

# **INDIAN DENTAL ASSOCIATION**

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# Prosthetic Rehabilitation of Maxillary Flabby Ridge Using Liquid Supported Denture: A Case Report

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**Abstract :** Flabby ridges commonly occur in edentulous patients. Inadequate retention and stability of a complete denture are the often encountered problems in these patients. A liquid supported denture due to its flexible tissue surface allows better distribution of stress and hence provides an alternate treatment modality in such cases. This case report presents the use of a liquid supported denture in a patient with completely edentulous maxillary arch with flabby tissue in anterior region opposing a completely edentulous mandibular arch. Furthermore, Esthetics was improved by characterizing the dentures to match with patient lip color.

**Running Title:** Liquid Supported Denture Key Words: Liquid Supported Denture, Flabby ridge, Glycerin, Polyethylene sheet

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## Prosthetic Rehabilitation of Maxillary Flabby Ridge Using Liquid Supported Denture: A Case Report

### Abstract

Flabby ridges commonly occur in edentulous patients. Inadequate retention and stability of a complete denture are the often encountered problems in these patients. A liquid supported denture due to its flexible tissue surface allows better distribution of stress and hence provides an alternate treatment modality in such cases. This case report presents the use of a liquid supported denture in a patient with completely edentulous maxillary arch with flabby tissue in anterior region opposing a completely edentulous mandibular arch. Furthermore, Esthetics was improved by characterizing the dentures to match with patient lip color.

Key Words: Liquid Supported Denture, Flabby ridge, Glycerin, Polyethylene sheet

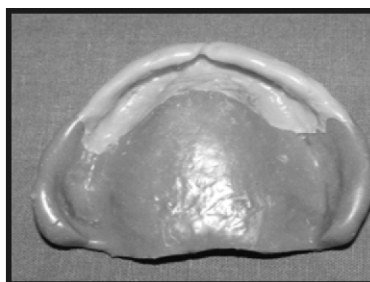
### Case report

A 75 year old male patient reported to Goa dental college and hospital for replacement of missing teeth. The patient had a history of wearing a maxillary complete denture since 12 years. His chief complaint was the poor fit and looseness of the upper denture while eating. He had a history of diabetes and hypertension since 18 years. The patient was wearing complete dentures even at the night and also using denture adhesive. On intraoral examination, a completely edentulous maxillary arch with flabby tissue existing in the anterior region [Fig-1] and a completely edentulous mandibular arch were observed. Keeping the various challenges associated with the case, clinical steps and treatment plan was modified to suit the patient's need. It was decided to give a maxillary complete denture (liquid supported) opposing conventional lower complete denture.

**[Fig-1]:**  
Intraoral view of  
maxillary arch.



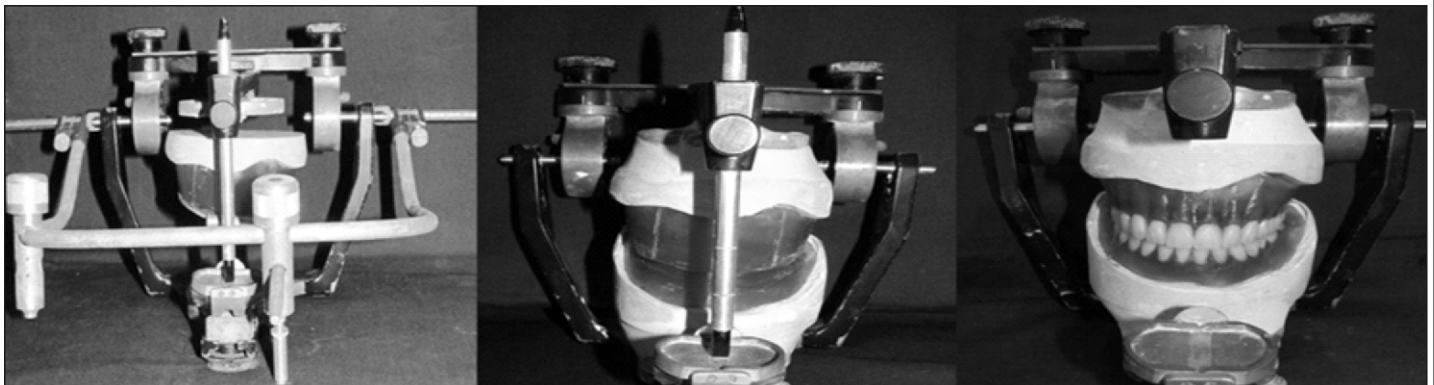
**[Fig-2]:**  
Maxillary secondary  
impression by  
window technique



Primary impressions were made with alginate (Prime Dental products Pvt. Ltd., Mumbai, India). On the maxillary cast, a special tray was made with two posterior handles. Border molding was performed by using low fusing impression compound (Aslate, India) and medium body addition silicone wash impression (Aquasil, Dentsply/caulk, U.K.) was made. The flabby tissue was marked in the mouth and transferred on the tray. This area on the tray was cut to form a window to expose the flabby tissue. It was recorded in rest position by injecting light body addition silicone material (Aquasil, Dentsply/caulk, U.K.) [Fig-2]. Jaw relations were recorded. Face bow transfer was made and casts were mounted on Hanau Wide Vue (semi adjustable) articulator. Teeth were set in balanced occlusion and the try in procedure of the waxed denture was done [Fig-3a, 3b and 3c]. The upper denture design was modified to make a liquid supported denture. Lower complete denture was acrylised using conventional procedure.

Steps in fabricating a liquid supported denture:-

1. Vacuum heat pressed polyethylene sheet of 1 mm thickness (Biostar vacuum forming machine, Scheu-dental, Germany) was adapted on the master cast. The sheet was made 2 mm short of the sulcus and was not extended in the PPS area.
2. Then, sheet was removed and investing was done in conventional manner. After dewaxing, 1mm temporary polyethylene sheet was adapted on the maxillary cast, and vaseline was applied over it so that it can be retrieved easily and denture was acrylised using heat cure resin along with the sheet [Fig-4a, 4b and 4c].
3. Upper complete denture (with 1 mm thick sheet) and lower complete denture were then delivered and the patient was recalled after 2 weeks to convert the denture into a liquid supported one. This was done to check the patient's comfort level to the polyethylene sheet [Fig-5a].
4. At recall appointment, the 1 mm thick sheet which was used as a spacer was removed from the denture. Due to removal of the sheet, ledge was formed all along the denture borders [Fig-5b].
5. An addition silicone putty wash impression was made of the tissue surface of the denture and cast was made of it [Fig-6a and 6b]. This was done to record the exact junction of the sheet to the denture.
6. On this cast a 0.5 mm thick polyethylene sheet was vacuum pressed which was used in place of 1 mm thick sheet creating a 0.5 mm space [Fig-7a and 7b]. Cyanoacrylate adhesive and autopolymerising acrylic resin was used to seal the borders and prevent escape of liquid.
7. The space created due to the replacement of a 1 mm thick sheet with a 0.5 mm thick sheet was filled with glycerine. This was done by making one hole in the buccal flange area of the denture and injecting glycerine through the hole and checking the vertical dimensions simultaneously. The hole was sealed using autopolymerising acrylic resin [Fig-8a and 8b].
8. Finally the upper liquid supported denture was delivered. Both upper and lower dentures were characterized by adding coloring agents during denture processing to match with patient lip color [Fig- 9]. Pre-operative and post-operative extra oral photographs of the patient are shown in Fig-10. Denture care instructions were given to the patient. Patient was told to clean the tissue surface using soft cloth. Recall appointments were scheduled at 1 day, 1 week, 1 month and 3 months. Minor adjustments were carried out at recalls and at 3 months recall appointment, patient was comfortable using the denture.



[Fig-3]: (a) Face bow transfer, (b) Casts mounted on Hanau Wide Vue (semi adjustable) articulator, (c) Teeth were arranged in Balanced Occlusion

## Discussion

'Flabby' ridge is a superficial area of mobile soft tissue affecting the maxillary or mandibular alveolar ridges. It develops when hyperplastic soft tissue replaces the alveolar bone. It is a common clinical finding in long term denture wearers and mainly caused due to trauma from denture bases [1]. In an edentulous patient, it is found more commonly in the anterior region [2-5]. Major problems encountered in patients with flabby ridge are loss of stability and inadequate retention of the dentures. As complete dentures are not able to remain in close adaptation to the underlying mucosa due to displacement of flabby tissue during impression taking and denture functioning. Therefore, an ideal denture should be rigid enough to support teeth and withstands masticatory forces during functioning and at the same time should have flexible tissue surface to continuously adapt to the mucosa and reduces stress concentration and trauma on the underlying tissues [6]. As both these properties cannot be combined in one material, therefore these problems can be solved by a liquid-supported denture where combination of materials is used [7].

Tissue conditioning materials like soft liners have been tried on the tissue surface of the dentures to relieve "denture sore mouth" problems. But it is only a temporary provision because they lose their plastic properties over a period of time due to loss of plasticizer.

**Basic principle behind using liquid supported denture is its flexible tissue surface which continuously changes its shape and adapts to the changing shape of flabby tissue during functioning and at rest. This is due to** a thin film of liquid placed between the rigid acrylic denture base and **thin** flexible polyethylene sheet on the tissue surface. During functioning, **this thin** flexible sheet placed on the tissue surface of the denture base adapts to the modified form of flabby mucosa due to the hydrodynamics of the liquid and **helps in maintaining optimal peripheral seal and provides better stress distribution over large surface area, thereby improving support, retention and stability of the denture. At rest,** when no forces are applied, thin flexible sheet comes back to its original shape that is the one during processing and act as a soft liner and maintains the peripheral seal. In this case, polyethylene clear sheet was used because of its softness, flexibility and biocompatibility. For a liquid cushion, Glycerin was used because it is clear, viscous, and biocompatible and also has been used as a vehicle in liquid medications [8]. Following are the advantages of liquid supported denture:

- a. *Preservation of residual ridge due to optimal stress distribution of masticatory forces over a larger area.*
- b. *Better retention, stability and comfort due to close adaptation of the flexible denture surface.*
- c. *Prevention of chronic soreness from hard denture surfaces.*
- d. *Protection of the mucosa from bacterial or biochemical irritation seen with tissue conditioners.*
- e. *Beneficial in patients with xerostomia, diabetes mellitus and vesiculobullous lesions.*

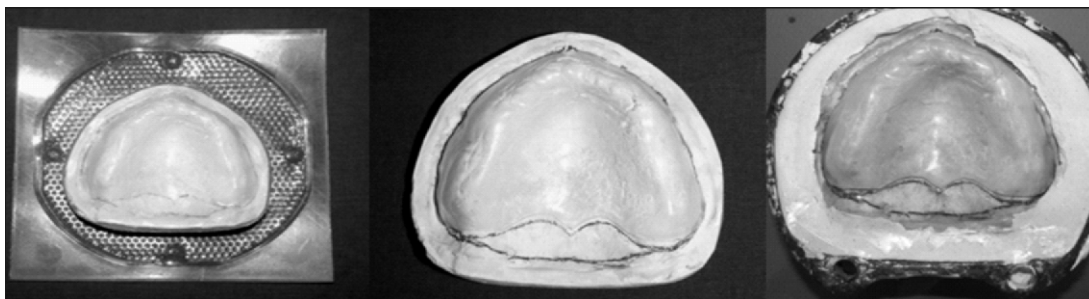
*Various precautions to be taken during fabrication of liquid supported denture [9]:*

(i) Thickness of denture base should be at least 3mm; (ii) the seal should be perfect and should be checked for microleakage; (iii) denture care instructions should be given to the patient; (iv) in case the liquid leaks out, the patient should inform the dentist, and the denture should be refilled; (v) repair is possible if the sheet gets ruptured and can be replaced over preserved stone cast.

The problem faced in fabrication of complete denture is the difficulty in achieving complete seal at the junction of polyethylene sheet and denture base. The main drawback of liquid-supported denture is the relining procedure, which is not possible with this liquid supported denture [10].

## Conclusion

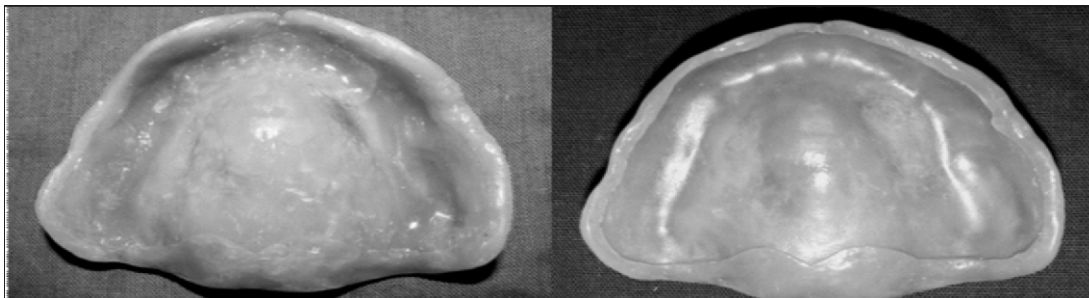
Fibrous ridges pose a prosthodontic challenge for the achievement of stable and retentive dental prostheses. Surgical removal of the fibrous tissue and implant retained prostheses may not be possible to be used in all cases. Considering conventional prosthodontics, the use of liquid supported denture can improve the patient's acceptance due to more uniform distribution of forces and due to the improved comfort level.



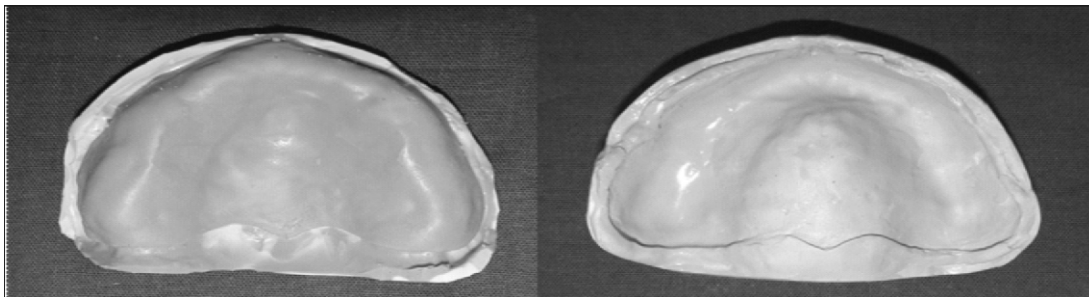
[Fig-4]:(a) 1 mm thick sheet pressed on the master cast, (b) Sheet cut 2mm short of the sulcus and PPS area and (c) Sheet incorporated into the denture during packing stage of denture processing

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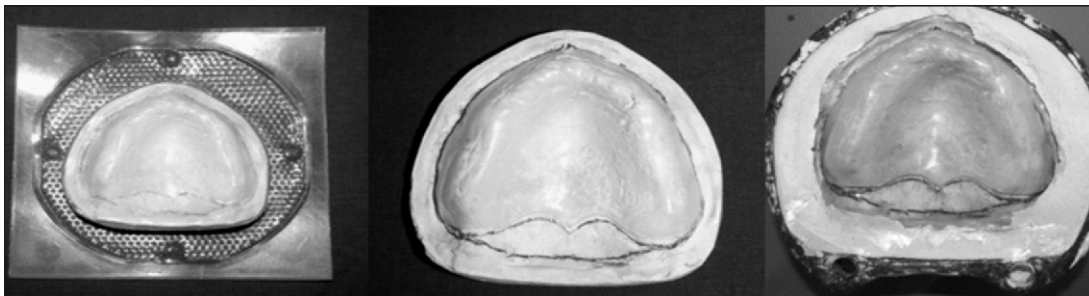
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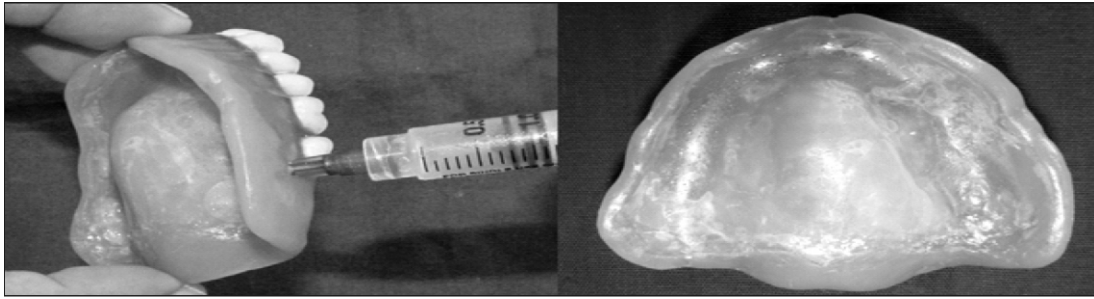
[Fig-5]: (a) Maxillary complete denture with 1 mm thick spacer sheet and  
(b) Ledge formed all along the denture border after sheet removal which helped in the placement of final spacer sheet



