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CASE REPORT

**PROSTHODONTIC MANAGEMENT OF A PATIENT WITH COMBINATION SYNDROME:
A CLINICAL CASE REPORT**

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ABSTRACT

A 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. It commonly occurs in patients with a completely edentulous maxilla opposed by a bilateral distal-extension removable partial denture. This syndrome poses a considerable challenge to dentists. The symptoms of the syndrome consist of anterior maxillary bone loss, mandibular bone loss, tuberosity overgrowth, and alveolar ridge canting. All of these effects render prosthetic treatment more difficult, and although it is preferable to use dental implants for functional support, complex cases still require conventional prosthetic treatments for medical or financial reasons. This clinical report presents the prosthodontic management of a patient exhibiting a condition that can proceed to combination syndrome, using soft denture lining material and modified impression technique along with a discussion of relevant literature.

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INTRODUCTION

The oral rehabilitation of patients with an edentulous maxilla opposed by natural mandibular anterior teeth is a considerable challenge for many clinicians. These cases pose many potential problems, including loss of bone from the anterior edentulous maxilla and super-eruption of unopposed mandibular anterior teeth. Kelly (1972) proposed the term combination syndrome for this oral condition and its resultant clinical features. The Glossary of Prosthodontic Terms [1] has defined 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 posterior mandibular removable dental prosthesis bases – also called anterior hyperfunction syndrome. Kelly (1972) [2] observed 20 patients equipped with complete maxillary dentures opposing distal-extension removable partial dentures (RPD). After three years of follow-up, six of these patients showed a reduction of the anterior bony ridge height on lateral cephalometric radiography. Meanwhile, an increasing bone level of the tuberosities was noted in five patients. Kelly (1972) proposed the preservation of posterior teeth to support lower partial dentures and a more stable occlusion to avoid combination syndrome. Preservation of posterior occlusion and avoidance of anterior hyperfunction are considered the primary treatment suggestions for this complex condition. Saunder et al (1979) [3] and Jameson (2001) [4] suggested the use of an alternative tooth form and occlusal concept (linear occlusion) and

minimum anterior contact for reducing further bone loss caused by hyperfunction of 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 in denture bases, 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. Prosthodontic management or prevention of such condition may involve the redistribution and redirection of forces. The use of soft denture lining material can be recommended in such condition to distribute functional load. Soft denture liners are applied to the intaglio surface of dentures to achieve a more even force distribution, to reduce localized pressures and to have a cushioning effect between the denture and underlying denture bearing tissues [5]. These properties make resilient liners useful for treating patients with atrophic or resorbed ridges, bony undercuts, bruxism, soreness, knife-edge ridges, congenital or acquired oral defects requiring obturation, xerostomia and dentures opposing natural teeth.

According to Tolstunov [6], CS can be classified into the following

1. **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.
2. **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).
3. **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 Classes I and II (M1, M2, M3A, and M3B).

The present report details the prosthodontic management of a patient exhibiting a condition that can lead to combination syndrome, using soft lining material.

Case report

A 63-year-old female patient was referred to the department for restorative treatment. The patient's chief complaints were inadequate retention of maxillary complete denture and inability to chew comfortably. No major systemic diseases or drug allergies were reported. On examination, the patient had an edentulous maxilla and ten natural mandibular anterior teeth (Figure 1). Clinically, the patient displayed flabby tissue of the maxillary ridge, overgrowth of the maxillary tuberosities, and over-erupting mandibular anterior teeth with spacing between mandibular central incisors. The patient rejected any surgery and implant therapy due to financial considerations. The patient agreed to have a new complete denture and a mandibular removable partial denture



Figure 1 Pre operative view-A typical case of combination syndrome

Initial therapy included oral hygiene instructions, caries control, and nonsurgical periodontal therapy. At the first clinical appointment for prosthodontic treatment, a preliminary impression of the maxillary arch with impression compound and mandibular arch with irreversible hydrocolloid materials was made and poured with dental stone.(Fig 2)

A custom tray was fabricated for the maxillary arch impression and a three layered wax relief was applied to the anterior flabby tissue area. A green modeling compound was then used to obtain accurate denture border position and

Seal. (Fig 3)



Figure 2 Preliminary impression



Figure 3 maxillary border molding performed using custom tray with thick spacer in the anterior region

Final impression was obtained using zinc oxide eugenol impression paste after removing the wax spacer and making relief holes. (Fig 4)



Figure 4 maxillary secondary impression

Mandibular cast was modified before fabricating the custom tray to obtain functional impression. The dentulous area (where teeth are present) was entirely covered with impression plaster and a wall like structure was constructed which was free of any undercut. A custom tray was fabricated using shellac base plate covering entire area. Now border molding was performed only in the edentulous region using green modeling compound. (Fig 5)



Figure 5mandibular border molding of posterior edentulous area

Escape holes were made on the dentulous area and relief holes on the crest region of the edentulous area of the custom tray.

Functional impression was obtained using irreversible hydrocolloid for dentulous area and zinc oxide eugenol impression paste for edentulous region.(Fig 6) simultaneously.



