



**3M** Science.  
Applied to Life.™

# Innova

*Orthodontic science and  
practice excellence*

Originally *Orthodontic Perspectives Innova*

**Vol. XXV, No. 2, Global Edition, October 2018**



**Sebastian Arana**  
President and General  
Manager, 3M Oral Care

## Building Upon Our Foundation

In the fast-paced digital world in which we live, change is all around us. We can order anything from anywhere at any time – all with a few clicks or swipes.

We at 3M Oral Care have embraced these ever-changing times to meet the needs of you, our customers. We have continued to invest, develop and promote the latest technology that will allow you to optimize the products we provide, so you can tend to the needs of your patients. Our products – including our 3M™ Clarity™ Aligners, the new 3M™ Oral Care portal or our most recent introduction, 3M™ Clarity™ Ultra Self-Ligating Brackets – have formed a comprehensive toolkit to allow you flexibility to design treatments your way, aligned with your patients' needs and desires.

While we continue to be at the forefront of technology, it is also imperative for us not to let all that technology overshadow the fundamentals of our business: our relationship with you – and our 70 years of orthodontic experience.

In this age of digital disruption, I want you to know that we continue to put our trust in you. We are confident that the art of your expertise will always precisely complement the rigorously tested and researched science that goes into each one of our products.

This belief helped spearhead our inaugural Excellere conferences last month. We hope you were able to join us for one of those events, either in San Diego or Madrid. Presented by our 3M™ Health Care Academy and our event partner, 3Shape, our mission was to introduce you, the orthodontic community, to new ways to drive efficiencies, influence positive patient experiences and improve practice profitability.

We hope all who attended found the conference to be both educational and inspirational. We strongly encourage you to join us again next year, as we look to make Excellere an annual tradition. We will be in Miami from Nov. 9-10, 2019 in the U.S. as well as in London, May 17-18, 2019. To learn more and to register for the conference in Miami, click the link below. We hope to see you at these future events... and if you enjoyed yourself this year, spread the word to your colleagues!

Thank you for your time and please enjoy our latest issue.

**3M** Science.  
Applied to Life.™

# Table of Contents

*Innova* (originally *Orthodontic Perspectives Innova*) is published periodically by 3M to provide information to orthodontic practitioners with clinical articles and news about 3M orthodontic products and services. 3M welcomes article submissions or article ideas. Contact address: Editor, *Innova*, 3M Oral Care, 3M Center, 275-2NW-2F13, St. Paul, MN 55144-1000 USA.

Copyright © 3M 2018. All rights reserved. No part of this publication may be reproduced without the consent of 3M. Some of the doctors contributing to the *Innova* publication may receive compensation from 3M.

3M, APC, Clarity, Forsus, Incognito, MBT, OrthoForm, SmartClip, Transbond, and Unitek are trademarks of 3M or 3M Deutschland GmbH. Used under license in Canada. All other trademarks are property of their respective holders.

## News and Information

<b>Introduction from Sebastian Arana, 3M Oral Care</b> .....	1
<b>3M in the News</b> .....	3
<b>3M™ Clarity™ Ultra Self-Ligating Brackets: Practice confidently. Smile beautifully.</b> .....	6
<b>Form meets function: Science and Technology that lead to the 3M™ Clarity™ Ultra Self-Ligating Brackets</b> <i>By Armineh Khachatoorian, 3M Oral Care</i> .....	7
<b>Digital Workflows: Enabling Choice-Based Esthetic Treatment</b> <i>By Amy Unklesbay, 3M Oral Care</i> .....	10
<b>Digital Flash-Free Bonding: An Evolutionary Step in Bracket Placement</b> <i>By David Solid, 3M Oral Care</i> .....	12
<b>3M™ Incognito™ Dynamic Wire Offset: The science behind an improvement in archwire-bracket adaptation.</b> <i>By Ralf Paehl, 3M Oral Care.</i> .....	14
<b>Optimizing Your “Digital Address” – Why Orthodontic Practices Should Care About SEO</b> <i>By Tammy Torbert, 3M Oral Care</i> .....	18
<b>A “Smart” Take on Orthodontics</b> <i>By Nathan E. Thomas, DDS, MS.</i> .....	19

## 3M™ Health Care Academy

### Clinical Cases

<b>Using Aligners in Interdisciplinary Treatment to Deliver Esthetic Solutions</b> <i>By Ryan McComb, DMD, MS</i> .....	24
<b>The Evolution of a Hybrid Technique with the 3M™ Incognito™ and 3M™ Clarity™ Advanced Appliances</b> <i>By Samuel Wise, DDS, MS</i> .....	28
<b>How to handle a difficult case with 3M™ SmartClip™ Self-Ligating Brackets – to make it easier.</b> <i>By David Fleitman, DDS</i> .....	32
<b>A reliable way to correct a Skeletal and Dental Class II, Div. I malocclusion with the 3M™ Incognito™ Lingual Appliance System.</b> <i>By Roberto Stradi, DDS, Orthodontic Spec., MSc Lingual Orthodontics.</i> .....	37
<b>Crowding and protrusion treated by unusual extractions</b> <i>By Gianluigi Fiorillo, DDS</i> .....	42



# 3M in the News



## Michael Roman Appointed 3M Chief Executive Officer

Michael F. Roman has been named 3M chief executive officer, effective July 1, 2018. He succeeded Inge G. Thulin, who was appointed to a newly created position, executive chairman of the board, also effective July 1, 2018.

“After a thorough and thoughtful succession planning process, Mike is the clear choice to lead 3M into the future as CEO,” said Thulin. “He is an accomplished, results-oriented and high-integrity leader, with an excellent track record of growing sales, improving operational efficiency and increasing value across a wide range of global businesses.”

Roman, 58, has served as chief operating officer and executive vice president since July 2017, with direct responsibility for 3M’s five business groups, along with the company’s international operations.

He has held several other key leadership roles throughout his 30-year career at 3M. Roman led the company’s largest business group, Industrial, which accounts for one-third of 3M’s worldwide sales. Prior to that, he served as 3M’s chief strategist, where he worked closely with Thulin to develop 3M’s strategic roadmap. He has also lived in and led 3M businesses around the world, including the United States, Europe and Asia.

Roman holds a master’s degree in electrical engineering from the University of Southern California and a bachelor’s degree from the University of Minnesota.

“It is an honor to lead 3M into the future,” said Roman. “Inge’s leadership has taken 3M to new heights, and I look forward to building on our momentum and delivering value for customers and shareholders.”

Mike Eskew, independent lead director for the 3M Board, expressed confidence in these changes. “3M will benefit greatly from having two strong leaders involved going forward,” said Eskew. “We are excited to appoint a highly capable leader like Mike as CEO, while also leveraging Inge’s tremendous experience in his new role as executive chairman of the board.”



## 3M in the News

### Orthodontists Gain Competitive Edge at Excellere Educational Conferences

3M Oral Care welcomed more than 400 members of the international orthodontic community to its inaugural Excellere educational conferences in San Diego, Sept. 15-16, as well as in Madrid, Spain, Sept. 21-22, 2018. These programs were designed to help participants learn from fellow practitioners about techniques and opportunities that can turn ongoing change into a competitive advantage, and excel in this expanding market.



“Excellere,” the Latin root word meaning “to elevate,” captures the spirit of 3M Oral Care’s commitment to helping practitioners grow, improve outcomes and elevate the practice of orthodontics. Beneficial for orthodontists, treatment coordinators, assistants and residents, presentations and hands-on activities encompassed key considerations that can help drive efficiencies, influence positive patient experiences and improve practice profitability.

“3M Oral Care is excited to launch its inaugural Excellere conference as a platform for clinical, professional and personal success,” says Sebastian Arana, president and general manager, 3M Oral Care. “Bringing together a global network of practitioners, Excellere offers annual sessions in both the U.S. and Europe—providing all attendees with valuable insights into new technologies and innovations, as well as proven strategies for growth.” Orthodontic presenters in San Diego included Dr. Adam Schulhof, Dr. Lisa Alvetro, Dr. Herbert Hughes, Dr. Anoop Sondhi, Dr. Ryan McComb, and Ms. Irene Iancu, RDH, CTD. P.

In addition to the presentations by noted practitioners, the participants were also invited to discover new products and services at an “Innovation on Display” area. **3M™ Clarity™ Esthetic Orthodontic Solutions** was introduced as a full portfolio of esthetic treatment options, ranging from traditional brackets, aligners and now to **3M™ Clarity™ Ultra Self-Ligating Brackets**. 3M invited 3Shape ([3Shape.com](http://3Shape.com)) to partner in this year’s events to demonstrate the digital transformation in orthodontics.

▶ Learn more about Excellere

## Excellere 2018



Read more about 3M products in additional articles in this issue.

An annual event, the 2019 Excellere conferences will take place in London, England (May 17-18) and in Miami Beach, Florida (November 9-10). For more information on the Miami event, visit [3M.com/Excellere](http://3M.com/Excellere). Registrations for the Miami event can be made [here](#).

Presented by the 3M™ Health Care Academy, Excellere offers CE credit for attendees. The 3M Health Care Academy offers access to thought leaders, peers, and educational content that translates knowledge into positive healthy outcomes.

*Note: The Madrid Excellere event will be detailed in an updated story.*



# Excellere 2019

SAVE THE DATES!

## 3M<sup>SM</sup> Health Care Academy

Please join us for an exciting **2019 Excellere** conference, where attendees will learn from fellow orthodontists how to turn change into a competitive advantage and excel in this dynamic market.

**U.S. Location:** Loews Miami Beach



**REGISTER NOW!**  
November 9-10, 2019

▶▶ [Learn more about Excellere](#)

- ✓ Be a part of **TWO INCREDIBLE DAYS!**
- ✓ Actionable take-aways for your **ENTIRE** team
- ✓ Exchange of **NEW IDEAS** – thought leadership

**COMING SOON!**  
May 17-18, 2019



**Europe Location:** London

Watch for more information!



# 3M™ Clarity™ Ultra Self-Ligating Brackets: Practice confidently. Smile beautifully.

## Creating success for patients and your practice.

Every patient's smile is unique—their treatment plan should be, too. 3M™ Clarity™ Esthetic Orthodontic Solutions help orthodontists offer patients a range of flexible, individualized treatment options, using effective and esthetically pleasing products.

New to the Clarity brand portfolio, **Clarity Ultra Self-Ligating Brackets** offer rotational control and improved versatility, without the need for ligatures.

A 5×5 upper and lower system, Clarity Ultra brackets enable successful treatment planning and precise outcomes for orthodontists. Featuring 3M's unique stress concentrator designed for predictable, consistent debonding, the brackets include a wide ceramic door with a broad mesial-distal span, to assist rotational control. The bracket's door has also been shown to endure twice as many opening and closing cycles as typical treatment—for reliability.



Clarity Ultra Self-Ligating Brackets are available precoated with 3M™ APC™ Flash-Free Adhesive for superior bonding efficiency, that helps orthodontists save time and bonding steps. Powered by 3M technology, the APC Flash-Free Adhesive Coated Appliance System is the most efficient bonding system in orthodontics.



"Fast and consistent bonding with APC Flash-Free Adhesive positively impacts chair time, practice workflow and patient satisfaction," says Armineh Khachatoorian, Orthodontic Scientific Affairs Manager, 3M Oral Care. "By removing steps in adhesive application and flash cleanup, there are fewer variables for a more positive bonding experience."

Translucent and stain-resistant, with no visible metal parts, Clarity Ultra Self-Ligating Brackets also support growing patient demand for esthetic treatment. Engineered for strength and beauty, the brackets' smooth ceramic surfaces and edges are designed to deliver patient comfort throughout the course of treatment. The natural tooth-like appearance of Clarity Ultra brackets positively impacts patient demand for esthetic treatment.

# Form meets function: Science and Technology that lead to the 3M™ Clarity™ Ultra Self-Ligating Brackets



**Armineh Khachatoorian,  
3M Oral Care**

Armineh Khachatoorian received her B.S. in Chemistry from the University of Southern California. She joined 3M in 1997 as a Sr. Technical Service Engineer in R&D. In 2002 she became a Marketing Product Manager and helped launch the 3M™ APC™ Adhesive Coated Appliance Systems, 3M™ Ortholux™ Curing Lights, 3M™ Transbond™ Primers, and others. She is currently a Scientific Affairs Manager, working with new product launches and technical publications.

Does the Orthodontic industry need yet another labial appliance? Isn't the clear tray aligner usage growing double-digit in some countries and quickly expanding the types of malocclusions that can be treated with aligners?

The answers are “Yes” and “Yes” to both questions.

Why then, would 3M decide to launch another labial appliance right on the heels of its announcement of the 3M™ Clarity™ Aligners in the U.S.?

Interviews with orthodontists globally indicate that even as some are increasing their use of the clear tray aligners, they realize that if they had an efficient, reliable and esthetic bracket they would be able to treat more cases, with great results and perhaps even faster. A self-ligating bracket that is also fully esthetic can be a valuable tool in the hands of an orthodontist who can effectively treat any type of malocclusion, perhaps even in combination (aligner on one arch, brackets on the other arch) or in tandem with an aligner (bond brackets for initial unraveling, then aligners for finishing, or, vice versa).

## Control and flexibility

### Door function

In laboratory testing the doors of the 3M™ Clarity™ Ultra brackets underwent many open-close cycles to validate their reliability. The results showed that the doors survived a minimum of two times open-close cycles of a typical treatment.

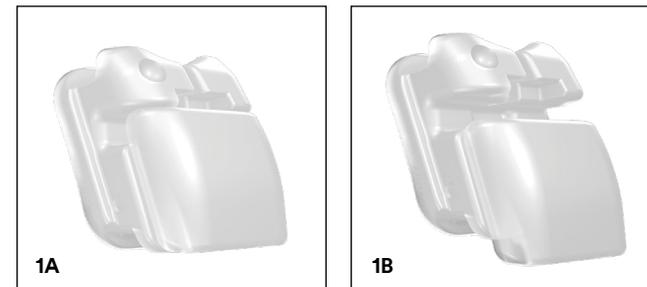


Figure 1A-B: 3M™ Clarity™ Ultra Self-Ligating Brackets.

Clarity Ultra brackets have two parts; the body and the door. The door mechanism includes a 0.007" Nitinol pin hidden within the bracket. The pin provides door resilience and stability and is hidden from view, making the bracket esthetic with no metal showing through.

The doors of the Clarity Ultra brackets are designed to provide an audible and/or tactile “click” when opened or closed. The “click” is an indication of the door opening or closing.

### Closing the door

Closing the bracket doors using the open-close instrument is easy.

