

Treatment of the Advanced Prosthetic Cases

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Abstract: All cases of partial and complete dentulous patient needs the a special treatment as edentulous maxilla is opposed by natural mandibular anterior teeth, including loss of bone from the anterior portion of the maxillary ridge, overgrowth of the tuberosities, papillary hyperplasia of the hard palatal mucosa, extrusion of mandibular anterior teeth and loss of alveolar bone and ridge height beneath the mandibular removable partial denture bases, treatment by retention of maxillary overdenture abutments. maxillary osseointegrated implants. and augmentation of maxilla with resorbable hydroxyapatite in conjunction with a guided tissue regeneration technique and vestibuloplasty.

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1. Introduction

The glossary of prosthodontic terms defines Combination Syndrome as: "the characteristic features that occur when an edentulous maxilla is opposed by natural mandibular anterior teeth, including loss of bone from the anterior portion of the maxillary ridge, overgrowth of the tuberosities, papillary hyperplasia of the hard palatal mucosa, extrusion of mandibular anterior teeth and loss of alveolar bone and ridge height beneath the mandibular removable partial denture bases, also called hyperfunction syndrome .

Michael ^[2] originally described Combination Syndrome in a sample of patients with complete maxillary dentures, opposing natural mandibular teeth and a distal extension RPD. He described five signs or symptoms that commonly occurred in this situation . They include:

1. Loss of bone from the anterior part of the maxillary ridge.
2. Overgrowth of the tuberosities.
3. Papillary hyperplasia in the hard palate.
4. Extrusion of the lower anterior teeth.
5. The loss of bone under the partial denture bases.

Misch CM. ^[3] later described six additional signs associated with the syndrome . They include:

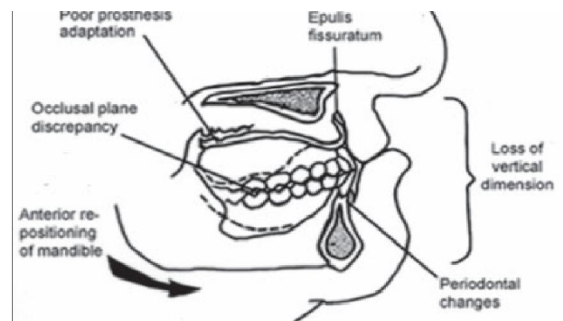
1. Loss of vertical dimension of occlusion.
2. Occlusal plane discrepancy.
3. Anterior spatial repositioning of the mandible.
4. Poor adaptation of the prostheses.
5. Epulis fissuratum.
6. Periodontal changes.

Pathogenesis:-

According to Kelly ^[2] the early loss of bone from the anterior part of the maxillary jaw is the key to the other changes of the combination syndrome.

With the anterior loss of bone, flabby hyperplastic connective tissue makes up the anterior

part of the ridge. This does not support the denture base and may fold forward with the formation of epulis fissuratum in the maxillary labial sulcus. The posterior residual ridge becomes larger with the development of enlarged fibrous tuberosities. With these changes, the occlusal plane migrates up in the anterior region and down in the back. After a time, the natural lower anterior teeth migrate upward, the anterior teeth on the complete denture disappear under the patients lips and both dentures migrate downward in the posterior region. The aesthetics are poor, with the patient showing none of the upper anterior teeth and too much of the lower anterior teeth and the occlusal plane drops down to expose the upper posterior teeth [Figure - 4].



Mechanics which produce the combination syndrome Kelly's theory suggests that negative pressure within the maxillary denture pulls the tuberosities down, as the anterior ridge is driven upward by the anterior occlusion. The functional load will then direct stress to the mandibular distal extension and cause bony resorption of the posterior mandibular ridge. The upward tipping movement of the anterior portion of the maxillary denture and the simultaneous downward movement of the posterior

portion, will decrease antagonistic forces on the mandibular anterior teeth and lead to their supraeruption. Eventually an occlusal plane discrepancy will occur denture bases occurs to permit these changes and inflammatory papillary hyperplasia often develops in the palate and the patient may have a loss of vertical dimension of occlusion. In addition, the chronic stress and movement of the denture will often result in an ill-fitting prosthesis and contribute to the formation of palatal papillary hyperplasia.

Shen and Gongloff in 1989, reviewed records of 150 maxillary edentulous patients.^[4-6]

Among patients who had complete maxillary dentures and mandibular anterior natural teeth, one in four demonstrated changes consistent with the diagnosis of combination syndrome.

Prevention of combination syndrome:-

- Avoid combination of complete maxillary dentures opposing class I mandibular RPD.
- Retaining weak posterior teeth as abutments by means of endodontic and periodontic techniques.
- An overdenture on the lower teeth.