Figure 6 secondary impression of mandibular arch

A definitive cast was created with type III dental stone. Record bases were fabricated over the master cast and bite registration was performed. (fig7)



Figure 7 bite registration with record bases and CR position is obtained

After the jaw relations, the maxillary and mandibular master casts were mounted in centric relation on the articulator. Selection of maxillary anterior artificial teeth was determined by patient gender and personality. Balanced occlusion was indicated for this case to assure an even distribution of occlusal force and prevent occlusal interferences on the residual ridge. The tooth arrangement was checked for esthetics and CR position and then submitted for processing.(Fig8)



Figure 8 try in to check esthetics and CR position

After prescrip, both casts were remounted, adjusted, and polished. At a subsequent appointment, the finished prostheses were delivered, soft lining material (Permasoft, Dentsply, New York, USA) (fig9a, b)was applied on maxillary denture and minimal occlusal adjustment was done.

The intaglio surface of the maxillary denture is roughened using bur. The powder & liquid was gently mix on the glass slab with p/l ratio -2.5:1.(Fig10). The mix was then applied over the intaglio surface and placed in the patient's mouth with opposing denture already in the mouth.All functional movements were performed and excess material was removed. The material thickness was kept 2-3 mm. The denture was

removed and kept in boiling water for 10-15 min for curing. After that the surface was dried and sealer was applied and allowed it to dry for atleast 5 min (.fig11) The denture was finally delivered to the patient (.Fig12)



Figure 9 a Permasoft soft denture liner b supplied with powder/ liquid form with sealer



Figure 10 mixing of soft lining material



Figure 11 maxillary denture with soft lining material



Figure 12 final prosthesis delivered

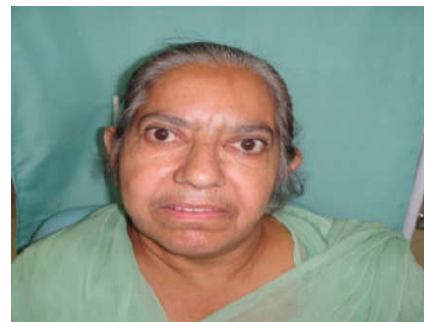


Figure 13 Post operative view

The patient was pleased with their appearance and chewing ability. A maintenance program including oral hygiene instruction and prosthesis home care was established.

DISCUSSION

Treatment of patients with an edentulous maxilla opposed to natural mandibular anterior teeth and a distal-extension RPD is considered a challenge for dental practitioners. Combination syndrome has a prevalence rate of approximately 24% for denture patients [7]. Therefore, it is necessary for dentists to understand the particular problems of patients and provide a comprehensive treatment plan. Increasing pressure on the premaxillary alveolar ridge and loss of adequate posterior occlusal contacts are important factors in relation to combination syndrome [7,8]. The bone loss in the midline of the maxilla observed by Kelly (1972) was 0.43 mm/year. López-Roldán et al (2009) [9] and Barber et al (1990) [10] reported similar results (0.32 mm/year and 0.36 mm/year, respectively) among patients wearing a maxillary complete denture and mandibular overdentures on two implants, a situation in which the prosthetics are biomechanically similar to Kelly's cases. Maximum support of the denture-bearing area, preservation of the mandibular posterior abutment, and balanced occlusion were all proposed to prevent bone loss and excess pressure on the anterior maxillary alveolar ridge. Similarly, Van Waas et al (1993) [11] suggested the avoidance of total tooth extraction, the preservation of a few teeth, and the use of overdentures.

In the present case, the mucostatic impression technique with relief at the anterior maxillary flabby tissue was applied to accurately record the entire functional denture-bearing area (Figure 3,4). Meanwhile, a proper occlusal plane, the balancing of tooth contacts during excursive movements, the elimination of anterior contacts, and remounting techniques were used to gain better distribution of occlusal force and reduce stress on the anterior maxillary alveolar ridge. For further distribution of force, the maxillary denture was relined with soft lining material (Permasoft-acrylic based autopolymerized resilient lining material). Autopolymerized resilient liner materials allow the clinician to reline a removable denture directly, intraorally. To provide an adequate shock absorption effect, the optimum liner thickness of approximately 2-3mm is required [12]. The use of these resilient lining material helps in absorbing the functional load on maxillary ridge by opposing natural teeth. The effect of mandibular status on maxillary ridge resorption has been widely discussed and investigated. Carlsson et al (1967) [13] compared bone resorption of the anterior maxillary alveolar ridge among patients with maxillary complete dentures and three different mandibular statuses: (1) a mandibular complete denture; (2) mandibular anterior teeth with bilateral extension RPD; and (3) mandibular teeth only. Greater bone resorption was found in the groups that had anterior mandibular teeth with or without an RPD when compared to the group with mandibular teeth only. However, small and insignificant changes of the bone height were described over five-years of follow-up in patients with a maxillary complete denture opposed by a bar-retained mandibular RPD [14]. Other studies [15, 16] showed no significant differences and proposed that the individual variations were larger, but the

experimental data revealed that greater bone resorption occurred among patients with unilateral or bilateral RPD. To prevent the occlusal and enhance the treatment of combination syndrome, we propose that (1) the distal-extension mandibular RPD may serve a negative role for the deterioration of combination syndrome [17]; and (2) the application of dental implants in edentulous areas, especially at premolar or molar regions, could provide better posterior support [18].

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