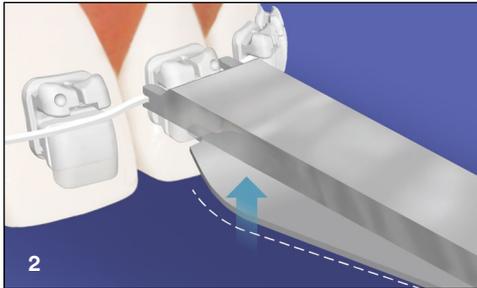


Figure 2: Closing the Clarity Ultra Bracket door.

There is a dedicated double-ended instrument for opening and closing of the Clarity Ultra brackets. The closing end of the open-close instrument has two notches and can be used to torque and seat the rectangular archwire into the slot before closing the door (Figure 2).

### Opening the door

Opening the doors of the Clarity Ultra brackets using the 3M™ Unitek™ Open-Close Instrument (Figure 3A-B) is easy and simple.

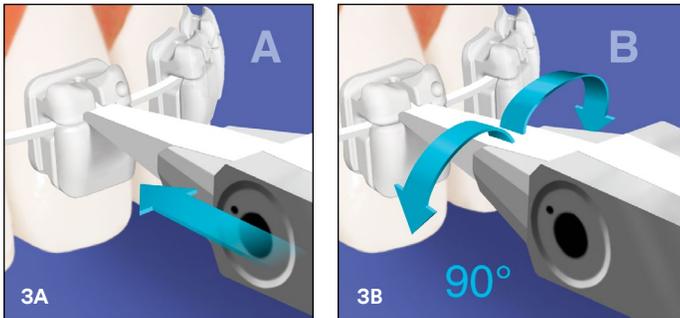


Figure 3A-B: Opening the Clarity Ultra Bracket door.

The opening end of the open-close instrument has a proprietary ceramic tip that not only resists wear but may also reduce marking the bracket compared to a metal tip. This means less frequent replacement of the instruments, as they have been designed to withstand 3,000 opening cycles.

### Bonding

Clarity Ultra brackets are available pre-coated with the industry-recognized 3M™ APC Flash-Free Adhesive. Brackets coated with APC Flash-Free Adhesive have been shown to offer:

- Shorter chairtime during bonding appointment
- Reduction of bonding steps – reduced variability in bonding process
- Protection of tooth enamel under the bracket due to acid erosion
- No flash clean-up – reduced stress during bonding, reduced possibility of door function failure due to cured adhesive



A glass grit bonding base, with uniformly sized grains of Aluminum Oxide glass, similar to 3M™ Clarity™ Advanced Ceramic brackets was used on Clarity Ultra brackets (Figure 4).

Clarity Ultra bracket bases were designed with the same proprietary stress concentrator used in all 3M ceramic brackets.

In addition, each Clarity Ultra bracket is designed with a tooth-specific, compound contoured base, similar to Clarity Advanced brackets for a better tooth to base fit.

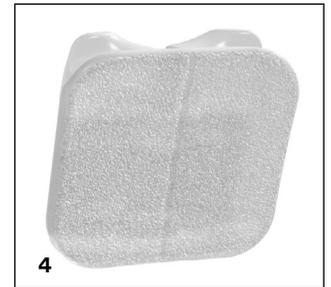


Figure 4: Clarity Ultra Bracket base.

### Debonding

The dedicated 3M™ Unitek™ Debonding instrument for Clarity Ultra is simple to use and provides a consistent and predictable debonding method. The centering guide of the instrument is designed to fit into the center slot of the bracket, with the door in the open position and the archwire removed (Figure 5).

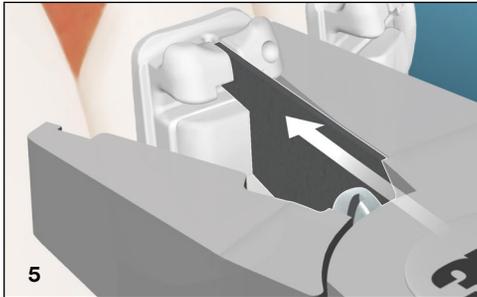


Figure 5: Debonding the Clarity™ Ultra Bracket.

A gentle squeeze followed by rocking the bracket mesial-distally while holding the grip will allow the bracket to detach and stay gripped by the instrument.

### Rotation control

Clarity Ultra brackets were designed with a wide door that covers the entire mesial/distal span of the bracket. They provide rotation control without the addition of accessories.

### Passive self-ligation with on-demand activation

The bracket door design of Clarity Ultra Self-Ligating Brackets allows the bracket to retain the archwire and remain passive. However, on-demand activation is possible due to tie-wings on all U/L 5x5 brackets.

The proprietary, oval-shaped under tie-wing area is also a unique and important feature. This design allows easy ligation and even double-ligation, if and when needed. The bracket can be ligated using metal or elastomeric ligatures, and when control and space closure is needed, chains can be used, even with ligatures.

### Class II treatment mechanics

Hooks on the Clarity Ultra brackets are another feature that add to the versatility of the appliances (Figure 6). This is a feature that is not always available with other ceramic self-ligating appliances, causing the practitioner to have to use other auxiliaries and treatment mechanics.

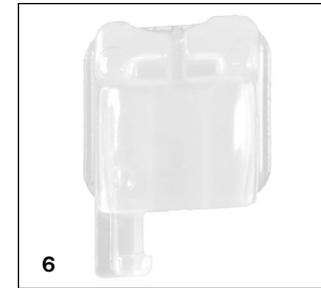


Figure 6: Clarity Ultra Bracket with hook.

All Clarity Ultra upper and lower cuspid and bicuspid brackets have hooks to allow the use of Class II elastics. Additionally, they are compatible with the 3M™ Forsus™ Class II Correctors as an option to elastics.

### Esthetics

Clarity Ultra brackets are made of translucent, stain resistant ceramic for brilliant esthetics. No metal parts show through the bracket. The ceramic door covering the Clarity Ultra brackets has a smooth contoured surface designed for patient comfort.



Available in U/L, 5x5, the brackets offer a full esthetic option with all-ceramic brackets. For additional scientific content about Clarity Ultra Self-Ligating Brackets, request a white paper using this [link](#).

# Digital Workflows: Enabling Choice-Based Esthetic Treatment



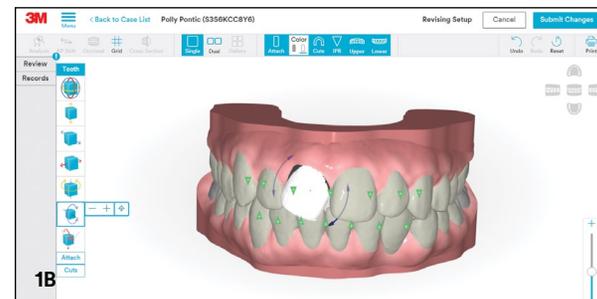
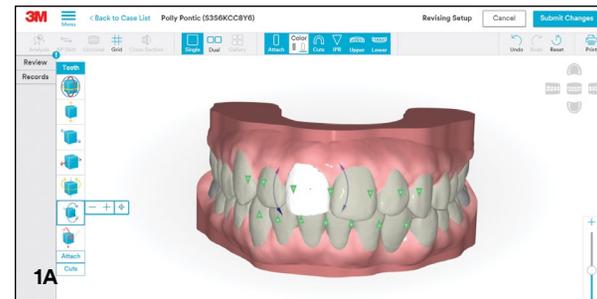
**Amy Unklesbay,  
3M Oral Care**

Amy received her BA from the University of Denver and MBA from Hamline University. She joined 3M in 2015 as a Sr. Technical Business Analyst in R&D. In 2016 she became the Global Digital Marketing Manager, responsible for the 3M™ Oral Care portal, 3M™ CAD software supporting custom orthodontics and 3M's patient-facing Treatment Tracking app.

Digital technology is enriching the field of orthodontics by providing advanced analytics and software tools to assist with treatment planning. Digital workflows are also advancing to support combination treatment with a range of esthetic appliances, providing orthodontists the control necessary to customize treatment for each patient.

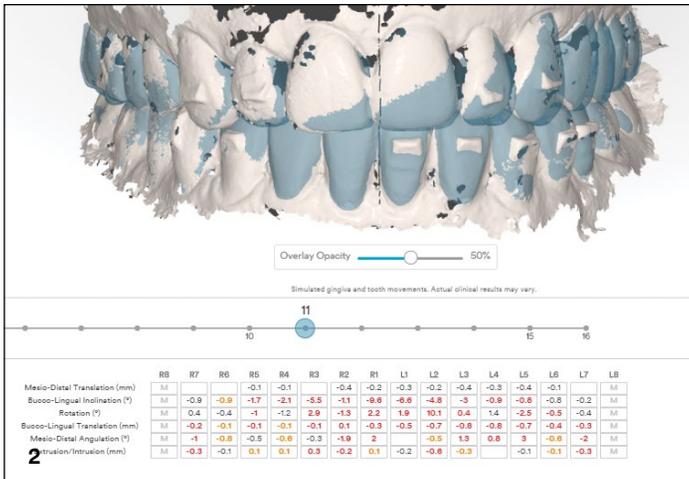
3M Oral Care is committed to delivering leading-edge technology in this field. The Oral Care portal is the software platform used to plan treatment with 3M™ Clarity™ Aligners. The web-based software allows clinicians to plan patient treatment at anytime from anywhere. Some of the most robust and widely used features of the portal are a direct result of 3M's collaboration with orthodontists. These features include advanced software tools to aid with esthetic treatment planning, as well as features to assist doctors with patient consultations.

**Pivot Points:** This feature (Figure 1A-B) allows clinicians to control the point from which the selected movements originate. Custom pivot points are available for rotation, mesio-distal angulations and bucco-lingual inclination.



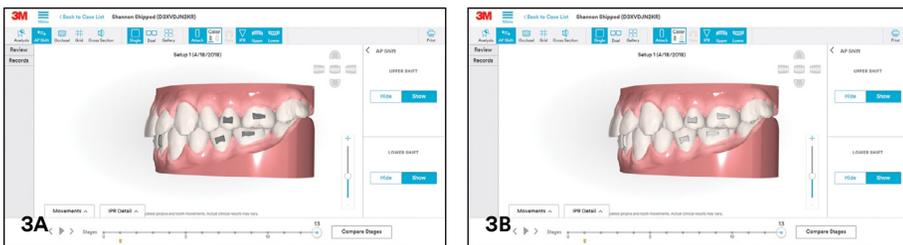
**Figure 1A-B:**  
By selecting the Rotating Tool from the Tooth Movement Bar, you can change the origin of movement in any tooth. In this example, the tooth is being rotated through its center pivot point.

**Progress Scans:** Clinicians have the ability to scan a patient periodically throughout treatment. The Oral Care portal can generate an overlay from this raw digital scan (Figure 2), allowing you to compare the planned treatment visually and via measured movement analysis. This is an excellent tool for engaging patients throughout treatment and planning for refinement and/or finishing stages.



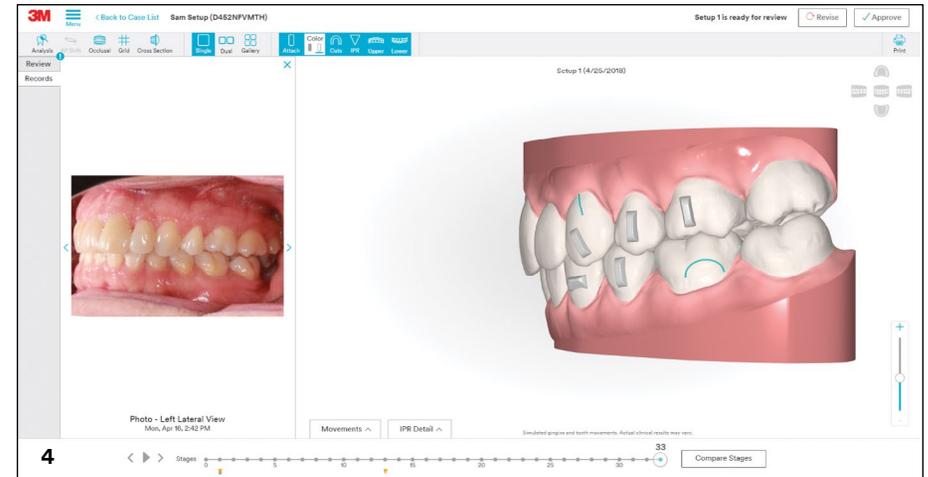
**Figure 2:** Progress scans can be uploaded into the portal to monitor a patient's treatment progress and to review overall patient compliance.

**Attachment Coloration:** Gaining patient acceptance for treatment can be challenging. Many patients lack an understanding of attachments. Attachments are presented in the portal as white by default to demonstrate their esthetic quality. With a single click, attachments can be presented in a high-contrast gray to assist with detailed setup reviews (Figure 3A-B).



**Figure 3A-B:** Attachments can be changed from gray to white by clicking on the Color Tool on the top bar on the setup page.

**Patient Record Visibility:** Many clinicians rely on dual monitors to reference patient photos when reviewing treatment setups. The Oral Care portal displays patient photos within the 3D Viewer. The setup model will also rotate to match the position of the selected photo (Figure 4).



**Figure 4:** The 3D dimensional image (right) on the main setup page correlates to the exact viewpoint of the images found under the Records tab.

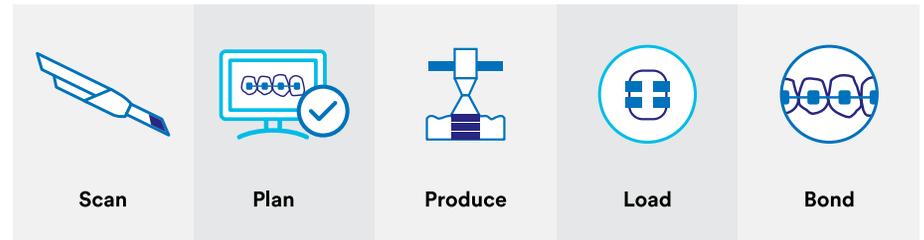
3M is continually investing in the Oral Care portal platform to deliver innovative solutions that allow orthodontic practitioners to confidently treat a variety of cases. Our collaboration with market leading companies like 3Shape and uLab Systems provide important integrations and streamlined capabilities. We are proud to partner with orthodontists to provide esthetic, digitally integrated, choice-based solutions that will help your practice grow.

# Digital Flash-Free Bonding: An Evolutionary Step in Bracket Placement



**David Solid,  
3M Oral Care**

David Solid, MBA, has worked at 3M in the orthodontics business for more than 20 years in various roles centered around customer service, marketing, brand management and education. In his current role, David is focused on building education that helps to connect orthodontists with the scientific advancements within the specialty that contribute to quality and efficiency.



*Accurate bracket placement and successful bonding* are among the most critical elements of efficient orthodontic treatment. Brackets in the desired position lead to expected movement according to the treatment plan; a low number of bond failures helps to reduce the number of emergency appointments and lost time during the course of correction.

Because of the importance of these factors, the history of orthodontics includes many innovations to help achieve reliable and consistent results, and the most recent advancements in technology continue the evolution.

