

### Utilizing speech to simplify a personalized denture service

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This article discusses the highlights of making personalized dentures. It shows how the design and position of both anterior and posterior teeth are influenced and greatly simplified by correlating these factors with articulate speech. “Being articulate” means speaking with sharp enunciation; “being inarticulate” means communicating or just talking with a slurring of words. We must realize that people can talk without teeth and sometimes do it better that way than they do with inadequate dentures.

This article also explains why occlusion is correlated to speech: these two subjects are often considered unrelated because occlusion is a contacting position of teeth whereas, during speech, the lower teeth function in space and there must be no contact with the upper teeth at any time. This approach is a very simple one and can be applied to any denture technique except those using linear concepts of occlusion that do not restore the natural horizontal and vertical overlaps.

Martone<sup>1</sup> pointed out that dentists’ responsibilities are with the lower half of the face and that in this part of the face there are two types of support. First, the external supports consist of the zygomatic bones, the mandible, the fatty tissue, and the salivary glands; these Martone considered as fixed supports which the dentist has to accept whether the patient is edentulous or not. Then there are the internal supports of the face which consist of the anterior teeth, the posterior teeth, and the anatomic structures supporting these teeth; Martone pointed out that when these supports are lost the lips, cheeks, and facial length suffer materially.

Let us evaluate Martone’s observations in greater depth. Consider the controls which remain following extractions. First he mentioned the zygomatic bones, over which we must agree we have no control. Next is the mandible, and here we can only agree that we must accept its size and shape because the pattern of its movements also remains the same following extractions.

This is so because the musculature that supports the mandible has previously developed certain ranges of movement which are consistent with that individual. The types and degrees of these movements have been controlled by muscle memories which will always remain in those muscles. These memories or functions could of course become impaired by lack of use, atrophy, and so on, but if they are restimulated they will revert to their original activity. So, since the pattern and extent of these movements are quite dependable, this article will discuss the means of capitalizing on them in redeveloping a personalized functional denture.

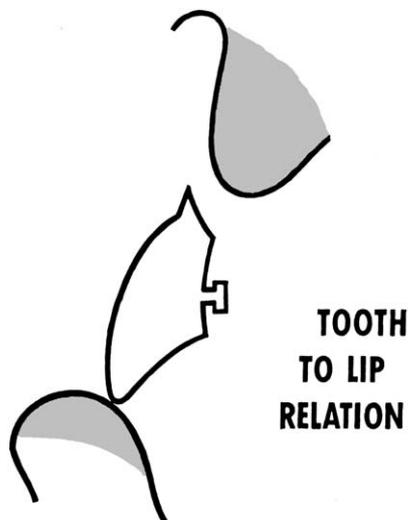
Martone also mentioned the salivary glands and fatty tissues. These we must cope with, but there are other anatomic parts which remain reasonably constant and usable following extractions. For instance, the two posterior components of articulation still remain: the temporomandibular joints which control condylar guidance. The retromolar pads, which are usually visible, also remain—or at least their original buccolingual position can be easily ascertained and can be used as a guiding factor in restoring tooth position, as will be shown. Then we must consider the tongue, the residual ridges, muscle attachments, and the like. It is among all of these remaining structures that we must cradle our dentures for stability and minimal movement.

On the other side of the ledger, he points out that we have lost the anterior and posterior teeth, their supporting tissues, and facial length. This is true but, unfortunately, these are not all we have lost. We have also lost the original tooth position, the occlusal plane levels, the vertical dimension of occlusion, and original cusp height; the patient’s original class of occlusion is no longer evident and, to complete the list, the anterior component of articulation, the *incisal guidance*, has been lost. Restoration of all of these factors is essential in developing a functionally esthetic occlusal scheme. Therefore, this article will attempt to show how to restore the occlusal vertical dimension, occlusal plane levels, upper anterior tooth position, lower anterior tooth position, incisal guidance, buccolingual placement of the posterior teeth, and a means for developing the artificial occlusal surfaces in such a way as to increase denture stability and efficiency in harmony with the chewing cycle. It will also show how much mysticism