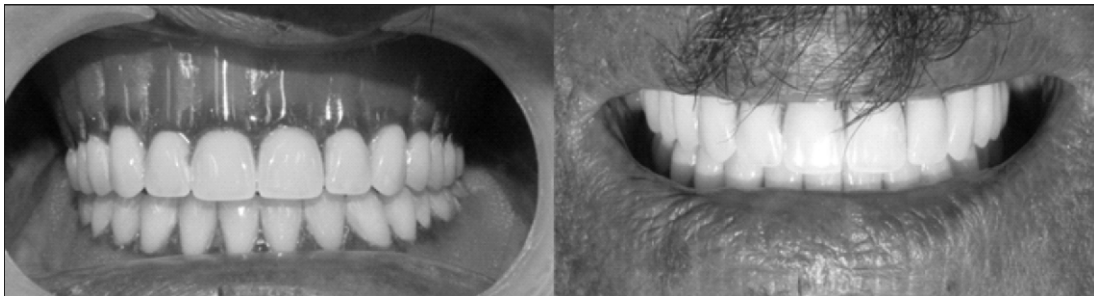
[Fig-6]:(a)A putty wash index was made of the tissue surface of denture and  
(b)Stone cast poured to mark the exact junction of sheet



[Fig-7]: (a) 0.5mm thick sheet pressed over stone cast and  
(b)Sheet cut according to markings on the cast



[Fig-8]: (a)Glycerine injected through the buccalhole and  
(b) Upper liquid supported complete denture



[Fig-9]: Intra oral views of the patient showing characterized dentures



[Fig-10]: Pre-operative and post-operative extra oral views of the patient

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Case Report**

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**Radix Entomolaris in Mandibular First Molar – Case Report**

**Abstract**

A mandibular first molar with two distal roots is an interesting example of anatomic variation. This paper describes case report of right mandibular first molar with three roots (one mesial and two distal). This additional root may complicate the endodontic management of the tooth if it is misdiagnosed. Accurate diagnosis and careful application of clinical endodontic skill can favorably alter the prognosis of mandibular molars with this root morphology.

**Introduction:**

The main objective of root canal treatment is thorough mechanical and chemical debridement of all root canals and their complete obturation with an inert filling material and a coronal filling, preventing the ingress of microorganisms.<sup>1</sup> Unfilled canals remain a nidus for infection and can compromise treatment outcome. A clinician should be aware of the internal morphology of permanent teeth and the possible variations which may be encountered. Mandibular first molar teeth display several anatomical variations. The major variant in this tooth type is the occurrence of a supernumerary (disto-lingual [DL]) root. This was first mentioned in the literature by Carabelli (1844) and was later termed radix entomolaris (RE) (Bolk 1915).<sup>2</sup> An RE was found on the first, second and third mandibular molars, occurring least frequently on the second molar. Some studies reported a bilateral occurrence of the RE from 50% to 67%.<sup>3</sup>

This supernumerary root in the mandibular first molar is associated with certain ethnic groups as follows: European 3.4%–4.2%, African 3%, Eurasian and Indian less than 5%, Europeans 4.2%, Asians such as Chinese, Eskimo, and American Indians has 5% to more than 30%.<sup>4</sup>

The exact etiology behind the development of Radix entomolaris is still unknown. The literature suggests that, in dysmorphic, extra roots, its formation could be related to external factors during odontogenesis or to penetrance of an atavistic gene or polygenetic system whereas in eumorphic roots, racial genetic factors cause more profound expression of a particular gene that result in the more pronounced phenotypic manifestation.<sup>5</sup>

The present report describes case which have undergone root canal treatment in mandibular first molar with three roots (one mesial, two distal that is distobuccal and an additional distolingual (radix entomolaris) and four canals (two mesial and two distal).

**Case Report:**

A 22 year old male patient was reported to the Department of Conservative Dentistry and Endodontics, Himachal Institute of Dental Sciences, Paonta Sahib, Himachal Pradesh, India, with a chief complaint of decayed tooth in lower right back tooth region since 1 week. Patient gave no history of pain. The medical history and allergy to any known drug was noncontributory.

On clinical examination there was caries present on distal and occlusal surface of mandibular right first permanent molar (#46) as shown in Fig1a. Tooth showed negative response on vitality testing, and was tender on percussion. Intra oral periapical radiograph revealed the presence of peri-apical radiolucency around both mesial and distal roots (Fig 1b). This radiograph also showed that the tooth had an additional distolingual root (Fig 1b). The patient was diagnosed with periapical pathology along with radix entomolaris of the mandibular right first permanent molar. Root canal treatment followed by full coverage crown was recommended.



The tooth was anaesthetized, isolated by a rubber dam and after removal of the caries the pulp chamber was opened. The conventional triangular access cavity was modified into a more trapezoidal cavity in order to locate and open the orifice of the distolingually located radix entomolaris as shown in Fig 2a. After finding orifices of the canal, a radiograph was taken to determine the working length of the canals with two instruments (10 no.K-File) in mesial root and two instruments in the distal roots (Mesiobuccal and Mesiolingual = 17mm Distobuccal=19mm Distolingual= 15mm) (Fig 2b). Cleaning and shaping was performed using K-files (DENTSPLY, Maillefer,) in step back manner. Apical preparation was done till size 40 no K-file (master apical file). The canals were irrigated with 3% sodium hypochlorite, during instrumentation and finally with normal saline. The canals were then dried with paper points; master cone selection radiograph was taken, and obturated with laterally condensed gutta - percha (DENTSPLY, Maillefer,) and zinc oxide eugenol sealer. Post endodontic composite restoration was placed and all metal full coverage crown was given (Fig 3a and Fig 3b).

**Discussion:**

The internal anatomy of great number of variations and their shape. Most normal roots with similar can occur. However it must be rare, but it is possible have one of these rare above case reports remind we must expect variations, outcome. These case mandibular first permanent two distal roots The mesial root had two mesiolingual) and two each. One of the variations first molars is radix RE can be classified into on the location of its (i) Type A: the RE is located complex which has two macrostructures.

(ii) Type B: the RE is root complex which has macrostructures.

(iii) Type C: the RE is located lingually to the mesial root complex.

(iv) Type AC: the RE is located lingually between the mesial and distal root complexes.

An alternative classification of RE by De Moor et al. describes the curvature of the root or the root canal and is based on the work of Ribeiro et al.<sup>17</sup>

(i) Type 1: a straight root or root canal.

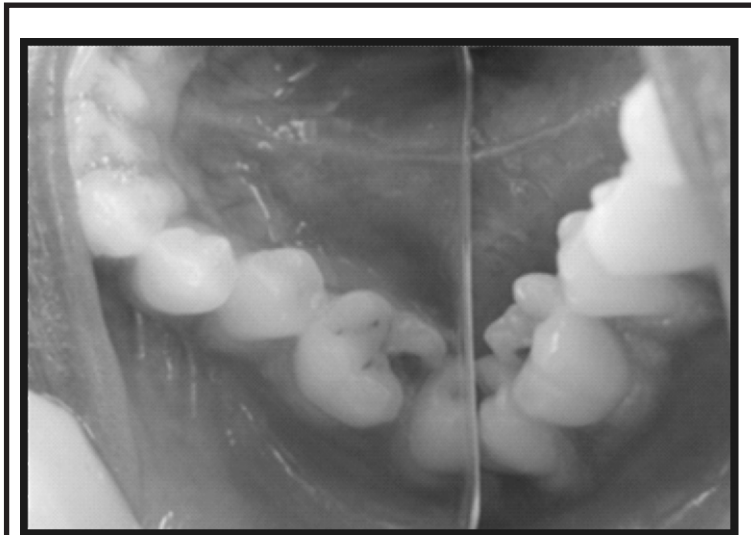
(ii) Type 2: a curved coronal in the middle and apical

(iii) Type 3: an initial curve second buccally oriented middle or apical third.

The infrequent occurrence that the clinician be vigilant of the lower molar teeth. tooth can reveal a more an extra cusp (tuberculum prominent occlusodistal or combination with a cervical indicate the presence of an examination such as camera, or a dental this respect.

As the RE is mostly located plane as the other two both roots can appear on and remain undiagnosed.

Wang et al. (2011) found



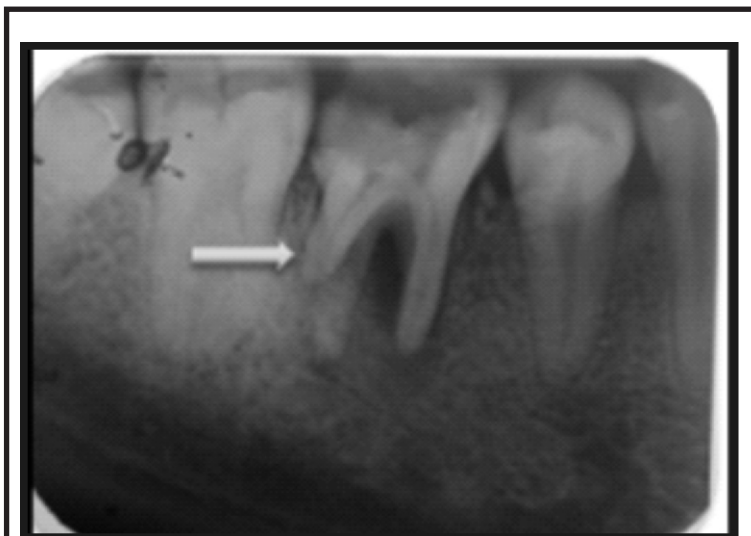
**Fig 1a:**  
**Pre-operative clinical photograph w.r.t 46**

tooth is not always similar. A could occur in number of roots dentists are used to treating traits; as a result, many failures be noticed that abnormalities that a patient referred may anatomic variations. The us that during each procedure which may affect the treatment reports have described molar with one mesial root and (distobuccal and distolingual), canals (mesiobuccal and distal roots with one canal that can occur in mandibular entomolaris.

four different types depending cervical part.<sup>6</sup>

lingually to the distal root c o n e - s h a p e d

located lingually to the distal o n e c o n e - s h a p e d



**Fig 1b:**  
**Pre-operative IOPA radiograph w.r.t 46**

third which becomes straighter third.

in the coronal third with a curve which begins in the

of such an anomaly requires in diagnosis and management The clinical examination of the bulbous outline of the crown, paramolare), or a more distolingual lobe.<sup>8</sup> These in prominence or convexity can additional root. Aids to clinical magnifying loupes, an intraoral microscope may be useful in

in the same bucco-lingual roots, a superimposition of the preoperative radiograph

that a horizontal radiograph

taken at a 25 provided additional detail of the confirmation of DL root. According to these authors, 25 mesial radiographs were significantly better than 25 distal radiographs for DL root visibility.<sup>9</sup>

Once a diagnosis is reached and be prepared, care should be taken line" access. With RE, the triangular access cavity opening take the form of a trapezoid or better locate and access the the additional root.

A severe root inclination or canal in the apical third of the root (in type shaping aberrations such as root canal or a ledge that displays a in the ledge canal. Calberson et al. canal exploration with small files determining the working length of creating a glide path before procedural errors.<sup>10</sup>

**Conclusion:**

The high frequency of a fourth first molars makes it essential to canals during molar root canal possibility of an extra root should and looked for carefully. Proper interpretation of radiographs help and root anatomy. In the case of an triangular opening cavity must be modified to a trapezoidal form in order to better locate and access the distolingually located orifice of the additional root.

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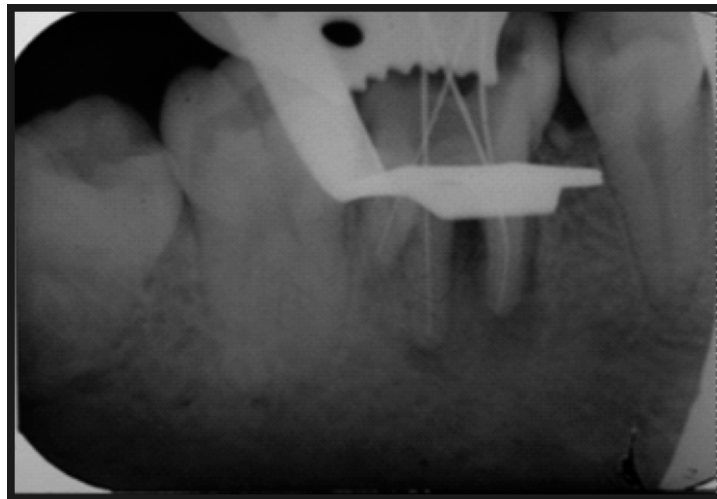


**Fig 2a:**  
**Access opening after rubber dam application w.r.t 46**

an access cavity has to to establish a "straight- c o n v e n t i o n a l must be modified to rectangular form to distolingual orifice of

curvature, particularly III RE), can cause straightening of the loss of working length suggested initial root (size 10 or less), the curved root, and preparation to avoid

canals in mandibular anticipate and find all treatment. The also be considered angulation and to identify chamber RE the conventional



**Fig 2b:**  
**Working length IOPA radiograph w.r.t 46**

Alexandersen, "Radix and morphology," *Dental Research*, vol. 1990.

Sayesh Vemuri, **Variable permanent Review of literature.** 2013;16(2):92-110.

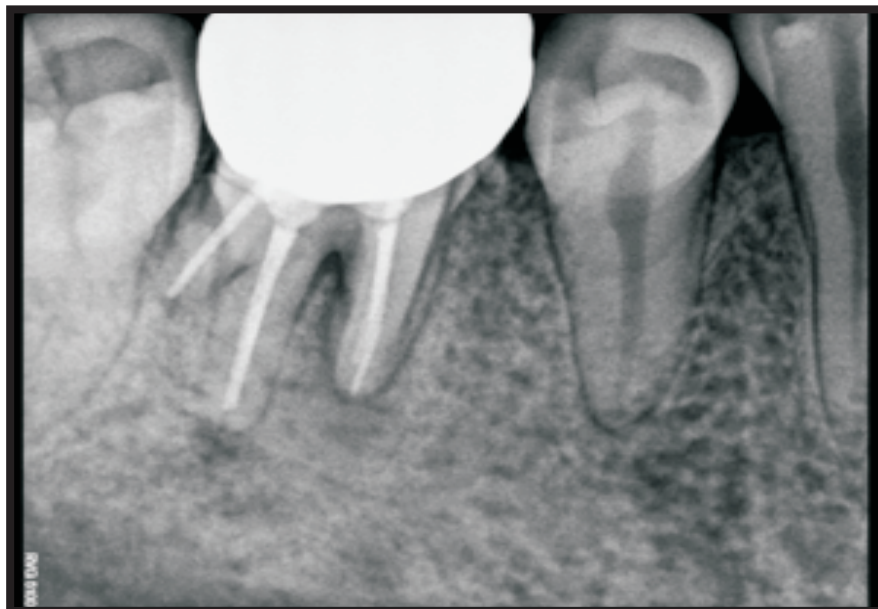
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Duran-Sindreu et al. with disto-lingual management. *Int* 978.

RJ, Deroose CA . The paramolaris: clinical *J Endod* 2007; 33,



**Fig 3a: P**  
ost operative clinical photograph after all metal  
crown cemenation w.r.t 46



**Fig 3b:**  
Post IOPA radiograph after all metal crown  
cementation w.r.t 46

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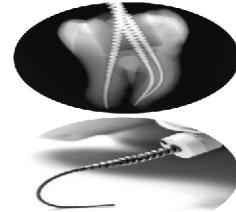
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# ROOT COVERAGE WITH CORONALLY POSITIONED FLAP AND LATERALLY POSITIONED FLAP-CASE REPORT

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## Abstract

Gingival recession resulting in root exposure is a common problem faced by clinicians. Desire for improved esthetic and the consequent need for cosmetic dentistry have increased tremendously in recent times making esthetic procedure an integral part of periodontal treatment. Periodontal plastic surgical procedures aimed at coverage of exposed root surface have evolved into routine treatment modalities. This case series enlightens the features and different treatment modalities of gingival recession with coronally positioned flap by Zucchelli's technique and laterally positioned flap.

