VOLUME-7, ISSUE-2, FEBRUARY-2018 • PRINT ISSN No 2277 - 8160

Original Research Paper

Prosthodontics

COMBINATION SYNDROME - A REVIEW

Dr. Renu Gupta HOD, Department of prosthodontics, Govt. Dental College, Shimla, H.P.

Dr. R. P. Luthra Principal, Govt. Dental College, Shimla, H.P.

Dr. Rajender Singh* PG Student, Department of prosthodontics, Govt. Dental College, Shimla, H.P.
*Corresponding Author

ABSTRACT 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.

KEYWORDS : Maxillary tuberosity, epulis fissuratum, mandibular distal extension prosthesis

Specific oral destructive changes are often seen in patients with a maxillary complete denture and a mandibular distal extension partial denture.[1] The group of complications which representing as a syndrome are interlinked to one another progressing in a sequential manner is known as 'combination syndrome' by Ellsworth Kelly in 1972.[2]

The Glossary of Prosthodontic Terms[3] defines combination syndrome as "the characteristic features that occur when an edentulous maxillae is opposed by natural mandibular anterior teeth and a mandibular bilateral extension-base removable partial denture, including loss of bone from the anterior portion of the maxillary ridge, hyperplasia of the tuberosities, papillary hyperplasia of the hard palate's mucosa, supraeruption of the mandibular anterior teeth, and loss of alveolar bone and ridge height beneath the mandibular removable partial denture bases; syn, anterior hyperfunction syndrome".

Clinical features

Kelly[2] originally described combination syndrome in a number of patients with maxillary complete dentures opposing natural mandibular teeth and a distal extension removable partial denture. He described five signs or symptoms that commonly occurred in this situation (Fig. 1). They include:-

- Loss of bone from anterior part of maxillary ridge.
- Overgrowth of tuberosities.
- Papillary hyperplasia in the hard palate.
- Extrusion of lower anterior teeth.
- Loss of bone under partial denture base.

Saunders *et al,*[1] in 1979 described 6 additional changes associated with this syndrome (Fig. 2). They include:-

- Loss of vertical dimension of occlusion.
- Occlusal plane discrepancy.
- Anterior spatial repositioning of mandible.
- Poor adaptation of prosthesis.
- Epulis fissuratum.
- Periodontal changes.

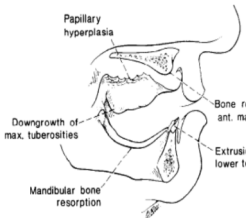

Fig. 1. Five changes described by Kelly

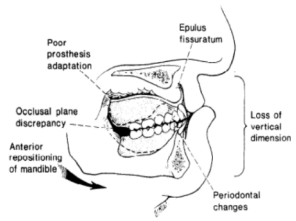

Fig. 2. Six additional changes described by Saunders *et al*

Classification of combination syndrome

Kelly[2] was the first person to use the term "combination syndrome." He believed that the key to many symptoms of the combination syndrome is the early loss of bone from the anterior part of the maxillary jaw.[4] Clinically relevant classification of combination syndrome was proposed by Len Tolstunov.[5] Three classes and 10 modifications of CS are described below. An anterior maxillary resorption resulting from the force of anterior mandibular teeth is the key feature of this classification. Maxillary edentulous condition defines the class, mandibular the modification within the class. (Fig. 3 and 4)

- Class I: Maxilla: completely edentulous alveolar ridge. Mandible: Modification 1 (M1): partially edentulous ridge with preserved anterior teeth only. Modification 2 (M2): stable "fixed" full dentition (natural teeth or implant-supported crowns/bridges). Modification 3 (M3): partially edentulous ridge with preserved teeth in anterior and one posterior region.
- Class II: Maxilla: partially edentulous alveolar ridge with teeth present in both posterior regions, edentulous and atrophic anterior region. Mandible: modifications are the same as in Class I (M1, M2, and M3).
- Class III: Maxilla: partially edentulous alveolar ridge with teeth present in one posterior region only, edentulous and atrophic anterior and one posterior region.Mandible: modifications are consistent with Class I and II (M1, M2, M3A, and M3B).

This classification is based on what seems to be the dominant feature of most CS cases—an edentulous premaxilla with an advanced resorption of anterior maxillary bone and overgrowth of the anterior mandibular bone with extrusion (super-eruption) of lower front teeth.

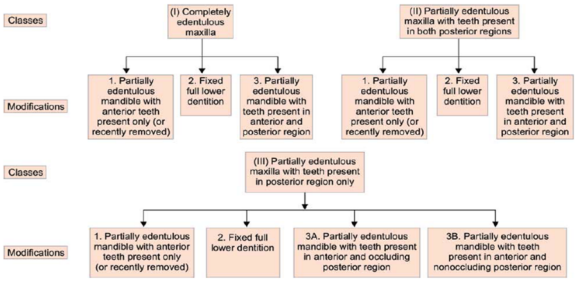

Fig. 3. Classification of combination syndrome: 3 classes and 10 modifications (10 clinical presentations of the combination syndrome).