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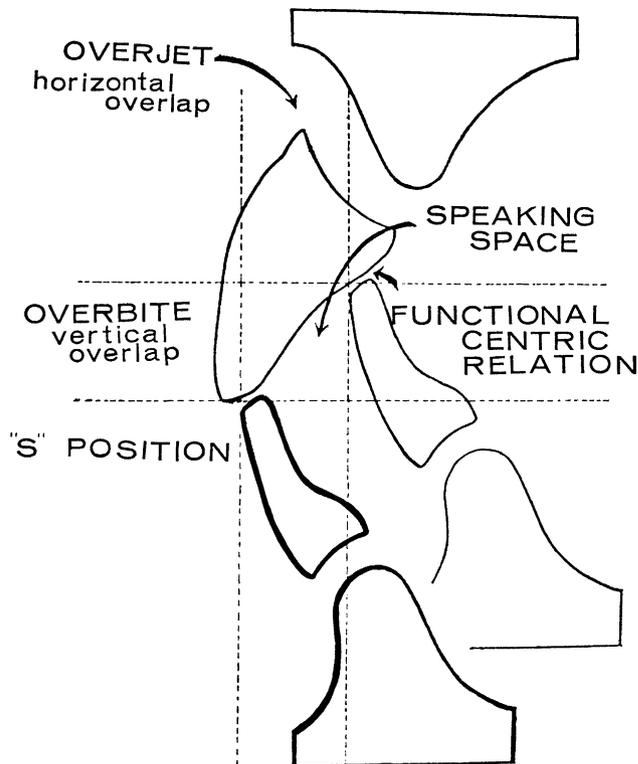
**Fig. 1.** Diagram showing distal position on lower lip of upper anterior teeth when "F" and "V" sounds are produced.

and stress have been removed from our procedures by utilizing this mandibular activity as it is generated by muscle memories.

### UPPER TOOTH POSITION

Let us start by considering the positions of the upper anterior teeth. No one that I know of has ever developed a positive method of recapturing the original position and pitch of upper anterior teeth in the case of an edentulous patient for whom no factual records exist. We use such aids as tooth display, lip support, harmonious relationships, and facial pictures of the patient taken when he had his own teeth. Old anterior partial dentures and radiographs are also of value. Another aid is to position the incisal edges of the upper teeth so that they make a definite seal against the lower lip, just lingual to its center, at or near the wet-dry line when the patient is pronouncing the "F" and "V" sounds. This has been stressed for years by Robinson.<sup>2</sup> He says that when the patient is pronouncing the "F" and "V" sounds, "the incisal edges of the maxillary teeth act as a valve seat and the lower lip acts as the valve." This, he explains, is a determinant for the length and labiolingual position of the incisal edges of the maxillary teeth. We also believe that this is necessary (Fig. 1), but it is not as definitive as we would like it to be at the beginning of our setup, because at this point there are other factors, as yet not fully developed, which influence the lower lip position and its activity in speech.

For purposes of clarity, I will assume that the upper anterior teeth are properly positioned or, better yet, that the patient has his own upper anterior teeth in a normal position. I am doing this because the position of these teeth is the controlling factor in the placement of the lower anterior teeth. However, it should be



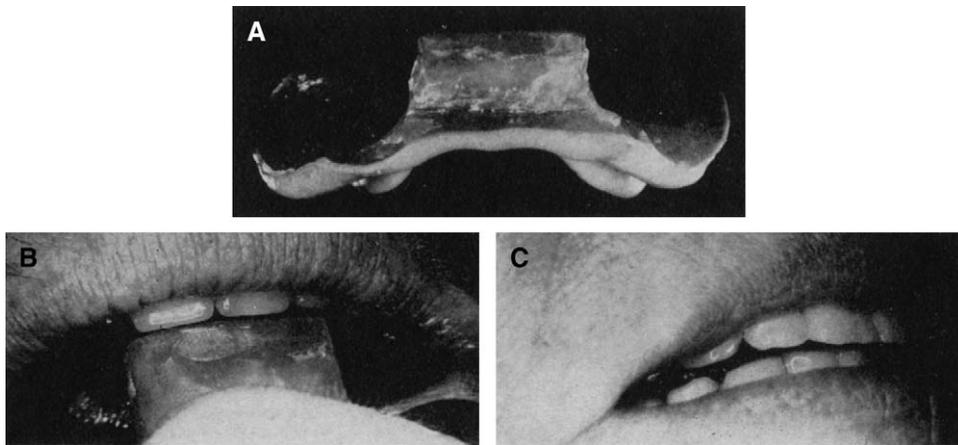
**Fig. 2.** Diagram showing ideal position in space of incisal edges of lower incisors as related to static position of upper incisors when repetitive "S" sounds are being enunciated.

made clear at this point that, if the upper teeth happen to be malpositioned, it should make no difference in our interpretation of the remainder of this article because these upper anterior teeth set the stage for the positions of all the remaining teeth.