## Introduction

Gingival recession is defined as exposure of the root surface due to the displacement of gingival margin apical to the cemento–enamel junction.<sup>1</sup> It may be localized or generalized and can be associated with one or more tooth surfaces. Its etiology is multifactorial and may include plaque-induced inflammation, calculus, restorative iatrogenic factors, trauma from improper oral hygiene practices, tooth malpositions, high frenum attachment, and uncontrolled orthodontic movements.<sup>2</sup>

The main goal of periodontal therapy is to improve periodontal health and thereby to maintain a patient's functional dentition throughout his/her life. However, esthetics represents an inseparable part of today's oral therapy, and several procedures have been proposed to preserve or enhance patient esthetics. The international literature has thoroughly documented that gingival recession can be successfully treated by several surgical approaches<sup>3</sup> provided that the biologic conditions for accomplishing root coverage are satisfied: no loss of height of interdental soft and hard tissues.<sup>4</sup>

The coronally positioned flap is the first choice surgical technique when there is adequate keratinized tissue apical to the recession defect.<sup>5,6</sup> Optimum root coverage results, good color blending of the treated area with respect to adjacent soft tissues, and recuperation of the original morphology of the soft tissues margin can be predictably accomplished using this surgical approach.<sup>5,6</sup> Furthermore, the coronally positioned flap is very effective in treating multiple recession defects affecting adjacent teeth with obvious advantages for the patient in terms of esthetics and morbidity.<sup>6</sup>

Laterally positioned flap is indicated to cover gingival recessions of one or more teeth, allowing better aesthetic, increasing attached gingiva, decreasing both hypersensitivity and cervical caries.

This article describes two case reports to observe the efficacy of periodontal plastic surgery for root coverage in the treatment of gingival recession with different treatment modalities by coronally positioned flap by Zucchelli's technique and laterally displaced flap.

## Case – 1 : Zucchelli's technique of coronally positioned flap for root coverage in multiple recession defects.

A 33 year old male reported to the Department of Periodontology and Oral Implantology at Peoples college of Dental Science and Research Centre with a chief complaint of tooth sensitivity in the maxillary left tooth region for the past 2 months. Sensitivity increased on tooth brushing & intake of hot & cold food stuff.

On clinical examination Millers class I recession was evident on 22, 23 and 24. The periodontium was healthy and with no inflammatory signs. The reason for the recession was attributed to faulty vigorous tooth brushing. Scaling and root planing was done and Oral Hygiene Instructions was given. Proper brushing technique was advised. Zucchelli and Sanctis modification in the coronally positioned flap technique for treatment of multiple recession defects was planned.

### **Surgical Procedure**

Under local anesthesia, a horizontal incision was made with a scalpel to design an envelope flap. This consisted of oblique submarginal incisions in the interdental areas, and these incisions were continued with the intrasulcular incision at the recession defects. The interdental papilla was kept intact, and only the surgical papilla was dislocated by the oblique interdental incisions. A full thickness flap was raised apical to the root exposure and facilitate the coronal displacement of the flap. The exposed root surface was thoroughly planed with a Gracy curette to detoxify the roots and the interdental papilla was deepithelialized to expose the underlying conn

eliminate the epithelium that might interfere with healing. The flap was then positioned coronally and secured using interrupted sutures.

A periodontal pack was placed at the surgical site and patient was recalled for post surgical follow up.



Fig :1  
Pre-operative View showing the multiple gingival recession.



Fig : 2  
Intraoperative View showing Oblique Interdental incision and elevation of flap with Zucchelli Technique



Fig : 3 Showing Flap coronally positioned and sutured.



**Fig : 4**

**Showing Postoperative view after 10 days.**



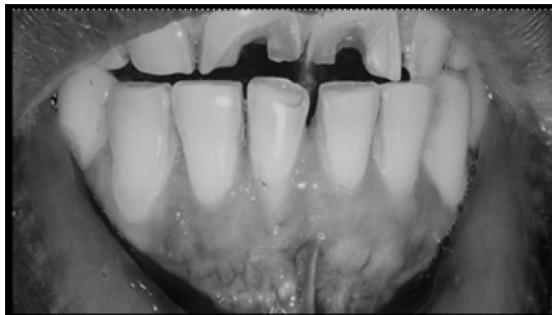
**Fig : 5**

**Showing Postoperative view after 6 month**

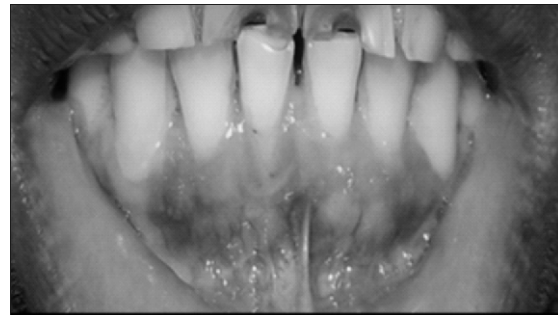
### **Case - 2: Esthetic Root Coverage of Miller's Class II Recession with Laterally positioned flap**

A 38 years female reported to the Department of Periodontology and Oral Implantology at Peoples College Of Dental Sciences & Research Centre, Bhopal with a chief complaint of receding gums in lower anterior teeth. The recession was localized and grade I according to Miller's classification in tooth 41 (Fig 1) and (Fig 2). The recession was about 3 mm and the width of attached gingiva was 2 mm. The patient was medically sound and fit, so a surgical procedure was planned. Scaling and root planing was done prior to surgery.

**An informed consent form was explained to and signed by the patient.**



**Fig-1**



**Fig-2**

### **Surgical Technique**

After injecting local anesthesia, the marginal epithelium surrounding the tooth 41 was denuded and removed to prepare a recipient bed (Fig 3). The adjacent partial thickness pedicle flap from 42 was reflected, leaving about 1 mm of marginal gingiva intact, of a width more than 1½ times the area of gingival recession. Thereafter root conditioning was done with tetracycline HCl on the exposed root surface of 41 to allow biological attachment of the grafted tissue to it. The pedicle flap was then covered over the recipient site on 41 and finger pressure was applied with a gauze piece until the graft was firmly seated. It was then carefully secured with interrupted and stabilization resorbable sutures without tension (Fig 4). Good adaptation of the flap to the underlying tissues is essential for adequate diffusion. Periodontal dressing was given after surgery (Fig 5). The patient was discharged with postoperative instructions and medications for 5 days to avoid postoperative pain and swelling. The patient was recalled after 10 days for checkup (Fig 6). The surgical site was examined for uneventful healing. There was no postoperative complication and healing was satisfactory. The defect created at the donor site heals by second intention. The patient was instructed to use soft toothbrush for mechanical plaque control in surgical area. The patient was monitored on weekly schedule postoperatively, to ensure good oral hygiene in the surgerized area. The reevaluation of this area at 3month followup showed no recurrence (Fig 7).





Fig-3



Fig-4

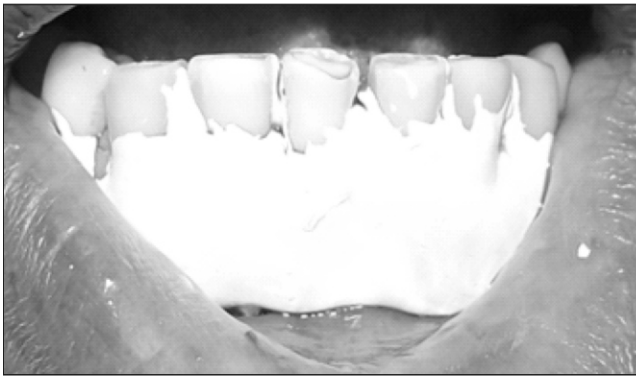


Fig-5

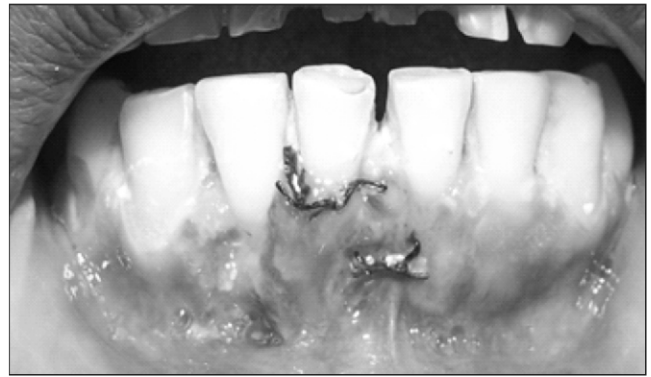


Fig-6



Fig-7

### Discussion

Gingival recessions may occur without any symptoms but may give rise to the patient concern about poor esthetics, dentine hypersensitivity, inability to perform oral hygiene procedures, and loss of the tooth. There are currently different techniques for root coverage, but it is often difficult to anticipate the success rate of root coverage procedures since coverage depends on several factors, including the classification and location of the recession and the technique used. The selection of the surgical technique also depends on several factors, including the anatomy of the defect site, size of the recession defect, the presence or absence of keratinized tissue adjacent to the defect, the width and height of the interdental soft tissue, and the depth of the vestibule or the presence of frenula.<sup>8</sup>

Treatment modality includes an attempt to cover the exposed root surfaces. Over the past decades numerous periodontal plastic surgery procedures have been described in an attempt to cover exposed root surfaces.<sup>9</sup> In this case report coronally positioned flap by Zucchelli's technique and laterally positioned flap technique was used for successful root coverage.

'Coronally repositioned flap' was introduced by Bruiestein in 1970 and modified by Allen & Miller in 1989.<sup>5</sup> Zucchelli & Sanctis modified this technique further in 2000.<sup>6</sup>

Zucchelli's technique: New modification of coronally positioned flap for multiple teeth recession coverage.<sup>7</sup> Clinical features of multiple coronal positioned flap are the absence of vertical releasing incisions and elevation of full thickness flap and the coronal repositioning of the flap. Another characteristic feature is the oblique submarginal incisions in the interdental area. Incisions are given obliquely connecting the CEJ of one tooth to the gingival margin of the adjacent tooth. It is recommended in class I and II shallow recessions according to Miller.

Case-1 demonstrates Zucchelli's modification of the coronally positioned flap. This new technique has few clinical and biological advantages over the conventional technique.<sup>6</sup> It is an envelope type of flap without vertical releasing incisions and hence the blood supply is not compromised and there are no unaesthetic scars along incision line. Since it is also a full thickness flap, it guarantees adequate coronal advancement, good anchorage and ample blood supply to the surgical interdental papillae. Using this flap technique adequate root coverage was achieved with stable results for over 6 months. No scar formation was observed and the color match of the tissue was excellent.

Laterally positioned flap was first described by Grupe and Warren<sup>10</sup> as a surgical procedure comprising the use of a full-thickness pedicle flap moved horizontally to cover the denuded root. It is recommended in class I and II shallow recessions according to Miller.<sup>4</sup>

Case-2 demonstrates laterally positioned flap. In this, the flap remains attached at their base so that they retain their own blood supply during their transfer to a new location. Studies have shown that the laterally positioned flap is an effective method in treating isolated gingival recession.<sup>12</sup> Postoperative discomfort is usually minor because no second surgery or another surgical site is involved. Also the color matches the adjacent gingiva. Clinical results 3 months postoperatively were favorable with no recurrence. Thus we can say that laterally positioned flap is a highly predictable and effective root coverage surgical procedure.

## CONCLUSION

Esthetic surgery is performed to reshape normal structures in order to improve the patient's appearance. Careful preoperative diagnosis and appropriate case selection are prerequisites for surgical success. This is a case report that presents techniques for treatment of multiple gingival recessions with coronally positioned technique and laterally positioned flap technique for treatment of isolated recession defect in the lower anterior region. These techniques were easier with fewer complications that could be used for successful management of recession. In both the cases good stable results were observed in terms of root coverage, increased thickness of attached gingiva, esthetic color matching, good blood supply to the reflected flap and resolution of dentinal hypersensitivity associated with gingival recession. The patient were highly satisfied with the treatment outcome.

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# TITLE: GINGIVAL DEPIGMENTATION : A CASE REPORT

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## ABSTRACT

In this current era of aesthetic awareness cosmetic dentistry is in demand like never before. It is a fast growing field that reflects the high aesthetic expectations of the dental patient and the current trend in dental sciences. Cosmetic dentistry is not centered only till aesthetic restorative procedures, but it may also involve the appearance of the gingiva. Gingival pigmentation is not an anomaly but can be highly unaesthetic. Esthetic gingival depigmentation can be performed in such patients with excellent results. Multiple cases are reported here in which a simple and effective surgical depigmentation was performed without the use of any sophisticated instruments or apparatus.

**Key words:** gingival depigmentation, melanin, aesthetics.

## INTRODUCTION

There is a gradual increase in the aesthetic requirements of patients with time; as a result the periodontal perspective of aesthetic dentistry has gained a lot of importance. Normal colour of the gingiva is pink which is due to melanin deposition by melanocytes. Melanin hyperpigmentation is an overproduction of melanin, beyond the normal expected degree in the oral mucosa, induced by various causes. Slightest of variation from the normal colour of the gingiva leads to an unaesthetic appearance. This condition is aggravated in patients giving high smile line or gummy smile. Several treatment modalities has been suggested and presented. The present case reports, describes a simple and effective surgical depigmentation technique that does not require sophisticated instruments or apparatus yet yields esthetically acceptable results along with patient's satisfaction.

## CASE SELECTION

The cases were selected based on Dummett–Gupta Oral Pigmentation Index (DOPI):(1)

1. No clinical pigmentation (pink gingiva)
2. Mild clinical pigmentation (mild light brown color)
3. Moderate clinical pigmentation (medium brown or mixed pink and brown)
4. Heavy clinical pigmentation (deep brown or bluish black).

The smile line classification (Liebart and Deruelle 2004)(2)

**Class 1:** Very high smile line – more than 2 mm of the marginal gingiva visible.

**Class 2:** High smile line – between 0 and 2 mm of the marginal gingiva visible.

**Class 3:** Average smile line – only gingival embrasures visible.

**Class 4:** Low smile line – gingival embrasures and cemento-enamel junction not visible.

## CASE REPORT

Two patients [one male, one female], aged 19 and 26 years respectively visited the department of Periodontology and Implantology of People's College of Dental Sciences and Research Centre, Bhopal (M.P.) with the complaint of pigmented gums. On examination it was found that their gingiva was deeply pigmented with pigmentation extending from right first premolar to left first premolar (Figure 1a and 1b). Their DOPI score was 3 and were having high smile line. Patients were made aware of the different treatment options available and after observing the development of pigmentation gradually, patient gave their consent for the treatment procedure. Prior to treatment oral prophylaxis of the patients was done and oral hygiene instructions were given. Local anesthesia was infiltrated in the maxillary anterior region from first premolar to first premolar. Number 15 Bard Parker blade was used for the procedure with which, scrapping of the pigmented epithelium up to the level of the mucogingival junction was done, leaving the connective tissue intact (Figure 2a and 2b). After complete removal of the entire epithelium, abrasion with diamond bur was done to get the physiological contour of the gingiva. Periodontal dressing (Coe-Pak) was placed on the surgical wound area for patients comfort (Fig. 3a and 3b) and to protect it for 1 week. Patients were kept on analgesics for a period of 5 days and were advised to use 0.12% chlorhexidine gluconate mouthwash for 2 weeks postoperatively. The patients were reviewed at the end of the first week. The healing process was normal and patients did not report any discomfort. The patients were asked to continue the chlorhexidine mouthwash for another week. At the end of the second month, re-epithelialization was complete and healing was found to be satisfactory (Figure 4a and 4b).

## DISCUSSION:

Pigmentation of gingiva is a natural occurrence but the degree of pigmentation may vary from person to person, race to race. Sometimes these pigmented gingival tissue forces the patients to seek cosmetic treatment (1). Melanin pigmentation is caused by melanin deposition by active melanocytes located in the basal layer of oral epithelium [3]. Cicek(2003) (4). There are different treatment modalities which can be used for the treatment of pigmented gingiva to attain superior aesthetics (5). Selection of the procedure is generally based on affordability of the patient, ease of the operator and clinical experience.

