Invisalign Q&A with Simon Beard, Senior Vice President and Managing Director, Align Technology EMEA

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Almost 6 million people have successfully straightened their teeth using Invisalign® clear aligners, treated by Invisalign trained doctors. Tell us more about this market for straighter teeth. Can you give us a breakdown on demographics?

The Invisalign clear aligners are an alternative to traditional braces and wires, and Align Technology has been driving the transformation in digital dentistry for 21 years now, offering a modern end-to-end approach to straightening teeth. Increasingly, more and more people see the many benefits of clear aligner therapy that can deliver aesthetic and orthodontic solutions without the need for using traditional, fixed braces.

One of the benefits of the Invisalign solution is that it can be used by both younger people, even conscious of their looks, as well as adults, who may otherwise have refused conventional orthodontic treatment. As a result, we are strong interest from both groups also here in the UAE and Middle East. The interest is reflected in the overall market dynamics – it is estimated that the dental devices market will grow 6.5% per cent through 2023.

We can observe it in the Middle East as well as in other markets: there has never been more demand for a beautiful smile than these days. Thanks to the Millennial or “selfie” generation, we can clearly see more and more consumers proactively looking for a treatment option that will allow them to straighten their teeth and get that camera-ready smile they always wanted. The Invisalign system offers this opportunity.

This new trend presents a great opportunity for the doctors to leverage growing demand from consumers and embrace digital technology, such as clear aligner therapy or intracanal patient scan. A more digital practice will allow them to see and treat more prospective patients visiting their clinic and asking for a treatment of their choice, but also to mirror more closely consumer buying behaviour and capture new patient interest and untapped segments.

Innovation in dental technology has prompted major growth in the dental health industry globally. Could you tell us more about how you use 3D technology to make the aligners?

As a pioneer in the industry of clear aligner orthodontics and digital dentistry, we were one of the earliest adopters of 3D printing. We are the largest 3D print manufacturer worldwide, and our priority is to ensure the highest quality of our manufacturing process. Currently, as many as 350,000 aligners are manufactured every single day, using stereolithography (SLA) to 3D print the molds. That means each patient receives their own, unique set of clear aligners to wear.

It’s worth pointing out how Invisalign clear aligners differ from the other market offering. The Invisalign system is a unique combination of patented SmartTrack material that applies constant force and improves control of tooth movements. SmartForce attachments engineered to make complex tooth movements possible without braces and wires, as well as Smart(Mages) technology, which optimizes tooth movements and aligner activation for greater predictability, while utilizing data from almost 6 million cases. Currently, we offer custom made solutions for younger patients with early mixed dentition, teenagers and adults alike, and the Invisalign system can be applied to treat approximately 80% orthodontic cases starts.

Tell us about the orthodontics market globally and how is it different to the region in terms or growth. The global orthodontic supplies market is expected to reach USD 6.63 billion by 2023 from USD 4.32 billion in 2018, growing at a CAGR of 8.9%, according to a recent report.

These market trends correspond to our business growth. In Q2 2018, we saw an increase in the number of Invisalign cases shipped internationally in EMEA by 9.2% compared to the corresponding quarter last year. That said, there is definitely a growing appetite for the clear aligner treatment.

The potential to grow the market for teeth straightening is enormous – according to our estimates, as many as 100 million patients in EMEA region could benefit from some type of teeth straightening. We would like to tap into this opportunity and make clear aligner therapy accessible to as many patients as possible, helping doctors create new, beautiful smiles. To make this happen, we are working closely with a growing network of Invisalign trained doctors - general dentists and orthodontists alike – to make clear aligner therapy widely available to patients in the region.

What are your plans for growth in the region? Who do you compete with in our region?

