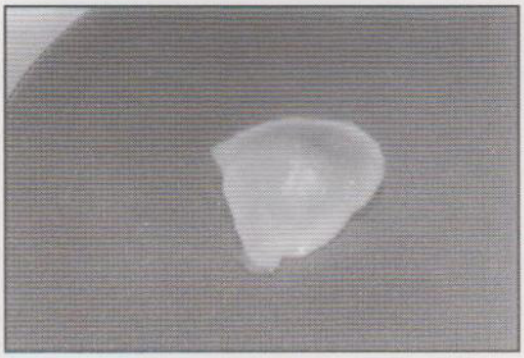

*Fig. 11 : Heat Cured Bulb opened externally.*

*Fig. 12 : Bulb lined with soft liner & fitted snugly.*

**WAX PATTERN FABRICATION :**

- Pre fabricated Eye shell was selected after matching with eye and was placed correctly on the facial mould simulating with the right eye. Utmost care was given for the positioning of the eye shell (Fig13).
- The defect area was then filled with wax on the required area and was carved to get the exact anatomy that of the other half.

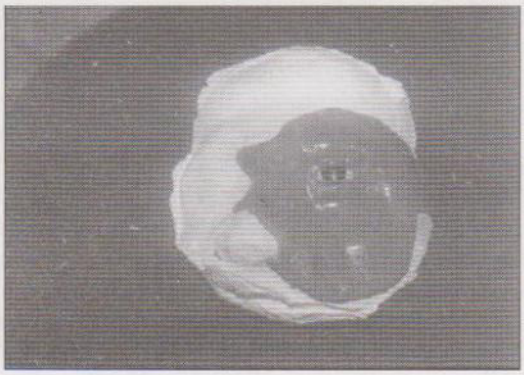

*Fig. 13 : Contoured wax pattern with Eye Shell.*

**DUPLICATION OF THE WAX PATTERN :**

- Before duplication of the wax pattern, it was checked on the patient face for the proper extension and fit (Fig 14,15).

*Fig. 14 : Wax pattern being checked on the patient face (Left Lateral View).*

*Fig. 15 : Frontal View.*

- The wax pattern wax duplicated with the alginate impression material which wax supported at the periphery by boxing with modeling wax. The impression was protected carefully for the fabrication of one piece self cure facial prosthesis (Fig 16,17).

**FABRICATION OF THE PROSTHESIS :**

- The wax pattern was dewaxed with boiling water. Water was poured carefully at the border of the eye shell to prevent its dislodgement, because th position of the eye shell much important.
- The material used for the prosthesis was only clear acrylic and different colors. As the patient was little black complexion color matching was not that much difficult. Only black ,brown and little yellow color was used.

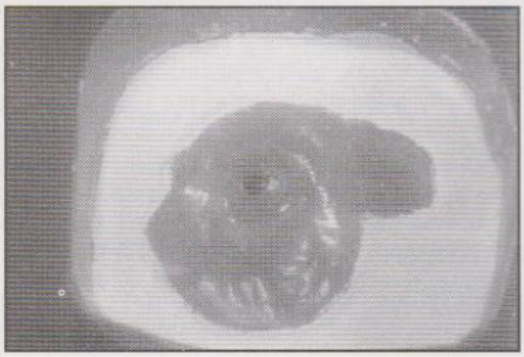

*Fig. 16 : Wax pattern supported on the plaster.*

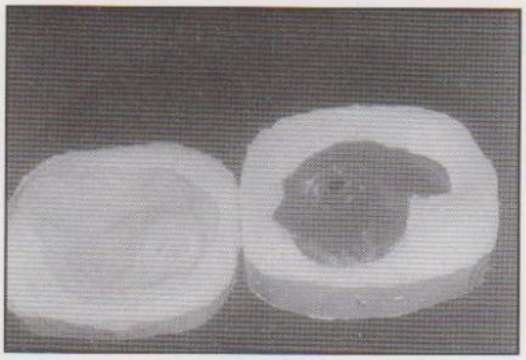

*Fig. 17 : Alginate duplicate of the wax pattern.*

- The acrylic dough was placed carefully on the eye shell first and then on the rest of the area. Thickness of the dough was controlled to avoid porosity which affect the color of the prosthesis.
- Both the half were closed and fastened by elastics and kept in cold water until the polymerization was complete. The prosthesis was recovered from the mold and finished and polished (Fig18).
- Eye lashes were added later on after the final check up.

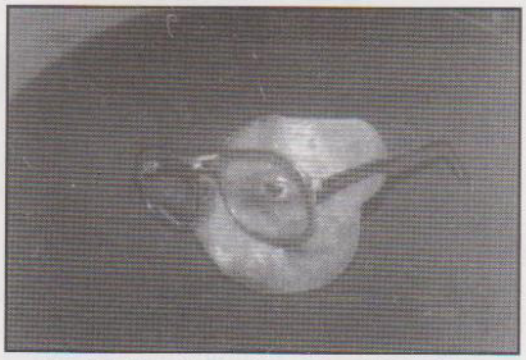

*Fig. 18 : One piece self cure Acrylic Prosthesis attached with Eye Glass.*

## FITTING OF THE PROSTHESIS :

- As both the parts of the prosthesis were decided to wear separately for the benefit of the patient, the extra oral part got the support of ear for the retention through the patient's previously used eye glasses (Fig19).
- The heart cure bulb was finished and polished properly and relieved from the tissue surface for the relining material. Adhesive was not required because the prosthesis was well retained after the aplication of the relining material (Fig 12).

## CONCLUSION :

Treatment potion for patients requiring a facial defect and obturator prosthesis include the use of magnets,

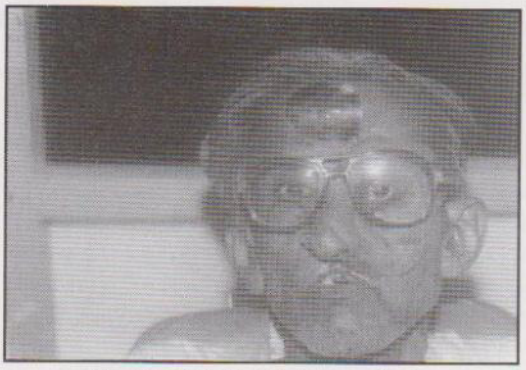

*Fig. 19 : Patient withthe prosthesis.*

hollow obturator prosthesis, and resilient silicone materials as purely prosthodontic treatment solutions. Implants and reconstructive surgery become increasing ly important treatment options, but are often, complicated by the age of the patients and by radiotheraphy.

