

Cases & Commentaries in Orthodontic Technology



Figure 7

Figure 7: At 15 months, after the prescribed 11 maxillary and 12 mandibular aligners were completed, the maxillary lateral incisors, the mandibular canines and the mandibular left 2nd premolar did not track properly, and the case needed additional finishing.

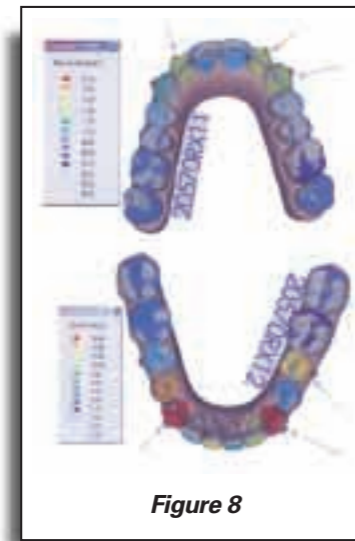


Figure 8

Figure 8: Superimposition of models of actual and prescribed treatment showed that the maxillary lateral incisors and left canine were not tracking by approximately 1.5 mm. The mandibular left 2nd premolar was off track by approximately 12 degrees, and the canines were off track by more than 15 degrees each.

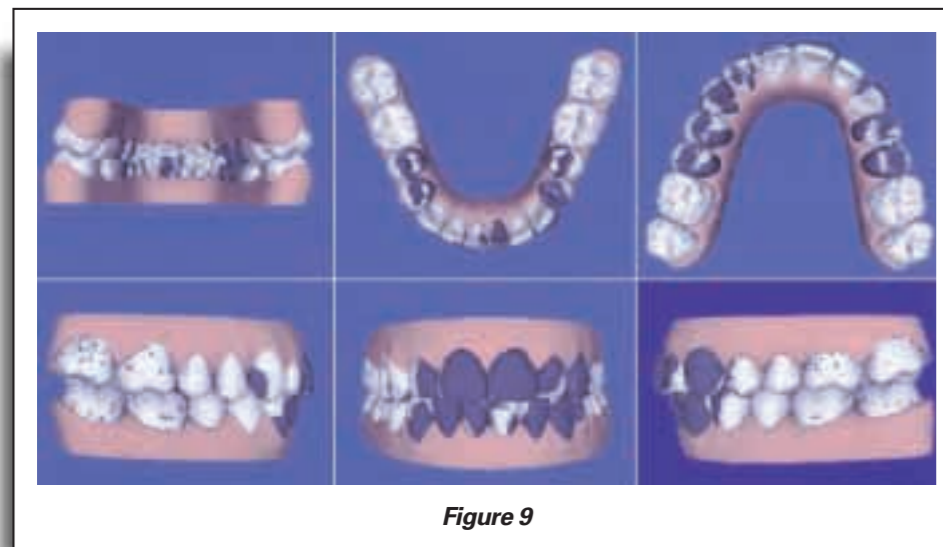


Figure 9

Figure 9: The case was rebooted and a new ClinCheck prescribed an additional 10 maxillary and 13 mandibular aligners. The prescribed rate of rotation for each stage was decreased to improve success.



EDITOR'S NOTE

Biological variation is unpredictable. Along the course of any clinical treatment, dosage, frequency, or intensity of applied medications or physical therapy must be titrated to fit patient's response. Rebooting is Invisalign's version.

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Figure 10

Figure 10: Superimposition of the final models with the predicted final position shows minor discrepancies that were not as evident clinically. Maxillary lateral incisors and 1st premolars were off by approximately 1-1.5 mm. Mandibular left canine and incisors, as well as the 2nd premolar, were off by approximately 1-1.5 mm.

