

aligners

international magazine of aligner orthodontics



opinion

Stop asking aligners to do things they are not good at!

case report

The informed, lifetime patient

industry report

When do you waste unused aligners, and how can you avoid it?



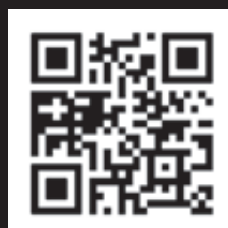
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Dr Luis Carrière

Specialist in orthodontics and dentofacial orthopaedics



Aligners, facial aesthetics and quality orthodontic care

Orthodontics is all about facial and skeletal harmonious relationships, adequate masticatory function, and perfect tooth alignment and occlusion. The orthodontist is probably the top professional in facial aesthetics, as well-performed orthodontics has the capacity to generate natural facial harmony and beauty, just by properly managing the patient's hard tissue orthodontically. It is important to have in mind that the patient's soft tissue is not self-supported and needs adequate dental, dentoalveolar and skeletal relationships to achieve the golden proportion of the middle and lower thirds of the face as far as possible. Aligners have certainly become a powerful orthodontic treatment approach, a serious alternative to fixed appliances, or traditional orthodontics, so patients welcome them as an appealing treatment option.

Orthodontic principles, the physiology of the masticatory space and treatment objectives have not changed, but because of new systems, new auxiliaries, new technologies and innovative treatment strategies, they have greatly evolved towards obtaining facial harmony, improving temporomandibular function and improving the patient's airway.

Treatments with aligners drive us to use advanced digital set-up treatment interfaces, but they are all related to the teeth and only the teeth. Therefore, the knowledge and skills of the practitioner are vital for implementing the principles of orthodontics and adapting digital treatments to the individual needs of each patient. Understanding the biomechanics of aligners properly is a key factor for treatment success, and knowing their advantages and disadvantages is essential for a clear treatment plan. Aligners work well for controlling rotation, torque, levelling and even expansion, but fail in controlling the sagittal dimension, or are not always efficient when dealing with certain

extrusive and vertical movements. If we clearly identify those weak points, we can achieve good results using a hybrid approach with external auxiliaries while boosting aligner treatment efficiency. Hybridisation in orthodontics, specifically when employing aligners, involves the use of technology outside of the scope of aligners to expand the treatment capabilities. An example would be the use of the Carriere Motion appliance to solve Class II or III sagittal discrepancies at the beginning of the treatment. Once the sagittal issue has been resolved, a shorter treatment with aligners can be achieved. Another example of hybridisation would be the combination of temporary anchorage devices and aligners.

Efficient treatment planning with aligners is ideally done with the 4D orthodontic perspective of the specialist, using his or her knowledge and vision to identify sagittal, transversal, vertical, facial and skeletal problems in order to predict which components and treatment strategies are going to be necessary for the specific case in order to achieve optimal results with minimal deviation. The objective is to diminish the necessity for refinements. If we leave the treatment definition to the aligner technicians, the company will provide us with a treatment proposal only based on the original intra-oral scan and the treatment will be a sequence of refinements, every one intended to solve the errors generated in anterior aligner stages. The final outcome could be an absolute orthodontic failure.

Keeping all this in mind will allow us to use aligners as a true premium orthodontic treatment for the benefit of our patients and our loved profession.

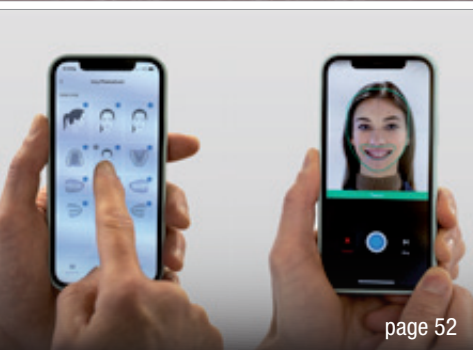
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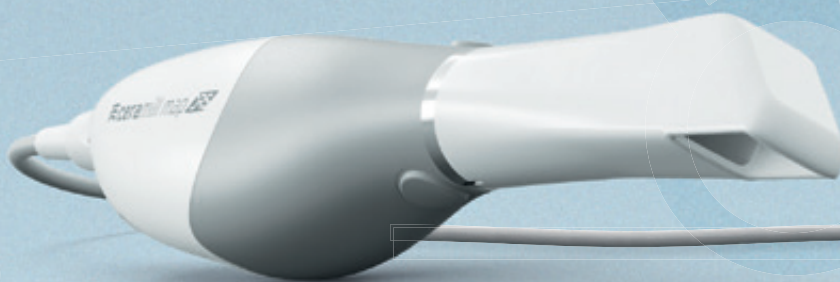
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Stop asking aligners to do things they are not good at!

Dr Bruce McFarlane, Canada

Clear aligners have come a long way in the past 25 years and have evolved to be incredibly pervasive and effective, thanks to enormous consumer demand and innovation from some of the best minds in orthodontics. There remain, however, certain orthodontic movements that are very difficult for clear aligners alone to achieve. Practitioners run into trouble, frustration, and roadblocks when they ask aligners to perform movements they are not effective at achieving. These include:

- correcting severely rotated teeth, especially premolars;
- extruding teeth;
- large space closures;
- transverse corrections;
- Class II antero-posterior corrections; and
- Class III antero-posterior corrections.

