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Split the Maxilla – Restore the Vertical and Esthetics: Prosthodontist way - A case report

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Abstract

Treatment goals for complete denture patients not only includes the restoration of function but also esthetics to ensure overall wellbeing of the patients .The same applies to the branching technique of interim treatment denture where in, with due course of time, the esthetics of the patient can be hampered due to the loss in vertical dimension. Also sometimes due to laboratory errors or errors in operator's subjective evaluation, required vertical dimension to fabricate definitive complete denture prosthesis of a patient may alter. This may lead to severe discomfort in both temporomandibular joint and muscles of mastication. Therefore it becomes imperative for a prosthodontist to be sensitive towards any such alterations and restore it back to achieve an acceptable outcome before any new definitive prosthesis may be planned and delivered.

Keywords: Denture esthetics, treatment dentures, splitting maxillary denture, maxillary denture repositioning, vertical dimension, Lefort I osteotomy, interim dentures.

Introduction

The broad objectives of complete denture treatment are – (1) to provide an adequate masticatory function, (2) to restore the natural appearance and normal speech¹, and (3) preserve the integrity of the structures that support and are supported by the prosthesis². These objectives are only accomplished if scientific and biological knowledge, technical achievement and clinical skill already known are used to the full potential. Patient's primary desire from his Prosthodontist is esthetics which is the effect produced by

a dental prosthesis that affects the beauty and

attractiveness of a person³. The loss in the vertical face height makes the chin more prominent, the normal contours of the philtrum and mento-labial sulcus are altered. There is deepening of the naso-labial fold, drooping of the corners of the mouth, and a loss of vermilion border (Fig 1). The aim of complete denture treatment is to restore the lost esthetics, phonetics and mastication to fulfill the psychological needs of the patient even during the branching phase of the treatment. Tooth supported complete denture can be very beneficial as soft tissue of residual ridges are spared abuse, denture has more horizontal and vertical stability during functional loading and above all the patient's acceptance is excellent⁴.

Case Report

Case 1: An elderly 65 years old male patient reported to the Department of Prosthodontics, Jaipur Dental College for repeated fracture of the mandibular complete denture. History revealed that the dentures were fabricated at the same institute four years back (Fig 2, 3) and the fractured denture (Fig 4) was repaired a few times but later the patient used "do it yourself" repair with the help of cyanoacrylate⁵.On examination it was revealed that his existing mandibular denture was an overdenture using 35, 34, 33 and 43 as abutments. The tooth abutments used to support over denture were periodontally healthy with no signs of decay. The abutments had joined metal copings in the third quadrant while single metal coping in the fourth quadrant (Fig 5). The existing maxillary denture had compromised retention, stability, phonetics and esthetics and the occlusal surface of both maxillary and mandibular denture showed severe attrition of acrylic teeth (Fig 6) which lead to the loss of vertical dimension and anterior heavy contact. Intra oral findings revealed flabby maxillary anterior region (Fig 7) with low well rounded ridge while mandibular arch was flat in the posterior region and low well rounded in anterior region⁶. Intra oral radiographs revealed adequate hermetic seal in all the abutments with no signs of secondary caries or bone loss (Fig 8).

Meticulous treatment plan was formulated to restore the lost vertical height and improve the esthetics and further prevent any abuse to the underlying tissues in the maxillary arch with the help of the existing dentures to be used as 'treatment dentures'⁷. A new vertical dimension was established, face bow transfer was done, and the existing dentures with new vertical dimension were articulated in centric relation. On the existing maxillary denture marking was made at the junction of the denture base and teeth and the existing denture was spilt (Fig 9) resembling lefort 1 osteotomy (Fig 10). The teeth segment of the existing maxillary denture was occluded in centric relation with the existing mandibular denture on the articulator, modeling wax was used to fill the space between the existing maxillary denture base and the teeth segment (Fig 11) which was tried in patients mouth for verification of esthetics, phonetics and vertical relation. The existing maxillary and mandibular denture bases were again transferred back to the articulator and modeling wax was replaced with pink colured self-cure acrylic resin(DPI – RR cold cure, acrylic repair material), taking care to maintain a proper centric relation and allowed to cure. Space was created and escape vents were made in the relieving area on the intaglio surface of the anterior region of the maxillary denture for the use of tissue conditioner^{8,9} (Visco Gel – tissue treatment material Dentsply Germany), denture fitting surface was treated with adhesive, tissue conditioner applied (Fig 12)and the treatment denture placed back and patient was guided to close in centric relation. Required occlusal adjustments with finishing and polishing of denture was done before delivering treatment denture to the patient (Fig13,14).

