. The presence of diastemas on the mandibular anterior teeth and the lack of adequate height of the lingual vestibule dictate the use of the sublingual bar. Labial or buccal bars are used when the mandibular teeth are severely tilted lingually, or when large tori are present and surgery is contraindicated.

Direct Retainers: Retainers in modern RPDs must be passive in placement and passive at rest. Retainers can be either clasps or attachments. Popular clasps used currently are circumferential, I-bar, and wrought wire. I-bar or circumferential clasps are good choices for almost any clinical situation. I-bars are considered the best option because they are more retentive than a circumferential clasp for the same undercut, and because they require only minimal tooth coverage. On the other hand, circumferential clasps are preferred over I-bars when there is a lack of vestibular depth, or when undercuts, exostoses, or labially inclined abutments exist.

Placing 1 or 2 additional rests and their corresponding guiding plates as far as possible from the abutment rests will help with force distribution over a wider area, thus improving the support, stability, and retention of the RPD. This will eliminate the need for a so-called “indirect retainer.

Step 3: Survey the Cast and Modify the Design

Surveying the cast with the RPD design drawn on it will help to identify the intraoral preparation needed to meet the selected RPD design. The optimum RPD path of placement approximates the perpendicular to the plane of occlusion. Once this step is completed, the dentist or the lab technician tripods the cast for future use and makes a preparation guide that will be used in the mouth to shape the guiding surfaces and tooth contours, and to eliminate undesirable undercuts on the abutment teeth. The preparation guide is formed in 2 different ways on the cast using the surveyor.

1. Select 2 adjacent teeth situated equidistant to all guiding surfaces. Block out cervical and embrasure tooth undercuts with pink base plate wax, then trim excess wax with the surveyor. Lubricate the selected area with petroleum jelly, apply a small amount of autopolymerizing acrylic, and embed a friction grip bur, using the surveyor (Figure 6A). Allow the acrylic to set, then finish and polish. The bur direction is parallel to the selected path of insertion of the designed RPD. The device is placed in the mouth and used as a reference to align the handpiece bur to execute the shaping of the selected guiding surfaces

2. Selecting a tooth surface that is parallel to the path of placement, mark it on the cast as a reference, and use it in the clinical situation to align the bur direction during the intraoral preparation procedures

Conclusion

This article has focused on a simplified, organized approach to designing modern RPDs. Three steps are enumerated: analyze the total environment, draw the RPD design, and check the feasibility of the design using the surveyor. This article also describes the different RPD components and their function,

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Prosthetic rehabilitation of a patient with amelogenesis imperfecta - A case report

* Binoy Mathews N

Abstract:

Amelogenesis imperfetca has been described as a complex group of hereditary enamel defect that disturbs the enamel structures and exist independent of any related systemic disorder. It is a dental condition that affects only the epithelial derivatives (enamel) therefore the mesanchymal derivatives (dentine, pulp and cementum) are normal, as it is an entirely ectodermal disturbance.

In this article, the prosthetic rehabilitation of a 20 year old female patient with amelogenesis imperfecta is discussed.

Introduction

In amelogenesis imperfecta the enamel anomaly affects both primary and permanent dentition. Amelogenesis Imperfecta has been categorised into four broad groups primarily based on phenotype – hypoplastic, hypocalcified, hypomaturation, and hypomaturation - hypoplastic.

The enamel is composed mostly of mineral that is formed and regulated by the proteins in it. Amelogenesis imperfecta is due to the malfunction of the proteins in the enamel, ameloblastin, enamelin, tuftelin and amelogenin. The exact incidence of amelogenesis imperfecta is uncertain. The prevalence varies from 1:700 to 1:14,000 according to the various studies.

Case report

A 20 year old female patient diagnosed with Amelogenesis Imperfecta reported to the Department of Prosthodontics, Pushpagiri College of Dental Sciences with a chief complaint of discoloration and hypersensitivity of her teeth. A detailed medical, dental and social history did not reveal any contraindications to dental therapy. Patient exhibited a symmetrical facial pattern and competent lips. Tempero mandibular joint showed synchronized bilateral movements with no deviation.

Clinical and radiographical examination of the patient revealed a generalized yellowish discoloration with a minimal attrition of the upper and lower posterior teeth. (Fig. 1) There was no evidence of any periapical pathology and reduced vertical dimension.

A definitive treatment plan was developed with complete coverage of metal ceramic restorations for the upper and lower anteriors and posterior teeth.

Maxillary and mandibular complete arch impressions were made using irreversible hydrocolloid (Tropicalgin, Zhermack clinical Italy) impression material. Diagnostic casts were fabricated and mounted on a semi adjustable articulator (Hanau) using a face bow (Hanau Spring Bow) transfer and interocclusal record (Fig. 2). The articulator was programmed. Diagnostic tooth preparation and wax-up was done and patient consent was obtained.

