The maxillary complete denture opposing the mandibular bilateral distal-extension partial denture: Treatment considerations

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Specific oral destructive changes are often seen in patients with a maxillary complete denture and a mandibular bilateral distal-extension partial denture. Kelly[1] refers to a "combination syndrome" which consists of (1) loss of bone from the anterior part of the maxillary ridge, (2) downgrowth of the maxillary tuberosities, (3) papillary hyperplasia of the tissues of the hard palate, (4) extrusion of the lower anterior teeth, and (5) the loss of bone beneath the removable partial denture bases (Fig. 1). In addition to these five changes, six other associated changes are often noted: (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) epulus fissuratum, and (6) periodontal changes (Fig. 2).

The term "combination syndrome" is most appropriate because these changes are usually interrelated. Bone resorption beneath mandibular bilateral distal-extension bases is relatively common,[2] and for discussion purposes it is suggested that this change occurs first (Fig. 3). Since the inferior displacement of the bases of a mandibular removable partial denture is gradual, patients are seldom aware that a problem exists and do not seek professional help until many of the other aspects of the combination syndrome have developed.

Loss of mandibular posterior support results in a gradual decrease of occlusal load posteriorly and an increased occlusal load anteriorly. Eventually this increased pressure can result in resorption of the maxillary anterior residual alveolar ridge, whose overlying tissue may or may not atrophy, resulting in the possibility of various degrees of redundant tissue overlying the residual alveolar ridge (Fig 4, *A*).[3, 4] The dentist is then faced not only with a decrease in the available bony denture support but also with varying amounts of mobile soft tissue support.

As these resorptive changes occur, the vertical dimension of occlusion is likely to decrease and the occlusal plane gradually becomes lower posteriorly. The maxillary denture is displaced anteriorly and superiorly, with a resultant tendency to develop epulus fissuratum associated with the labial flange (Fig. 4, *B*) and an associated overgrowth of the fibrous tissue overlying the maxillary tuberosity (Fig. 4, *C*). The change in the occlusal plane also encourages of protrusive occlusal contact, with a risk of extrusion and flaring of the mandibular anterior teeth and associated periodontal changes. If some of these changes have occurred to a significant degree, the patient is likely to note decreased retention and stability of the maxillary complete denture. Unfortunately, this combination syndrome is all too often treated by relining only the maxillary complete denture, which merely perpetuates the existing problem. Kelly[1] postulated that this may further encourage overgrowth of the fibrous tuberosities because of the negative pressure introduced.

The palatal inflammatory and papillary changes are probably due to poor prosthesis adaptation, which progresses along with the other retrograde changes described (Fig. 4, *D*). These changes are also influenced by poor oral hygiene, the use of relief chambers, and certain predisposing factors.[5]

The pathologic changes which are sometimes

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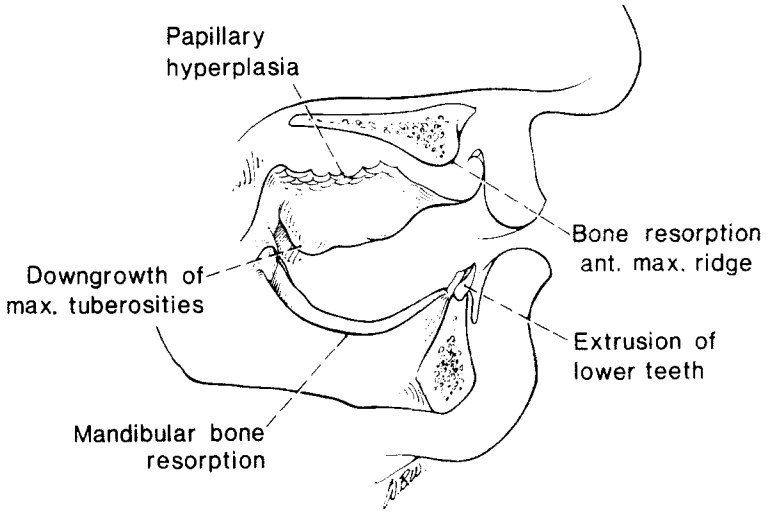

Fig. 1. Five potential clinical changes referred to as the combination syndrome.

