


In Perfect Harmony

The founder of the industry's first digitally customized, self-ligating lingual system shares his insight into the new approach that aims to make lingual orthodontics as easy

A portrait of Dr. Patrick Curiel, a man with dark hair, smiling, wearing a white shirt and a dark tie. He is positioned on the left side of the page, with his head and shoulders visible.

Harmony is the orthodontic profession's only fully digital, customized self-ligating lingual system, developed in 2007 by Dr. Patrick Curiel. After four years in development, and more than a thousand successfully treated cases, Harmony launched worldwide in 2011 through an exclusive distributor partnership with American Orthodontics, which recently purchased Harmony in the latter part of 2011. Dr. Curiel is an innovative orthodontist with a premier private practice in Paris, France, currently starting 300 lingual patients per year. Dr. Curiel recently spoke to *Orthotown Magazine* about what sparked his desire to develop Harmony, and how it is changing the way orthodontists think about lingual treatment.

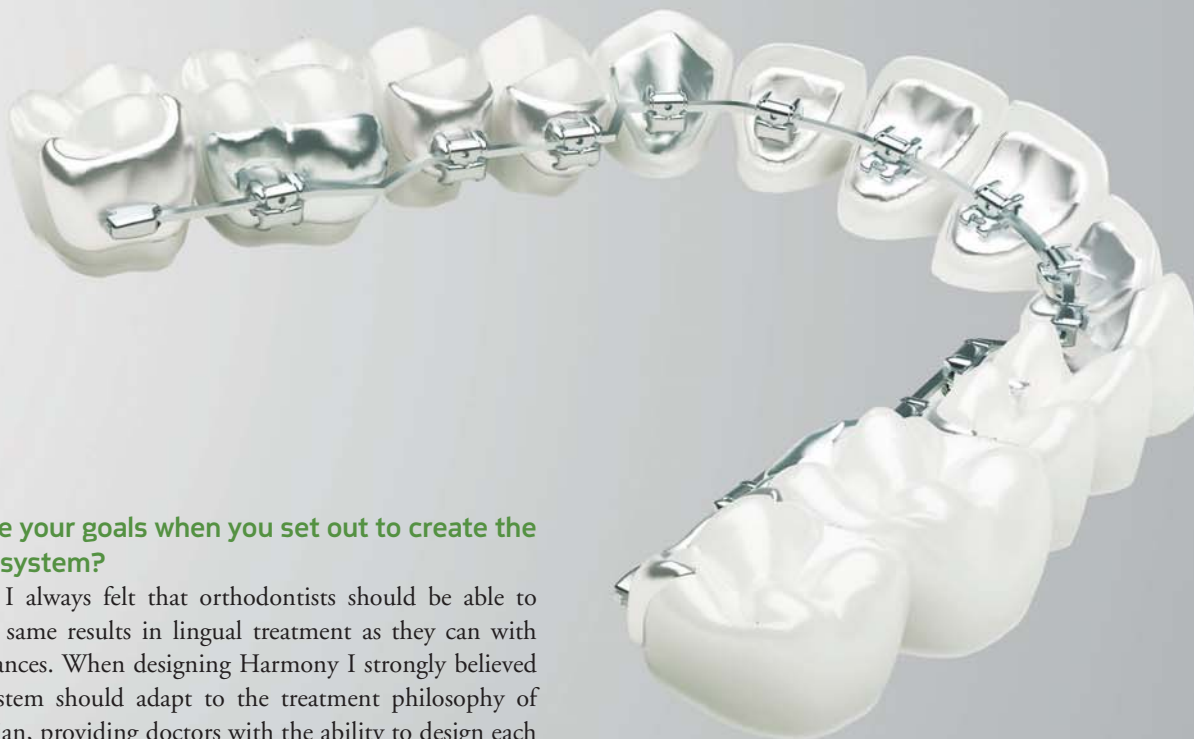
Describe your experiences treating lingual cases before Harmony. What were the biggest challenges you faced with other lingual systems?