As a pioneer in the field of digital dentistry, our focus is very much on expanding our presence in the region – which is still a relatively new market for our technology. We will continue drive innovation in the dental industry – as we have done for the past 21 years - by offering doctors and patients cutting-edge solutions to respond to their ever-changing needs. Our technology as well as commercial setup we have built in EMEA to support the Invisalign trained doctors gives us great, competitive advantage over other orthodontic solutions, available on the market.
**In-office welding by Nd:YAG laser**

*By Prof. Carlo Fornaini & Prof. Caroline Bertrand, France*

**Introduction**

Just after the introduction of the first laser by Maiman in 1960,1 there was a very fast evolution of this new technology, characterised by constant progression in techniques and applications, increasing the possibility to have smaller and cheaper devices and introducing even new wavelengths. Laser welding was first introduced in the jewellery industry during the 1970s and soon after successfully used by dental technicians as well.2 The first lasers used were the carbon dioxide and Nd:YAG lasers, but the market was rapidly conquered by the second, owing to the results that could be obtained with it.3,4

Laser welding offers a great number of advantages compared with traditional welding. Firstly, the laser device saves time in the commercial laboratory because all welding is done directly on the master cast. Inaccuracies in assembly caused by transfer of the master cast along with investment are reduced.5 The use of a laser technology, instead of soldering, is indicated when very close to acrylic resin or ceramic parts with no physical contact (cracking) or colour damage.6 This means it is possible to save time and money during the restoration of broken prostheses or orthodontic appliances. Because it is not necessary to remake the non-metallic parts, this welding technique may be used on every kind of metal, but its property of being very active on titanium makes it particularly advisable for prostheses supported by endosseous implants.7

Many laboratory tests have demonstrated that laser-welded points have a high reproducible strength for all metals, consistent with that of the substrate alloy.8 All these advantages led to this method being extensively used in dental technicians’ laboratories and stimulated companies to put on the market increasingly upgraded appliances. Some aspects, such as large dimensions, high costs and delivery systems, today still characterise those machines that use fixed lenses, strictly limiting their use to dental technicians’ laboratories.

The aim of this study is to show, through the description of a series of clinical cases, the utilisation of a laser device normally used for surgery in the dental office to weld orthodontic appliances and to demonstrate the advantages of this technique. The appliance used, the Fidelis Plus III (Foton), is a combination of two different laser wavelengths, the Er:YAG (λ = 2.940 μm) and Nd:YAG (λ = 1.064 μm). The first allows the dentist to treat hard tissue (enamel, dentine and bone) with a mechanism that, utilising the affinity of this laser for water and hydroxyapatite, induces the explosion of intracellular water molecules and so causes the ablation of the tissue.9 Its utilisation may be extended also to dermatology, where it can be employed in the treatment of keloid scars and wrinkles with resurfacing, in addition to the elimination, by vaporisation, of lesions such as condyloma, naevi, warts and mollusca contagiosa.10 The Nd:YAG laser allows the dentist to perform surgery with complete haemostasis; utilising the affinity of this wavelength for haemoglobin and thus avoiding the use of sutures.11 The delivery system for this laser is provided by optic fibres of different sizes, chosen according to the kind of application needed, ranging from 200 μm (endodontics) to 900 μm (whitening).

In addition to a pulse duration of microseconds, which is necessary during dental interventions, the peculiarity of the Fidelis Plus III appliance is the possibility of pulse durations of milliseconds (5 μs to 25 μs), which can be utilised in phlebology, in the treatment of lesions of vascular origin, owing to the affinity of this wavelength for haemoglobin.12

In our previous work, we demonstrated, by in vitro tests on different metal samples, the good quality and high resistance of a joint welded by this device, while in this paper we demonstrate the clinical application of this technique.

**Material and methods**

The laser device used was, as already stated, the Fidelis Plus III, with a 900 μm fibre and a 2 mm spot handpiece (R2, Foton), normally utilised in dermatology, or in some cases a prototype provided by Fotona itself. The parameters that we normally use for welding are:

- Wavelength: 1.064 μm
- Energy: 9.9 J
- Frequency: 1 Hz
- Spot diameter: 2 mm
- Pulse duration: 15 ms
- Fluence: 1.26 J/cm²
- Working distance: 8 mm

**Clinical cases**

**Case 1**

A 9-year-old female patient in orthodontic treatment in our office came in urgently owing to damage to the rapid palatal expander applied to her maxillary molar. The clinical examination revealed that the brace had been damaged close to the connection with the arm (Fig. 1). The patient had just finished one stage of the expansion and, since it was very risky to leave her without an appliance, we decided to weld it directly in the office with the Fidelis laser.