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# A Simplified and Innovative Technique of Denture Repair by Fibre-Reinforced Composite

HEMANT GOEL *, SUJIT K. DAS ** M.D.S. (CAL.)


## ABSTRACT

*Denture Repair is a very common practice encountered in everyday clinical prosthodontic practice. Fracture may be due to intraoral fatigue failure of acrylic resin or accidental dropping of denture outside the mouth. It is well known that the ultimate purpose of repairing of a fractured denture is to* restore its strength at least to the original one. It seems in practice that it is not the fact.

The essence of successful denture repair relies on the phenomenon of adhesion. Strong bonding of inter surfaces improves the strength of the repaired unit and reduces the stress concentration. Unfortunately the reinforcements like metal wires, meshes and even some fibres do not bond to the parent resin.

Fibre-Reinforced composite because of its superior flexural strength and capacity of its resinous matrix both to uniformly wet the fibres and to chemically bond to the parent resin makes it the most suitable material for long term repair.


## INTRODUCTION

Heat-polymerising acrylic resin has been the most common denture base material for more than 60 years. These resins are esthetic, easy to manipulate and offer satisfactory mechanical properties; however, fractures resulting from impact and flexural fatigue to occur.[4] Hargreves (1969) reported that 68% of dentures had broken within 3 years of their provision. Beyli and Fraunhofer (1981) analyzed the causes of denture fracture and recognized that poor fit, lack of balanceed occlusion, material fatigue, deep notching at the midline labial frenum are the possible reasons.[7]

Repair of the prosthesis are generally made by applying "bank-aid" patches of resin to the site of fracture.[4] Use of autopolymerising acylic resin, which generally allows for a simple, quick and economic repair is the most popular. However, dentures repaired with autopolymerising resin often experience a refracture at the repaired site and have approximately 40-60% of the original strength of denture base unless additional thickness is provided original.[1,8] One of the reason for this unfavourable phenomenon is the insufficient transverse strength of cold cure resin which is lower than heat polymerizing acrylic resin (E. Nagai et al 2001).[1] Heat cure repair often causes dimensional changes due to stress release and warpage of previously polymerized denture base.

Therefore, various methods for enhancing the strength of the repaired part have been reported. These include repair surface designing, repair surface treatment and combined use of autopolymerising acrylic resin with reinforcing materials such as metal or nylon meshes, metal wires and various fibres.[9] Metal also provide poor handling, make the denture bulky and have insufficient bonding with parent resins.

Among the fibres, Carbon fibres are esthetically unacceptable because of their black color. Polyethylene fibres usually provide inadequate adhesion to polymer. Aramid fibres have poor esthetics and provide difficulty in polishing but glass fibres are strongest fibres, which are esthetic and also have good bonding character with resins.

## MATERIALS AND METHODS

Fibre Reinforced Composites are structural materials that have atleast 2 distinct constituents. The reinforcing component provides strength and stiffness while the surrounding matrix supports the reinforcement and provides workability. Fibres in Fibre-Reinforced Composite may be arranged in unidirectional, woven or braided form. For unidirectional Fibre-Reinforced Composite, properties are highest in the direction parallel to the fibres and lowest in the direction perpendicular to the fibres. So in restoration and appliances, fibres should be placed parallel to the highest stress.

Most of the pre-impregnated unidirectional Fiber Reinforced Composites have flexural strength in the range of 600-1000 Mpa which is about 10 times greater than denture resin.[4]

## TECHNIQUE:

1. First the two fractured parts of denture were rejoined with cyanoacrylate and sticky wax. (Fig.1)
2. Then stone cast was poured to maintain the orientation of 2 fractured segments through out the repair and denture was removed from the cast.

*Key Words : Denture repair, Fibre-Reinforced Composite.*

*This paper was presented in the World Congress on Prosthodontics and 31st IPS Congress held on 26th-29th November at New Delhi.*

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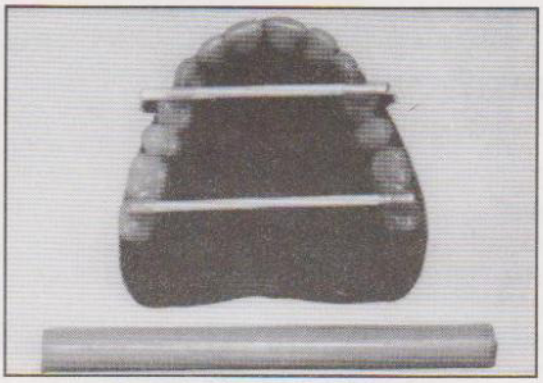

