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American Academy of Cosmetic Orthodontics

The Academy for Clear Aligner Therapy

ORTHODONTIC RETENTION

The age-old problem!

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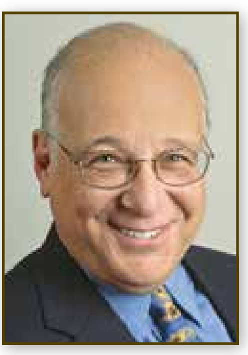


Editorial

Join the Forum

Your best New Year's resolution: log on to **www.aacortho.com** regularly, and click on "AACO Forum."

You will find an incredibly rich source of current information about Clear Aligner Therapy. Thought-provoking questions posed by online visitors, pleas for help with difficult cases, and inquiries about different philosophical approaches to challenging concerns, provide a springboard for analysis and discussion by some of the top experts in the world.

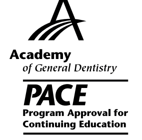
For example, recently:

- One dentist wrote that she was concerned about using expansion rather than IPR on older patients with buccal recession.

  After an AACO Board member responded to her question, she wrote back, "Thank you so much. That was a big help. I have asked this question from many of Invisalign lecturers, and this is the first time I got a logical answer."
- A recent discussion regarding bisphosphonates and tooth movements attracted close to 600 views.
- A dentist wrote about a potential problem with a patient who was experiencing "buyer's remorse," and the ensuing Forum discussion drew the attention of almost 300 members.
- Over 200 were interested in a question, posed by an AACO member: "A recent school of thought is said to improve tracking, by cutting down the amount of movement per aligner in half, and prescribing one-week aligner changes. The total time to complete treatment stays the same but the case supposedly tracks better. Has anyone else tried this?"

Log on, join the Forum, and help share, promote, and advance knowledge and expertise for attaining beautiful smiles through the use of clear aligners.

Dr. Jeffrey Galler
Editor



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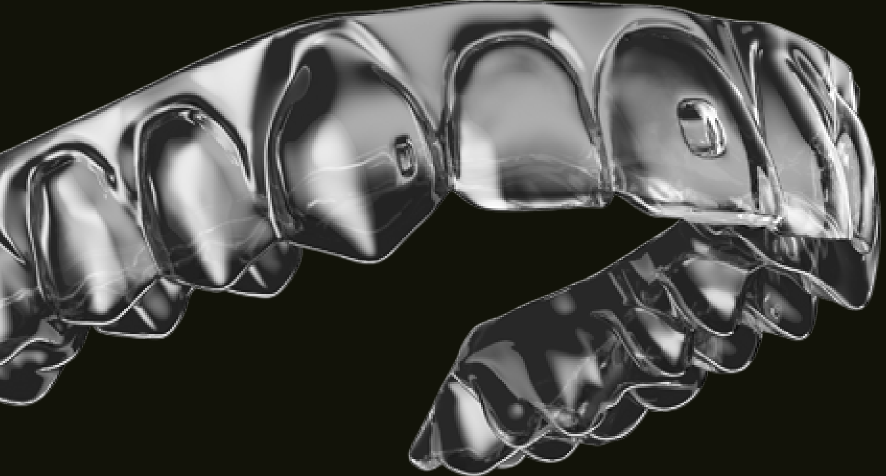

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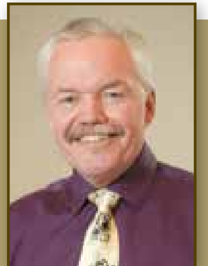
Case Reports

Developing an Implant Site using Invisalign

by Richard Schmidt, BSc, DDS



Dr. Richard Schmidt practices general dentistry in Brampton, Ontario. He has been in practice with his wife, Dr. Tamara Sosath, for 25 years. He has always had an interest in orthodontics and recently introduced Clear Aligner Therapy (Invisalign) as a treatment option for his patients to establish a sound occlusion. In addition to treating teens with Invisalign, he is utilizing it to align teeth conservatively for rehabilitative restorative treatment.

Salama, Danesh-Meyer, and others have documented[1,2,3,4,5] how an implant site can be developed and improved by applying an orthodontic extrusive force. The force induces dentoalveolar bone remodelling and increases the volume of bone, both vertically and buccolingually/palatally, thereby improving the esthetics and the prognosis of the implant treatment.

Case

A 22-year-old woman was involved in a traumatic injury, resulting in an alveolar fracture from tooth #4 through tooth #9 and the avulsion of teeth #7 and #8. The avulsed teeth were reimplanted after being out of the mouth for approximately 1.5 hours, in a nonideal fluid medium (originally a plastic glove and then a cup of milk). We saw the patient in the dental clinic 6 weeks after the trauma (**Figure 1**). Both of the avulsed teeth underwent root canal therapy (RCT), and the dentoalveolar complex was assessed for future implant treatment (**Figure 2**).

Evidence of ankylosis resorption can be seen in 50% of cases after only 3 months, and the long-term prognosis of avulsed/reimplanted teeth is poor, with a 10-year survival rate of only 25%.[6] Hence to maximize the chance of success, the implant treatment planning must start **immediately**.

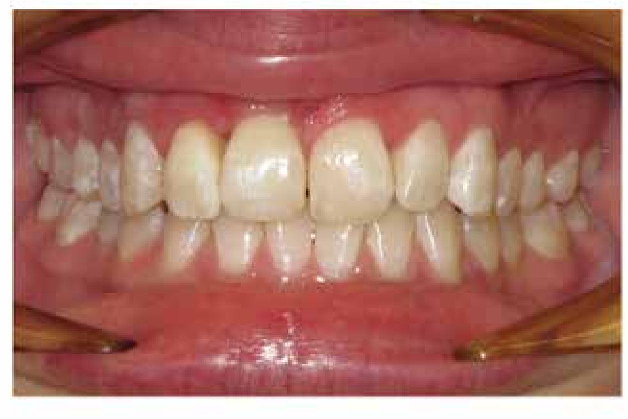


Figure 1: the patient presented for initial exam, 6 weeks after traumatic injury.

Achieving excellent esthetics of implant treatment in the highly visible, anterior, esthetic region is challenging to begin with, but when dealing with the loss of an interdental papilla, the challenges become more arduous, because the loss of the interdental papilla indicates a loss of the supporting interproximal bone.

We decided that attempting orthodontic dentoalveolar extrusion (DAE) of the traumatized teeth, to improve the

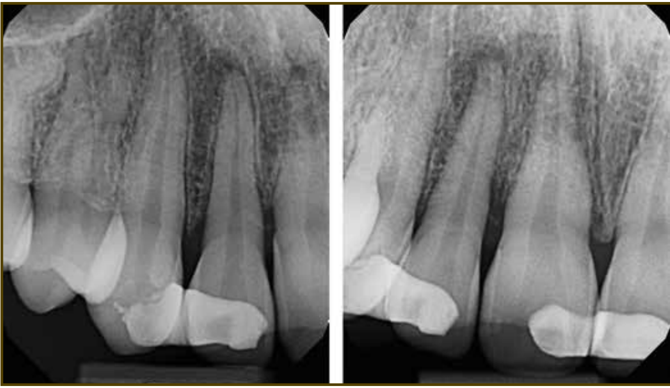


Figure 2: periapical radiograph of reimplanted teeth #7 and #8, May 2014, 6 weeks after trauma.

Figure 3: extrusion attachment design and prescribed extrusion.

Figure 4: the change in incisal positioning of teeth #7 and #8 during treatment.

interdental papilla, would greatly enhance the esthetic outcome of any future implant treatment.

The goals of orthodontic DAE

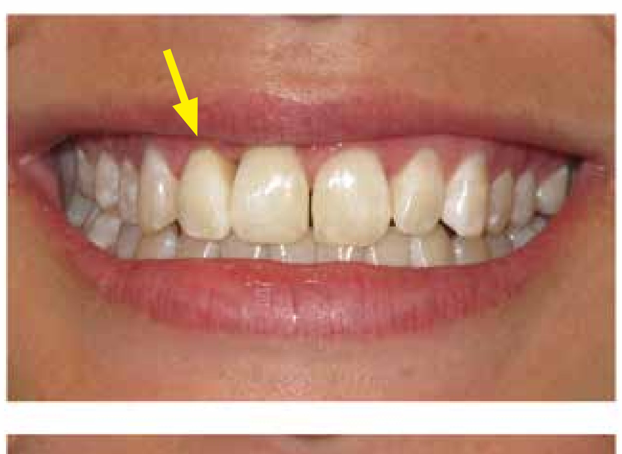
By performing DAE at the site, we hoped to improve the esthetics and function of future implant treatment:

- move the interproximal bone between teeth #7 and #8, and subsequently, the interdental papilla, incisally to level the papilla with the contralateral site
- allow for the levelling of the gingival margins of teeth #7 and #8 with those of the contralateral site at time of implant treatment
- increase bone volume, vertically and buccopalatally

Treatment

The treatment used the Invisalign Express protocol of 10 aligners, with extrusive attachments on teeth #7 and #8. The prescribed treatment involved extrusion and proclination with no IPR. The ClinCheck positioning of the incisal edges of teeth #7 and #8 was approximately 2.5 mm incisally. We intruded tooth #9, to assist in achieving the final esthetic outcome by improving the gingival margin positioning in relation to the adjacent teeth. By aligning the mandibular anterior teeth, we reestablished favourable anterior incisal contact.

We prescribed an excessive degree of incisal positioning of teeth #7 and #8 (**Figure 3**) because oftentimes, clinically, not all of the aligner extrusive action is realized. We advised the patient that if the full extrusion movement was accomplished, incisal tooth equilibration would be necessary to balance her bite.



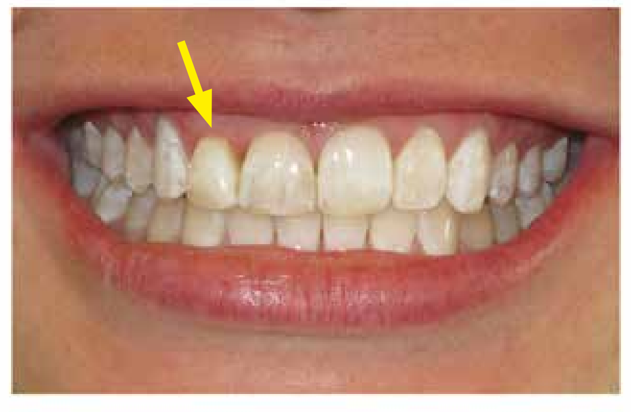
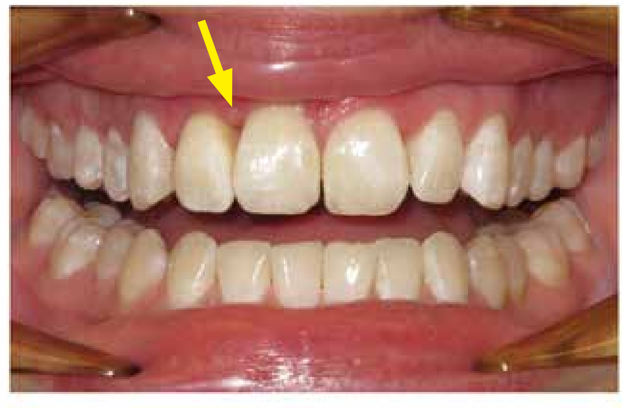


Figure 5: note the change in the gingival margin locations of teeth #7 and #8 (top: May 2014; bottom: June 2015).



