Digital Orthodontics Symposium addresses progressive topics

By Dental Tribune MEA / CAPPmea

DUBAI, UAE: CAPP (Centre for Advanced Professional Practices) held its first Digital Orthodontics Symposium. The event evolved around digital orthodontics in present dentistry and its importance for the future of orthodontics. From 04-05 May, around 122 orthodontists attended the event, which was held at the famous Madinat Jumeirah Conference Centre, Dubai.

The event gathered Top Key opinion Leaders from the dental field 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 illustrated 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.

Kicking off the symposium’s scientific program, Dr Naif Almosa, Consultant in Orthodontics, which embodies the basic principles of the widely-used acid-etch technique which is designed to enable orthodontists to use metal brackets, and which now addresses the need to meet growing preference for ceramic brackets that are clear and provide an invisible appearance, which usually results in more enamel damage on removal of the brackets at the end of the treatment.

Orthodontics welcomed warmly all present orthodontists at the event with his opening speech.

The symposium provided as exclusive opportunity to learn more about relevant topics from the experts in orthodontics.

Keynote speaker, Dr Francesco Garino from Italy focused on the digital revolution with intraoral scanning of Orthodontics, and Consultant in Tissue Engineering & Biophotonics of Orthodontics, and Consultant in Dentistry. Dr Francesco Garino explained “Orthodontists will embrace the technique since there are less clinical steps, no specialist training required, less clinical steps, no specialist training required, no specialist training required. 3D printing of dental models. The symposium was conducted in the Deb laboratories by Ali Ibrahim, an orthodontist and a PhD student at King's College London, with support from Professor Van Thompson. Professor Sangakta Deb explained ‘Orthodontists will embrace the technique since there are less clinical steps, no specialist training involved and in fact, due to no adhesive remnants left on enamel, this will eliminate the need for enamel polishing after bracket removal.”

A new paradigm in orthodontic bracket bonding

By King's College London

Orthodontic treatment is widely used in preventing and correcting irregularities of the teeth and jaws, by the use of braces. A novel method in orthodontic bracket bonding, developed by the Deb group from the Tissue Engineering & Biophotonics Division at King’s College London, could eliminate enamel damage. This is a frequent occurrence on debonding including white spot lesion formation and chipping or cracking of enamel during bracket removal after orthodontic treatment.

Introducing the PeR system in orthodontics, which embodies the basic principles of the widely-used acid-etch technique which is designed to enable orthodontists to use metal brackets, and which now addresses the need to meet growing preference for ceramic brackets that are clear and provide an invisible appearance, which usually results in more enamel damage on removal of the brackets at the end of the treatment.

An international patent has been published on this know-how, which is expected to provide a revolutionary leap in orthodontic bracket bonding. The study was conducted in the Deb laboratories by Ali Ibrahim, an orthodontist and a PhD student at the Dental Institute at King’s with support from Professor Van Thompson. Professor Sangakta Deb explained ‘Orthodontists will embrace the technique since there are less clinical steps, no specialist training involved and in fact, due to no adhesive remnants left on enamel, this will eliminate the need for enamel polishing after bracket removal.”
scanner and clinical applications of intraoral scanners in orthodontics. Another speaker Dr. Amar Benaddi from France spoke about a New 3D Concept in Vestibular Orthodontic Treatment. Prof. Ross Hobson from UK spoke about improving planning and predictability using digital workflows in ortho-restorative cases. After the break the stage took Dr. Khhaled Hazem Attia from Egypt and his lecture “The Role of CBCT in Evaluating Carriere® Motion Appliance”. The event was concluded by Dr. Jaswinder Gill from UK explaining how to increase case acceptance with the digital workflow. During the second day there were four various tables where the hands-on trainings took place. The tables operated simultaneously with a rotation of several groups for each table. The trainings were held in small groups (no seats available per session) in order to have the highest impact. Outstanding orthodontists presented various topics of a great interest. The participants had an opportunity to interact immediately and ask their personal questions. The practical demonstrations, at the same time, provided inspiration and offer means of trouble shooting.