*Fig. 1 : Stabilization by sticky wax.*

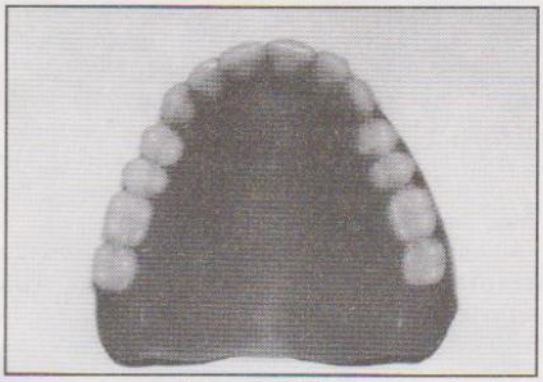

*Fig. 2 : Bevel given.*

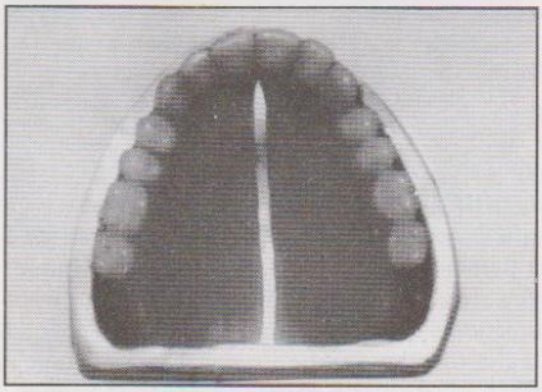

*Fig. 3 : Space for fibres made.*

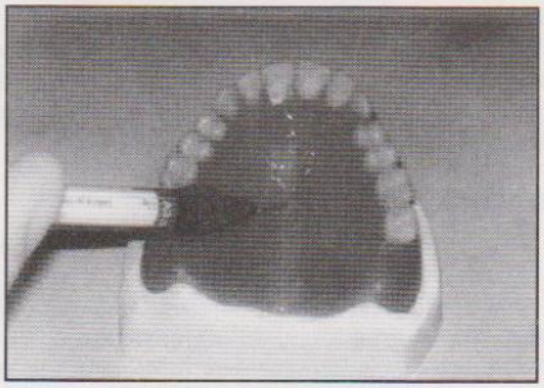

*Fig. 4 : Flowable composite applied.*

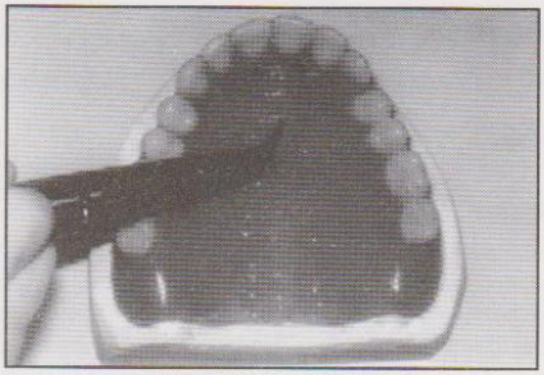

*Fig. 5 : Placing the FRC.*

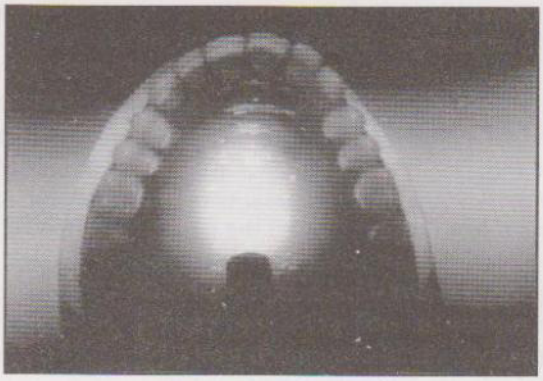

*Fig. 6 : FRC polymerized.*

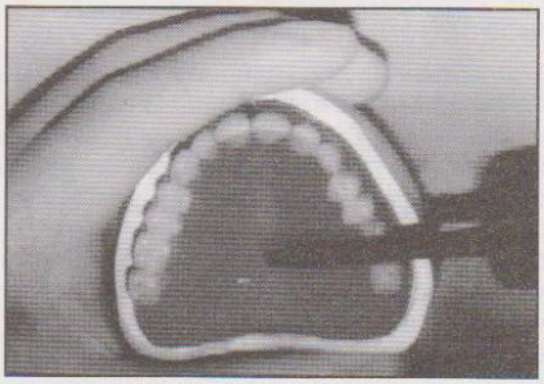

*Fig. 7 : Cold cure resins filled.*

3. Gap of 2-3 mm was created and edges were beveled to 45° (Fig.2)
4. Then space for fibres was made and the fracture site was prepared with monomer/bonding agent. (Fig.3)
5. Then a thin layer of flowable composite resin was applied. It was not polymerized as it creates an adhesive surface that allows for the FRC to be tacked down. (Fig.4)
6. Multiple strips of FRC were cut, tacked across the fracture site and light cured. (Fig.5 & 6)
7. FRC repair is then covered with cold cure resin to mask the color of FRC. It is slightly overfilled to compensate the polymerization shrinkage. (Fig.7)

8. Then prosthesis was placed in warm water and allowed to polymerize in a pressure pot at 20 Psi. After 15 minutes, the prosthesis is removed, pumiced and polished.

## DISCUSSION

Though the clinical performance is the final determinant of success, flexure is still the most widely reported mechanical property. When metal, glass fibre and cold cure was used as repair material, it was found that transverse strength value for glass fibre was highest (E. Nagai et al 2001).[1] Glass fibres, polyethylene fibres and aramid fibres were when used as repair material, glass fibres produced the highest flexural strength. Though both unidirectional and woven fibres can be used but unidirectional Fibre-Reinforced Composite has superior flexural property and provides stronger repair. The most common type of glass fibre used in fibre production is E type (Electrical glass) and this type of glass is often used in Fiber Reinforced Composites. Denture repaired with glass Fibre-Reinforced Composite has shown that 88% of the dentures were in excellent condition after 4.1 years.[2]

A 45° bevel was used while repairing because it has been proved that round and 45° joint produces the highest transverse bonding strength among all joints. (Ward J.E. et al 1992). Geometry of 45° also increases the interfacial bond area. In butt joint maximum failures are adhesive failures but 45° bevel shifts the mode of failure from weak adhesive fracture to stronger cohesive fracture of repair material.[3]

When continuous, unidirectional glass Fibre-Reinforced Composite is used, the fibres should be oriented at a 90° angle to the potential fracture line and should be placed as near as possible to the denture margin which is prone to fracture. Fracture propagates from the side under tension until it reaches the fibres of the Fibre-Reinforced Composite which stops the propagation of the fracture. Thus placement of fibres as near as possible to the location of highest tensile stress in denture may prevent the initiation of fracture.[5] (Vallittu P.K. 1997)

Advantages of this technique are that (1) it is a simple straight forward procedure & can be easily incorporated into office. (2) The essence of successful denture repair relies on the phenomenon of adhesion so excellent bonding of inter surfaces improves the strength of repaired unit. (3) Esthetics is not compromised. (4) There is no increase in weight and bulk.

## CONCLUSION

Remaking of the denture is a time consuming process. Placement of the fibre can enhance the strength of repaired denture hence can reduce the clinical failures. Fracture of Maxillary Complete Denture opposing a natural dentition are common and they are being seen with increasing frequency when opposing an implant supported prosthesis. Infact many dentists prefer to fabricate the denture with metal framework in case of repeated fracture. Though reliable, but the use of metal is unesthetic, time consuming and does not allow the denture to be relined or rebased if necessary. In such conditions denture reinforced with FRC should be considered.