### LOWER TOOTH POSITION

The placement of the lower anterior teeth should be related to the upper teeth by the extent of the mandibular movements that occur during speech. They must be so set that, during speech, clarity of diction will result when they and the mandible function in harmony with this static upper tooth position—*wherever it may be*. If the upper teeth are incorrectly positioned, the lower anterior teeth and all of the posterior teeth must be placed correspondingly wrongly if clear enunciation is to result.

The key to this ideal relationship, and therefore to clarity of speech, is commonly known as the "S" position (Fig. 2). This "S" position is best developed by setting the incisal edges of the four anterior teeth, when repetitive "S" sounds are being enunciated, slightly lingual to the labial edges of the upper incisors with a space of only 1.0 to 1.5 mm between them. This "S" position is the most forward position the mandible ever assumes *during speech* and it is the *most intimate*, or the closest to contact, of any teeth during speech.



**Fig. 3.** *A*, Stabilized lower base with “speaking wax” in place. It is advisable not to have an occlusion rim that will create any interferences during speech. *B*, “Speaking wax” can be quickly adjusted by bending and cutting until satisfactory “S” clearance is obtained when patient is speaking. *C*, “S” sound can be refined after teeth are set up in place of “speaking wax.”

## THE TECHNIQUE

After stabilized bases have been made and teeth have been selected, our next move is to set up freehand, on the maxillary occlusion rim, the six upper anterior teeth. We then proceed to establish the “S” position on the lower stabilized base. This is done by securing, in the region of the four lower anterior teeth, a section of base-plate beeswax about three quarters of an inch high and one eighth of an inch thick (Fig. 3, *A*). This base is then placed in the mouth and the patient is instructed to count quickly from one to ten. As the three repetitive “S” sounds of the six and seven are enunciated, the position of the edge of this wax is noted and is adjusted by finger and/or knife manipulation until its upper edge is at this desired “S” position (Fig. 3, *B*). After this has been accomplished, one half of this wax can be removed and a central and a lateral incisor are placed at this level. Then the other two incisors are placed accordingly. The “S” position can now be refined (Fig. 3, *C*) while the patient reads aloud; this is advisable because teeth permit a much smoother flow of speech than does wax. However, if chair time is at a premium, or if the dentist does not care to set up these teeth, this beeswax can be reinforced with hard wax so that its edge will not become distorted during the recording of the occlusal vertical dimension, which is our next step. In this event, these teeth can be set up later on the articulator by the technician.

It should be noted here that there are some persons who, because of tongue thrusting or malpositioned teeth, never did have this ideal “S” position. This becomes quite evident to the dentist when he is adjusting the wax. In those people whose speech cannot be corrected with dentures, a wax position entirely out of harmony with any normal tooth position becomes apparent. What to do with these patients has been outlined in a previous article.<sup>3</sup>

## A GROUP PROJECT

Our next step is a very interesting group project which involves recording, reasonably accurately, the patient’s original class of occlusion, occlusal vertical dimension, centric occlusion, and original incisal guidance. To accomplish all this in one short sitting calls for some opinions and explanations.

Occlusal vertical dimension and centric relation are among the most challenging phases of denture construction. There is no one technique that will satisfy these requirements for all denture patients. Landa<sup>4</sup> even goes so far as to state that establishment of the occlusal vertical dimension for patients with gross resorption is a figment of the imagination. Our technique is not definitive either, so in the early stages of denture construction we are not concerned about extreme accuracy.

We work in an unstressed, relaxed manner because we are reasonably sure that almost any original records we make can and should be improved when the musculature relaxes after being put to use under the more nearly ideal conditions which we employ. In other words, we do not strive for perfection at this point; it is enough that we develop records that are only reasonably acceptable.

## THE TECHNIQUE

The way we go about arriving at these primary conclusions is very simple: We first ascertain whether the patient did function with a true “S” position and we set wax or lower teeth according to the method just described (Fig. 3).

From this “S” position, we allow the patient’s mandible to relax distally to a comfortable hinge relation, and note the extent of this retrusive movement. The amount of movement will indicate the patient’s original class of

occlusion. Also, when closed into anterior contact at this hinge position, the position will be in close approximation of the patient's original occlusal vertical dimension. These are very simple and measurable observations.