Curiel: I gained valuable exposure to lingual treatment during my years studying at Columbia University, which was beneficial because many patients in Paris seek lingual treatment. The first lingual system I used had great end results, but we had to work extremely hard to get them. Plus it was very uncomfortable for patients. The second lingual system was more comfortable for patients, but was still difficult to achieve the consistent results we were getting with labial treatment. The third lingual system we tried showed great promise because it was customizable. However, the challenges with finishing and the complicated ligating methods used in this system caused a lot of frustration. After making numerous suggestions for improvements, I decided to design a new lingual system that offered efficiency and patient comfort, and also delivered a precise finish – a combination that I found lacking in all the lingual systems I had tried previously.

Dr. Patrick Curiel, Founder of Harmony

ny

stem provides
as labial.



What were your goals when you set out to create the Harmony system?

Curiel: I always felt that orthodontists should be able to achieve the same results in lingual treatment as they can with labial appliances. When designing Harmony I strongly believed that the system should adapt to the treatment philosophy of every clinician, providing doctors with the ability to design each case to meet their individual treatment goals. I knew that a lingual system must be easy to use, so that orthodontists do not have to work like crazy to finish a case. I really wanted doctors to be able to treat cases lingually without having to change their mechanics or treatment philosophy. With the help of my friends and colleagues, I started developing the Harmony system to meet these goals. The result was the world's first digitally customized lingual system that offered the features and benefits of self-ligating brackets and the accuracy of robotically formed wires.

Why is self-ligation more beneficial in a lingual system than traditional ligation?

Curiel: Before Harmony, we used a lot of self-ligating systems for labial cases. I have tried just about every one of them, which has given me a lot of insight into the advantages of each one. I applied the features that I liked from popular labial self-ligating systems to the lingual environment, which provided low friction and light forces during treatment. In lingual treatment, traditional ligation becomes very difficult. It's time consuming, irritating for the patient, and often difficult to tell if the bracket is ligated correctly. In our previous experience with traditionally ligated lingual systems, we had to use time consuming tying techniques like elastomeric double overties, which led to longer appointments and longer treatment time due to the increased friction over self-ligation. So, I designed Harmony to offer the same features and benefits as the best self-ligating systems.

Why is Harmony more efficient than other lingual or labial systems?

Curiel: Harmony takes the best concepts from labial systems like low friction, low force, MIM technology and self-ligation

and combines them with digital customization, which moves teeth more efficiently and more precisely than any other lingual system. Harmony offers the advantages of a passive self-ligating bracket during treatment. When the .018 x .025 finishing wire is inserted in the .018 x .025 slot, Harmony becomes a fully active system that provides consistent results. By filling the slot with a NiTi finishing wire, which is highly recommended, the customized prescription that is built into every bracket is translated accurately to the teeth. While it is possible to place offset bends in the finishing wire, it is rarely necessary. The flexibility of NiTi allows the teeth to settle in while the tight tolerances gently guide each tooth to its ideal position, which was designed by the doctor before treatment began using Harmony's proprietary digital technology.

Harmony is the only digitally customized, self-ligating system in the world. Talk about how you digitally customize a Harmony case

Curiel: First of all, Harmony doesn't dictate the course of treatment. It adapts to the clinical philosophy of each orthodontist. Each Harmony case starts with a silicone (PVS) impression that is sent to us by the orthodontist, which we use to create a 3D scan of the teeth. Using Harmony's digital technology, the teeth are then moved to their ideal position following the orthodontist's recommended treatment plan. Once the teeth have been moved to their ideal position, the doctor can go online and access the digital setup for the case and instruct the Harmony Technical Center to make changes, if necessary. The digital setup is then used to fabricate the customized lingual self-ligating system, as well as robotically formed arch wires, which are created using proprietary CAD/CAM technology. After the customized

continued on page 28

brackets are produced, an indirect bonding tray is fabricated to ensure a precise fit with the patient's malocclusion during the bonding appointment. So, the benefits of Harmony are derived from its ability to move teeth with a level of accuracy not seen in other lingual systems.

Talk a little more about the robotically formed arch wires and why those are so important.