Page 8

Patient was recalled after 24 hours and minor denture adjustments were done. Tissue conditioner was replaced after every 3-4 days until the tissues got back to their normal form.

Definitive prosthesis was planned. Impression compound and alginate impression material were used for making primary impressions for maxillary and mandibular arch respectively. Zinc-oxide eugenol and elastomeric impression material were used for recording final impressions of maxillary and mandibular arches respectively with appropriate spacer design of Modified Bernard – Levin for maxillary arch and conventional full spacer for mandibular arch¹⁰. Chrome-cobalt alloy denture bases were planned for both maxillary arch and mandibular arch. These were used as stable bases for recording jaw relation of compromised ridges, precise adaptation of the abutment copings to the metal denture base and to prevent repeated fracture of the mandibular denture base¹¹. The metal bases were made thin in crosssection, particularly over the abutments to avoid compromise in esthetics and also have adequate strength¹¹. To eliminate vertical and lateral forces monoplane teeth were selected and teeth arrangement was done following Pound's Triangle^{13, 19}. Amalgam stops (Fig 15) were incorporated to prevent attrition of acrylic teeth¹². The dentures were then fabricated in the routine fashion and the borders of the dentures were finished in acrylic resin (Fig 16)

Case 2: Another patient, 62 years old male, reported in the department of prosthodontics, Jaipur Dental College with a chief complaint of discomfort and facial fatigue on usage of removable prosthesis with upper jaw since 3 months (fig 17). Clinical examination revealed stretched facial and lip musculature, apparent increase in lower-facial height with no abnormality during TMJ examination. Also at rest position, the amount of anterior

teeth display was more than 3mm (fig 18).Intra-orally, single complete denture was present with maxillary arch against removable partial prosthesis replacing 31,32,41,42,44 teeth with mandibular arch. The existing maxillary denture showed distorted occlusal plane in anterior region with decreased overjet and increased overbite. It had adequate retention with compromised phonetics and esthetics .However no difficulty in swallowing was detected. The above extra-oral and intraoral findings revealed apparent increase in vertical dimension due to faulty anterior teeth postion that were present below the required plane of occlusion.

Treatment planning was done for above case to restore the normal positioning of maxillary anterior teeth so as to achieve required support for the lip and face musculature, improve esthetics and speech along with comfort. Vertical dimensions were recorded, orientation Jaw relation was done using whipmix facebow and transferred to Hanau wide veau articulator with existing denture articulated in centric relation. Alike Lefort I osteotomy , anterior segment of maxillary denture was split(fig 19) without involving the intaglio surface of denture. The denture with only posterior teeth segment was then placed in patient's mouth. Now the centric relation was re-evaluated and vertical dimension was cross-checked with previous value, which was found to be satisfactory.

The maxillary denture was positioned back to the articulator, with posterior teeth segments occluding with mandibular cast in centric relation. The split anterior segment was trimmed and trial-positioned using modeling wax (fig 20), until the required overjet and overbite were restored and normal occlusal plane re-established in anterior region. Try-in was done in patient's mouth and denture transferred back to the articulator. Modelling wax was then replaced with pink colour self cure acrylic resin (DPI-RR cold cure, acrylic repair material), which was

Dr. Aarti Mehta, et al. International Journal of Dental Science and Innovative Research (IJDSIR)

allowed to cure, maintaining the segment in place .The corrected denture was then placed in patient's mouth (fig 21) followed by minor occlusal adjustments, finishing and polishing. Re -evaluation of lip support, oro-facial musculature, freeway space, esthetics and phonetics was done. Patient's comfort was re-affirmed and final delivery of denture was done (fig 22). Patient re-calls and re-evaluation was done for minor denture adjustments and assessment of proper masticatory function, esthetics and comfort.

