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DIAGNOTIC WAX UP TECHNIQUE AS A VALUABLE ADJUNCT IN THE AESTHETIC MANAGEMENT OF MESIODENS – A CASE REPORT

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Abstract

Presence of supernumerary teeth especially in the anterior region is known to severely compromise esthetics. A natural looking and esthetically pleasing dentition is the wish of most patients. One of the stumbling blocks for this wish is the most commonly occurring super numerary tooth, the "MESIODENS". This article describes a systematic and sequential approach in the esthetic management of mesiodens.

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Introduction

The presence of a mesiodens is one of the causes for diastema between the central incisors. The two common options for treating this condition is either by extracting the mesiodens followed by orthodontic management or by fixed prosthodontic treatment . The conservative management of the diastema space with a composite resin is considered to be difficult because of two reasons;

1. Amount of unsupported resin will be more
2. Size of the tooth becomes larger.

By retaining this supernumerary tooth and applying the principles of illusion it may be possible to correct the problem by direct composite veneering. The difficulty to this procedure comes in the form of the operator trying to visualize the outcome which is very difficult but mandatory for the planning of the restoration . The easiest way to device a procedure by which the final shape and outcome can be viewed, which in turn will help the operator give a satisfactory smile is the "*Diagnostic waxing up technique*"

DIAGNOSTIC WAXING UP

The diagnostic waxing up of an esthetic rehabilitation case is a demanding task. It should be kept in mind that more effort that is placed in planning the therapy, easier is the execution of the final result.[1,2] Well established artistic guidelines can be followed to define the suitable shape and arrangements of the teeth.

WAXING UP TECHNIQUE

- Additive waxing technique[3]
- Veneered wax up, made with preformed vestibular wax veneers.

Prior to the waxing up it should be kept in mind that creating illusion is one of the most important objectives of esthetic dentistry. One rule, that is fortunately always absent in a mesiodens case is the *"Rule of symmetry"*. Due to the presence of a supernumerary tooth ie a mesiodens between the central incisor, the anterior teeth of the patient is seldom symmetrical. This asymmetry is piled up, when there is an existing malocclusion with the presence of a rotated tooth or the presence of a single tooth crossbite. Bearing this in mind, the diagnostic mock up with the additional wax up technique (this technique is most suitable for a composite build up or any veneering , than the preformed vestibular wax veneers, which are more suitable for full coverage crowns[4]) should be initiated. A No.25 Bard Parker blade is to be employed to shave the surfaces of the teeth on the study models, that would require reduction prior to the restoration.

Additive waxing technique[3]

The first step, is to define the basic new volumes of restorations by applying the vertical proximal crests, which determine the transitional line angles between the facial and proximal surfaces.

The second step, is to define the surface topography by applying the superficial lobes and horizontal developmental lines.

Utilizaton of Concepts of Illusion

1. If no shift in midline is present, the mesio-distal width of the mesiodens can be given the illusion of a central incisor.
2. The decreased mesiodistal width available adjacent to the mesiodens, due to the mal aligned tooth, for example a rotated tooth, can be utilized to give the illusion of a lateral incisor.
3. The lateral incisor can be given the mesial and distal curvatures both facially and incisally to give the illusion of a canine.
4. The counter half of the anterior teeth can be waxed up symmetrically to the previously waxed portion of the patient's dentition.
5. The technique of overlapping can be used to mask the discrepancies in the mesiodistal widths of anterior teeth to give the illusion of existence of proportion

Diagnostically prepared and waxed stone study models offer the patient and the dentist a near exact, three dimensional preview of the final restorative result. This is called the *"Technical treatment plan"* which is defined through the diagnostic waxing up, a wax stimulation of the final result.[5]

RESTORATIVE PROCEDURE STRATEGY

In an esthetic restoration case, the restorative procedure alternatives should always be explained to the patient including the difference in costs, the levels of tooth structure removal, the expected clinical longevity, the time period necessary to conclude the treatment and the possible esthetic result. Based on the factors, the patient and dentist then will decide, what is the best treatment to be selected. However, conservative restorative techniques with directly applied restorations should be the primary option among all of the armamentarium of conservative esthetic techniques.[6]

Having decided the composite restorative management as the treatment of choice the following questions should be discussed;[7]

1. What are the circumstances of the patient and why does he wish to proceed to rehabilitation without prior orthodontic treatment?
2. Will the tooth reduction be extreme resulting in virtually no remaining enamel or even requiring endodontic treatment? If YES, then the importance of extraction of the mesiodens

and orthodontic treatment should be stressed to the patient in light of these findings or a prosthetic management may need to be considered.