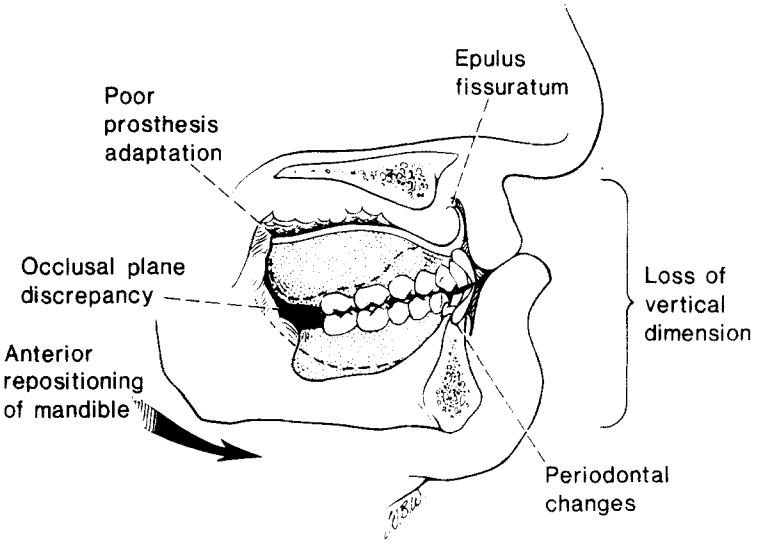

Fig. 2. Six additional clinical changes often found in patients with edentulous maxillae and partially edentulous mandibles.

noted in the periodontal ligaments can be directly or indirectly associated with the other resorptive changes of the combination syndrome. Depending on the design of the partial denture, the major connector may cause irritation of the lingual tissues or gingival stripping. There is an increased stress imposed on the teeth, which may result in thickening of the periodontal ligament, mobility, or both of abutment teeth or teeth engaged by the partial denture framework.[6]

SYSTEMIC AND DENTAL CONSIDERATIONS

A complete review of the patient's medical and dental history is essential in the analysis of this problem, since Stahl and associates[7] have stated that patients with systemic disease (such as diabetes or osteoporosis) show increased amounts of bone resorption when compared to healthy patients. A thorough clinical and radiographic evaluation of both the hard and soft tissues associated with prosthesis wear is an essential preliminary step in treating these patients.

Furthermore, any of the various inflammatory processes which may be present must also be resolved if successful prosthodontic treatment is to be rendered. An evaluation of the patient's caries susceptibility, periodontal status, and oral hygiene is also important. Other considerations including tooth

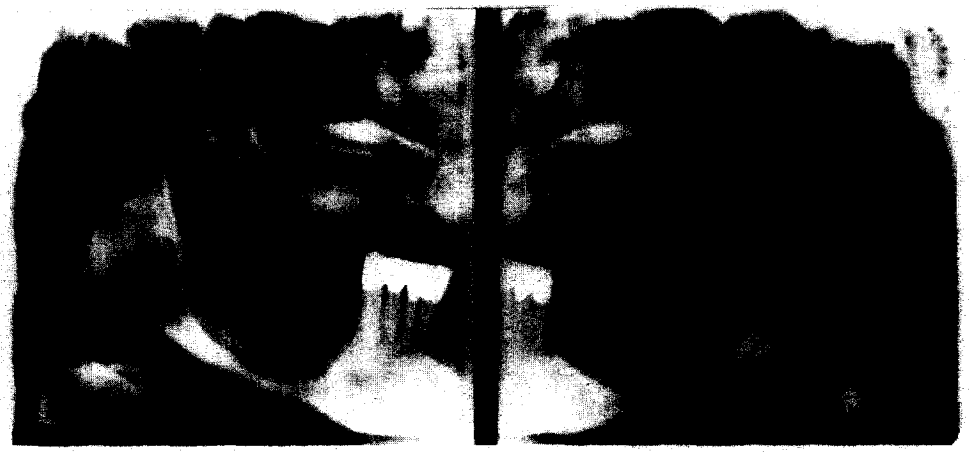

Fig. 3. Radiographic evidence of severe bilateral resorption of the residual mandibular alveolar ridge.