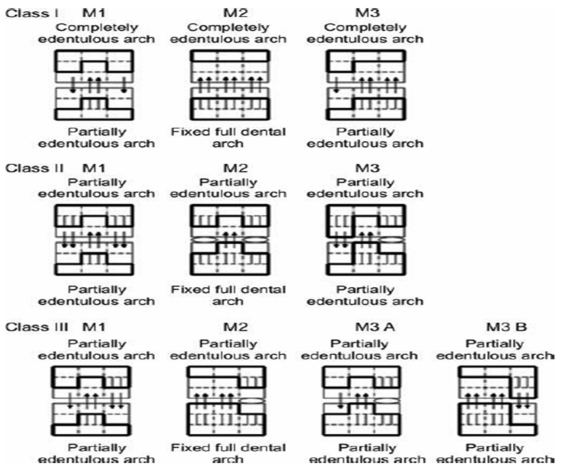

Fig. 4. Classification of combination syndrome (CS): 3 classes and 10 modifications. M: CS modifications (M1, M2, M3, A and B); shapes in solid heavy lines represent bone-teeth complex that undergoes changes in the particular modification of CS (maxillary and mandibular jaw/teeth shapes match, like a jigsaw puzzle); arrows: the direction of alveolar remodeling (hypertrophy) and teeth movement (super-eruption) in certain jaw regions (single arrows—moderate degree: in cases of edentulous regions opposed each other, double arrows—severe degree: in cases when an edentulous region is opposed by teeth); 3 columns represent anterior and 2 posterior stomatognathic regions; basal row represents bone (alveolar ridge), middle row represents dentition, and top row represents bone and teeth remodeling changes (atrophy, hypertrophy, extrusion) in a particular modification of CS; vertical thin solid lines: natural teeth (fixed dentition) or an implant supported bridge in a specific region of the jaws; oval represents no change status (no bone remodeling or teeth movement) in the region of preserved posterior occlusion

Pathogenesis

Combination syndrome progresses in a sequential manner. The progress of the disease can occur in any of the following sequences.

Sequence 1 (Ellisworth Kelly)[2]

1. Patient tends to concentrate the occlusal load on the remaining natural teeth (mandibular anteriors) for proprioception. Hence there is more force acting on the anterior portion the maxillary denture.
2. This leads to an increased resorption of anterior part of the maxilla which gets replaced by flabby tissue.The occlusal plane gets tilted anteriorly upwards and posteriorly downwards.
3. The labial phalange will displace and irritate the labial vestibule leading to formation of epulis fissuratum. Posteriorly there will be a fibrous overgrowth of the tissues in the maxillary tuberosity.
4. The shift of the occlusal plane posteriorly downwards produces resorption in the mandibular distal extension denture bearing area.
5. Mandible shifts anteriorly during occlusion.
6. The vertical dimension at occlusion is decreased. The retention and stability of the denture is also reduced.
7. The tilt in the occlusal plane disoccludes the lower anteriors causing them to supraerupt. This reduces the periodontal support of the anterior teeth.
8. The supraerupted anteriors increase the amount of force acting on the anterior part of the complete denture and the vicious cycle continues.

Sequence 2 (Saunders et al)[1]

1. Gradual resorption of the distal extension residual ridge in the mandible.
2. Tilting of the occlusal plane posteriorly downwards ands and anteriorly upwards. Rest of the vicious cycle continues as sequence 1.
3. 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.

Histopathological Changes

Histopathology of hyperplastic anterior ridge tissue and fibrous tissue over tuberosities are indistinguishable with mature, dense fibrous connective tissue consisting of bundles of collagen fibers, few cellular elements, and a very few inflammatory cells.[2] This is also similar to the histopathology of mature epulis fissuratum. Similarity of histopathology of all three conditions (hyper plastic tissue, fibrous tissue, epulis fissuratum) may be attributed to similar tissue response to prolonged trauma from denture base.

Prevalance

Shen & Gongloff in 1989, reviewed records of 150 maxillary edentulous patients who had maxillary complete dentures and mandibular anterior natural teeth. One in four demonstrated changes consistent with the diagnosis of combination syndrome.[6]

Mehmet Ali Kilicarslan *et al* in 2012, examined the clinical and prosthetic status of 100 maxillary edentulous patients with four different mandibular occlusal schemes to evaluate the prevalence of and oral risk factors for combination syndrome. Only nine patients were found to have all five symptoms of combination syndrome. All of these patients used dentures. Eight of them had Kennedy class I and one had Kennedy class II mandibular occlusal schemes.[7]

Prevention of combination syndrome

- Avoid combination of maxillary complete dentures opposing class mandibular R.P.D
- Retaining weak posterior teeth as abutments by means of endodontic and periodontic treatment.
- An over denture 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.[1]

Systemic and dental considerations

- Review of medical and dental history.
- Through clinical and radiographic evaluation of both hard and soft tissues, associated with prosthesis wear.
- Resolution of any inflammation if present.
- Evaluation of patients caries susceptibility, periodontal status and oral hygiene.
- Factors to be considered in tooth to be used as abutment include 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[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 tratment objective

Saunders *et al*[1] in 1979 stated that, the basic treatment objectives in treating these patients is to develop an occlusal scheme that discourages excessive occlusal pressure in maxillary anterior regions in both centric and eccentric positions.They also stated some specific objectives:-

- Mandibular R.P.D should provide positive occlusal support from the remaining anterior teeth and have maximum coverage of basal seat beneath 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 maintainance care are essential, if the development of this insidious syndrome is to be avoided.

