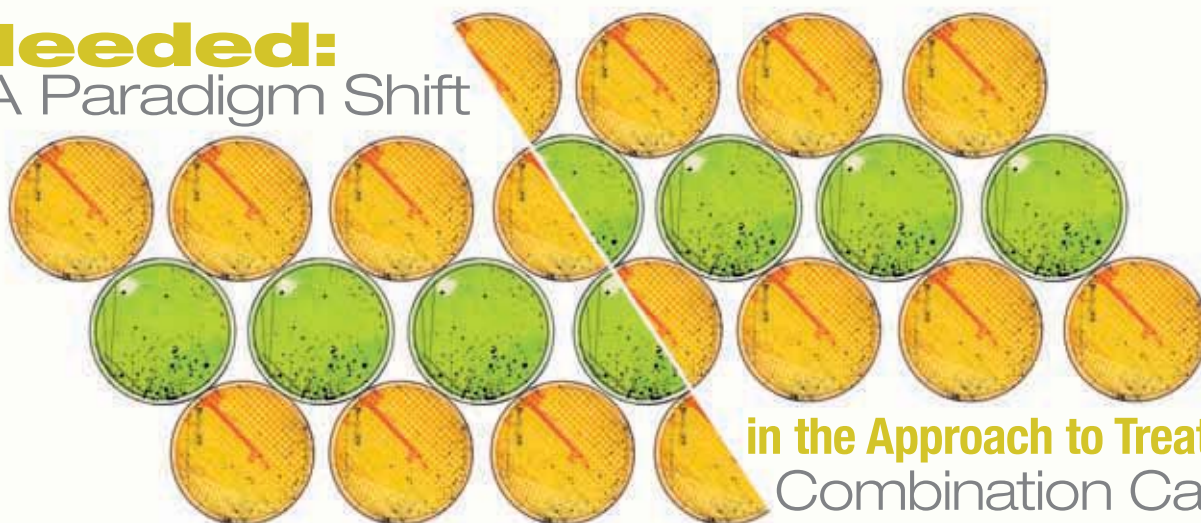


Needed: A Paradigm Shift



in the Approach to Treating Combination Cases

by William S. Jameson, BS, DDS, FACP, FICD

Present day circumstances are causing many patients to forgo extensive full mouth reconstruction and opting for minimal to no restorative treatment. Unfortunately, in the opinion of the author, this will ultimately increase the future demand for restoration of edentulous and partially edentulous patients with complete and removable partial denture (RPD). In fact, research by Dr. Chester Douglas estimated by the year 2020, there will be 3.8 million arches requiring treatment.¹ Many of these patients will be combination cases in which there will be only six mandibular anterior teeth remaining. This is in an attempt to forestall the dreaded fate of having to wear a mandibular complete denture. Couple this with the fact that many dentists do not like to do complete dentures because they have too many problems, especially with lower complete dentures. Problems cause frustration and stress, two conditions everyone wants to avoid. Thus the potential to cause an iatrogenic condition known as combination syndrome results.

Combination Syndrome or *anterior hyper function syndrome* has been shown to exist in one out of every four individuals wearing a maxillary complete denture opposing mandibular anterior teeth and a bilateral distal extension removable partial denture.^{2,3} Kelly first noted patients restored in this manner experienced decrease in vertical dimension of occlusion and the anterior repositioning of the mandible in addition to bone loss of the maxillary

anterior ridge.⁴ Saunders, et. al., noted it was impossible to predict which patients would develop these characteristic features associated with anterior hyperfunction syndrome; therefore, all patients with maxillary complete dentures and a mandibular bilateral distal extension RPD should be treated as potential candidates.⁵

All of the traditional occlusal schemes and posterior occlusal tooth forms taught in pre-doctoral dental institutions and thus practiced by the majority of dentists and support provided by majority of dental laboratories, incorporate a vertical overlap of the anterior prosthetic teeth as well as the predominant use of resin anterior and posterior teeth. Even if the maxillary anterior teeth were originally arranged out of contact with opposing mandibular teeth, as they should be, over time, as the resin posterior prosthetic teeth wear down and the residual ridges resorb, a resulting reduction of vertical dimension occurs. This, in association with the forward and upward migration of the mandible,⁶ results in the firmer more rigid mandibular natural teeth contacting the softer maxillary resin anterior teeth. The resulting wear of the resin teeth as well as undesirable trauma being transmitted to the maxillary anterior residual ridge with associated anterior bone loss (*Fig. 1*). To prevent the denture teeth from wearing down, some dentist will employ porcelain anterior teeth, which being



Fig. 1



Fig. 2



Fig. 3

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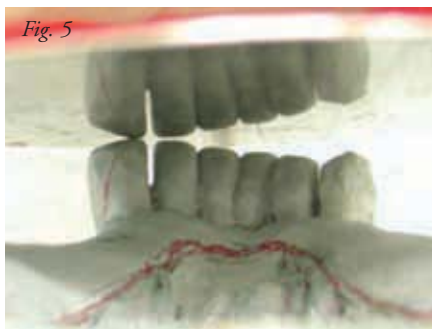
harder than natural teeth, will cause wear of the natural teeth as well as hyperfunction trauma and loss of the maxillary anterior residual bony ridge (Figs. 2 & 3).