## DETERMINING THE CLASS OF OCCLUSION

### Class III occlusions (Fig. 4, A)

If there is no distal movement from the "S" position, an edge-to-edge Class III situation probably existed with the natural teeth. In these patients, the vertical dimension of occlusion would be 1.5 mm less than the "S" dimension and directly vertical from the lower incisal edge. It is advisable to use plastic lower anterior teeth for these patients to prevent chipping. There are a few Class III patients in whom the lower anterior teeth overlap the upper anterior teeth labially. These people have a normal "S" clearance, but it is labial to the upper central incisors instead of being lingual to them. Such patients also have a large interocclusal distance posteriorly. The occlusion of these patients can usually be redeveloped into an edge-to-edge situation by increasing the occlusal vertical dimension and decreasing the tooth display. This may adversely affect esthetics and could be otherwise uncomfortable. In such patients, just set the lower anterior teeth to this labial overlap any way. The mandible cannot move backward and no occlusal problems will result.

### Class I occlusions (Fig. 4, B)

If there is only 2 or 3 mm of retrusion, the incisal edges of the lower teeth would have to contact in the cingulum area of the upper teeth or incisally to this point when the teeth are closed in centric occlusion. Therefore, this would automatically result in a Class I occlusion because this is the normal area of contact of lower incisors.

### Class II occlusions (Fig. 4, C)

If there is a distal movement of the anterior teeth of more than 3 mm from the "S" position (in some patients, this can be as much as one half inch), their centric occlusal position, and therefore the vertical dimension, would place the incisal edges distal to the cingulum of the upper teeth, and possibly against palatal soft tissues. All such situations would naturally be Class II occlusions.

We do not believe it advisable to attempt to change a patient's evident type of occlusion to another type, eg, a Class II occlusion should not be changed to a Class I. Whatever type of occlusion the patient has developed is normal for that patient, and it should be restored. If it is changed, clarity of speech and/or esthetics will suffer.

This operation consists of (1) recording the "S" position. (2) recording the extent of the mandibular retrusion from the "S" position, and (3) permitting the teeth to contact until the lower anterior teeth touch whatever they may. By this procedure, the patient's original horizontal and vertical overlaps are determined, the esthetic position of the lower anterior teeth is assured, the patient's original class of occlusion becomes evident, and an accurate record of the incisal guidance is obtained. Also, a very valuable tentative occlusal vertical dimension and centric occlusion are developed.

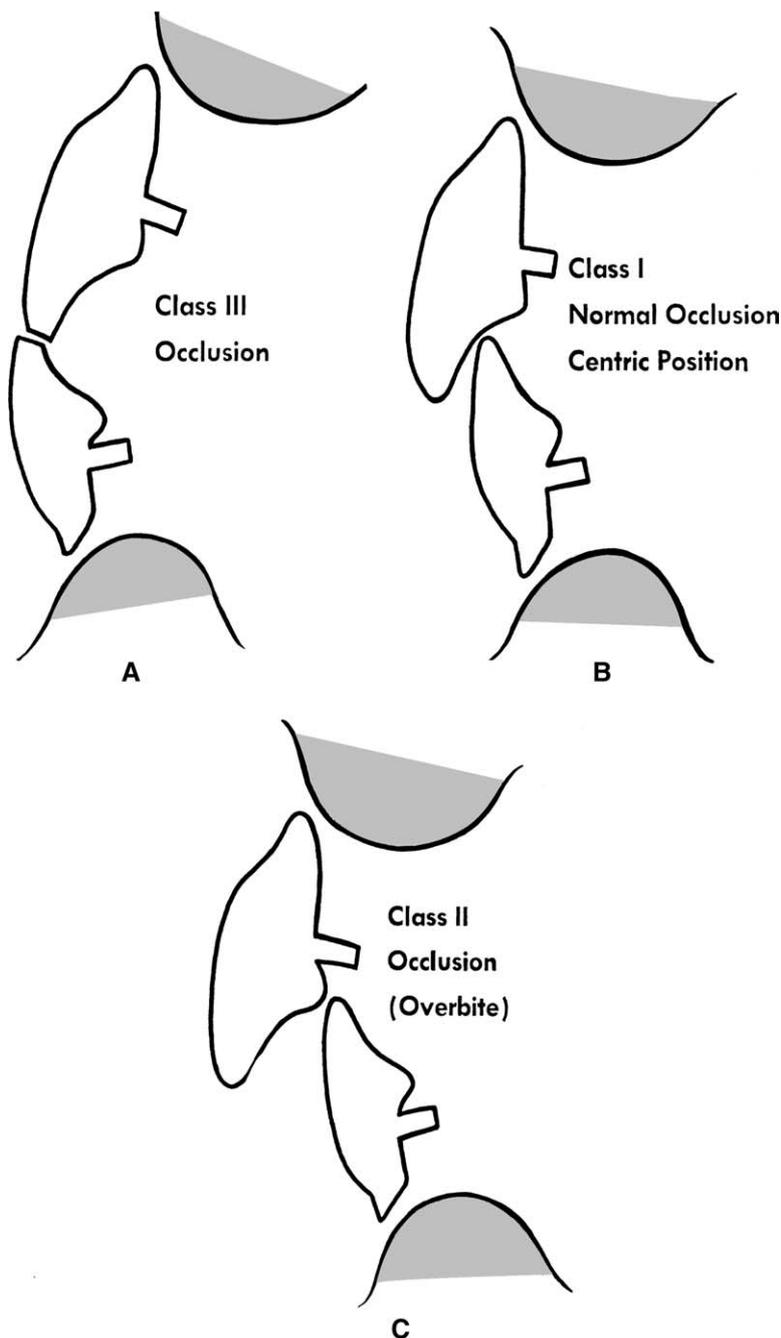
All of these extremely important components of occlusion were lost when the teeth were removed. Muscle memories and a coordination of their resultant muscular activities, combined with a knowledge of the requirements of good enunciation, serve as the guides for the restoration of the lost components.

