Ormco Unveils Symetri™
Clear ceramic twin bracket system

New Bracket Incorporates Advanced Manufacturing Technologies in Polycrystalline-Alumina to Forge Next-Generation of Ceramic Brackets

By Ormco

ORANGE, Calif.: Ormco Corporation, a leading manufacturer and provider of advanced orthodontic technology and services, today announced the next generation of aesthetically pleasing ceramic twin brackets, Symetri™ Clear. Adding to Ormco’s expansive product portfolio of both lingual and self-ligating bracket systems, Symetri Clear is a refined, aesthetic bracket system incorporating design features that apply expert clinical advice and analysis, end-user feedback and technological advancements and achievements of the Company.

“Over the past 30 years, ceramic materials have evolved to bring more sophistication to manufacturing capabilities, and to deliver an appearance that meets the aesthetic interests of patients. Ormco has been keen on developing proprietary technologies and manufacturing products that leverage the advancements in materials, and also serve clinical demands,” said Matt Turner, president of Ormco. “Backed by over seven years of research and development, we’re pleased to bring our latest innovation, Symetri Clear, to the conventional twin market.”

Boasting a low profile and ample torque and tie-wing strength, Symetri Clear addresses and minimizes the challenges that may come with leveraging a ceramic system—bracket breakage, wire notching and difficulties while debonding. Symetri Clear is designed to debond in one piece without fracturing requiring minimal forces. Initially offered in the McLaughlin, Bennett, Trendis® prescription, Symetri Clear was designed with upwards of seven years of dedicated research and development, focusing on clinical analysis, end-user feedback and Ormco’s proprietary development of technological advancements in ceramics. Serving the needs of doctors and patients, the twin bracket is designed with round surfaces and edges, creating enhanced patient comfort and greater radio on sliding surfaces.

Combining state-of-the-art manufacturing technology and the latest in ceramic materials, Symetri Clear provides the benefit of aesthetics and offers easy, non-destructive, single-piece debonding. Its noteworthy clinical features include:

- **Torque and Tie-Wing Strength**: To better manage treatment flexibility and prevent bracket breakage, Symetri Clear is made of polycrystalline-alumina using a small particle size and is designed to withstand clinically applied forces. The material, combined with advanced processing, promises tie-wing and torque fracture resistance allowing clinicians to confidently treat effectively and efficiently, especially when steel ligatures are needed.
- **Low Profile**: Up until now, a lower profile bracket may have been associated with limited bracket strength or compromised performance. Symetri Clear changes that. With optimized in/out dimensions and a design that angles tie-wings inward on the lower incisors, Symetri Clear is less likely to interfere with opposing occlusions.
- **Advanced Aesthetics**: Symetri Clear has been designed with more rounded surfaces that diffuse light better than a flat surface. This enhances the bracket’s ability to blend with tooth enamel, adding to its aesthetic appeal for patients.
- **Ease of Debonding**: Ormco’s patented laser-etched pad technology allows for a precise, controlled surface that results in reliable bonding and safe, easy, non-destructive single-piece removal.

To learn more about Symetri Clear, please visit www.ormco.com/products/symetri/ or connect with your Ormco sales representative directly.

### Digital Orthodontics Symposium 2019

Save the date: 12 April 2019, Dubai, UAE

By Dental Tribune MEA / CAPPmea

DUBAI, UAE: The event is open to all orthodontists and general practitioners interested in the latest orthodontic progressions in the digital era. The event will attract delegates from across Middle East, Africa and Asia coming April.

The event will gather top key opinion leaders with a focus on the latest trends and developments in digital orthodontics. Digital dentistry can assist us in many ways, by assessing space and measuring the amount of crowding in cases, predicting treatment outcomes, assisting patients’ communication but also storing models digitally and treatment planning. With the introduction of 3D printing in dentistry, the opportunities in orthodontics have expanded from digital impression taking, to developing virtual treatment plans and 3D printing of dental models. The Digital Orthodontics Symposium will illustrate the necessity for orthodontists to look into and highly consider digitalizing their working ways to save time, money and provide more efficient and effective treatments for the patients.