Treatment approaches

- Stephen M. Schmitt,[8] 1985 described a treatment approach that attempted to minimize the destructive changes by using the treatment objectives of Saunders et al.
  - Prosthesis is made in 2 stages.
  - Mandibular R.P.D is completed first.
  - Acrylic resin teeth are used to replace maxillary anterior teeth.
  - Cast gold occlusal surfaces for posterior denture teeth.
- Mandibular overdenture produced better prognosis in patients who already had combination syndrome and whose mandibular 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.[9]
- Some form of stabilization of the maxillary arch.[9]
  - retention of maxillary overdenture abutments.
  - maxillary osseointegrated implants.
  - augumention of maxilla with resorbable hydroxyapatite in conjunction with a guided tissue regeneration technique and vestibuloplasty.
- Implant supported fixed prosthesis.[10]
- In 2001 Wennerberg et al reported excellent long term results with mandibular implant supported fixed prosthesis, opposing maxillary complete dentures.[10]
- Yair Langer et al[11] described an approach in which maxillary impression is made in a specially designed tray using a combination of elastomeric impression material and impression plaster without distorting the anterior residual ridge**.** The mandibular RPD is supported anteriorly by cingulum rests on the canines with a lingual plate as the major connector. The lingual plate delays the overeruption of the mandibular teeth, preventing undesirable anterior pressure on the anterior part of the maxillary denture. Optimum fit of the denture base is achieved using the altered cast technique. Posteriorly, maximum support is obtained by extending the denture base to cover the retromolar pad. The attachments of the buccinator, superior constrictor, and temporalis muscles to the retromolar pad and the overlying firmly bound masticatory mucosa provide a stress-bearing region that is relatively resistant to resorptive change, thereby maintaining posterior occlusal contact. Coverage of the horizontal buccal shelf with its superior layer of cortical bone, submucous layer with glandular connective tissue, and buccinator muscle fibers provides primary- support for the denture base. Maximum occlusal support posteriorly with no contact anteriorly in centric occlusion and a balanced articulation in eccentric movements further reduce pressure on the anterior maxillary ridge.

After treatment is completed, it is essential to maintain recall appointments at 3, 6, and 12 months during the first year to observe any changes in posterior support. If acrylic tooth wear and support are lost in the posterior regions, accelerated premaxilla atrophy will develop from excessive forces. Bilateral balanced occlusion is essential for long term success.[12]

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 essential. Every patient must be made aware from the outset, that the longest possible life of any prosthesis with the least possible harm to the remaining tissues, can only be ensured by regular recall and maintenance care.

REFERENCES

1. Saunders T R, Gillis R E, Desjardins R P. The maxillary complete denture opposing the mandibular bilateral distal-extension partial denture: Treatment considerations. J Prosthet Dent 1979;41: 124-128.
2. Kelly E. Changes caused by a mandibular removable partial denture opposing a maxillary complete denture. J Prosthet Dent 1972; 27: 140-150.
3. The glossary of prosthodontic terms. J Prosthet Dent 2017 May;117(5S):e1-e105.
4. Palmqvist S, Carlsson GE, Owall B. The combination syndrome: a literature review. J Prosthet Dent 2003;90:270–275.
5. Tolstunov L. Combination syndrome: classification and case report. J Oral Implantol 2007;33:139-151.
6. Shen K, Gongloff RK. Prevalence of the 'combination syndrome' among denture patients. J Prosthet Dent 1989;62:642-4.
7. Kilicarslan MA, Akaltan F, Kasko Y, Kocabas Z. Clinical evaluation of maxillary edentulous patients to determine the prevalence and oral risk factors of combination syndrome. Journal of Dental Sciences 2012; xx:1-6.
8. Schmitt SM. Combination syndrome: A treatment approach. J Prosthet Dent 1985;54:664-70.
9. Thiel CP, Evans DB, Burnett RR. Combination syndrome associated with a mandibular implant-supported overdenture: A clinical report. J Prosthet Dent 1996;75:107-1
10. Wennerberg A, Carlsson GE, Jemt T. Influence of occlusal factors on treatment outcome: A study of 109 consecutive patients with mandibular implant-supported fixed prosthesis opposing maxillary complete dentures. Int J Prosthodont 2001;14:550-5.
11. Langer Y, Laufer BZ, Cardash HS. Modalities of Treatment for the Combination Syndrome. J Prosthodont 2007;4: 76-81.
12. Cabianca M. Combination Syndrome: Treatment With Dental Implants. Imp dent 2003;12:300-305