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# Prosthetic Management of A Patient with Ectodermal Dysplasia

Sahil Narula *, Raghunath Patil **, Supriya Nerli ***, Gangadhar S. A. ****


## ABSTRACT

*The orofacial characteristics of ectodermal dysplasia include defective hair follicles and eye brows, anodontia or hypodontia, hypoplastic conical teeth, generalized spacing, underdevelopment of the alveolar ridges, frontal bossing with prominent supraorbital ridges, a depressed nasal bridge, protuberant lips, and hypotrichosis. Patients with these clinical features often need complex prosthetic management. The options for a definitive treatment plan may include fixed, removable, or implant supported prostheses, singly or in combination. However, clinical conditions and other priorities can prevent from choosing the most desirable treatment.*[4]


## INTRODUCTION

The National Foundation for Ectodermal Dysplasia (NFED) defines ectodermal dysplasia (ED) as a genetic disorder in which there are congenital birth defects (abnormalities) of 2 or more ectodermal structures. Although there are alterations in ectodermal structures, disturbances in tissues derived from other embryologic layers are not uncommon.[2] The ectoderm develops at or around 13th day in utero, which is earlier than the mesoderm and the endoderm.

These structures may include skin, hair, nails, teeth, nerve cells, sweat glands, parts of the eye and ear, and parts of other organs. Hypodontia with widely spaced peg-shaped teeth are classic clinical manifestations of ectodermal dysplasia.[2] The pharyngeal and laryngeal mucosa may be so atrophic that it results in dysphonia and hoarseness of the voice. In oropharynx the defect may be manifested as a high palatal arch or even a cleft palate. Other findings in females include aplastic or hypoplastic mammary glands, impaired lacrimal gland function and occasionally glaucoma have been reported. Other findings include increased susceptibility to allergic disorders such as asthma and eczema. The shape of the skull resembles an inverted triangle. Ears may be situated obliquely on the head causing them to stand out.

*Key Words : Ectodermal dysplasia, hypodontia, prosthetic management.*

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The NFED lists 20 common types of the disorders. Severity differs, even among people affected with the same type of Ectodermal Dysplasia. Atleast 121 subtypes of ectodermal dysplasia are inherited through all mandelian modes. Birth prevalence is estimated between 1 in 10,000 to 1 in 1,00,000. The frequency of various abnormalities shows dissimilar penetrance among affected individuals. Recent research findings have established the feasibility of accurate carrier detection and prenatal diagnosis. It has even raised the hope of eventual treatment or prevention of some of the disorder's systemic manifestations. A definitive and comprehensive classification of ectodermal dysplasia is difficult to formulate because many of the syndromes that involve have overlapping features. Nevertheless, Nelson et al included 5 categories; hypohidrotic (anhidrotic); hidrotic (Clouston's syndrome; EEC (ectrodactayly ectodermal dysplasia) syndrome; Rapp-Hodgkin syndrome and Robinson's disease.[5]

Ectodermal dysplasia is usually divided in to 2 types based on the number and function of the sweat gland: hypohidrotic, where the sweat glands are absent or significantly decreased, and hidrotic, where the sweat glands are normal.[10] The hypohidrotic type is considered more severe and is associated with heat intolerance, frequent high fever, otolaryngological problems and more associated dental defects.

Clinicians can readily recognize the dental (80% of cases), hair (91% cases), nail (75%) and sweat gland (42%) abnormalities associated with the most commonly occurring ectodermal dysplasias.[3] Diagnosis of ectodermal dysplasia is often based on frequent episodes of severe pyrexia, lack of hair and absent tooth germs. Peeling skin at birth, eczema and asthma

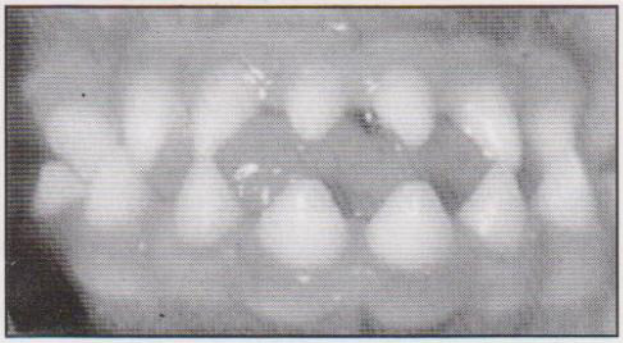

*Fig. 1 : Coincal teeth characteristic of a ectodermal dysplasia patient.*

or frequent respiratory infections may be additional clues. Facial characteristics may be striking, subtle or almost absent.[3]

## DIAGNOSIS

The diagnosis of Ectodermal Dysplasia is difficult because of the variety of types, range of abnormalities, and severity of defects singularly and collectively. A panoramic radiograph can be a useful tool for prediction of ectodermal dysplasia. It is important to identify the diagnostic components of the disorder so that appropriate treatment can be rendered to ensure the best quality of life for Ectodermal Dysplasia patients. It is also important to understand the genetic hereditary patterns so that the parents of the affected child can be councseled and better predict the chances that future offsprings will be affected. Defective genes cause ectodermal dysplasias; these genes can be inherited from one or both parents or manifested through gene mutation. Genetic studies have revealed an X-linked mode of inheritance. The gene is carried by the female but the condition is manifested in the male.[7] However, there are reports of multiple siblings being affected and of females suffering from this condition.

## SIMULTANEOUS TREATMENT IN CASES OF ECTODERMAL DYSPLASIA

It is generally accepted by pediatric dentists that at age 2, it is normal for a child to have all of his/her deciduous teeth or to have none. Prosthetic intervention can be done with a child as young as 2 or 3 years therefore can be successful, especially if the child is co-operative and properly motivated by parents or relatives.[2] Early intervention affords the child the opportunity to develop normal forms of speech, chewing, and swallowing and normal facial support; and improved temporamandibular joint function. Indirect composite resin crowns bisacrylates provide a durable restoration and allows treatment of patients who lack the co-operative ability to endure prolonged direct bonding appointments.[8] The indirect composite resin may provide abrasion and wear resistance as well as reduction in chair time. It should be noted that the psychosocial benefit of intervening when the child is young is as important as the dental benefits.[8]

As the Ectodermal Dysplasia child matures, the removable prosthesis will have to be relined, rebased, or remade to accommodate growth changes and maintain the patient's vital oral functions of speech, chewing, and swallowing. When the Ectodermal Dysplasia child reaches his/her early teenage years, orthodontic treatment may be indicated, as consolidated of spaces may better prepare the mouth for a fixed partial denture or implants in the future.[2]

When growth stabilizes in the older Ectodermal Dysplasia patients, osseointegrated implants can be used to support, stabilize, and retain the prosthesis. Depending on the pattern of missing teeth and the remaining available alveolar bone, the ideal long-term prosthetic prognosis often requires implants have been shown to help preserve alveolar bone.[2] If bone atrophy progresses to the extreme in these already alveolar deficient patients, implant placement may not be possible without bone grafting. It is important to intervene with implants as early as possible, usually when the patient is in his/her late teens and pubescent growth has ceased.