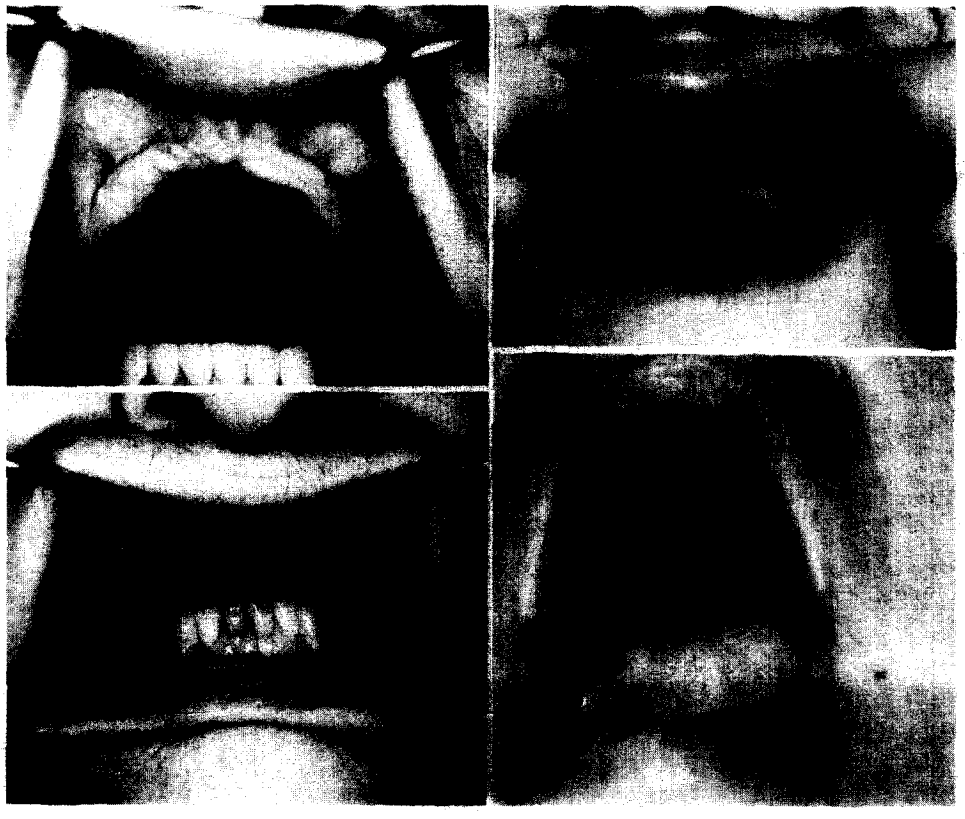

Fig. 4. A, Anterior maxillary resorption and soft tissue change resulting from increased anterior occlusal load. **B,** Epulus fissuratum resulting from overextension and loss of adaptation of the maxillary complete denture following resorption of the anterior alveolar ridge. **C,** Typical downgrowth of fibrous connective tissue over the maxillary tuberosities. **D,** Papillary palatal hyperplasia. Poor maxillary denture adaptation and poor oral hygiene are contributing causes to this condition.

vitality, morphologic changes, number of roots, bony support, mobility, crown-root ratio, presence and position of existing restorations, position of teeth in the arch, and the availability of retention and guide planes are all essential in the consideration of a tooth as an abutment.

The changes associated with the combination syndrome are not necessarily seen in all patients with a maxillary complete denture and a mandibular bilateral distal-extension removable partial denture. Some clinical states, however, seem to encourage development of this syndrome. This problem can be

