

# The Forsus™ Appliance. Clinical efficiency in Class II correction.



*An interview with Dr. José Chaqués-Asensi.*



## **Dr. José Chaqués-Asensi**

Dr. José Chaqués-Asensi received his MD degree in 1980 and a Specialist in Stomatology degree (DDS) in 1986 from the University of Seville. In 1990, he received a master's degree from Case Western Reserve University, Cleveland, Ohio and in 1995 received a PhD degree from the University of Seville. He has published numerous papers of major impact in national and international orthodontic journals, and has given oral presentations and lectures at the Congress of the Spanish

Orthodontic Society (SEDO), the European Orthodontic Society (EOS), the American Association of Orthodontists and in the World Orthodontic Congress of San Francisco (1995) and Chicago (2000). He has been a guest speaker for National Orthodontic Societies in Europe and the Middle East, and for Universities in Spain, Europe and the USA. He is an active member of the American Association of Orthodontists (AAO), a Diplomate member of the Spanish Orthodontic Society (SEDO), board-certified in the European Orthodontic Society, and an active member of the Angle Society of Europe (ASE). Since 1990, he has worked at his orthodontic practice in Seville, Spain.

## **Foreword**

**David Solid, Scientific Affairs Manager, 3M Oral Care**

*Class II correction is one of the most common, and one of the most difficult, modes of orthodontic treatment. There are multiple variables to consider when deciding on the method of treating a Class II malocclusion, and, unfortunately, the most common techniques involve some amount of patient compliance, which can be yet another variable.*

*Dr. José Chaqués-Asensi, MD, DDS, MSD, PhD, has several years of experience in correcting Class II malocclusions using the Forsus™ Class II Corrector. He teaches courses on the options and biomechanics of using this Class II corrector. Dr. Chaqués agreed to an interview on the unique properties of the Forsus Corrector and the reduction in variables when using it in treatment.*

### **Q: What are key considerations when deciding how to treat Class II?**

Dr. Chaqués: There are three key considerations when deciding how to treat Class II. The first is whether the patient is a growing patient or a non-growing (adult) patient. The second would be the amount of skeletal discrepancy, that is, the degree of mandibular retrognathism, since the mandible is the jaw mainly affected in Class II skeletal malocclusions. The third factor, directly connected with the two previously mentioned, is the need or indications for extractions.

### **Q: Given those considerations, what are the most common methods to perform orthopedic correction of the Class II?**

In a growing patient with a mild to moderate skeletal discrepancy, functional appliances have been used with the aim of "jumping the bite" and make the mandible grow forward. However, the available data does not support the notion that there is a significant difference in the global amount of mandibular growth in patients treated with functional appliances. Today, the most accepted concept is that the effects observed with the use of these appliances are due to dentoalveolar compensation.

In the same trend, the use of the headgear, with or without Class II elastics, has undergone a significant decline over the years. The main reasons are that we would be treating the wrong jaw (the maxillary base is normally positioned in most Class II skeletal cases) and because the effects are not significant from the skeletal point of view. It is important to remark that both approaches (functional appliances and headgear use) require a great amount of patient cooperation. In the last three decades, intermaxillary hinge devices, like the Herbst®, the Forsus™ Appliance and some others have come into place, mainly because they avoid patient cooperation to a great extent and because they are more efficient in achieving the Class II correction.

**Q: What about treatment of non-growing patients?**

In young adults, with a good periodontal status and a mild to moderate skeletal Class II, dentoalveolar compensation can be considered and could be applicable in certain cases. In that sense, both the Herbst and the Forsus Appliance have been used with successful results in non-extraction cases. However, extractions may be indicated for several reasons: the amount of crowding (mainly in the lower arch), proclination of the upper incisor and protrusiveness of the upper lip, severity of the overjet or convexity of the face. In these cases extractions should be considered a form of dentoalveolar compensation and must be limited to upper bicuspid.

The only exception to this rule is when the lower arch absolutely demand extractions and these cases, very often, are not good for orthodontic compensation. When the degree of skeletal discrepancy is severe, so the mandible is severely retrognathic, a combined approach of orthodontics and orthognathic surgery must be indicated. If the patient rejects the surgical treatment a “limited treatment” could be advised, consisting in leveling and aligning both arches and leaving the malocclusion as such. If neither the upper incisor nor the upper lip are protrusive and the nasiolabial angle is within normal limits, upper extractions, very commonly used in the past in order to correct the overjet, are to be absolutely avoided.