In the patient population affected by multiple congenital/developmental deficiencies of ectodermal origin, including congenitally missing teeth, formed peg-like teeth, and total anodontia, it is important to provide early prosthodontic treatment to replace missing teeth and/or restore vertical dimension of occlusion. Because of early age intervention and the need to easily modify the intraoral prosthesis during rapid-growth periods (generally every 2 to 4 years), a removable partial denture or complete denture prosthesis is indicated initially. This treatment protocol affords the Ectodermal Dysplasia patient and his/her family an affordable, and reversible method of dental habit. Full cooperation of the patient and full support of patient's family is essential if removable prosthesis

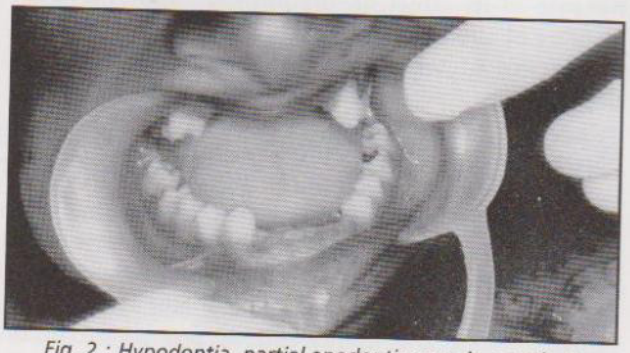

*Fig. 2 : Hypodontia, partial anodontia seen in a patient with ectodermal dysplasia.*

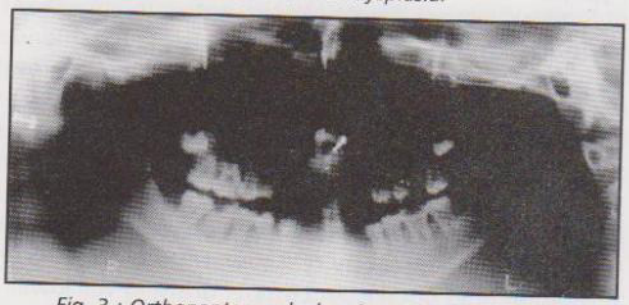

*Fig. 3 : Orthopantograph showing partial anodontia, mixed dentition in a 16 year old girl suffering from ectodermal dysplasis.*

is to be successful in pre-teen patients. As the patient grows, the maxillofacial prosthodontist should follow the patient regularly to intercept tissue irritations and occlusal discrepancies that result from growth.

An understanding of the Ectodermal Dysplasia patient's psychosocial status is crucial to any prosthodontic treatment effort. The unesthetic appearance that accompanies Ectodermal Dysplasia syndrome often has a negative psychological effect on the patient. Poor self-image, peer pressure, and school/job related discrimination have been directly related to psychological scarring experienced by the patients.[2] Providing expedient prosthodontic treatment to manage orofacial disfigurement may afford the patient some measure of confidence.

## DISCUSSION

As noted earlier, any structure derived from the ectoderm can be defective in Ectodermal Dysplasia. Each type of Ectodermal Dysplasia involves different structures, and the severity of the disorder varies from patient to patient. In general, the skin of affected children is lightly pigmented and appears thin and almost transparent; surface blood vessels are easily visible. Pigmentation is heaviest around the eyes (usually wrinkled) and on the elbows, palms, and soles, with the latter 2 areas hyperkeratotic in nature. The skin is usually dry, scaly, and easily irritated as a result of poorly developed or absent oil (sebaceous) glands. Anodontia or oligodontia is extremely grave because of its effect on the nutrition and emotional stability of the individual. Missing teeth (oligodontia) or absence of teeth (anodontia) occur in both, the deciduous and permanent dentition. Teeth are fragile, milk white and somewhat opaque, while some are darkly pigmented.[6] The pulp and root canal of these teeth seem to be large and the occurrence of carious lesions is high.

Histopathologic study of the epidermis of anhidrotic patients reveal it to be thinner than normal. The vascular beds are normal in the hair follicle. The mucous membrane in the mouth and throat show hypoplastic changes.

Sweat glands can be absent, reduced in number or functioning (hypohydropic), which may result in elevated body temperature. Higher body temperature can develop during illnesses, during strenuous physical activity, when the environmental temperature is elevated or even when the child is wearing heavy clothing. Treatments of these hyperthermic episodes are part preventive and part reactive in nature. Limiting physical activity in warm/hot weather, increasing fluid uptake, and proper dressing will lower the incidence of such events. When the child is overheated, he/she could be given a lukewarm or sponge bath to reduce body temperature.[2]

Scalp hair may be absent, sparse, very fine, pigmentation or abnormal in texture. Eyebrows, eyelashes, and other body hair also may be sparse or absent. When hair present, it may be fragile, dry, and generally unruly cause of the lack of oil glands. Treatment consists of use of gentle or proteincoating shampoos. Wigs afford Ectodermal Dysplasia children an improved quality of life in moderate to severe cases of hypotrichosis.[2] Fingernails and toenails also may show faulty development and be thick or thin, brittle, discolored, cracked, and/or aged. Treatment consists of lubricating the nails, coping them short and smooth and consulting a clinician if fungal or yeast infections persist.

The most common consequence that a maxillofacial prosthodontist can treat is complete or partial anodontia (with or without cleft lip and cleft palate), each has significant developmental/growth consequences. If teeth are present, they are taped (peg-like), informed, and widely spaced. Where teeth are missing the alveolar bone is hypoplastic because of the lack of tooth bud formation; the alveolus never forms, scaling to a lack of development of the jaw(s) and a reduced vertical dimension of occlusion. It is not uncommon for the face of an affected child to take on the appearance characteristic of old age.

