

C L I N I C A L R U B R I C

Malfunctions and the lingual technique

Frank POURRAT

LINGUAL THERAPY AND REFERENCE POSITION

In adult orthodontic treatment one of the many important parameters is the identification of a working referential goal for ultimate stabilization of the dentition, which differs from the one used for children. So orthodontists must carefully evaluate all the factors that make treatment for an adult patient desirable in relation to the patient's needs in order to make a therapeutic decision with controlled risks.

As orthodontists we have available to us a certain number of reference positions from which we can make decisions that will help us to establish, maintain, and stabilize our treatment results:

- **Rest position and myo-centered position** neither of which can actually be used because they are not reproducible.

- **Therapeutic position**, which is defined spatially and maintained by the orthodontist. It appears that in spite the assured stability of the final result this position is quite difficult to maintain through the vicissitudes of therapy. However, orthodontists can use phenomena of adaptation to keep it stable despite its imprecision.

- **Position of maximum intercuspation.** "This is the most fundamental position because it establishes the end point of functional movements" (C. M. Valentin). Although it has exceptional reproducibility, orthodontists can utilize it only in certain special cases because

the attachments of the lingual technique interfere with its completion.

- **Position of centric relation.** This is usually the position of choice during treatment because orthodontists can assess it from a point removed from the dentition and re-evaluate it and make comparisons between readings taken throughout the course of therapy.

Whichever of these reference points is chosen, it becomes an essential adjunct of all prosthetic, surgical, or orthodontic reconstructive therapy.

That is why in our orthodontic examinations we make a note of two important reference positions that will allow us at various stages to define the maxillo-mandibular position.

1 – 1 – The position of maximum intercuspation (M.I.O.)

- The difficulty patients have of easily assuming this position should be a supplementary sign to be noted in our diagnostic assessment. In fact, compression or strain of the TMJ may cause patients enough pain to prevent them from achieving MIO.
- An absence of stable dental structures will block anchoring the mandible in an interface with the maxilla giving the orthodontist a

Address for correspondence:

F. Pourrat,
267, rue Mandron,
33000 Bordeaux.
Frank.pourrat@orange.fr



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*Figures 1a and 1b
Variation between centric relation and maximum intercuspation.*

variety of fluctuating readings in a search for a reliable reference position. Complementary muscular contractions may complicate this difficulty (fig; 1a and 1b)

1 – 2 – Centric relation position (C. R. O.)

Orthodontists may encounter an important variation or special difficulty of manipulation when they attempt to get a centric relation reading from patients' reflex opposition to their manual guidance of the mandible. So it is advisable for orthodontists to use mandible relaxation techniques, such as the wearing of a splint or bite plate before attempting to obtain a valid centric relation reading.

Next, in analyzing this situation orthodontists should examine diag-

nostic and treatment data that are highly important for their ultimate therapeutic approaches. For example, if they discover a TMJ disorder like rupture of the condyle-disc bond, central relation readings will be unreliable.

In spite of all precautions, it is possible that at the first stage of lingual treatment, practitioners may find that bonded upper attachments are working like a bite plate that allows the mandible to adopt a changed position. So after re-evaluation, orthodontists may have to adopt a new therapeutic strategy.

It is the variation between centric relation and maximum intercuspation in just one or in all three planes of space, frontal, sagittal, and vertical, that imposes different therapeutic decisions.

2 – OCCLUSODONTIC THERAPY AND LINGUAL THERAPY

2 – 1 – Individualization at the beginning of treatment

As a precaution, some authors, like D. Fillion, advise orthodontists to bond lingual brackets on two separate visits, one for the mandible, and another for the maxilla in order to minimize discomfort for patient. On the other hand, we should consider the possibility that certain latent dysfunctional conditions may be triggered or exacerbated when initial mandibular movements occur with newly bonded lingual attachments are first put in place. It seems to us reasonable to begin lingual treatment by placing a full set-up at the same visit, at least for a certain number of patients.

If, for example, the malocclusion is a Class II division 1 type, with a marked difference between centric and maximum intercuspation occlu-

sions in the sagittal sense, latent signs of TMJ fragility, such as hyper-mobility or a reducible, there is a strong risk that the mandibular incisors will be lodged behind the palatal attachments, thus transforming the disc displacement from a reduction to a non-reduction status in the first month of treatment. Other conditions such as lack of coordination between disc and condyle and hyper-mobility of ligaments with inflammation of the capsule and/or of the ligaments may also be indicators of the same difficulties. Bonding of maxillary attachments accompanied by posterior bite blocks to create a tripod effect to avoid posterior compression of the TMJ would seem to be a reasonable tactic especially if maxillary attachments provoke a lateral open bite.

In cases of bruxism with considerable abrasion of tooth surfaces, where



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*Figures 2a and 2b
Intraoral views of substantial wear of incisor teeth.*



Figure 2c

Tripodism established by bite blocks and the "bite plate" formed by lingual attachments.



Figure 3

The bite plate plays the role of a muscle relaxant.

tooth clenching is severe enough to cause muscular contractions that force mandibular teeth to contact upper lingual attachments, bonding of a single arch would eliminate the beneficial role of tooth sensitivity during the primary treatment stage and allow the painful muscle contractions to persist thus making the adjustment of patients to the discomfort of a lingual appliance even more arduous than it already is (fig. 2a and 2b). By placing attachments of both arches on the same visit, orthodontists give the proprioceptors of the periodontal membranes of affected teeth to trigger avoidance reflexes that make tooth clenching impossible. By evaluating such conditions, orthodontists can make a careful analysis of the categories of patients, orthodontists can decide which ones will do well with all lingual attachments in a single visit and which ones would benefit from the bonding of beginning treatment with bonding of the mandibular in a first visit, with devices such as bite blocks or splints applied to the maxilla (fig. 2c). The upper arch

would receive its attachments in a subsequent visit.