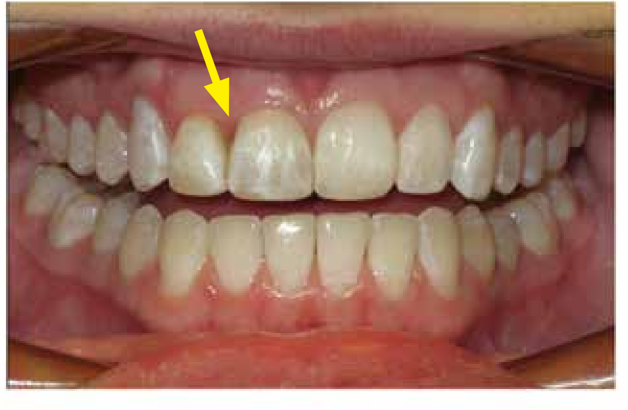


Figure 5a: the interdental papilla has developed between teeth #7 and #8 (top: May 2014; bottom: June 2015).

Discussion

There is room for debate in this case over whether the results were achieved through dentoalveolar extrusion (DAE) of the reimplanted teeth as planned, through dentoalveolar intrusion (DAI) of the adjacent teeth, or through a combination of both. It is very difficult to ascertain which was responsible for the end result. We performed incisal equilibration on both teeth #7 and #8 on two separate occasions during the treatment (**Figure 4**), and reduced the mesiopalatal marginal ridge on tooth #8. The equilibration of #7 and #8 was necessary because of the anterior tooth movement. The marginal ridge adjustment was not unexpected, since when a tooth extrudes, the bulkier, palatal aspect of the tooth comes into occlusion.

The desired clinical outcome of the implant site development was realized, both esthetically and functionally. Esthetically, the gingival margins of teeth #7 and #8 were positioned to allow for their final, apical positioning subsequent to implant treatment (**Figure 5**), and the interdental papilla between #7 and #8 showed greater development (**Figure 5a**).

The clinical evidence of DAE can be seen in:

- the changes to the incisal positioning of the gingival margins of teeth #7 and #8
- the changes to the incisal positioning of the interdental papilla between teeth #7 and #8
- the need for incisal equilibration of teeth #7 and #8 and the subsequent shorter clinical crown

The radiographic evidence of DAE can be seen in the changes to:

- the relative levels of the cementoenamel junction (CEJ) between teeth #7 and #8, and also between adjacent teeth #6 and #9
- the relative levels of the root apices
- the interproximal bone between teeth #6 and #7, #7 and #8, and #8 and #9 (**Figures 6, 7**)

Eventually, implant treatment will be necessary for this patient, but when? In the meantime, improved bone support and esthetics have been realized (**Figures 8, 9**).

Conclusion

Orthodontic DAE is a valuable treatment modality to enhance the esthetics of a compromised tooth. The remodelling of the hard and soft tissue surrounding the tooth, as it moves very slowly into position, allows the restorative dentist to achieve an esthetically pleasing result which otherwise would not be possible. Both the dentist and the patient are very pleased with the result.

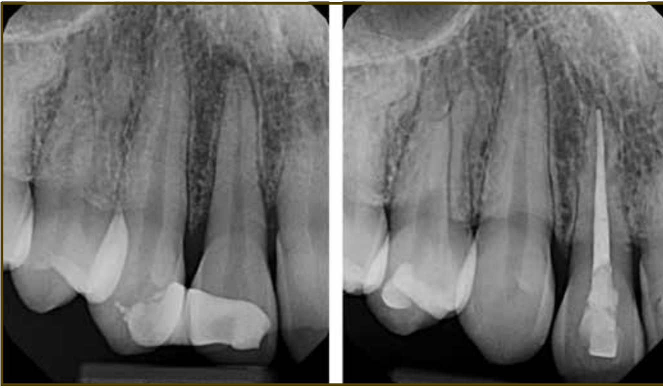


Figure 6: note the change in angulation of the interproximal bone between teeth #6 and #7 and the amount of new bone between teeth #7 and #8 (left: May 2014; right: June 2015).

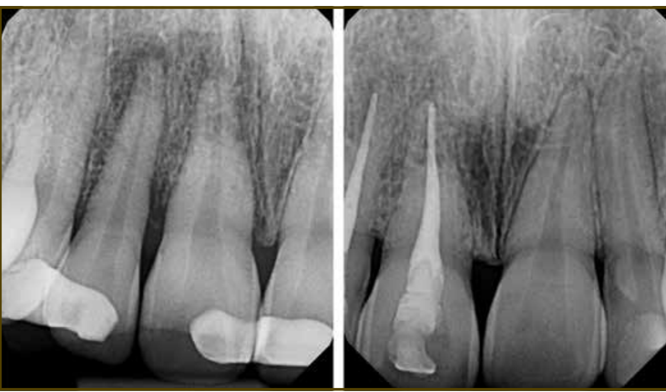


Figure 7: note again the increase in interproximal bone between teeth #7 and #8 and between teeth #8 and #9 (left: May 2014; right: June 2015).

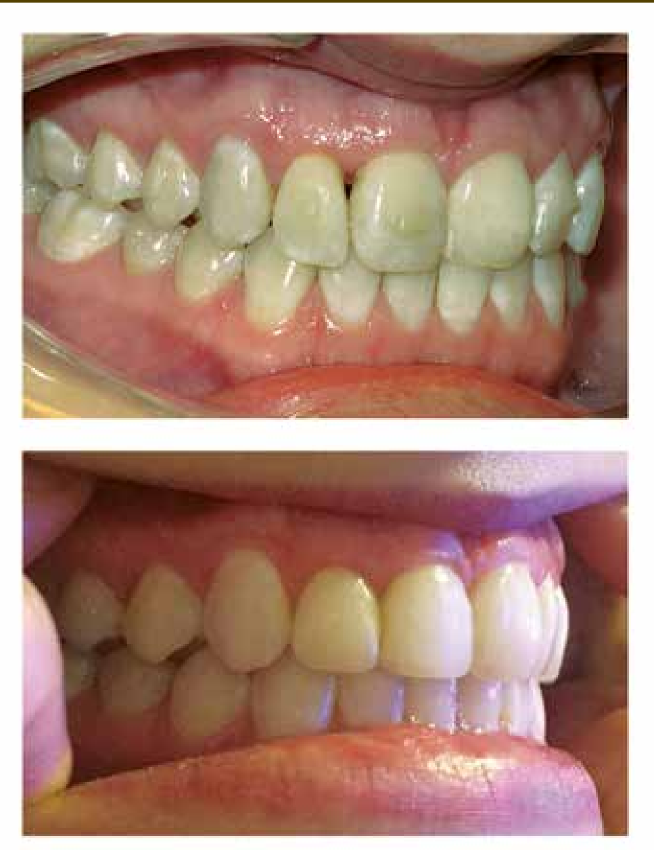


Figure 8: development of papilla between teeth #7 and #8.

Figure 9: a very happy patient.

Topic for another day

Many events took place prior to the patient arriving at the dental clinic which might diminish the prognosis of the avulsed teeth, which was very poor at the outset, with the likelihood of ankylosis quite high. The radiographs are being examined by certified specialists and the results will be presented in a subsequent article. ■

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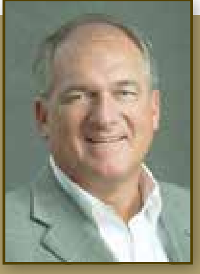
Invisalign: Maxillary Canine Lingual-Version Crossbite Correction

by Perry E. Jones, DDS, MAGD, IADFE

Introduction

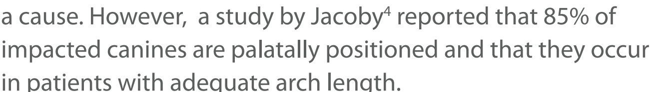
Maxillary canines may assume unfavorable positions during eruption,[1] with 70% to 85% of impactions exhibiting palatal displacement.[2] Canines are documented to be the most frequently impacted teeth of the permanent dentition, with an incidence of 0.8% to 2.8%.[3] Etiology of unfavorable canine positioning remains a subject of great debate.[3] For example, one would speculate that arch length discrepancy might be



Dr. Perry Jones is a graduate of Virginia Commonwealth University School of Dentistry, where he now serves as Director of Continuing Education and Faculty Development, as well as Adjunct Faculty, Associate Professor, Department of Oral Maxillofacial Surgery.

He is Director of the Virginia Academy of General Dentistry MasterTrack program, and is a Master of the Academy of General Dentistry. One of the very first GP Align Technology education speakers, Dr. Jones lectures extensively and has given some 300+ Invisalign and iTero presentations.

Currently, Dr. Jones serves as Director of Education for AACO, and maintains an active private practice in Richmond, Va.



a cause. However, a study by Jacoby[4] reported that 85% of impacted canines are palatally positioned and that they occur in patients with adequate arch length.

Malposition of maxillary canine teeth can create functional issues with occlusion, especially as a canine might interfere with the envelope of function (**Figure 1**). Malposition can present periodontal issues for both soft tissue and the supporting bone of the attachment apparatus. Patient concern for esthetics is often the primary reason to seek treatment.[5]

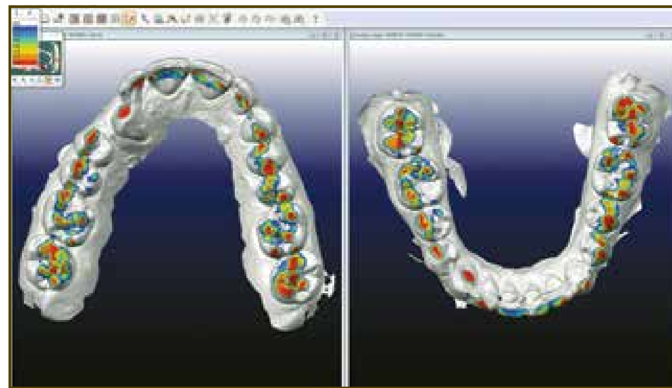


Figure 1: ClinCheck initial view occlusogram.

Invisalign is a movement system that uses a series of clear plastic aligners, staged using proven orthodontic science, to successfully move teeth. The movement of particular interest in this case is controlled crown movement, or tipping, in the buccolingual plane of resistance. Controlled crown movement is a strength of movement with Invisalign.[6]

Canine movement can be challenging owing to root morphology and larger root surface area. Typically, the maxillary canine is a single-rooted, single-canal tooth. The proximal mesial and distal root surfaces are commonly concave. Variation may occur, with multiple roots and canals possible.[7]

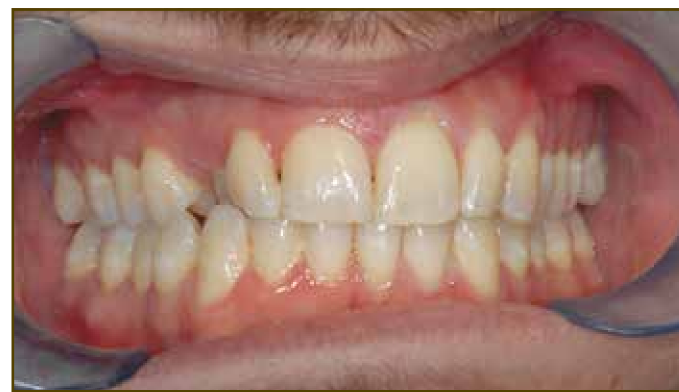


Figure 2: initial Anterior View.

Diagnosis

A healthy 33-year-old patient presented with a maxillary right canine in lingual-version crossbite. Arch forms exhibited a mild degree of constriction with mild crowding. The anterior-posterior (A-P) molar relationship was Class I, with good intercuspation. The midlines were slightly nonconcurrent, with the maxillary midline off to the left about 1-2 mm. There was minimal excess overjet with reasonable anterior coupling. The vertical appearance of deep bite/overbite was within normal limits. Interestingly, the patient reported that he had completed prior orthodontic movement with traditional wire braces and still had a lower fixed retainer. Canine wear facets confirmed unwanted functional interference (**Figures 2-6**).