Electro surgery is one of the modalities which are available, but it requires more expertise as compared to scalpel technique moreover its frequent use can lead to burning of the tissue. Also, contact of the electrode with the bone should be avoided as it may lead to necrosis (6).

Cryosurgery is followed by considerable swelling, and it is also accompanied by increased soft tissue destruction. Depth control is difficult, and optimal duration of freezing is not known, but prolonged freezing increases tissue destruction (7).

Laser is the latest and most preferred modality for the treatment of gingival pigmentation as it produces bloodless field for surgery, causes minimum damage to the periosteum and underlying bone, and the treated gingiva and mucosa do not need any dressing. This has the advantages of easy handling, short treatment time, hemostasis, and decontamination and sterilization effects. But this approach needs expensive and sophisticated equipment, which makes the treatment very expensive.

Out of all the available treatment options this case report focuses on the scalpel surgical technique in gingival hyperpigmentation cases with satisfactory results. This technique in comparison is less expensive and also there are no constraints of sophisticated armamentarium thus, it can be readily used in day to day clinical practices. However, it has its own disadvantages of increased bleeding and postoperative pain. Also, it is mandatory to cover the surgical site with periodontal dressing after the procedure.

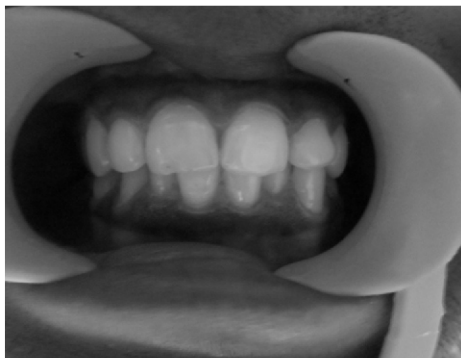
Re-pigmentation after depigmentation has been reported following the use of different treatment modalities. Perlmutter *et al.* in their study (8) showed that gingival surgical procedures performed solely for cosmetic reasons offer no permanent results. Repigmentation refers to the clinical reappearance of melanin pigment following a period of clinical depigmentation. Exact mechanism for this is not known but according to 'migration theory' the active melanocytes migrate from the adjacent pigmented tissues to the surgical site causing repigmentation.

#### **CONCLUSION:**

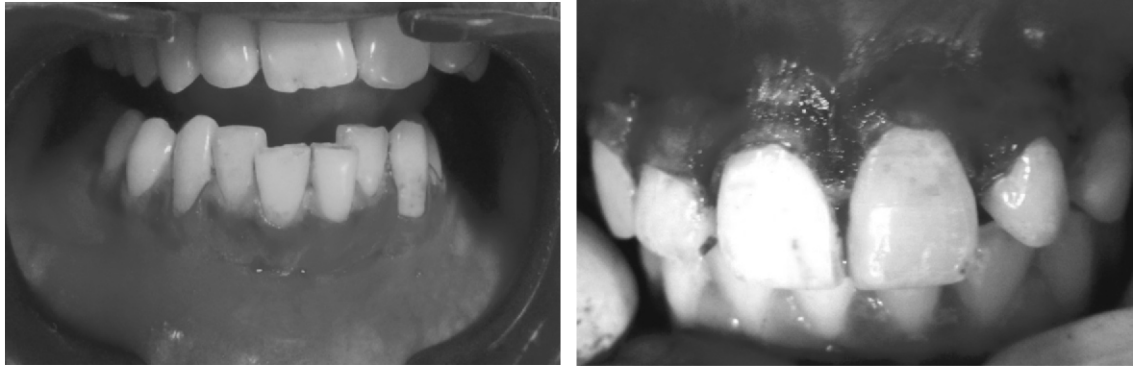
The choice of treatment should be based on cost effectiveness, patient preferability and clinical expertise. In this case report we chose scalpel technique for depigmentation and the patients were extremely satisfied with the results. Thus, we conclude that scalpel technique is easy to perform, cost effective and aesthetically acceptable to the patients.

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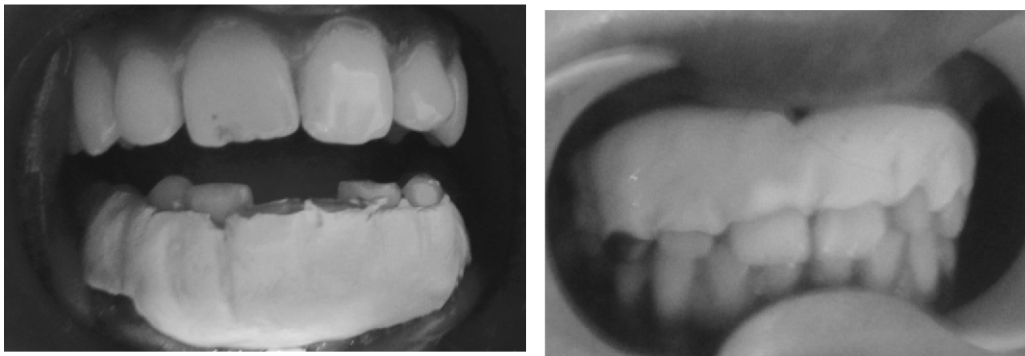
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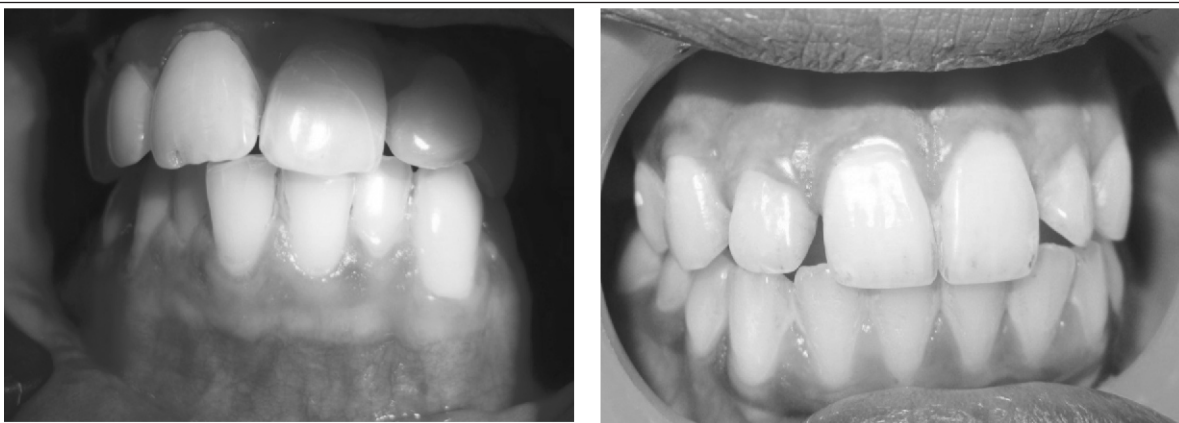
**Fig.1 a,1b preoperative**



**Fig. 2a,2b immediate post operative**



**Fig. 3a, 3b Periodontal dressing**



**Fig. 4a,4b post operative after 2 month**

# Endodontic management of C shaped configuration in a mandibular second molar:

## A case report

**Abstract:** Recognition of unusual critical because it has been tapering canal and apical foramen is early recognition of these shaping, and obturation of the root an important anatomic variation, canals. This case report presents a semicolon shaped configuration of C molar.

Key words: Root canal anatomy, C percha.

### Introduction:

The study of root and canal anatomy significance. In fact, it is important to and characteristic features in various can aid location and negotiation of management (1). One of the most configuration of the canal system. The documented in endodontic literature for the cross-sectional morphology of the root and root canal. Instead of having several discrete orifices, the pulp chamber of the C-shaped canal is a single ribbon-shaped orifice with a 180° arc (or more), which, in mandibular molars, starts at the mesiolingual line angle and sweeps around the buccal

to the end at the distal aspect of the pulp chamber. Below the orifice level, the root structure can harbor a wide range of anatomic variations. These can be classified into two basic groups: (1) those with a single, ribbon-like, C-shaped canal from orifice to apex and (2) those with three or more distinct canals below the C-shaped orifice. Fortunately, C-shaped canals with a single swath of canal are the exception rather than the rule (3).

Once recognized, the C-shaped canal debridement and obturation, especially shaped orifice found on the floor of the apical third of the root. Because of the management of "C" configuration; is discussed along with a case showing molar.

### Case Report:

A 21 year old female reported to the and Endodontics, Himachal Institute Of chief complaint of decayed tooth in lower months. Clinical examination revealed to 47. Medical history was non revealed that the patient had got this the restoration fractured and got periapical radiograph showed coronal dentin and the pulp, alongwith a distal root of the tooth (Fig. 1). Pain on thermal pulp testing gave negative response in comparison to the reference tooth (37) indicating pulpal necrosis. A diagnosis of pulpal necrosis with periapical pathosis in relation to 47 was made and the treatment plan included root canal treatment followed by suitable restoration.

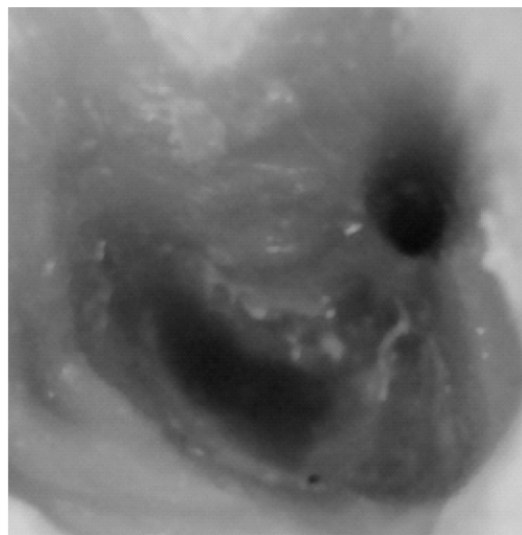


**Fig 1: Pre operative IOPAR**

variations in the canal configuration is established that the root with a single the exception rather than the rule. The configurations facilitates cleaning, canal system. "C" configuration, which is presents a thin fin connecting the root successful endodontic management of shaped canal in a mandibular second

shaped canals, Thermoplasticized gutta

has endodontic and anthropologic be familiar with variations in tooth anatomy racial groups because such knowledge canals as well as their subsequent important anatomic variations is the "C" C-shaped canal, which was first by Cooke and Cox in 1979 (2), is so named



**Fig 2: Image of orifices with Intra-oral camera**

provides a challenge with respect to because it is unclear whether the C-pulp chamber actually continues to the great challenges encountered in the diagnosis and treatment of this variation C-shaped canal in a mandibular second

Department of Conservative Dentistry Dental Sciences, Paonta Sahib with the right posterior tooth region since 6 deeply carious occlusal lesion in relation contributory. Past dental history tooth restored around 5 years back and dislodged around an year ago. Intra-oral radiolucency involving the enamel, periapical radiolucency in relation to the percussion was absent. Electric and

After the access cavity was prepared under rubber dam isolation, the pulpal floor revealed one semicolon type of canal orifice

extending from distal canal to mesiobuccal canal and the other orifice of mesiolingual canal separately, suggestive of C-shape canal anatomy which was confirmed by taking a picture with an intra-oral camera (Fig. 2). Working length was recorded for both the canals (Fig. 3) and root canal cleaning and shaping was completed using hand files with copious amount of irrigation with 1.25% NaOCl and final rinse with normal saline. Irrigation procedure was carried out using the Max I- Probe needle to avoid any extrusion of the irrigation solutions from the apical foramen. The mesiolingual canal was prepared to master apical file size ISO #40 and the larger distal canal was prepared to an apical size of ISO #50, along with a circumferential filing with ISO #40 H-file (DENTSPLY) to smoothen the walls and additionally serve the purpose of agitation of the irrigant inside the root canal. Calcium hydroxide was given as an inter-appointment medicament for 1 week.

The patient reported after 1 week and was totally asymptomatic. Appropriate master cones were selected. The canals were dried with absorbent paper points. The mesiolingual canal was obturated using the cold lateral condensation technique with gutta percha cones and AH Plus sealer. The distal canal was obturated using the hybrid technique. An apical seal of 4mm was formed by a sectional obturation using the gutta percha cone and AH Plus sealer, while the rest of the canal was backfilled using the Thermoplasticized gutta percha system; Obtura (Spartan). On confirming the satisfactory obturation of the root canals by radiograph and an image with intra-oral camera, the access cavity was temporarily sealed with Cavit G temporary filling material (Fig. 4, 5). The patient was recalled after 3 days for the post endodontic restoration. As the tooth had sufficient remaining coronal tooth structure, a conservative approach was followed and the tooth was restored using composite resin (Fig. 6). Patient was referred to the Department of Prosthodontics for replacement of the other missing teeth.

### **Discussion:**

The C-shaped canal system can assume many variations in its configuration so a comprehensive classification can help in true diagnosis and management. Many classifications have been proposed by different authors, out of which classification by Melton (1991)<sup>4</sup> and Fan (2004)<sup>5,6</sup> stand out to be the most accepted ones. Endodontic textbooks state that the C-shaped canal is not uncommon, and this is confirmed by studies in which frequencies ranging from 2.7% (7) to 8% (2) have been reported. This configuration is a significant ethnic variation in the incidence of C-shaped molars. It is seldom found in white people; they have a relatively high prevalence in mandibular second molars of Chinese and Lebanese populations. This anatomy is much more common in Asians than in whites (3). This variation may occur in mandibular first molars, maxillary molars, mandibular first premolars, and even in maxillary lateral incisors, but it is most commonly found in mandibular second molars. When present on one side, a C-shaped canal may be found in the contralateral tooth in over 70% of individuals. (8). Failure of Hertwig's epithelial root sheath to fuse on buccal or lingual root surface is the main cause for occurrence of C-shaped roots, which always contain a C-shaped canal. However, C-shaped root may form by coalescence because of deposition of cementum with time.

Practically it is very difficult but not impossible to diagnose a C-shaped canal from pre-operative radiograph which usually shows single fused roots or images of two distinct roots. So, clinical recognition of C-shaped canal is unlikely until access to the pulp chamber has been achieved. Micro-computed tomography also helps in diagnosing it in a non-destructive manner. Intra-oral periapical radiograph taken while negotiating the canals may reveal any of the following characteristics.

- instruments tending to converge at the apex
- instruments appearing both clinically and radiographically to be centered and appearing to be exiting at the furcation.

The pulp chamber has large occluso-apical dimensions with low bifurcation. Root displays a deep buccal and/or lingual longitudinal groove at the line of fusion between mesial and distal roots, predisposing to localized periodontal disease which may be the first diagnostic indication to this anatomical variant. In a true C-shaped canal, it is possible to pass an instrument from mesial to distal aspect without obstruction. In other configurations, such passage is impeded by discontinuous dentine bridges (4).

Clinically, when a C-shaped canal orifice is observed under the operating microscope, one cannot assume that such a shape continues throughout its length. New methods should be developed to diagnose not only the existence, but the configuration of the entire C-shaped canal

system. It is possible to overlook the fact that the canal may be connected in the coronal portion yet separated in the apical region. When the canal orifice looks continuously connected at the subpulpal level, a separate root canal exiting at the apical level should be suspected. Fiberoptic transillumination can enhance variant canal anatomy identification. Placing the fiberoptic tip under the rubber dam on the buccal surface illuminates the pulp chamber. The canal system appears as a dark line or area in an illuminated field (9).

The necessity for deep-orifice preparation and careful probing with small files characterize the C-shaped category more accurately. In all categories, the mesiobuccal and distal canal spaces usually can be prepared normally. However, the isthmus should not be prepared with larger than no. 25 files; otherwise, strip perforation is likely. Also, Gates-Glidden burs should not be used to prepare the mesiobuccal and buccal isthmus areas. Extravagant use of small files and 5.25% NaOCl is a key to thorough debridement of narrow canal isthmuses.

Alternative canal cleaning techniques, such as those that use ultrasonics, would be more effective. An increased volume of irrigant and deeper penetration with small may allow for more cleansibility in fan-shaped areas of the C-shaped canal (4). Although ultrasonic preparation may C-shaped canal ramifications, perforation (9). The ribbon canal lingual side of the C-shaped radicular the coronal third of the canal is needed directed buccally, perforation will likely

Obturation of C-shaped modifications. The mesiolingual and obturated as standard canals. difficult if lateral condensation is the may not be prepared with a sufficient spreader, application of appropriate. Gutta-percha can be in an open flame or electric spreaders Single-insertion thermoplasticized not condense gutta-percha adequately into the long narrow isthmuses. In addition, proper placement of sealer with

ultrasonic endodontic files is critical, regardless of the choice of obturation technique (10).