This fresh approach almost reverses procedures used in the past. Our old methods involving the use of wax occlusion rims have led to many shortcomings in denture construction. Usually, in using these techniques, no thought has been given toward development of the vertical and horizontal overlaps with the occlusion rims. Little knowledge was acquired toward determining or restoring the patient's original class of occlusion, and the occlusal vertical dimension was developed by imaginative or measurable means.

This turn-around approach solves many problems in the beginning of our work. It demands only that the dentist learn to keep his spatula hot and that he spend a little time at the very start to determine the upper anterior tooth position by setting up a few of these teeth with care and then leveling off the upper occlusion rim from their incisal edges. He should follow this by establishing the "S" position with the "speaking" wax on a lower base that would have practically no occlusion rim to interfere with speech, and then proceed to develop all of these essential values. Such a procedure has been utilized as the basis of this technique of progressive refinement.<sup>5</sup>

## THE TECHNIQUE

Our first working appointment is devoted to selecting teeth and making irreversible hydrocolloid impressions. At our second appointment we use stabilized bases and set up two to six upper anterior teeth and then adjust the upper occlusion rim to parallel Campers' line, and place V-like grooves in its occlusal surface. We then determine the "S" position of the lower anterior teeth with wax or teeth. Next we place an excess of soft wax (synthetic occlusal plane wax; Harry J. Bosworth Co, Chicago, Ill) on the posterior part of the lower occlusion rim, insert this in the mouth, and have the patient close and open his jaws and repeat the closure, into this wax, firmly to softly, at the presumed hinge position. This is continued until we obtain



**Fig. 4.** *A*, Diagram of Class III “S” position. Since mandible cannot retrude from this position, vertical occlusal dimension and centric occlusion are directly vertical to tooth contact. *B*, Diagram showing average relation between incisor teeth in centric occlusion of Class I occlusion. *C*, Diagram showing Class II centric occlusion. Lower anterior teeth are usually distal to cingulum of upper anterior teeth, and may be on or near soft tissues.

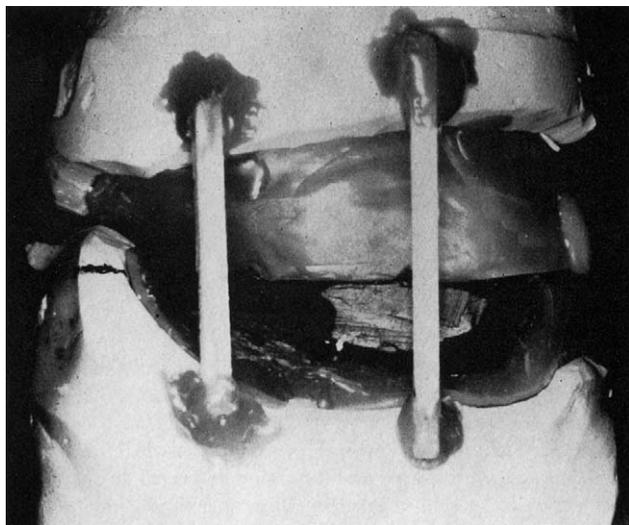
a sharp wax record with the lower teeth in contact with the upper teeth or denture *without* tissue displacement.

These records are chilled and used to mount the casts in any articulator that has an incisal pin control (Fig. 5). All the teeth except the lower posteriors are then set up and tried in the mouth and patient approval is obtained.