Treatment planning:-

When planning treatment for patients with edentulous maxillae and a partially edentulous mandible, the risk of development of the combination syndrome must be recognized.^[7,8,9]

Systemic and dental considerations:-

- Review medical, dental history.
- Thorough clinical and radiographic evaluation of both hard and soft tissues associated with prosthesis wear.
- Resolution of any inflammation, if present.
- Evaluation of patient's caries susceptibility, periodontal status and oral hygiene.
- Factors to be considered in tooth to be used as abutment. (Tooth vitality, morphologic changes, number of roots, bony support, mobility, crown-root ratio, presence and position of existing restorations, position of teeth in the arch, the availability of retention and guide planes.)^[10,11]

Michael^[2] said that before proceeding with the prosthetic treatment, gross changes that have already

taken place should be surgically treated. These include conditions like:

- Flabby (hyperplastic) tissue.
- Papillary hyperplasia.
- Enlarged tuberosities Lower partial denture base should be fully extended and should cover retromolar pad and buccal shelf area.

Basic treatment objective:-

Saunders *et al.*^[3] in 1979 stated that the basic treatment objective in treating these patients is to develop an occlusal scheme that discourages excessive occlusal pressure on the maxillary anterior region, in both centric and eccentric positions.

They also stated some specific treatment objectives:

- The mandibular RPD should provide positive occlusal support from the remaining natural teeth and have maximum coverage of the basal seat beneath the distal extension bases.
- The design should be rigid and should provide maximum stability while minimizing excessive stress on remaining teeth.
- The occlusal scheme should be at a proper vertical and centric relation position.
- Anterior teeth should be used for cosmetic and phonetic purpose only.
- Posterior teeth should be in balanced occlusion.

The author described a treatment approach that attempted to minimize the destructive changes, by using the treatment objectives .

- The prosthesis is made in 2 stages.
- Mandibular RPD is completed first.
- Acrylic resin teeth are used to replace the maxillary anterior teeth.
- Cast gold occlusal surfaces for posterior denture teeth.

Mandibular overdenture provided better prognosis in patients who already had combination syndrome and whose mandibular anterior teeth were structurally or periodontally compromised.

Mandibular implant-supported overdenture offers significant improvement in retention, stability, function and comfort for the patient and a more stable and durable occlusion.

Implant supported fixed prosthesis.

Some form of stabilization of the maxillary arch.

- retention of maxillary overdenture abutments.
- maxillary osseointegrated implants.
- augmentation of maxilla with resorbable hydroxyapatite in conjunction with a guided tissue regeneration technique and vestibuloplasty.

The author reported excellent long-term results with mandibular implant supported fixed prostheses, opposing maxillary complete dentures

and reviewed the literature on the combination syndrome and related features such as alveolar bone loss, bone resorption, maxillary tuberosities, denture

stomatitis and maxillary abnormalities, all combined with removable partial denture variables.^[12]

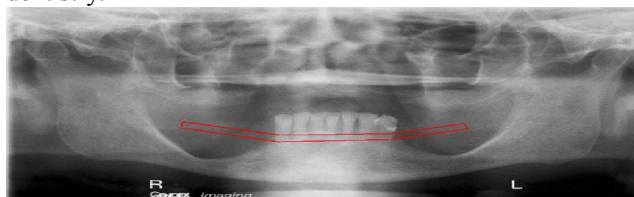


Original appearance with upper and lower prosthesis NOT in place demonstrating inadequate facial support

- The treatment time can be reduced to **ONE SURGICAL VISIT** in many cases, with all treatment completed in one week with follow-up visits needed approximately once a week for several weeks
- **Sequence For One Appointment**

Surgical Treatment

1. PRE-SURGICAL/ PROSTHETIC PLANNING:
Prostheses completed prior to surgery with image capturing & referencing.
2. SURGICAL/ PROSTHETIC PHASE:
 - a. Maxillary “PermaRidge” grafting completed first c upper immediate denture ready for insertion.
 - b. Extractions, Alveoplasty, & insertion of mandibular implants & healing abutments c immediate lower denture & soft liner ready for insertion.
 - c. Minimal Invasive Surgical technique allowing surgical correction and final implant connecting bar impression the day of surgery.
3. ANESTHETIC CONSIDERATIONS:
Appointment length c surgery, need for sedation dentistry.



Pre-operative radiograph for treatment planning with diagram showing approximate position of implant connecting bar and plane of occlusion.

Grafting SOFT TISSUE with Hydroxylapatite :-

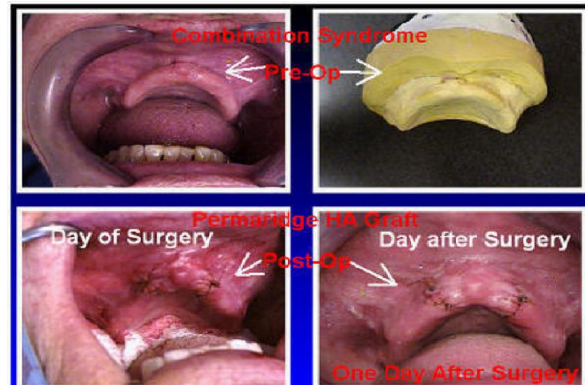
1. Two incisions are made in area of the cuspids through keratinized tissue to the bone.
2. A series of instruments are first used in the posterior segments to tunnel and raise the periosteum off the bone, to the length required.

