

Combination Syndrome

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Abstract:

Combination syndrome, first described by Kelly in 1972, occurs in patients with a complete maxillary denture opposing a mandibular distal extension prosthesis. This syndrome encompasses a series of interrelated complications, which collectively characterize the condition. The key manifestations include the development of flabby tissues in the anterior region of the maxillary ridge, posterior downward tilting of the occlusal plane, supraeruption of the mandibular anterior teeth, fibrous tissue overgrowth in the maxillary tuberosities, resorption of the mandibular distal extension area, and a reduced vertical dimension of occlusion. The treatment approach is based on the patient's susceptibility to developing combination syndrome and the condition of the remaining mandibular anterior teeth. Overdentures provide a predictable prognosis, especially for patients already exhibiting the syndrome. Additionally, the use of fixed mandibular prostheses supported by implants placed immediately after dental extractions offers a favorable outcome.

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

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INTRODUCTION:

Specific oral destructive alterations are commonly observed in patients wearing a maxillary complete denture paired with a mandibular distal extension partial denture. These alterations are collectively known as "Combination Syndrome."

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."

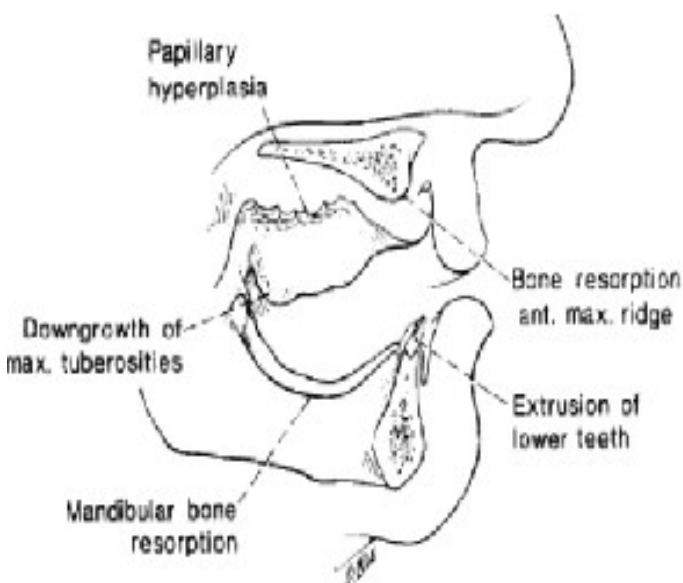
Ellsworth Kelly was the first to coin the term "Combination Syndrome." Kelly initially identified the syndrome in a group of patients with complete maxillary dentures opposing natural mandibular teeth and a distal extension removable partial denture (RPD). He outlined five common signs or symptoms typically observed in this scenario. These includes -

- Resorption of bone in the anterior region of the maxillary ridge.
- Overdevelopment of the tuberosities.
- Papillary hyperplasia of the hard palate.

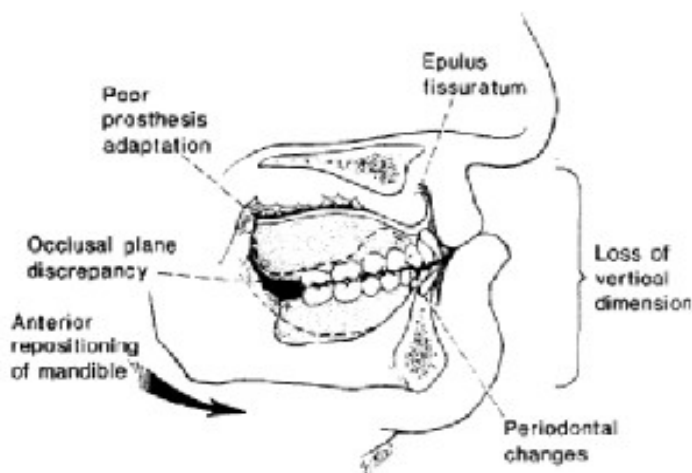
- Extrusion of the mandibular anterior teeth.
- Resorption of bone beneath the partial denture bases.

Saunders et al. [3] later identified six additional signs associated with the syndrome, which include:

- Loss of vertical dimension of occlusion.
- Discrepancy in the occlusal plane.
- Anterior shifting of the mandibular position.
- Poor adaptation of the prostheses.
- Epulis fissuratum.
- Periodontal changes.^{1,2,3}



Patient with edentulous maxillae and remaining mandibular anterior teeth



Six additional clinical changes often found in patients with edentulous maxillae and partially edentulous mandibles

ETIOPATHOGENESIS OF COMBINATION SYNDROME

Combination Syndrome (CS) arises due to the imbalance in occlusal forces caused by a completely edentulous maxilla opposed by natural mandibular anterior teeth without adequate posterior occlusal support. The pathogenesis of this condition involves biomechanical, functional, and structural changes in both hard and soft tissues.