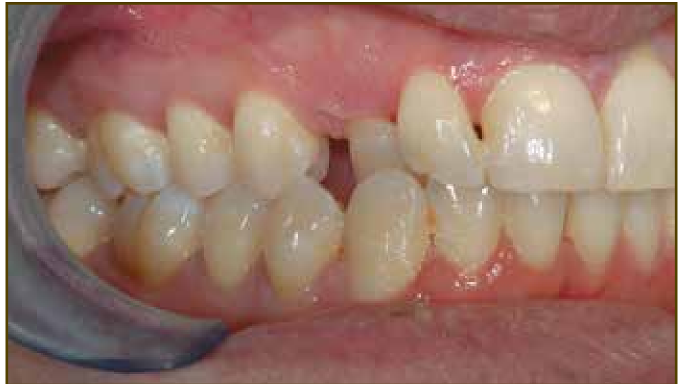


Figure 3: initial Right Buccal View.

Figure 4: initial Left Buccal View.

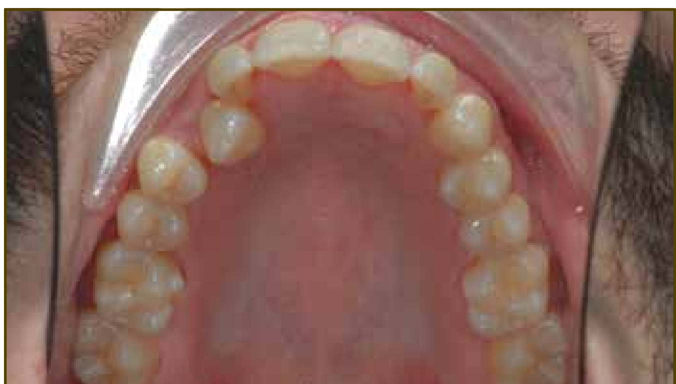


Figure 5: initial maxillary Occlusal View.

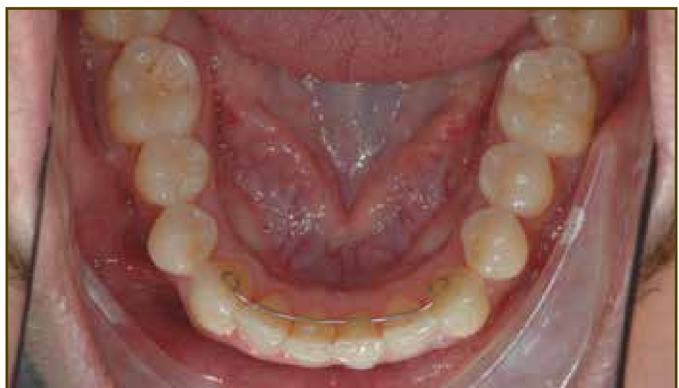


Figure 6: initial mandibular Occlusal View.

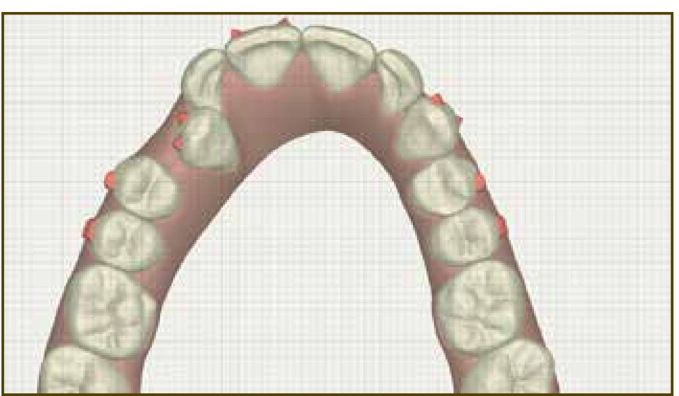


Figure 7: ClinCheck initial maxillary Occlusal View.

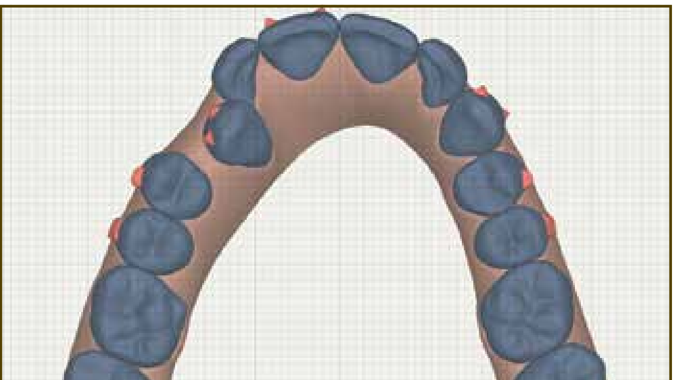


Figure 8: ClinCheck initial maxillary Occlusal View.

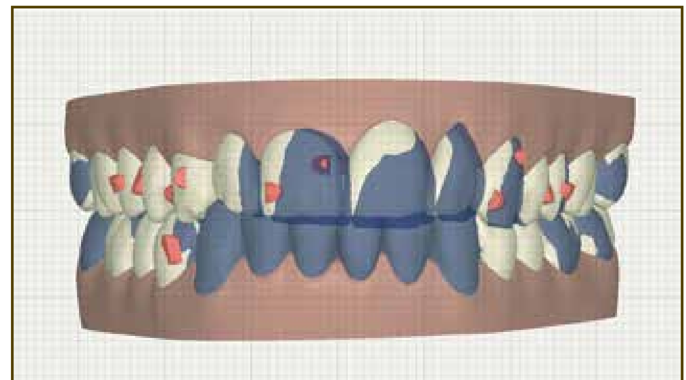


Figure 9: ClinCheck final Anterior View.

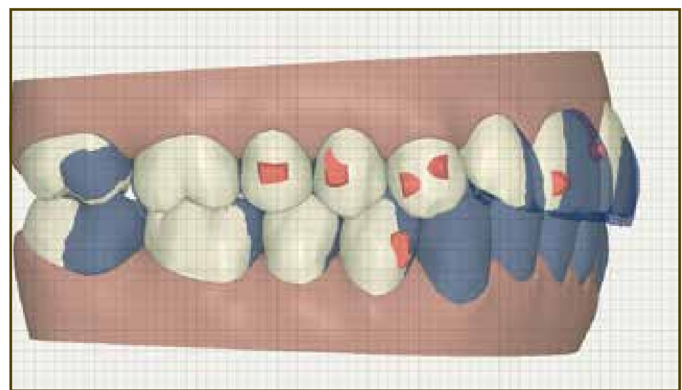


Figure 10: ClinCheck final Right Buccal View.

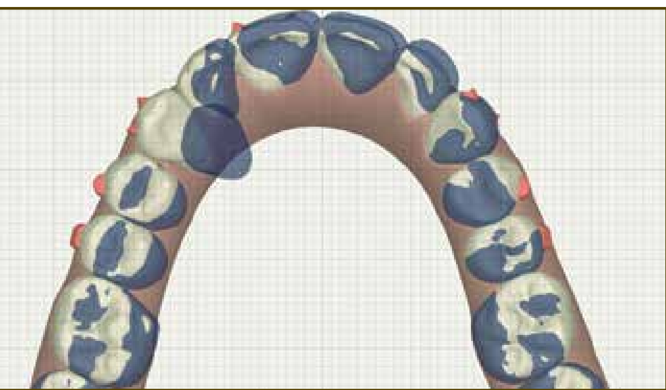


Figure 11: ClinCheck final Occlusal View.

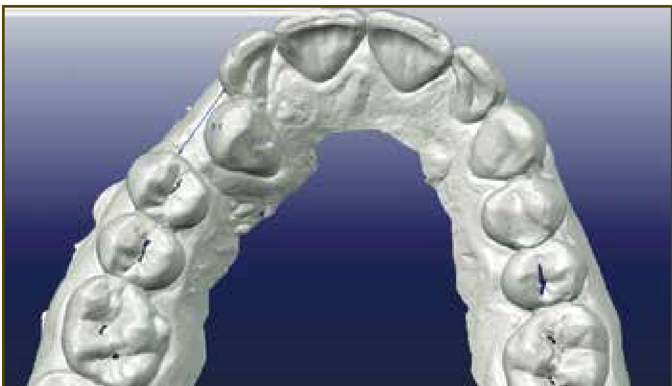


Figure 12: measurement space.

Treatment plan

Objectives included maintaining the existing Class I A-P relationship and establishing a sound Class I canine relationship. We planned to resolve the crowding using proclination and expansion. Proclination was also used to improve the labial angle of inclination and the interincisal angle. Given that the lower arch form looked good, we maintained the lower lingual fixed retainer during Invisalign treatment. Custom features of the Invisalign software allowed the aligner plastic to be constructed to cover the fixed lingual retainer.

ClinCheck

We sent iTero Element Digital scan data and an orthodontic photo series to Align. The initial virtual movement Invisalign setup consisted of 21 maxillary and 7 mandibular aligners (**Figures 7-11**). The ClinCheck measurement tool, as well as those included in iTero's OrthoCAD software, enabled us to verify adequate space to move the maxillary canine (**Figure 12**).

Clinical outcome

Based on clinical experience and published data,[8,9] an activation time interval of 2 weeks with a minimum wear of 22 hours per day was used. The patient was very compliant and wore each aligner for the full 2 weeks. After the movements of the initial ClinCheck were completed, we added a refinement to fine-tune the finish.

Controlled crown tipping movements are often accompanied by relative intrusion/extrusion. The canine cusp tip first appears to extrude as it moves across the occlusion to the desired buccal position. The canine next crosses the bite, and then appears to intrude as the tooth is tipped to the buccal about a center of rotation in the apical two-thirds of the tooth. We used the refinement to help add true extrusion movement to the canine and position the cusp tip to an optimal incisal edge proportion. The refinement photos (**Figures 13-17**) demonstrate the interference of the canine as it was moved to the buccal.

The occlusogram tool (**Figure 18**) and final clinical views (**Figures 19-23**) illustrate how the patient's bite was adjusted for optimal occlusion.

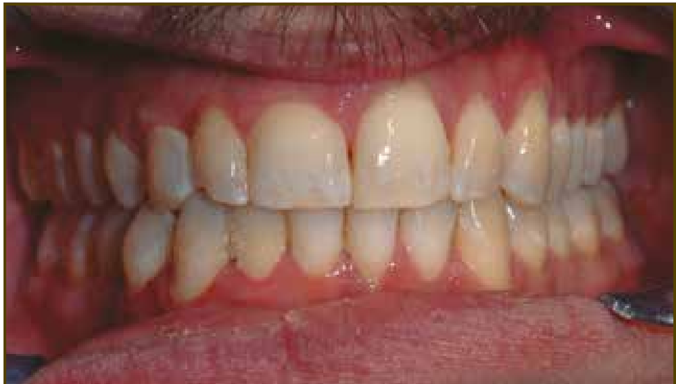


Figure 13: refinement, Anterior View.

