Is occlusion becoming more confusing?
A plea for simplicity

If your dental education was typical, you received very little information about occlusion during your dental school years, and what little instruction you did receive probably was confusing. In my opinion, many practitioners remain confused about occlusion throughout their entire careers.[1] To make matters worse, there is constant conflict among promoters of occlusion products about which occlusion philosophy/theory/concept is the most correct. In many ways, the subject resembles the current confusion in organized religion, in which most religions seem to be trying to achieve similar altruistic goals, but each has slightly different ways to achieve those goals.

Practitioners who are interested in occlusion are attempting to do one of two things:

- maintain occlusal health;
- accomplish procedures to correct pathological occlusal conditions so that patients can chew well without pain, or that degeneration of the stomatognathic anatomical structures can be arrested or prevented.

Why is there so much controversy about occlusion? We could fight over which automobile is best, or which of the very different diets now in vogue is the best. Whatever controversial subject is discussed, there are numerous ways to reach the same goals. The topic of occlusion and occlusal treatment is certainly no exception.

In this article, I discuss the known characteristics of "normal" occlusion, as observed in healthy people, and make suggestions about the desirability of achieving those same characteristics when altering occlusion for whatever reason.

OBSERVATIONS ON 'NORMAL' OCCLUSION

Whatever I say on this subject, someone is going to disagree with me. Nevertheless, the following information is a compilation of normal occlusal characteristics I have observed over many years of practice, teaching and research, as well as the characteristics recorded in voluminous dental literature.

Centric occlusion. Centric occlusion, or the most interdigitated tooth relationship of the maxilla and the mandible, is one area in which almost all practitioners concerned with occlusion can agree. This position in the natural unaltered condition of a young adult is almost always about 1 to 1.5 millimeters forward and slightly closed from the most retrusive position. When the mandible is placed in the most retrusive position with the teeth touching, and the patient is asked to clench the teeth together, a forward and slight closure of the mandible can be observed in most "normal" occlusions.

Centric relation. Centric relation has been defined in many ways, and the phrase is highly controversial. However, most practitioners accept the concept that centric relation is the most comfortable posterior location of the mandible when it is bilaterally manipulated gently backward and upward into a retrusive position. Centric relation usually is reproducible, assuming the patient is in a sitting position, rested and cooperative, and that the practitioner knows how to manipulate the mandible posteriorly with equal bilateral force. However, in my experience, centric relation varies slightly (about 1 mm) from day to day in relation to physical or psychological variables the patient has in his or her life.

I have restored the dentition of hundreds of total-rehabilitation patients in the described centric relation position with almost no difficulty through many years. Many clinicians describe the situation in which centric relation and centric occlusion are the same position as "centric relation occlusion." Usually, when occlusal tooth structure has been removed mechanically for an occlusal rehabilitation, centric relation occlusion is used for construction of the rehabilitation, instead of centric occlusion with a shift from centric relation to centric occlusion. The reason for this decision is that centric relation occlusion is easier to reproduce clinically and in the laboratory than is an arbitrary shift between centric relation and centric occlusion. Do occlusal rehabilitations maintain themselves over time in centric relation occlusion? In my opinion and experience, most of them do so, but occasionally a shift of the functioning position (centric occlusion) occurs over a few months or years. This recurring shift is a minor movement of the mandible and associated structures forward to a new centric occlusion position about 1 mm anterior of centric relation. In such situations, the mandible again can be manipulated into a slightly more posterior position, or centric relation.

Canine rise. Canine rise—contact of the maxillary and mandibular canines only—when the mandible is moved into a right or left position is present in most fully erupted, nonaltered occlusions of young adults. However, in those patients, as years pass and tooth wear occurs, the surface of the canines wears flat, and in some patients all of the teeth are in contact on the side when canines meet end to end. A few patients do not have a canine rise in young adulthood. Bruxing patients soon wear their canines to the degree that all of their teeth make contact when the mandible is moved to either side.[2] If some preventive therapy, such as an occlusal splint, is not carried out for these patients, severe and continuing tooth wear occurs. These patients have contact between all or most of their teeth, on both sides of their mouths, as the mandible is moved side to side or forward and backward. When this total tooth contact is observed during function, the occlusion is defined as "group function." Sometimes, in Class III malocclusion situations, or other conditions, group function occurs naturally in the unaltered, unworn dentition. Group function also can occur in some occlusions after orthodontic care.

Occlusion with group function. Occlusion with group function is difficult to treat from a restorative standpoint, because almost all occlusal tooth surfaces contact when the mandible is moved from side to side or forward and backward. As a result, the crowns, small restorations or fixed prostheses must have exact harmonious function with the remaining teeth; otherwise, there will be severe, premature contact of teeth that results in pain or restoration fracture. In my opinion, improper restoration of group function occlusion is too common in practice.

