

Tutorial

Fulcrum - Turning Point for Orthodontic and Oral Myology Diagnosis

Robert E. Brewka

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Fulcrum—Turning Point For Orthodontic And Oral Myology Diagnosis

Robert E. Brewka, D.D.S., M.S., P.C.
Littleton, Colorado

The etiology of anterior open bites, either skeletal or dental, has been traditionally attributed by orthodontists to:

1. Swallowing habits
2. Airway problems
3. Oral-facial muscle imbalance
4. Long face syndrome
5. Extra-oral habits

Post orthodontic relapse of anterior open bites and the resultant loss of good functional dental occlusion are classically treated or retreated by the continued use of orthodontic appliances, modified retainers, tongue cribs and muscle shields. Patients who should be referred for ortho-gnathic surgical procedures are incorrectly diagnosed and referred to the oral myologist.

This author's postgraduate studies and clinical experience indicates that frequently these anterior open bites are not the result of any one of the above attributed reasons, but that the true etiology of the anterior open bite reoccurrences is due to the lack of consideration of proper mandibular condyle—fossa relationship. In many of these anterior open bite problems, the condyle is not centered symmetrically left and right in its respective fossa when the teeth are in their "best bite."

Many times, in order for the teeth to "meet" and function properly, the mandible must be postured forward by the musculature to achieve a functional bite. In dentistry, the functioning of the anterior or front teeth is termed "coupling." Patients find that they can chew their food better if they can couple their teeth, oftentimes holding their jaw forward in an acquired position in order to get the teeth to meet. This strained position can be encouraged by overzealous use of orthodontic elastics for an extended period of time during the patient's growing years, encouraging an acquired forward position of the mandible. This forward posture positions the mandibular condyles forward and downward on the eminence of the glenoid fossa resulting in a "dislo-

cated" or "subluxed" position. Such a position often manifests itself with classical temporomandibular joint—myofacial pain.

A mandibular auto repositioning splint, hereinafter referred to as a "splint," is a vacuum formed removable plastic plate that can be adapted to snap over the biting surface of the upper teeth preventing the musculature from closing the mandible into its habitual bite. Over

a period of days, weeks or months, the dentist can modify the plastic biting surface of this splint, (Figure 1), encouraging the musculature that controls the mandibular position and function to return to its normal length and tonus, thus centering the condyles properly in the glenoid fossae. During long term splint therapy, the joint "heals" due to muscle relaxation, reduction of inflammatory fluid and condylar-fossa

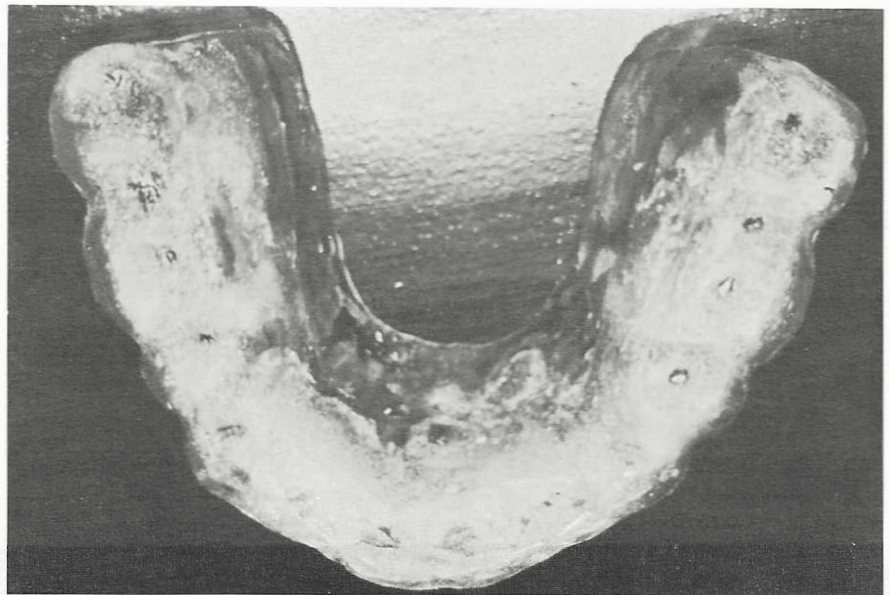


FIGURE 1. Plastic biting surface of mandibular auto repositioning splint.

