

Combination Syndrome: Review of Literature, Treatment, and Prevention

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Abstract

Completely edentulous maxilla opposing mandibular anterior teeth without any posterior teeth in the mandibular arch is a common clinical situation. Combination syndrome usually occurs in patients with maxillary complete denture opposing a partially edentulous mandibular arch with preserved anterior teeth with or without distal extension removable partial denture. The syndrome shows a complex of pathologic conditions affecting both hard tissue and soft tissue. These changes are initiated by loss of bone in the upper anterior maxilla. The common feature of most combination syndrome cases is an edentulous pre-maxilla with advanced ridge resorption in the anterior region and overeruption of the mandibular anterior teeth. Loss of lower posterior teeth and over-erupted lower anteriors lead to uneven occlusal forces. Over-erupted anteriors put excessive load on anterior edentulous maxilla and cause resorption. Flabby ridges are most commonly seen in the anterior part of maxilla opposing natural mandibular anterior teeth. Combination syndrome is one of the most peculiar oral conditions which is less studied and analyzed in the literature and clinical practice. This article reviews the important literature on this subject and discusses about different modalities of treatment.

Keywords: Complete denture, Flabby ridge, Ridge resorption, Anterior hyperfunction.

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 anterior hyperfunction syndrome.” (G.P.T. - 8).^[1]

After studying many maxillary complete denture wearers, Shen and Gongloff found out that combination syndrome occurs among 25% of individuals who wear both complete denture opposing mandibular anterior teeth. This rate did not differ significantly between patients who do and do not wear a mandibular removable partial denture.^[2]

DISCUSSION

Combination syndrome was first identified by Ellsworth Kelly in 1972. Ellsworth Kelly was the first person to use the term “combination syndrome.” Hence, it is also called Kelly

syndrome or anterior hyperfunction syndrome. According to him, early loss of bone from the anterior part of maxilla is the key to other series of changes.

Later, all other changes and complications progress in a sequential manner. These groups of complications are interlinked and are presented as a syndrome.

Ellsworth Kelly described five signs or symptoms that commonly occurred in patients with complete maxillary dentures, opposing natural mandibular teeth, and a distal extension removable partial denture.^[3] They are: (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) Loss of bone under the distal extension removable partial denture.

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Received: Dec. 04, 2021; **Accepted:** Jan. 18, 2022; **Published:** Feb. 24, 2022

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How to cite this article: Mahesh B, Das JR, Ebinu A. Combination Syndrome: Review of Literature, Treatment, and Prevention. J Res Adv Dent 2022;13(2):40-42.

Access this article online

Website:
www.jrad.co.in

DOI:
<https://doi.org/10.53064/jrad.2022.13.2.131>

Later Saunders *et al.*^[4] described six additional signs associated with the syndrome. They are: (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.

SEQUENTIAL PATHOLOGICAL CHANGES

There are a series of destructive pathological changes in soft tissue as well as hard tissues which start in a sequential cycle from one stage to another which are interlinked. Combination syndrome usually occurs in patients with maxillary complete denture opposing a partially edentulous mandibular arch with preserved anterior teeth. Patients have a maxillary complete denture opposing mandibular distal extension removable partial denture.

Later either due to the failure to wear the lower removable partial denture or wearing of an inefficient removable partial denture, patient acquires habit of eating entirely on anterior teeth because lower anteriors have proprioceptive impulse. Patient concentrates occlusal load on lower anteriors for proprioception and for generating maximum force. This excessive load on anterior part of the denture results in ridge resorption in the anterior maxilla which gets replaced by resilient flabby tissue. Flabby, fibrous ridges are seen in all parts of the upper and lower jaws but the most common position is in the upper anterior region and is usually due to the loss of all the natural teeth except the lower anteriors.

These changes occur in sequences or stages. According to Kelly, early loss of bone from the anterior part of maxilla is the key to other series of changes.

Due to lack of support at anterior region, the occlusal plane gets tilted anteriorly upward and posteriorly downward. This downward tilting of posterior plane causes negative pressure in posterior palatal seal area which causes fibrous or bony overgrowth in maxillary tuberosity region.

Downward tilting of the occlusal plane posteriorly causes anterior open bite which lead to supraeruption of lower anteriors. Hence, the natural lower anterior teeth migrate upward showing more of lower anterior teeth. Flabby resilient ridge in the upper anteriors gives less support and stability to maxillary complete denture. Because of tilting of occlusal plane, mandible shift anteriorly during occlusion showing a pseudomandibular prognathism.

The esthetics becomes poor with the patient showing more of the lower anterior teeth and downward tilted posterior occlusal plane showing more of upper posterior teeth. This is because vertical dimension at occlusion is decreased and the upper anterior teeth on the complete denture disappear under the patient's upper lip.

Supraerupted lower anteriors again cause more masticatory force on anterior part of maxillary denture and again these groups of complications are continued because they are interlinked with each other.

OTHER COMPLICATIONS INCLUDE

Excessive anterior function and overload on anterior ridge result in alveolar bone resorption causing ill-fitting prosthesis which develops epulis fissuratum.