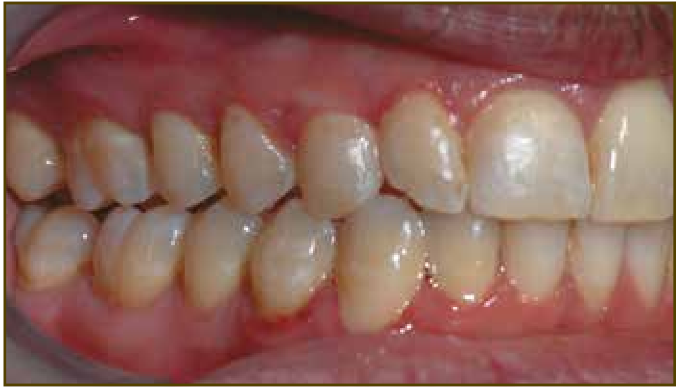


Figure 14: refinement, Right Buccal View.

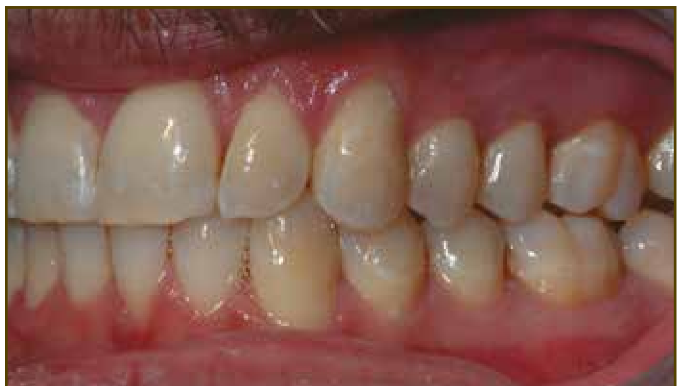


Figure 15: refinement, Left Buccal View.

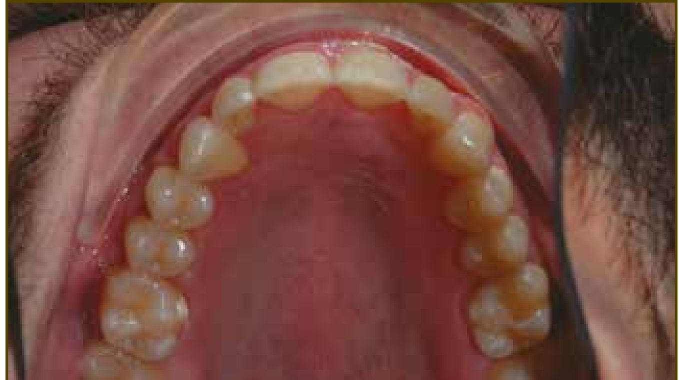


Figure 16: refinement, maxillary Occlusal View.

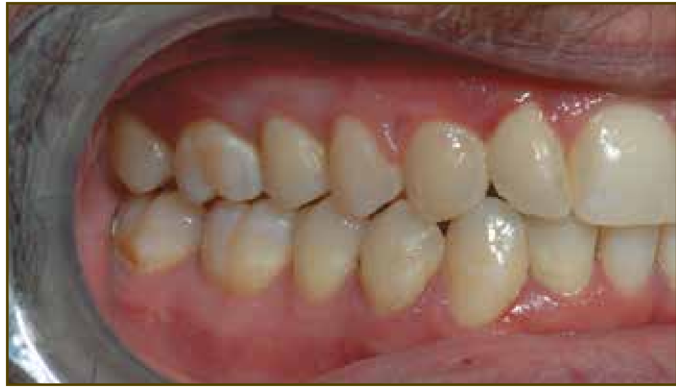


Figure 20: final Right Buccal View.

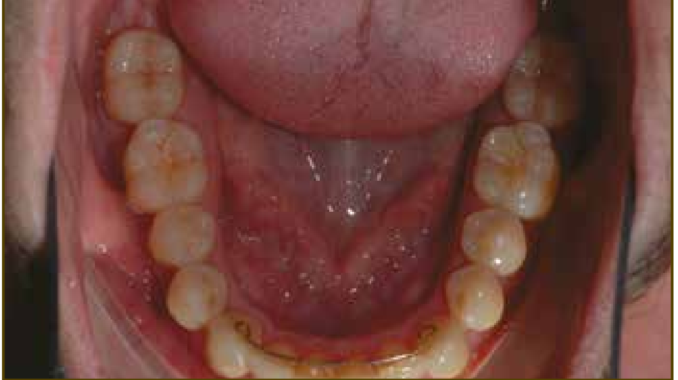


Figure 17: refinement, mandibular Occlusal View.

Figure 21: final Left Buccal View.

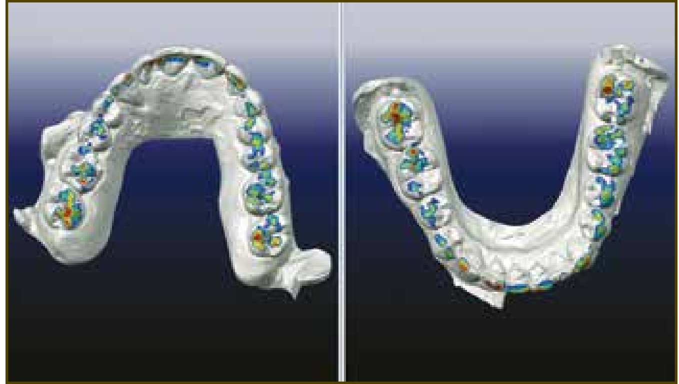


Figure 18: ClinCheck final view occlusogram.

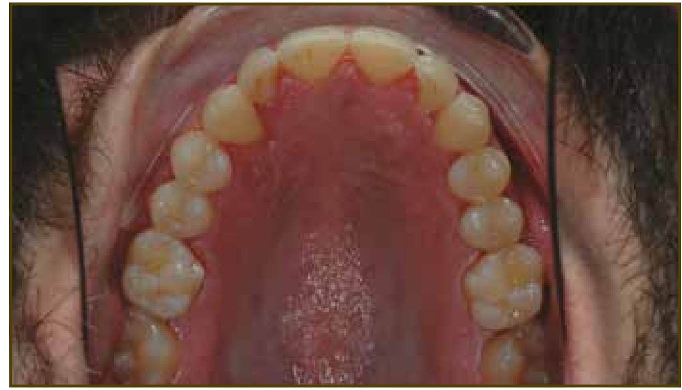


Figure 22: final maxillary Occlusal View.

Figure 19: final Anterior View.

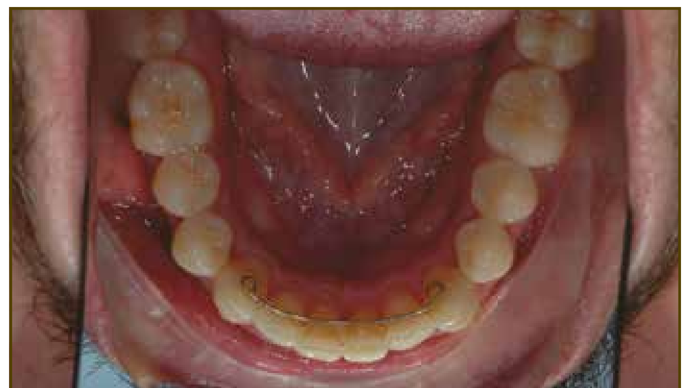


Figure 23: final mandibular Occlusal View.

Summary

This case demonstrates the strength of the Invisalign movement system in using controlled crown tipping movements in the case of a palatally positioned maxillary canine.

The final clinical outcome was excellent, with crossbite correction and incisal edge positioning completed as planned. The patient was extremely happy with the result, commenting that he only wished he had had Invisalign for the original case! ■

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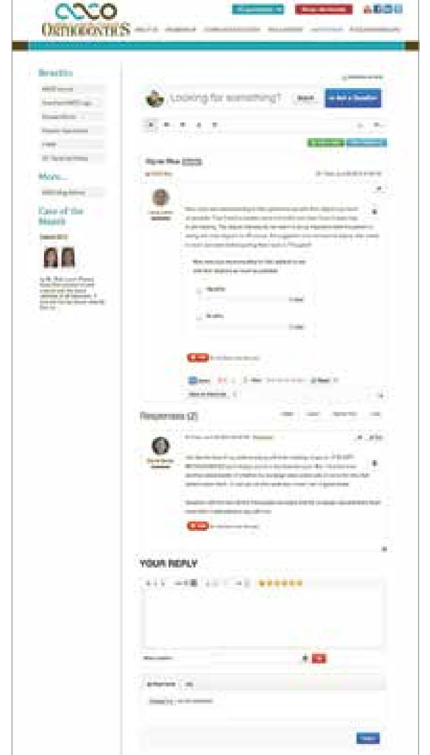

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Feature Article

Retainers: A Comparative Guide

by Eli Halabi, DMD

Dr. Eli Halabi received his BA from Yeshiva University and his DMD from the University of Pennsylvania. He completed his specialty training in orthodontics and dentofacial orthopedics at the George Washington University and at Children's National Medical Center, which is one of the top pediatric hospitals in America. While at Children's National, he dedicated time to the study of facial growth and development as a member of the Craniofacial Team at the Washington Hospital Center in Washington, D.C. Dr. Halabi is a member of the Omicron Kappa Upsilon honor society. His interpersonal, clinical, and management skills are all cutting-edge. His communication skills are mirrored by the fact that he is able to speak four languages, enabling him to communicate with and treat individuals from various walks of life. Dr. Halabi maintains private practices on Kings Highway in Brooklyn, N.Y. and in Denville, N.J.

Visit Dr. Halabi's website: **www.SettingThingsStraight.com**

You can e-mail Dr. Halabi at: **halabiortho@gmail.com**

Removable Retainers

Hawley Retainer

Named after inventor Dr. Charles Hawley, this retainer is built on an acrylic body that sits on the palate (in the maxillary version) or hugs the lingual aspects of the lower teeth (in its mandibular counterpart). Embedded in the acrylic, the Hawley retainer has a labial wire, or Hawley bow, which incorporates two omega loops for adjustment with three-pronged orthodontic pliers.

Hawley retainers are usually lab-fabricated and have many different designs.

The most common design used for the maxilla is the "circumferential" design (**Figure 1**), in which the labial wire wraps around the entire maxillary arch and is soldered to a

Figure 1: circumferential Hawley retainer.

C-clasp on the upper molars for retention. The advantage of this design is that it touches only the palatal aspect of the teeth (with the acrylic) and the labial aspect of the teeth (with the wire), while the occlusal surface of the teeth is free to erupt. This design allows for post-treatment "settling" of the occlusion. It can be beneficial in cases that have minor posterior open bite due to aligner thickness, as it allows the posterior segment to erupt into "socked-in" occlusion (a final locked-in occlusion with no gaps between the upper and lower teeth in centric occlusion).

The standard lower Hawley (**Figure 2**) has occlusal rests on the lower first molars or Adams clasps for added retention.

In recent years, a more esthetic version of the Hawley has been developed, in which the labial metal wire is replaced with a translucent, highly adaptable, resilient polymer wire called ASTICS® (**Figures 3, 4**). This wire replaces the earlier QCM wire, which was bulkier and had more incidents of breakage. The ASTICS retainer has better esthetics while maintaining the same adjustability and durability as a standard Hawley.

Modified Spring Hawley Retainer

This retainer has the acrylic body of a standard Hawley, but incorporates a flexible spring encased in the acrylic on

Figure 2: lower Hawley retainer.

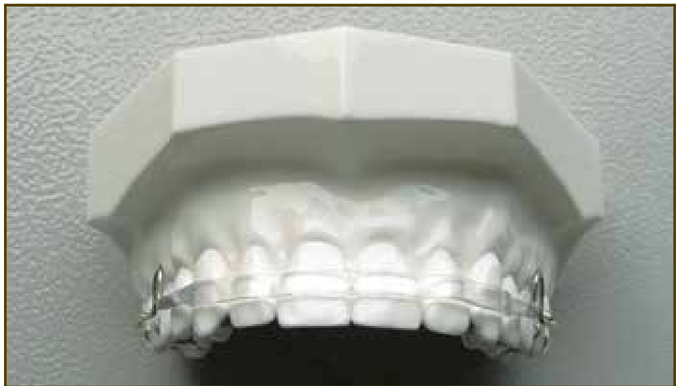

Figure 3: ASTICS.