Curiel: Pre-formed wire blanks designed for lingual appliances create a lot of challenges. They can only approximate the unique lingual arch of each patient as well as the variations in tooth size and shape, so the wire is often far away from the surface of the teeth. When designing Harmony, I felt that the arch wire should adapt to the teeth instead of building up the base of the bracket to compensate for a pre-formed arch wire. Harmony's robotically formed wires offer the clinician the flexibility of placing the wire as close to the tooth surface as possible, or, when the case requires opening or closing of spaces (such as an extraction case) the wire can be formed with straight wire sections to improve sliding mechanics. For every Harmony case, the doctor dictates the type of customized arch wire needed to achieve the best clinical results. For example, the doctor can choose to place the brackets as close to the teeth as possible, which results in many bends in the arch wire to achieve the desired finish (Fig. 1). Alternatively, the doctor can choose to make the wire straighter along the lingual arch, which results in an increase in the profile height of some of the brackets to achieve the desired finish (Fig. 2). Harmony offers an "optimized" wire, which incorporates both features into the system based on the treatment goals described on the prescription sheet that accompanies each case (Fig. 3).

How does Harmony address debonds during treatments, and teeth that are blocked out at the initial bonding appointment?

Curiel: Harmony offers a set of positioning jigs with every case for bonding the anterior teeth (six jigs per arch). Positioning jigs are designed to slide over the occlusal surface of each anterior tooth and provide a mechanical guide for positioning the bonding pad just prior to light curing the appliance on the tooth. It is common for an adult patient to present with severe crowding where one or more anterior teeth

cannot be bonded during the initial indirect bonding appointment. The positioning jig is used at a subsequent appointment when space opens up to allow for a bracket to be direct bonded to the lingual surface of the anterior tooth. If a bracket comes

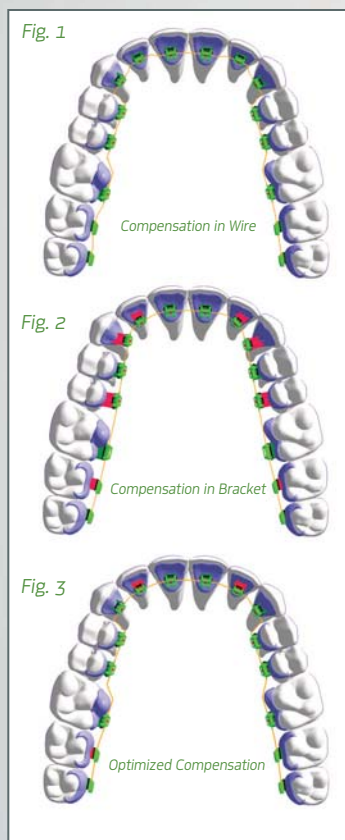
loose at any time during treatment, the positioning jigs provide an easy solution that ensures placement accuracy, which is highly critical for a digitally customized orthodontic system. The posterior teeth can be direct bonded at any time during treatment due to the shape of the bonding pad, which has occlusal rests that guide the appliance to the correct position for bonding.

What happens if a Harmony case does not progress as expected?

Curiel: If the orthodontist feels that the case is not progressing as planned, the digital setup can be modified at any time during treatment and, for a small fee, a new set of arch wires will be robotically formed that follow the new treatment plan. The doctor is in complete control of the case during treatment. For example, a case can start out as a non-extraction case and then, later in treatment, the doctor may determine after meeting with the patient that premolars need to be extracted in order to achieve the desired finish. This is an easy change with Harmony. The doctor only needs to send a new prescription sheet to the Technical Center, which leads to the creation of a new digital setup, which can be viewed online. After two to three weeks a new set of arch wires is robotically formed and shipped to the doctor.

How challenging is Harmony for doctors with little to no lingual experience?

Curiel: Many doctors who have little to no background in lingual orthodontics have started treating lingual cases with Harmony. Because Harmony adapts to the doctor's philosophy and is digitally customized for a highly accurate finish, orthodontists can submit their first case after taking an online certification course. However, attending a certification lecture is recommended. Harmony is designed to treat lingual cases using self-ligating brackets, which open and close very similarly to labial self-ligating brackets. Due to the ease of wire insertions, there is no need for intensive ligature and wire-tying exercises. A knowledge of indirect bonding is helpful, but this procedure can be learned using online resources as well as by following



Above: Harmony's arch wires are robotically formed based on the doctor's treatment plan.

Below: Anterior positioning jigs provide a mechanical guide for bonding accuracy.