## Indirect Bonding

The technique of indirect bonding has been identified to offer a number of advantages in this area, when perfected. Compared to direct bonding, research has shown that indirect bonding achieves greater bracket positioning accuracy in height, mesio-distal position, and angulation<sup>1,2</sup>. Additional reported advantages include reduced chair time at bonding, better marginal ridges, simplified archwire adjustments and improved productivity<sup>3,4,5</sup>.

Indirect bonding is not the most common form of bonding, however, potentially due to the technique sensitivity in transferring the placed brackets to the patient's teeth, and the variability that comes in working with multiple materials. Inconsistency in any of the steps can lead to bond failure. The need, then, is to achieve the benefits of indirect bonding in ways that can reduce the traditional complexity of the system.

## The Impact of Digital Technology

Technologies available in other medical disciplines are gaining relevance in orthodontics, particularly in bonding, and especially when integrated to act as a digital system. A Digital Flash-Free Bonding process combines the newest solutions in collecting and analyzing clinical data, creating a plan, and creating an efficient bonding procedure.

Many of the variables that have traditionally made indirect bonding a technique-sensitive process have been replaced or eliminated, allowing for a more manageable protocol. Digital scanning removes the complexity in working with impression



material. Bracket placement software provides analysis and measurement tools to assist in accuracy. And 3M™ APC™ Flash-Free Adhesive coated brackets eliminate the presence of cured flash that needs to be removed after bonding.

The first step in implementing Digital Flash-Free Bonding into a practice is the decision on whether the bracket delivery tray will be created in the practice or from an external source, such as a laboratory. Creating the tray in the practice requires the investment in a 3D printer and associated material, but it can provide the practice full control of all steps in the bonding process. The orthodontist should decide if the practice is better suited to print these trays, or work with a lab that will provide the trays.

Digital Flash-Free Bonding, then, is comprised of five steps: Scan, Plan, Produce, Load and Bond. More specifically, after the arches are digitally scanned, the analysis and bracket placement is done with software. From the plan, translucent trays are created with wells in the shape of the bracket. APC Flash-Free Adhesive coated brackets are loaded into the trays on the day of bonding.

In the case where a practice decides to work with a dental lab to provide trays, the digital scan can be loaded into their software, where a proposed setup can be analyzed, adjusted, and approved. Once confirmed, the bracket placement associated with the setup will be used to create bonding trays, which will then be mailed to the practice. On the day of bonding, APC Flash-Free adhesive coated brackets are loaded into the trays and kept in a light-tight box until the bonding appointment time.

There are two production options when a 3D printer is installed in the practice. After using software to place virtual brackets onto the patient scan, a 3D-printed arch can be created of the brackets positioned onto the teeth. From that model, a traditional indirect bonding tray can be created, which will include wells in the tray designed for the chosen brackets. Alternatively, bonding trays complete with bracket wells can be printed directly, assuming the printer and software's capability can provide the required level of detail.

On the day of bonding, a team member in the practice will load the correct brackets into the trays and hold them in a standard indirect bonding light-tight box. During the appointment, the tooth preparation steps remain the same, but because the brackets are light cured instead of chemical cured, and because there is no step to remove cured flash, the total intraoral time of the appointment is reduced, compared to traditional indirect bonding.

Over the years, the critical fundamentals of bracket placement have remained unchanged: accuracy of placement, efficiency in bonding, and simplicity to control variability. But technological advancements are providing new levels of accessibility to those fundamentals. Digital scanners, planning software, 3D printers and APC Flash-Free Adhesive coated brackets assist in the balance of accuracy and efficiency. Integrating these solutions together into one protocol can deliver a positive start to treatment for patients, assistants and orthodontists alike.

Talk to your 3M Oral Care Sales Representative about in-office courses in practices where this unique protocol is being followed.

#### References

1. Nojima, Lincoln, et al. Indirect orthodontic bonding - a modified technique for improved efficiency and precision. *Dental Press J Orthod.* 2015 May-June;20(3):109-17.
2. Koo, BC, et al. Comparison of the accuracy of bracket placement between direct and indirect bonding techniques. *Am J Orthod Dentofacial Orthop.* 1999;116(3):346-51.
3. Guenther, T and Larson, B. Indirect Bonding: A Technique for Precision and Efficiency. *Semin Orthod,* 2007;13:58-63.
4. Kalange, J. and Thomas, R. Indirect Bonding: A Comprehensive Review of the Literature. *Semin Orthod* 2007;13:3-10.
5. Yildirium, K and Saglam-Aydinatay, B. Comparative assessment of treatment efficacy and adverse effects during nonextraction orthodontic treatment of Class I malocclusion patients with direct and indirect bonding: A parallel randomized clinical trial. *Am J Orthod Dentofacial Orthop* 2018;154:26-34.

# 3M™ Incognito™ Dynamic Wire Offset: The science behind an improvement in archwire-bracket adaptation.



**Ralf Paehl,**  
**3M Oral Care**

Ralf Paehl is an R&D Specialist at TOP-Service for Lingualtechnik GmbH, a 3M company (Bad Essen, Germany).

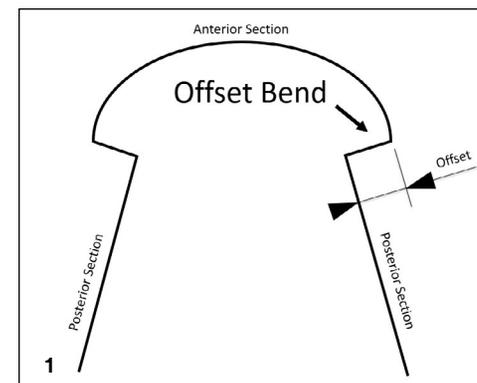
With his group, he develops both mechanical and software solutions for custom lingual orthodontics. He received his diploma in Aeronautical Engineering in 1992 in Braunschweig, Germany, and joined TOP-Service in 2001.

As part of the 3M commitment to continuous improvement, the 3M™ Incognito™ Appliance System has offered significant enhancements over the past few years. Hardware improvements included the 3M™ Incognito™ Clear Precision Tray and the Tip Bar Bracket. There have also been digital developments, such as Digital Setup and the 3M™ Unitek™ Treatment Management Portal (TMP). 3M relies on customer input to help drive the advancements that are offered.

The same is true for enhanced features incorporated into Incognito System archwires. Available since 2016 and well accepted is the Incognito™ Adapted Wire Length, for malocclusions with gaps. And the latest advancement is what we call Dynamic Wire Offset.

To better understand the advantages and the rationale behind Dynamic Wire Offset, it is helpful to look at the basics of lingual archwires. Typical for lingual wires is the mushroom shape, with a more-or-less distinct offset bend between anterior and posterior section (see Figure 1). This offset bend is needed to compensate for the different tooth profiles in the anterior and posterior section. With Incognito system archwires, this offset is very individual, as is the entire wire. It varies from case to case, and sometimes even from one quadrant to the opposing one.

As stated previously it is needed to factor in the patient's individual dentition, but this can also cause problems when there are conflicts with bracket slot positions. It is obvious that a canine can get false rotation, e.g. when erroneously being ligated to the wire segment between anterior and posterior section.



**Figure 1:**  
Lingual mushroom-shaped wire.



### Incognito™ Adapted Wire Length

In 2016, 3M introduced a specific solution for malocclusions with gaps. All Incognito custom wires are based on the setup for a patient arch. The wires are designed to perfectly fit the setup situation. The wires are inactive in the setup situation, as they are not deformed anymore. Before the setup situation is achieved, because of their resulting deformation, the wires are active and apply forces to the teeth, moving them towards the setup situation.

For regular cases, the wire length (based on the setup geometry) matches the malocclusion situation, in most cases good enough to be able to insert the wires. For initial wires this is OK, because in the first phases of a treatment it is not yet about precision anyway. However, for cases having a malocclusion with gaps, the situation is different.

A wire designed for a setup where the gaps are closed is too short to be inserted into a malocclusion situation with gaps. The problem becomes obvious when trying to insert both offset bends between anterior and posterior section, distal to the canines. If the wire is too short to match the malocclusion, it is not possible to get both offset bends distal to the canine slots. In the past, one possible fix was to ligate one quadrant first, close the gaps there, and later ligate the other quadrant to close the gaps there (Figure 2).

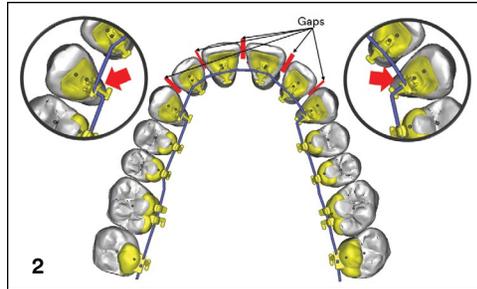


Figure 2: Malocclusion with gaps.

One of the strengths of a digital appliance design is the ability to analyze each individual 3D geometry – specifically the difference between malocclusion and setup situation. For both states, the design software looks at inter-bracket distances. For a malocclusion with gaps, those distances will be larger compared to the setup state. A difference for each inter-bracket distance is computed and then totaled. When the total exceeds a certain threshold, the software determines the appropriate elongation for the wire (Figure 3A-B).

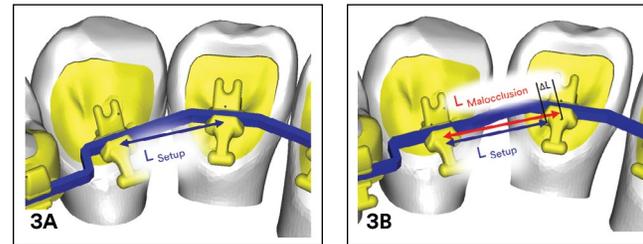


Figure 3A-B: Interbracket distance analysis.

The elongation, representing the accumulation of the gaps, is split up to the individual Inter-Bracket Distances. Gaps totalling to 5 mm compared to the setup situation, add 1 mm for each Interbracket Distance. This results in a wire elongated by 5 mm from 3-3. The slot locations on the wire subsequently move distally starting at the center between the two quadrants. This makes sense, as relative to the center between the two quadrants, the teeth in a malocclusion with gaps are also located more distally. As a result, the wire will be a much better fit for the malocclusion (Figure 4).

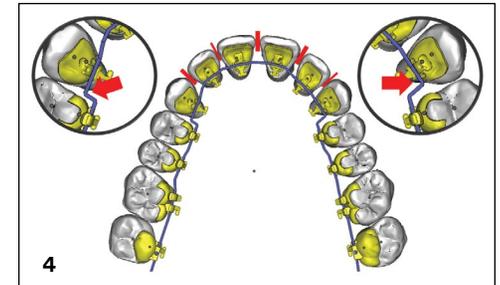


Figure 4: Malocclusion with gaps and adapted wire.

For cases with gaps, the first wire will be manufactured with elongation. Nevertheless, depending on individual strategies to close gaps, the elongation can also be ordered for subsequent SE NiTi wires.

### Incognito™ Dynamic Wire Offset

The TOP-Service lab was approached by some doctors who reported difficulties inserting archwires, especially Super-Elastic NiTi Wires, into the canine slots of regular cases not having the gaps as described above.

For all other malocclusions, we keep the slot locations on the wire according to the setup. This is a well-proven strategy and also works fine for the initial and intermediate phase of the lingual treatment. However, it sometimes can get tight where the wire transitions from the anterior to the posterior section distal to the canine. Then the offset wire bend may conflict with the canine slot and makes wire ligation challenging as it basically is only possible to insert straight wire sections into the slots. The problem is most obvious with SE NiTi wires. Other than steel or Beta III wires those are not bent mechanically, but shape-set in a thermal programming process. This process does not allow for the same sharp bend radii as mechanical bending. This results in smoother wire geometries with softer bends, actually something very useful for the initial phase of a treatment, where brackets often need to travel along the wire. Nevertheless, the larger bend radii tend to increase the problem with the offset bends being too close distal to the canines, as now the bend section extends even more mesially and gets in conflict with the canine slots even more.

When looking at Figure 5, another aspect can be observed. The manufacturing method also has an impact on the bend angle. Due to limitations inherent in the process, angles can deviate from the designed angles of the offset bend. Here especially sharp angles (close to 90°) and small offsets are critical.

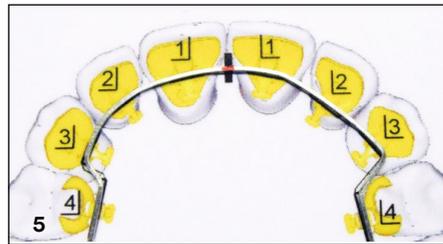


Figure 5: Superleastic NiTi Wire

To avoid the problem, it is necessary to move the offset bend distally. Other than with the wires for malocclusion with gaps here the bracket slots on the wire remain in the original position. They do not move distally. But when doing so it is easy to fall into another trap: A more distal offset bend is at risk to collide with the first posterior tooth typically a premolar, see Figure 6C. This could e.g. restrain to close all gaps. In the past we had a simple strategy to handle this. We defined additional straight wire segments mesial and distal to the actual slot segments. This avoids bends being too close to the brackets and also give some freedom for the brackets to move in mesio-distal direction. For the canines and premolars, we set these additional straight sections to values based on experience.

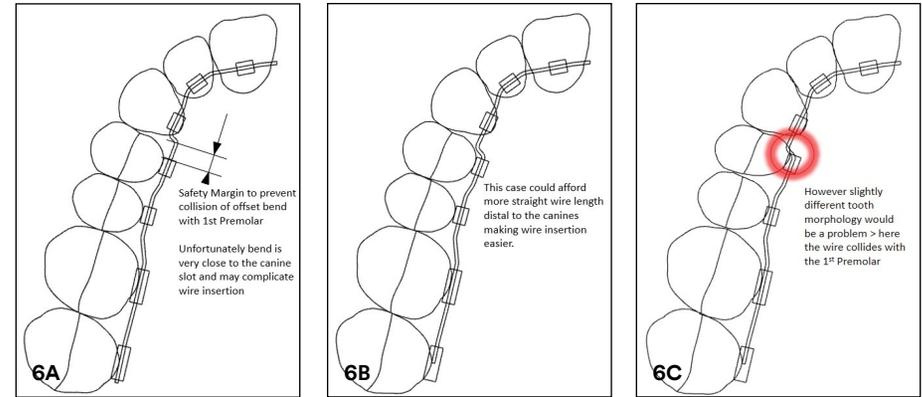


Figure 6A-C: Offset bend locations and potential collision with premolar.

Now, based on customer input, a new approach has been developed. In addition to the settings defining the offset bend location, the design software has been enabled to analyze each individual situation. That allows the bend to be set more distally, away from the canine slot. If this shift results in a collision of the wire with the first posterior tooth or its bracket, the software is able to detect the collision. In that case, the bend is moved mesially, in small increments, until the collision is resolved (Figure 7A-B).

