“An elegant and efficient approach”

An interview with Dr Luis Carrière, Spain, developer of the Carriere Motion™ Class III Appliance

Dr Carrière, how long has the Motion appliance for Class III malocclusions been on the market?

We presented the appliance for the first time at the American Association of Orthodontists meeting in 2015. The approach is not entirely new and we have been working on it for a couple of years. The Class II appliance was invented for Class II cases, but many participants in several courses I taught on Class II, especially in Asia, asked whether it could also be used in Class III cases. In response to this, we decided to explore this to see if it was a good option. The results we achieved with the use of the Carriere Motion Class II Appliance in Class III cases were amazing.

This made us realise that this appliance was really changing the relation between the mandible and the maxilla, harmonising soft tissue and balancing the patient’s face. We were completely surprised by the fantastic facial outcomes that we achieved with this minimal approach. We thus decided to create a special design according to the needs of the mandible, the Carriere Motion Class III Appliance.

Could you please describe in short the design features of the Carriere Motion Class III Appliance? Why does it only have a simple molar bonding pad with a small step in the arm and why did you abandon the joint design you have with the Class II Motion Appliance (rotation of the molar)?

If we look at the occlusion of the lower arch in relation to the upper, normally there is an inclination of the posterior segments owing to the fact that the buccal side of the mandibular molars should fit between the buccal and the lingual aspects of the maxillary ones. This means that the design of the traditional Class II pad ball is too bulky. Often, it can interfere with the occlusion at the start of bonding, so we decided to create a flat surface on the posterior segment in order to avoid unnecessary collisions in Class III mandibular positioning with the appliance. What we have created is a design that is very clean and simple with only those features that are needed. We have also adapted it to the requirements of Class III malocclusions. While we used Motion Class II Appliances in Class III patients initially, we needed to create something that was really suited to Class III cases. We achieved this by flattening the profile, which is now very slim and straightforward.

It is very important to understand that in 95% or more of our fixed cases, we start treatment with the Carriere Motion Appliance, which is not only restricted to Class II or III malocclusions but also extremely useful for those cases in which we have minor crowding. We need to open limited space between the
maxillary or the mandibular incisors in order to easily align the maxillary teeth or the mandibular anterior teeth without protrusion while accomplishing what we term a “Super Class I posterior occlusion”. For me, this is an elegant and efficient approach to cases that dramatically reduces the period for which brackets are worn by our patients. Reducing the time for which the patient has to wear brackets is a very important factor for many patients nowadays.

With clear systems like invesalign this appliance works amazingly well for simplifying treatment and dramatically shortening the aligner period. This way, many complex Class II or III cases can easily be resolved with Invisalign Lite treatment with less than fourteen aligners. This also makes treatment cheaper for patients and boosts the reputation of clinicians, as they are able to treat complex cases using very simple procedures.

The combination of the Motion appliance with our new passive self-ligating bracket Carriere SLX and archwire sequence truly makes complex treatment simpler while creating a dynamic and efficient scenario in our treatments. We are very pleased with the new Carriere SLX. Technically speaking, it was a challenge, as we needed to create a masterpiece of precision. Our engineers did their best work and we achieved the highest level of technical bracket outcomes. It is a real game-changer.

How many cases have been treated with the appliance so far?

In our office, around 100 cases have already been treated with the Motion Class III Appliance. It is astonishing to see the extraordinary change to the patient’s face every time, changes that one could imagine have been accomplished surgically, yet were achieved without a single extraction. I think the reason for this effect is the balanced combination of distalisation of the mandibular posterior segments, change of the posterior occlusal plane, and anti-clockwise rotation of the mandible that completely changes the relation between the mandible and the maxilla. Distalisation in the mandible is extremely fast and efficient mainly because there is an almost empty channel between the external and internal cortical bone. That is the reason we need very low force elastics in terms of traction. We only use 6 oz, ¼ inch, and we normally never use 8 oz in Class III cases, which is what we normally use in Class II cases.

