

CASE REPORT

Occlusal Rehabilitation of Severely Mutilated Dentition

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ABSTRACT

Severe caries, attrition, abrasion, erosions of anterior teeth lead to loss of anterior guidance. This in turn causes attrition of posterior teeth and loss of occlusal vertical dimension. To gain the space for esthetic rehabilitation in these cases is challenging task. The required space can be achieved by crown lengthening and increasing the occlusal vertical dimension within physiologic limits. Unmethodical alteration of vertical dimension may lead to temporomandibular joint (TMJ) and masticatory muscle problems. Careful treatment planning and stable occlusion are key point of successful treatment. This case report describes the methodical multidisciplinary approach used to treat severely mutilated dentition.

Keywords: Decreased vertical dimension, Full mouth rehabilitation, Occlusal rehabilitation.

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INTRODUCTION

The gradual wear of occlusal surfaces is normal during lifetime of any patient but when tooth surface loss is severe, it can be associated with decreased vertical dimension of the occlusion resulting in a poor esthetic appearance, loss of muscle tone and decreased masticatory efficiency.¹ Loss of anterior guidance due to anterior teeth degeneration leads to unnatural oblique forces on posterior teeth and temporomandibular joint (TMJ), causing severe attrition of posterior teeth and TMJ problems. Management of these patients using fixed or removable prostheses is complex and among the most difficult to restore.² A critical aspect for successful treatment in these patients is to determine the occlusal vertical dimension (OVD) and the interocclusal rest space. A systematic approach for managing tooth wear can lead to a predictable and favorable prognosis.³ The necessary space required for restorations can be achieved crown

lengthening procedures and increasing OVD. Restoring the lost vertical dimension of occlusion can have far reaching effects on facial esthetics, not just on the perioral areas but on the whole face.⁴ Rationale for altering OVD comprise of esthetics, altering the occlusal relationship and for prosthetic convenience to allow space for restorations.⁵

This case report presents detailed discussion about planning of a severely mutilated dentition with multidisciplinary approach.

CASE REPORT

A 52-year-old female patient approached the Department of Prosthodontics for restorations of lower anterior teeth. She complained of unesthetic appearance of lower teeth and sensitivity to hot and cold food. Patient was unhappy with her gummy smile.

Diagnosis and treatment planning: on examination her mandibular anterior teeth were severely carious and attrited (teeth no. 31, 32, 33, 41, 42, 43). Lower premolars also exhibited buccal and mesial caries (teeth no. 34, 35, 44, 45). (Figs 1 to 3). Her maxillary anterior teeth were restored with direct composite laminates 5 years back, (teeth no. 11, 12, 13, 21, 22, 23) which were discolored and exhibited palatal caries.

Patient was having deep bite around 4 mm and a high smile line, making her maxillary anterior gingival tissues more visible.

Her facial height at occlusion (OVD) was decreased but freeway space was increased suggesting that she had lost her vertical dimension of occlusion because of attrition.

A orthopantomogram (OPG) and a lateral cephalometric view X-rays were taken. OPG suggested chronic apical



Fig. 1: Intraoral pretreatment view

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periodontitis with all mandibular anterior teeth and premolars. Maxillary anterior teeth exhibited deep caries. Endodontic treatment was planned for all maxillary anterior teeth, mandibular anterior teeth and mandibular premolars.

Diagnostic impressions were made by using irreversible hydrocolloid (Tropicalgine, Zhermack, Badia pole-sine, Italy), poured with the dental stone and mounted on semiadjustable articulator (Hanue Wide view, Arcon, Whip-mix corporation, west Fort Collins, Co, USA) by using facebow record and interocclusal records made in centric relation. Existing smile line was marked on maxillary cast.

The height of maxillary anterior teeth was short and patient was having gummy smile so a crown lengthening procedure was planned.

The height of mandibular anterior teeth was very less to sustain the crown restoration. Post and core restoration along with crown lengthening procedure was planned.

The gingival recounturing of maxillary and mandibular anterior teeth was carried out on the cast using carver. The cast was altered to achieve repositioned gingival tissues as expected to be achieved by the periodontist. A vacuum formed template was then adapted on the cast. This template was used as a surgical template for crown lengthening.

Diagnostic wax-up: The diagnostic wax-up was done by using Hobos twin table principle according to which anterior guidance is made steeper than condylar guidance and cuspal angulations to achieve disclusion in eccentric movements (Fig. 4).

With the diagnostic wax-up, it was clear that to gain sufficient space for esthetic restorations in anterior region, increase of 1 mm vertical dimension in 1st molar region was necessary. This can be achieved only by altering mandibular teeth morphology. Since, available freeway space was about 5 mm, restoration of OVD was possible without compromising optimal physiologic freeway space.