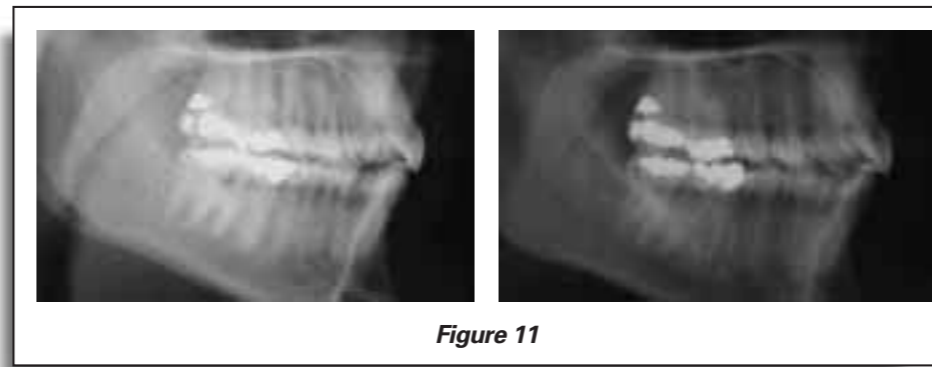


Figure 11

Figure 11: Comparison of both the initial (left) and final (right) cephalometric x-rays shows that alignment was not accomplished by overproclination of the teeth.

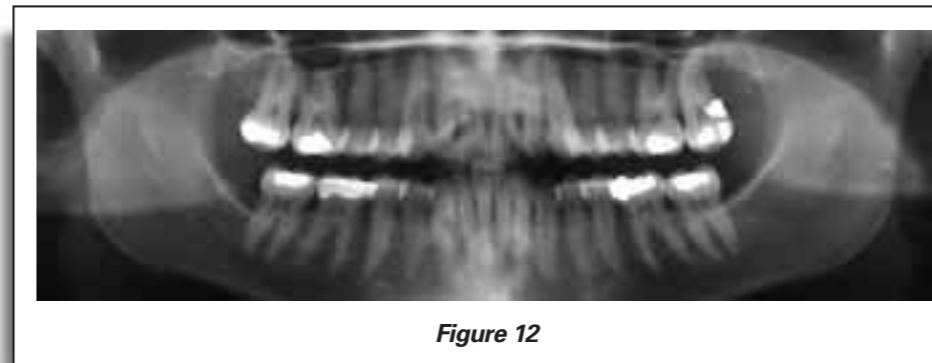


Figure 12

Figure 12: Final panoramic radiograph shows good root alignment.



Figure 13

Figure 13: Final photos after the additional 10 maxillary and 13 mandibular aligners. A total of 30 maxillary and 34 mandibular aligners were necessary to treat this case. The entire treatment with 2 reboots took 23 months. With current techniques, use of auxiliaries, and a better understanding of how to accomplish the desired tooth movement, this treatment time should be able to be reduced.

To view the ClinCheck animated images depicting the progress of this case, visit www.myinvisalign.com/studies and click on Dr. Wheeler's Case 2004.

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From the Editor

In the history of science, views held as truth in ancient times are today known as "myths." The eclipse of the sun or a highly charged thunderstorm frightened primitive man, and the fear of such unknowns prompted our ancestors to make up stories about the spirit and rage of these events of nature. In due course, our ancestors worshiped these events, perhaps with the hope that they would be forgiven for their bad behavior. But just because their level of sophistication and understanding of nature was at that level, they cannot be accused of wrongdoing. Similarly, in science, just because the older views are incompatible with the views and beliefs we hold today, they are not, in principle, unscientific because they have been discarded. Those views were the best one could hold given the level of science and technology available at the time. Not allowing science to evolve, however, can only be described as a "violent intellectual crime." Along these lines, it should be noted that clinical standards of care evolve alongside scientific thought.

During the middle ages, it was natural to believe that the earth was flat and the sun went around it. Methods of measurement of the time – in this case, simple observation – could only lead the curious to conclude this celestial phenomenon was, indeed, fact. GV Black thought extension for prevention was good. But does it hold true today? Why should CO = CR in this day and age? These are difficult questions for a "dental agnostic" to answer. It would not be wrong to label Edward Hartley Angle as a "non-traditionalist." He was under contract with the SS White Company to invent new appliances every so often. He and his colleagues were the ones who evolved orthodontic appliances from unipoint contact screw-like devices to bands, brackets and archwires. The future of orthodontics must be built on such ancestral inheritance.