Looking at the occlusal plane, in Class III cases, we intrude the mandibular molars with the Motion appliance and extrude the canines. This intrusion of molars and extrusion of canines is necessary in Class III cases to change the occlusal plane. This way, we bring the mandible into a better functional and aesthetic position. The change between the mandible and the maxilla that occurs in Class II and III cases is the main reason that we renamed the appliance from Distalizer to Motion. Not everything can be attributed only to distalisation.

The Carriere Motion Appliance changes the relation between the mandible and the maxilla to some extent by altering the posterior occlusal plane, thereby moving the mandible and the maxilla into a better functional position while balancing the face in Class II and III cases.
In retrognathic Class II patients, we combine maxillary distalisation, controlled maxillary molar distal rotation, and uprighting with mandibular repositioning for a better functional relation, giving stability to the case while balancing the position of the temporomandibular joint (TMJ) anatomical structures and harmonising the soft-tissue facial aesthetics. In Class III patients, we promote posterior mandible repositioning, changing the posterior occlusal plane, combined with distalisation of the posterior segments from the canine to the molars. This approach is often combined with a certain upper arch development with the Carriere SLX passive system to compensate for the typical premaxillary hypoplasia related to this type of malocclusion. Our main objective is to establish a stable and solid occlusion while balancing the patient’s face.

Have there also been cases in which the Class III malocclusion could not be corrected? Have you observed any TMJ problems during Class III treatment?

Figs. 4a & b: Patient before (a) and after (b) 14-month of treatment.

Figs. 5a–c: Initial intra-oral shot (a), after one month of treatment with Motion™ Class III Appliance (Fig. 5b shows the transparent prototype, which is not yet available), final treatment outcome in 14-month follow-up.

Figs. 6a & b: Patient before (a) and after (b) 3-month of treatment with Motion™ Class III Appliance (b).

Fig. 7: Initial intra-oral shot.
We are normally confronted with two types of Class III patients, dental and skeletal Class III patients. The Motion Class III Appliance is a treatment option for both. Skeletal discrepancies are normally treated with a combination of surgery and orthodontics. Many patients reject the option of maxillofacial surgery for many reasons however and remain as they are.

With this new approach, we can provide a minimally invasive treatment alternative to change their decision and provide them with a substantial facial change that still maintains their facial features.

We do not change the patient’s face completely, but we move the features into a more aesthetically pleasing position. We seek to achieve facial harmony, bringing self-confidence to the patient through compensated occlusion, facial improvement and spiritual equilibrium.

No TMJ problems have been found at this point and not a single patient has had any problem or symptomatology in the TMJ with this approach.

In many cases, Class III cases show an additional functional shift of the mandible. While balancing the occlusion, we balance the TMJ anatomical structural and functional relations. This achieves harmony in the area.

Are there any studies that have shown the proportion of the mesialisation effect in the upper jaw and of the distalisation effect in the lower jaw in the total correction of Class III cases?

This is a relatively new approach. We have conducted no studies at this point, but in relation to the effect of the Carriere Motion Class II Appliance, together with Prof. James McNamara from University of Michigan and Prof. Lorenzo Franchi from University of Florence, we are studying our records in order to determine answers to this. They are tracing our cases to establish what is going on. Results are expected very soon.

We have observed clinically good and stable occlusions over many years. For example, you can see in my lectures several cases that have been out of retention for more than ten years and are completely stable. What we need is an explanation for the experts.
What force elastics do you recommend for children and adults, and what is the recommended wearing time?

Wearing time of elastics with the Motion appliance is 24 hours normally, except for eating. Fresh elastics are required after each meal. In Class III cases, there is a channel between the external and internal cortical bone in the sagittal direction, from mesial to distal. There is no resistance, so substantial force is not required. Instead, we only use 6 oz elastics.

In mixed dentition cases, such as those of 7-year-olds in which we place a Motion Class III Appliance from the mandibular first molar to the mandibular canine, we slightly minimise the force. For 4 oz, ¼ inch will suffice. We can increase this to up to 6 oz, ¼ inch, if required. With this technology, significant changes to the patient's face are achieved, resulting in a beautiful balance. This occurs in Class II and III patients with mixed dentition. You may ask why that is. The answer is that we change the posterior occlusal plane and stimulate the orthopaedic effect in a new functional relation. I think this is key.

