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Occlusion 360

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The Roundtable is new forum for debate on key topics, trends, and techniques in dentistry. Every other month, a panel of experts will take on a subject to help expand your knowledge and boost your practice. This month, our panel of experts discusses occlusion, a selection of which is presented here. Watch the whole conversation at dentalaegis.com/go/occlusion360.

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is an accredited member of the AACD and a member of the *Inside Dentistry* editorial board. He has lectured internationally on adhesive, comprehensive, and cosmetic dentistry and dental materials. Cofounder of the Long Island Center for Advanced Dentistry, he maintains a private practice in Huntington, New York.

THOMAS BASTA, DDS
is the cofounder, director, and chairman of the restorative department of the Foundation for Advanced Continuing Education (FACE). He is widely known for his expertise on occlusion and restorative and prosthetic dentistry. He maintains his private practice at the FACE teaching facility in the San Francisco Bay Area.

JOHN CRANHAM, DDS
is an internationally recognized speaker on contemporary occlusal concepts, esthetic principles, treatment planning, restoration selection, and other topics. He is the member of the *Inside Dentistry* editorial board and the clinical director of the Dawson Academy. Dr. Cranham maintains a private practice in Chesapeake, Virginia.

INSIDE DENTISTRY (ID): Can you define occlusion for us? Why it is so important in dentistry?

DR. GARY ALEX: Well, the glossary of prosthetic terms in a rather uninspired fashion defines occlusion as the static relationship between the incising or masticating surfaces of maxillary or mandibular teeth. Basically, what that means is simply the meeting of the teeth as they come together. But I think we all know that occlusion means a great deal more than that. We need to think of occlusion as both the static and the dynamic interaction of the teeth. Not just with the teeth in the opposing arch, but with all the other components of the masticatory system: that is, the interrelationships between the teeth, muscles, bone, tissues, joints, and (something we don't normally associate with our masticatory system) our central nervous system, our brain. And all these components are interfaced, and in this sense "talk" to one another, through an exquisite proprioceptive nerve network system that permeates the entire gnathic system. Occlusion is so important simply because anything you do—or in some cases may not do—to the occlusion during reconstruction or restorative dentistry has the potential to affect all these other components. Everything is interrelated. To deliver predictable and physiologic dentistry, we absolutely need to have an understanding of occlusion from a static, functional, and in some cases a parafunctional standpoint, and then design occlusal schemes contingent on the specific needs and requirements of our patients.

DR. THOMAS BASTA: I agree completely and would like to add that occlusion is probably the most important factor in the success or failure of all of our treatment modalities. And unfortunately, it is probably the most misunderstood subject we have in dentistry.

DR. JOHN CRANHAM: Gary did a beautiful job talking about all the different components of the system that we have to think about. I also believe we have to understand that there are certain people who rub their teeth and do parafunctional things, and when occlusion is off, they have much more trouble. So, we are almost looking at this as a disease process in some people. But as Tom said, I do think that the sad reality is—whether it is our schooling or whether maybe we do not find our way to the right places—that the vast majority of dentists just do not have a good grasp of these principles. The reality is, as a restorative dentist or an orthodontist, pretty much everything we do hinges on our understanding of how to make the teeth come together and then how to get them apart by controlling the forces the best way we possibly can. I think it is great that we are having this discussion. So, hopefully, we will shine a little light on a topic that we are obviously all very passionate about.

ID: Dr. Basta, what is the significance of maximum intercuspal position (MIP) not being coincident with centric relation (CR)?