Harmony's printed protocols. I recommend that doctors start their first Harmony case on the maxillary arch and use labial appliances on the lower arch. The maxillary teeth are wider, so they are easier to bond and insert arch wires. After starting a few cases, then progress to the Harmony system on both arches.

What gives Harmony an advantage over clear aligners?

Curiel: When patients want a truly invisible system, Harmony is the only choice. First of all, clear aligners are not truly invisible. Second, in order to get three-dimensional control of teeth, bonded buttons are required and do not always achieve a perfect result. Aligners also require patient cooperation and can become lost or damaged. I find most of my patients do not like having to constantly remove and re-insert aligners during the day. A lot of my patients who initially requested clear aligners have switched to Harmony just for these reasons.

A distinct advantage Harmony has over clear aligners is the range of cases that can be treated. Essentially, if you can treat a case with labial appliances you can treat the case with Harmony. The same cannot be said for clear aligners. When a patient tells me that they want invisible braces, I educate them on the advantages and disadvantages of both systems. Not surprisingly, almost every patient seeking invisible braces selects Harmony.

What is Harmony's biggest benefit for the patient?

Curiel: Harmony offers patients an orthodontic system that is not just truly invisible, but quick and effective. I find that many patients seeking invisible orthodontic treatment have already visited several orthodontists, so I know they have already heard the clear aligner story from other dentists and orthodontists. When presenting Harmony, I inform the patient that their smile can be improved using the latest in digital technology, that they can benefit from the most efficient method for straightening teeth, that their office visits are typically 10 weeks apart, and that each office visit is only 10 to 15 minutes. These advantages are very compelling. Whether patients seeking invisible orthodontics choose to use Harmony or not, I find that by offering Harmony it really distinguishes my practice from other offices in the area.

How much time will Harmony save both the doctor and the patient?

Curiel: With Harmony, I change a lingual arch wire in about three to five minutes. A traditionally ligated lingual system takes me about 15 minutes or more per arch due to the challenges of tying in ligatures. I find appointments with Harmony to run about four times faster than with other lingual systems. Another

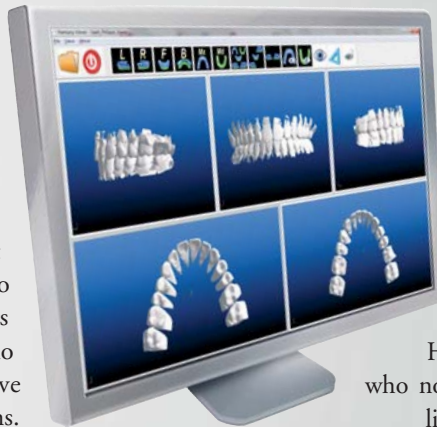
time-saving benefit is that I do not have to spend time bending wires. This saves a lot of time and overcomes one of the biggest challenges orthodontists face with lingual treatment. Because Harmony is a self-ligating system, I can schedule appointments up to 10 weeks apart instead of every four weeks, which opens up my schedule for more patients. I find that I can finish most of my Harmony lingual cases with the same number of appointments

and the same overall treatment time as my self-ligating labial cases, so there really is no downside to starting a lingual case versus a self-ligating labial case. Fortunately, patients are willing to pay a lot more for invisible orthodontics, so Harmony is a great tool for creating additional revenue for the practice.

Why did you partner with American Orthodontics?

Curiel: We realized that to take Harmony to the next level, we needed a partner who not only shared our vision, but had well-established global distribution. We found this in American Orthodontics. One factor that was critical is that American Orthodontics is a privately held company whose focus is strictly on orthodontics. They are different from other large companies where orthodontics is a small fraction of their business. Another factor that was important in building a long-term relationship with American Orthodontics is that they are like a family. They manufacture quality products and offer outstanding customer service, so we felt this would be a great fit for our two organizations. We're excited American Orthodontics has taken over the manufacturing of Harmony and will now have their full resources and experience behind it. They are truly the company of choice as we look to move Harmony forward in the future.

For more information about Harmony and American Orthodontics, visit www.americanortho.com, or call 800-558-7687. ■



Harmony's digital setup is determined by the orthodontist's treatment philosophy.