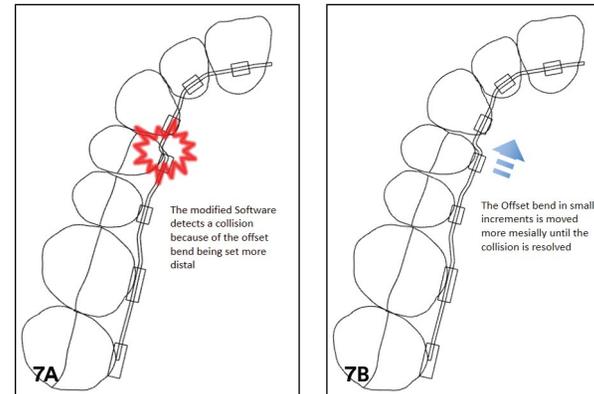


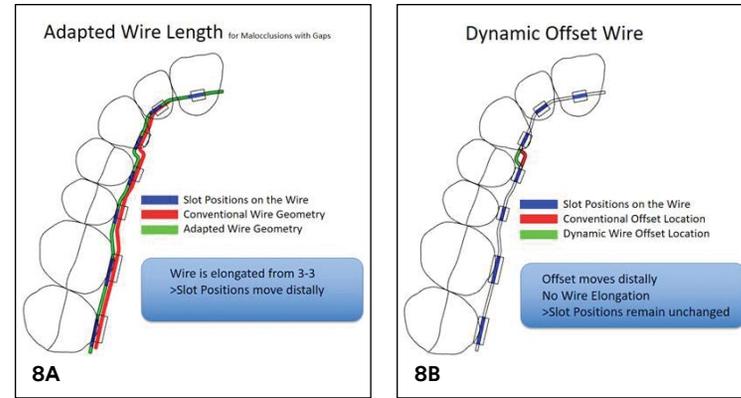
Figure 7A-B: Software resolving a collision of wire and premolar.

The outcome is a wire with an offset bend location that is optimized for each individual case. This wire data now is made available for digital wire manufacturing.

Collision detection is a common and powerful software function also used in other 3D Software, for example, CAD software. It is also used in the Incognito System Setup Software to avoid tooth collisions, which would result in clinical problems.

After developing the necessary software module, doctors who asked for the offset bend modification were provided with modified wires featuring the more distal offset bend and reported significantly easier wire insertion. The positive feedback as well as discussion with other experienced customers led to the decision to make this change available to all customers in August 2018.

For both wire modifications described here, it would visually be hard to notice without knowing about the difference. Nevertheless, the tiny but smart changes to the archwire make a difference for lingual treatment.



**Figure 8A-B:** Illustration and summary of the difference between the two wire changes.

# Optimizing Your “Digital Address”

## Why Orthodontic Practices Should Care About SEO



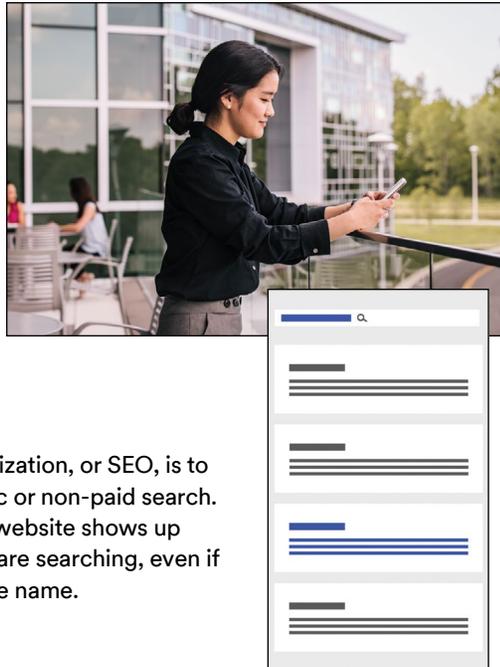
**Tammy Torbert,**  
**3M Oral Care**

Tammy Torbert has worked in 3M Healthcare, Industrial, and Consumer global marketing roles, including the iconic Post-It® Brand.

Most first time customers will use Google Maps® to easily end up at your front door. But what about prospective patients searching online for an orthodontic practice? **Will your practice show up?**

It's no surprise, Google® is the most common Search Engine. Would you believe it processes 3.5 billion searches per day. Some may look for your practice by name or enter phrases like “Orthodontists near me” or “Best orthodontist in my city”.

The objective of Search Engine Optimization, or SEO, is to improve a website's position in organic or non-paid search. In simple terms, it's making sure your website shows up when people in your geographic area are searching, even if they are not searching by your practice name.



SEO can be segmented into two types:

1. Objective SEO, which is in your control and can be measured and improved. There are several actions that will improve Objective SEO including:
  - ✓ Use of prominent but evenly spaced keywords
  - ✓ Use of html text and links, including text descriptions for Alt Images
  - ✓ Including a Title Tag for every searchable page on your practice website
2. Subjective SEO, which rewards web pages that provide quality content searchers want to consume.

Believe it or not, search engines are smart and measure what searchers click on. They even track when a searcher clicks on a link and hits the back button after landing on the page.



SEO is complex and strategies evolve as search engines become “smarter.” Want to know the best part? You can optimize your practice website for SEO.

### Free On-Demand Webinar!

**3M Oral Care worked with our agency partner to develop a 15 minute webinar to help orthodontic practices optimize their website SEO.** The webinar will go deeper into the critical elements for both Objective and Subjective SEO with examples and a checklist of questions to ask your agency.

This webinar will be available by the end of December.

Questions, please contact Tammy Torbert at [tmtorbert@mmm.com](mailto:tmtorbert@mmm.com).



▶▶ [Click here to visit the 3M website.](#)

# A “Smart” Take on Orthodontics



## Nathan E. Thomas, DDS, MS

Dr. Thomas received his DDS degree at the University of Nebraska Medical Center. He completed his Orthodontics specialty at the State University of New York at Buffalo. He also has a Masters in Nutrition and BSEd in Exercise Science from the University of Nebraska, Lincoln.

Dr. Thomas is an ABO Certified Orthodontist practicing in Bridgman, Michigan. He is a member of the AAO, ABO and Great Lakes Association of Orthodontists.

Noise – all of the things that distract us from being orthodontists. Unfortunately, many orthodontists are caught up in the noise. I hear a lot of colleagues complain about the current environment today in orthodontics, but choose to look away from the source of the problem that led to our present challenges.

There is often a sense that, in order to compete, it is necessary to cut the time spent on some aspects of treatment, when in fact it is the core fundamentals that separate us from any other dental professional or company that attempts to provide orthodontic care. The key aspects I am referring to are diagnosis and treatment planning. Instead of focusing on these fundamentals and long-term strategies, there is a reactionary temptation to focus on money and short-term strategies that often involve abandoning the time required for good diagnosis and treatment planning in favor of more appointments per day and more starts per year. In this competitive environment, efficiency and time savings are important, but cannot be maximized without thorough diagnosis and treatment planning. Proper planning, paired with

a system designed for efficiency, will yield time savings throughout the remaining stages of treatment, allowing for more patient volume without sacrificing quality.

Solutions that maintain orthodontic integrity while avoiding unnecessary additional appointments that impede starting orthodontic treatment do exist. My life experiences and previous education have taught me to stop and look around before moving forward. After observing our profession’s history and the great orthodontists today, the common theme I have found is an emphasis on the patient. Focusing further on the patient, we can affect them physically, emotionally, or spiritually. As an orthodontist, we tend to dwell in the first two aspects. I argue that many of the current problems in our profession will diminish if we maintain a focus on the patient with proper diagnosis and treatment planning, providing great customer service, and emphasizing efficiency. In this article, I plan to discuss a few ways to stand out from the pack and provide excellent orthodontic outcomes as efficiently as possible.

Unfortunately, there are quite a few orthodontists who have categorically decided to regard clear aligner therapy as inferior to braces. Clear aligners CAN produce orthodontic results similar to braces (and better in some instances) in a similar amount of time or less. On the other end of the spectrum are the orthodontists that speak negatively about braces and carry on about the longer treatment time in braces compared to clear aligners. Orthodontists who prefer braces can compete with aligners in both quality of finish and treatment time simultaneously. In order to compete with clear aligners, orthodontists have to stop their blind allegiances to their brackets and their cost. If you were given a bracket that costs \$15 per bracket, but it helped play a role in reducing the total number of patient visits by three visits or more, would you switch? If your answer is no, then you are bending over to pick up pennies while dollars are flying over your head.

Aligners are a fully customized appliance. In order to compete with clear aligners, braces cannot be used as they are currently in a large number of orthodontic offices. Braces in these offices are a generic appliance, using a singular prescription, despite the fact that patients present with a broad spectrum of issues. In the end, additional time must be spent to increase or reduce tooth movements because the standard prescription cannot successfully express the needed movements in patient populations outside of the peak of the bell curve without manual modifications to the archwire. Dr. Anoop Sondhi has spent much of his career speaking about clinical efficiency and, in particular, about VPO (variable prescription orthodontics). This is a way of turning braces into a semi-customized appliance. Since braces are limited to a set number of prescriptions and cannot control movements in all three planes of space from the start, the best braces can be is a semi-customized appliance. An additional way to make up for this limitation and reduce inefficiencies is to utilize indirect bonding.

The technology of the bracket has evolved much more than what they commonly teach in residency. There are clear advantages to self-ligation technology, but with so many brackets on the market possessing this feature, how do you make a purchase decision? My advice is to stop, clear your mind of all your biases, and think biomechanics. I studied hard in school to become an orthodontist and I preferred to use a bracket that allowed me to utilize my training as an orthodontist. I did not want to be handcuffed by my bracket biomechanically and limit my treatment options for my patients. This is how I arrived at my decision to use the 3M™ SmartClip™ Self-Ligating Bracket by 3M right out of residency, despite never using the bracket previously.



### Durability

No door to break or get stuck. In the past four years in private practice I have had four clips TOTAL that have broken off (three on the ceramic bracket and one on the metal). In the event that this happens, the bracket simply becomes a ligated bracket, and does not require replacement, thereby, saving treatment time and cost.

### Precision

This is a part of 3M's DNA. Other bracket systems have undergone study and large tolerance ranges have been discovered. Yes, most of us do not fill our bracket slots, but these wide tolerances add additional slop in the bracket and produce greater under expression. However, this under expression is difficult to predict and is considerably variable among brackets. Ultimately, this translates to additional treatment time to manually accommodate for these inaccuracies. 3M's reputation for high quality is visible with the SmartClip bracket, as the consistent and predictable movement I get speaks to the precision in the system's tolerances.

### Mechanical advantages related to design

A maximized bracket width helps to provide control over dental rotations. The already wide bracket has clips that hold the wire at the outermost perimeter of the bracket in addition to extensions where the wings are attached to the bracket, increasing the width even further. This translates to superior rotation correction. Treating over 200 cases with another popular self-ligating system, I have experienced firsthand how poorly a bracket can perform when its width is decreased. I have heard similar stories of frustration from prominent, large volume orthodontists trying to finish cases with this bracket system. The technology of a bracket should work FOR you, not AGAINST you.

With SmartClip, I am able to alter inter-bracket distances to reduce excess forces and unwanted side effects while maintaining my original placement of the bracket and avoid wasteful repositioning later (Figure 1).

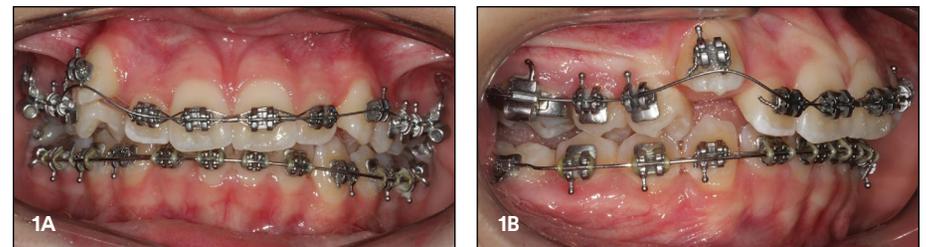


Figure 1A-B

One of the largest inefficiencies with braces is the time spent correcting side effects. Leveling severely displaced teeth becomes much more predictable and simple when using the ability of the SmartClip bracket to selectively engage one or both wings. This can be further enhanced utilizing tandem wires and using one of the archwires as an arch stabilizer and bypassing the severely malpositioned tooth (Figures 2 and 3).



Figure 2



Figure 3A-C

Another frustration with other brackets is severe rotations because they prevent archwire engagement into the brackets from the start to begin the derotation process and require more involved and time-consuming methods to move the teeth to a point where the archwire can be engaged. Using SmartClip brackets and an open coil spring with a bracket to a bracket-and-a-half activation on the initial archwire has proven to be the most simple and efficient method (Figure 4). Since brackets with doors are essentially a single wing bracket, it is impossible to ligate the wire to utilize this technique. A standard twin bracket can work with this technique but ligating a single wing in such a severely rotated position with the open coil spring trying to expand is time-consuming and technically challenging. The simplicity of compressing the spring with an archwire director and pressing the archwire into the wing that is accessible is unmatched by other self-ligating brackets with doors.

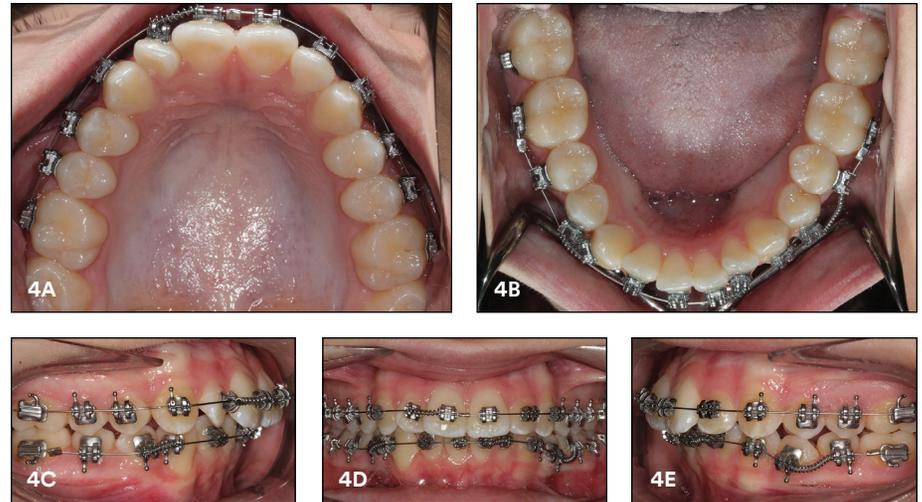


Figure 4A-E: Deep bites like this scare many orthodontists but is quite easy with VPO and 3M™ SmartClip™ SL3 Brackets.