The waxed-up mandibular model was duplicated in dental stone type III (Kalstone, Kalabhai Dental corporation, Mumbai, India) to get the cast. A vacuum formed template was adapted on the cast. This template was used as a guide for teeth reduction as well as for fabrication of temporary restorations.

The treatment was planned to be carried out in different phases. Periodontal surgery and crown restorations of mandibular arch were to be done first followed by periodontal surgery and crown restorations of maxillary anterior teeth. As maxillary posterior teeth were healthy, they were planned to be kept unaltered.

Preprosthetic phase: The patient had undergone oral prophylaxis. And oral hygiene instructions were given

taking in to consideration her high caries susceptibility. Mandibular anterior 8 teeth and maxillary anterior 6 teeth were treated endodontically.

The lost crown structure was then reconstructed by using I-post (Integrated endodontics, prime dental products, Mumbai, India) and light cure composite resin



Fig. 2: Severely carious mandibular anterior teeth



Fig. 3: Pretreatment in occlusion with decreased vertical dimension



Fig. 4: Diagnostic wax-up

(Filtek-Z 250 XT, 3M ESPE, St Paul, USA). The crown lengthening of mandibular anterior teeth was carried out the vacuum formed surgical template as a guide.

PROSTHETIC PHASE

All mandibular teeth were prepared to receive full veneer metal ceramic restorations. All the prepared teeth were restored with provisional crowns fabricated in tooth colored acrylic temporization material (DPI self cure teeth molding powder and liquid, Dental Products of India, Mumbai) by using vacuum formed temporization template as a guide. As vertical dimension needs to be restored, simultaneous arch technique was used. Occlusal contacts were adjusted. All centric and eccentric premature contacts were reduced to achieve posterior disclusion during eccentric movements. The provisionals in self cure acrylic resin were replaced with heat cure acrylic resin which lasts long.

The heat cure provisional restorations were kept for 3 to 4 weeks. A follow-up was done to assess patients comfort and acceptance to altered OVD. This transient period is necessary to denote consequences of altered OVD on patients' masticatory system. Patient was instructed for diet restrictions and oral hygiene maintenance.

Patient was evaluated thoroughly for occlusion, temporomandibular joint discomfort, pain and tenderness of muscles of mastication. Once patient was adjusted to provisional restorations, she was prepared to receive permanent restorations.

All provisional restorations were removed and final impression was made with polyvinyl siloxane elastomeric impression material (Express XT putty and light body, 3 M ESPE, St Paul, USA). The impressions were poured in type IV die stone.

Posterior provisional restorations were then placed in the mouth. A Lucia jig was prepared with the self-cure acrylic resin in anterior region with posterior provisional restorations in the maximum intercuspation. The posterior provisional restorations were removed and an inter occlusal record was made with Lucia jig in position. The master casts were mounted by using Lucia jig an inter-occlusal record on a semi adjustable articulator.

A putty index of provisional restorations was made to follow the contours and anatomy of provisional restorations. The mounted casts, and index were proceeded to lab for wax pattern and metal coping casting procedure. Metal coping were tried for marginal adaptation and fitting (Fig. 5). Metal copings were veneered with ceramic (IPS Inline, Ivoclar Vivadent, Liechten Stein) by using putty index of provisional restorations as a guide. Final

occlusal adjustments were done intraorally during bisque trial to achieve posterior disclusion during eccentric movements (Figs 6 to 8).

Glazed PFM crowns were cemented by using Zinc Phosphate cement (Zencem, Medisept, Middlesex, UK).

Increased OVD gave sufficient space for restoration of mandibular anterior teeth as well as helped to achieve lost anterior guidance.

Crown lengthening of maxillary anterior teeth was performed with the help of crown lengthening surgical template. After satisfactory healing, anterior teeth were prepared to receive full veneer metal ceramic crown restorations. The maxillary anterior teeth were restored with PFM crowns in the conventional manner with due precaution not to alter anterior guidance once achieved. Patient was quiet happy with her new look (Figs 9 and 10).