Figure 4: ASTICS bow.

Figure 5: modified spring Hawley retainer.

the lingual side of the anterior teeth (**Figure 5**). This provides the flexibility and force needed to correct minor relapse, when it occurs because of a patient's noncompliance with wearing the retainer as directed, or to achieve ideal alignment in cases where full finishing and detailing were not attained during the active phase of treatment.

To summarize, Hawley-type retainers have:

Advantages:

- Adjustability: labial bow can be manipulated to provide minor corrections
- Durability: may last several years with normal wear
- Allows posterior settling of occlusion

Disadvantages:

- Usually lab-fabricated, and may take more time and expense to deliver to the patient
- Poor esthetics (except for ASTICS)
- Speech: may be affected by palatal coverage of maxillary Hawley retainers, if daytime wear is needed

Invisible Thermoplastic Retainers (Essix)

Another removable retainer which is gaining popularity for esthetic reasons is the Essix retainer, made from a clear acrylic wafer, vacuum- or pressure-formed over a model of the arch (**Figures 6, 7**). A further selling point for this type is the clinician's ability to fabricate these retainers in-office using a vacuum "suck-down" machine or a pressure machine like the Drufomat (**Figure 8**) (Dentsply Raintree Essix, Sarasota, Fla.; www.essix.com). (Pressure machines can be used to make nightguards, occlusal splints, bleaching trays, and sports mouthguards in-office, in addition to retainers.)

The esthetic clarity of the Essix retainers makes them ideal in cases that need long-term, full-time retainer wear—such as in patients with congenitally missing lateral incisors. In such a case, the pontic is embedded in the plastic and the retainer is worn until the patient is ready to get the lateral incisor implants.

The durability and adjustability of these retainers depend on the type and thickness of the plastic used. For example, Dentsply offers the Essix Ace plastic, which has an average life of 18 to 24 months and can be adjusted, as advocated by Dr. Keith Hilliard, using Thermoplier pliers to add dimples or "force points" to correct minor relapse. For patients who are heavy bruxers, you may consider the Essix C+ plastic for added durability.

AlignTech, the manufacturer of Invisalign, has its own retention system called Vivera, which uses scans or PVS impressions to fabricate thermoplastic retainers. Align claims these are stronger and more durable than other manufacturers' plastic retainers. A perk of using Vivera is that AlignTech stores a digital file of the patient's dentition, and can fabricate new retainers without taking a new impression or scan.

Figure 6: Essix retainer.

Figure 7: Essix+2.

Figure 8: Drufomat.

Figure 9: tooth positioner.

To summarize, invisible thermoplastic retainers have

Advantages:

- Esthetics and clarity
- Good for long-term, daytime retention; does not affect speech
- Easy transition for patients who had CAT (Clear Aligner Therapy)

Disadvantages:

- Durability: average life is only 24 months
- Posterior coverage may not allow settling in cases where full-time wear is prescribed

Tooth Positioners

A tooth positioner (**Figure 9**) is a custom-made, lab-fabricated, resilient silicone mouthpiece that is constructed over a set-up and fabricated in normal hinge-axis relationship (www.tportho.com). It is historically used as a "finishing appliance" to correct minor intra-arch and interarch discrepancies in cases where active treatment has to be stopped early for whatever reason.

The tooth positioner is also considered one of the most effective retention devices ever invented. It has the advantages of producing small amounts of detailed tooth movement and conditioning the gingival tissues. However, long-term compliance with it is problematic because patients consider it bulky and unesthetic, and it interferes with function.

Advantages:

- Ability to stop active treatment earlier
- Ability to close slight spaces and to correct minor rotations and buccolingual discrepancies
- Corrects and relates teeth in both arches simultaneously

Disadvantages:

- Bulky
- Unesthetic
- Cumbersome to wear

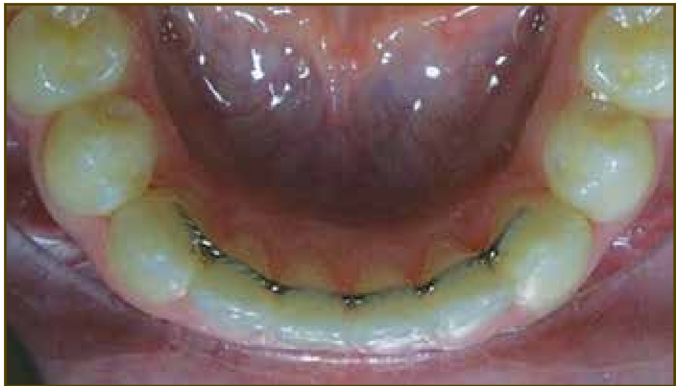

Figure 10: fixed retainer.

Figure 11: Ortho-FlexTech.

Fixed Retainers

With the advent of composites in dentistry, the use of bonded fixed retainers (**Figure 10**) has become more popular, especially in the lower incisor region, the area most prone to post-treatment relapse. One system entails placing a passive, flexible wire that extends canine to canine and fixing the wire to every incisor with flowable composite. An example of such a retainer is the Ortho-FlexTech (**Figure 11**), which comes as a 14K gold or stainless steel chain (Reliance Orthodontic Products, Itasca, Ill.; www.relianceorthodontics.com).

These retainers maintain tooth position very well. However, a few problems may occur. One is that the composite can break away from a tooth, allowing the tooth to move. For another, hygiene is often a challenge because plaque can accumulate on the retainer and in the closed interproximal surfaces.

These retainers can stay in place for years. Caution should be taken not to rely solely on fixed retainers in cases where expansion of the arch was needed during treatment. In these cases, full-coverage removable retainers are more appropriate in lieu of or in addition to the fixed retainer to retain the posterior arch expansion.

Advantages:

- Retains area most prone to relapse: lower anteriors
- Compliance not an issue
- Esthetic solution
- Can stay in place for many years

Disadvantages:

- Accumulates plaque; hard to maintain excellent hygiene
- Bonding may break without patient's knowledge and teeth can shift
- Does not retain posterior segments
- Upper fixed retainers must be bonded more gingivally to avoid anterior occlusion; this can be challenging in some cases

Understanding postorthodontic relapse, and the different types of retainers available, can certainly help the doctor and patient maintain the excellent orthodontic treatment result they have worked so hard to achieve. ■

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Perspectives from the Hygiene Chair

A Dental Hygienist for Your Orthodontic Practice: A Wise Move

by Joycelyn A. Dillon, RDH, MA

Joycelyn Dillon is an Associate Professor and Chair of the Dental Hygiene program at New York City College of Technology. She also practices clinical dental hygiene, and is an extended member of the New York State Board for Dentistry. Passionate about her profession, Professor Dillon teaches periodontics and clinical dental hygiene. She lectures on a variety of topics and also provides community services.

Although many orthodontic practices do not conventionally hire dental hygienists, it can be proven that hygienists can play a significant role in the treatment of orthodontic patients and be a valuable asset to an orthodontic practice. The Dental Hygiene Practice Acts (DHPA)[1] reveal that a vast number of procedures before, during, and after orthodontic treatment can be handled by the dental hygienist, thereby making the dentist available to treat additional patients.

This article will demonstrate the benefit of having a dental hygienist available in the orthodontic practice, or in a general practice that offers orthodontic treatment to patients, to provide additional service.

The new patient, arriving at the office, will first come in contact with the dental hygienist, who interviews him or her, takes and reviews the medical history, and alerts the dentist of medical considerations.[2] The following are additional procedures that the hygienist can accomplish prior to the patient's case treatment planning by the dentist.

Prior to planning of orthodontic treatment:

- Radiographs[1]
- Dental charting[1]
- Intra-/extraoral examination[1]
- Occlusal assessment[3]
- Impressions for study casts or diagnostic casts[1]
- Photos[4]
- Patient education regarding:
  - Need for orthodontic appliances
  - Types of orthodontic appliances—conventional versus Clear Aligner Therapy (CAT)
  - Oral hygiene self-care[5]
  - Nutrition related to caries prevention[4]
- Dental hygiene treatment: removal of calcareous deposits, accretions, and stains, and fluoride treatment[1]

During orthodontic treatment:

During orthodontic treatment, the hygienist can also be a significant participant. Depending on the office structure, the hygienist can play a role restricted to providing conventional dental hygiene procedures such as ultrasonic scaling, fluoride treatments, x-ray exposures, patient education, and maintenance care. However, the DHPA also allows the dental hygienist to perform additional services that are integral parts of orthodontics, such as:

- Prefitting of orthodontic bands[1]
- Placement of spacers[6]
- Placement of attachments[6]
- Removal of orthodontic arch wires and ligature wires[1]
- Prophylaxis every three months[4]
- Fluoride treatment[4]
- Dietary counseling[4]
- Photos[4]
- Patient education regarding hygiene care of conventional orthodontic appliances[5]
- Patient education regarding hygiene care of clear aligners[5]
- Patient education regarding using whitening gels inside of clear aligners
- Monitoring of treatment and patient compliance

While many of the services listed above can be performed by a dental assistant, the dental assistant is not licensed to provide hygiene services. Thus there is an added benefit in having a registered dental hygienist available to provide dental hygiene services.

After orthodontic treatment:

After the completion of orthodontic treatment, the hygienist can continue orthodontic patient treatment in the following ways:

- Dental hygiene maintenance[4,7]
- Fluoride varnish[4]
- Treatment of decalcification[4]
- Patient monitoring and compliance (retainers)

The availability of a hygienist in the orthodontic practice means that the hygienist can also provide dental hygiene services to the family members of orthodontic patients.[8] While treating these family members, the hygienist may discover the need for additional dental treatment and can recommend that the orthodontist refer the patient or the family member to the appropriate practitioner.

Another plus in having a dental hygienist in the orthodontic practice, as stated by a dental assistant, is that a dental hygienist in the orthodontic practice will be more sensitive to the issues surrounding cleaning of teeth, reducing the number of patients who return with loose brackets or retainers due to overaggressive use of ultrasonics or curettes.[8]

The same article[8] also points out that when patients need to interrupt orthodontic treatment to go to another office for dental hygiene care, it creates an inconvenience and adds to the length of orthodontic treatment time. This shows the benefit of having a dental hygienist on site at the orthodontist's office; however, it also presents a reason why many orthodontists are hesitant to hire a hygienist. According to the author, orthodontists "don't want to upset" referring dentists by stealing patients. By allowing patients to be treated by an in-house dental hygienist, the orthodontist may be unintentionally taking patients from the referring dentist. The patients may also develop a bond with the hygienist in the orthodontic practice as a result and may not want to return to the hygienist at the referring dentist's office.[8]

In the quotes to the right, my conclusion is summarized perfectly.

Regarding the concern of "stealing patients"[8] from referring dentists, if professional ethics prevail, both practitioners can work to form an amicable, symbiotic patient-sharing relationship. ■

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[The dentist] began to recognize that many orthodontic procedures were simple and repetitive tasks that could be broken down into smaller steps and performed by a hygienist.[6]

Dentists who are smart enough to utilize the abilities of their hygienists will be able to generate more case acceptances and will be able to provide Clear Aligner Therapy more successfully, more competently, more efficiently and more profitably.