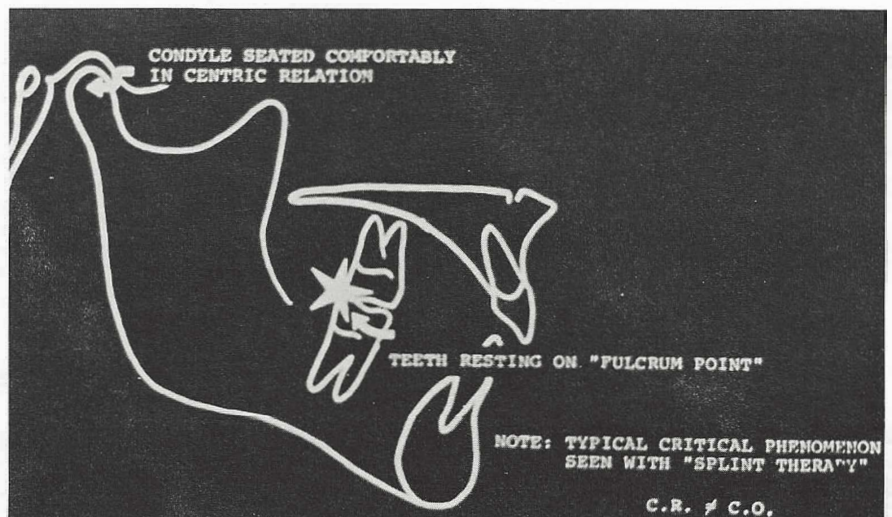


Figure 2. Teeth resting on fulcrum point.

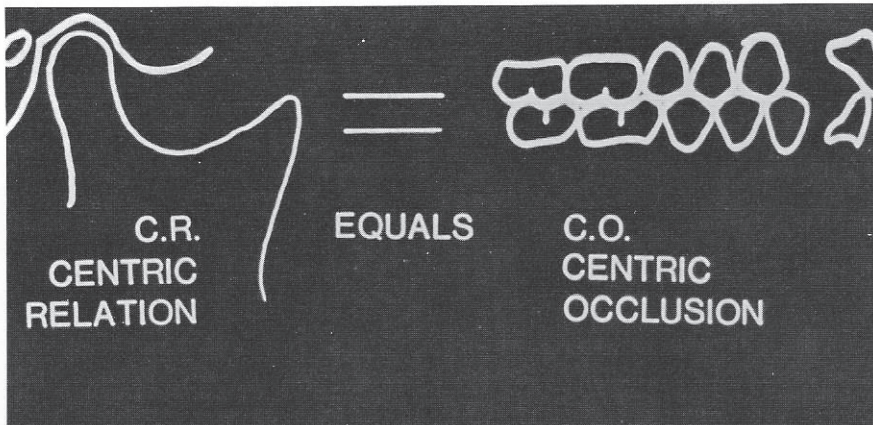


FIGURE 3. Centric relation: proper positioning of the condyles in the fossa.

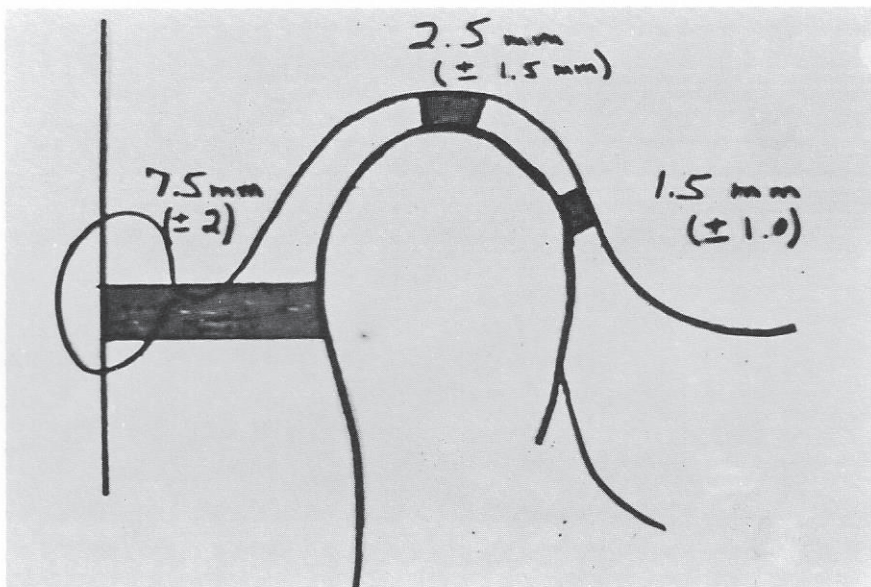


FIGURE 4. Normal condyle fossa position measurements (according to Dr. Robert Ricketts).