To prevent or treat combination syndrome one should do the following:

1. Use porcelain posterior teeth to prevent or greatly reduce wear and thus loss of vertical dimension of occlusion.
2. Eliminate anterior vertical overlap to prevent anterior contact.
3. Use auto centric non-interceptive posterior teeth.
4. Establish a horizontal occlusal plane.
5. Establish a posterior bilateral fulcrum to prevent anterior tooth contact in a protrusive position of the mandible.
6. Establish positive tissue contact between the RPD saddles and the residual ridge with a reline procedure utilizing a functional impression material and soft reline material as tissue stops over the retromolar pads to prevent loss of vertical dimension during the functional impression.

upper and lower master casts, verify proper lip support, etc. with the aesthetic control base, make an intraoral recording of vertical dimension and centric relation at rest position, establish the horizontal plane of occlusion from the incisal edge of maxillary central incisors to the top of the retromolar papilla on either side, arrange the remainder of the maxillary anterior and posterior teeth on the circular setup template (3.000 in. x 0.002 in.) used to establish the horizontal plane, set the mandibular anterior teeth to the underside of the template and then remove the template and arrange the posterior teeth contacting the maxillary flat posterior teeth. This automatically provides a half-millimeter clearance between the maxillary and mandibular anterior teeth in centric occlusion. In a combination case where mandibular anterior teeth are present, often the restorative procedure must be altered.

There are three distinct scenarios possible: all the remaining mandibular anterior teeth are to receive new restorations to the prescribed vertical height (Fig. 4), altering existing restorations to the



The first five of the above elements can be accomplished through implementing the principles of linear occlusion.⁷ Linear occlusion is defined as “the occlusal arrangement of artificial teeth, as viewed in the horizontal plane, wherein the masticatory surfaces of the mandibular posterior artificial teeth have a straight, long, narrow occlusal form resembling that of a line, usually articulating with opposing monoplane teeth.”⁸ Frush⁹ first described this concept in 1966. Linear occlusion is still the only concept designed to *prevent* anterior tooth contact. Lingualized occlusion is similar, but incorporates one to two millimeters of anterior overlap and no bilateral fulcrum of protrusive stability.

The proper sequence of procedures for complete maxillary and mandibular dentures using linear occlusion are as follows: produce

desired vertical height (Figs. 5 & 6) and modifying existing natural teeth without the use of restorations (Figs. 7 & 8).¹⁰ In each of these situations the horizontal occlusal plane must first be established after mounting on the bench instrument. With the setup template contacting the central incisors and the retromolar papillae, the upper member of the articulator is rotated until contact of the incisal pin or mandibular stone teeth is achieved. If the template makes contact before the incisal pin touches, then the contacting stone must be relieved until the incisal pin can make contact. If the incisal pin makes contact and the existing stone teeth are out of contact, the pin must be lowered until the desirable plane is achieved relieving wherever needed. Closing the pin does not over close the vertical dimension of occlusion, but rather increases the interocclusal rest space

since the relationship record was made and mounted at rest vertical dimension. Closing the vertical after mounting for linear occlusion is inconsequential with regard to creating premature occlusal contacts since there are no occlusal incline planes that may interfere during the arc of closure – only a straight blade to a flat surface.

In all three scenarios, once the stone reduction has been accomplished, a visible light cure reduction jig should be fabricated. This jig can then be used during crown preparation to insure adequate incisal reduction and at the time of delivery to reduce the existing restorations and/or teeth to reproduce the modified mandibular anterior segment used to establish the horizontal plane of occlusion



Fig. 9

(Figs. 9 & 10). After the clinical modifications are made, it is prudent to check the amount of reduction for adequacy when verifying for lack of contact between the maxillary and mandibular anterior teeth in protrusive position before dismissing the patient.

The final procedure necessary for success with any and all distal extension RPD regardless of the occlusal, will be accomplished with a reline procedure as taught by Dr. Walter F. "Jack" Turbyfill of West Columbia, South Carolina. The technique is as follows:

1. Make sure the rests, clasps and indirect retainers seat fully. If a lingual plate has been used as the major connector, make sure it contacts the lingual surfaces of the anterior teeth.



