INTRODUCTION

The prosthetic rehabilitation of a patient with a functionally compromised dentition frequently involves a multidisciplinary approach. The successful integration of esthetics and function do not emerge by chance, but rather as a result of the meticulous development of clearly defined parameters and their subsequent incorporation into the design of the prosthesis. Appropriate case selection and careful treatment planning are critical to a successful outcome and patient satisfaction in multidisciplinary cases. Successful restorative dentistry also requires the preservation of a healthy apparatus to provide a positive long term prognosis for the restored tooth. An intact relation of gingival tissues and teeth together with an understanding of biology are essential for successful restoration of both mechanical and biologic factors. The prognosis of a complete coverage restoration relates to the tooth preparation that it fits and to the state of health of the periodontium that supports it. The placement of the margin of the tooth preparation and its interaction with the gingiva is the most important interaction of periodontics and restorative dentistry.

CASE REPORT

Full Mouth Rehabilitation

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ABSTRACT:

The objective of full mouth rehabilitation must be the reconstruction, restoration and maintenance of the health of the entire oral mechanism. It demands rehabilitation within the physiological and functional harmony of the stomatognathic system. Full Mouth rehabilitation seeks to convert all unfavorable forces on the teeth which inevitably induce pathological conditions, into favorable forces which permit normal function and therefore induce healthy conditions. Careful evaluation of the etiology, history and factors relative to occlusal vertical dimension are essential to appropriate treatment planning.

A 43 year old individual presented with difficulty in chewing food and severe worn out teeth. The case was treated by restoring the lost vertical dimension by prosthetic rehabilitation along with periodontal reconstruction procedure. Crown lengthening was performed by Gingivectomy and by osseous resection and recontouring. Pankeymann- Schuyler philosophy is followed for the prosthetic rehabilitation because it is a well organized, logical procedure where anterior guidance is first established followed by restoration of the posterior teeth.

A team approach by clinicians, lab technicians and the patient is necessary to achieve desired results when a multidisciplinary approach is desired. All the efforts are directed toward re-establishing a state of functional efficiency in which the teeth and their periodontal structures, the muscles of mastication and the temporomandibular joint mechanisms all function together in synchronous harmony.

Key words: Restored teeth, Healthy teeth

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Surgical crown lengthening has been proposed as a means of facilitating restorative procedures and preventing periodontal injuries in teeth with structurally inadequate clinical crowns or exposing tooth structure in the presence of deep, subgingival pathologies which may hamper the access for proper restorative measures.

The use of diagnostic elements and a preoperative treatment plan allows the clinician to identify areas of concern, outline the desired protocol for restorations, and communicate desired parameters to a lab. In the present case, prosthetic rehabilitation for extensive tooth loss was carried out along with periodontal reconstruction procedure.

**Case presentation**

A 43 year old man, moderately built with good general health reported to the department of Prosthodontics crown and bridge, KLE VK’s Institute of Dental Sciences, Belgaum, Karnataka, India with a chief complaint of difficulty in chewing food and worn out teeth. General examination revealed no significant systemic history. On clinical examination generalized attrition of the dentition was present due to the habit of bruxism (Figure 1). Patient, other than difficulty in mastication was also dissatisfied with the unsightly appearance of his face due to a decreased vertical dimension. Radiograph revealed severe attrition of the maxillary and mandibular teeth and presence of root stump in relation to the right first mandibular molar. Endodontic therapy was performed for teeth with severe attrition before further treatment was undertaken.

On the basis of clinical and radiographic examination, a diagnosis of worn out dentition with reduced vertical dimension of occlusion was made. Full mouth rehabilitation of the mouth was planned to restore the function, esthetics, speech and comfort of the patient. The patient was informed of the diagnosis, the treatment planning and his consent was taken before the start of the procedure. Due to the presence of decreased VD, an increase in VD was first considered. Vertical dimension was increased by 3mm using an Occlusal splint which was fabricated using self cure acrylic resin (DPI RR Coldcure, India) at the Centric Relation position (Figure 2). The patient was asked to wear the occlusal splint for the maximum possible time in a day except while eating and in the night for a period of 6 weeks and was asked to report after 6 weeks.

Complete arch maxillary and mandibular impressions were made with irreversible hydrocolloid (Algiplast; Heraeus Kulzer, South Bend, India) and used to obtain diagnostic casts, using type III dental stone (Lab stone, Kalabhai, Mumbai, India). Face bow transfer was done and interocclusal records were made to mount the casts in centric relation on a semi adjustable articulator (Hanau Wide view; water pik, Fort Collins, USA) (Figure 3). Special attention was paid in restoring the function and esthetics of the dentition. Due to the presence of generalized attrition, the clinical crown height was reduced such that insufficient crown structure was present in order to prepare the teeth for retention of the full coverage restorations. Hence the patient was referred to department of Periodontics to restore the height of the attrited teeth.