Considering the ease and speed of lateral compaction as well as the superior density gained by vertical compaction of warm gutta-percha, Martin (11) developed a device Called EndoTec II (Medidenta, Inc., Woodside, NY) that appears to achieve the best qualities of both techniques. In 1993, an Army group (12) found they could measurably improve compaction while obturating a mandibular molar with a C-shaped canal by using the EndoTec in what they termed a “zap and tap” maneuver: preheating the EndoTec plugger for 4 to 5 seconds before

insertion (zap) and then moving the hot instrument in and out in short continuous strokes (taps) 10 to 15 times. The plugger was removed while still hot, followed by a “cold spreader with insertion of additional accessory points.

In 2000, Walid (13) described the use of two pluggers simultaneously to down pack the main canals in a C-shaped canal. In this case, the pulp floor showed a C-shaped orifice from the

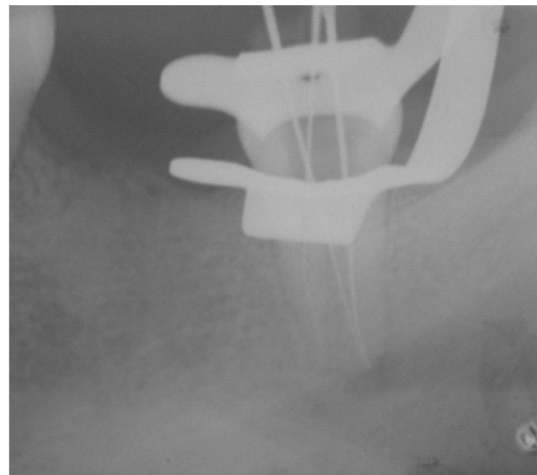
distal to mesiolingual canals and a separate mesiobuccal orifice. Two fine-medium cones were selected for distal and mesiolingual canals, and no accessory cones were placed in the fin between them, whereas a medium point was fitted in the mesiobuccal canal. Three pluggers were

selected for obturation. A Touch'N Heat (Sybron off gutta-percha at the mesiolingual orifice level placed while down packing the distal canal with plugger used in the distal canal was held in Placing two master points and blocking the resistance toward the passage of obturating

**Conclusion:** Although C shaped canal but if sound principles of biomechanical the long-term prognosis for the C-shaped root Cautious optimism would seem most success of the root canal treatment of a C-

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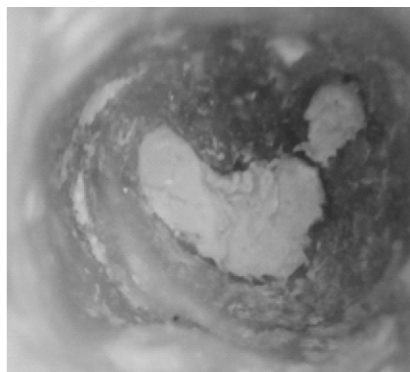
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**Fig 3: Working length IOPAR**

instruments using sonics or ultrasonics shaped areas of the C-shaped canal (4). effectively remove tissues from narrow aggressive instrumentation may cause space is frequently eccentric to the dentin. An anticurvature filing method in to prevent perforation. If dentin filing is be avoided.

canals may require technique distal canal spaces can be prepared and However, sealing the buccal isthmus is only method used. Because this isthmus flare to permit deep placement of the thermoplasticized gutta-percha is more thermoplasticized with spreaders heated or delivered by injectable systems. gutta-percha condensation devices may



**Fig 4: Image of obturated orifices with Intra-oral camera**

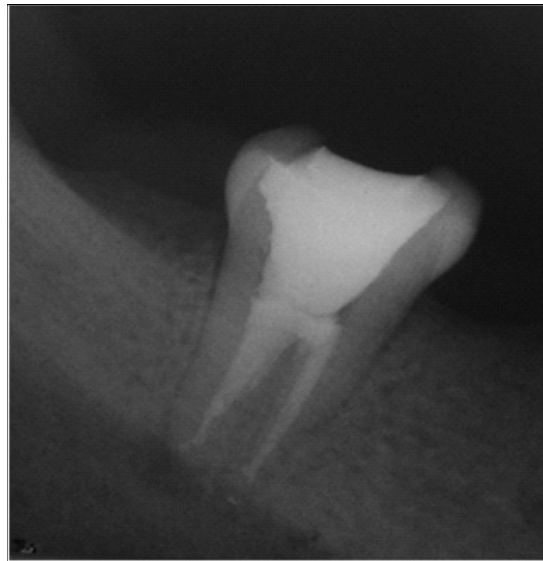
Endo/Analytic, Irvine, CA) was used to sear where the largest plugger selected was the smallest plugger. Then, the smallest place while packing the mesiolingual canal. canal entrance with a plugger increases the material from one canal to another.

morphology is not routinely encountered , preparation and obturation are followed, retention equals that of other molars. appropriate when prognosticating the shaped canal.



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**Fig 5: IOPAR post obturation**



**Fig 6: Post endodontic restoration with composite**

# PERIPHERAL OSSIFYING FIBROMA IN MANDIBLE: A RARE CASE REPORT AND LITERATURE REVIEW.

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DUA P.

**Abstract:** Peripheral (POF) is a solitary gingival overgrowth thought to arise from gingival periosteum and periodontal ligament. The greatest numbers of cases are encountered during first and second decade with slight female predilection. Maxilla is involved more commonly (60%) than mandible. POF represents 1-3 % of all oral lesions that are biopsied.

**Key Words:** Peripheral cementifying fibroma, Peripheral fibroma with calcification, calcifying fibroblastic granuloma.

## INTRODUCTION:

The term, peripheral ossifying fibroma was coined by Eversole and Rovin in 1972. Neville (1995) defined Peripheral ossifying fibroma as "a gingival nodule which is composed of a cellular fibroblastic connective tissue stroma which is associated with the formation of randomly dispersed foci of mineralized products, which consists of bone, cementum-like tissue, or a dystrophic calcification".<sup>1</sup> POF comprising nearly 1-3 % of all oral lesions that are biopsied. The other two lesions are the pyogenic granuloma, and the peripheral giant cell granuloma which may represent an early immature form of the peripheral ossifying fibroma,

It is a non neoplastic enlargement of gingiva that is classified as a reactive hyperplastic inflammatory lesion. It is more commonly seen in 1st and 2nd decades of life and has a female preponderance. There is a slight predilection for the maxillary arch and in the incisor cuspid region.<sup>1</sup>

Trauma or local irritants such as dental plaque, calculus, micro-organisms, masticatory forces, ill-fitting dentures and poor quality restorations have been implicated in the etiology of peripheral ossifying fibroma.<sup>3</sup> Clinically, it presents as a growth of well delineated tissue, with a smooth surface, overlying mucosa is normal in color, sessile or pedunculated, hard in consistency & smaller than 1.5cm at its largest diameter. The colour ranges from red to pink and the surface is frequently but not always ulcerated, the lesion may recur after excision and repeated recurrences are not uncommon.<sup>4</sup>

Two types of ossifying fibromas have been cited, the central type and the peripheral type. Central ossifying fibroma arises from endosteum causing expansion of medullary cavity, while the peripheral type occurs solely on soft tissues covering tooth bearing areas.<sup>5</sup>

Here, we present a case of peripheral ossifying fibroma in the mandibular incisor region.

**Case Report:** An 11 year old male reported to Department of Paedodontics and Preventive Dentistry in Paonta Sahib (H.P) with chief complaint of presence of painless gum swelling in lower front tooth since 1 year. The swelling was associated with bleeding while brushing. The patient did not have any history of trauma, injury of food impaction and the medical or family history was not significant. He gave previous history of swelling in same region which he got excised 1 year back. Intra oral examination revealed a swelling on labial gingiva in relation to 41, 42 region. Lesion was asymptomatic sessile & firm in consistency. Mucosa was reddish pink in color which was around 1.5 X 2 cm in size. Ulceration was present over the lesion. On the basis of above findings a differential diagnosis of pyogenic granuloma, peripheral giant cell granuloma, and peripheral odontogenic fibroma was made.

Informed consent was obtained for investigations and surgical procedures, complete hemogram was performed which showed all blood counts within normal limits. Irritating factors (plaque & calculus) were eliminated by thorough scaling and root planning. Oral hygiene instructions were given and patient was recalled after 1 week. After 1 week and 2 week follow up there was no change in size of lesion. Under local anesthesia, complete surgical excision of the gingival growth was performed. Excision also included removal of the base of the lesion with reflection of flap to ensure the complete removal of the lesion and to prevent further recurrence. There was considerable bleeding during excision; thorough gingival curettage was also done. The excised mass was sent for histopathological examination to Department of Oral Pathology.



Fig1: Swelling irt to lower anterior region



Fig 2: Excised specimen

Patient was motivated and educated to maintain his oral hygiene. Patient was called after 7 days for suture removal. Healing was uneventful. Prognosis was good. The patient was recalled after 1 year to find any evidence of recurrence. No enlargement was seen on follow up.



Fig 3: Complete healing at follow up.

Histopathological examination of the specimen revealed Microscopic examination of the excised tissue revealed a gingival nodule that was partly ulcerated and partly lined with hyperparakeratinized stratified squamous epithelium with a normal maturation pattern. Nodule consisted of hypercellular, well-vascularized fibrous connective tissue containing plump mesenchymal cells as well as numerous multinucleated giant cells. The specimen also exhibited a fairly large area of immature bone formation.

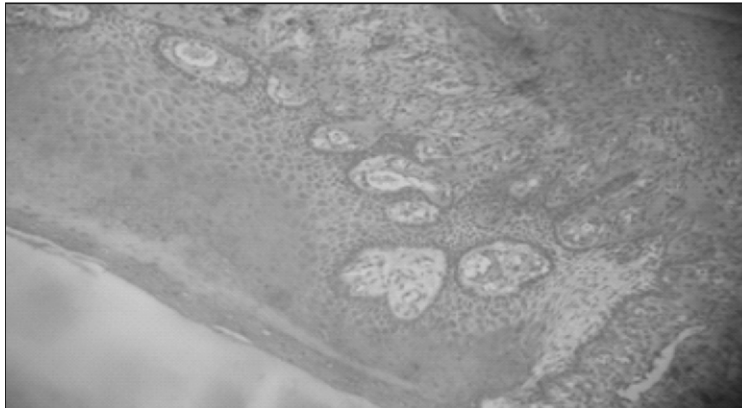


Fig 4: Histopathological picture.

Peripheral giant cell granuloma was proposed differential diagnosis due to similarity in clinical presentation but PGCG is more bluish purple and it is more likely to cause bone resorption. All these findings were suggestive of peripheral ossifying fibroma. Discussion: Intraoral ossifying fibromas have been described in the literature since the late 1940s. Many names have been given to similar lesions, such as epulis, peripheral fibroma with calcification, peripheral ossifying fibroma, calcifying fibroblastic granuloma, peripheral cementifying fibroma, peripheral fibroma with cementogenesis and peripheral cemento-ossifying fibroma. Ossifying fibroma occurs mostly in craniofacial bones and is generally categorized into two types central and peripheral.<sup>6</sup> The central type of ossifying fibroma arises from endosteum or periodontal ligament adjacent to root apex and expands from medullary cavity of bone. On the other hand, the peripheral type shows a contiguous relationship with PDL occurring solely on soft tissue overlying alveolar process. The early POF presents as ulcerated nodules with little calcification, allowing easy misdiagnosis as a pyogenic granuloma. (Buchner and Hansen, 1987)<sup>7</sup> When presented clinically with a gingival lesion, it is important to establish a differential diagnosis. In this case, the clinical features led to a differential diagnosis of irritation fibroma, pyogenic granuloma or Peripheral Giant Cell Granuloma. POF may present as a pedunculated nodule, or it may have a broad attachment base. These lesions can be red to pink with areas of

ulceration, and their surface may be smooth or irregular. They are generally < 2 cm in Diameter, in our case the size is around 1.5 X 2 cms.<sup>7</sup> Size may vary; reports range from 0.2–3.0 cm to 4 mm–8 cm.<sup>2</sup>

The surface is frequently but not always ulcerated, according to Mulcahy and Dahl there is high prevalence of ulceration i.e. 62%-65%. Because the clinical appearance of these various lesions can be remarkably similar, classification is based on their distinct histologic differences. The POF must be differentiated from the peripheral odontogenic fibroma (PODF) described by the World Health Organization. POF cellular connective tissue is so characteristic that a histologic diagnosis can be made with confidence, regardless of the presence or absence of calcification (Gardner et al, 1982)<sup>8</sup>

Hormonal influences may play a role for higher incidence of POF among females. By most reports, the majority of the lesions occur in the second decade, with a declining incidence in later years.<sup>7,9,10</sup>

In a retrospective study of 431 cases in the Chinese population by Zhang and others the mean age of incidence of POF was found to 44 years which is contrary to the previously published literature.

#### Demographic data for peripheral ossifying fibroma:

Age	2nd and 3rd decade
Gender	Males>females
Pediatric	20%
Prevalence	
Race	White>black

The lesion may be present for a number of months to years before excision, depending on the degree of ulceration, discomfort and interference with function. Approximately 60% of POFs occur in the maxilla, and they occur more often in the anterior than the posterior area, with 55%–60% presenting in the incisor-cuspid region.<sup>7</sup>

Regarding the pathogenesis, there are two schools of thought; some believe that POF develops from cells of periodontal ligament /Periosteum, which is accepted by most, while another group believe it to be a more mature variant of pyogenic granuloma following fibrous maturation and calcification.

POF occurs only in the gingiva which is closer to the periodontal ligament, origin of cells from the periodontal ligament (PDL) is considered. Also relevant is the occurrence in interdental papillae and presence of oxytalan fibers.

Histologically, the POF has been defined as a fibroblastic neoplasm containing odontogenic epithelium.<sup>9</sup>

POF appears to be a non-encapsulated mass of cellular fibroblastic connective tissue of mesenchymal origin, covered with stratified squamous epithelium, which is ulcerated in 23%–66% of cases.<sup>8</sup>

It contains areas of fibrous connective tissue, endothelial proliferation and mineralization. Endothelial proliferation can be profuse in the areas of ulceration, which can be misleading in clinical diagnosis, as the lesion may appear to be a pyogenic granuloma.

The mineralized component of POF varies, occurring in approximately 23%, 35% or 50%–75% of cases according to published reports.

Mineralization can vary between cementum-like material, bone (Woven and Lamellar) and dystrophic calcification.<sup>12</sup>

Histologically, a typical ulcerated POF can exhibit three zones:

Zone I: the superficial ulcerated zone covered with fibrinous exudates and enmeshed with polymorpho-nuclear neutrophils and debris.

Zone II: The zone below the surface epithelium composed almost exclusively of proliferating fibroblasts with diffuse infiltration of chronic inflammatory cells mostly lymphocytes and plasma cells.

Zone III: More collagenized connective tissue with less vascularity and high cellularity; osteogenesis consisting of osteoid and bone formation is a prominent feature, which can even reach the ulcerated surface in some cases. Ulcerated type except for the presence of surface epithelium.<sup>13</sup>

Buchner et al observed that mineralized tissue observed in POF can be 3 basic types:

- 1) Bone that may be woven, lamellar or trabecular sometimes surrounded by osteoid.
- 2) Cementum like material that appears as spherical bodies resembling cementum or large acellular rounded bodies
- 3) Dystrophic calcification which can range from small cluster of minute basophilic granules<sup>7</sup>

**Conclusion:** POF is a relatively uncommon, solitary, non neoplastic gingival growth; it is characterized by a high degree of cellularity usually exhibiting bone formation. Based on the clinical and histopathological findings, a final diagnosis of peripheral ossifying fibroma was confirmed. Surgical excision is the preferred choice of treatment of POF as the recurrence rate is high it reflects the technique and philosophy of surgical management. In addition, any identifiable irritant such as ill fitting dental appliance and rough restoration should be removed. Total excision in maxillary anterior region can result in unsightly defect. Various surgical techniques like lateral sliding full thickness or partial thickness flap, sub epithelial connective tissue graft or coronally positioned flap may be used to manage this defect. Regular follow up is required as there is a growth potential of inadequately excised lesion with recurrence rate of 8% to 20%.