Maxillary and mandibular anterior and posterior teeth were prepared for metal ceramic restorations. Definitive impressions of the maxillary and mandibular were obtained using vinyl polysiloxane impression material (Aquasil L.V). Working casts were obtained from type IV die stone and mounted on a semi adjustable articulator using interocclusal records.(Fig.3)

Provisional restorations were fabricated and cemented with non eugenol cement. Patient wore the provisional restoration for two weeks after which mandibular complete arch, maxillary anteriors followed by maxillary posteriors with metal ceramic crowns. (Fig.5)

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Fig 1 Yellowish Discoloration of teeth - intra oral photograph

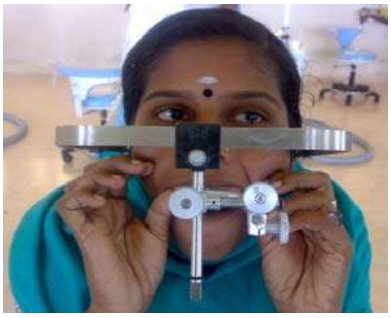

Fig 2 Making Face bow record

Fig 3 Making bite record in centric relation

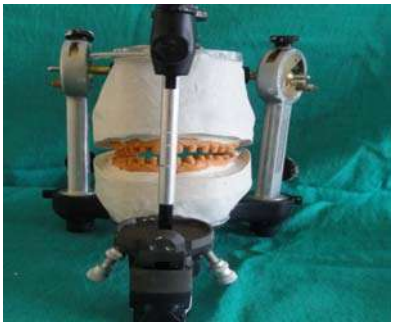

Fig 4 Mounting of upper and lower cast

Fig 5. Final restoration- post operative photograph

Discussion

Treatment of amelogenesis imperfecta depends on the specific type and character of the affected enamel. Treatments range from preventive care using sealents and bonding for esthetics to fixed prosthodontic reconstruction. Management of amelogenesis imperfecta in the young adult using fixed prosthodontic restoration is very effective in esthetics and function than other treatment alternatives. This option however requires the patient to maintain meticulous oral hygiene since caries of abutments is the major complication of fixed restoration. Comprehensive pre-prosthetic surgery with fixed prosthesis offers excellent esthetics along with improved phonetics and hence an extremely successful treatment option in full mouth rehabilitation.

Conclusion

Patient affected with amelogenesis imperfecta have teeth with abnormal yellow, brown or grey in color. The teeth have a higher risk for dental caries and are hypersensitive to temperature changes. This disorder can affect any number of teeth. These conditions are often embarrassing, distressing and lead to social exclusion. Sensitive interview and early supportive intervention are essential along with other modes of treatment. Prosthodontic rehabilitation of the kind described in this article greatly improves function and esthetics and proves to be great psychological boost to the patient's well being.

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Comparison of Primate Dentition

* Najeeb Jalal

Abstract:

Teeth are deathly dull but terribly important. If you want to identify a mammal or want to know how old it is you look in its mouth. They are extra specially useful for paleontologists.

Introduction

Primate dentition can be traced back to the primitive mammalian dentition. One of the main distinctions of mammals is that they are heterodont [different types of teeth in the tooth row].

Most other animals have a mouthful of teeth that are largely identical. There are 4 types of teeth in primate which are functional as well as morphological distinctions:

Incisors [for biting off food items or gnawing] Canines [for impaling prey and grasping]

Premolars and Molars [for chewing]

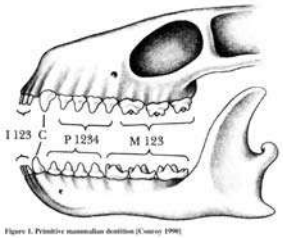

Figure: 1

The general pattern of primate, and indeed mammalian, evolution has been the loss of teeth. The pattern of tooth types is indicated by the dental formula.

Thus a primitive mammal has the dental formula of 3.1.4.3/3.1.4.3 which indicates 3 incisors, 1 canine, 4 premolars and 3 molars on each side of the upper jaw; and 3 incisors, 1 canine, 4 premolars and 3 molars on each side of the lower jaw. This gives a total number of teeth of 44. In contrast most humans have 32 teeth and many have 28 since the 3rd molars are sometimes absent.

There has been a change in tooth number and molar morphology during primate evolution.

Taxonomy

Teeth are very commonly used to define particular primate taxa. Many primate families can be defined by dental formula alone so counting the number of teeth is a very useful first step in identifying an unknown skeleton. Dental formulae can be used to distinguish up to the infraorder level with 3 lemuroid families and 1 cebid subfamily identifiable by dental formula alone.