2 – 2 – Therapy for dysfunctions

2 – 2 – 1 – Defects of the capsule and/or the ligaments

Orthodontists should treat capsulitis and tendonitis by putting the TMJ in a rest status and prescribe anti-inflammatory medication. They should delay orthodontic treatment for these patients.

2 – 2 – 2 – Muscular disorders, muscle contraction or myofascial pain

In patients with muscular disorders, lingual brackets with substantial coverage of palatal surfaces of teeth will usually have a relaxing effect (fig. 3). As long as the overbite is not too severe and the ligaments are only slightly stretched, this occlusion will not cause inflammation (fig. 4a and 4b).



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Figures 4a and 4b

If the lingual attachment bite plane effect over-corrects the anterior deep bite too much orthodontists can make adjustments with posterior bite blocks.

2 – 2 – 3 – TMJ disorders

• Inflammatory TMJ disorder

Even before treatment begins orthodontists must start relieving the pain of patients with inflamed TMJs. The medication treatment protocol will stipulate use of pain relievers and anti-inflammatory pills accompanied by local applications of gel as well as parenteral introduction of medications. This pharmacological therapy should continue throughout the course of lingual mechano-therapy.

• Lack of coordination between disc and condyle

Orthodontists should have patients with disc displacement begin disc and condyle coordination exercises as soon as the decision to begin orthodontic treatment has been made and continue them for an intensive six to eight week period. The exercises will have the objective of restoring good TMJ function without a dental tampon effect occurring when lingual attachments are placed (fig. 5a to 5e).

• Disc displacement with reduction

Therapy for this disorder consists primarily of a set of reinforcement and re-coordination exercises. It seems to us prudent to bond both arches with lingual attachments for these patients at the same in order to avoid the transformation of a reducible disc into one where reduction is not possible in some cases under some conditions.

• Disc displacement without reduction

Today most authorities, including the American Academy of Periodontology agree that dentists should adopt a stance of non-intervention in cases of non-reducible disc displacements. However, it remains evident to us that the both the youth of the individual and the precocity of the displacement should guide us in our therapy although we will always bear in mind that the success rate for treatment of this disorder is low. But for these cases we are tempted to



*Figures 5a to 5e
These photos depict one series of reinforcement exercises.*

reposition the mandible in few well-selected special cases. For these patients an accompaniment to treatment could be a decompression or repositioning splint or, more simply, plastic bite blocks that assures that patients assume the desired therapeutic maxillo-mandibular posture (fig. 6a to 6c).

- **Luxation of the condyle**

An important phase of treatment for these patients consists of providing

patients with information about their malady and explaining to them what attitude they should adopt during and after orthodontic treatment. Patients should learn to avoid large sweeping mandibular movements, yawning too broadly, laughing too uproariously, biting too deeply on apples or bulky delicatessen rolls, and avoiding the non-functional mastication required for gum chewing and nail biting.



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Figures 6a to 6c
Temporary stabilization-reconstruction blocks on first molars for a new reference position.



Figure 7
Remodeling of the TMJ after treatment for juvenile arthritis.

- **Hyperlaxity of ligaments and/or hypermobility**

This disorder is treated principally with reinforcement exercises that minimize the risk of blockage or states of non-reduction disc displacement that might manifest themselves at any time.

- **Degenerative TMJ disease**

Older people today are as eager as any giddy adolescent to have a mag-

nificent smile, an important component of youthful good looks. This formidable desire makes itself known in initial consultations with orthodontists, along with acute or chronic age-appropriate degenerative disease. Orthodontists are, accordingly, obliged to prescribe pain relief and non-steroid corticoid medications designed to arrest arthritic degeneration of the TMJ but not to cure it (fig. 7).

3 – INFLUENCE OF LINGUAL BRACKETS ON DYSFUNCTIONAL DISORDERS: AN AT-RISK PATIENT

We know that among the dysmorphias that could put patients at risk are certain occlusal modalities that are encountered in dysfunctional subjects but are rare in healthy patients. These rarely occurring dysmorphias include anterior skeletal deep bite and a discrepancy between maximal intercuspation and centric relation of more than two millimeters a loss of five or more posterior teeth not replaced by prostheses (Pullinger).

But, in any case, the bonding of attachments to the palatal surfaces of teeth never interferes with the occlusions of patients with dysmorphias such as anterior deep bite and unilateral cross bites, which makes it safe to say that if the diagnosis is well established, orthodontists can safely undertake treatment for this category of patients.

4 – CONCLUSION

No matter what type of appliance they contemplate using, orthodontists must carry out a scrupulous search for crano-mandibular dysfunctions in order to establish a complete and accurate diagnosis, even a provisional one. The simple presence of symptoms or signs of dysfunction is not in itself sufficient reason for undertaking

orthodontic treatment. On the other hand, orthodontists preparing treatment plans must include in it a management program to deal with the dysfunctions a patient presents, that is to say they must consider the over-all dental environment, including, of course, its lingual component.