The next Digital Orthodontics Symposium will take place from 12-13 April 2019 in Madinat Jumeirah Conference Centre, Dubai.
A retrospective study to evaluate the intra-arch dimensional changes in moderate crowding cases treated non extraction with a passive self-ligation appliance

By Vishal Bharadwaj, Gurkeerat Singh, Sridhar Kannan, Raj Kumar Singh, Ashish Gupta, Gaurav Gupta, and Abhishek Goyal

Background

Irregularly placed front teeth is one of the most frequently encountered chief complaint in day to day orthodontic practice. The etiology for which may be tooth size-arch length deficiency (3). This condition can be treated, either by reducing tooth size and/or by increasing arch width and/or arch depth (5,7). In other words, Orthodontists can gain space by expanding the arch anteropositorly or transversely along with other conventional means, depending on the treatment plan.

Non-extraction treatment protocols are better accepted by patients as well as clinicians. Among the techniques and mechanics with the potential to facilitate nonextraction treatment includes headgears, fixed sagittal correctors, transverse expansion screws and self-ligating systems. Although each of these approaches necessitates an increase in arch length to facilitate alignment with the process or tools associated with their application. This is supposed to bring about several favorable features to the treatment including, the elimination of potential crosscontamination with elastic ligatures, consistently full engagement without any undesirable force relaxation of elastomeric modules, reduced risk for enamel decalcification from elimination of the retentive site for plaque accumulation, reduced friction in sliding mechanics, and assumed low magnitude forces resulting in fewer side effects (11).

Objectives

The Objective was to retrospectively evaluate the intrarch dimensional changes in moderate crowding cases treated non-extraction with a passive self-ligation (Damon 3MX appliances by assessing the pre-treatment and post-treatment digitized models and lateral cephalograms.

The study was formulated as a double blind study.

Methods

A total of 20 patients between the age group of 15 - 18 years who had undergone non extraction orthodontic treatment with the Damon 3MX (Orトranco, San Diego, Calif.) appliance were selected. Patients with a full complement of teeth up to erupted second permanent molars with moderate crowding in the maxillary and/or mandibular arch, with skeletal Class 1 jaw base relation treated with non-extraction treatment plan were included in the study. Orthodontically treated cases, congenital absence of teeth, aberration in tooth size/shape were excluded.

Only those pretreatment and post treatment models and lateral cephalograms were selected for scanning which met all the inclusion and exclusion criteria as well who were treated according to the passive self-ligation philosophy as well with the standard wire sequencing. The following arch wire sequencing were used

0.016" / 0.022" Copper-Nickel-Titanium (Cu Ni Ti) was in place for 2 - 4 months

Followed by 0.016" x 0.025" Cu Ni Ti for a minimum period of 2 months or a 0.016" x 0.016" Cu Ni Ti for a minimum period of 2 months

0.016" x 0.025" Cu Ni Ti for minimum of 2 months

0.016" x 0.022" SS, 0.019" x 0.025" Titanium Molybdenum alloy (TMA) finishing wire for minimum period of 2 months.

All the pre-treatment and post-treatment dental stone models of maxillary and mandibular arches were scanned using 3D digital scanner (Maestro 3D, Great lakes, USA) and converted into digital models which could be examined in all the 3 planes of space.

Parameters undertaken for study were measured digitally on the computer in millimeters which included intercanine width (IC) of maxilla and mandible, inter-canine premolar width (IPM) of maxilla and mandible; inter and premolar width (IPM) of maxilla and mandible, inter molar width(IM) of maxilla and mandible, Arch depth of maxilla and mandible, Mandibular incisor inclination and Mandibular incisor inclination (Figures 1 - 4).

Inter-canine width. Measurements were made from the cusp tips of the right and left first premolars.

Inter-first premolar width. Measurements were made from the buccal cusp tips of right and left first premolars.