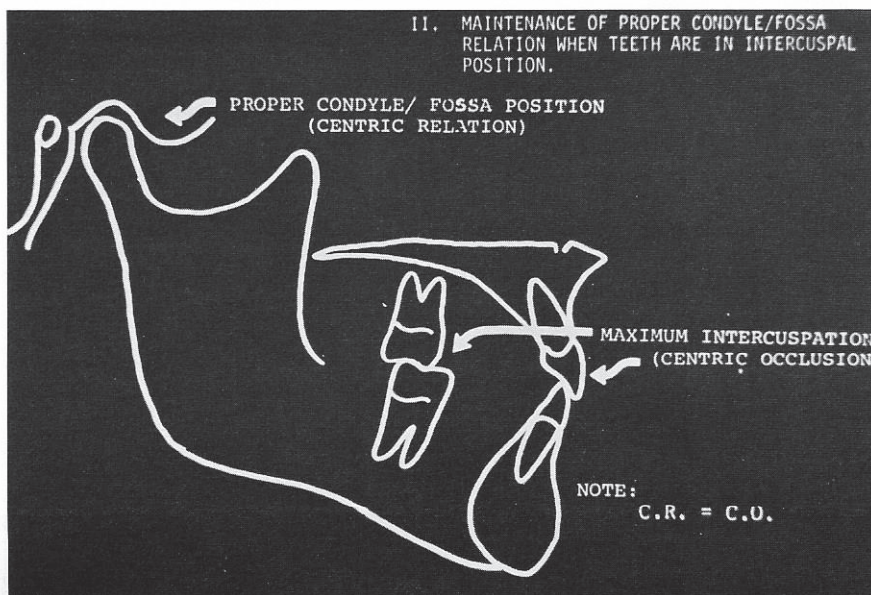


FIGURE 5. Centric relation must equal centric occlusion.

bone remodeling, along with remission of the myofascial pain and the popping and clicking so often associated with TMJ dysfunction.

When a splint is taken out of the mouth, a first contact point will be revealed showing where the teeth first touch on relaxed closure of the mandible. This point is called a "fulcrum point," (Figure 2). It is around this first contact that the condyle is leveraged out of its centric related position in order to interdigitate the teeth into centric occlusion. Neither the muscles nor the teeth are meant to take this type of stress. Most pain dysfunction patients have a fulcrum over the most distal molars resulting in a subluxation of the condyles when the teeth are interdigitated into centric occlusion. Dr. Ron Roth, noted ortho-gnathologist in San Mateo, California has said, "I have never seen a TMJ patient who didn't have a fulcrum."

Proper positioning of the condyle in the fossa has certainly been a topic of controversy among dentists. Nevertheless, a concept of centric relation is vitally important to functional considerations. Centric relation is a physiologic position determined more by the patient's neuromusculature and less by the dentist. It is truly the final position of the condyles in the fossa attained ideally after successful splint therapy. At this position, the neuro-musculature is in a state of equilibrium, and the patient is comfortable. (Figure 3).

For years, we dentists have tried many ways to establish centric relation. The classical gnathologic definition of CR is upper-most, mid-most and rear-most position (R.U.M.) of the condyle in the fossa. More recently, the upward positioning of the condyle has been emphasized; Dr. Robert Ricketts, Pacific Palisades, California, has found the rear-most position to be contributing to pain dysfunction. Figure 4 shows Dr. Ricketts' normal condyle fossa position measurements. These studies show that TMJ laminography x-ray is essential to disclose pathology and degenerative joint disease. In other words, CR must equal CO, (Figure 5), and the patient must be comfortable.

Using the traditional method of manipulation shown in Figure 6, it is difficult, if not impossible, to posi-

tion the condyle upward. Thus, the large white arrow emphasizes the need for a posterior upward force.