### Mechanical treatment method diversity

SmartClip can incorporate all methods seamlessly – Segmental, sliding, non-sliding, tandem wire, overlay wires, auxiliary wires. Some of these methods cannot be performed with a door present. The advantages of the tandem wire method are maximum efficiency without compromising quality of finish. Tandem wires used with the SmartClip bracket can reduce the number of wires necessary to correct a case by doing more with each wire. After eight weeks when the second wire was added to create tandem wires, all aspects of tooth movement are corrected except torque. Other methods require more wires and do less movement per wire. The patient shown in Figures 5, 6, and 7, underwent Class II correction with the 3M™ Forsus™ appliance and SmartClip brackets using a VPO prescription of high torque on the upper 3-3 and lower torque on the lower 3-3. Utilizing this method of practice saved me from placing additional torque into her archwires, which would have added additional months onto her treatment.

In the end, there are many areas of the practice where efficiency can be exploited to improve competitiveness without compromising quality and the orthodontic bracket is one. When you filter out all of the marketing, a bracket is nothing more than a handle on a tooth. I can achieve the same board-standard result with any bracket; but some brackets can do things easier than others or do more things at once.



Figure 5A-H: Initial photos.

The SmartClip bracket exceeds other brackets by providing me, the orthodontist, with the flexibility to use my knowledge and training as I see fit. We spent a considerable amount of time (and money) to gain our knowledge and need to rely more on our expertise and less on outside forces that are trying to influence our decisions for their gain. I hope this article illustrates the importance of tuning out the noise and shifting focus to a long-term strategy that restores our profession and leads to a successful practice model emphasizing the patient through proper diagnosis and treatment planning, customer service, and efficiency.

Case photos provided by Dr. Nathan E. Thomas.



Figure 6A-H: Final photos.

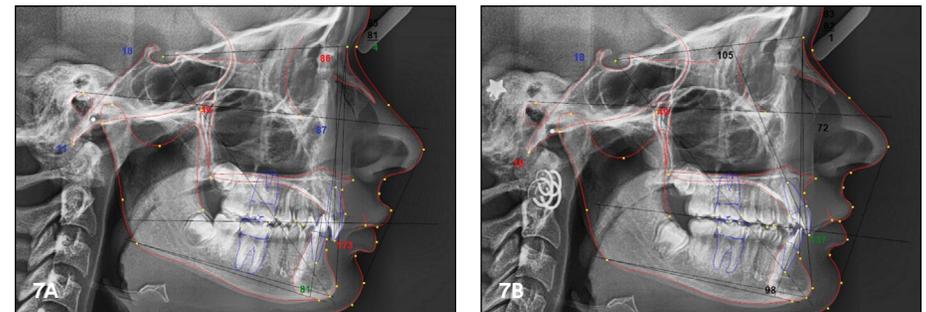


Figure 7A-B: Initial and final tracings.

# Clinical Cases



## 3M<sup>SM</sup> Health Care Academy

# Using Aligners in Interdisciplinary Treatment to Deliver Esthetic Solutions



**Ryan McComb, DMD, MS**

Dr. Ryan McComb graduated from Harvard University in 2010 with a DMD and earned his orthodontic certificate and master's degree from the University of California, Los Angeles in 2013. Dr. McComb opened his private practice in the hyper-competitive Los Angeles market and has quickly demonstrated that the

opportunity for rapid practice growth exists even in the most saturated markets. Dr. McComb is board certified and is a lecturer at UCLA. His speaking interests include practice management, team development and marketing. When not in the office, you'll find him mountain biking, surfing or skiing.

## Introduction

As orthodontists, it is easy to feel like we practice on islands, yet it is critical for us as specialists to work with other oral care professionals when it comes to the best interests of our patients and their orthodontic and long-term dental goals.

To address the changing esthetic needs of our patients, interdisciplinary collaborations have become a necessity. To be successful in our pursuits, we must establish an open line of communication from the very beginning — and keep that line of dialogue open as modifications (if any) need to be made to the overall treatment plan.

Restorative treatment is often a combination of oral function and smile esthetics, and not only when the case is completed, but during treatment as well. 3M™ Clarity™ Aligners provide the option of esthetic treatment without sacrificing the control needed to achieve spacing and optimal esthetics for implants, crowns or other restorative dentistry needs.

## Diagnosis

I had a 45-year-old male patient approach me with the desire to improve his alignment, close small spaces (between UR2 and UR3) and prepare for dental implants in the UR6 and LR7 areas (Figure 1A-I). The patient's chief complaint was the crowding and the minor spacing. He had a Class I malocclusion with moderate lower crowding and mild upper crowding (U&L, 3×3), and a need for improved arch development and coordination.

When he first walked into my practice, the patient was scheduled to receive two implants in three months. It should be noted that the patient already had crowns on his LL7 and UL4.

The same day I consulted with the patient, I called his dentist — whom I had previously worked with on other cases — to formulate the treatment plan.

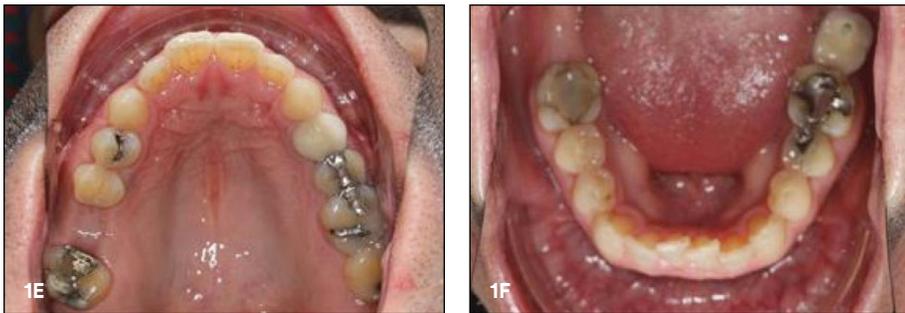


Figure 1A-I: Initial photos.



Figure 2: Initial radiographic imaging.

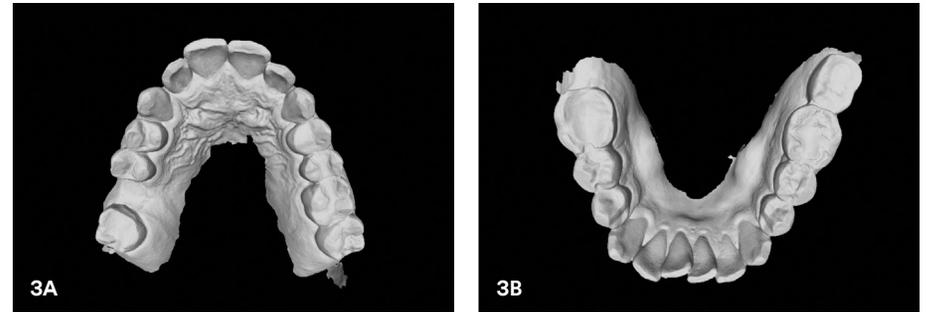


Figure 3A-B: Initial maxillary and mandibular occlusal view.

### Treatment Plan

I utilized Clarity™ Aligners to develop his upper and lower arches, align his upper and lower teeth and stabilize his bite. The aligners were used purely for esthetic reasons. The patient opted for aligners over brackets so they would be less visible.

The plan also involved maintaining spaces for future implants by using programmed space maintenance in the UR6 and LR7 areas and minor tooth uprighting programmed into the aligners on the teeth that were immediately adjacent to these spaces.



Figure 4A-E: Photos four months into treatment.



Figure 5A-I: Photos six months into treatment.

At initial delivery, we added seven attachments, consisting of six bevels (UR5, UR4, UL5, UL4, LR4, LL4) and one bar (LR3). To bond the attachments, we used 3M™ Transbond™ Plus Self Etching Primer, 3M™ Transbond™ LR Light Cure Adhesive and the 3M™ Clarity™ Aligner Attachment Template.

After 13 weeks, we completed the initial 13 trays – with the patient wearing one new tray every week. Three months after the attachments were bonded, we performed a refinement scan, using our 3Shape TRIOS® Intraoral Scanner. The refinement consisted of eight trays to finish and detail the case.

The patient's final visit (Figure 7A-I) took place 10 months after the initial visit. Following treatment with the aligners, the patient received crowns on top of the implants. For retention, I fitted the patient with upper and lower clear retainers.

The patient was in active movement for six months. Overall, I found this treatment to be very predictable and the case tracked nicely — even for minor rotational movements in the anterior, which can sometimes be difficult to control with aligners.

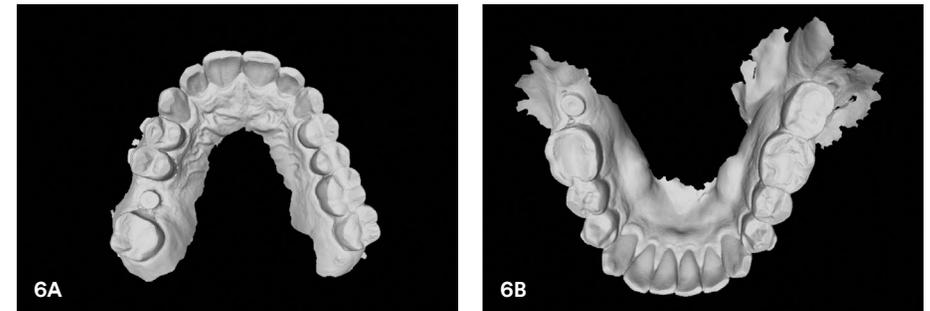


Figure 6A-B: Maxillary and mandibular occlusal views, six months into treatment during first refinement.



Figure 7A-I: Photos on patient's final visit, 10 months after starting treatment.

## Conclusion

The patient was very happy with the treatment outcome. He was also very satisfied with the overall comfort and esthetics of Clarity™ Aligners.

Although I have done other cases with aligners that are similar in complexity to this one, this is the first that I have treated using Clarity™ Aligners. The experience has been seamless and I would feel confident treating even more complex cases that include implants, crowns, or other restorative dentistry needs with a similar approach in the future.

*Case photos provided by Dr. Ryan McComb.*

## 3M<sup>SM</sup> Health Care Academy

# The Evolution of a Hybrid Technique with the 3M<sup>TM</sup> Incognito<sup>TM</sup> and 3M<sup>TM</sup> Clarity<sup>TM</sup> Advanced Appliances



**Samuel Wise, DDS, MS**

Dr. Samuel Wise received his DDS degree from The Ohio State University College of Dentistry in 2004 and his MS in Orthodontics from the University of Detroit Mercy in 2009. He served as a General Dentist in the U.S. Air Force at Nellis AFB in Las Vegas, Nevada, and Dover AFB in Dover, Delaware. He has been in private practice in North Canton, Ohio, since 2010. Dr. Wise is a Diplomat of the American Board of Orthodontics and a member of the AAO as well as Ohio and local Dental Societies.

I was asked recently to share our practice's experience using the combination technique of 3M<sup>TM</sup> Incognito<sup>TM</sup> Lingual Braces on the upper arch and 3M<sup>TM</sup> Clarity<sup>TM</sup> Advanced Ceramic Braces on the lower. In order to share my thoughts on this "hybrid" treatment modality, it's probably best to start with how our practice got here.

Coming out of residency in 2009, the economy was in the middle of the great recession and most practices were trying to rebound from the downturn of 2008. I was practicing as an associate in a large group practice outside of Detroit that had made heavy investments in technology. These investments paid dividends as they took market share from their competitors to stay even in an economy where many practices saw significant decreases in patient starts and revenue. When I had the opportunity to join a practice closer to home in 2010, I jumped on the chance and carried these lessons to the Buckeye State.

Once settled in Ohio, my partner and I looked for ways to differentiate ourselves from our competition. We determined that one of our practice's core values is *Innovation*, so we decided to add treatment options that honored and embraced technology. We started with SureSmile<sup>®</sup> which made us more efficient but something was missing. Like our dental colleagues, we had more and more adult patients coming into the practice demanding greater esthetic options. Patients that demanded aligners who we felt were not good candidates (due to case difficulty) would come in for new patient consultations and leave without scheduling when they didn't fit our aligner profile.

So, in 2011 we took our first Incognito course to find a treatment option for those patients that we felt were not good aligner candidates. We looked to Incognito as an option to take patient compliance out of the picture and allow us to treat difficult cases more predictably. In addition, lingual braces offered the only truly hidden option satisfying the appetite of the adult patient that places a high priority on esthetics.

We treated our first 10-15 cases with full upper and lower Incognito braces at the same cost as our labial cases. We wanted to get as much experience as quickly as possible, so offering these hidden braces at equal cost to our labial cases allowed us to do so in short time. We dove in head-first, tackling extraction and borderline surgical cases right out of the gate. Our assistants at the time were highly experienced in labial orthodontics but completely inexperienced in lingual. They welcomed the challenge of learning something new and cool (lingual orthodontics is neat) and would actually negotiate who would get to work with the lingual patients when they came in for appointments.

Treating patients with lingual braces and technology created a buzz, and doctors began referring to our office to provide their patients with a higher level of care and some doctors specifically referred ONLY their adult patients who they knew demanded premium esthetics. Patients began coming to our office from all over the state of Ohio, many driving to Canton from areas as far as two-plus hours away.

As time went on, we treated more and more patients with full upper and lower Incognito. We treated the first 50 cases or so this way. Full lingual bonding appointments take longer than labial bonding in some cases, could be tough to work on the lower brackets due to the tongue, short inter-bracket distances make wire engagement more difficult, plaque and tartar on the lower brackets may be a major issue for some patients, and the patient can sometimes have a difficult time with speech and adapting to their braces when they have full upper and lower lingual appliances.

To solve these issues, starting in about 2016 we moved away from full upper and lower Incognito and began encouraging these aesthetically-driven patients to consider upper Incognito and lower ceramic braces. Clarity Advanced brackets had improved dramatically from previous versions and many of these patients will accept lower labial ceramic brackets since they don't show or show minimally in their smile. This combination offers now the best of both worlds, superior esthetics and reduced issues compared to treating the lower arch with lingual appliances.



Figure 1A: Upper arch with 3M™ Incognito™ Appliance System.

Using this treatment option, we have been able to keep our treatment cost down due to reduced lab fees (single arch versus dual arch). This encourages more patients to accept Incognito as a treatment option. The greater interbracket distance in the lower arch makes archwire engagement easier and we also experienced fewer bond failures due to easier isolation when bonding. The friendlier work environment of the upper arch, allows newer orthodontic assistants to become proficient treating lingual braces sooner. As well, patients are generally happier with the combination due to less tongue irritation and easier speech adaptation due to having a place for the tongue to rest without being interfered with by custom brackets.