The Primate Families

The primary dental formulae for strepsirhines show an important diagnostic feature.

A tooth comb is formed by the anterior teeth in the lower jaw. In this case it is formed by the 2 incisors and an incisiform canine. The most mesial premolar has become canineform to replace the canine. It is assumed that the toothcomb is basically used for grooming although it may also be important for food extraction, especially in gumnivorous(gum-eating) strepsirhines.

The dental formula is not the complete story.

In the Lemuridae, the upper incisors are greatly reduced as shown in the aside diagram, although once again the lower canine has become incisiform and the mesial lower premolar has become caniniform.

In the Lepilemuridae (also known as Megaladapidae) this reduction of the upper incisors has proceeded so that in the adult they are missing altogether, although the mandible looks normal.

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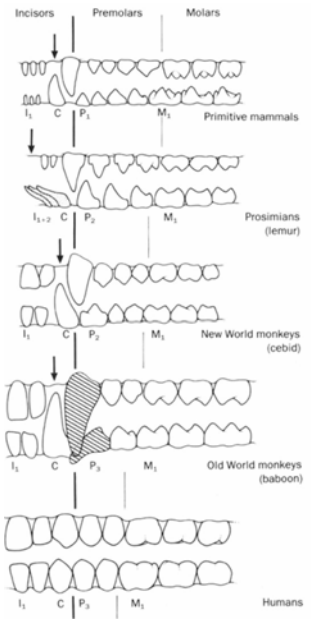

Figure: 2 The general pattern of dentition change in primates

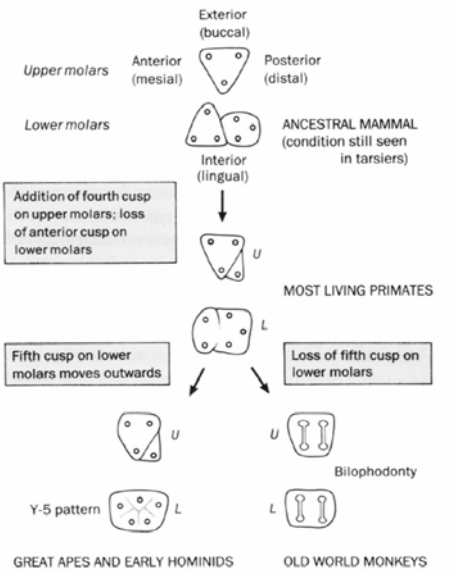

Figure: 3 The general pattern of molar cusp change in primates

Order	Suborder	Infraorder	Superfamily	Family	Dental Formula
Primates	Strepsirhini	Lemuriformes	Lorisoidea	Lorisidae	2.1.3.3/2.1.3.3
			Lemuroidea	Cheirogaleidae	2.1.3.3/2.1.3.3
				Lemuridae	2.1.3.3/2.1.3.3
				Lepilemuridae	0.1.3.3/2.1.3.3
				Indriidae	2.1.2.3/2.0.2.3
				Daubentoniidae	1.0.1.3/1.0.0.3
	Haplorhini	Tarsiiformes	Tarsioidea	Tarsiidae	2.1.3.3/1.1.3.3
		Platyrrhini	Ceboidea	Cebidae †	2.1.3.3/2.1.3.3
				Atelidae	2.1.3.3/2.1.3.3
		Catarrhini	Cercopithecoidea	Cercopithecidae	2.1.2.3/2.1.2.3
			Hominoidea	Hylobatidae	2.1.2.3/2.1.2.3
				Pongidae	2.1.2.3/2.1.2.3
				Hominidae	2.1.2.3/2.1.2.3

† Except Callitrichinae 2.1.3.2/2.1.3.2

Figure: 4 Eulemurmacacao (black lemur) dentition showing the reduced upper incisors

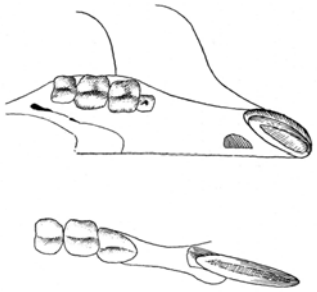

Figure: 5

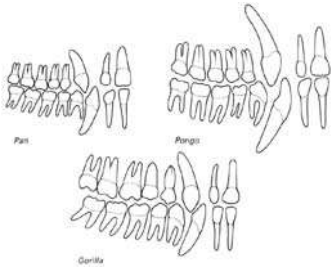

Figure: 6 Dentition of Daubentoniamadagascariensis (aye-aye)

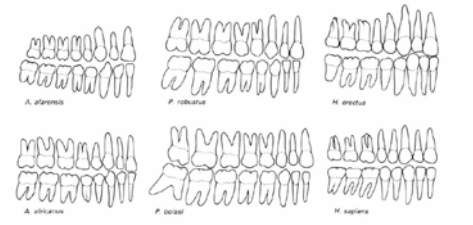

Figure: 7 Pongid teeth

The dentition of the aye-aye (Figure 6) is just plain weird. In fact this animal was considered as a rodent for a long time because of its single procumbent lower incisor. Its dental formula is 1.0.1.3/1.0.0.3.