3. Will the gingival margin and papilla be symmetric and of appreciable height following restorations?
4. Will the restored tooth length and width be appropriate?
5. Will the long term health of teeth periodontium and dental pulps be compromised because of altered tooth contours?
6. Will the oral hygiene be compromised?
7. Will the final restorative result with composite restoration alone satisfy the patient and the dentist?

CASE PRESENTATION

A 22 year old, male reported to the Department of Conservative Dentistry, Meenakshi Ammal Dental College and Hospital, Chennai, complaining about the poor appearance of his anterior teeth. The patient had a mesiodens between the two central incisors. The mesiodens was complexly shaped and stained. The left central incisors was rotated and the right lateral incisors was in a cross bite.

The patient was depressed about the appearance of his anterior teeth, resulting in low self esteem and communication difficulty. The main intention of the patient was to rehabilitate his anterior teeth regardless of the restorative technique employed.

Following clinical examination, an interdisciplinary interactive session was scheduled with the necessary diagnostic aids which included the IOPA of 12,11,21,22 region and a report on the vitality status of the involved teeth (12,11, mesiodens, 21,22,23) evaluated by both thermal tests and an electric pulp tester. The patient was evaluated by an orthodontist and a prosthodontist. The orthodontist recommended the extraction of the mesiodens followed by orthodontic treatment for a treatment duration of 10 – 12 months. The patient was not interested in orthodontic correction due to the longer treatment span . The prosthodontist suggested the extraction of the lateral incisor in cross bite and rehabilitation with a fixed bridge with the right canine and left first premolar as the primary abutments. This treatment option would have involved the intentional root canal treatment in 21 and preparation in all the teeth involved. Prosthodontic correction was ruled out due to:

- Compromise of vitality of a tooth for esthetics.
- The phobia of prosthetic rehabilitation at a young age.
- More expensive treatment

The diagnostic wax up was done on the patients's study model, to visualize the restorative outcome of the composite build up. Following this, it was observed that limited tooth preparation would be sufficient and an esthetic result could be achieved with composite build up alone. The compromise in this treatment plan was that the restored teeth would be 1-1.5mm thicker faciolingually. To test the patient's ability to accept the increased thickness of the central incisor thickness, an acrylic provisional restoration was placed on the facial surfaces of the anterior teeth to simulate the increased faciolingual width. After a week of evaluation, the patient reported no discomfort during speech or lip function.

On the day of the appointment, the altered study model was used as a guide. The facial surfaces of the mesiodens and the rotated central incisor were prepared. The other teeth involved were given the conventional bevel preparation for the composite buildup. In the lingual aspect minimal tooth reduction and a bevel was given on the rotated left central incisor. The mesiodistal width of the mesiodens was utilized to provide the illusion of a central incisor. The reduced mesiodistal width occupied by the rotated central incisor was built up