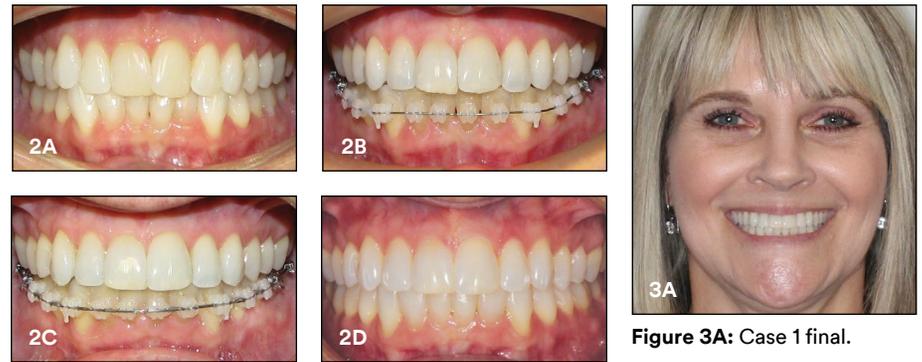


Figure 2A-D: Case 1 progression.

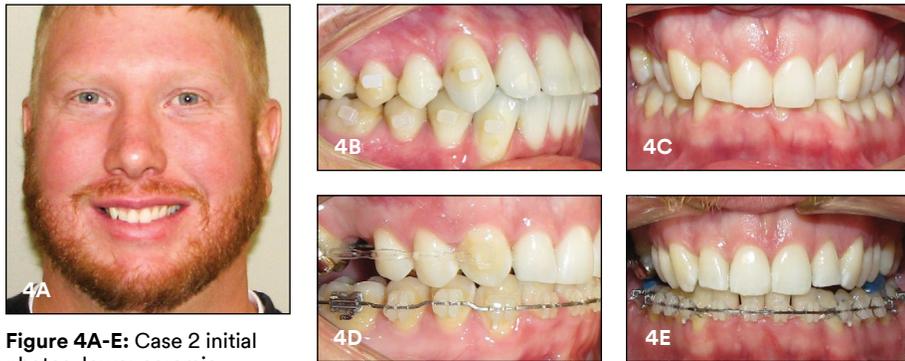
Figure 3A: Case 1 final.

Case Setup	
Midlines:	Align midlines
Class Relation (Canine Right):	Finalize Class I
Class Relation (Canine Left):	Finalize Class I
Class Relation (Molar Right):	Finalize Class I
Class Relation (Molar Left):	Finalize Class I
Interproximal Reduction:	As needed
Arch Form:	3M™ OrthoForm™ III
Lower Intermolar Width:	Expand as needed to fit OrthoForm III
Lower Intercanine Width:	Expand as needed to fit OrthoForm III
Close All Spaces:	Close all spaces
Leveling of Upper Anteriors:	Level the central incisal edges (the gingival margins will be off) and leave the laterals .3 mm shorter.
Overbite:	Ideal (1.0 mm - 3.0 mm)
Anterior Crown Torque:	UR1 needs proclined. Set upper incisors to ideal as needed.

Table 1: Case setup.

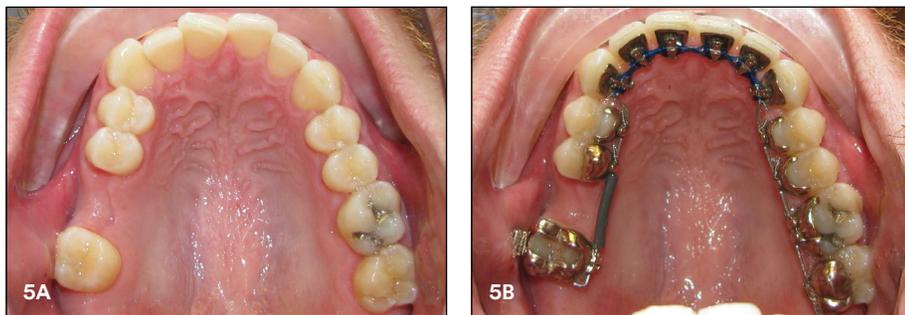


Our general treatment protocol has evolved over the past couple of years, but we have found that it is best for patient comfort to bond the lower arch first. At that lower arch bonding appointment, we scan the arches for fabrication of the upper Incognito appliances. When setting up the case in 3M™ Unitek™ Treatment Management Portal (TMP), we ask that the upper lingual braces be setup to match the lower labial archform that we will be using (for us 3M™ OrthoForm™ II or III) so that the arches will coordinate during treatment.



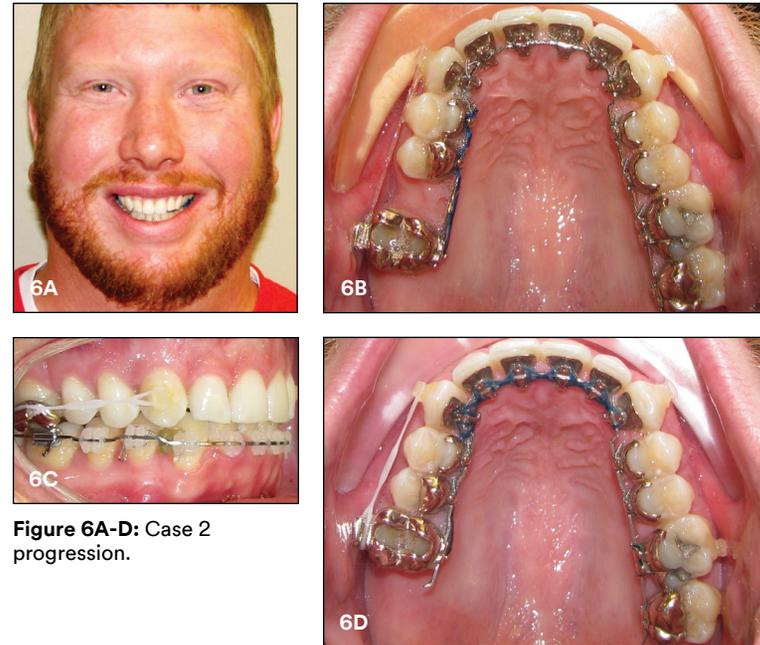
**Figure 4A-E:** Case 2 initial photos, lower ceramic brackets applied.

We bond the upper arch 6-8 weeks later at which time the patient is fairly adapted and comfortable with their lower appliances and ready and excited to get their lingual braces started.

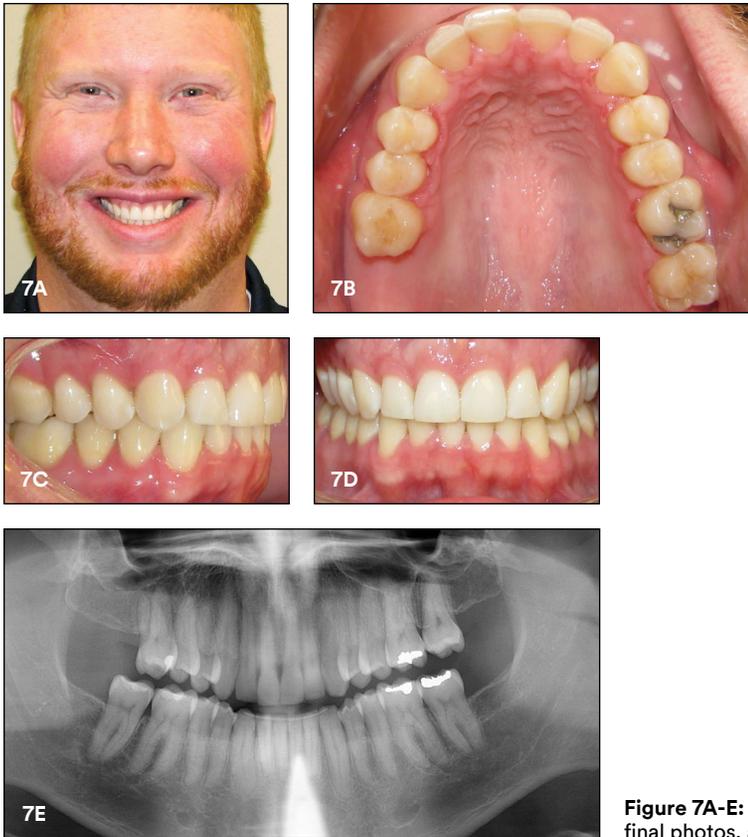


**Figure 5A-B:** Case 2 initial upper, upper bonded 6-8 weeks after lower.

Once the brackets are bonded and secure, we schedule these patients every 8-10 weeks for 30-minute adjustments. On one appointment we change the lower archwire and at the alternate appointment change the upper archwire. On the appointment when the opposite arch is not due for a wire change, we check for full wire engagement and retie the archwires as needed. Labial buttons needed for elastics that once had to be added to both arches, now only need to be added to the upper arch since the lower arch has hooks included with the ceramic brackets.



**Figure 6A-D:** Case 2 progression.



**Figure 7A-E:** Case 2 final photos, and X-ray.

In the past couple of years, we have treated another 40-50 patients or so using this technique and it continues to gain favor with another handful of patients electing this treatment option this summer. We do still offer full upper and lower Incognito treatment as an option but at a premium cost due to the longer and more difficult appointments and encourage patients to consider the combination technique for all of the reasons mentioned. Our office continues to challenge itself; we will try anything once as they say, with our first hybrid surgical patient having started his braces this summer, who by the way drives from the west side of Cleveland after finding our office online!

*Case photos provided by Dr. Samuel Wise.*

## 3M<sup>SM</sup> Health Care Academy

# How to handle a difficult case with 3M<sup>TM</sup> SmartClip<sup>TM</sup> Self-Ligating Brackets – to make it easier.



**David Fleitman, DDS**

Dr. David Fleitman, DDS, studied and earned his degree in dentistry from the University of Autonomy in Mexico in 1994, and completed his training and studies in Orthodontics in 1996.

He has attended 3M<sup>TM</sup> MBT<sup>TM</sup> courses and training meetings since 1998 and has worked with the MBT Appliance for the last 20 years. Since 2004, he has worked with the self-ligating system technique using the 3M<sup>TM</sup> Clarity<sup>TM</sup> SL and 3M<sup>TM</sup> SmartClip<sup>TM</sup> appliance systems.

Dr. Fleitman is a member of the “European Orthodontic Society” and continues to lecture worldwide. Dr. Fleitman has a private practice in Herzelia, Israel.

### Introduction

At present, there is increased demand from the patients to be in treatment with brackets for the shortest time possible. With advanced technology today we can provide this, even in difficult treatments. The self-ligating system appliance philosophy gives us the instruments to perform even the most difficult treatments, as we are about to see in this clinical case and to do it easily.

### Diagnostic

Female patient, 15 and six months old (Figure 1A-C).

Class III on the right side, Class II on the left side malocclusion (Figure 1D-F).

Severe crowding in the upper and lower arches, anterior and posterior crossbite on both sides, tooth 22 blocked out palatally, no room for tooth 13, missing teeth: 16, 36 (Figure 1G-J).

### Appliance

3M<sup>TM</sup> SmartClip<sup>TM</sup> SL3 Self-Ligating Appliance System, using direct bonding technique 7-7, both arches.

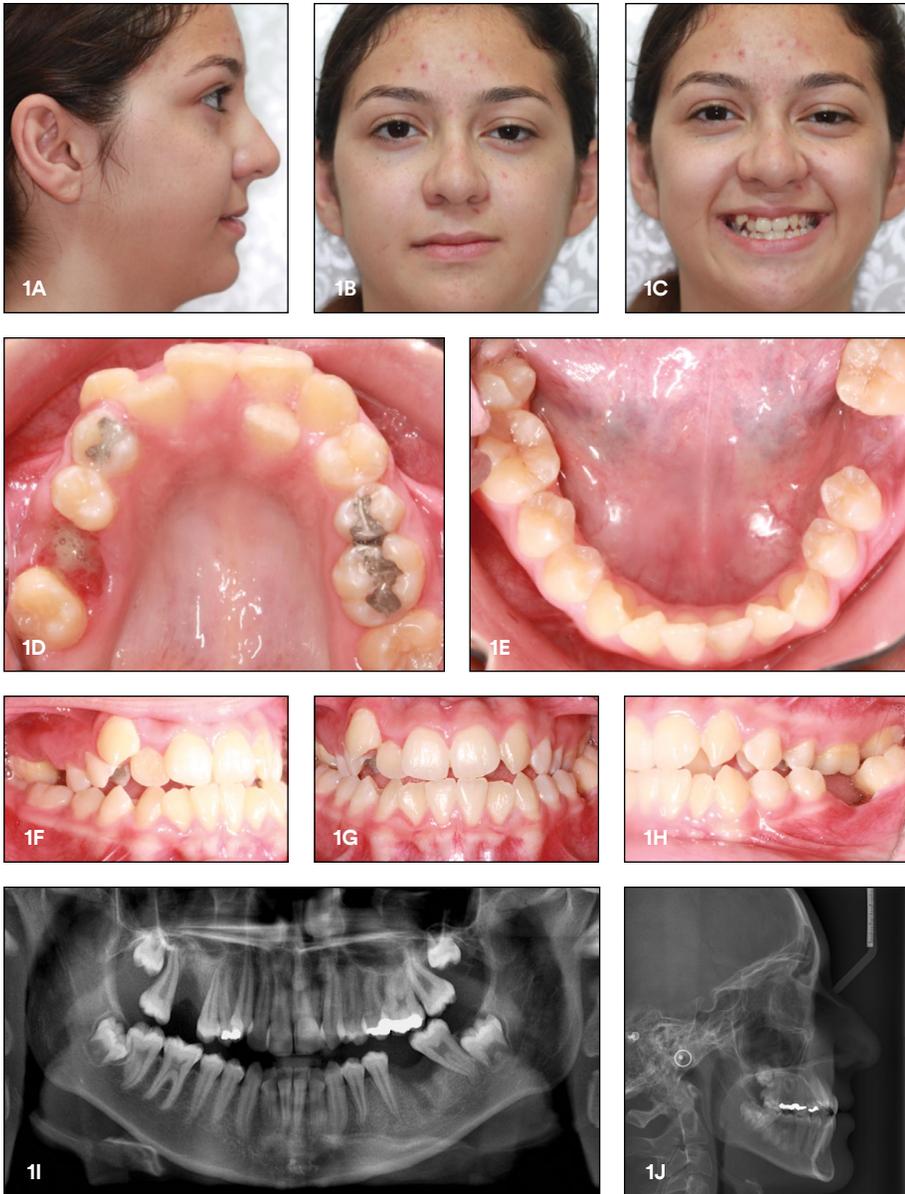


Figure 1A-J: Initial photos.

**Treatment plan and progress**

At the beginning, we started with 0.014 in. Nitinol Heat-Activated archwires in both upper and lower arches.

We made a space between the 14th and 12th teeth with Titanium Molar Distalizing Spring, and between teeth 21 and 23.

We tied an elastic chain under the wire on teeth 35 and 45 to rotate them (Figure 2A-E).