Fig. 10

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2. Relieve the tissue side of the saddles approximately 1.5 mm or the depth of a number 8 round bur or until acrylic retentive metal is exposed. Paint the retromolar pad area with Bonding Liquid (Bosworth Trusoft Resilient Acrylic Reline Material, Bosworth Co., Skokie, Illinois) and then mix the resilient material (1 liquid: 2 powder by volume in identical measuring vials) and place in the retromolar pad areas. Place the partial into the mouth and make sure the indirect retainers (and lingual plate) are fully seated. Hold the indirect retainers until the material sets (approximately two to four minutes). Do *not* let the patient occlude. Remove and trim excess.

3. Mix (five seconds) Hydrocast (Sultan Chemicals, Englewood, New Jersey) 1 1/3 powder: 1 liquid. Cover and let material "mature" 5-7 minutes until it will not run off the spatula. "Wet" fingers (Hydrocast Wetting Agent) in solution of eight to 10 drops of Wetting Agent in 1 qt. (946 ml) warm water, then place small amount of Hydrocast in saddles. "Wet" the partial and seat it to place in the mouth.

4. Have patient occlude and hold gently for two to three minutes. Remove and trim excess. If pressure show-through is present, "wet" the appliance first before grinding. A hot Bard-Parker blade or electric waxing instrument can be used on excess material.

5. To those relieved pressure areas, make a new mix of Hydro-

cast and after maturing, add to these areas only; "wet" and return to mouth for function (talking, swallowing water, licking lips, etc.) for two to three minutes. Remove and if the surfaces look good, grossly adjust the occlusion to establish simultaneous contact on both sides. Patient is reappointed in two days.

6. At recall, the impression surface is adjusted for over extensions and pressure points. Another mix of Hydrocast is prepared if needed and those adjusted areas are repaired. While the Hydrocast is maturing, use the Replenisher liquid (two to three drops) to restore flow. Reappoint the patient and continue the process until the patient presents with a good impression surface and is perfectly comfortable.

7. After total comfort is attained, the free end saddle areas will be washed with a fresh mix of Micro-Seal (Amco International), 2 parts powder : 1 part liquid. This material is temperature sensitive, therefore keeping the liquid refrigerated is advisable. Add the powder to the liquid and mix for not more than five seconds. Quickly apply a thin wash to the entire surface with a disposable brush (solder brush, Ace Hardware) and *immediately* place in the mouth and hold the indirect retainers in a fully seated position until set (three to four minutes); do not let the patient occlude. Once the material sets, it can be sent to the laboratory and a stone cast produced immediately without danger of impression material adhering to the stone.

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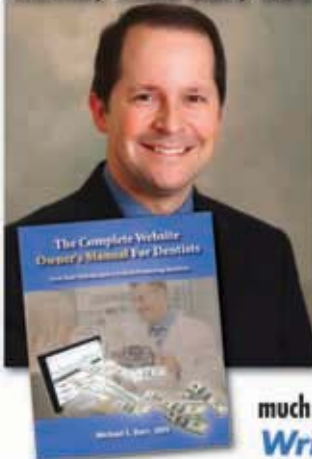
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8. When the appliance is relined and returned, it should be fitted with Pressure Indicator Paste. After this is accomplished, the occlusion can be refined.

Conclusion

Because of its built in anterior clearance and bilateral fulcrum to prevent anterior contact, linear occlusion is an exceptional choice for use in combination cases. However, at times, due to occlusal wear, over-eruption, maligned restoration, etc., the ability to create a favorable anterior component of the horizontal occlusal plane is impossible. But by following the protocol set forth in this article, modifications can be accomplished which will prevent anterior interference. Unfortunately, the linear occlusion concept is not included in any pre-doctoral curriculum. One must avail his or herself of articles and lectures to become knowledgeable of the concept. Ideally, the best approach

is to take a hands-on course to gain the experience to become proficient with the technique. It is also imperative to utilize a laboratory certified in the system for support. ■


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Author's Bio

Dr. William Jameson graduated with honors from the University of Tennessee in 1954 and completed postgraduate training in Prosthodontics, Tufts University in 1962 and was certified as a Diplomate, American Board of Prosthodontics in 1967. He retired from the Air Force in 1976 to become a core faculty member at Oral Roberts University, School of Dentistry tasked with developing the removable prosthodontics curriculum. In 1980 he established a practice limited to prosthodontics in Tucson, Arizona. Since retirement in 1992, he has been a consultant and lecturer while maintained a part-time practice limited to removable prosthodontics using linear non-interceptive occlusion. His presentations have covered complete dentures, removable partial dentures and implant reconstruction.







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