Inter second premolar width. Measurements were made between the

Fig 1. Scanned Digital Image of Pretreatment and Post Treatment Archwidth of Maxillary Arch

Fig 2. Scanned Digital Image of Pretreatment and Post Treatment Arch Depth of Maxillary Arch

Fig 3. Scanned Digital Image of Pretreatment and Post Treatment Arch Width of Mandibular Arch

Fig 4. Scanned Digital Image of Pretreatment and Post Treatment Arch Depth of Mandibular Arch

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12-13 April 2019

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Table 2. Descriptive Statistics of Pre-Treatment and Post-Treatment Upper Incisor and Lower Incisor Inclination Values Are Shown (Degrees)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>Mean Difference</th>
<th>t-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper first incisor angle (N-A)</td>
<td>Pre-treatment</td>
<td>0.82</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower first incisor angle (N-A)</td>
<td>Pre-treatment</td>
<td>0.77</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper incisor-SN plane angle</td>
<td>Pre-treatment</td>
<td>0.76</td>
<td>0.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower incisor-SN plane angle</td>
<td>Pre-treatment</td>
<td>0.77</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper first incisor angle (A)</td>
<td>Pre-treatment</td>
<td>0.81</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower first incisor angle (A)</td>
<td>Pre-treatment</td>
<td>0.78</td>
<td>0.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper incisor-B point angle</td>
<td>Pre-treatment</td>
<td>0.75</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower incisor-B point angle</td>
<td>Pre-treatment</td>
<td>0.76</td>
<td>0.32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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buccal cusps of right and left second premolars.
Inter first molar width: Measurements were made between the maxillary and mandibular second first molars.
3.1. Arch Depth
First line is drawn connecting the central fossa of first molars on the right and left sides. A second line was drawn perpendicular to the first, bisecting the contact point between the central incisors.
Cephalometric tracings were performed using digital cephalometrics (Nemo Ceph, version 6.0, Spain). Pre-treatment and post-treatment tracings of each patient were evaluated from the software and pre-treatment arch-to-treatment superimposition was also carried out.
3.2. Upper Incisor Inclination
U1 to SN plane angle: It is the inferio inner angle formed between the long axis of upper incisor and Sella-nasion line. U1 to Palatal plane angle: It is the inferior inner angle formed by the intersection of the long axis of the lower incisor with the occlusal plane. This angle is read as a positive or negative deviation from the right angle. U1 to NB (Angular): It is the angle formed by the intersection of the lower incisor long axis and the line joining the nasion to point B.
L1 to Mandibular plane angle: It is the angle formed by the intersection of the lower incisor with the mandibular plane. It indicates the inclination of the lower incisors.
L1 to Occlusal plane angle: It is the inferiror inner angle formed between the long axis of the lower incisor and the occlusal plane.
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Results
All the pretreatment and post-treatment measurement of scanned digital models and the measurement obtained from the scanned cephalograms were subjected to statistical analysis using software SPSS (statistical package for social sciences) version 20.0 and Epi info version 3.0 and Paired t-test was applied to test the statistical significance. It was used for comparison of 2 mean values obtained from a same group or a pair of values obtained from the same subject.

The P-value was taken significant when less than 0.05 (P < 0.05) and Confidence interval of 95% was taken.
The following results were obtained after the statistical analysis.

Discussion
Self-ligation appliances regained popularity since the early nineties because of the certain advantages which were claimed such as: increased patient comfort, better oral hygiene, increased patient cooperation, less chair time, shorter treatment time, greater patient acceptance, expansion, and less dental extractions (10, 12, 13). Self-ligation appliances achieved significant amount of expansion in the maxillary arch (8).
In the mandibular arch also an increase in mandibular intercanine width, inter premolar width, inter lower second premolar width as compared to the intercanine and inter molar region can be because of lip bumper effect which minimizes the proclination which could have been produced during uncontrolled crowding of the teeth thus the arches with the space which have been gained with passive self-ligation appliance by posterior expansion.
5.3. Limitations of Study
Present study had the limitations of small sample size of twenty patients and retrospective in nature. As retrospective studies are always subject to various types of bias because of the lack of randomization. Hence, the results obtained from the current study should be further strengthened using a larger sample size and preferably using a prospective study model.

References