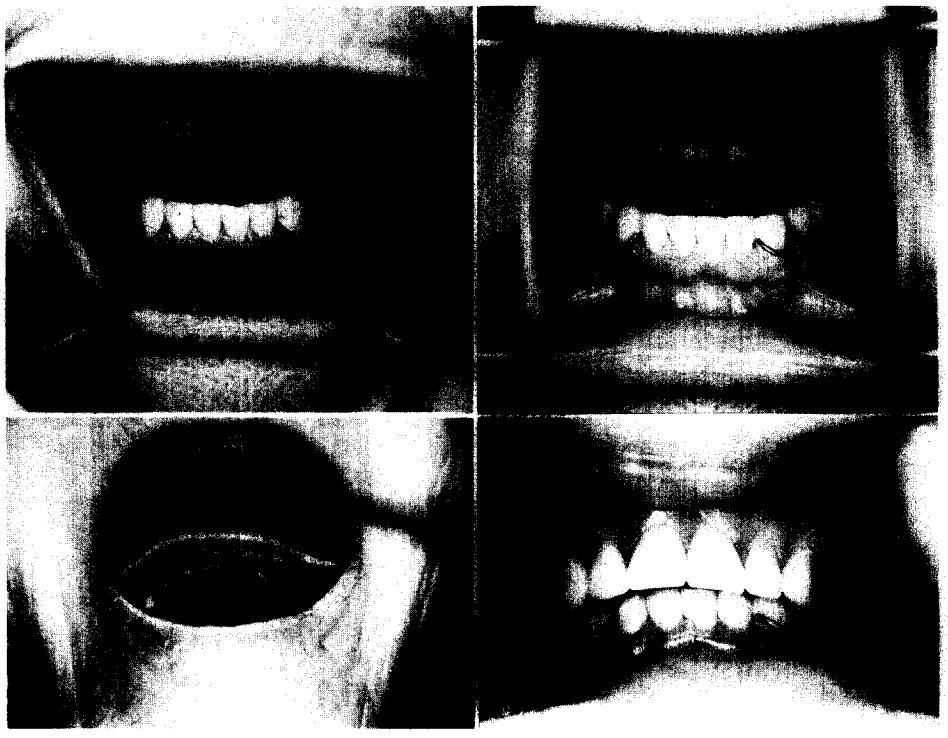

Fig. 5. Completed treatment. **A,** Full crown restorations on the remaining teeth. **B,** Lingual view. Note the cingulum rests for support of the removable partial denture. **C,** The mandibular removable partial denture is in place. Note the maximal coverage of the distal extension base, the level of occlusal plane, and the PGP wire retainers. **D,** Note the absence of anterior occlusal contact when the teeth are in centric occlusion.

accentuated in the patient with the Angle Class III jaw relationship because of increased stress concentrated on the anterior maxillary ridge. Conversely, the tendency for development of this problem might be decreased in the patient with the Angle Class II, Division I relationship. The patient whose mandibular posterior teeth have not been replaced and who has functioned with only anterior teeth for extended periods could also be expected to develop this syndrome. Patients with parafunctional habits may also demonstrate this syndrome more frequently than patients who do not. The occlusal scheme provided by the dentist may also encourage the development of this problem, since deflective anterior occlusal contacts in centric and eccentric positions will concentrate increased stresss anteriorly and a lack of occlusal balance posteriorly.

TREATMENT PLANNING

When planning treatment for the patient with edentulous maxillae and a partially edentulous mandible, the risk of development of the combination syndrome must be recognized. Therefore, treatment of a patient who already has some or all of the manifestations of this syndrome is similar to that given a patient in whom the symptoms are absent.

The basic objective of treatment is an occlusal scheme that can best discourage excessive occlusal pressures in the maxillary anterior region in both centric and eccentric occlusal contacts. Initially this treatment must concentrate on the periodontal and restorative needs of the remaining teeth (Fig. 5, *A*). Splinting of these teeth by fixed or removable means should be considered while planning the design of the mandibular removable partial denture. The latter should include positive occlusal support (Fig. 5, *B*) on the remaining teeth as well as maximal coverage of the basal seat beneath the distal-extension bases (Fig. 5, *C*). The direct and indirect components of retention must be considered in their ability to place additional stress on the natural teeth. The rigid portions of the prosthesis must function adequately to increase the stability of the prosthesis by minimizing movement in lateral, rotational, and anteroposterior directions.

The maxillary complete denture should incorporate maximal extension, border seal, and tissue detail to ensure retention (Fig. 5, *D*). The occlusal scheme should be developed at the proper vertical dimension and the proper centric relation position. The anterior

teeth of the maxillary complete denture should be used for cosmetic and phonetic purposes only. There should be no incisal contact of the anterior teeth in centric position and only minimal contact in eccentric positions as long as the posterior teeth can maintain contact. Balanced occlusion should be developed with the posterior teeth by using the proper cuspal angulation in conjunction with the condylar and incisal guidances.

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

SUMMARY AND CONCLUSION

The dentist should approach the treatment of the complete maxillary denture opposing the mandibular bilateral distal extension partial denture cautiously, and the institution of correct treatment initiatives is essential. Every patient must be 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. Kelly E.: Changes caused by a mandibular removable partial denture opposing a maxillary complete denture. J PROSTHET DENT 27:140, 1972.
2. Applegate, O. C.: An evaluation of the support for the removable partial denture. J PROSTHET DENT 10:112, 1960.
3. Carlsson, G. E., Bergman, B., and Hedegård, B.: Changes in contour of the maxillary alveolar process under immediate dentures: A longitudinal clinical and x-ray cephalometric study covering 5 years. Acta Odontol Scand 25:45, 1967.
4. Colman, A. J.: Occlusal requirements for removable partial dentures. J PROSTHET DENT 17:155, 1967.
5. Laney, W. R., and Desjardins, R. P.: Surgical preparation of the partially edentulous patient. Dent Clin North Am 17:611, 1973.
6. Glickman, I.: Clinical Periodontology, ed 3. Philadelphia, 1964, W. B. Saunders Co., pp 772-778.
7. Stahl, S. S., Wisan, J. M., and Miller, S. C.: The influence of systemic diseases on alveolar bone. J Am Dent Assoc 45:277, 1952.

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