Treatment generally includes a removable and/or fixed partial denture, a complete denture prosthesis (overlaying affected teeth when the vertical dimension of occlusion allows), and/or an implant retained prosthesis when indicated. In those situations where cleft lip and cleft palate are part of the syndrome, additional treatment with a combination of plastic surgery, oral and maxillofacial surgery, and/or maxillofacial prosthetics may be indicated. To further enhance retention and stability of interim prosthesis, a resilient "O" ring attachment can be used. "O" ring attachement resists lateral movement in the horizontal axis. Consideration can be given to magnets, but concern for corrosiveness, gradual loss of retention and inability to resist lateral forces favour "O" ring/ male stud attachment. Abutments connected with a solid gold alloy bar and clip is more ideal for retention, stability and load distribution.[9] Free standing fixtures are subjected to more unfavourable forces than those that are splinted, and it is unknown whether fixtures loaded free standing can withstand occlusal forces over the long term. Overdenture supported by the fixture and rsilient mucosa can be designed to prevent vertical loading on the abutment when the underlying mucosa is compressed under functional forces. It is important to eliminate dead space under the over

denture, particularly in areas of unattached mucosa, to minimize hyperplasia.[9]

## SUMMARY

The nature of ectodermal dysplasia has been described, with special emphasis on the dental complications associated with this congenital/ developmental condition. Early dental intervention can improve the patient's appearance and minimize the onset of emotional and psychosocial problems often experienced by Ectodermal Dysplasia patients. Patients require a complete and coordinated diagnostic work up and treatment plan representative of the whole team's expertise.[1] In addition to medical colleagues, team consists of an oral surgeon, a prosthodontist, an orthodontist and a restorative and a pediatric dentist. Para professional team members such as a social worker, a psychologist and a speech pathologist will assure optimum treatment.[1]

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10) Van Ramos-Complete dentures for a child with hypohidrotic ectodermal dysplasia. Jn. of Prosthetic Dentistry 1995; Vol 74 : 329.

# *Abstract*

### SPONTANEOUS EARLY EXPOSURE OF SUBMERGED ENDOSSEOUM IMPLANTS RESULTING IN CRESTAL BONE LOSS : A CLINICAL EVALUATION BETWEEN STAGE I AND STAGE II SURGERY

***Purpose :*** *Crestal bone loss was been observed during the osseointegration period. Spontaneoum early exposure of implement during making many affects crestal bone levels around implements. The affect of spontaneous implant exposure on crestal bone loss was evaluated . Correction between the degree of exposure and the amount of bone loss was determined.*

***Material & Methods :*** *Crestal bone at the time of implement placement was measured relative to the shoulder of the implement. The bone level was measured again at the time of exposure. When spontaneoum early exposure was detected, it was recorded and classified according to the degree of exposure from class 0 (no perforation) to class IV (complete exposure). Measurement from 206 implants in 64 patients produced 85 groups for statistical comparison with atleast 2 different types of lesions in each group.*

***Result :*** *A significant difference was seen between bone loss with an intact mucosa and bone loss with soft tissue lesions. No significant differences were found between class I or III lesions or class II and III lesions. In class II and III lesions, more bone loss was associated with the bunal aspect of the implants, of 115 perforated sites, 10 sites were associated with bone loss 72mm, 2 sites with 3 to 4mm of bone loss, 1 sites with >4mm of bone loss.*

***Conclusion :*** *Given the observation that particularly exposed implants are prone to bone loss, it scans prudent to surgically cover these implants early to prevent further bone loss.*

*- J.P.D. Feb 2002, Vol. 87, Issue 2*

# Creation of Palatal Rugae in Complete Denture : A Simplified Technique

Tushar Mowade *, S. P. Dange **

**ABSTRACT**

*Restoring patient's speech is an important goal in complete denture fabrication. For those patients who have difficulty with their speech patterns accommodating to the introduction of a prosthesis, texture in the palatal region may prove helpful. This article describes methods of incorporating palatal rugae in a newly fabricating and existing complete denture.*

## INTRODUCTION

Restoration of patient speech pattern is one of the important factors influencing denture fabrication. Speech is essential to human activity. Therefore, phonetics must be considered with mechanics and esthetics as cardinal factors contributing to the success of denture prosthesis. In order to deal with the problems of phonetics, the general mechanisms of speech production and the specific mechanism of production of sound must be understood.

Kantor and West (1941) divided speech into 6 component, which are respiration, phonation, resonation, articulation, neuralgic integratir, audition (added by Chieria and Lawson 1973). Of these component articulation is most readily affected by the fabrication of complete denture. Articulation is defined as amplified resonant sound that is formulated into meaningful speech by articulators like lips, tongue, the cheeks, the teeth and the palate, by changing spatial relationships of these structure to each other. Their approximation to the teeth, the hard palate and alveolar process create valves for the production of specific sounds of speech. These sounds include lingual-alveolar, lingual-dental and palatal consonants. Of these the palatal consonants or fricatives 's' / 'sh' / and 'z' are formed as the air escapes from the median groove on the tongue when the tongue is just behind the upper incisor teeth. The sides of tongue in contact with the upper posterior teeth and alveolar ridges and this contact may extend as forward to the lateral incisors.

The essential factor is grooving of tongue. As groove is decreased 's' softened to 'sh'. If further decreased, 's' turns to 'th' i.e. lisping occur as in case of excessive thickness in anterior part of denture. Therefore Lander states that rugae are detrimental and useless as they increase the thickness of denture. But Slaughter believes that smoothness of the denture is disturbing to the patient and there are some patient who are not able to adapt their speech production to compensate for the presence of a denture and have difficulty in accommodating. These patient often require tactile sense to orient the tongue. The palatal rugae and incisive papilla can often serve as a "cue". Because the lack of texture on the palatal portion of a complete denture can impede proper articulation and therefore rugae must be reproduced.

The purpose of this article is to provide simplified and quick method to add palatal rugae.

## PROCEDURES:

Rugae can be added to the existing prosthesis or it can be created in the new prosthesis.

## NEW PROSTHESIS:

In this technique lead foil is used which is generally a waste after x-ray is developed. The foil is cut to the desired shape and adapted to the rugae area of master cast or any available cast with prominent rugae (fig. 1). The foil pattern is removed from the cast and a thin layer of wax was added on the underside of foil pattern only on the valleys of the rugae. This pattern was then sealed to the palatal area of the completed wax-up with hot base plate wax (Fig. 2). Flasked, processed, finished and polished as usual (Fig. 3).