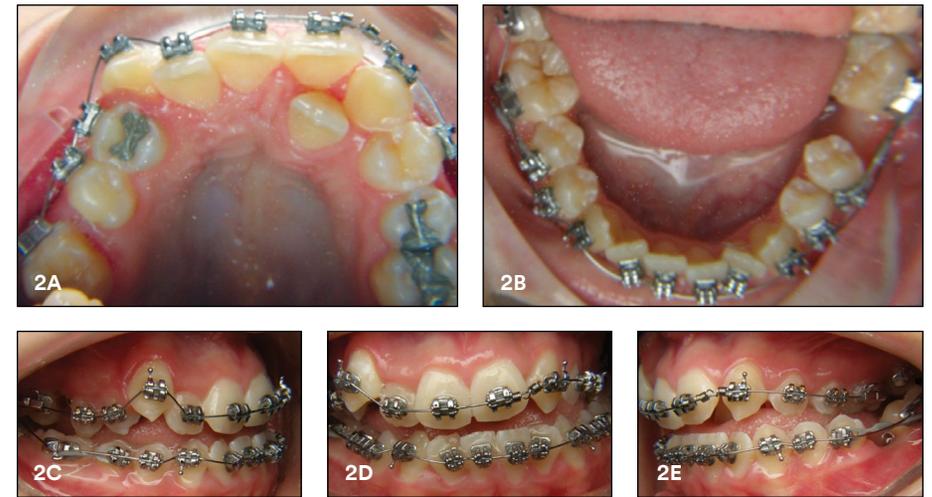


Figure 2A-E

After eight weeks, we changed the wires in the upper jaw to 0.016 in. Nitinol Heat-Activated archwire and activated the Titanium Molar Distalizing spring. In the lower jaw we added 0.016 in. Nitinol Heat-Activated archwire lower tandem and kept the elastic chain in place to keep the rotation. The tandem archwire system works very well for the lower crowding (Figure 3A-E).

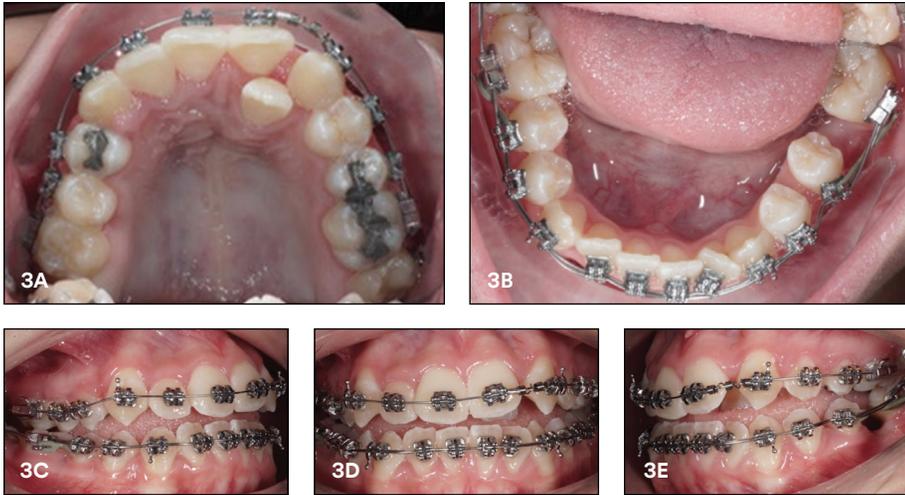


Figure 3A-E

Afterwards, we bonded a bracket with 180 degrees of rotation on tooth 22 because we needed a minus torque to help the root advance buccally and engaged only the distal wing.

In the lower jaw we changed the wire for 0.014×0.025 in. Nitinol Heat-Activated archwire. Also, we rotated tooth 32 with the elastic chain under the wire (Figure 4A-E).

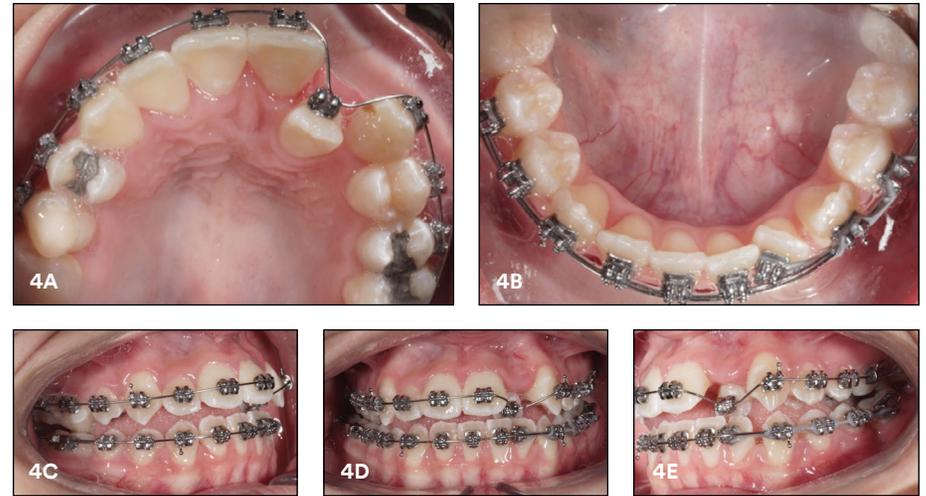


Figure 4A-E

We then changed the wires in both upper and lower arches to 0.014×0.025 in. Nitinol Heat-Activated archwires and finished the leveling and alignment (Figure 5A-E).

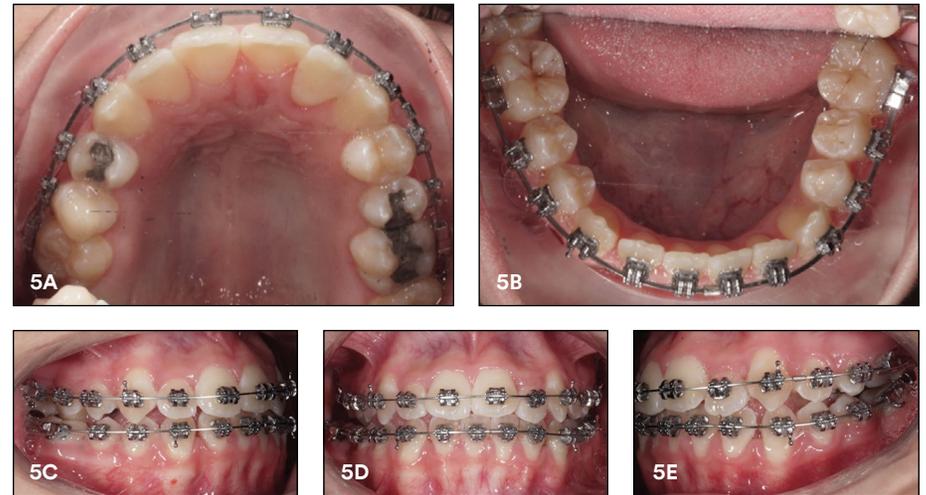


Figure 5A-E

Next, we changed the wires in both arches to 0.019×0.025 in. Nitinol Heat-Activated archwires and repositioned the brackets on tooth 12 and 22, rotating the brackets 180 degrees using elastic chain to get the torque, and a Class II vertical elastic rubber band (Figure 6A-E).

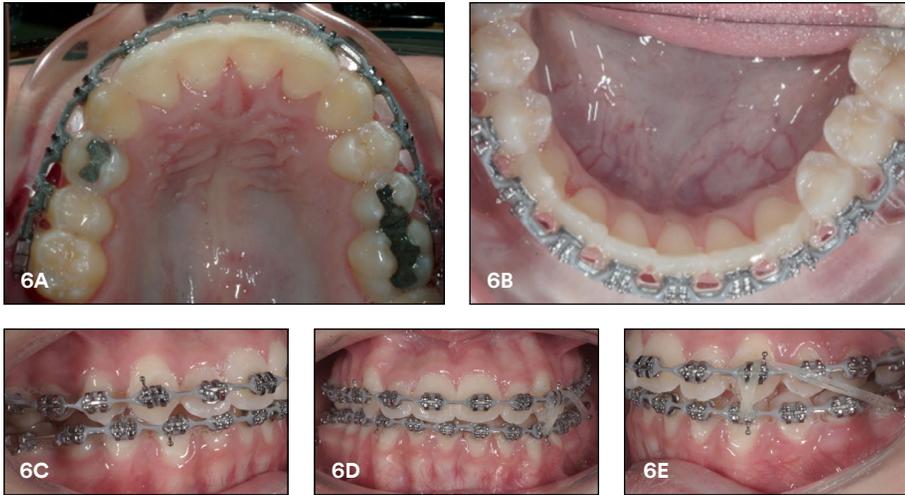


Figure 6A-E

We then changed the wires to 0.019×0.025 in. Beta Titanium in both the upper and lower arches (Figure 7A-E).



Figure 7A-E

To finish the occlusion, we added an elastic chain in the upper jaw between 13 to 25 and bonded a button on tooth 26 and used an elastic rubber band 3/16 inch medium 4 oz. (Figure 8A-E).

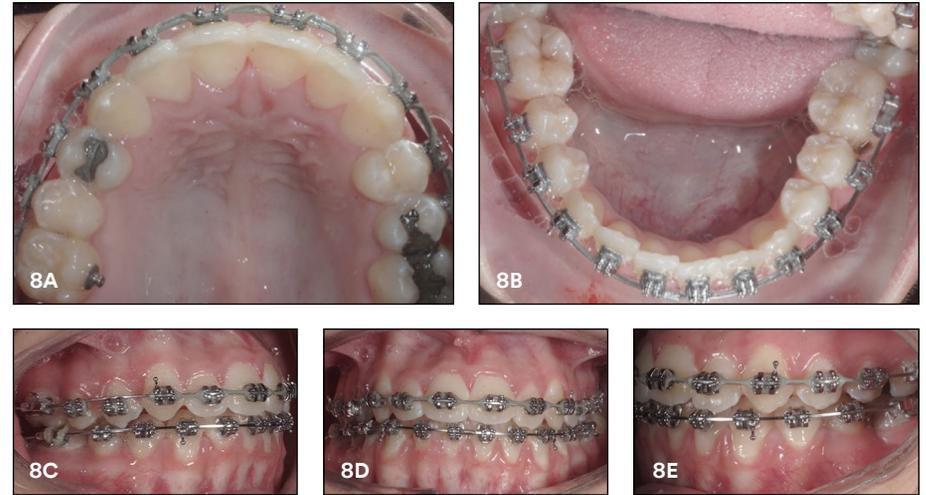


Figure 8A-E

Appointments were made every eight weeks. The treatment lasted 20 months. Upper and lower fixed retainers were placed at the time of the debonding and vacuum formed retainer (thickness 0.40) for the upper jaw was prepared (Figure 9A-K).

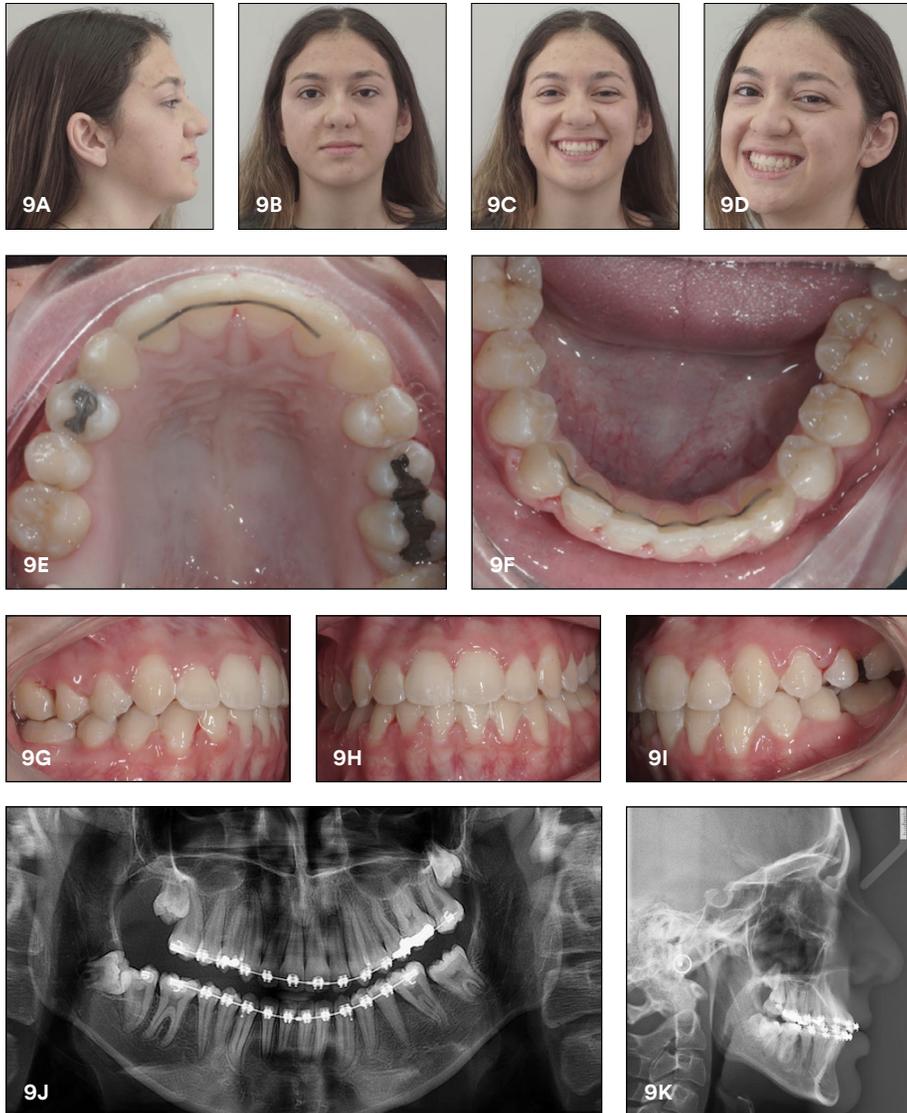


Figure 9A-K: Final photos.

We can see in the panoramic X-ray an excellent parallelism between the roots. The patient was sent to extract tooth 48. During the 12-month follow-up no relapse was observed (Figure 10A-H).