Dr. James Long of Daytona Beach, Florida, originally presented a device called a "leaf gauge" in the *Journal of Prosthetic Dentistry* in 1973. This device can be utilized by speech therapists, physical therapists, and dentists to determine whether or not there is a "fulcrum" present in the patient's bite. It is also a unique way to clinically measure the degree of anterior open bite.

A leaf gauge is a homemade stack of approximately 10 shims of acetate plastic 0.010 inches thick, 0.5 inches wide and 2 inches long held together with a paper clip or rivet. (Figure 7). Initially, approximately 5 leaves of the gauge are placed between the anterior teeth similar to a flexible "feeler gauge." The number of leaves is reduced or added until the first contact is felt between the posterior teeth. The number of leaves is increased by 1 or 2 so that the posterior teeth are just out of contact. Over a five minute period of time, the musculature will seat the mandible into its centric position. We use the leaf gauge routinely for: 1.) initial examinations, 2.) evaluating progress of orthodontic treatment, 3.) post treatment retainer construction, 4.) equilibration, and, 5.) splint construction.

Figure 8-A shows a classical patient with a "nice orthodontic result," and a good bite, but experiencing myofascial pain syndrome. After six months of wearing a repositioning splint, the patient had achieved a comfortable position. Note Figure 8-B. The teeth have changed position to one another, the difference being that the musculature of the mandible has centered the condyles and fossa unveiling a great difference between centric relation and a good bite (centric occlusion). In dental talk, centric relation should equal centric occlusion. This type of discrepancy, many times cannot be resolved by clinical dental means. It may require:

1. Complete dental reconstruction
2. Orthodontics
3. Ortho-gnathic surgery
4. Intelligent equilibration, or
5. A combination of any or all of the above

In conclusion, what I am trying to say to the oral myologist is that, many times, the anterior open bite which has been referred to by orthodontists or in conjunction with dental orthodontic treatment, may be attributed to one of the first five reasons that we listed earlier in this paper, but, there may be a phantom reason for the symptoms and the clinical symptoms. This phantom reason may be a discrepancy between centric relation and centric

occlusion which can only be unveiled through the proper use of "splint therapy." (Figure 9.)

A "leaf gauge" can help you somewhat in your offices, to test for a fulcrum point, but it certainly does not resolve the total pathology and inflammation of the jaw joints that a strained set of mandibular muscles can cause due to an acquired bite. What I am suggesting is that the oral myology - dental teams consider fulcrum points as part of their diag-

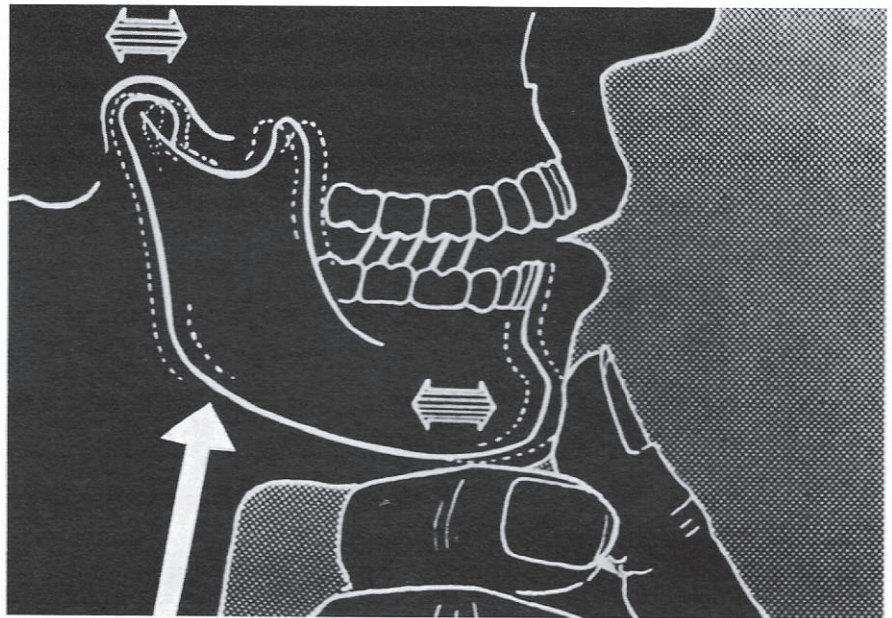


FIGURE 6. Traditional method of manipulation fails in upward positioning of the condyle.

