

# Combination syndrome

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Combination syndrome, first identified by Kelly in 1972, is found in patients wearing a complete maxillary denture, opposing a mandibular distal extension prosthesis. The group of complications occurring in these patients are interlinked to one another and collectively represent a syndrome. The manifestations include flabby tissues in the anterior part of the maxillary ridge, tilting of the occlusal plane posteriorly downwards, supraeruption of lower anteriors, fibrous overgrowth of tissues in maxillary tuberosities, resorption in mandibular distal extension area and decreased vertical dimension of occlusion. Treatment modality is determined by the apparent potential of the patient to develop the combination syndrome and the condition of the remaining mandibular anterior teeth. Predictable prognosis is offered by overdentures, especially for patients who already have the syndrome and using fixed mandibular prosthesis over implants placed immediately after dental extractions.

**Key words:** Maxillary tuberosity, epulis fissuratum, mandibular distal extension prosthesis

## INTRODUCTION

Specific oral destructive changes are often seen in patients with a maxillary complete denture and a mandibular distal extension partial denture. These changes have been referred to as the 'Combination Syndrome' [Figure 1].

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."<sup>[1]</sup>

### Clinical changes

Ellsworth Kelly was the first person to use the term 'Combination Syndrome'. Kelly<sup>[2]</sup> 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 [Figure 2]. 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.

Saunders *et al*<sup>[3]</sup> later described six additional signs associated with the syndrome [Figure 3]. 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

The Combination syndrome progresses in a sequential manner.

According to Kelly,<sup>[1]</sup> 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].

Excessive bony resorption under the lower removable partial denture bases occurs to permit these changes and inflammatory papillary hyperplasia often develops in the palate.



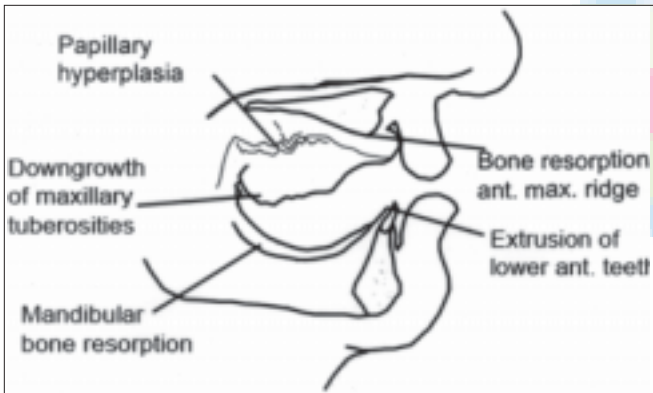
**Figure 1:** Patient with edentulous maxillae and remaining mandibular anterior teeth

## 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 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.

## PREVALENCE AMONG DENTURE PATIENTS

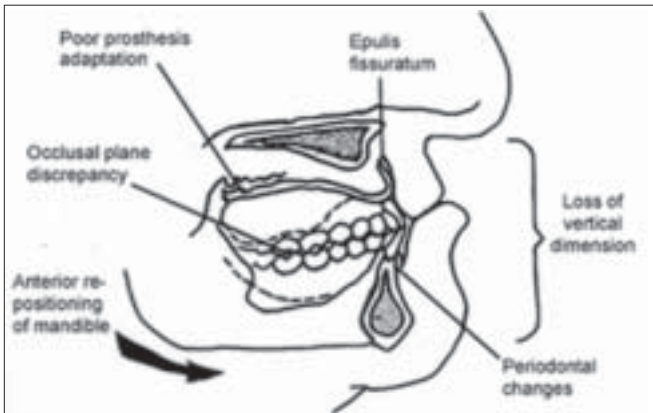
Shen and Gongloff in 1989, reviewed records of 150 maxillary edentulous patients.<sup>[4]</sup>



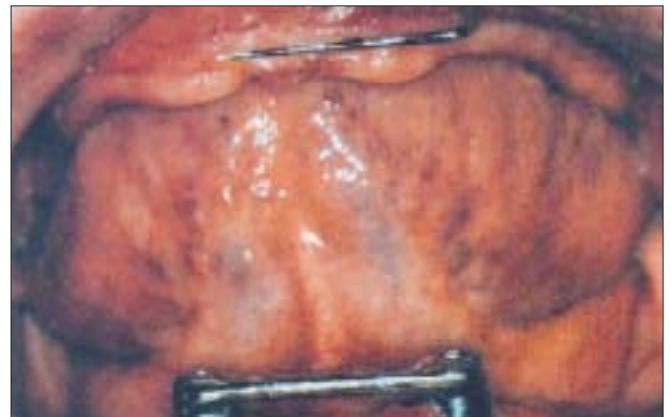
**Figure 2:** Five potential clinical changes referred to as the 'combination syndrome'



**Figure 4:** Diagnostic mounting reveals occlusal plane discrepancy and need for tuberosity reduction



**Figure 3:** Six additional clinical changes often found in patients with edentulous maxillae and partially edentulous mandibles



**Figure 5:** Implants used to support and retain mandibular prosthesis

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.<sup>[3]</sup>

### 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.)

Kelly<sup>[2]</sup> 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*<sup>[3]</sup> 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.

**Patient education and frequent recall and maintenance care are essential, if the development of this insidious syndrome is to be avoided.**

### Treatment approaches

- In 1985, Stephen M. Schmitt<sup>[5]</sup> described a treatment approach that attempted to minimize the destructive changes, by using the treatment objectives of Saunders *et al.*
  - 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 [Figure 5].<sup>[6]</sup>
- Implant supported fixed prosthesis.<sup>[7]</sup>
- Some form of stabilization of the maxillary arch.<sup>[6]</sup>
  - retention of maxillary overdenture abutments.
  - maxillary osseointegrated implants.
  - augmentation of maxilla with resorbable hydroxyapatite in conjunction with a guided tissue regeneration technique and vestibuloplasty.
- In 2001, Wennerberg *et al* reported excellent long-term results with mandibular implant supported fixed prostheses, opposing maxillary complete dentures.<sup>[7]</sup>

Sigvard Palmqvist *et al* in 2003, 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.<sup>[8]</sup>

They concluded that combination syndrome does not meet the criteria to be accepted as a medical syndrome. The single features associated with the combination syndrome exist, but to what extent or in which combination has not been clarified.

### CONCLUSION

Almost inevitable degenerative changes develop in the edentulous regions of wearers of complete upper

and partial lower dentures. The dentist should approach the treatment of these patients cautiously and the institution of correct treatment initiatives is essential. Every patient must be made aware from the outset, that the longest possible life of any prostheses with the least possible harm to the remaining tissues, can only be ensured by regular recall and maintenance care.

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