The suggestion therefore is that orthodontic purveyors simply recognise these limitations, humbly accept them and stop trying to produce incredibly difficult manoeuvres with aligners alone. This means thinking about much more effective and efficacious techniques along with aligner treatment. It also means incorporating them right from the start, instead of trying with aligners alone and then back-peddalling when that approach fails.

The devices referenced here are mostly fixed and can be utilised concomitantly with clear aligners in their first round. Their outcomes are much more assured than those which could be realised with aligners alone. This results in the following advantages:

- better results are achieved;
- treatment takes less time;
- the important movement occurs early—when the patient is most enthusiastic and compliant;
- fewer aligners are used overall;
- fewer aligners are wasted owing to failed attempts with aligners alone;
- aligners are used to move teeth that are already limbered up by the first-round fixed devices;
- the devices can be included in the fee if used proactively; and
- patient confidence and trust are optimised.

Let us look at some applications that incorporate this approach. The fixed add-ons are agnostic to any specific



Fig. 1: Severely rotated mandibular left second premolar.



Fig. 2: Underway with rotational couples.



Fig. 3: After four months of de-rotation.

“The definition of insanity is doing the same thing over and over again and expecting a different result”—Albert Einstein

technique or philosophy. The examples given are simply the favourites I use in most cases.

Severely rotated teeth

Aligners alone will fail because the plastic simply cannot adequately deliver the appropriate rotational couples—especially in cylindrical teeth. This is so despite ingenious attachment combinations that will indeed achieve some rotation, but not much. *Instead use* bonded buttons and elastomerics strategically placed into precision cut-outs of the first round of aligners and activated to produce force couples that will indeed rotate teeth (Figs. 1–3). *The outcome* is much more assured rotations in a shorter amount of time and with less chance of loss of aligner tracking.

Extrusions

Aligners alone will fail because of the push that clear aligners produce, being very difficult to translate into the pull required to extrude teeth. Again, this is so despite brilliant attachments that incorporate inclined planes in attempts to overcome this limitation. *Instead use* fixed devices that will much more assuredly deliver extrusion. These can include buttons or elastics, intra- or inter-arch, or even fixed appliances first, transitioning to aligners alone once the extrusions have been produced (Figs. 4–9). *The outcome* is the delivery of true extrusion in a timely and effective manner early on and with less chance of aligner tracking loss.

Large space closures

Aligners alone will fail because bodily movement of teeth is not a strength of clear aligners, and loss of tracking or anchorage is very common. This is so, despite some brilliant attempts to overcome this limitation with attachments, velocity changes, sequencing, etc. *Instead use* fixed appliances, which are much more tried and true and effective for space closure. Various auxiliaries can be utilised along with the fixed appliances to direct the space closure and manage the anchorage. This should all be performed with sectional aligners that are effecting movement at the same time in the other



Fig. 4: Maxillary right lateral incisor requiring extrusion.



Fig. 5: Intra-arch elastic-button technique.



Fig. 6: Extrusion elastic in place.

quadrants of the mouth (Figs. 10–12). *The outcome* is complete space closure in a much more assured manner, without having to worry about loss of aligner tracking, frequent refinements, wasted aligners and wasted time.



Fig. 7: Maxillary left canine requiring extrusion.



Fig. 11: The set-up with sectional brackets and a temporary anchorage device.



Fig. 8: Inter-arch elastic-button technique.



Fig. 12: After six months of space closure.



Fig. 9: After three months of extrusion.



Fig. 13: Narrow maxilla.



Fig. 10: Maxillary left molar space requiring closure.



Fig. 14: Nitantium Palatal Expander2 (Henry Schein) with sectional canine-canine aligners.



Fig. 15: After six months of expansion.

Transverse corrections

Aligners alone will fail with significant width corrections because they simply cannot accurately produce the bodily movement, bone remodelling and root torque that is required to profoundly and fully provide transverse corrections. *Instead use* a fixed expander. This most often involves using clear aligners only in the mandible at first while the expander of choice is widening the maxillary arch. In the time it takes the expander to be effective (four to six months), the mandibular arch movements have often been achieved with clear aligners. The case is then finished with full maxillary and mandibular aligners (Figs. 13–15). *The outcome* is much more assured width change while the opposing arch is being aligned.

Class II antero-posterior corrections

Aligners alone will fail because there are often significant skeletal components to Class II malocclusion, along with dental compensations, frequently making Class II a very difficult malocclusion to address with aligners alone (Figs. 16 & 17). *Instead use* fixed Class II correctors. An example is the Carriere Motion 3D Class II appliance (Henry Schein), utilised off maxillary canines or premolars back to first or second molars. Again, other movements can be happening in other areas of the mouth while the Class II correction is occurring, including maxillary canine–canine alignment, if desired (Figs. 18 & 19).



Fig. 16: Class II set-up for sequential distalisation.



Fig. 17: After 12 months of unsuccessful distalisation.

The outcome is concomitant Class II correction while the aligners are aligning elsewhere, toward the fastest, most assured and synergistic antero-posterior correction possible.