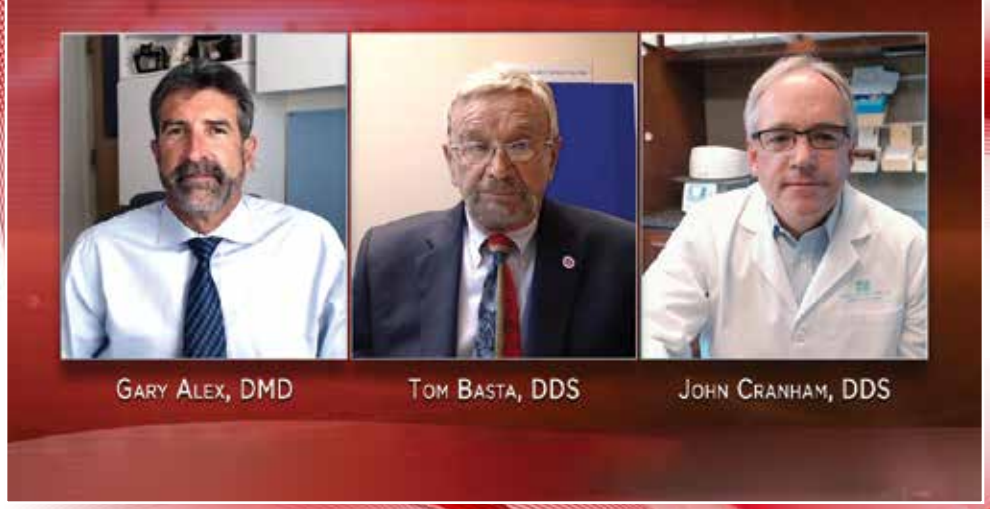
DR. BASTA: Well, centric occlusion (CO) or maximum intercuspation is the interdigitation of teeth where they fit together the best, and it is a tooth-guided position, whereas centric relation is a joint-guided position. We have to understand what centric relation is: It's the position where the condyles are seated upper most in the fossa. The combination of forces of the muscles and the ligaments direct the condyles upward and anteriorly

against the posterior slope of the eminence with the disc interposed.

When MIP is not coincident with centric relation, in order to get the teeth together, posterior tooth interferences or fulcrums may distract the condyles from their seated position in the fossa. The dilemma becomes how to deal with those distracted positions clinically.

Probably every dentist has had the experience of repairing one or two teeth, for example a second or first molar, that they are going to restore in centric occlusion. After the preparations are made, the clinician takes a CO wax bite over the prepared tooth and discovers that the prepared tooth is very close to going thru the wax or even touches the opposing tooth. They find that the preparation they made now no longer has room for the restoration. That happened because in MIP, the first interference or fulcrum that distracted the condyle from the fossa was the tooth that the dentist prepared. When the interference or fulcrum was removed during the preparation of the occlusal surface of that tooth, the condyle on that side seated itself upward in the fossa. The posterior teeth on that side then came closer together, not leaving enough room for the restoration. More importantly, it changed the relationship of the teeth in CO or MIP in all three planes of space. The original CO or MIP no longer exists; therefore, when restoring teeth to CO, we are in essence treating to a moving target. When we are treating to CR, our goal is to have maximum intercuspation coincident with centric relation. If it is not, we are going to introduce fulcrums that will distract the condyle from their seated position in the fossa.

ALEX: To be honest with you, I think the average clinician may not understand the difference between maximum intercuspation and centric relation. I think most clinicians really do not know what centric relation is, and Tom did a nice job explaining it. I will just elaborate on that a little bit. It is basically the fully seated position of healthy, intact temporomandibular joints. So, it is the condyles fully seated, as high as they can go, in the glenoid fossa with their discs in their proper position and orientation on the head of the condyles. What clinicians need to understand about centric relation is that it is a joint-based position typically found independently of the teeth. The teeth are



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in fact totally superfluous to the location of centric relation. You do not need the teeth to find centric relation. We all know what MIP is, on the other hand, and as Tom mentioned, this is a tooth-based position.

So, the question is what happens when the two of these do not coincide, which in fact is often the case, and the answer is sometimes this is a real problem and sometimes it isn't. What we need to really understand is when the teeth are in MIP and the condyles are not in centric relation but somewhere down and forward from that position, is that a clinical problem or not? And again, the answer to that is sometimes this is not a problem and we can go ahead a do the dentistry we need to do with no problems at all. But there are many times when it's not an acceptable arrangement and we need to seriously consider a changing the occlusion prior to restoring the teeth or doing a reconstruction. The key is to know when a change is warranted and when it is not!