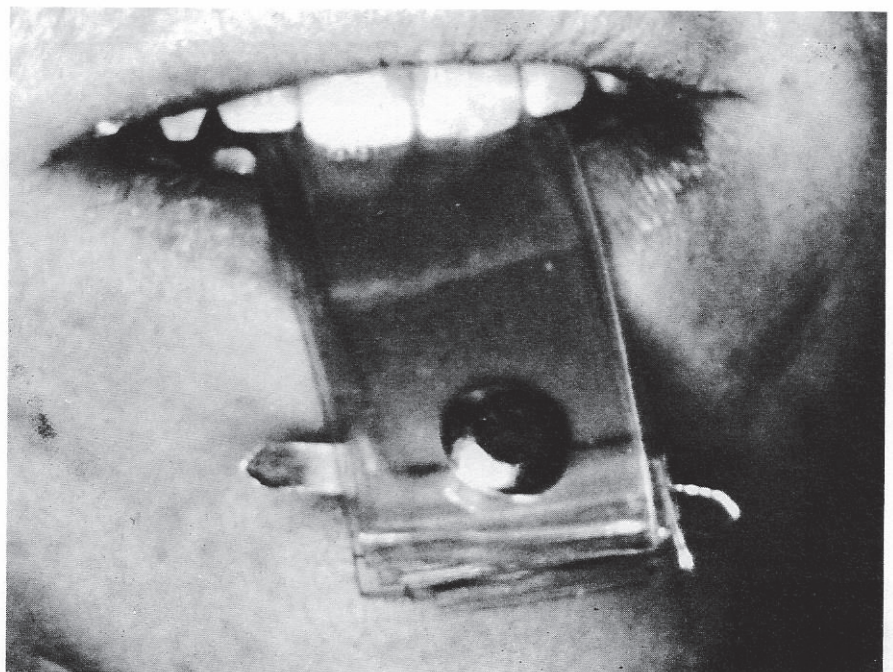


FIGURE 7. Leaf gauge made of acetate plastic.

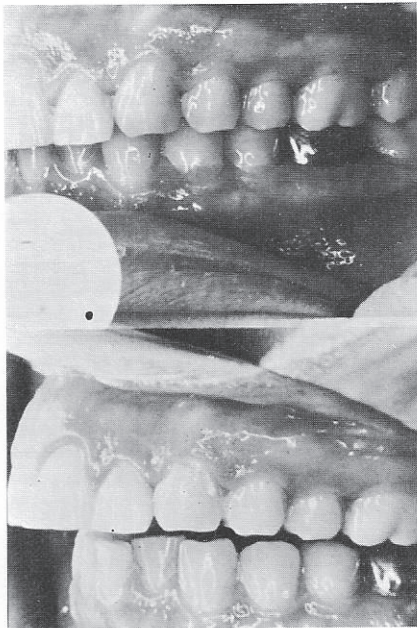


FIGURE 8. A. Myofacial pain syndrome in patient with "nice orthodontic result" and a good bite. B. Achievement of a comfortable position after six months of wearing a repositioning splint.

nosis and not believe what they see in the mouth. Resort to the usage of splints and leaf gauges and laminographic-tomographic type x-rays of the TMJ to unveil positional discrepancy and degenerative joint problems in the TMJ area.

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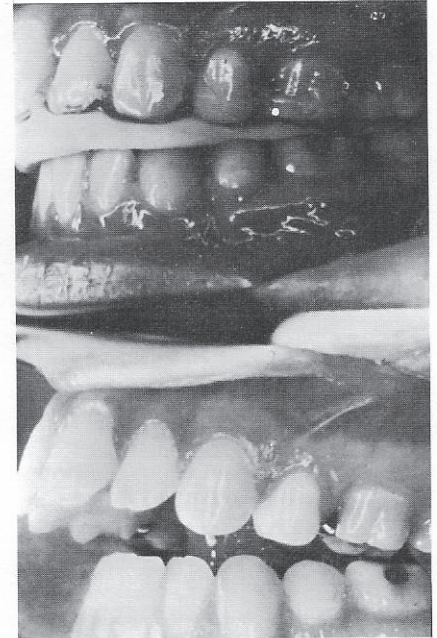


FIGURE 9. Discrepancy between centric relation and centric occlusion revealed in proper use of "splint therapy."