1. Biomechanical and Functional Factors

The primary etiological factor of CS is the uneven occlusal force distribution that leads to excessive pressure on the maxillary anterior ridge. This causes:

- **Localized Pressure on the Premaxilla:** The absence of posterior support results in excessive functional loads on the anterior maxillary ridge, leading to rapid resorption of bone¹.
- **Loss of Posterior Occlusal Support:** Without posterior teeth, the posterior mandibular ridge lacks functional stimulation, leading to progressive ridge atrophy².
- **Proclination and Overeruption of Mandibular Anterior Teeth:** Lack of occlusal stability causes these teeth to migrate labially³.
- **Displacement of the Maxillary Denture:** Due to maxillary bone loss and tuberosity overgrowth, denture retention and stability decrease significantly⁴.



Bone Resorption Patterns

Occlusal imbalances alter bone remodeling, leading to distinct resorption patterns:

- **Maxillary Anterior Ridge Resorption:** Excessive pressure from the opposing mandibular teeth accelerates anterior maxillary bone loss⁵.
- **Maxillary Tuberosity Enlargement:** The absence of occlusal function in the posterior maxilla leads to compensatory hyperplastic growth of the maxillary tuberosities⁶.
- **Posterior Mandibular Ridge Resorption:** Due to the absence of occlusal forces, the posterior mandibular ridge undergoes continued resorption, affecting future prosthetic rehabilitation⁷.

3. Soft Tissue Changes

The hard tissue alterations in CS are accompanied by notable soft tissue changes, including:

- **Papillary Hyperplasia:** Chronic irritation from an unstable denture leads to hyperplastic, inflamed tissue formations on the palate⁸.
- **Flabby Ridge Formation:** The anterior maxillary ridge becomes replaced by mobile, fibrous tissue, affecting denture retention and function⁵.
- **Mucosal Thinning and Ulceration:** Chronic mechanical trauma from an unstable denture contributes to mucosal thinning, irritation, and ulceration⁹.

4. Occlusal Changes and Functional Impairments

Due to progressive loss of occlusal stability, patients with CS experience:

- **Loss of Vertical Dimension of Occlusion (VDO):** Continuous bone resorption leads to a decrease in vertical dimension, impacting esthetics and function⁴.
- **Altered Speech and Mastication:** Phonetic difficulties arise due to instability of the prosthesis, while chewing efficiency declines due to a compromised occlusion³.
- **Temporomandibular Joint (TMJ) Dysfunction:** The loss of occlusal stability and increased functional stress can contribute to TMJ disorders⁶.

5. Role of Prosthesis-Induced Factors

Several prosthodontic factors accelerate CS progression, including:

- **Ill-Fitting Dentures:** Poorly adapted dentures exacerbate ridge resorption and lead to chronic irritation¹⁰.
- **Inappropriate Occlusal Schemes:** Improper occlusal designs lead to uneven force distribution, worsening the condition⁵.

PREVALENCE AMONG DENTURE PATIENTS

In 1989, Shen and Gongloff reviewed the records of 150 patients with maxillary edentulism.

Among patients with complete maxillary dentures and natural mandibular anterior teeth, one in four showed changes that were consistent with the diagnosis of combination syndrome.

Prevention of Combination Syndrome

- Avoid using complete maxillary dentures in opposition to a class I mandibular removable partial denture (RPD).
- Preserve weakened posterior teeth as abutments through endodontic and periodontic treatments.
- Consider an overdenture for the lower teeth.^{3,4}

Clinical Manifestations

The classic clinical presentation of Combination Syndrome includes:

- Flabby, resorbed anterior maxillary ridge – Progressive resorption of the anterior maxillary ridge occurs due to excessive occlusal forces from the opposing natural mandibular anterior teeth¹.
- Enlarged, hypertrophic maxillary tuberosities – The loss of posterior occlusion results in excessive functional stimulation of the tuberosities, causing compensatory overgrowth².
- Poor retention and stability of maxillary denture – Due to the ridge resorption and tuberosity enlargement, maxillary dentures lose their stability, affecting masticatory efficiency and phonetics³.
- Palatal hyperplasia and inflammation due to chronic trauma – Prolonged denture wear without proper occlusal balance can lead to hyperplastic tissue changes in the palate, often associated with chronic irritation from an unstable prosthesis⁴.

- Extrusion and proclination of mandibular anterior teeth – Without posterior occlusal support, the mandibular anterior teeth tend to overerupt and migrate labially, leading to further occlusal imbalances⁵.
- Progressive resorption of mandibular posterior ridges – The absence of functional stimulation in the posterior mandible results in ridge resorption, which compromises future prosthetic rehabilitation⁶.
- Difficulty in mastication and speech due to occlusal instability – Loss of proper occlusion leads to inefficient mastication and articulation difficulties, significantly impacting the patient's quality of life³.