Delegates will have a sneak peek at the latest technologies at the exhibition area where the dental industry will present its latest research, development, equipment and solutions to serve better the dental professionals.
Incisal apical root resorption evaluation after low-friction orthodontic treatment using two-dimensional radiographic imaging and trigonometric correction

By Fabio Savoldi, Stefano Bonetti, Domenico Dalessandri, Gualtiero Mandelli, Corrado Paganelli, Italy

Abstract

Background: Root resorption shall be evaluated the severity of apical root resorption of maxillary and mandibular incisors after low-friction orthodontic treatment, using the combination of panoramic and lateral cephalographs, and applying a trigonometric correction.

Aim: The aim of this investigation was to evaluate the severity of apical root resorption of maxillary and mandibular incisors after low-friction orthodontic treatment, using the combination of panoramic and lateral cephalographs, and applying a trigonometric correction.

Settings and Design: A hospital based retrospective study at the orthodontic Department Dental School, University of Brescia, Speciali Civili di Brescia, Brescia, Italy.

Materials and Methods: Ninety-three subjects (53 females and 40 males; mean age: 14 years) with mild teeth crowding were treated without extractions by the same operator following an integrated straight wire (SW) protocol. The pre- and post-treatment root lengths of the maxillary and mandibular incisors were to be measured on panoramic radiographs. A trigonometric factor of correction for the pre-treatment lengths was calculated based on the difference between the pre and post-treatment incisal inclination on lateral cephalograms.

Statistical Analysis: The changes in lengths were investigated using the Student’s t-test for paired values (p<0.05).

Results: Maxillary central incisors showed no changes (0.5%, 0.6%), maxillary lateral incisors showed a small increase (1.4%, 1.8%) that was statistically significant and with the Helsinki Declaration of 1975 that was revised in 2000.

Ethics

The procedures followed were in accordance with the ethical standards of the responsible institutional committee on human experimentation and with the Helsinki Declaration of 1975 that was revised in 2000.

Measurement techniques

In order to analyse the degree of root resorption, panoramic and lateral cephalometric radiographs were examined before and after orthodontic treatment. Each patient had his/her pre and posttreatment panoramic and cephalometric film taken by the same radiology technician using a standardized procedure. Each film was traced as a .jpeg file and cephalometric analysis of pre and post-treatment lateral radiographs was performed using the Neomorph XSoft software. The change of inclination of maxillary and mandibular incisors was then measured (with reference to the long axis of the tooth, from the incisal edge to the root apex).

Pre and post-treatment panoramic radiographs were evaluated using Adobe Photoshop CS6® (Fig. 7). Initial and final tooth lengths of maxillary and mandibular incisors (with reference to the long axis of the tooth, from the incisal edge to the root apex, through the midpoint of the CEJ) were measured in pixel using the tool “ruler”. For each film, the length of the mesio-distal diameter of the crown of the mandibular right first molar was measured in pixels, and then all the measurements were converted using this value as the specific unit for each patient. This procedure ensured the normalisation of the data for the intra-patient comparison, assuming no changes in the occlusal diameter, despite the changes in the root length. Two different clinicians performed each measurement.

In order to ensure that the shortening of the CEJ (Fig. 8) that showed in the frontal plane was not a result of the change of inclination of the teeth in the sagittal plane (Fig. 9), the values of the pre-treatment root lengths were adjusted using the following formula:

\[ L_{\text{OPT}} = L_{\text{POST}} \times \cos \theta \]

Once this trigonometric correction was adopted, it was possible to compare the pre and post-treatment root lengths. The same amount of correction was adopted
Results

Each pre and post-treatment average tooth length was calculated. Then, depending on the differential inclination, the respective trigonometric correction was applied to obtain a pre-treatment length that was comparable to the post-treatment length without an inclination bias (Table 1). Table 1 summarizes the outcomes of our measurements. The values of the pre- and post-treatment misalignments were similarly distributed in both the Kulmogorov-Smirnov and Shapiro-Wilk test p > 0.05 taken as significant. Then, a twosided Student’s t-test was used for paired values to evaluate the differences between the pre- and post-treatment measurements p > 0.05 taken as significant. We estimated the inter-rater absolute agreement in the measurement of the parameters are shown in (Table 4).