(Jeffrey Galler, DDS, email communication, November 2015)

Social Media & Technology

Google—Love ’Em or Hate ’Em: The Changing Local Landscape

by Leonard F. Tau, DMD

Dr. Leonard F. Tau maintains a full-time private practice in Northeast Philadelphia focusing on general, cosmetic, reconstructive, and implant dentistry. He received his dental degree from Tufts University School of Dental Medicine in Boston, Mass., and a Certificate in Advanced Education in General Dentistry at UMDNJ in Somerdale, N.J. Dr. Tau has had extensive training in cosmetic and reconstructive dentistry, including Invisalign.

Dr. Tau is the Director of Media Relations for the American Academy of Cosmetic Orthodontics.

In recent years Dr. Tau has focused his attention on the process of practice marketing, using tools that have not historically been available. His development of iSocial Reviews (now a part of BirdEye) has grown out of that intensive study. Dr. Tau consults with hundreds of dentists around the country, particularly in the area of reputation marketing. He can be reached at **215-292-2100** or **drlentau@pcde.com**.

The marketing landscape has changed immensely over the years. Traditional marketing is extinct, and you need to have a presence online in order to be found. Frequent readers of my column know that I am fully invested in online marketing and have been for the past 8 years, since I purchased my practice in Northeast Philadelphia.

For years Google was my best friend, sending a ton of new patients to my practice through paid advertising, organic website ranking, and directories I had signed up for that promoted my practice, as well as my number one referral source over the years—online reviews. When you were searching for a dentist in Philadelphia, you would have had a hard time not finding me on the first page of Google listings, even though my office is about 20 miles outside of Center City. To be honest, a day did not go by without new patients calling the office for an appointment and, when asked how they found me, saying “Online.”

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Map results for dentist 19116

Figure 1

In July 2014, Google released the Pigeon update to its algorithm. Pigeon focused specifically on local search—neighborhoods rather than metropolitan areas. Many dentists, including me, saw a significant shift in the local map listings when this took effect. If someone searched for your service and you were not located close to that user’s neighborhood, it became very difficult to rank in the group of 7 listings alongside the first page of the map—the so-called “7 pack.” For the next few months while the dust settled, I saw a decrease in new patients who were calling from downtown Philadelphia, as I was no longer ranking in the listings there (**Figure 1**).

Some practices started to panic at the lack of new business, and marketing companies rushed in to make suggestions on how to be found again. Many suggested PPC (pay-per-click

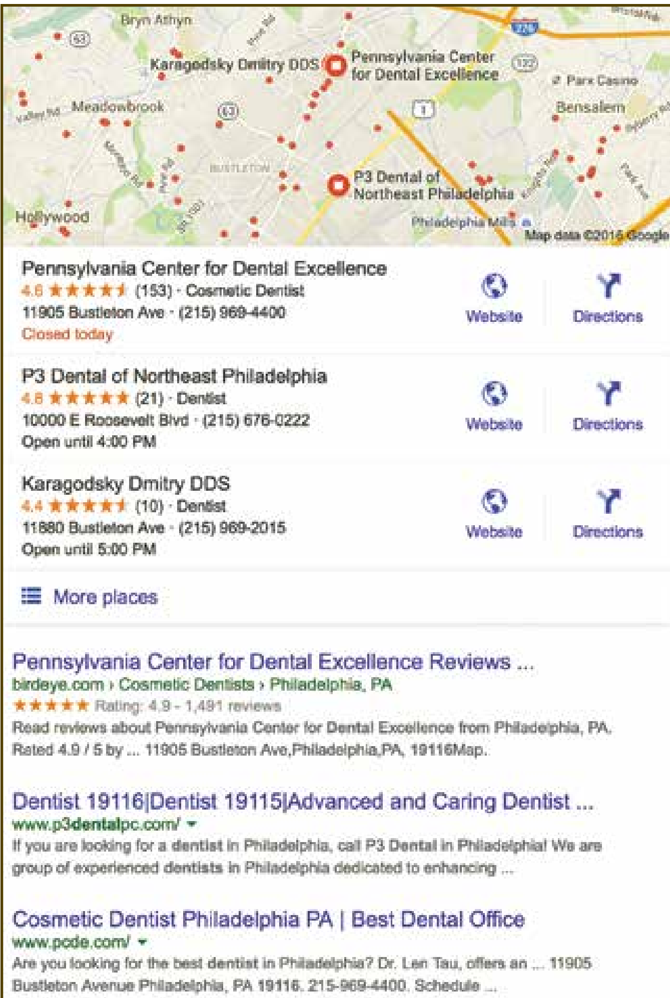

Figure 2

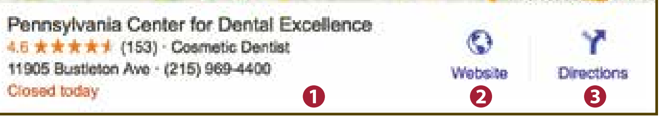

Figure 3

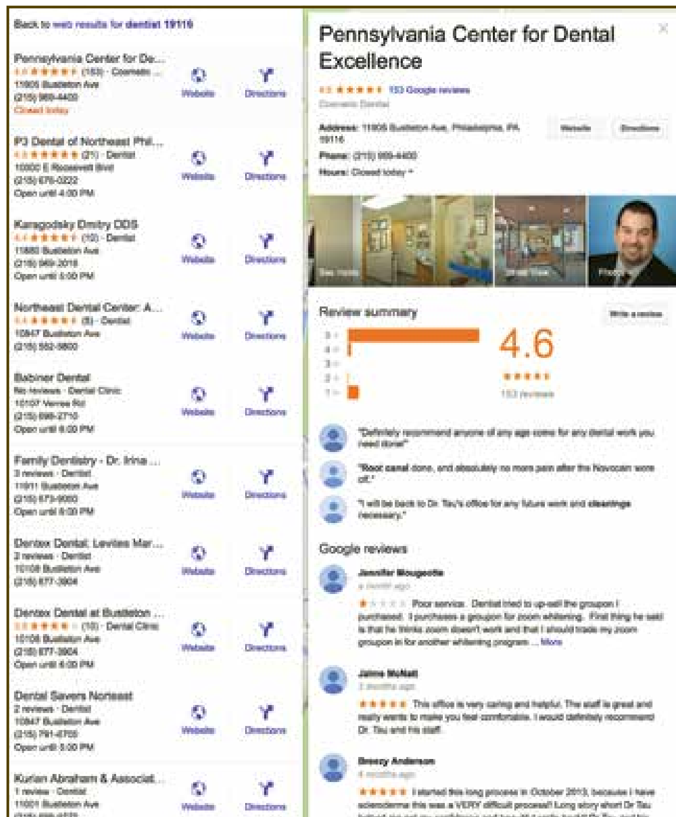

Figure 4

advertising)—paying Google to have your listings appear at the top of a specific search; others suggested ramping up your website's SEO (search engine optimization). Still others, like me, continued to focus on reputation marketing and having my patients talk about me online by posting reviews on Google, Yelp, and Facebook (the most visible sites). It took many months, but my new patient numbers started to increase again, even though I was not as visible unless you were fairly close to my office location.

Knowing that Google likes to make changes quite often and wreak havoc, I expected some changes in 2015, as more and more agencies were focusing on the SoLoMo (social, local, and mobile) model. As general manager for the dental vertical of BirdEye, a Sunnyvale, California–based reputation marketing software company, I attend many trade shows around the country, conducting demos of the software for those attendees who are interested in learning more about what our software can do for their practice. I was in Dallas at the Southwest Dental Conference in August when, during one of those demos, I noticed that the map pack once known as the 7 pack was now showing only 3 dentists during any location search (**Figure 2**).

What you can see in the accompanying images is that my office ranks first in the maps; in the organic rankings, our reputation software ranks first and my website is ranked third. Those searching for a dentist near me have lots of info to find out about my practice.

Once again, many dentists who had worked hard to achieve online visibility, lost that visibility when the Pigeon update dropped them. A dentist who had ranked fourth on the 7 pack, and was thus visible on the first page of listings, was now practically invisible: that dentist would only be found if the searcher clicked on "More places." Few searchers do, just as most searchers don't click "Next" to view page 2 of Google search results.

What does this mean for your practice?

It means even fiercer competition. Your practice will be far less visible if it can't crack those top 3 listings (now called the "snack pack"). But not only are there fewer listings; Google has also made some changes in the format. You need to consider how these will affect new patients searching for a dentist.

For one, the link to your Google+ page is gone. Google is revamping Google+ and decoupling it from its other services.

This will be annoying if you've recently put effort into making your Google+ page more of a marketing tool.

For another, there are now multiple places in each listing where the searcher can click, with different functions. The main link—from your name and address—brings up a box Google calls the Knowledge Graph, with more information about your practice, along with pictures and a selection of reviews. There are separate links to go directly to your website and to get directions via Google Maps (**Figure 3**).

Notice that the left column now shows more than just the top three listings (**Figure 4**). If you look at that list of other dentists, you will notice that a lot of the ranking order is determined by the number of Google reviews that an office has. If you were a patient looking for a new dentist, which would you choose: an office with 152 reviews, or one with 21, 10, 5, or worse yet, 0? I think you know the answer to that question.

Some things to consider when determining your next steps:

- The list of other dentists that comes up alongside your Knowledge Graph shows, and is ranked by, the number of reviews each practice has received. People will be reading those reviews and considering them when selecting a dentist; so **reviews are more important than ever.**
- Google has changed its rules many times and will certainly change them again. If you rely on any one strategy to pull in new patients, you run the risk of getting caught unawares by the next change. Keep yourself visible by using all the resources: social media, pay-per-click, local SEO, even video marketing. **Use a diversified marketing strategy.**
- You and I know that the best dentists aren't necessarily the first 3 that Google lists. But do patients? How many will take the trouble to look at the next page? You need a strategy that **will keep you in the top 3** under Google My Business, or on the first page of organic results.

As always, if you have any questions or need any help regarding your Internet marketing strategy, please do not hesitate to contact me for some advice or assistance. If you are interested in learning more about what BirdEye can do to improve your local SEO and get you ranked in the 3 pack, check out birdeye.com/dental and request your personalized demo. ■

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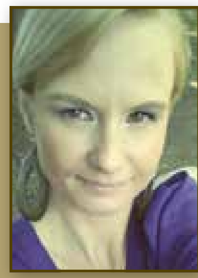
Focus on Photography

Excellence in Dental Photography

by Anna Kataoka, MS, MBA



Anna Kataoka is an employee of Shofu Dental Corporation. She is a graduate of the MBA dual program in marketing and international business at Baruch College in New York City. She also holds MS degrees in mechanical engineering and in management from Gdansk Polytechnic, in Poland.

Abstract

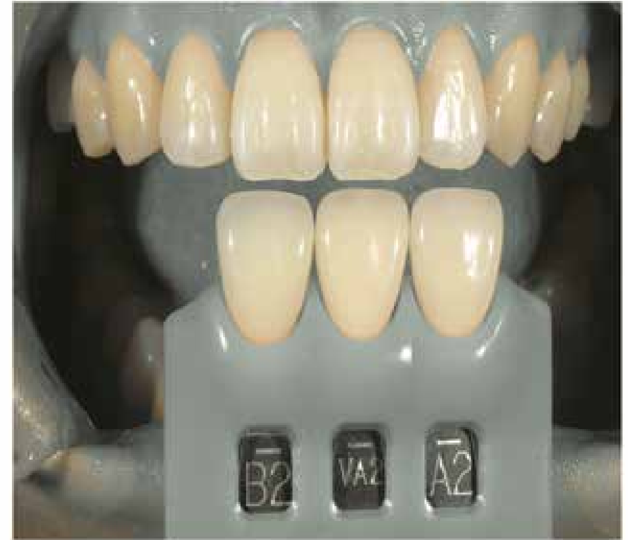
This article discusses the basic components of successful clinical photography, including the camera equipment, accessories, adherence to procedures and protocols, and involving the dental team by delegating the tasks of clinical photography. The Journal of the American Academy of Cosmetic Orthodontics is planning to publish more on this subject, with topics ranging from orthodontic photo guides recommended for clear aligners, to the application of clinical photography in marketing and intercommunication with patients and the dental team.