It is true that there can be a number of methods of scientific treatment, but as scientific knowledge and technology increase, some of those methods fail to be adequate. For example, regardless of the appliance used, teeth will only move as fast as the periodontal tissue remodeling will allow. In the process, it is critical that the appliance used does not inhibit tooth movement. Unfortunately, fixed appliances may indeed retard tooth movement because the forces bent into the archwire cannot be precisely controlled by manual means. Yet, the future is bright ... there are potential means to pharmacologically control the remodeling response of the periodontal tissues by affecting vascular activity or loosening the collagen matrix of the soft tissues. There is significant evidence that it is not the bone that should be affected, but rather the soft tissues of the periodontium. Time is ripe for a paradigm shift in tooth movement from hard tissues to soft, and from mechanical to biological. These advances will be made possible not manually, but through the use of science and technology.

More restraining than manual methods of force application to teeth is the projected outcome of a prescribed treatment plan. It is common practice for a clinician to start treating a case with an imaginary end result in mind, and then to witness her/his imaginary ideal getting blurred, fuzzy and perhaps totally transformed. At times, this metamorphosis escapes the clinician's notice. In the end, the clinician decides the patient has been in braces long enough, the parents are tired, and it is time to remove the appliances. Fortunately, the visual template available to the orthodontist today will not allow 1) the ideal treatment plan to get fuzzy, and 2) the clinician to call it quits easily. Visual 3D diagnostic and treatment methods have now elevated the standard of orthodontic care. It is possible, for example, to incorporate 3D images of the skeleton and the face with ClinCheck images. In the world of virtual reality, one could easily try several different treatment approaches for their effect on facial balance and smile before choosing the best approach for a specific case, or know exactly how much, and in which direction every single tooth will move long before the treatment begins.

These advances are significant and exciting enough to be called "revolutionary." But revolutions are seldom completed by one man, and never overnight. There is much work to be done to define the rules of this paradigm shift.

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An Evaluation of Different Attachment Designs and the Use of Invisalign® Without Benefit of Other Auxiliaries

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INTRODUCTION

A study to examine the efficacy of different attachment designs was undertaken at the University of Florida College of Dentistry. This study was also designed to examine the use of Invisalign® without the use of any other auxiliaries, such as elastics, buttons or dimples.



Figure 1: This 42-year-old female, with a Class I malocclusion consisting of 3 mm of maxillary crowding and 4 mm of mandibular crowding with minimal overbite and overjet, was a subject in this study. The severity of her canine rotations was the inclusion criterion which qualified her for the trial.

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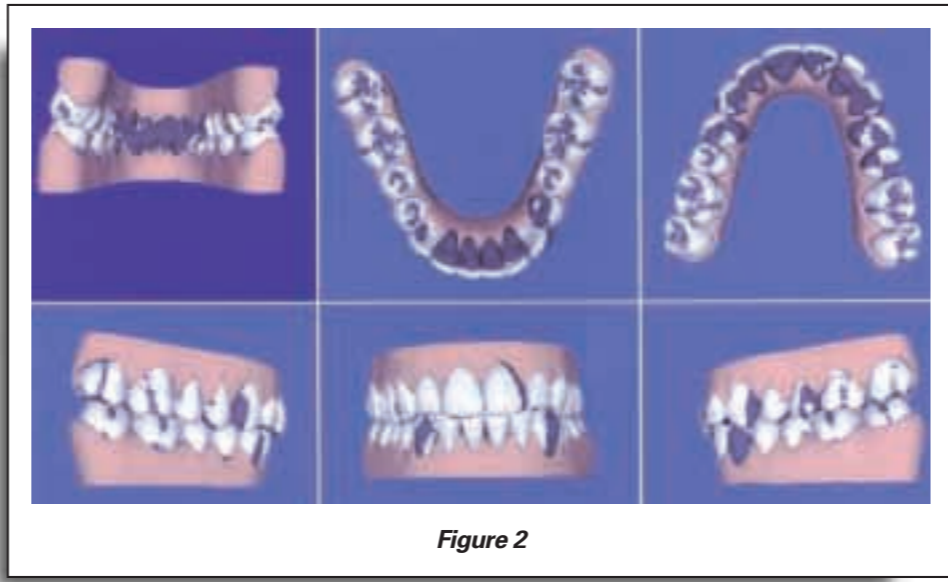