What degree of dental Class III malocclusion can be corrected with the appliance in children?

We can completely transform the scenario by controlling the posterior occlusal planes and changing the relation between the mandible and the maxilla. There are things that we cannot change in our patients, such as the genetic capacity of the patient to grow. What we can do from our side is everything to direct the growth, to modify the position of the structures and to bring structures into another position in order to try to modify the direction and to change the scenario completely in a way that we really ought to.

To what degree can a dental Class III malocclusion in adults be corrected with the appliance?

We can completely change full-step Class III cases in adult patients. We treat patients of all ages with this system, from teenagers to 60-year-olds. Skeletal repositioning does not mean skeletal changes but a skeletal repositioning of the mandible in relation to the maxilla, as the mandible, specifically the TMJ, is a dynamic anatomical structure. It is very important that we balance that and bring it into a better position.
The changes we can achieve in adult cases are amazing. It is a great alternative to surgery in adult cases and something that is going to establish a new treatment option for Class III patients.

You call your new series of lectures “facially driven treatment for Class II and III”. What are your key facts in this matter, and why should the facial, skeletal and dental factors not be isolated during treatment?

In orthodontics, we focus on good occlusion of the molars and the canines, looking out for midline correction, overbite, overjet and whether there are too many teeth. The patient’s face, teeth and bone position have to be correctly adjusted and balanced. The patient has to be left with an attractive face, as well as facial proportions and relations. We should never forget that behind the face there is a human being who wants to be successful in life, form natural social relationships and have the opportunity to establish a relationship with the person he or she has fallen in love with. We as orthodontists are fully responsible for the patient’s face and this is very important to consider.

The Carriere system is all about this and together with Henry Schein Orthodontics worldwide we are trying to spread this message. We, the orthodontists, are able to manage the patient’s soft-tissue profile in a positive way. How do we do that? Instead of using synthetic material like an aesthetic surgeon, we concentrate on bone and teeth and bring the soft tissue into a better and more natural position. We are also able to balance the relation between the mandible and the maxilla. By balancing the patient’s face, we are also balancing his or her life, bringing him or her self-confidence and restoring happiness.

However, we could also totally ruin the patient’s life by extracting teeth unnecessarily. I am convinced that nowadays we cannot consider orthodontics only as treatment of the teeth. Our patients are human beings and we have to give recognition to that.

With the Carriere system, the Motion appliance, the Carriere SLX bracket, the wire sequence, respect for the tissue and the physiology of the orthodontic movement, and considering the patient’s face, we aim to benefit our patients. Many profiles have been affected in the past, so our objective is to create tools to be added to the orthodontic armamentarium that help us in this direction.

So you are saying that the orthodontist should place much more emphasis on harmony of the patient’s face.

The orthodontist is responsible for the patient’s face. In my understanding of the specialty, he or she has to be an expert on moving teeth into the correct position, as well as on balancing profiles. He or she is responsible for the harmonisation of the soft-tissue and, if necessary, for sculpting the lips with dermal fillers. Nobody understands better than an orthodontist the anatomy and proportionality of the lips. Orthodontists also have to be experts on the use of Botox for excessive gingival display in those patients with a particularly gummy smile, blocking the levator labii superioris alaeque nasi muscle to retain the correct arch for a beautiful smile.

However, we are not only responsible for the face. I think we also have to train society on the correct way to gain a beautiful facial appearance. Instead of seeking treatment from an aesthetic surgeon, they would do better to visit an orthodontist. He or she will be able to give them a natural and elegant aesthetic outcome, including an attractive facial profile. If they are not satisfied, they can always visit an aesthetic surgeon later.

If society comprehends the importance of orthodontics for the face, far more patients will opt for orthodontic treatment. That is why we have to start upgrading our specialty. Orthodontics is all about aesthetics, art and science.

Thank you very much for the interview.