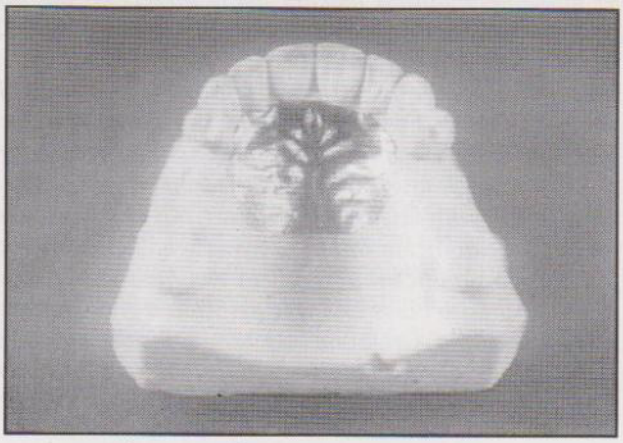

*Fig. 1 : Leadfoil trimmed and adapted to the cast of prominant rugae.*

* *Postgraduate Student,* ** *Prof. Incharge & Head,* Dept. of Prosthodontics, G.D.C. & H. Aurangabad - 431 001.

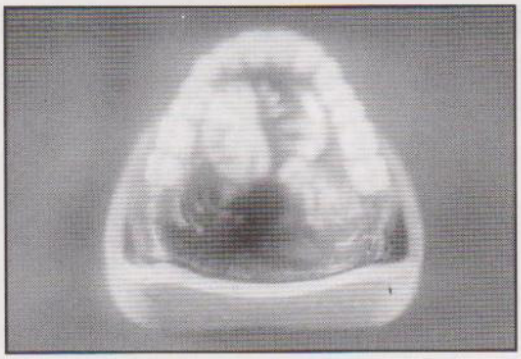

*Fig. 2 : Foil pattern sealed to the palatal area of completed wax-up.*

*Fig. 3 : Completed additionof rugae.*

**EXISTING PROSTHESIS:**

Adapt lead foil on any available cast with prominent rugae, flow hot baseplate wax over the surface to reinforce the foil (Fig. 4). (Adapt tin foil on the maxillary cast of same patient, if rugae are prominent, so that adapted foil will adapt closely to the palatal rugae area of patients upper denture). Prepare existing prosthesis by roughening the rugae area. Remove wax reinforced foil from the cast and trim to desired shape, by using sprinkle method and autopolymerizing acrylic resin onto the underside of foil pattern (Fig. 5). When cured, remove the foil and secure acrylic rugae to the palatal area of the existing prosthesis with autopolymerizing acrylic resin. Refine, finish and polish.

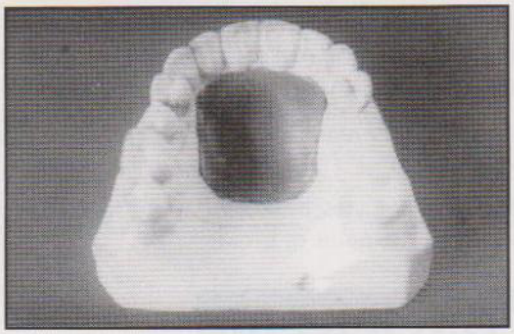

*Fig. 4 : Wax flown over surface of foil pattern to reinforce it.*

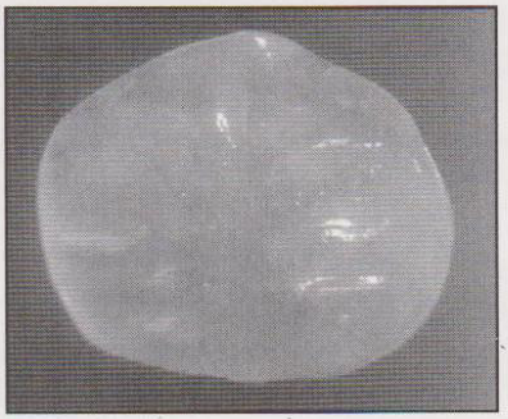

*Fig. 5 : Autopolymerising acrylic resin template fabricated from foil pattern by addition of resin on inner side of the pattern.*

**SUMMARY**

It is an easy and quick laboratory procedure. The dentist or technician can complete the addition of rugae to an existing prosthesis in short laboratory time eliminating need for the patient to go without their prosthesis. In newly made denture dentist himself can add the rugae after try-in or can ask the laboratory technician to add the foil pattern as a part of completed wax up. In event that a patients speech is not improved, is worsened or the patient finds the texture annoying, it can easily be eliminated with acrylic resin bur and routine polishing. Unfortunately, the addition of rugae is not a full proof method of eliminating speech problems, some patient may still experience difficulty with speech accommodation.

A simplified method of adding rugae to a newly fabricated complete denture and an existing prosthesis has been presented. It is a tool for the alleviation of speech problems encountered by patients sensitive to changed relationships caused by the introduction of a prosthesis into the mouth.