Tarsier dentition is completely diagnostic. Its dental formula is 2.1.3.3/1.1.3.3 and there is no tooth comb. The shape of the molars is very little altered from the primitive mammalian shape.

Dental features are very important for distinguishing the major hominid groups.

These all have large, sexually dimorphic canines and somewhat sectorial lower first premolars.

Figure: Hominid teeth - Similar view of the Hominins.

The canines are very much reduced compared to the non-Hominins, and tooth size in Homo is relatively small.

Behavioural Indicators

The main purpose of teeth is food reduction. Different shapes of teeth are better for different food reduction tasks – this is why we have the 4 different sorts of teeth in the first place.

The 4 main classes of primate food are shown in Figure along with the dental morphology that is associated with that diet. The picture is not normally as clear as indicated though.

There are also foods not on this list (seeds and nuts, vertebrates, buds and flowers, faeces) that are more or less commonly eaten by primates.

There are some general observations that spiky teeth can be used for puncture-crush to access food

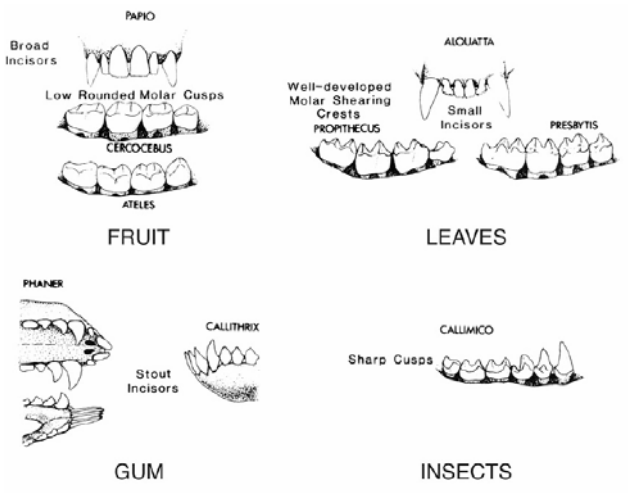

Figure: 8 Dietary dental adaptations

contained within a tough envelope such as most insects. Shearing crests are thought to be able to break down hard-to-digest fibrous, plant materials such as leaves.

Another dental feature that can be used to infer diet is micro wear. The tiny scratches and pits caused by normal food reduction can be visualized using a scanning electron microscope. By comparing the pattern of wear with that seen on animals with a known diet we can attempt to reconstruct the diet. Heavy pitting suggests impact with hard food items that need to be crushed. Scratches are associated with the shearing action that is associated with chewing softer plant food.

Another important use of teeth is as developmental indicators. There is a slow progression of teeth throughout childhood – the so-called deciduous dentition – which is finally replaced with a permanent adult dentition. The ages at which teeth erupt is fairly well characterized so that by looking at the current state of the teeth we can estimate the age of an individual.

The age of eruption gives us a lot of information about the life history of the animal. Late eruption ages indicate extended periods of childhood which means longer periods of infantcare, increased opportunities for social learning. There is a strong correlation between the age of eruption and adult brain size. The far right point is Homoand the far left is Cheirogaleus.

Primate tooth enamel only grows before eruption because it is laid down on the inside of a layer of cells called ameloblasts. This occurs whilst the tooth is developing within the jaws and once the tooth erupts the ameloblasts rapidly slough off leaving the enamel exposed. Further growth cannot therefore occur.

Conclusion

The teeth are very important in comparative anatomy. Their morphological complexity and the fact that they fossilize so well makes them extremely useful for taxonomy as well as arthropological studies. They have a direct functional role for diet reconstruction and they can also be used indirectly for inferring important ecological parameters.

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EVENTS 2011

Installation of Office bearers 2011,
Chief guest - Sri Anto Antony MP

CDE on 'Laser in Dentistry'
by Dr. Alex Mathews MDS

CDE on 'Frontiers on Stem Cells' by Dr. Rajendran MDS

CDE on Medical Excellence in Dental Practice by Dr. Mohan MD

EVENTS 2011

CDE on Interceptive Orthodontics by Dr. Elbi Peter MDS

'Dentist Day' celebration inauguration by Advocate Sivadasan Nair, MLA

IDA Colgate Academic Programme Inauguration by Jacob Job AIG of Police