Relevance of dental photography

The application of digital photography has permeated every aspect of modern dentistry. In fact, it would be difficult to imagine today's dental practice without the use of photography. It is simple and fast, and its uses include case documentation; treatment planning; and patient, peer, and lab intercommunication, collaboration, and education.

The main objective of dental photography is documentation of dental treatment, through images demonstrating the patient's record, the treatment plan, and progress of the results. Clinical photography offers an instant look at the patient's case which can be effortlessly reviewed, monitored, and compared with the patient's other records. Other applications of dental photography include:

- **Patient education and communication:** Visual aids help educate patients on diagnosis and proposed treatment, ultimately resulting in better understanding of a proposed treatment plan, higher case acceptance, and improved practice productivity.
- **Peer-to-peer collaboration and referrals:** Images introduce an entirely new dimension when referring patients to other specialists. Clinical photographs, in particular, play a pivotal role in consultations regarding new patients, facilitating effective communication with both the patient and the referred specialist.
- **Laboratory communication:** Although a stone model accurately renders the details of a tooth's shape and position, it provides no details on a tooth's gingival character, shade, color, or translucency. A shade guide may help characterize the color, but it does not have the ability to portray the complexity of the tooth structure as comprehensively as an image. Photographs, on the other hand, effectively convey visual information about hue, chroma, and value of a restoration, leaving little room for misinterpretation of the desired outcome.
- **Patient record management and insurance verification:** Dental charting, radiographs, and the proper description of a patient's clinical condition are required by insurance providers before benefits can be disbursed. Although useful in recording the state of the mouth, radiographs and charting do not provide information about the tissue. Digital photographs of a patient's condition can support a recommended treatment plan and expedite authorization of an insurance claim.
- **Legal documentation:** A malpractice lawsuit is every dentist's nightmare. In certain cases, clinicians may find themselves involved in consulting on, or even rectifying, a negligent treatment. Proper photo documentation may support the case of a mistreated patient or, conversely, defend a falsely accused colleague.



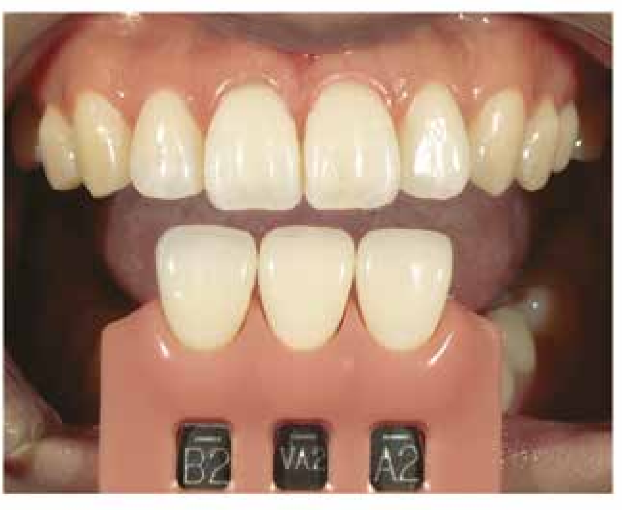


Figure 1: Shofu EyeSpecial C-II digital dental camera includes the Isolate Shade mode, which grays out the gingival tissue for optimal shade matching.

- **Marketing dentistry with photography:** Marketing can take many forms. A patient's before-and-after photographs are powerful tools to motivate, excite and persuade. Besides their invaluable visual appeal in an office portfolio or gallery, they also provide the most cost-effective way to increase patient acceptance and promote a dental practice.
- **Professional instruction and research:** Narrative alone is often inadequate in conveying concepts. On the other hand, instructional photographs depicting the tools and protocols of specific procedures can help improve practice efficiency. In addition, photographic series can be employed to describe a clinical condition or to communicate ideas and concepts with other clinicians in lectures, presentations, trade publications, and professional certification.
- **Self-education, work ethic and personal improvement:** Clinical photography is the backbone of honest self-assessment. A practitioner can use comparative images to objectively evaluate and improve the quality of care provided, ultimately setting a path to becoming a better clinician.

General guidelines

The progress of health care technologies and the ubiquity of information technology have made patients better informed about the aspects of dental care. Today, patients' written consent is a legal obligation, as well as an ethical principle which represents patients' right to take part in clinical decisions concerning their treatment. Therefore, it is a necessity to obtain informed consent before using patients' images for clinical, marketing, or educational purposes (in lectures and the like, as well as in professional print and online publications).

A variety of available practice management software solutions have built-in consent templates; some even provide an option to create customized forms using on-screen step-by-step instructions. Similarly, trade literature, popular dental periodicals, and online resources may supply information useful in finding appropriate forms.

Photographic equipment

In the last decade, dental photographic equipment has undergone a tremendous transformation. With a score of cameras available to dental professionals today, two types are the most prevalent: point-and-shoot cameras and single-lens reflex (SLR) cameras. Despite their deficiencies, which can be mitigated with ancillary equipment, accessories, carefully arranged surrounds, and standardized procedures, both types can deliver satisfactory solutions.

The rule of thumb is to invest in a camera capable of capturing images with accurate human color, full tonal range, and adequate depth of field, and providing the ability to produce close-up images with good light control. Whatever hardware they use, practitioners can increase efficiency and reduce chair time by developing excellent skills in using mirrors and retractors, as well as knowledge of how to photograph with consistency and predictability.

Wireless images for clinical photography with a smartphone, tablet, computer or TV

With the proliferation of smartphones and tablets, clinicians now have the ability to interconnect a dental camera with other communication devices and systems in the operatory and laboratory. A photograph, captured with a digital camera that is equipped with a Wi-Fi card, will instantly appear on connected office devices, such as computer monitors, laptops, or tablets, turning a dental office or a laboratory into an efficient communication hub.

Surrounds and background

A consistent background should be present behind each patient for pre-, mid-, and post-treatment photographic sessions. For routine photographing in a clinical setting, it is worth the effort to devise a system with a standardized

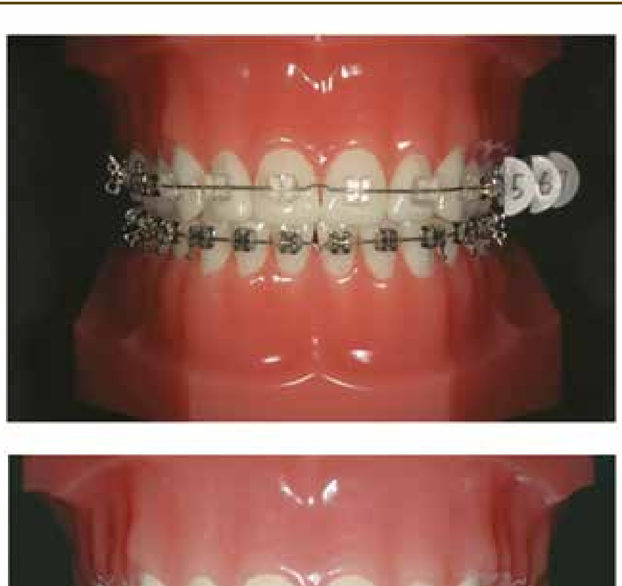
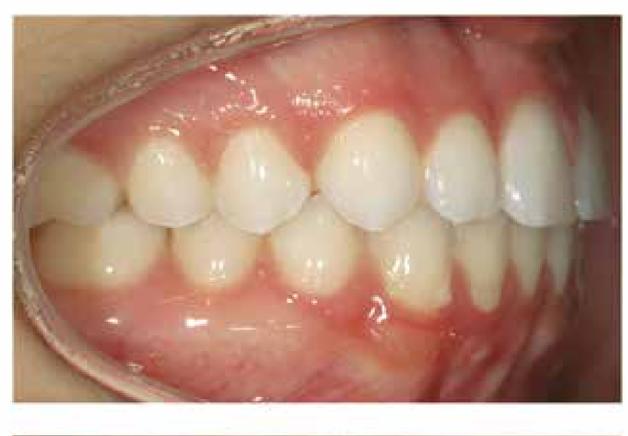


Figure 2: depth-of-field range of Nikon D100 (top) and Shofu EyeSpecial C-II (bottom).



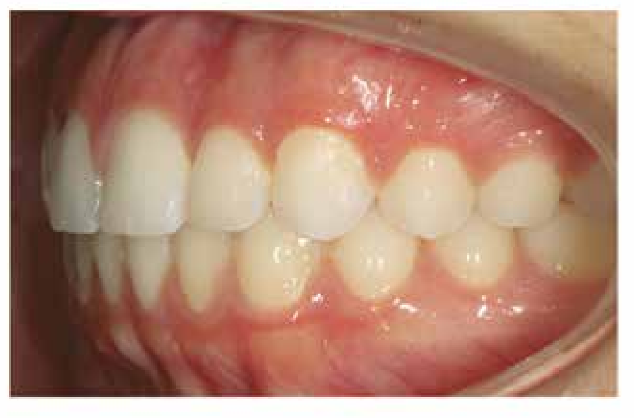


Figure 3: a series of retracted images captured for the orthodontic series: Right Buccal, Frontal, and Left Buccal.

background that can be used in any room without disrupting the office traffic. The ability to take professional pictures at any time, simply and conveniently, without disrupting the work flow is also an advantage in a high-volume practice. Nothing looks worse than equipment and furniture in the background of clinical images.

Professional medical photographers often use a nonreflective dark background, preferably duvetyn, a velvet-like cloth used in theatrical staging for light control. However, with little effort, behind the door of each treatment suite, one can mount a simple picture frame on tracks, to allow the frame to be raised or lowered to accommodate patients of any height, or even patients in wheelchairs. Another option is to utilize a widely available nonglare bulletin board which can be swiftly affixed with sticky tape, Velcro or bulldog clips.

Infection control

Dental photography requires strict adherence to infection control protocols. All photographic equipment, including the body of the camera, lens, flash, tripod, and cable releases, should be draped with films, barriers, or disposable covers. Cheek and lip retractors should be either autoclaved or cold-sterilized, depending on the manufacturer's instructions. Intraoral mirrors and contrastors should be cleaned and disinfected carefully with a mild surface disinfectant to avoid smearing and damaging of their delicate coating. To avoid scratching, mirrors should never be placed on or near metal instruments. Sanitary sheaths and plastic barriers that cannot be sterilized in an autoclave must be disposed of in accordance with OSHA standards.

Dental mirrors

Manufactured in an assortment of sizes for both adults and children, intraoral mirrors are excellent for capturing reflected images when working in regions which are difficult to access. Generally, occlusal mirrors should be used for maxillary and mandibular occlusal images, while buccal mirrors should be utilized when photographing quadrants, or buccal or lingual areas.

Although metal mirrors are more durable and less expensive, and can be sterilized in an autoclave, optically they are inferior to glass mirrors because the polished metal tends to reflect less light than the glass mirrors, and it seems to slightly distort the images. Conversely, glass mirrors, specifically rhodium-coated ones, tend to be more fragile and expensive, but produce more brilliant mirror images than metal mirrors, and are therefore a recommended option.