Diagnostic dentures made of cold-curing resin are processed with wax spacers which are retained in them until the occlusion is checked (Fig. 6) or corrected

with an adhesive occlusal adjustment wax (Miners occlusal coordination wax [thin]; E1 Cerrito, Calif).

At this time the spacers are removed and tissue treatment material is substituted for them. The dentures are carefully adjusted to this material to allow for effective conditioning of the tissues of the basal seat. During the period of tissue conditioning,<sup>6,7</sup> the essentials of personalizing dentures are progressively achieved. It is the combination of the use of conditioning material



**Fig. 5.** Vertical and centric relations have been tentatively established. Wax is chilled and casts are secured together and mounted on simple articulator that has incisal pin control.

and acrylic resin blocks on the posterior part of the lower denture which permits the patient to register the occlusal vertical dimension and centric occlusion best suited to the improved condition. We can add to or reduce the height of these blocks until a comfortable mandibular position is located.

After these mechanical factors of occlusion are fully developed and the tissues have responded and are in good tone, the patient is comfortable, and the facial and dental appearance meet with the approval of all, these dentures are used as a mockup for the making of “continuance” dentures.

At this juncture, the occlusal vertical dimension is recorded by measurement. The impressions in the dentures are perfected. Centric relation is recorded in a stabilizing manner with the occlusal vertical dimension slightly increased. Then the dentures are mounted on an articulator with the aid of a face bow. The centric relation record is removed, and the vertical dimension of occlusion is restored on the articulator as it was in the mouth. Cores are made to accurately relate the teeth to the cast. The diagnostic dentures are removed and returned to the patient, and a duplicate set of teeth is secured to a base for a final try-in. When all refinements of appearance and speech have been made, we adjust the articulator to our records and then set up and balance the posterior teeth.

The first step of the articulator procedures is to adjust the instrument to the condylar records that have been made.

### INCISAL GUIDANCE

The third component of occlusion, the incisal guidance, is another story. Its position and angulations have



**Fig. 6.** Cold-curing resin diagnostic dentures are made with wax spacers on basal surfaces, and a free-running occlusal block of resin is used instead of lower posterior teeth.

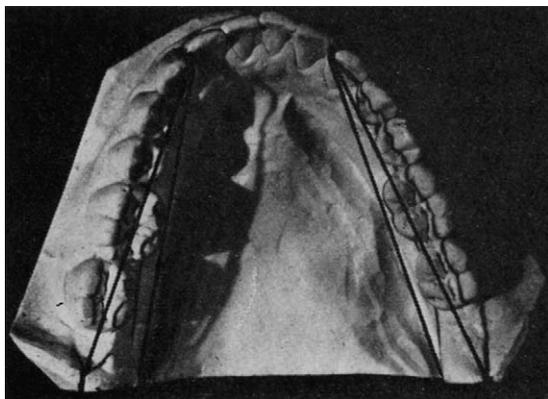
been completely lost, but the memories of the muscles which serve as the controls are still there. The static, or set control was the upper anterior teeth. These were replaced. The dynamic control is a combination of the lower anterior teeth working in harmony with the same muscular activity that previously controlled both speech and the centric occlusal position. Redeveloping this same activity restores the original horizontal and vertical overlaps of the teeth and this is what generates the incisal guidance.

Adjusting the articulator to reproduce this action is very simple. First, place the upper and lower incisors in an edge-to-edge position. This raises the incisal guide pin off the flat incisal guide table. Next, loosen the locking nut of the table and tilt its distal part upward until it contacts the incisal guide pin, and then lock the table in this position. Now the incisal guide pin can move backward and forward without anterior tooth interference, the anterior teeth barely clearing one another. This adjustment should never be altered unless other tooth or articulator settings need changing.

The true values of incisal guidance have been grossly underrated and they are not stressed as they should be in prosthetic and in operative dentistry. Only recently Scott (Dr William Scott, Vancouver, BC, Canada. Personal communication) developed a teaching aid to study and compare patterns of occlusion and cusp height as they were influenced by condylar and incisal guide angulation changes. His findings indicate that incisal guidance has three to four times more influence on occlusion than does condylar guidance. We have been entirely too arbitrary in adjusting the incisal guide table to our liking, rather than to the patient's needs. Compared to incisal guidance, condylar guidance has been overrated.

