When Does a Patient Need a “Functional Analysis” of their Occlusion?

Most Patients:
- Have a Reasonable Compliment of Teeth
- Close Comfortably in C.O. (Intercuspal Position – ICP)
- Have a C.R.-C.O Slide of 0.5 - 1.0 mm or less
- Have No Subjective Awareness of Pain or Other “Discomfort”

Most Dentistry is Done to the Existing Bite: This is known as “Conformative Dentistry”

When Do Patients Need a Careful Consideration of Their Dental Occlusion?

- Patients who describe or demonstrate clinical signs of TMD on a screening history and/or exam, even though they are unaware of pain. When the patient clearly exhibits clinical signs of possible TMD on a screening history and/or exam, the first step with these patients is to do a comprehensive history and exam. Determine if there are sub-clinical symptoms (joint tenderness or muscle tenderness on palpation) that they were unaware of. Then, if it seems appropriate from the findings, consider mounted models and possibly additional imaging. A panoramic film is the appropriate screening film to start. Corrected tomographs, an arthrogram, MRI, cone beam imaging, or CT may need to be considered. The indications for each are quite specific. Just remember, the diagnosis is usually not made from the imaging, but from the history and exam.

- Patients with a subjective awareness of pain in facial and neck muscles, joints, or a history of headaches. Because the dental occlusion may or may not play a role in these symptoms, a thorough history and exam is always appropriate before undertaking an occlusal analysis. In these patients, careful assessment of the dental occlusion is best achieved with models mounted in Centric Relation. If occlusal issues appear to be of concern, in the vast majority of patients, irreversible treatment to alter the occlusion should not be undertaken until symptoms have been significantly reduced or eliminated. There are a very limited number of situations when some irreversible treatment may be necessary before effective symptoms management can be accomplished. If unsure, find out.

- Patients with evidence of bruxism. You should consider whether the evidence of bruxism (tooth wear) is age-appropriate or excessive for the patient’s age. You should look for other evidence of breakdown or poor tolerance of the bruxist activity; i.e. joint pain in response to intrameatal palpation, to joint loading, or with jaw movement, significant muscle pain, fractured teeth, abfraction lesions, loss of joint integrity; i.e. joint sounds, radiographic evidence of degenerative change at the joints?

It is unlikely that occlusal treatment will significantly reduce or eliminate the bruxist activity. The objective of occlusal treatment in a patient of this kind is to alter loading on the system to improve tolerance and to minimize the risk of further
breakdown. Start with models mounted in Centric Relation to determine what, if anything, can be done that would decrease loading on critical parts of the system.

- **Patients with significant edentulous segments.** Reliable occlusal support is a critical need for long-term masticatory health. In the absence of clenching and bruxism, absence of occlusal support may be tolerated. However, in a bruxer, occlusal support that does not change over time is critical. Tissue-borne partial dentures provide very poor occlusal support, due to rapid resorption of the edentulous ridge. To maintain true occlusal support of the joints, relining of saddles must be done frequently.

In a patient who wears a tissue-borne partial, one solution is to place an implant as far distal as possible in the edentulous ridge and use it as a rest for the edentulous saddle. Using a very low-profile healing cap that protrudes minimally above the tissue, grind out and reline the saddle over the implant to achieve support. Then re-evaluate the resulting occlusal support and, if necessary, replace the teeth on the edentulous saddle for positive contact with the opposing teeth. Porcelain denture teeth will wear the opposing dentition and also introduce significant levels of friction during bruxing. Cast metal occlusals on plastic teeth offer the best option for long-term occlusal support that does not change significantly. When low-abrasion porcelain denture teeth become available, they should provide satisfactory long-term occlusal support.

- **Patients who require significant amounts of restorative dentistry.** Start with diagnostic mounted models (mounted in C.R.) to do your treatment plan. Do an occlusal equilibration on the models to see if equilibration is feasible in the mouth. If a stable and functional occlusion can be accomplished by equilibration of the models, equilibrate the whole mouth prior to starting any restorative. By establishing a stable occlusion in C.R. through equilibration, prior to doing the restorative, you can do the restorative a few teeth at a time and know that you will end with an acceptable occlusion. This approach is feasible in many cases, but not all. When it is not feasible, the restoration is potentially much more problematic. Be very careful.

- **Patients who require restoration of a tooth that is the initial contact in Centric Relation.** This is a classic that most dentists have experienced, even though they may not have understood what happened. Typically, a second molar (it could be some other tooth) is prepared for a crown. Unbeknownst to the dentist, this tooth was the initial contact in Centric Relation. The dentist knows that he/she removed enough tooth structure from the occlusal surface to provide room for the restoration. Yet when the models are mounted, there is little or no space.