Discussion

The success of complete denture treatment involves -

- highest level of comfort with overall restoration of function and esthetics which commensurate with the limitations of the patient ,
- (2) to keep the functional demands of the prosthesis within the limits of the physiologic ability of the supporting tissues
- (3) to bring the patient expectations within the boundaries of the level of achievement possible
- (4) to harmonise the co-operative effort of the patient and the dentist to best possiblely achive the required treatment goals.[1]

When a patient wearing complete denture comes to a prosthodontist for fabrication of new denture, all abnormalities like ill- fitting dentures, worn off acrylic teeth, alteration in vertical dimension, hampered esthetics, phonetics and abnormalities of the soft tissue beneath the denture must be recognized and treated[14] Discontinuing the use of denture is the best way to rejuvenate the supporting tissues¹⁴ which is not always acceptable to the patient. So a branching technique to alter the course of treatment can be instituted with the use of interim treatment dentures^{7,19}. These treatment dentures can be later lined with a temporary soft liner which allows the soft tissue to recover to their normal form ⁹. In above case

series, the existing dentures were used as treatment dentures where in the maxillary dentures were split using Lefort I type of osteotomy and re-positioned using required vertical dimensions for the patients. This has helped in the re-establishment of the esthetics and function by harmonizing oro-facial musculature and temporomandibular joint, ensuring patient's comfort.

Therefore patients with minor post insertion problems can be treated using the existing denture as a treatment denture, until a definitive complete denture can be fabricated for the patient. This same technique can even be implicated in immediate denture prosthesis to retrude the upper segment. The limitation of the said technique could be a shade mismatch between old and new pink acrylic .So for esthetically demanding patient and with patients with short upper lip careful implication of this technique is required.

Conclusion

Complete denture treatment is not merely giving a "set of denture" to a patient but is a continuing process of patient evaluation and their ability to adapt with given prosthesis. Complete denture is a physical object generally made of resin, metal or similar material which is designed and fashioned to be placed in the midst of a vital, dynamic oral environment on a foundation which itself is not very stable, thus making the treatment even more challenging. The patient's subjectivity in evaluation of their denture esthetics and comfort is an extremely important consideration in the treatment plan, in order to comply with their needs and choices. Here an attempt was made to restore the vertical height and denture esthetics in the existing dentures so as to enhance the purpose of the treatment denture. This can be later used to predict the treatment results before any definitive dentures are fabricated and meanwhile also ensuring the overall wellbeing of the patient.

Dr. Aarti Mehta, et al. International Journal of Dental Science and Innovative Research (IJDSIR)

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Legends Figures



Fig. 1: Patient without dentures



Fig. 2: Patient with his first dentures at the start of treatment



Fig. 3:Patient with over dentures delivered 4 years back



Fig. 4 : Metal copings on over denture abutments



Fig.5: Fractured mandibular denture and severe attrition on occlusal aspect



Fig.6: Patient with old dentures



Fig.7: Flabby anterior maxillary ridge



Fig. 8: Orthopantomograph of the patient



Fig. 9 : Maxillary denture split into two parts



Fig. 10 : Lefort 1 osteotomy



Fig. 11 : Split parts secured by modeling wax



Fig 12. Finished treatment dentures with tissue Conditioner



Fig. 13: Treatment dentures intraorally



Fig. 14: Patient with treatment dentures



Fig. 15: Final complete denture prosthesis



Fig. 16: Patient with new dentures



Fig.17: Patient without denture



Fig. 18: display of anterior teeth with denture in place



Fig. 19: Anterior segment split from the maxillary denture



Fig. 20: Anterior segment trimmed and secured using modeling wax



Fig 21.maxillary denture with anterior segment position

Page 14



Fig. 22: Post-operative patient with corrected corrected maxillary denture