### POSTERIOR TOOTH POSITION

The next step after the anterior teeth have been finally positioned is to set up and balance the occlusion of the



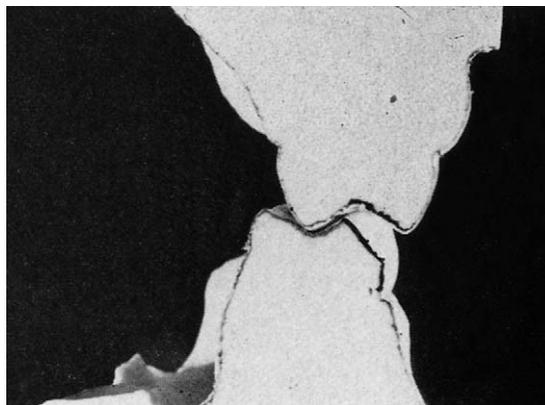
**Fig. 7.** Cast shows that normal position of lingual surfaces of lower posterior teeth always lies between two lines that radiate posteriorly from mesial surface of lower cuspid. One line extends to lingual and the other to buccal side of retromolar pad.

posterior teeth. The placement of the posterior teeth in a natural position is easily accomplished because the occlusal level has already been set, and the only remaining problem is to determine the buccolingual position that the natural teeth previously occupied. The positions of the residual ridges are not constant and should not be used as controls for this position.<sup>8</sup> Our aim is to place these teeth in a comfortable relation to the musculature. We do not follow the “tooth over the ridge” concept with its restrictions. Instead, we use the following observation, which gives us a natural setting regardless of the resorption or the position of the ridges.

Studies of dentitions reveal that the lingual surfaces of the lower posterior teeth always lie between two slightly divergent lines, both of which star from the mesial surface of the lower cuspid and continue backward, one to the lingual side of the retromolar pad and the other to its buccal side (Fig. 7). These surfaces occupy this basic position regardless of the type of occlusion, because it is a functional tooth alignment created during the growth and development of the face by the reciprocal pressures of the tongue on one side and the cheek muscles on the other.

The position of the lower posterior teeth controls the buccolingual position of the upper posterior teeth. To accommodate the lower teeth, the upper teeth may have to be slightly readjusted at this time. Such positioning will result in the upper teeth being placed on the buccal aspect of the upper ridge where they will still have solid bony support. On the other hand, because the lower ridge centers move buccally as resorption progresses, it is not unusual to find the lower posterior teeth directly over the resorbed ridge.

This principle is applied by marking these two lines posteriorly from the cuspid on the lower wax occlusion rim and then setting the lower posterior teeth so that



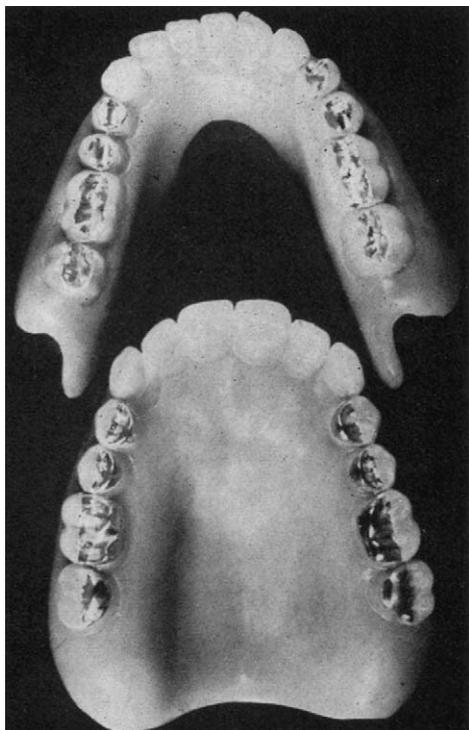
**Fig. 8.** Casts showing lingualized effect developed by reducing efficiency of lower buccal cusps. This centralizes power of chewing and reduces lateral thrust on dentures.

their lingual surfaces are slightly buccal to the lingual line. The upper posterior teeth are then arranged to occlude with them, and the occlusion is balanced.

## THE OCCLUSAL SCHEME

The last phase of balancing the occlusion is to develop occlusal surfaces that are as efficient as is consistent with denture stability. This we do by grossly reducing the efficiency of the lower buccal cusps so that there is practically no lateral thrust against the upper buccal cusps (Fig. 8). This develops a “lingualized” occlusion utilizing only the five upper lingual cusps on each side to act as cutters operating in the central fossae of the lower teeth. Thus we maintain a natural food table on the mandibular arch and place the direction of force closer to the lingual side of the crest of the lower ridge. This materially reduces the lateral thrust against the upper denture and centralizes the chewing forces.