On periodontal examination, gingiva was pale pink in colour with mild calculus and stains. After an initial examination and treatment planning session, patient received detailed instructions in proper self performed plaque control measures and underwent full mouth scaling and polishing and removal of marginal irritants. Transgingival probing was performed to establish the dimension of biologic width prior to Surgical Crown Lengthening procedure. It was decided to perform crown lengthening by gingivectomy on all the quadrants except for the mandibular anterior teeth including the premolar teeth where crown lengthening would be performed by flap surgery with osseous resection and recontouring. Patient was informed about the treatment plan and its outcome. Gingivectomy was performed using Bard Parker blades no. 12 & 15, Gingivectomy knives (Orban and Kirkland) (Fig 4 & 5). After control of hemorrhage, periodontal dressing using Coe-pack was given at the surgical sites. Post operative instructions were given and patient was asked to report immediately if the pack loosens else after 7 days. For the mandibular anterior teeth including the premolars on both the quadrants, crown lengthening was performed by osseous reduction. A full thickness mucoperiosteal flap was reflected using a periosteal elevator. Debridement of
the granulation tissue was done. Osseous reduction was performed using rounded tapered burs and Sugarman and Schluger files till the desired height of the crown & biologic width was obtained. Flap was sutured back and a periodontal dressing was placed and post surgical instructions were given to the patient (Figure 6). He was recalled on the 7th day for removal of the sutures.

Tooth preparation was done with minimal Occlusal reduction with a shoulder finish line on the facial side and chamfer on the lingual side. Impressions of the prepared teeth were made with poly vinyl siloxane ( Reprosil;Densply,USA) in stock trays. Definite maxillary and mandibular casts were formed, mounted on an articulator with trimmed dies of the prepared teeth. Maxillomandibular relationship record was made with Aluwax at raised VD (Figure 7).

Provisional restorations were given (Temperon;GC corp,Tokyo,Japan) and the Occlusal plane was established. Restorations were placed in a sequential manner i.e. restoration of the lower anterior teeth followed by the upper anterior teeth using the putty index made on the provisionals after establishing anterior guidance. When final restorations were placed on the anterior teeth, splint was used as a guide to maintain the vertical dimension on the posterior teeth. Lower posterior teeth were restored in harmony with anterior guidance followed by the restoration of the upper posterior teeth. A trial evaluation of the metal substructure done prior to the buildup of ceramic material enabled final Occlusal refinement (Figure 8 & 9). The crowns were cemented with Glass Ionomer Cement(GC Fuji 1,GC corporation, Tokyo, Japan) The vertical dimension was carefully maintained during the period of provisionalization and through the completion of restoration (figure 10). The patient was followed up for 1 year on a regular 3 month recall appointment schedule

DISCUSSION

Reconstruction of severe attrited dentition has been a challenge to a dentist’s skill and capabilities. It demands rehabilitation within the physiological and functional harmony of the stomatognathic system. For occlusal rehabilitation two occlusal philosophies exist. One advocates simultaneous reconstruction of both arches and the other advocates complete restoration of one quadrant in a programmed sequence before proceeding to the next. The concept of complete mouth rehabilitation is dependent basically upon three proved and accepted principles. These are; the existence of a physiological rest position of the mandible which is constant, the recognition of a variable vertical dimension of occlusion and the acceptance of a dynamic, functional centric occlusion. Thus the aim of rehabilitation includes the health of the periodontium, vertical dimension, interocclusal distance, functional balanced occlusion and esthetics.

The presence of caries, restoration, attrition or a combination of these conditions can cause teeth to have little intact coronal tooth structure remaining, resulting in loss of vertical dimension of occlusion. Many clinical studies indicate that, vertical dimension of occlusion is maintained even with rapid wear. As the occlusal surface wears, compensatory alveolar process elongates by progressive remodeling of the alveolar bone. As a result there is no loss of vertical dimension unless tooth loss occurs. However, occlusal wear may occur more rapidly than continuous eruption depending on the etiology of the wear. Therefore, it is critical to verify loss of occlusal vertical dimension prior to restoration at an increased vertical dimension. So combination of methods like phonetics, facial appearance and measuring the interocclusal distance are used to verify the lost vertical dimension. Occlusal splint is used as a means to raise the vertical dimension of occlusion for 6 weeks. Basic function of a splint is referred to as muscle deprogrammer and it helps the condyle in returning to their centric relation position.