Retractors and contrastors

Available in clear plastic and metal, retractors are used to pull back the lips and the labial and buccal mucosa. Retractors can be either single- or double-ended. Single-ended retractors

Figure 4: a series of orthodontic face images, repose (left), smile (middle), and profile (right), photographed against a nonreflective, dark background.

have longer, tapered handles, while double-ended retractors provide both a small and a large curvature, allowing for more adaptability and maneuvering.

Their fragile nature notwithstanding, clear plastic retractors are preferred because they offer a slightly better outcome than their metal equivalent, are non-distracting, and look more esthetic in photographs. Metal retractors made of wire, with a larger or smaller curvature at either end, are also in common use. However, the challenge with these retractors is their inability to properly hold the center of the lips.

The important point for dental photography is to retract the cheeks and lips away from the teeth, and photograph the teeth with no cheeks, lips, or retractors present in the images. To facilitate improved placement of retractors, lubricant may be applied to the lips to prevent their chapping. For quality dental photography, I recommend using the largest set of retractors that the patient can comfortably tolerate. If possible, air-dry the teeth as well, to minimize the presence of saliva and to better reproduce the gingival characterization.

An anterior contrastor can be used in anterior photographs to obscure the inside of the mouth and to make the images more presentable for patients, or as visual aids in lectures and publications. The contrastors can also effectively aid in depicting incisal translucency and the complexity of hue, chroma and value.

Getting the shots done

Before attempting to capture clinical images, the practitioner should sterilize both the camera and ancillary equipment, and make sure they are supplied with charged batteries and appropriate memory cards. A tray with retractors, contrastor, dental mirrors, moisture control (e.g., lukewarm water), isolation materials, lip lubricant, and other accessories of choice should be ready for single-patient use.

Explain the purpose of the photographic session, and obtain the patient's written consent. The next step is the preparation of the space and background and the appropriate positioning of the patient. Arrange the area in such a way that the background office equipment and furniture are not visible in photographs. The patient should be clean of debris, including blood, excess saliva, lipstick on teeth, remnant cement, and glove powder.

Carefully position the camera and patient according to the type of photographs to be captured, to avoid the errors associated with canting or with taking the images at angles that are too high or too low. Use the interpupillary line and the midline to help orient the camera.

Standardization

It may be challenging for today's busy practice to standardize clinical photography when so many images are taken by different people, in different rooms, using different cameras and lenses, under different lighting, and from different distances or angles to the patient. Still, when comparing photographs to demonstrate the treatment progress, ideally, the only variable component should be the patient. Everything else—the background, positioning, perspective, lighting, color, magnification, and contrast—should remain constant.

Although standardization in clinical photography requires effort, planning, and a systematic approach to procedures and protocols, the ability to capture high-quality dental photographs each and every time will invariably increase practice productivity and profitability.

Including the team in dental photography tasks

Although some clinicians may prefer to take dental photographs themselves, delegating this task to another member of the dental team, such as a dental assistant, hygienist, or dental technician, may be worth considering. Firstly, the clinician's unique expertise may be better utilized in performing dental work that cannot be assigned to adjuncts. Secondly, allowing the staff to acquire a new skill is motivational and may be helpful in transforming a daunting task into a rewarding assignment for the entire dental team.

Disclosure

The author is an employee of Shofu Dental Corporation. ■

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Industry News

Align Technology

Align Technology, maker of Invisalign®, announces that in response to feedback from practitioners and patients, it has made several meaningful enhancements to improve the comfort and fit of the aligners. The continuous innovations made to Invisalign clear aligners will improve patients' compliance as well as their overall satisfaction with Invisalign treatment.

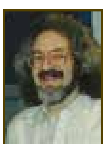
- **Use of real gingival data:** For a better fit along the gum line and to reduce incidences of sharp edges and papilla impingement, Align has improved the use of the gingival data, forming aligners using real gingival shape data instead of the virtual gingiva previously used.
- **Delivering better edge quality:** To address sharpness and lessen irritation to the gingiva and tongue, Align has made improvements to the edge quality of the aligners by rounding the pointy edges on the anterior areas along with making modifications to the edge angle on the lingual side.

For further reduction of tongue irritation, Align has also improved the trimming of the aligners to minimize incidence of rough surfaces.

Increasing Number of Adults Seek Orthodontic Treatment

According to the ADA Morning Huddle: Healthline (December 23, 2015) discusses the growing number of adults seeking orthodontic treatment, stating that "the number of adults undergoing orthodontia has risen by 40 percent in the past decade, according to the American Association of Orthodontists." The article states that nearly 25 percent of people who began orthodontic treatment in 2014 were adults, attributing the increasing number of adults seeking orthodontic treatment to "a combination of relatively lower prices and newer, less clunky products."

AACO in the News



Marc S. Glasser, copyeditor of the Journal of the American Academy of Cosmetic Orthodontics, recently won an award in the Small Acts of Kindness contest on *Live with Kelly and Michael*. He was nominated by a friend on the basis of providing rides in his minivan for a variety of friends, some of whom are mobility impaired. Marc is a semi-retired mainframe geek who has been proofreading and copyediting for the past dozen years.

Journalism Award to the AACO

For the second year in a row, the Journal of the American Academy of Cosmetic Orthodontics was the recipient of the prestigious Platinum Pencil Dental Journalism Award, from the International College of Dentists.

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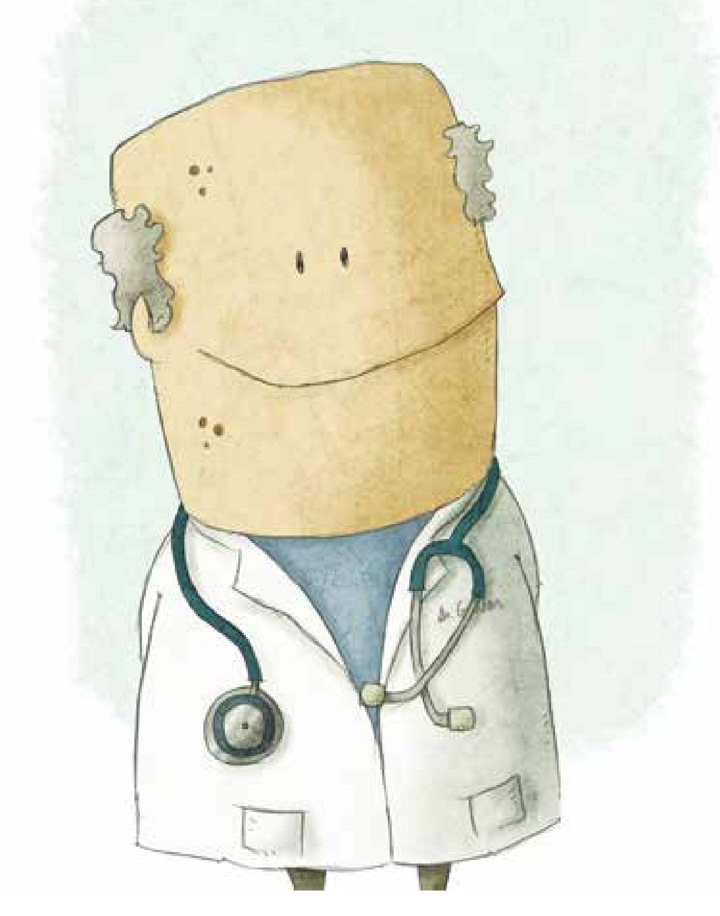
the Lighter Side

Working Out

by Jeffrey M. Galler, DDS



I couldn't believe it.

My wife, who is also my office manager, best friend, and harshest critic, had just handed me a present for our wedding anniversary: a gift certificate for ten, twice-a-week, sessions with a personal trainer at the local fitness club.

"You have to get into shape!" admonished my wife.

"Get into shape?" I countered. "Isn't round a shape?"

Showing up

My protests were to no avail. So, fashionably dressed in a snazzy Nike workout ensemble and wearing my brand-new Reebok sneakers, I considerately showed up at the gym 30 minutes early. I hate when my own patients come late for an appointment.

I was greeted by two gorgeous blonde receptionists wearing matching, tight-fitting Lycra outfits. They looked like they had just stepped out of a Victoria's Secret catalogue. I felt like I fit right in.

The first one greeted me, asked me to fill out an information sheet on a clipboard, and smiled. I noticed that her upper and lower anteriors were severely overcrowded. The second receptionist told me that, after my workout session, she would be happy to discuss my signing up for an annual gym membership. She smiled at me, and I noticed that she was missing her upper left first premolar.

I calculated that the dentistry needed at this front desk alone could pay, many times over, for an annual gym membership.

Giving good advice

After filling out my information sheet, I thought I'd tour the state-of-the-art gym while waiting for the appointment with my trainer.

Clipboard in hand, I walked around and was amazed at the variety of individuals around me. Folks of all sizes, shapes, and ages were busily straining, huffing, puffing, stretching, lifting, and otherwise torturing themselves on an incredible assortment of machines. A good number of the machines looked like macabre medieval torture devices.

Out of the corner of my eye, I saw an extremely old man walking toward me. This gentleman was not looking very good. In fact, he was in terrible physical condition. By the time he reached me, he was completely out of breath.

If he had shown up at my office for a dental appointment, my assistants would have immediately insisted that he sit down while they checked his pulse and blood pressure.

Addressing me, he said, "Excuse me. I have a question."

I realized that he was mistaking me for one of the trainers. Completely understandable, I thought, given my flashy gym outfit, clipboard, and outstanding physique.

No problem. I am used to giving people advice. I responded, "How can I help you?"

He looked around furtively, and asked confidentially, "If I want to attract a beautiful young woman, which machine should I use?"

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I looked him over thoroughly, and answered, "I suggest you use the ATM machine, outside."

Getting started

Finally, my trainer, Tomi, came over and introduced himself.

He went over my info sheet and asked, "What are your goals over the next five weeks?"

I glanced at the myriad of folks around me who were stretching, twisting, and contorting their bodies into tortuous positions.

"Uh, survival?" I ventured.

He smiled condescendingly and pointed to a very energetic fellow, working out on a nearby machine. The "gym rat" was racing up a machine that I learned is called a Vertical StairMaster. His arms and legs were moving so quickly that I could barely discern a blur of motion.

I remembered a National Geographic film that featured slow-motion videos of a hummingbird in flight. The narrator explained that the hummingbird flaps its wings 4200 times per minute. The client's arms and legs looked like the wings of that hummingbird.

"Wouldn't you like to be able to do that?" he offered. "Look at him. He doesn't have an ounce of fat on his body!"

I watched the fellow racing up the interminable stairs and noticed that the floor around the StairMaster was completely covered in a puddle of sweat. I couldn't help but think back to the World Trade Center on 9/11, and how it would be a much more valuable skill to learn how to quickly run down a flight of stairs, instead of up.

"So, Doc," insisted Tomi, "don't you wish you could be like that?"

I tried explaining that turtles live a lot longer than hummingbirds.

Tomi looked at me and sighed.

It all works out

I survived the five weeks, signed up for an annual gym membership, and, all in all, considered the experience to have been worthwhile.

I ditched my expensive Nike outfit for more comfortable sweat pants and T-shirts, learned how to use some of the fancy exercise machines, and survived the taunts of friends who mocked my long-held belief that it is extremely undignified to sweat. I actually did allow myself to perspire, on occasion, in a gentlemanly fashion.

Even better, Tomi's girlfriend and one of the receptionists wound up doing Invisalign orthodontics in my office, and I restored the other receptionist's missing premolar with an implant and crown.

Still better, I discovered a terrific pizza store that features brick oven pizzas with extra cheese toppings, right down the block from the gym. ■

This article appeared originally in the New York State Dental Journal.

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