Excessive occlusal load by lower anterior teeth may even fracture denture, especially at the midline.

Constant movement and abrasion of upper ill-fitting denture lead to papillary hyperplasia under the maxillary denture.

PREVENTION OF COMBINATION SYNDROME

The combination syndrome is best managed by prevention. According to Kelly, treatment planning should avoid combination of complete upper dentures against distal extension partial lower dentures.

Retain and preserve weak posterior teeth by means of combined endodontic and periodontic treatments so that they will serve as abutments to support lower partial dentures. This will reduce residual ridge resorption under partial denture bases. It also provides more stable occlusion.

An overdenture on the lower ridge preserves proprioception in the posterior region avoiding patient biting with lower anteriors, thus reducing resorption. Patients treated with complete maxillary dentures and mandibular overdentures demonstrate less vertical alveolar bone reduction than patients with complete maxillary and mandibular dentures.^[5]

TREATMENT OPTIONS

According to Kelly, before commencing the treatment flabby (hyperplastic) tissue in the upper anterior region has to be removed, the papillary hyperplasia should be eliminated, and the enlarged tuberosities are to be reduced. This allows the distal end of the occlusal plane to be raised to the proper level and allows the lower partial denture bases to be fully extended. This is extremely important, and covering the maximum area possible for support of partial denture bases would help prevent the combination syndrome.

Covering the retromolar pad where muscle and raphe attachments prevent or reduce resorption, and covering the buccal shelf area is necessary to retard bone loss. Often, this is not done with removable partial dentures.

According to Palmqvist *et al.*, these stages are interrelated and there is no evidence that a properly fabricated mandibular removable partial denture can prevent the development of the events described.^[6]

Fabrication of removable partial denture which minimizes destructive forces can be given according to Schmitt.^[7] He described a treatment approach that attempted to minimize the destructive changes, using the treatment objectives of Saunders *et al.* The prosthesis is made in two stages. The mandibular removable partial denture is fabricated first after which acrylic resin teeth are used to replace the maxillary

anterior teeth and cast gold occlusal surfaces is provided for posterior denture teeth.

Implants retained and implant-supported prostheses have been proven successful in prosthetic rehabilitation of partially and completely edentulous maxilla and mandible. According to a study by Zarb and Attard,^[8] rehabilitation of patients who are partially edentulous in the posterior zone is highly effective and that survival of the implants is excellent.

Lechner and Mammen when studied among patients with a maxillary conventional denture and mandibular osseointegrated implant-supported overdenture for at least 3 years found that this combination of prostheses also produced similar effects of combination syndrome.^[9] According to him, it is, therefore, important to ensure that where an implant-supported mandibular overdenture is planned for the edentulous patient, some form of stabilization of the maxillary arch is also considered.

The unstable occlusion in combination syndrome results in progressive bone resorption under partial denture bases. The only benefit of mandibular implant-supported overdenture is that it offers significant improvement in retention, stability, function, and comfort for the patient and a more stable and durable occlusion.^[10]

According to Langer *et al.*,^[11] a well-designed removable partial denture and an overdenture provide a more predictable prognosis, especially for patients who already have the combination syndrome or whose mandibular anterior teeth are structurally or periodontally compromised or over-erupted.

Regarding the occlusal scheme to be given in the prosthesis, Jameson^[12] suggested the use of linear occlusion eliminating anterior contact. Unlike traditional occlusal scheme, linear occlusion consists of masticatory surfaces which are flat or monoplane with no cuspal inclines with less vertical overlap of anteriors. As anterior contact was eliminated, the potential for further bone loss caused by anterior hyperfunction syndrome is also reduced.

OTHER ADDITIONAL FACTORS TO BE TAKEN INTO CONSIDERATION ARE

Fabrication of removable partial denture with even stress distribution – A cast partial denture can be made with minimum stress on the remaining natural teeth. This cast partial denture should have maximum coverage at distal extension at the retromolar pad and buccal shelf area. Altered cast impression technique can be used for the distal extension RPD.

During teeth arrangement, anterior teeth should be used for phonetics and cosmetic purposes only so that there is only less anterior occlusal load. Occlusal scheme should be in correct centric and vertical relation. Posteriors should be in balanced occlusion. A metal reinforced maxillary complete denture and mandibular teeth supported overdenture can also be an option.

CONCLUSION

Destructive changes of hard and soft tissues can be avoided by preventing combination prosthesis and by retaining mandibular posterior teeth by endodontic or periodontal treatment. Once the patient is presented with the syndrome proper treatment, option should be done to prevent further bone loss. Ill-fitting dentures are responsible for all the lesions of edentulous tissues, but it is inevitable because there will be gradual resorption of alveolar bone even under well-fabricated lower partial dentures. Frequent relining of ill-fitting dentures slows down resorption but it does not stop the development of combination syndrome. Relining of the distal extension denture base compensates for its resorption because it maintains posterior occlusal contact. An important measure to be taken is that the patient should be recalled periodically for checkup and assessment of removable dentures. Removable dentures need periodic attention at least as often as the natural teeth for checking any tissue changes.

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