Along with temporary occlusal treatment with occlusal splint, collateral treatment was suggested to the patient like stress relaxation techniques and regular exercises. Definite occlusal treatment includes selective grinding, orthodontic treatment and prosthodontic treatment. Definite occlusal treatment is initiated when subjective and objective symptoms have disappeared permanently or at least improved significantly. Collateral treatment should be continued even after definite occlusal treatment
has started. The prognosis of definite occlusal treatment depends upon patient’s age, period between onset of symptoms, beginning of treatment and severity of psychogenic factors.

When attempts are made to obtain sufficient retention and resistance form by extending preparations subgingivally, the periodontium will most often be deleteriously affected. In 1921, Gotelib discovery of the epithelial attachment of the gingiva opened new horizon which served as the basis for a better understanding of the biology of the dental supporting tissues in health and disease. The distance from the base of the epithelial attachment to the crest of the alveolar bone (Connective tissue attachment), is the most constant. Its mean average length in all phases is 1.07mm. Based on the dimension of the work of Gargiulo et al, the dimension of the biologic width was estimated as being in the vicinity of 2.04mm. This was made up of a junctional epithelial dimension of 0.97mm plus 1.07mm of connective tissue attachment in a coronal apical direction. These results gave rise to the concept of a “biologic width,” and various authors have shown that a definite dimensional relation exists among the alveolar crest, supraalveolar connective tissue attachment, and junctional epithelium. It is recommended that there be at least 3mm between the gingival margin and the bone crest. Surgical crown lengthening may include the removal of soft tissue or both soft tissue and alveolar bone. Gingivectomy alone is indicated if there is adequate attached gingiva and more than 3mm of tissue coronal to the bone crest. Inadequate attached gingiva and less than 3mm of soft tissue require flap procedure and bone recontouring.

A diagnostic waxing procedure should be performed on diagnostic tooth preparation to establish optimum contour and occlusion of the eventual prosthesis. Bekke et al (1992) showed that occlusal contact influence muscle activity during mastication. Any restorative procedure that adversely affects the occlusal stability may affect timing and intensity of the elevator muscle activity. Horizontal forces on teeth should be avoided and loading should be parallel to the long axis of the teeth. This is facilitated when the tips of the centric cusps are located centrally over the roots and when loading of teeth occur in the fossae of occlusal surface rather than on the marginal ridge.

Correct orientation of occlusal plane with compensating curves incorporate problems in rehabilitation of worn dentition. It is therefore essential that an anterior occlusal plane be established at the temporization stage. Speaking line, smile line and lower lip line may be assessed for optimum visibility of upper and lower anterior. In addition labiobuccal and superior-inferior positioning may be checked using labiodental sound (F&V) and Silverman’s closest speaking space. Once the anterior occlusal plane has been established then it may be extended posteriorly incorporating anteroposterior and mediolateral compensating curves. There is a definite relationship between incisal guidance, condylar guidance and curve of SPEE. There tends to be a harmony of steepness or flatness which in turn determines the cusp height, fossa depth and occlusal tooth form of the posterior teeth.

Lateral guidance can be established by canine guided occlusion, group function and bilateral balanced occlusion. Canine guided occlusion is superior to the other because it is easier to establish anatomically, acceptable and reduces lateral stresses on posterior teeth and ridges. More over canine has a long root surrounded by dense compact bone and least muscular activity is recorded when canines are in function. Hence canine guided occlusion is chosen to for establishing lateral guidance.

Treatment of reduced VD is not designed to increase the VD beyond the normal, but is intended to restore the amount of VD that has been lost. In rehabilitation procedures, the masticatory organ must be reconstructed within the limits of physiologic rest position with sufficient allowance for a functional interocclusal distance.

Conclusion:

Appropriate case selection and careful treatment planning are critical to a successful outcome and patient satisfaction in multidisciplinary cases. The use of diagnostic elements and a preoperative treatment plan allows the clinician to identify areas of concern, allows the desired protocol for restoration. The
restoration of normal healthy function of the masticating apparatus is the ultimate aim of full mouth rehabilitation.

REFERENCES:

Figure 1: Pre-operative view showing severe attrition of teeth with decreased vertical dimension.

Figure 2: Occlusal splint placed.

Figure 3: Cast mounted on a semi-adjustable articulator with interocclusal record in place.

Figure 4:
Figure 5: Fig 4 & 5 shows crown lengthening done by gingivectomy.

Figure 6: Crownlengthening performed by raising a flap & osseous reduction done with mandibular anterior teeth.

Figure 7: Fabrication of anterior wax pattern

Figure 8: Trial evaluation of the metal substructure done prior to the buildup of ceramic material- mandibular arch.

Figure 9: Trial evaluation of the metal substructure done prior to the buildup of ceramic material- maxillary arch

Figure 10: Permanent crowns in place.