This can occur when the tooth being prepared was the first contact in Centric Relation. When all occlusal contact has been eliminated during tooth preparation, it allows the condyle to seat fully, thus closing the occlusal space. Even if the intention is to restore a single tooth to C.O. (ICP), before starting the prep, check in the mouth (using bi-manual manipulation, a la Dawson) to see if the tooth you are preparing is the initial C.R. contact. By the way, if this should occur to you, be aware that all the other tooth contacts will have changed as well.

- **Patients with either anterior or posterior open bites.** Each of these represents a different set of circumstances. From a functional standpoint, neither represents a physiologically healthy long-term condition. The first thing you should attempt to determine is whether the open bite is a static condition or represents a progressive change over time. If it appears that there is ongoing change occurring, determining the cause, if possible, is the first priority. Perhaps the most common progressive condition would be an anterior open bite (presenting as contact on molars only) and the most common cause would be degenerative changes in the TM joints. If the patient had a skeletal anterior open bite to start with, the presence of degenerative joint disease (DJD) may not be the cause of the open bite. It may be the result, due to chronic excessive joint loading, resulting from the long-term molar contact. Therefore, the question that you must ask yourself is, what is cause and what is effect. The answer is not always clear.

The presence of DJD may be seen on a panoramic screening film but is more reliably determined by corrected tomographs, cone beam or CT. The evidence of such change would be flattening of the articular surfaces, especially the condyle, with a possible break in the cortical outline. There may also be a reduced space between the condyle and fossa, (evident on a tomograph, CT, or cone beam CT) representing breakdown in the inter-articular tissues (disc, etc.) Posterior open bites are much less common. The most likely cause would be excessive growth, possibly at the condyles, or a tumor in the joint. Sometimes determining the cause of either of these can be perplexing, with insufficient clear evidence.

- **Patients who, when asked, say that their bite is not comfortable.** These patients often will not describe their discomfort as pain. But they recognize that putting their teeth together is uncomfortable in a non-painful way. It is important not to lead them with your questions. They may say that it feels “strained” (or similar term) to close their bite into the intercuspal position. Or they may say it is more comfortable to not put their back teeth together. There may be occlusal evidence that they have found a resting posture in a protrusive position (excessive incisal wear with key-in-lock faceting.) They may say that they are aware that their teeth don’t fit together well. Their responses can vary a great deal. These are patients who, with additional time, may develop more overt symptoms. For those who have already developed symptoms, a relationship between their perception of an uncomfortable bite and their symptoms is probable.

- **Patients with deep, tightly locked anterior relationships** and/or with anterior tooth contact in C.O., particularly in the presence of joint clicking/popping, and/or poor posterior occlusal support. This combination of findings is common in patients who have developed symptoms. In the absence of symptoms, does it appear that the mandible is being functionally restricted, with resulting possible excessive distal loading of the joints. If this appears to be true, consider discussing with the patient the potential for the development of problems in the future. This is also often the patient who is aware of lack of comfort on closing (previous paragraph).
Patients with no anterior guidance. The question that you need to answer is whether an absence of anterior coupling is contributing to increased mechanical load, at the TM joints, in the muscles, or on the teeth. If the patient does not brux (no evidence of wear), a lack of anterior coupling may be physiologically tolerable. This patient should have, at a minimum, a screening history and exam.

Patients who have a limited number of occlusal contacts on closure. You may think that you can tell whether a patient has good occlusal support by looking directly in the mouth. You can’t. The presence of a reasonable compliment of teeth does not assure a stable occlusion. Not uncommonly no more than two or three actual tooth contacts are found when the patient closes into the intercuspal position (ICP.) How do you determine if they have a stable occlusion that would allow you to use ICP?

Give the patient instructions to Tap, Tap, Tap their teeth together in their best bite. Ask them what teeth they feel touching. Ask them if they can close to that same position again. Repeat the Tap, Tap, Tap. Tell them that you will ask them to close to this position and you want them to do it very quickly, boom. Then dry their lower teeth with a 2 x 2 and inject PVS bite registration paste onto all lower teeth (including the incisors.) Then say “Close quickly!” Usually, if they close quickly, they will go to the true ICP. If they do it slowly or hesitate, they may close somewhere else. Closing very quickly is essential. That is why you make a point of having them do it several times first so they know where it is.

With the bite registration paste, you want to be able to see how many teeth in the entire mouth actually touch (a slight hole through the bite material.) If in doubt as to whether they closed in ICP, have them tap on very thin marking ribbon or tape. Compare the marks with what you see in the bite registration. The marks should be in exactly the same position as the holes in the bite registrations paste. Why bite registration paste? Because only this way will you know what teeth actually come into contact. With bite ribbon or tape you will get marks on teeth that are not quite in contact. If you do this routinely, expect to be surprised at what you find.

Remember, uniform posterior support is critical for long-term masticatory health. In this context, when doing crown and bridge, positive occlusal contact is essential (preferably contact that provides axial loading on each tooth.) So, if your lab “shims up” the dies so you don’t have to adjust the crown at delivery, you are contributing to iatrogenic masticatory degradation. Don’t do it.