DIAGNOSIS

A comprehensive diagnostic approach is essential for identifying Combination Syndrome and formulating an effective treatment plan. Diagnostic methods include²:

- **Clinical Examination:** Evaluation of occlusion, ridge resorption, denture stability, and soft tissue changes.
- **Radiographic Assessment:** Panoramic and periapical radiographs help assess bone resorption patterns, while CBCT (Cone-Beam Computed Tomography) provides detailed three-dimensional imaging for advanced cases.
- **Occlusal Analysis:** Mounted diagnostic casts and articulation studies help evaluate occlusal discrepancies.
- **Patient History:** Understanding the patient's prosthetic history, symptoms, and functional difficulties is crucial for comprehensive assessment.^{3,4}

MANAGEMENT STRATEGIES

The treatment of Combination Syndrome requires a multidisciplinary approach that combines preventive, prosthodontic, surgical, and implant-based strategies-

1. Preventive Approaches

- Early identification and intervention to preserve remaining teeth and ridges.
- Use of overdentures supported by retained roots or implants to maintain posterior occlusion.

- Patient education on the importance of balanced occlusion and denture maintenance.

2. Prosthodontic Management

- Fabrication of complete dentures with proper occlusal schemes, such as lingualized occlusion, to distribute forces evenly.
- Use of resilient liners or tissue conditioners to enhance denture retention and patient comfort.
- Removable partial dentures to provide additional posterior support where possible.

3. Surgical Interventions

- Maxillary tuberosity reduction in cases of excessive overgrowth to improve denture seating.
- Vestibuloplasty and ridge augmentation procedures to improve prosthetic support.
- Removal of hyperplastic tissue and correction of occlusal plane discrepancies.

4. Implant-Based Rehabilitation

Recent advances in implantology have significantly improved the management of Combination Syndrome. Implant-supported prostheses provide superior stability and function. Options include:

- All-on-4 and All-on-6 implant-supported dentures to restore full-arch function.
- Mini-implants for cases with severe ridge resorption where conventional implants are not feasible.
- Implant-retained overdentures to enhance retention and prevent further ridge resorption.^{2,6}

CONCLUSION

Combination Syndrome remains a significant challenge in prosthodontics, affecting both function and esthetics. Early diagnosis, patient education, and the use of advanced prosthetic and implant solutions can significantly improve outcomes. The integration of digital technology and interdisciplinary treatment planning holds promise for enhanced rehabilitation strategies. Further research is needed to refine treatment protocols and explore innovative biomaterials for long-term success.

REFERENCES

1. Kelly E. Changes caused by a mandibular removable partial denture opposing a maxillary complete denture. *J Prosthet Dent.* 1972;27(2):140-150.
2. Kelsey CC, Lang BR, Wong M. Methods for improving retention and stability of complete maxillary dentures in patients with Combination Syndrome. *J Prosthodont.* 2018;27(6):530-537.
3. Zarb GA, Hobkirk J, Eckert SE, Jacob RF. *Prosthodontic Treatment for Edentulous Patients.* 13th ed. St. Louis: Mosby; 2013.
4. Misch CE. *Contemporary Implant Dentistry.* 4th ed. St. Louis: Elsevier; 2020.
5. Fenlon MR, Sherriff M. The prevalence of Combination Syndrome in edentulous patients. *Br Dent J.* 2019;226(5):347-351.
6. Bidra AS, Agar JR. A systematic review of implant-supported overdentures. *J Prosthet Dent.* 2012;107(3):166-172.
7. Chrcanovic BR, Kisch J, Albrektsson T, Wennerberg A. Factors influencing implant failure. *Clin Implant Dent Relat Res.* 2018;20(6):852-879.
8. Sadowsky SJ. Implant overdentures: treatment planning and prosthodontic considerations. *Dent Clin North Am.* 2014;58(1):143-159.
9. Yuan JC, Sukotjo C. Digital workflow in complete denture prosthodontics. *Dent Clin North Am.* 2019;63(2):345-363.
10. Balshi TJ, Wolfinger GJ. Immediate loading of implants in edentulous maxilla. *J Oral Implantol.* 2011;37(3):345-354.
11. Tolstunov L. Combination syndrome: classification and case report. *J Oral Implantol.* 2007;33(3):139-15
12. Carlino P, Pettini F, Cantore S, Ballini A, Grassi FR, Pepe V. Surgical and prosthetic rehabilitation of combination syndrome. *Case Rep Dent.* 2014;2014:18621
13. Bidra AS, Agar JR. A systematic review of implant-supported overdentures. *J Prosthet Dent.* 2012;107(3):166-172.
14. Chrcanovic BR, Kisch J, Albrektsson T, Wennerberg A. Factors influencing implant failure. *Clin Implant Dent Relat Res.* 2018;20(6):852-879.
15. Sadowsky SJ. Implant overdentures: treatment planning and prosthodontic considerations. *Dent Clin North Am.* 2014;58(1):143-159.
16. Yuan JC, Sukotjo C. Digital workflow in complete denture prosthodontics. *Dent Clin North Am.* 2019;63(2):345-363.
17. Balshi TJ, Wolfinger GJ. Immediate loading of implants in edentulous maxilla. *J Oral Implantol.* 2011;37(3):345-354.