Discussion

This clinical retrospective investigation analysed root resorption after a low-friction orthodontic treatment. Tooth length measurements were performed on panoramic radiographs that are the standard radiographic exams required by orthodontists at the initiation and end of treatment, patients did not need to undergo further radiography.

As a result of difficulties in discriminating the crown from the root on panoramic X-rays, our measurements involved the whole tooth, assuming the absence of changes in the tooth crown and assigning any possible shortening only to the root. As panoramic radiographs are not ideal for the qualitative evaluation of the root shape15,16, and periapical radiographs were not available for all patients, we limited our evaluation of resorption on length measurements. X-rays were in a digital format and direct measurements were not possible. Therefore, we carried a pixel unit measurement on the digital format.

As panoramic radiographs are based on a para-frontal plane, different inclinations of the incisors between the pre and posttreatment may result in length changes. In order to reduce the above-mentioned error, the difference between pre and posttreatment initial inclination was measured on the respective lateral cephalogram, and each patient had his/her initial tooth length modified using a mathematical correction. This trigonometric correction can set the root length that the pre-treatment tooth would exhibit in the post-treatment panoramic radiograph to normalise the intra-treatment comparison. However, this method is based on a theoretical trigonometric formula, and further studies would be useful to evaluate its accuracy and biological cost-effectiveness. Additionally, as shown in our recent studies17, a comparison between 2D and 3D methods is worth of interest in the orthodontic treatment planning, especially when multiple evaluations are needed.

Studies that use panoramic radiographs to measure changes in root lengths between pre and post-treatment values that do not take modifi-
cation of the initial inclination into account should consider this potential bias.

Our group of patients was selected with a mild grade of crowding, because our aim was to evaluate the most representative sample concerning a non-extractive orthodontic protocol by means of a specific straight-wire, low-friction technique. In order to allow a qualitative comparison, if our results were transposed onto the scale of Malumgren (grade 0 to 4), the maxillary incisors would be represented by grade 0 or 1 and the mandibular incisors by no more than grade 2, none of our patients had grade 3 resorption. Although Previous studies found an overall percentage of root resorption of 7% to 69%, milder degrees of root resorption could be the result of many variables, including lower amounts of root movement18 for this reason, our findings could be less realistic than the values related to the central incisors. Even though our estimate was specific for the central incisors, it was useful for the laterals but less effective. Therefore, we follow a standardized protocol during the preparation of this manuscript.

Clara Piccinelli for her contribution to the taking of measurements. We would like to thank Dr Linda Sangalli for her exemplary information, please contact: marketing.emeai@ormco.com

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evident than the results reported by the literature.

As reported by other authors, a slight increase in root lengths was shown in the mandibular lateral incisors (3.4 ± 1.8%), although this was not statistically significant in our study p = 0.03. This could be attributed to the completion of root development in younger patients, which would be in accordance with the median age of our sample (9 years) and with the root completion sequence.

Limitations

Even though we followed a stand- ardization procedure during the X-ray exams, a different level of distortion may exist between pre- and post-treatment radiographs. This bias was reduced by measuring the mesiodistal diameter of the crowns of the mandibular right first molar and using it as a baseline unit for all the other measurements on the same X-ray, in order to normalize the intra- patient comparison. However, a certain degree of distortion may be present.

To distinguish between the left and right central incisors on the cephalometric radiograph, we therefore selected the most inclined teeth in the maxillary and mandibular arches, and then applied the obtained correction to both the central and lateral incisors. Even though our estimate was specific for this central incisor, it was useful for the laterals but less effective. Therefore, the lateral incisors values reported in our results may be less realistic than the values related to the central incisors. Further researches including different amount of crowding and comparisons with other X-ray examinations, e.g. high accuracy CBCT linear measurements21, shall assess the reliability of the methods used in this preliminary study.

Conclusion

In patients with mild crowding and consequent low amount of root movement, a straight wire orthodontic treatment can lead to a slight decrease in the mandibular central and lateral incisor root lengths on both the right and left side approximately of 3%. However, our analysis on panoramic radiographs found no evidence that resorption was involved the mandibular incisors. The use of a trigonometric correction may reduce the limitation of the 2D radiographs, but further studies are needed to assess its accuracy.

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