**Q: When do you recommend the use of a fixed appliance?**

The ideal case would be a growing or young adult patient with a mild to moderate Class II skeletal discrepancy and acceptable facial pattern, presenting with a Class II division 1 malocclusion, normal to slightly proclined upper incisor after the alignment of the upper arch and normal or retroclined lower incisor after the alignment of the lower arch. From the clinical management point of view, maximizing clinical efficiency, reducing treatment time and minimizing patient cooperation are major reinforcements of the indication of a fixed appliance.

**Q: How does the Forsus Appliance meet your requirements for a fixed appliance?**

The popularity of the Herbst® appliance in the last 25 years has brought about a new interest in the potential use and application of inter-maxillary hinge devices for the correction of the Class II malocclusion. The Forsus™ Fatigue Resistant Device belongs to the new generation of such appliances. The Forsus Appliance is an easy-to-use, yet dependable appliance that can be used effectively and efficiently in different clinical scenarios where the correction of the skeletal or dental components of the Class II malocclusion is needed. All the parts of the appliance are pre-made and, therefore, no lab work is required. The ideal size of the rod can be easily selected and the parts can be assembled together, adjusted and located in the mouth of the patient within a few minutes.



**Q: Can Forsus Correctors be used in skeletal cases?**

The initial purpose of the use of intermaxillary hinge devices of the Herbst type (as it happened before with Functional appliances) was to enhance and promote mandibular growth. However, the scientific evidence available today does not permit to support the concept that a significant skeletal modification can be achieved with the use of these appliances. So, the skeletal effects, albeit noticeable to some extent in some cases, are not clinically significant and do not justify its use.

Nevertheless, in mild to moderate Class II skeletal patients, the Forsus Appliance is very effective in introducing dentoalveolar compensations that would carry out a very successful correction of the Class II malocclusion. Furthermore, I am aware of the suggestion that the Forsus Appliance, as it has been proposed for the Herbst, could induce a remodeling of the glenoid fossa, allowing a forward position of the condyle in the joint and, therefore, a sagittal forward repositioning of the whole mandible. However, sufficient scientific evidence to support this concept is not available at this moment. In fact, the time of wearing of the appliance rarely exceeds six months and, from a biological point of view, this time span does not seem enough to generate a craniofacial response of this nature. Finally, in severe skeletal cases other treatment alternatives should be considered, like a surgical procedure in adult patients or a “limited treatment” both in growing and non-growing patients.

**Q: What types of dental cases can be treated with Forsus Appliances?**

The ideal indication for the use of the Forsus Appliance has already been described above. However, the clinical possibilities for the use of the appliance is much wider. Unilateral Class II division 1 malocclusions can be properly handled with a differential force placed on each one of the two rods. Even dentoalveolar compensation of asymmetrical malocclusions with a skeletal component can be achieved with the use of the Forsus Appliance. When the inclination of the lower incisor allows a prolonged use of the Forsus Appliance (6 to 9 months), severe overjets of more than 5 mm can be fully corrected with this appliance. Vertical control can also be achieved by applying the force distal to the lower first premolar instead of the cuspid. In Class II division 2 malocclusions, the Forsus Appliance can be used after leveling and aligning the two arches.

**Q: The Forsus Appliance has been compared with the intraoral molars distalizers, like the Pendulum appliance. What is your opinion?**

You are right. But this is a very common misunderstanding, because the Pendulum (like most of the intraoral distalizers) and the Forsus Appliance are totally different types of appliances. They both share some features, like they both can be used in non-extraction treatment and do not require patient cooperation. But the differences are very significant. First, the main indication for the use of the Pendulum is the Class II division 2 malocclusion, in a Class I or minimal Class II skeletal case with a cusp-to-cusp (no full step) Class II molar relationship. If the Class II molar relationship is complete (7 mm), the Class II skeletal discrepancy involves a retrognathic mandible or the upper incisor is flared, the Pendulum is contraindicated because in the majority of these cases extractions will be necessary in the end unless skeletal anchorage (TADS) is used to prevent further mesial movement of the upper front teeth.

It must be explained that one of the initial indications of the Forsus Appliance was to distalize the upper molars and, in fact, it can be used for that purpose if the upper molars are not connected to the rest of the upper teeth. However, nowadays, the Forsus device is used in the large majority of the cases with the upper arch totally consolidated and the molar position reinforced with a trans-palatal bar.