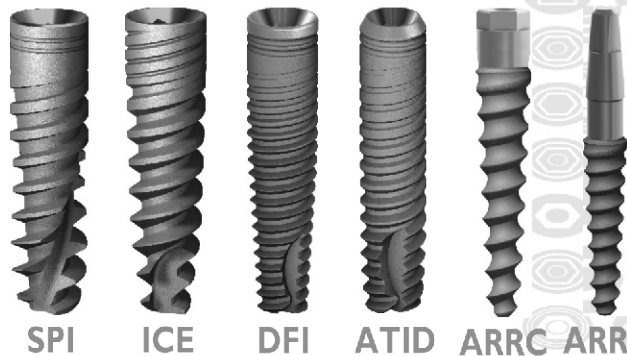
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# **TUMOR VACCINES: FICTION TO FACT**

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## **ABSTRACT**

Oral cancer is significant component of global burden of cancer. The current approaches to the management of oral cancer emphasize on the multidisciplinary team approach to coordinate surgery, radiation therapy and chemotherapy but substantial gap still remains in its effective control therefore, new therapeutic modalities such as immunotherapy which involve the use of tumor vaccines are urgently needed. The vaccination strategies against cancer include therapeutic, adjuvant and preventive vaccination. The present article deals with the types of tumor vaccines, recent developments, efficacy of tumor vaccines against oral cancer and the challenges faced by vaccines.

## **INTRODUCTION**

Oral cancer is one of the major reasons for morbidity and mortality worldwide. It encompasses a range of malignant tumors arising from various diverse and complex structures that have major physiological functions like speech and swallowing and aesthetic importance. For most early stage oral cancers, high cure rates are achieved with either surgery or definitive irradiation and both speech and swallowing functions can often be preserved. On the other hand, locally advanced or recurrent oral cancers are usually treated with combination therapy consisting of either surgery followed by postoperative chemo-radiation or chemo-radiation with surgical salvage if needed. However, most patients remain at high risk for loco-regional recurrence and distant metastasis.<sup>1</sup> Therefore, advances in new therapeutic modalities such as tumour-specific immunotherapy for patients with locally advanced or recurrent oral cancers are urgently needed.<sup>2</sup>

Cancer immunotherapies, including cancer vaccines, are novel investigational modalities for cancer treatment. In contrast to chemotherapy and radiotherapy regimens that are often associated with severe side effects, cancer immunotherapy stimulates the body's immune system and natural resistance to cancer, thus offering a gentler means of cancer treatment that is less damaging to the rest of the body. The goal of immunotherapy is to produce anti-tumor effects through activation of the patient's immune system or through patient supplementation with natural substances, and thus to ultimately destroy the cancer.<sup>3</sup>

Tumor immunotherapy generally consists of administration of cells/antibodies ex vivo (Passive and Active) with administration of vaccine, eliciting the specific immune response against the Tumour Specific Antigen (TSA) and Tumor Associated Antigens (TAA).<sup>4</sup> Cancer vaccines can be broadly classified into two types as therapeutic and prophylactic vaccines, with former focused on cancer immunotherapy and later on cancer immunoprevention.<sup>5</sup>

1.	<b>Therapeutic vaccination: Cancer vaccine administration in tumor-bearing patients</b> <ul style="list-style-type: none"><li>• Combination of radiation therapy and vaccination to favor tumor infiltration by lymphocytes</li><li>• Combination of treatments reducing the tumor burden (chemotherapy, surgery) with vaccination</li></ul>
2.	<b>Adjuvant vaccination: Cancer vaccine administration in patients with residual disease</b> <ul style="list-style-type: none"><li>• Repeated immunizations</li><li>• Vaccination combined with treatments that prolong the survival of T lymphocytes or avoid tolerance induction</li></ul>
3.	<b>Preventive vaccination: Cancer vaccine administration in patients at risk of developing cancer</b> <ul style="list-style-type: none"><li>• Repeated immunizations combined with anti-angiogenetic molecules</li></ul>

**Vaccination Strategies against Cancer**

## **TYPES OF TUMOR VACCINES**

### **▣ Vaccine with bacteria, yeast, viral vectors against cancer**

Vectors such as bacteria, yeast and virus had been used in cancer immunotherapy to induce immune response against Tumor Associated Antigens (TAA).<sup>7</sup> Recombinant vector based vaccine had been used to direct strong immunogenic response against the weakly immunogenic Tumor Associated Antigens.<sup>8</sup> Inflammatory responses are increased against genes of interest that are inserted inside the vector, and recombinant proteins that are produced, are more immunogenic than protein injected with adjuvants.<sup>7</sup> Dendritic cells provide the T cells with antigenic signal, and activates them in the presence of co-stimulatory molecules, for the generation of potent T cell responses towards weak Tumor Associated Antigens (TAA).<sup>9</sup>

### **▣ Vaccines with proteins and peptides against cancer**

Protein or peptide had been used to stimulate immune response against the cancer employing broad range of proteins such as heat shock proteins (HSP), agonist peptides, anti-idiotype antibodies. Vaccines based on proteins have stronger response on the generation of CD4+ lymphocytes, and less effective on production of Cytotoxic T lymphocytes.<sup>10</sup>

### **▣ Vaccines with tumor cells or tumor cell lysates against cancer**

Tumor vaccines can target both unknown and different antigens and the resulting immune response is not restricted to HLA. Tumor antigens are phagocytosed by dendritic cells and presented to CD 8+ cells by the MHC molecules.<sup>11</sup>

### **▣ DNA and RNA vaccines against cancer**

DNA Vaccination had been widely used as alternative approach to develop efficient vaccines for cancer therapy. DNA vaccines are made using the Tumor specific antigens which direct them and amplify. Improved delivery systems such as gene gun, Cationic liposome's, simultaneous administration of cytokines (GM-CSF or IL-2) are used to enhance the potency of DNA vaccines. DNA based vaccines are used to enhance the immunogenicity of plasmid encoded antigens. The mRNA based vaccine encoding the mRNA for Tumor Associated Antigen is transfected into dendritic cells and translated into proteins thus entailing the antigen specific cytotoxic T lymphocyte immune response.<sup>9</sup>

## **RECENT DEVELOPMENTS**

Recent developments in the field of immunology have resulted in vaccines (Cervarix & Gardasil) to treat patients with HPV against cervical cancer. HPV is accepted as an etiological factor for oral and pharyngeal cancers.<sup>12</sup> Numerous trials have studied the prevalence of HPV in OSCC and a largest study on this aspect calculated the average to be 4% for cancers of the oral cavity and 18% for oro-pharyngeal cancers. Kreimer et al showed HPV-16 was the predominant type in 87% and 68% cases of HPV infected oro-pharyngeal and oral cancers respectively.<sup>13</sup> Hence a possible reduction in OSCC as a result of widespread vaccination against HPV appears promising, as a good proportion of the infection is caused by HPV types and therefore potentially preventable.<sup>14</sup>

## **EFFICACY OF TUMOR VACCINE AGAINST ORAL CANCER**

Available HPV vaccines, at present are prophylactic and not therapeutic. Numerous studies done till date discuss the effect of HPV vaccines against cervical cancer alone and do not address the issue related to tumour vaccine specifically for oral cancer. It is surprising indeed, that though OSCC is a common cancer there are only a handful of studies dealing on this issue. One of the recent studies investigated immunomodulatory activity of autologous tumour cell vaccine from oral cancer patients ex vivo by lymphoproliferation assay and two color flow cytometry. Vaccine treatment lead to 10-fold higher proliferation of lymphocytes compared to untreated controls.<sup>15</sup> This finding of lymphocyte proliferation is definitely a positive prognostic factor for oral cancer patients. Another study 'throws up' a promise in the prevention of HPV associated oral cancer with the help of L1 DNA vaccines.<sup>16</sup> Due to lack of further studies pertaining to vaccines in oral cancer, the exact impact of HPV in prevention of oral and oro-pharyngeal cancers and other benign lesions is not known. As the overall 5-year survival rate for OSCC is only approximately 55%, if a vaccine could confer long-term immunity and reduce the incidence of oral cancer, it will have a huge impact on the society. Also, HPV is considered to be a sexually transmitted due to abnormal sexual practices. Sex education, improvement in personal hygiene and vaccination in high risk groups can also add on to bring down the incidence of oral cancer. Dentists can play a crucial role through effective counselling pertaining to safe sexual practice and oral hygiene.<sup>17</sup>

## **CHALLENGES FACED BY VACCINES**

Whether vaccines are designed to prepare the immune system for the encounter with a pathogen or with cancer, certain common challenges need to be faced, such as what antigen and what adjuvant to use, what type of immune response to generate and how to make it long lasting. Cancer, additionally, presents several unique hurdles. Cancer vaccines must overcome immune suppression exerted by the tumour, by previous therapy or by the effects of advanced age of the patient. If used for cancer prevention, vaccines must elicit effective long-term memory without the potential of causing autoimmunity.<sup>18</sup>

## CONCLUSION

The discovery, development and testing of the highly promising HPV vaccines is a major breakthrough in modern preventive medicine. **Cancer vaccine development is in the process of becoming reality in future, due to successful phase II/III clinical trials. However, there are still problems due to the specificity of tumor antigens and weakness of tumor associated antigens in eliciting an effective immune response. Multidisciplinary approach and continuous efforts will surely make tumor vaccines available in market in near future.**

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## ANEMIA: THE ORAL PERSPECTIVE

### ABSTRACT

Anemias are haematological disorders which may occur independently or as a part of a systemic disorders and may reflect the general health of an individual. As anemias have a wide array of oral manifestations these can help the dental surgeon in identifying disease of hemopoiesis which may cause complications during dental procedures hence their knowledge becomes a boon in preventing eventful dental procedures.

Key words: Anemia, oral, manifestation,

### Introduction

Anemia is functionally defined as an insufficient RBC mass to adequately deliver oxygen to peripheral tissues.<sup>1</sup>

There may be various causes of anemia ranging from blood loss, destruction of RBC'S, deficiency of Iron, inadequate production of RBC'S etc.<sup>2,3</sup>

Anemia may present with a wide array of symptoms which manifest systemically and orally and sometimes the orofacial manifestations may precede the systemic manifestations.<sup>4</sup>

### Iron deficiency anemia

It is the most common type of anemia<sup>4</sup> chiefly seen in women.<sup>5</sup>

It is caused due to deficiency of iron which is a result of chronic blood loss, inadequate dietary intake of iron<sup>5</sup> and impaired iron absorption.<sup>3</sup>

Oral manifestations

Atrophy and pallor of oral mucosa, depapillation of tongue, glossodynia and angular cheilitis.<sup>2,4</sup>

Plummer Vinson Syndrome

Also referred to as sideropenic dysphagia.<sup>4</sup> It is closely associated with iron deficiency anemia.<sup>3</sup> Its features are dysphagia due to oesophageal webbing<sup>6</sup>, atrophy of papillae of tongue, sore tongue and dry mouth.<sup>2</sup>

### Pernicious anemia

It is caused due to deficiency of vitamin B12 owing to faulty absorption as a result of the atrophy of the gastric mucosa<sup>2,3</sup> which causes lack of intrinsic factor required for B12 absorption.<sup>2,6</sup>

Oral manifestations

Inflammation and burning sensation of tongue.<sup>3</sup> The tongue appears beefy red atrophy of papillae is seen (bald tongue) which is referred to as Hunter's or Moeller's glossitis.<sup>3,6</sup> There is associated glossodynia and glossopyrosis.<sup>3</sup>

### Sickle cell anemia

It is a hereditary type of anemia<sup>3</sup> which is caused as a result of an abnormality in the beta chain of hemoglobin<sup>2</sup> leading to the formation of sickled Hemoglobin.<sup>7</sup>

Oral manifestations

Jaundice and pallor of oral mucosa, delayed eruption of teeth<sup>2</sup>, enamel hypomineralization, orofacial pain, osteomyelitis of the

mandible<sup>4</sup>, mongoloid facies, necrosis of pulp<sup>6</sup>, stepladder like appearance of alveolar bone owing to coarseness of trabeculae.<sup>4</sup>

### **Aplastic anemia**

It is caused by bone marrow failure.<sup>2,3</sup>

Oral manifestations

Multiple orofacial hemorrhages<sup>4</sup>, gingival bleeding<sup>5</sup>, oral ulcers, oral candidiasis and viral infections of the oral cavity.<sup>4,6</sup>

### **Thalassemia**

Also referred to as Cooley's anemia<sup>3</sup> characterized by a decreased production of the alpha or beta globin chains.<sup>7</sup>

Oral manifestations

Bimaxillary protrusion and occlusal abnormalities give an appearance of chipmunk or rodent facies<sup>2,3</sup>, pallor of oral mucosa<sup>6</sup>, coarsening, blurring and disappearances of bony trabeculae leading to a salt and pepper effect in the oral radiographs.<sup>3,5,6</sup>

### **Conclusion**

A thorough knowledge of oral manifestation of anemia is necessary as many a times the oral manifestations may precede the systemic manifestation, hence they can be recognised by the dentist and the patient can be referred for prompt treatment.

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## **Title: "Fine needle aspiration cytology": A possible adjunct for histopathology in the diagnosis of tuberculous lymphadenitis**

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### **ABSTRACT**

Peripheral tuberculous lymphadenitis—previously termed "scrofula"—is a unique manifestation of disease due to organisms of the Mycobacterium tuberculosis complex. In contrast to invasive procedures available for the diagnosis of tuberculous lymphadenitis, fine needle aspiration cytology (FNAC) can be good possible adjunct for the early diagnosis of the same. Here we report an unusual case of tuberculous lymphadenitis in a 23 years old asymptomatic female patient with no primary bronchopulmonary involvement diagnosed using FNAC technique.

Keywords: Fine Needle Aspiration Cytology (FNAC), Scrofula, Tuberculous Lymphadenitis

## INTRODUCTION

Peripheral tuberculous lymphadenitis—previously termed "scrofula"—is a unique manifestation of disease due to organisms of the *Mycobacterium tuberculosis* complex.<sup>1</sup> Lymphadenitis is the most common extrapulmonary manifestation of tuberculosis.<sup>2</sup> In contrast to invasive procedure like core-needle biopsy and excisional biopsy which are traditionally used for collection of specimens in extrapulmonary tuberculosis for histopathologic and mycobacterial studies, FNAC is a simple and economic tool with high diagnostic accuracy for tuberculous lesions.<sup>3</sup> Fine needle aspiration cytology (FNAC) can be used as a first line of investigation for the diagnosis of lymphadenopathy because of its cost effectiveness, accuracy, being less traumatic, simple, safe, and rapid.<sup>2</sup> Here we are presenting a case report of tuberculous lymphadenitis in a young female, with no primary bronchopulmonary involvement.<sup>4</sup>

## CASE REPORT

A 23 years old female patient came to the Seema Dental College and Hospital, Rishikesh, Uttarakhand with the chief complaint of swelling in left upper neck region since 4 months. She gave the history of extraction of lower left mandibular first molar around 4 months ago following which she developed swelling on left side of her face and in the left submandibular region. The patient also complained of delayed healing of wound w.r.t 36 and pus discharge from lower left jaw region. She had undergone extraction of left mandibular third molar under local anesthesia and curettage of extracted socket of left mandibular first molar.

Extraoral examination revealed a single diffuse swelling in left submandibular region with ill-defined borders measuring approximately 2x2 cm in diameter and oval in shape. It extended anteriorly 4cm from midline upto 3cm from angle of mandible posteriorly and inferiorly, approximately 1cm below inferior border of mandible. Also a sinus opening was evident in the left submandibular region. The overlying skin was the same as surrounding skin.

On palpation the swelling was firm, tender, noncompressible, nonfluctuant and adherent to the underlying soft tissue. Matted left submandibular lymph nodes were also observed during palpation.

A clinical diagnosis of left submandibular tuberculous lymphadenitis was considered. A panoramic radiograph and CT scan were carried out which revealed healing socket w.r.t. 36 and 37 region.

On the basis of clinical presentation and examination a provisional diagnosis of tuberculous lymphadenitis was given.