We also like to speak and think of balancing the occlusion with lower fossa depth and fossa curvature rather than of cusp height. The surfaces of the lower fossae are the controlling factors used to balance the occlusion. There is no need to place a 20 degree cusp in a 20 degree fossa: the cutting value of such an arrangement would be very poor. Occlusal balance can be obtained just as well, and cutting efficiency can be vastly improved, if we place a 30 or 40 degree cusp in this same fossa. Extremely sharp metal cusps may be used. The steeper the cusp, the less the force required to penetrate food. We use 33 degree porcelain cusps on occlusions ranging from 0 to 33 degree opposing surfaces if such are necessary to obtain balance. Porcelain cusps steeper than this are not likely to resist attrition, but if steeper cusps are desired, gold occlusal surfaces<sup>9</sup> should be used (Fig. 9).



**Fig. 9.** Complete dentures in which gold occlusal surfaces have been placed in areas of cutting of resin teeth. Note sharp upper lingual cusp.

## DENTURE PLACEMENT

Despite the greatest of care in setting up and balancing occlusion, in processing, and remounting, this occlusal precision will not be as evident when the dentures are placed in the mouth and subjected to the tissue responses when put to use.<sup>10</sup> To locate and correct such discrepancies we use adhesive occlusal adjustment wax and refine the centric occlusion first. On the first application of gentle pressure on this warmed wax all ten cuspal contacts will seldom, if ever, show. Those showing are marked with a wax pencil; the wax is removed and the marked fossae are ground. This process is repeated until an even penetration of the wax is evident in all ten fossae. This, of course, is only a direct posterior hinge closure and does not rule out deflective occlusal contacts that could exist within the larger range of closures during chewing cycles.

The next step is to locate any interferences which might exist beyond the loose centric occlusion already established. We know from experience that some of these deflections can be subtle and very disturbing to denture stability. These contacts are located, as taught by Skinner (Clausen Skinner, Personal communication), by covering all of the lower teeth with the adhesive occlusal adjustment wax and having the patient eat a few seedless grapes or pitted olives. The lower denture is then removed and the areas of wax abrasion are studied.



**Fig. 10.** Upper denture in which anterior teeth had to be set with reverse pitch in order to clear forward deflecting thrusts of mandibular teeth during chewing function.

Any abrasion on the buccal surfaces of these teeth or on the higher lingual walls of the fossae indicates that there is a side shift of the mandible, which should be eliminated. This is a simple way to compensate for deflective occlusal contacts created by Bennett movements.

## THE PROTRUSIVE THRUST

Possibly the least understood of chewing cycle movements are the anterior deflections occurring on the lingual surfaces of the upper anterior teeth. These are created by a protrusive thrust of the mandible just prior to making contact in centric occlusion. This can be a very disturbing and dislodging force even to a firm upper denture. These interferences also become evident when a patient is chewing on the wax. They are indicated by a definite abrasion of the wax from the incisal edges of the lower anterior teeth. Such contacts should not exist in dentures because a comfortable clearance should be maintained between these edges and the teeth in the upper denture in the centric occlusal position. When this type of chewing cycle exists, these anterior deflecting forces should not be corrected by grinding away any part of the incisal edges of the lower teeth, because this would ruin the clarity of the “S” sound and it would become an “SH” sound. The correction must be made on the upper teeth. This is done by covering all the chewing surfaces of the upper teeth and having the patient eat again. These contacts will show on the lingual surfaces of the upper teeth or on the upper denture base, and usually they can be reduced sufficiently by grinding to eliminate the deflecting forces.

In some patients, this movement is amazingly pronounced, and the only way to allow for its complete freedom is to remove the two or four upper teeth involved and set in new teeth that maintain the same incisal position but have cervical ends pitched labially so as to develop a reverse pitch effect (Fig. 10). Such a pitch probably existed in the natural teeth.

Before dismissing the patient, we recheck the “S” position to make sure there are no anterior tooth interferences during speech. At the time of our final setup on the articulator the four lower anterior teeth might be elevated slightly to be sure that the “S” space will not be

too large. If the lower anterior teeth prove to be a bit too close to the upper anteriors during speech, it is not difficult to reduce their length as needed by grinding away some of the incisal edges of the upper or lower teeth. If the "S" space is too large, we are in trouble because we cannot add length to these teeth. Therefore, we play it safe.

**SUMMARY**

A fresh approach toward the solution of many of the debatable problems in complete denture construction consists of simply recording, as guided by muscle memory, the extent of the downward and forward mandibular movements made during speech. This automatically restores the patient's original horizontal and vertical overlaps which can be used to control seven factors of occlusion. The values derived by progressive function refinement of this information, through the controlled use of diagnostic treatment dentures incorporating tissue treatment material, and a free running occlusal scheme have been reviewed.

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