One of the things I look for is signs and symptoms of occlusive instability, and these can manifest as worn teeth, fractured teeth, joint pain, muscle pain, loose teeth, and so on. I personally—as someone who does a lot of prosthetic and restorative dentistry—find centric relation to be a wonderful treatment position for most prosthetic reconstructions. Prosthetically, it is a very convenient position to work from. In my mind, it is logical, it is physiologic and consistently reproducible, which is critical when you are trying to build an occlusion. You must have a consistent arc of closure to work with and centric relation provides this.

CRANHAM: In patients for whom we really need to think about changing the occlusion, we are looking for signs of instability—mobility, migration, sore muscles, TMJ issues where the disc is still in place, these early TMJ problems. We can control occlusion by first looking at it in centric relation.

But we also consider if somebody is not in centric relation when their teeth fit together, that condyle is basically sitting on the articular eminence with the disc interposed, sitting on a slippery slope. And if somebody clenches and bruxes, they have the ability to pump that condyle higher, and they will actually be able to rub on their posterior teeth. One of the goals is this concept of getting the back teeth to separate. One of the biggest enemies of any good occlusion is the ability to rub on back teeth or having a good anterior guidance. I think most dentists understand that they do not want back teeth to rub and protrusion on the working side or the balancing side. But they forget that if they are building the patient in MIP and the condyle has the ability to go higher, then they are going to be rubbing between CR and MIP and those back teeth will be in the way.

Tom talked about losing height from the standpoint of while you are prepping. I bet every other dentist has had the experience where they put a crown on the first and second molar, and they know the day that they put those crowns in that they had a tight interproximal contact, only to come back a couple months later where there is now a great big space between the first and second molar. And that comes from that patient clenching and creating a distalizing interference and a distalizing force that moves that back tooth

back. So when we are trying to have complete control of the occlusion, we have to first get that condyle seated into a position where it cannot go any higher. If we make the teeth hit evenly from that position, that is the first step in getting a really good stable occlusion.

ID: There are many philosophies and opinions on how to obtain proper occlusion. In your opinion, what do experts in occlusion tend to agree on?

BASTA: I believe that our goals are basically the same. Our goal is to create an ideal occlusion, one where centric occlusion and centric relation are coincident where there are no lateral interferences. We would like to have simultaneous contact of the posterior teeth in centric and most importantly, an ideal occlusion is the one that requires the least amount of neuromuscular adaption to function properly. Now, if the three of us on this panel got together over dinner to discuss our different protocols, we might have some very heated arguments; however, we would probably all agree on the goals we are trying to achieve and our commitment and passion to deliver the highest quality dentistry to our patients.

ALEX: All the occlusive philosophies seek to develop stable and efficient occlusal schemes that hold up over time and function harmoniously with all the other components of the gnathic system. I think all philosophies strive to distribute bite forces and minimize force on the teeth by developing equal intensity contacts on as many teeth as possible and as far as I know all believe in the concept of anterior guidance. All of the occlusal philosophies, with the exception of neuromuscular, advocate a centric relation position that is coincidental with MIP as the ideal. And I believe in general all proponents of the various occlusal philosophies are good people who strongly believe in what they are doing and want to do the best thing they can for their patients. So, while there are these similarities, there are also very significant differences. Essentially, I think everybody is trying to do the best they can for their particular patients with whatever occlusal philosophy they are using in their practice.

CRANHAM: Yes, that is one of goals that we are all trying to achieve through this knowledge of occlusion, and that is to make it as predictable as we possibly can. If we can develop a protocol in our practice, we can take exceptional care of our patients. And we can go through from point A to point Z with the least number of steps at the end, and have complete control of that neuromuscular system for the joints, muscles, and teeth that are working together in functional harmony. We have laid out the basic goals to do that, and I do agree we might fight a little bit about the different articulators and how we are going to mount the maxillary cast and all these little things, but one thing is for sure, just pay the price and learn how to do good dentistry from an occlusal perspective. If you do, you will have an unbelievably fun career as a dentist. If you do not, it will be an unpleasant place to go to work. It just comes down to being productive, and a good knowledge of occlusion will get you there.