Specimen collected for fine needle aspiration cytology from the swelling was an important aid in the diagnosis of the lesion. The FNAC was done using 22 gauge needle which was positioned within the target tissue. The plunger was pulled to apply a negative pressure so as to avoid tearing of cells from the tissue. Then the needle was moved back and forth inside the target and the negative pressure was released while the needle remained in the target tissue. The needle was then withdrawn and detached and the air was drawn into the syringe. Finally the aspirate was blown onto the microscopic slide. Cytological smear stained with H& E showed numerous lymphocytes and epithelioid histiocytes with abundant and pale cytoplasm. A few multinucleated giant cells were also evident. These giant cells showed nuclei arranged peripherally in horse-shoe manner resembling Langhan's type giant cells. Amorphous and granular debris was seen throughout the smear (Figure 1) suggestive of chronic granulomatous disease.

For confirmation of the same, a lymph node biopsy was performed. H& E stained section of the same showed numerous caseating granulomas with central caseous necrosis surrounded by numerous lymphocytes and epithelioid cells. Also numerous Langhan's giant cells with nuclei present in horseshoe pattern at the periphery of the cytoplasm were seen (Figure 2), giving an impression of chronic granulomatous lesion suggestive of tuberculosis.

## DISCUSSION

Primary tubercular infection of orofacial tissues does follow minus systemic infection; however it is enormously uncommon and largely transpires in younger patients. The focus organ of mycobacterium TB is bronchopulmonary apparatus, and those in the head and neck region are commonly secondary. Primary involvement is prevalent in youngsters and adolescents than in grown-ups.<sup>5</sup>

The diagnosis of primary TB in the present case was an enigma because of negative signs and symptoms in the bronchopulmonary apparatus. Hence, to ruminant TB lymphadenitis as a differential diagnosis in such cases becomes mandatory.

The present case which reported with a swelling on left submandibular region, measuring approximately 2x2 cm in diameter which on intraoral examination revealed no obvious odontogenic involvement; but the matting of the nodular swelling mass in the left submandibular lymph node was evident which made us to differentially consider a clinical diagnosis of left submandibular tuberculous lymphadenitis<sup>6</sup>

Though biopsy has been traditionally used for confirmatory diagnosis of tubercular lymphadenitis; but now it has been greatly replaced by the technique of fine needle aspiration cytology. In the present case the aspirate collected from the swelling by means of FNAC served as an important aid in the diagnosis of the disease.

FNAC reveals presence of histiocytes of epithelioid type forming cohesive clusters and multinucleated giant cells of Langhan's type are the criteria for diagnosis of granulomatous lymphadenitis examples: tuberculosis, sarcoidosis, leprosy and atypical mycobacterial infection. Granuloma with caseous necrosis is the hallmark of tuberculous lymphadenitis.<sup>7</sup> In the present case also, FNAC revealed similar findings which finally gave an impression of tuberculosis.

FNA cytology is a simple and economic procedure for diagnosis of TB compared with core-needle biopsy or excision biopsy, not only at the initial stage, but also during follow-up of patients after treatment with an antitubercular regimen.<sup>3</sup> Finally to conclude, FNAC would serve as a specific and sensitive possible adjunct to histopathology.

**Conflicts of Interest : Non declared**

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#### Legends for photomicrograph

**Figure 1-** Photomicrograph of FNAC smear at 40x showing numerous lymphocytes and epithelioid histiocytes with multinucleated giant cells

**Figure 2-** Photomicrograph of histopathological presentation of the lesion at 10x showing sheets of histiocytes intermixed with multinucleated giant cells and areas of necrosis.

### Photomicrographs

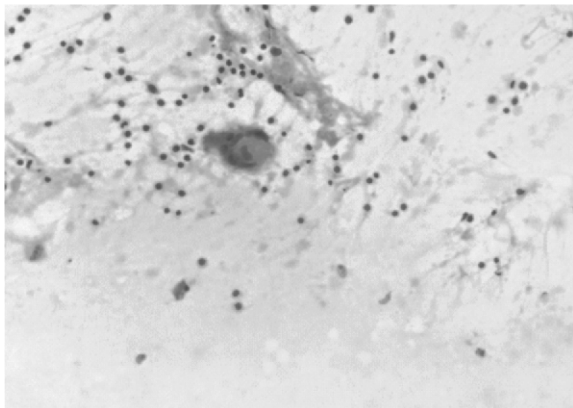


Figure 1



Figure 2

## EXPLORING TELEDENTISTRY

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## EXPLORING TELEDENTISTRY

**ABSTRACT:** Teledentistry is a subset of dentistry which is rapidly forming. It is basically a combination of dentistry and telecommunications which involves exchange of clinical information and images between the patients of remote area and panel of specialist for better diagnosis & treatment planning. It has improved the access and delivery of healthcare and has lowered its cost. It has potentially eliminated the difference of oral health care between urban and rural communities. It has the potential to meet the needs by just logging into the internet site and getting immediate relief. The purpose of this article is to highlight the past, the present and the future of field of dentistry called **teledentistry**.

Keywords: Dentistry, Teledentistry, Internet and Telemedicine

### **INTRODUCTION:**

With the new era of telecommunication and computers, health care is changing dramatically. With the extensive evolution in the world of telecommunication various new implementation for hospital have been implemented and telemedicine is advised<sup>1</sup>. American Medical college association states that "Telemedicine is the use of telecommunication technology to send data, graphics, audio and video images between participants who are physically separated for the purpose of clinical care. The entire process of networking, distant consultation, sharing digital information, analysis and workup is dealt with the branch of telemedicine science known as teledentistry<sup>2</sup>.

### **DEFINITIONS:**

Cook in year 1997 defined Teledentistry as "the practice of using videoconferencing technologies to diagnose and provide advice about treatment over a distance"<sup>3</sup>.

### **ORIGIN & BACKGROUND:**

It developed as a part of dental informatics. Focus was basically on the discussion to apply dental informatics in dental practice to deliver good oral health care directly to the patient<sup>4</sup>. In the year 1944 the United State Army launched a project to improve dental education, patient care and the communication between dental laboratories and dentist. It extended dental care to rural and distant area patients reducing its cost and this offered deeper analysis. There is a great scope to shape current business models by the new opportunities been offered by teledentistry<sup>5</sup>.

### **BASIS OF TELEDENTISTRY:**

Internet forms the basis of modern system Teledentistry. High speed internet and method of data transfer prompted information technology experts to re-evaluate it as a highly valuable healthcare tool. It enabled students to learn at their own convenient place & time from the web.

### **FORMS OF TELEDENTISTRY:**

There are 2 forms of teledentistry

- 1) Two way interactive or Real time consultation
- 2) Store and forward teledentistry

**1)Two Way Interactive Technology Or Real Time Consultation:** involves use of ultra high band width network connections and advanced telecommunication technology which allow videoconference between highly educated dental professionals and their patients at distant locations<sup>4,6,7</sup>.figure 1 depicts this form of dentistry.

**2)Store And Forward Teledentistry:** This involves the collection and storage of clinical information of the patient like history, oral and extra-oral images, digital X ray images, Computer tomography scan, Magnetic resonance images between various consultants for treatment planning via established networks or the internet. The treatment which is then provided is cost effective and is targeted. It consists of computers adequate in RAM, hard drive memory, intraoral video camera, speedy processor and digital camera for capturing pictures. Internet connection and Modem. Printers, scanners fax machine may be required in few cases<sup>6,7,8,9,10</sup>.Figure 2 depicts this form of teledentistry.

### **ROLE OF TELEDENTISTRY:**

The role is variable in all the branches of dentistry but it starts by the first dental visit of the patient to local dental practitioner who records patient dental and medical histories, this information is then forwarded through electronic media to the specialist. An appointment is fixed for the patient through videoconferencing and mean while patient is kept at ease. Various roles of teledentistry are:

1) **FORMAL ONLINE EDUCATION:** The web based self instructions educational system allows the user to control the pace of learning and review material many times at their own convenience<sup>4</sup>.

### **2) INTERACTIVE VIDEOCONFERENCING:**

In this, patient information is sent with or without patient's presence in the form of medical, dental history and radiographs. In this form users get immediate feedback.

### **3) IN ORAL MEDICINE & RADIOLOGY:**

Teledentistry works with the basic motive to make a good decision for the patient management which may also involve referred to various specialists. After many studies it was concluded that if complete data about the patient is not exchanged a correct diagnosis cannot be established and this can be achieved by E mail<sup>11</sup>.

### **3) TELE PERIODONTICS:**

In the year 1944 a study was done on 15 patients who underwent periodontal surgeries at a far off dental clinic at Fort Gordon .The intraoral images before and after the surgery were taken. The sutures were removed at their local clinic at Mc Pherson but all images were transferred to the specialist at Fort Gordon to be examined by the panel of periodontal surgeons. They concluded that 14 out of 15 patients were pleased by the elimination of a long trip to Fort Gordon and felt that they have received better care<sup>12</sup>.

### **4) TELE ORTHODONTICS:**

According to the barrier of cost and access to the orthodontic treatment, the low income children enter adulthood with bad teeth which impair their quality of life. A study which was done on Teledentistry services for interceptive orthodontic care concluded that general dentist can do fairly well under supervision. It also reduced the number of inappropriate referrals and enable dentist to treat more patients themselves. Cook et. al<sup>13</sup> along with Mandall et. al<sup>1</sup> concluded that Teledentistry is an easy way in accessing orthodontic help and assistance. It is a guide to assess malocclusion patient and ensure complete observation and record it.

### **5) TELEDENTISTRY IN DETECTING DENTAL CARIES:**

In the year 20005,7 childcare centres were established in the inner cities of New York.Using telehealth many school children and child care centre children got their teeth examined at an early age and a prompt feedback was provided to them.<sup>14</sup>

### **6) TELEDENTISTRY IN PROSTHODONTICS:**

Ignatius E et al. investigated diagnosis & treatment planning for the patients by the use of video conferencing and they stated that it has a potential in increasing total number of dental specialist services<sup>15</sup>.

### **7)TELEDENTISTRY IN PEDIATRIC & PREVENTIVE DENTISTRY:**

Various authors showed that it is good in tactile /visual examination for dental caries in young children.According to Kopycke-Kedzierawshi DT et al. intraoral cameras are feasible and has the potential for visual oral examination for caries screening in preschool children<sup>16,17,18</sup>.

**PROFITS OF TELEDENTISTRY**<sup>3,4</sup>.Various profits of teledentistry are

1. It allows distant diagnosis of oral diseases.
2. It performs preventive service.
3. It improves the quality of care.
4. Isolation of practitioner is reduced by providing specialist support and peer contact.

5. Insurance requirement can be met instantaneously online.
6. It improves inter-professional communications improving integration in dentistry leading to a larger healthcare system.
7. It reduces paper work.
8. There is ease of storage of data on computers along with diagnostic images.
9. Better coordination with dental laboratories are developed
10. Better time management.
11. It can easily reduce the problem of shortage of dental consultants.
12. Health care services can be provided to immunocompromised Geriatrics, adolescent and children population.

#### **LIMITATIONS OF TELEDENTISTRY:**

Teledentistry has to be fully accepted as an adjunct to dentistry, various constrains related to it are listed.

1. High speed internet connection is required which is difficult to obtain in severe areas of developing constrains.
2. Technical support group is needed.
3. 24 x7 backup communication system is needed.
4. Experienced panel of dentist is needed.
5. Cyber space security and privacy issues are to be dealt with the strict laws.
6. If the patient data is lost the entire project is discontinued.
7. Generation of bill is an issue.
8. Reimbursement of telehealth services are limited.

Clark stated both good & bad points related to teledentistry. Good points is that a vast expertise for the patient is available through teleconsultation. Bad point is few dentist may directly contact patients and become "Cyber dentist" who may not work in the best interest of public, thus state dental board should keep a check on dentistry and punish abusers<sup>6</sup>.

#### **FUTURE OF TELEDENTISTRY IN INDIA:**

India is a developing country and most of the population stay at rural areas where even basic amenities for daily routine life are missing. Gram Panchayat workers & social workers should be educated and trained towards the importance and functioning of teledentistry. The government should provide infrastructure and basic facility through high centre and institutes around the states for the same. Success and implementation for this proposal is difficult and all answers lie in development and expansion of teledentistry<sup>19</sup>.

#### **ETHICAL & LEGAL ISSUES:**

Concerns about confidentiality of patient information which is transferred in the form of history, radiographs and oral & extra-oral images is of great concern as the chance of its interception is high despite maximum security efforts. Thus an informed consent about teledentistry should cover each and every pros and cons involving the risk of improper diagnosis, its treatment and its failure. Medico legal issues and copyright issues along with electronic commerce should be made clear. Information on license to teledentistry is not available readily. Laws for license, malpractice and jurisdiction should be formulated and should be strictly observed.<sup>20</sup>

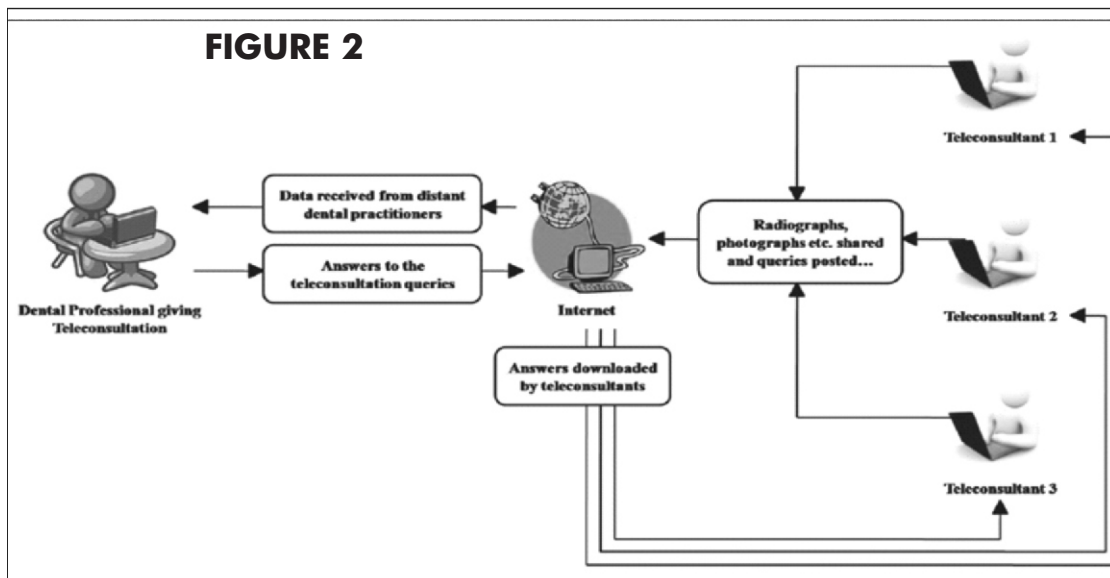
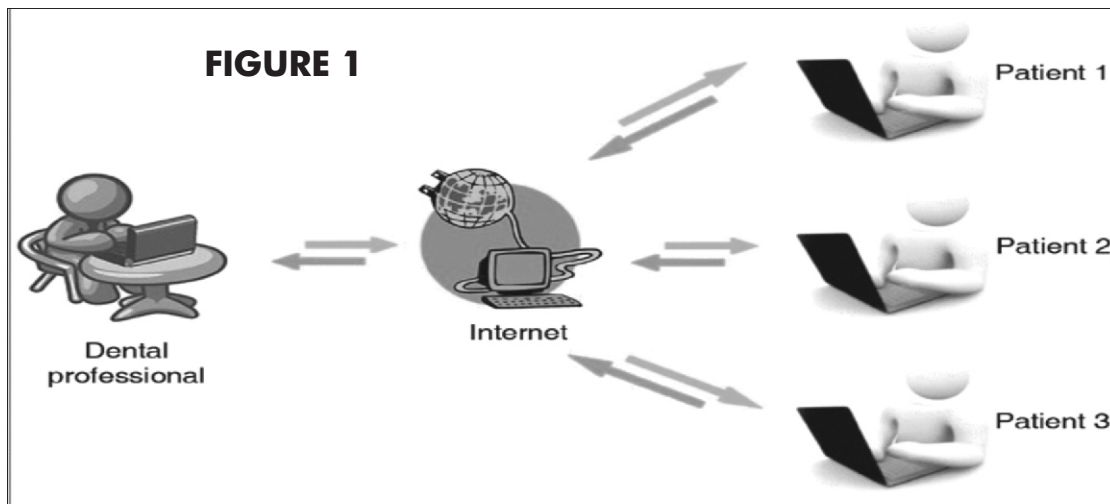
#### **CONCLUSION:**

Teledentistry benefits people oral health to a great extent as a panel of specialist give opinion for the proper diagnosis and treatment planning via e-mails and videoconferences. The future may involve robotized instruments in varying situation. The road for the future research and investigations are positive as the results achieved are encouraging. Further studies involving high number of participants are required to validate it.