Working position. Working position occurs when the mandible is moved to the right or left and the canines are nearly end to end. On the opposite side of the arch, the teeth are in nonworking position.

Nonworking position. Nonworking position occurs on the opposite arch side from the above-described working position. When almost all beliefs and theories of occlusion are compared, nonworking contact of natural teeth or fixed restorations usually is considered to be a potentially pathogenic condition. The only situation in which most occlusal theories accept nonworking tooth contact as desirable is the case of a mouth with removable complete dentures.

REHABILITATION OF THE NATURAL DENTITION

Does it not seem logical that in the rehabilitation of the natural dentition, the fundamental occlusal characteristics that existed before the rehabilitation should be reproduced? If those occlusal characteristics are acceptable for the natural dentition, my opinion is that they should be acceptable for the restored dentition.

There are a few developmental or traumatically induced exceptions to the preceding statement. In my experience, gained from hundreds of oral rehabilitations, reproduction of the original characteristics of the patient's natural occlusion has been the most successful concept. To obtain more expertise on the confusing topic of rehabilitating patients with occlusal challenges, I encourage dentists to seek continuing education about occlusion.[3]

How does the clinician reproduce the natural occlusion? In my opinion, the safest and simplest type of rehabilitation is a segmented rehabilitation, which

is accomplished a few teeth at a time.[4] Assuming that the vertical dimension of occlusion is acceptable, the dentist accomplishes a definitive occlusal equilibration before starting the segmented rehabilitation and makes certain that the basic characteristics of the patient's occlusion are acceptable. The most broken-down teeth should be restored first. At a later time, another segment of teeth is restored, followed by several other such segmental restorative sessions. The result of a segmented rehabilitation, accomplished over a period, is almost always a comfortable rehabilitation that satisfies both the dentist and the patient. Additionally, third-party insurance adapts to this concept well, and the patient receives the maximum benefit when the treatment is spread out over time.

The most difficult and potentially threatening oral rehabilitation involves all of the teeth on one or both arches being prepared at the same time, or the vertical dimension of occlusion being changed. Diagnostic casts are a necessary aid in determining the characteristics of occlusion to be developed in the rehabilitated dentition. The preoperative occlusion must be observed carefully on diagnostic casts. How steep is incisal guidance? What is the angulation of canine rise, if present? How much shift is present between centric relation and centric occlusion? What is the condylar inclination on each side, the immediate Bennett side shift and the progressive Bennett side shift? These characteristics may be observed visually or on preoperative casts mounted on an articulator. How do you reproduce these occlusal characteristics after you have prepared the teeth? You should determine them before the tooth preparation appointment. You cannot reproduce the preoperative occlusal characteristics unless you have recorded them preoperatively.

In my experience, if most of the characteristics of the original occlusion are replaced in the rehabilitated occlusion, the treatment will seldom, if ever, fail. On the contrary, if a steep incisal guidance is placed in the mouth of a person who previously had worn his or her teeth into a group function, failure may occur over a short time. If a dentition is restored into a centric relation occlusion, when the natural occlusion had a long shift from centric relation to centric occlusion, I have observed broken porcelain on anterior maxillary crowns or drifting anterior teeth within weeks or months of seating the rehabilitation.

Success during many years of practice has shown me that seldom is nature wrong when used as a guide to determine occlusal characteristics for planned crowns or fixed prostheses. If the clinician allows patient demands, or use of instruments that predict occlusal characteristics far from previously observed patient occlusal characteristics, to dictate significant deviations from preoperative occlusal characteristics, failure is probable. I have deviated from patient occlusal norms numerous times, and failure often has accompanied my treatment when I have done so.

SUMMARY

It is not difficult to observe and record patient occlusal characteristics before starting simple or complex occlusal rehabilitations. If this is done, and if the subsequently placed crowns and fixed prostheses are constructed in observation of similar characteristics, clinical success usually is the result. Deviations from the suggestion to duplicate the "normal" occlusion should be made when the original natural occlusion had caused overt pathosis, or when all teeth or one arch of the teeth is being restored at one time. If this is the case, centric relation occlusion is more reproducible and easier to develop than occlusion with a shift from centric relation to centric occlusion. Peculiar requests of patients relative to occlusal positioning, or routine dependence on various devices to predetermine occlusal characteristics for rehabilitation (as is currently popular in some groups), should be considered, but they should be tempered with careful observation of preoperative occlusal characteristics. ■

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The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the American Dental Association.

Educational information on topics discussed by Dr. Christensen in this article is available through Practical Clinical Courses and can be obtained by calling 1-800-223-6569.

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