The expander was prepared with the conventional procedure required for laser welding (sandblasted with alumina powders of 50 μm in diameter using the MiniBlaster, Deldent, cleaned with acetone and both parts dried). The appliance was directly welded in the office using CoCr-Schweizstrahl welding wire (DENTALU-BUM). After a few minutes only, the appliance was ready to be reinserted into the patient’s mouth (Fig. 2).

**Case 2**

An 8-year-old male patient in treatment in our office with a Schwartz removable orthodontic appliance came to us for periodic checking of the appliance, and we saw that one of the Adam’s hooks had broken (Fig. 3). We welded it without filler metal (Fig. 4), and the plastic shield, although very close to the welding zone, was not damaged or modified (Fig. 5). We were able to reseat the repaired appliance in the patient’s mouth after some minutes (Fig. 6).

**Case 3**

An 8-year-old male patient in treatment in our office with a Frankel removable orthodontic appliance came to us for periodic checking of the appliance, and we saw that one of the wires had broken (Fig. 7). We welded it without metal filler (Fig. 8), and the plastic shield, although very close to the welding zone, was not damaged or modified. We were able to reseat the repaired appliance in the patient’s mouth after only some minutes.
Orthodontic treatment not associated with overall happiness, study finds

By DTI

ADELAIDE, Australia: Research undertaken at the University of Adelaide has examined whether an orthodontic treatment has an impact on psychosocial outcomes. The study concluded that, contrary to popular belief, such therapy does not result in better psychosocial functioning in later life.

The study, the first of its type in Australia and the second in the world, investigated whether having undergone treatment with fixed orthodontic appliances led to a greater level of happiness or psychosocial outcomes later in life. The longitudinal study followed 482 13-year-olds from Adelaide who had previously participated in an oral epidemiology study between 1988 and 1989. By the time the participants turned 30 in 2005 and 2006, more than a third had received an orthodontic treatment. “There was a pattern of higher psychosocial scores in people who did not have orthodontic treatment, meaning people who hadn’t had braces fitted were significantly more optimistic than the ones that did have braces,” said study co-author Dr Esma Dolgoci, lecturer in orthodontics at the university’s School of Dentistry. “Those who didn’t have braces had varying levels of crooked teeth, just like those who had braces, treatment, ranging from mild through to very severe.”

The study looked at four psychosocial aspects. First, it examined how well the participants felt they coped with new or difficult situations and associated setbacks. Then, the researchers checked how confident they felt in taking care of their own health. The researchers also assessed the support the participants believed they received from their personal network and, finally, their level of optimism. “These indicators were chosen because they are important for psychosocial functioning and are relevant to health behaviours and health outcomes, since the core research question was the impact of braces treatment on patients’ self-confidence and happiness in later life,” Dolgoci noted. “A lot of people are convinced that if they have braces, they will feel more positive about themselves and do well, psychosocially, in later life. This study confirmed that other factors play a role in predicting psychosocial functioning as adults—braces as a youngster was not one of them.”

The study, titled “The long-term influence of orthodontic treatment on adult psychosocial outcomes: An Australian cohort study,” was published online on 27 May 2019 in Orthodontics and Craniofacial Research, ahead of inclusion in an issue.
Creating the ideal smile in the best possible way

For better, safer, faster orthodontic care.

When it comes to orthodontics, each patient is a unique case. Creating their ideal smile means balancing many variables, including treatment effectiveness, visibility, and time. Our range of innovative solutions, spanning from traditional to low visibility braces, provides the options dental professionals need.

For more information, please contact your Dentsply Sirona representative, or visit dentsplysirona.com/Orthodontics