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# Intimacy between Cardiology and Dentistry

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## **Introduction**

In present era everyone is aware of the importance of good dental care and oral hygiene for maintaining health but still there is a tendency of physicians to leave the problem of seeking and obtaining dental advice and care to the patient. However, there are many reasons why physicians and, in particular, cardiologists should be more active in advising patients to maintain excellent oral hygiene and dental health and in urging those with poor dental hygiene to obtain satisfactory dental care.<sup>1</sup>

The lack of interest of cardiologists in problems related to dentistry is evident when one considers the rarity of papers related to this subject in journals of cardiology and the lack of attention to the dental health of the patient in the teaching and practice of medicine.

The purpose of this presentation is to discuss the relationship and importance of dentistry to cardiology, as well as to demonstrate the need for early and constant care of the teeth not only in the patient with heart disease but in any patient with chronic disease. Although the concepts are presented from the point of view of the cardiologist, they apply to all physicians.

## **Dental pathology and focal infection**

It is not within the scope of this paper to discuss dental pathology in detail; however, for purposes of orientation, as well as to illustrate the extent of dental diseases. By far, the conditions of greatest concern to the cardiologist are those which involve infection of the oral tissues, primarily dental caries and periodontal disease.<sup>2</sup> The importance of these diseases is twofold. First, they may give rise to serious systemic disease, and, second, they take the patient with heart disease to the dentist's office. As indicated below, dental procedures in patients with serious cardiac disease may be associated with a certain degree of risk to cardiac health and to the life of the patient.

It is important to understand the mechanisms by which dental infections may progress to become a source of serious systemic disease. The least complicated form of tooth infection is known as dental caries. In this condition the enamel is demineralized and the dentin is invaded by bacteria, which produces destruction of these tissues. Although a carious tooth may be painful, under ordinary conditions it does not present a threat to general health. However, after trauma to the face, infected fragments of a carious tooth may be aspirated into the lungs, which results in pulmonary abscess or pneumonia. Furthermore, unless dental carious processes are interrupted by operative dentistry, the dental pulp will almost surely be invaded by pathogenic microorganisms.<sup>3</sup> The resulting pulpitis is usually followed by periapical involvement through the egress of the products of infection by way of the apices of the root. As the infection progresses, this apical lesion becomes more severe and suppuration may occur, with the development of dento-alveolar abscess.

As a result of involvement of the dental pulp (pulpitis) and the periapical tissues, bacteria are brought into proximity with blood vessels and lymphatics and thereby have access to the systemic circulation to cause bacteremia, septicemia, and associated complications, such as subacute bacterial endocarditis. In addition, as the teeth function in mastication, they undergo a plunger-like action which serves to force bacteria into the circulation.<sup>4</sup>

Dental caries is not the only process which may result in disease of the supporting structures of the teeth. The soft tissues and alveolar bone which support the teeth (perioclonium) may become infected by agents which enter at the free margin of the gingivae. Local factors, such as dental calculus, food impaction, and traumatic occlusion, when left uncorrected, will contribute substantially to the destruction of the dental ligament. The overlying infection, which may be primary or secondary, can certainly further this degenerative process which eventually leads to the formation of deep pockets of infection around the teeth.<sup>5</sup> If the infection and irritation remain untreated, suppuration and even periodontal abscess may develop.

Underlying systemic disease, particularly diabetes mellitus, may markedly accelerate the degenerative process. The over-all result of this syndrome is that concentrations of pathogenic organisms are present in an area of degenerating tissue. During the trauma of dental procedures, mastication, or brushing of the teeth, bacteria may invade the blood stream from these infected areas in the periodontium.<sup>6</sup>

### **Role of the cardiologist in dental management**

As has been indicated briefly, dental procedures in patients with arteriosclerotic heart disease present a small but definite risk. On the other hand, poor dental health may result in secondary systemic disease which may be fatal in the presence of the cardiac disease. The situation is complicated by the fact that both dental and cardiac diseases increase with age. Much of the difficulty could be avoided by early institution of dental care in cardiac patients.

The cardiologist must not assume that the patient is receiving adequate dental care. When the cardiologist sees a patient with early arteriosclerotic, hypertensive, or valvular heart disease, he recognizes the fact that, despite his best efforts, the disease will usually progress. He must

also recognize that existent dental disease will also progress.<sup>7</sup> Therefore, he should take steps immediately to make sure that the patient's oral hygiene and dental health are in the best possible state at all times.

Necessary extractions, periodontal therapy, and replacement of lost tooth structures should be performed as soon as possible after the diagnosis of heart disease is established. The cardiologist should not rely on his own examination of the teeth to determine whether dental care is indicated. Indeed, periapical infection may be present in the absence of objective or subjective signs of tooth infection. If dental problems are allowed to accumulate in patients with cardiac disease, eventually the dentist or oral surgeon will be faced with a patient who is in need of extensive dental care but who has poor cardiac reserve. Treatment of such poor-risk patients is rarely satisfactory. It is often necessary to make therapeutic compromises, and in some instances the treatment of choice may be no treatment at all.<sup>8</sup> In addition, whatever procedures are performed are undertaken at increased risk. The cardiologist should consider the fact that with the progression of cardiovascular disease the patient may become debilitated and bedridden, or a cerebrovascular accident may place him in a wheel chair.

Under such circumstances it may be extremely difficult, if not practically impossible, to provide adequate dental care. Another reason for instituting early dental care in patients with cardiac disease is that at some time the patient may become obtunded or comatose secondary to myocardial infarction, cerebrovascular accident, or narcotics used in therapy. Foci of infection in the periodontal tissues may discharge purulent material which, in turn, may be aspirated into the lungs to produce pulmonary infections and decrease the chances of recovery from the primary disease.<sup>9</sup>

The importance of early and complete dental care should be carefully explained to the patient. The patient should be adequately informed that the risk of dental procedures increases with time, whereas early therapy carries no risk. The patient should also be reminded of the fact that he is better prepared to finance dental care while he is working than after he has retired or has become too ill to work and his income has decreased. Furthermore, the total cost of dental care will most likely be greater if the teeth are neglected and the dental diseases allowed to become extensive.<sup>10</sup>

If dental procedures do become necessary in patients with severe coronary arteriosclerosis and ischemic heart disease, certain precautions should be considered. It may be advisable to extract only one or two teeth at a time. However, the hazard of frequent dental manipulations of short duration should be weighed against the hazard of more prolonged manipulation with fewer visits. It must always be remembered that certain patients cannot tolerate prolonged dental therapy. The amount of dental manipulations which the patient with severe cardiac disease can safely tolerate should be decided by both the dentist and the physician in consultation.

In patients with frequent episodes of angina pectoris, nitroglycerin should be placed under the tongue before pain develops. If a particularly difficult extraction is expected, mild sedation or a narcotic should be administered. As little epinephrine as necessary should be used in the local anesthesia. It has been recommended that no more than 10 CC. of 1:50,000 epinephrine be used at any one time in persons with cardiac disease.<sup>8</sup>

Dosages of cardiac drugs, such as digitalis, quinidine, and procaine amide, should be carefully regulated prior to dental therapy, in order to avoid the side effects of these drugs during dental procedures. In patients receiving anticoagulants, prothrombin time should be allowed to decrease to the lower limits of the therapeutic range. Hypertensive patients taking rauwolfia preparations should not be given a general anesthetic agent. After rauwolfia therapy is discontinued, it is necessary to wait at least 2 weeks before general

anesthesia can be considered to be safe.<sup>5</sup>

In patients with congenital and rheumatic heart disease the cardiologist should again be certain that the patient has the best possible oral hygiene. If tooth extraction becomes necessary in patients with congenital or rheumatic heart disease, parenteral penicillin should be administered at the time of the extraction and for a few days thereafter. If the patient is sensitive to penicillin, erythromycin should be employed. Oral penicillin should be used only when the complete cooperation of the patient is fully assured. In patients with rheumatic heart disease receiving prophylactic penicillin therapy it is important to recognize the fact that the dosages of penicillin employed for prophylaxis against Group-A beta hemolytic streptococci are inadequate to prevent bacterial endocarditis.<sup>11</sup>

Therefore, even in patients receiving prophylactic penicillin therapy, additional penicillin should be administered in preparation for dental procedures, in order to insure high concentrations of penicillin in the blood. The patient with congenital or rheumatic heart disease should be prepared for periodontal procedures and other procedures traumatic to the soft tissues in the same manner as for tooth extractions. Furthermore, the trauma associated with periodontal therapy should be kept to a minimum.<sup>9</sup>

Physicians have always been interested in unusual oral manifestations of systemic disease. However, there has been a lack of interest in the ordinary problems of oral hygiene and continued dental care. The prevalent attitude of leaving the problem of oral hygiene to the patient may be detrimental to the patient's health and may ultimately result in an increase in the risk and extent of dental procedures. The physician should obtain a dental consultation in the same manner and with the same exchange of information and thought as he does when he consults physicians in other specialties.<sup>8</sup>

Rapid advances in both medical and dental therapy have made communication between physicians and dentists, in the form of joint conferences and the like, not only highly desirable but necessary. Because of the increased aging population of this country, dentists and oral surgeons will treat an increasing number of patients with cardiovascular disease. The cardiologist must be acquainted with the nature of the various dental procedures if he is to provide his patient with the best treatment and advice. It is the cardiologist who is best able to evaluate the reserve of the cardiac patient, and it is he who should advise the dentist of which procedures can be performed safely in a particular patient. Unless the cardiologist has some knowledge of the various dental procedures, he is in no position to evaluate the ability of the patient to tolerate dental therapy.<sup>11</sup>

On the other hand, the experiences of dentists and oral surgeons with cardiac patients should guide the cardiologist in determining whether a particular procedure is safe for his patient. Unfortunately, the cardiologist has little opportunity to learn of the experiences of dentists with cardiac patients. Joint conferences between dentists and physicians would help to provide the cardiologist with such information. Because of mutual problems, dentists may find it advisable to join the American Heart Association.<sup>11</sup>

## Summary

Few people possess and maintain excellent oral hygiene at all times. Thus, it is to be expected that most patients with heart disease have unmet dental needs. In such patients, dental care should be obtained as early as possible. The patient should not be permitted to wait until the cardiac disease has become so serious that dental procedures which would have been innocuous earlier have become hazardous.

The cardiologist should insist that the patient with heart disease maintain an excellent state of oral hygiene and dental health. The cardiologist knows the natural history of cardiac disease. He knows, for example, that a patient with coronary artery disease may develop a myocardial infarct at any time. If good dental care is obtained before the development of the myocardial infarct, continued maintenance of dental health should not be difficult.

However, if dental problems are allowed to accumulate, restoration of dental health may be impossible. Most dental diseases are curable and should be attended to early when the cardiologist and dentist can elect the proper time and procedures rather than later when they are compelled to institute compromise therapy under adverse medical and dental circumstances and when the dental disease is irreversible.

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## Oro-facio-digital syndrome: A Rare Case

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### ABSTRACT

Orofacial digital syndrome (OFDS) is a heterogeneous group of developmental disorders of which at least nine different forms have been described. It is transmitted as an X-linked dominant condition. The gene responsible for the syndrome is found on the short arm of the X chromosome (Xp22.3-p22.2). The incidence of OFDS is estimated to be 1 in 250 000 live births, and it occurs in diverse racial backgrounds. Almost all affected individuals are females, as male fetuses with the syndrome die before birth. We hereby present a case of 7 and half year old child with features of OFDS.

**Keywords: Oro-facial-digital syndrome, dyostosis, telorism.**

### INTRODUCTION

Orofacial digital syndrome (OFDS) is a heterogeneous group of developmental disorders of which at least nine different forms have been described. [1] In 1954, Papillon-Leage and Psaume described malformation of face, oral cavity, and digits under the heading of Orodigitofacial dysostosis which subsequently has been renamed as orofacial digital syndrome (OFDS) due to involvement of other tissues than bone. [2] It is transmitted as an X-linked dominant condition. The gene responsible for the syndrome is found on the short arm of the X chromosome (Xp22.3-p22.2) [3] and mutation analysis identified CXORF5, which was then renamed OFD1 as the gene responsible for this disorder. [4] The incidence of OFD1 is estimated to be 1 in 250 000 live births, and it occurs in diverse racial backgrounds. [5] Almost all affected individuals are females, as male fetuses with the syndrome die before birth. [6]

The craniofacial features affecting the head are described as 'remarkably characteristic' and include facial asymmetry, frontal bossing, ocular hypertelorism, micrognathia, broadened nasal bridge, aplasia of alar cartilage, strabismus, downslanting palpebral fissures, cleft lip/palate, high arched palate, ankyloglossia, oligodontia, supernumerary teeth, hyperplastic frenula. [7,8,9] The digital abnormalities, which affect the hands (50–70%) more often than the feet (25%), include syndactyly, brachydactyly, clinodactyly and rarely pre- or post-axial polydactyly. [10]

### CASE PRESENTATION

A 7 and half year old boy reported to the Out Patient Department of Himachal institute of dental science with complaint of delayed eruption of permanent teeth. On clinical examination, patient revealed intraoral abnormalities including lobulated tongue (Figure 1), fused deciduous lateral incisor and Canine (Figures 2) and multiple frenum (Figure 3). Facial features were mild ocular

hypertelorism, and broad nasal root were present (Figure 4). Digital features include syndactyly of both hands for which he was operated before. Further clinico-radiological examination revealed absence of left lateral incisor (Figure 5). Examination of kidney was normal without any evidence of polycystic kidneys. This patient showed some cardiovascular changes. The patient was referred to a cardiologist for the opinion she was diagnosed with PRIMUM ASD she was treated for the same by the cardiologist. Photograph of the defect is attached here.

## DISCUSSION

Oral-facial-digital syndrome is an extremely variable congenital condition whose diversity has engendered widespread investigation and debate. Mohr is credited to have given the first description of OFDS in 1941 when he reported a family with significant OFD findings, including highly arched palate, lobate tongue with papilliform outgrowths, broad nasal root and hypertelorism. [11] In 1954, two French dentists Papillon-Leage and Psaume reported a hereditary malformation of the buccal mucous membrane and abnormal frenum and suggested that the syndrome was inherited as a complete recessive trait. [12]

Gorlin and Pindborg (1964) first reported this condition in the English literature. They described it under the heading of orodigitofacial dystosis, but as there was involvement of other tissues than bone, the term oral-facial-digital (OFD) syndrome was preferred. [13]

Because of the variable clinical expression, the attribution of the correct diagnosis among the several forms of OFDS is often difficult. [14] Therefore, to achieve the correct diagnosis and offer proper genetic counseling, it is necessary to search carefully for any possible abnormality associated with the oro-facial digital spectrum of defects. In the present patient there are multiple clinical manifestations with more pronounced oral features along with digital features and less facial features which allowed us to recognize the diagnosis of OFDII considering the differential diagnosis with OFDSI.

A multidisciplinary approach is required in the treatment of this syndrome to provide a complete physical, mental, psychological rehabilitation of the patient so that he can live a normal healthy life. Cosmetic or reconstructive surgery for tongue nodules and accessory frenulae; orthodontic treatment for malocclusion; surgery to repair syndactyly and regular follow up.

## CONCLUSION

A newborn or infant with structural abnormalities of face, oral cavity and digits should be evaluated for Oro-facial digital syndrome spectrum for future outcome.

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**Figure Legend**



**Figure 1: Picture shows Lobulated tongue**



**Figure 2:  
Picture shows fused deciduous lateral  
incisor and Canine**



Figure 3: Picture shows Multiple frenum



Figure 4:  
Mild ocular hypertelorism,  
and broad nasal root



Figure 5: OPG showing absence of left lateral incisor



ECHOCARDIOGRAPHIC 4 CHAMBER VIEW OF PRIMUM ASD