Figure 2

Figure 2: The initial ClinCheck prescribed 17 aligners for both arches and no interproximal reduction. Early in aligner treatment, it was determined that the contacts between the maxillary centrals, mandibular left central and mandibular left canine are too tight and teeth would collide while unraveling. Tooth size and shape were such that interproximal reduction would benefit the case.



CLINICAL TIP

The most important routine procedure in any Invisalign treatment is to check the tightness of interproximal contacts at each visit. A thin dental floss works best.



Figure 3

Figure 3: After 9 maxillary and mandibular aligners, the upper right and lower left canines were not tracking properly. Both maxillary and mandibular incisor alignment was progressing, but it was decided to reboot the case.



Figure 4

Figure 4: Superimposition of models of predicted movement and actual movement using Treat software illustrated that the maxillary right canine and lateral were not tracking as prescribed by about 1-1.5 mm. In the mandibular arch, the left canine and lateral incisor, as well as both central incisors were off track by approximately 10-12 degrees each. Both situations were likely due to a lack of adequate space prior to attempting the rotations.

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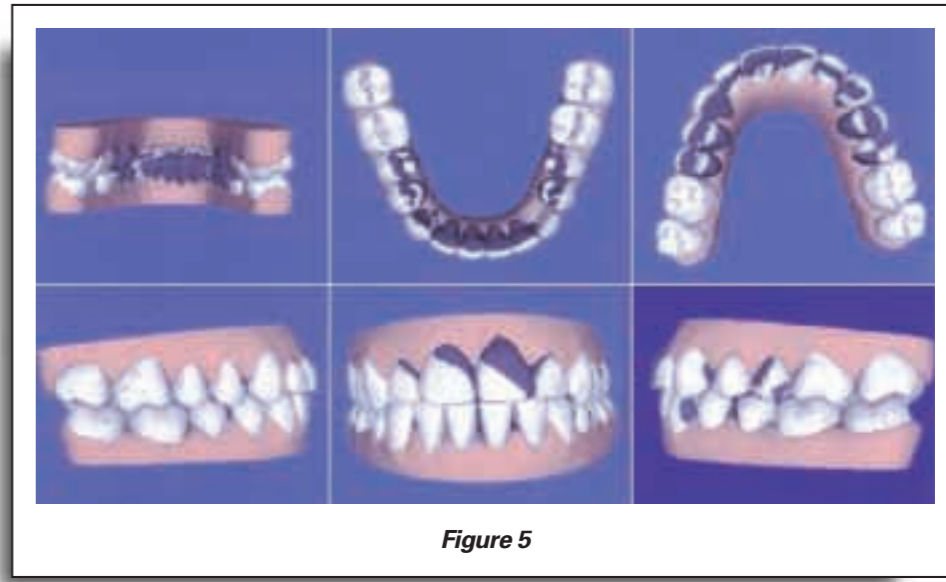


Figure 5

Figure 5: After reboot impressions were made, the new ClinCheck called for the same treatment goals, but used IPR to create the space necessary for the rotations. The new treatment prescribed an additional 11 maxillary and 12 mandibular aligners.



CLINICAL TIP

The superimposition tool gives the clinician an idea of how closely s/he is following the prescribed treatment plan. These images are significant measures of treatment efficiency unavailable in the conventional systems.



Figure 6

Figure 6: Photos of the case at 11 months after 6 additional aligners. Alignment is progressing well in both arches, as well as derotation of the mandibular canines.

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