3. Next straight taper instruments are used to enlarge the tunnel and dilate the tissue, creating room for the “Permaridge” HA graft.

4. Next a cutting osteotome is used to plane the bone in the tunnel, smoothing out the rough areas, creating a smooth passage.

5. Finally the graft carriers are used to carry either the 4.5mm or 6.0mm sections of the “Permaridge” HA graft. 4-0 gut sutures are then used to close the two openings.

Simulated Alveoplasty with Simplant program



Day after Surgery



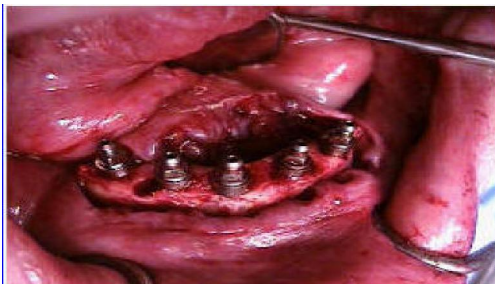
The soft tissue takes on the created shape of the inner surface of the denture. The denture must fit grafted tissue loosely.



Maxillary Patient’s maxillary dental arch six months post-operatively tissue is no longer loose, now has load bearing capabilities

Grafting SOFT TISSUE with Hydroxylapatite for Reconstructive success:-

1. Soft Tissue Graft must not be loaded during healing by immediate maxillary denture.
2. Vestibule, hard palate, and remaining non-grafted tuberosities support the maxillary immediate denture.
3. **KEY TO SUCCESSFUL GRAFTING:** is the change in occlusal forces with an unloaded HA graft. Six surgical instruments are used to create an ideal site. The denture supports the graft and the totally implant supported mandibular prosthesis allows control of the occlusal forces to the grafted ridge.



Day of surgery. Alveoplasty with 3-D implant placement & grafting.

Day of Surgery. final impression for implant connecting bar.



Polyether material of choice for impression.



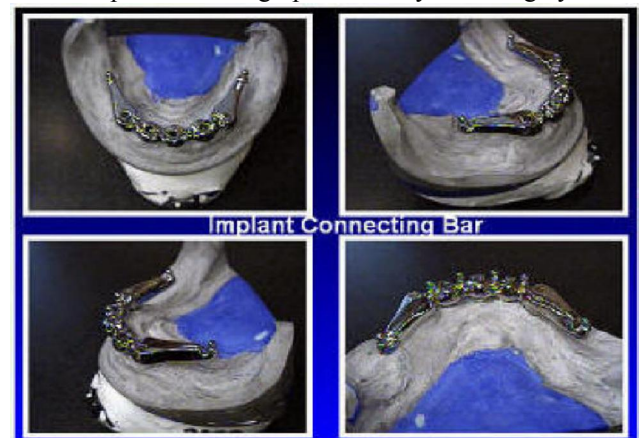
Day of surgery. Minimal Invasive Surgery contributes to rapid healing. PRP Platelet Rich Plasma increases rate of healing.



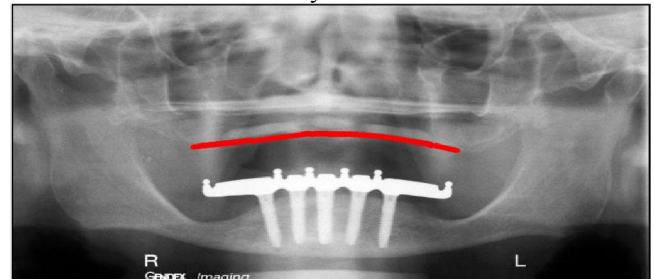
Soft liner placed day of surgery. Patient never without teeth.



Post-Operative radiograph taken day after surgery



Implant connecting Bar constructed & placed on third day



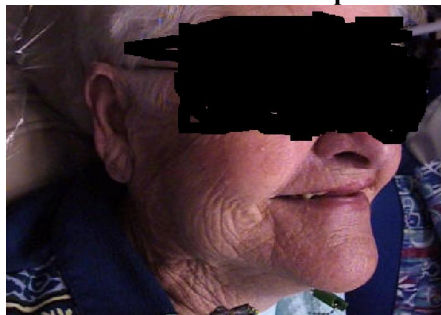
Impression taken day of surgery. Bar inserted two days later



Completed Mandibular Therapy with Posterior Supported Occlusion



Six Months Post-Op



Pre-Operative Picture 6-Months Post-Operative Picture

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