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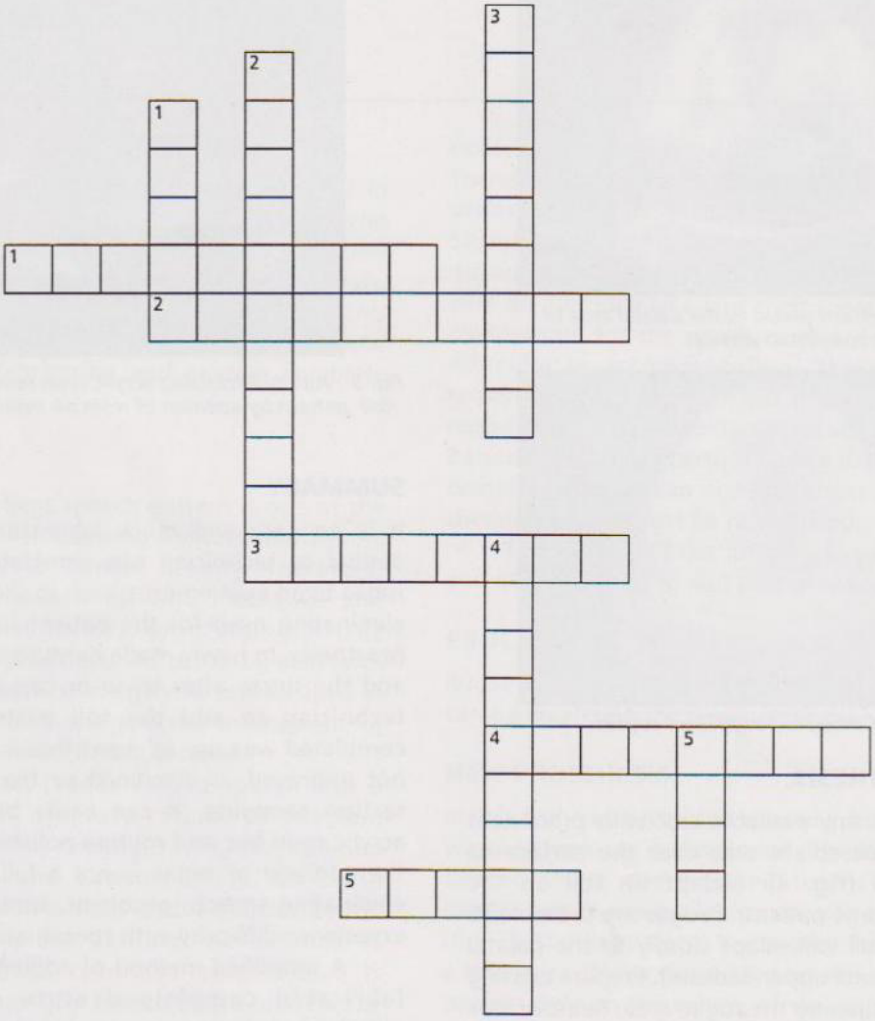
# PROSTHODONTIC WORD POWER - 11



## ACROSS

1) Silica bonded investment is usually used for casting which alloys.
2) In gypsum investments quarz serves as
3) Zone of gas-air blow pipe flame used for melting casting gold alloys.
4) Hot spot results in what type of porosity.
5) Direct wax pattern are constructed with which type of wax.

## DOWN

1) Placing _?_ somewhat short of the ends of the ring 3.25 mm produces a more uniform expansion and there is less chance for distortion of wax pattern and the mold.
2) Wax pattern is attached to it and they are then surrounded with investment.
3) Localized shrinkage porosity can be prevented by adding _?_ to spruing network.
4) Compensation made for shrinkage of pattern is by expansion of
5) Ideal area for attachment of sprue former to wax pattern is the point of greatest.

# Upcoming Events

**December 19 - 23, 2004**
**32nd IPS Conference**
Bangkok, Thailand.
*Information*
Conference Secretariat : Dr. U. V. Gandhi
2C, Madav Chatterji Street, Kolkata 700 020.
Website : www.ips32.com

**February 23 - 24, 2005**
**American Equilibration Society**
Chicago, Ilinois.
*Information*
A & S
Fax : +1 847 965-4888
E-mail : aesdental@sprynet.com
Website : www.occlusion-tmj.org

**February 24 - 25, 2005**
**American Prosthodontic Society**
Chicago, Ilinois.
*Information*
A & S
Fax : +1 312 944-5147
Website : www.prostho.com

**February 24 - 27, 2005**
**Chicago Dental Society Midwinter Meeting**
Chicago, Ilinois.
*Information*
APS
Fax : +1 312 836-7337
Website : www.chicagodentalsociety.org

**February 25 - 26, 2005**
**American Academy of Fixed Prosthodontics**
Chicago, Ilinois.
*Information*
Dr. Robert Staffanon
Secretary, AAFP
Fax : +1 707 875-2927
E-mail : secaafp@monitor.net
Website : www.prosthodontics.org/forum/aafp

**February 26 - 27, 2005**
**American Academy of Restorative Dentistry**
Chicago, Ilinois.
*Information*
Website : www.restotrativeacademy.com

**March 5 - 9, 2005**
**American Dental Education Association**
Baltimore, Maryland.
*Information*
ADEA.
Fax : +1 202 667-0642
Website : www.adea.org

**March 9 - 12, 2005**
**American / International Association for Dental Research**
Baltimore, Maryland.
*Information*
IADR
Fax : +1 703 548-1883
Website : www.iadr.org

**March 10 - 12, 2005**
**Academy of Osseointegration**
Orlando, Florida.
*Information*
AO.
Fax : +1 847 709-3029
Website : www.osseo.org

**March 10 - 13, 2005**
**International Conference on Advanced Digital Technology in Head and Neck Reconstruction**
Banff, Alberta, Canada.
*Information*
RES Seminars
Fax : +1 858 272-7687
E-mail : ses@ses-inc.com
Website : www.ses-inc.com/advanced_technology.htm

**April 8 - 9, 2005**
**Esthetic and Restorative Update 2005**
Orlando, Florida.
*Information*
AAED.
401, N. Michigan Ave, Chicago, IL 60611.
Fax : +1 312 673 6952
E-mail : aaed@smithbucklin.com
Website : www.estheticacademy.org

**April 14 - 17, 2005**
**Joint Meeting of the American Academy of Orofacial Pain and the American Academy of Oral Medicine**
Phoemix, Arizona.
*Information*
AAOP
Fax : +1 856 423-3420
E-mail : aaopmtg@talley.com
Website : www.aaop.org

**April 19 - 23, 2005**
**American Academy of Cosmetic Dentistry**
Nashville, Tennessee
*Information*
Ms Stacey Budd
Fax : +1 608 222-9540
E-mail : info@aacd.com
Website : www.aacd.com

**May 17 - 21, 2005**
**Academy of Prosthodontics**
Scottsdale, Arizona.
*Information*
Fr Stephen D. Campbell
E-mail : stephend@aic.edu
Website : www.academyprosthodontics.org

**May 25 - 28, 2005**
**International College of Prosthodontists**
Crete, Greece.
*Information*
ICP Administration
Fax : +1 858 272-7687
E-mail : icp@icp-org.com
Website : www.icp-org.com

**June 23 - 26, 2005**
**21st International Symposium on Ceramics**
San Diego, California.
*Information*
Quintessence Publishing Co., Inc
Fax : +1 630 682 3288
E-mail : service@quintbook.com
Website : www.quintpub.com

**August 24 - 27, 2005**
**FDI World Dental Congress**
Montreal, Quebec, Canada.
*Information*
FDI
Fax : +33 4 50 40 55 55
E-mail : congress@fdiworlddental.org
Website : www.fdiworlddental.org

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