The other main difference is that the Pendulum is located, works and performs the Class II correction in the upper arch and ... at the expense of the upper arch. That means that the lower arch is unaffected, so there are no side effects in the lower dentition. Conversely, the Forsus Appliance connects the upper and lower arches and has an effect in both of them. However, the effect is far more noticeable in the lower dentition that exhibits mesial migration, as perceived by the proclination of the lower incisor, whereas the upper dentition remains relatively unchanged.

Nevertheless, in recent years I have been using a combined protocol for the treatment of severe Class II division 2 malocclusions (7 mm or more of Class II molar), where the patient shows a Class I or mild Class II skeletal relationship and the lower incisor is retroclined. In such patients, the first part of the treatment is done by molar distalization with the Pendulum, which allows a partial (but not total) correction of the Class II malocclusion. The final part of the Class II correction is done through the use of the Forsus Appliance to achieve a perfect Class I. This combined approach carries out great facial changes in these patients. So, the two appliances have different indications and mechanics but they are compatible in some selected cases.

**Q: What is the process to achieve the patient's acceptance of the appliance?**

Tolerance to the appliance is normally good and the patient must be informed and instructed about the specific features of the appliance, the advantages of its use versus other treatment alternatives and how to overcome the possible initial discomfort. If the patient rejects the use of the appliance from the beginning or does not tolerate the appliance, the possible drawbacks or limitations in the treatment outcome must be explained and discussed with the patient or his/her family.

**Q: After removal of the Forsus Appliance, are there any recommended steps to ensure good retention of the correction?**

One of the main, and logical, concerns with the use of this appliance is stability. During treatment the check-ups of the patient must include the check-up of the bite. After two or three months of appliance wearing, the spring must be removed from the headgear tube and the bite must be checked, looking for a double or "Sunday" bite. While the occlusion is cusp-to-cusp the bite is not stable in many cases and the position of the lower arch may relapse easily. However, after four to six months of appliance wearing the occlusion is normally in Class I without the patient posturing the mandible forward.

At this point we must also monitor the changes in the inclination of the lower incisor. When in doubt, a follow-up cephalogram can be taken in order to assess the changes. An increase in the axial inclination of the lower incisor as compared to the initial situation will certify that the dentoalveolar compensation has taken place. At this point, the position of the mandible is stable in the large majority of the cases and the correction of the malocclusion can be considered completed.

Mandibular positioners or occlusal positioners have been recommended in order to ensure or stabilize the position of the mandible. In my protocol, and according to my experience, such devices are not necessary on a routine basis and are not part of my armamentarium. After removal of the Forsus Appliance, a brief period of vertical or short Class II elastics, as needed, may be necessary to settle the occlusion before debanding. My retention protocols are the same for these patients as for any other patient of my office.

**Q: What has been your patient's response to the use of Forsus Appliances in their treatment?**

Proper indication is a key factor to achieve a successful treatment response with this appliance, as it is with any other appliance of any kind. Class II dental correction can be performed with a high level of accuracy and in a very efficient way, reducing treatment time and avoiding to rely on patient cooperation.

As stated before, there is a wide range of clinical situations where the Forsus Appliance can be used. In mild to moderate skeletal Class II malocclusions the Forsus Appliance is capable of producing a controlled dentoalveolar compensation that allows to achieve a Class I occlusal relationship with positive facial changes. A favorable skeletal response in mandibular growth and/or mandibular position has been observed in some cases, although this type of treatment outcome is not to be expected and can't be fully explained from the biological point of view. The correction obtained with the Forsus Appliance has been proven to be very stable over time and the retention protocol of these patients do not require any specific variation from a common case.

**Q: Any final considerations?**

Well, the Forsus Appliance is a wonderful tool that can become a great help for the orthodontist in a variety of clinical scenarios. Understanding of the parameters that define a proper indication for its use is fundamental to obtain satisfactory results. Good clinical management of the adequate patient can be accomplished within a limited amount of time, since the learning curve is not long. Once the clinician learns when to use it and how to use it, a wide range of possibilities are open for the orthodontist. I would make a sincere and strong recommendation to any orthodontist to get familiar with the appliance, since the Forsus Appliance has changed my approach of treating Class II malocclusions. And I am sure it can do the same for others.

**Thank you very much, Dr. Chaqués.**

It has been a pleasure.

*Editor: Dr. Chaqués was interviewed by David Solid, Scientific Affairs Manager with 3M Oral Care. July 2016.*