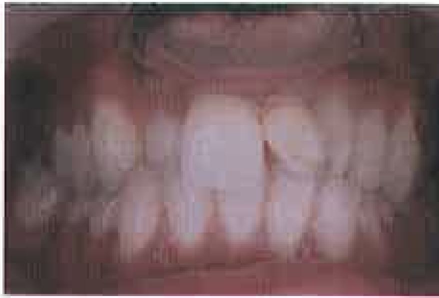

Fig 1 ; Pre operative intra oral view

Fig 4 ; Transitional areas mocked up with modeling wax

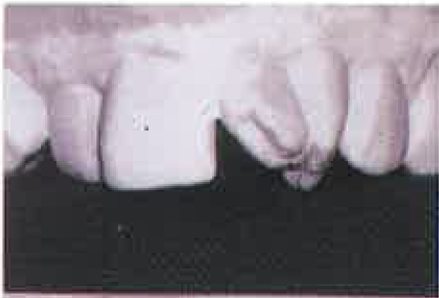

Fig 2 ; Pre operative diagnostic cast

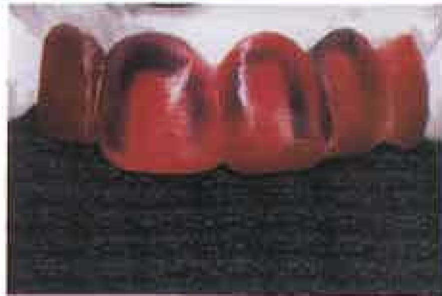

Fig 5 ; Completed diagnostic wax mock up

Fig 3 ; Areas (coloured) indicating transitional changes

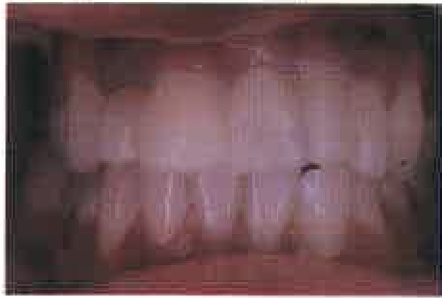

Fig 6; Direct composite veneering done, with the aid of diagnostic mock up

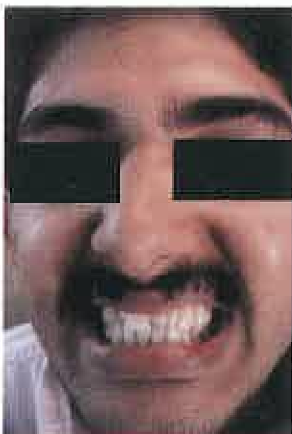

Fig 7 ; Pre operative smile profile

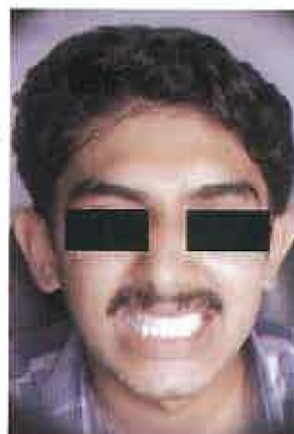

Fig 8 ; Post-operative smile profile

to provide the illusion of a lateral incisor, the facial and incisal surface of the left lateral incisor was built up to provide the illusion of canine. Corresponding to the increase in the faciolingual width of new central and lateral incisors in the 2nd quadrant, the faciaolingual width of the right central and lateral incisor was increased on the facial aspect, this aspect was more critical in the lateral incisor which was in a cross bite. Some degree of overlapping was given from canine to canine, to provide the illusion of the proportion. In the lingual aspect, the prepared rotated central incisor was molded off with the adjacent teeth to make the area more self-cleansing. Preparing and waxing up the pre-operative study model afforded a near exact preview of the final restorative result.

OCCLUSAL ADJUSTMENT, FINISHING AND POLISHING

After restoring, the occlusal contacts were checked. The occlusal points were high in intercuspal position. Adjustments were made, removing interfering occlusal contacts with a fine diamond bur. Afterwards an analysis of the excursive movements was performed, reproducing anterior and canine guidances to achieve a harmonic distribution of occlusal contacts. This is an important aspect when restoring the incisal region of the maxillary teeth. However esthetics is correctly determined when the final finishing and polishing are accomplished. The excess resin was removed with a flame shaped diamond finishing bur, and then a graded Sof Lex polishing disc (3M) was used to reproduce the tooth surface texture resulting in an excellent final esthetic result.

Conclusion

There are a number of alternative treatment plans for the anterior teeth rehabilitations involving the presence of a mesiodens. Patients and dentists should together analyse the benefits and limitations of each technique and then decide, what would be the best treatment. The technical execution of the restoration should follow a series of steps and checks logically sequenced. The diagnostic wax up should receive prime attention so that the following steps are straightforward. Most dentists consider a direct composite restoration as a semipermanent solution and believe that patients want only permanent restorations.[8] The fact that a composite restoration cannot be considered to be a permanent solution is not a drawback for the patients, as they will have it repaired or replaced if necessary. Its should be realized that the restorations are seldom permanent when esthetics are important. Even if a restoration itself doesn't change over time natural teeth do. Of all the restorative techniques the bonded direct composite restoration is the least invasive, economical and an immediate solution in achieving esthetic rehabilitation of a mesiodens case.

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