DISCUSSION

Management of worn dentition using fixed or removable prostheses is complex and among the most difficult cases to restore. Assessment of the vertical dimen-



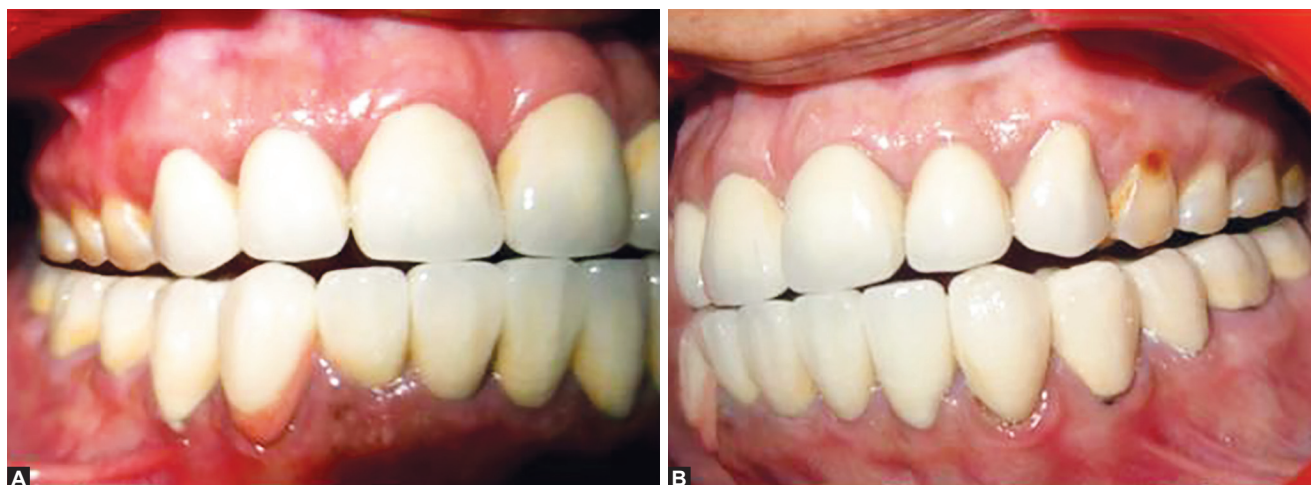
Fig. 5: Metal try-in for mandibular teeth



Fig. 6: PFM crowns on mandibular teeth and crown lengthening of maxillary teeth



Fig. 7: Post-treatment teeth in maximum intercuspation



Figs 8A and B: Post-treatment teeth in excursive movement

sion is important for the management, and careful comprehensive treatment plan is required for each individual case.

In 1984, Turner¹ classified the treatment of a severely worn dentition by the amount of the loss of VDO and available space to restore. His classification and conventional treatment, which includes raising VDO with multiple crown-lengthening procedures, have been widely used up to present.

This patient has lost the anterior guidance due to carious mandibular anterior teeth. This in turn has led to posterior attrition because of loss of posterior disocclusion during eccentric movements.

The lost mandibular anterior teeth were built-up with the help of I-posts. These are passive metal posts with coronal design matching to coronal flare of the root canal which strengthens the tooth at the cemento-enamel junction.

The lost occlusal vertical height in this case was restored by giving crowns on the mandibular posterior teeth. This increased space along with periodontal crown lengthening provided sufficient room to restore mandibular anterior teeth.

The term 'increase in occlusal vertical dimension' is a misnomer as it indicated the 'change' in occlusal vertical dimension. Clinical problems associated with altered OVD include joint or muscle pain, instability of altered OVD, impaired muscle activity and altered phonetics.⁶⁻⁹

In this case, the 'change' of vertical dimension was not arbitrary but instead it was a methodical approach so, the term 'restoration of vertical dimension' is appropriate.

The maxillary posterior teeth were kept unaltered as the desired height was easily achieved by altering mandibular teeth and, moreover, the maxillary posterior teeth showed minimal degenerative changes. The ceramic used for restoration (Ivoclar design) was chosen to minimize attrition of the opposing teeth.

Carefully developed anterior guidance avoids posterior contacts during eccentric movements. Maxillary anterior teeth were carious with marginal caries at composite laminates. The patient was also having gummy smile with 2 to 3 mm of gingival tissues visible during smile. Crown lengthening of maxillary anterior teeth was carried out, caries excavated and filled with composite resin. Metal ceramic restorations were placed on maxillary anterior teeth to improve the smile line and give desired esthetics.

SUMMARY AND CONCLUSION

A multidisciplinary management of severely carious, mutilated teeth with loss of occlusal vertical dimension is discussed. The use of crown lengthening procedure and reasonable change in occlusal vertical dimension helps to gain predictable results. A systematic approach, to achieve a stable centric, posterior disclusion during



Fig. 9: Pretreatment smiling view



Fig. 10: Post-treatment smiling view

eccentric movements should be the aim of whole treatment. A close follow-up during and after treatment is very important to notice any TMJ or masticatory muscle problems.

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