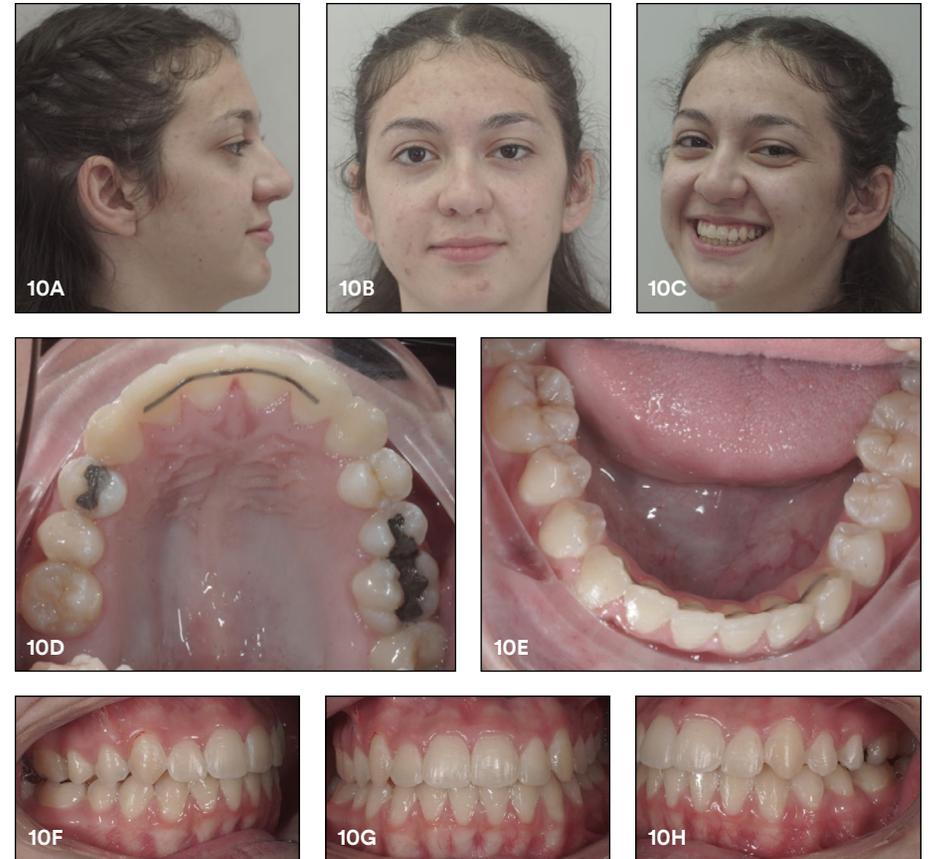


Figure 10A-H: 12-month follow-up.

### Wire sequence

- 0.014 in. Nitinol Heat-Activated archwires upper/lower.
- 0.016 in. Nitinol Heat-Activated archwires upper/lower (tandem).
- 0.014×0.025 in. Nitinol Heat-Activated archwires upper/lower.
- 0.019×0.025 in. Nitinol Heat-Activated archwires upper/lower.
- 0.019×0.025 in. Beta Titanium upper/lower.

Case photos provided by Dr. David Fleitman.

\*The patient gave her consent to take her picture and for them to be published.

## 3M<sup>SM</sup> Health Care Academy

# A reliable way to correct a Skeletal and Dental Class II, Div. I malocclusion with the 3M<sup>TM</sup> Incognito<sup>TM</sup> Lingual Appliance System.

*Non-compliance biomechanics and precise 3D control used to accomplish the planned outcome.*



**Roberto Stradi, DDS, Orthodontic Spec.,  
MSc Lingual Orthodontics**

Dr. Stradi received his post-graduation degree in Orthodontics in 2001 in Italy. He received his Master of Science in Lingual Orthodontics in 2016. He has been a clinical instructor in Lingual Orthodontics since 2001 and in charge of managing and teaching the Level II Master of Lingual Orthodontics at the University of Naples "Federico II" 2012-2017.

He is an international lecturer, active member of ESLO and WSLO and will serve as president of ESLO in 2020. Dr. Stradi has a private practice in Caserta, Italy.

In recent years, invisible orthodontic appliances have gained a lot of interest among both orthodontists and patients. In this respect, lingual appliances have proven to be potentially capable of correcting any type of malocclusion, regardless of the intrinsic difficulty.

The 3M<sup>TM</sup> Incognito<sup>TM</sup> Appliance System is a completely digital and customized lingual appliance, designed and manufactured for each single patient, customized in every single component, according to the doctor's requirements. It has been my only lingual appliance in the last 10 years and I've used it to treat many different types of malocclusion.

This case presentation shows a skeletal and dental Class II malocclusion treated with the Incognito System, in combination with Herbst appliance. Similar treatment options are reported in scientific papers, where this approach was used to treat skeletal and dental Class II patients, showing a very precise 3D control<sup>(1,2)</sup>.

### **Case Report: Female, 15 years old**

After the clinical examination and the evaluation of all the records, the patient was diagnosed as follows:

Skeletal and dental full cusp Class II, Div. I malocclusion, in a female patient, 15 years old, at stage CS4/CS5 of cervical vertebral maturation<sup>(3)</sup>.

The esthetic evaluation of the patient's profile evidenced a retruded mandible, confirmed by the S.N.Pg value (76°).

Sagittal discrepancy (A.N.Pg) was 8° confirming, also under a radiographic point of view, the skeletal nature of the malocclusion.

The mandible growing direction was clockwise (S.N./Go.Gn=39°), thus not favorable for this kind of discrepancy.

Lower incisors resulted proclined in respect to the mandibular plane (-1/Go.Gn=104°).

Overjet value was high (8mm) with a slight open bite tendency (ovb=0/-1 mm).

Interincisal angle was markedly reduced (-1/+1=111°).



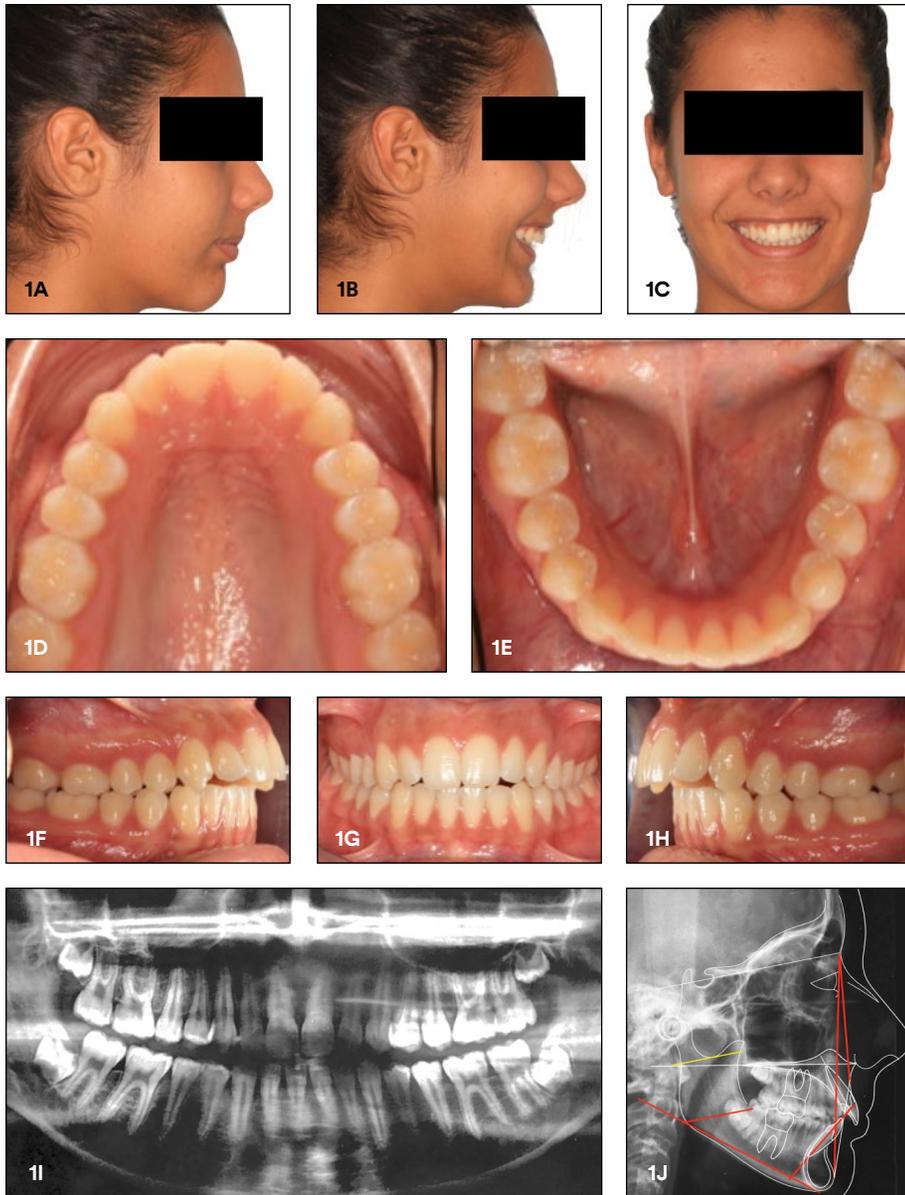


Figure 1A-J: Extra and intraoral pictures. Radiographs, tracing and values.

Initial Cephalometric Analysis		
Sagittal Sk. Relations	V.N.	Pre-Treatment
S.N./A	82° -/+ 3.5°	84°
S.N./Pg	80° -/+ 3.5°	76°
A.N./Pg	2° -/+ 2.5°	8°
Vertical Sk. Relations		
S.N./ANS-PNS	8° -/+ 3.0°	11°
S.N./Go.Gn	33° -/+ 2.5°	39°
ANS.PNS/Go.Gn	25° -/+ 6.0°	28°
Dento-Basal Relations		
+1/ANS.PNS	110° -/+ 6.0°	118°
-1/GoGn	94° -/+ 7.0°	104°
-1/A.Pg (mm)	2 -/+ 2 mm	0
Dental Relations		
OVJ (mm)	3.5 -/+ 2.5	8
OVB (mm)	3.5 -/+ 2.5	0
-1/+1	132° -/+ 6°	111°

Table 1: Initial cephalometric analysis.

### Treatment Plan

In agreement with the patient's expectations and according to the diagnosis and clinical evaluation, the therapy was planned to correct the sagittal skeletal and dental discrepancy, without tooth extractions.

Using the 3M™ Unitek™ Treatment Management Portal (TMP) software interface, I planned my patient's Incognito appliance. A CAD-CAM procedure in the laboratory in Bad Essen, Germany was used to customize the appliances according to the specific needs and requirements.

The target setup was realized in order to reach the planned final molar and canine Class I relationship (Figure 2A-E).

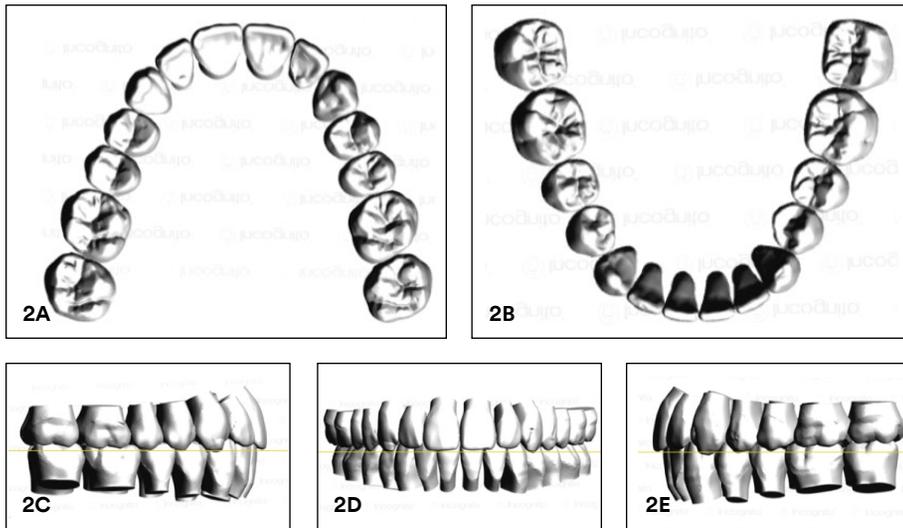


Figure 2A-E: Target setup.

The archwire sequence was chosen according to the treatment needs, in order to achieve the highest 3D control of the teeth position.

All the arches were individually designed by a specific software and shaped using a bending machine.

The archwires were ribbonwise, flat, and of the “Non-extraction” series (straight in the lateral section).

Three archwire materials and different sizes were ordered:

- Nickel Titanium
  - Upper and Lower: 0.014 in. round, 0.016×0.022 in., 0.018×0.025 in.
- Stainless steel
  - Upper and Lower: 0.018×0.025 in.
- Beta III Titanium
  - Upper and Lower: 0.0182×0.0182 in.

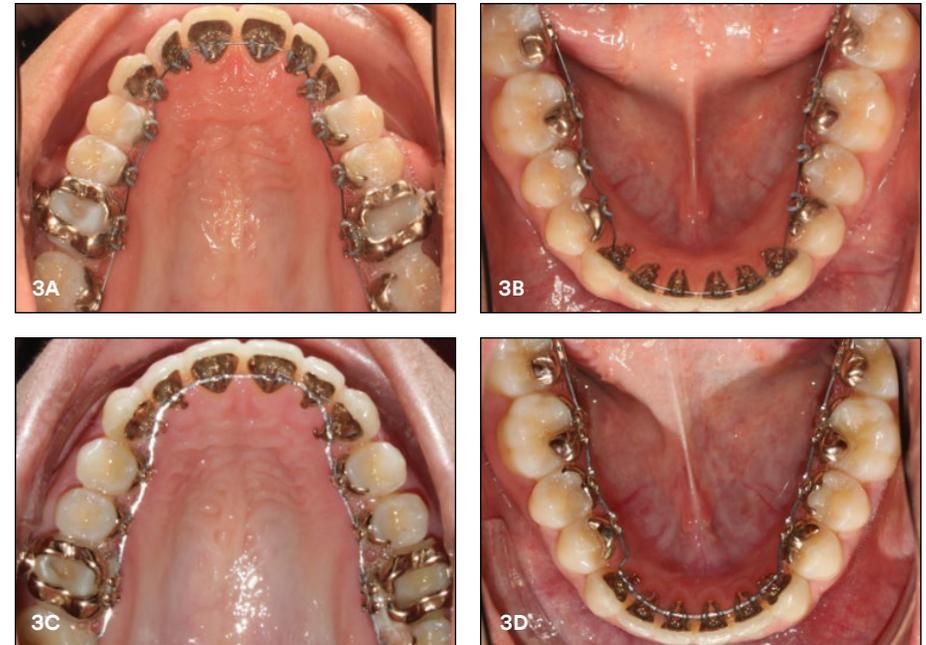


Figure 3A-D: Intraoral photographs with appliance.

The NiTi archwires were used to level, align, reshape the patient’s arches and set the right value of torque.

After the Nickel Titanium step, full size upper and lower SS archwires were inserted, in order to start the Herbst phase with maximum control (Figure 4A-C).



Figure 4A-C: Herbst in.

Progressively, with a step-by-step activation, the sagittal discrepancy was corrected and finally over-corrected, (Figure 5A-B) by inserting single, 2 mm activation rings, about every 2-3 months, 3 each side, in total. Then, the Herbst appliance was removed, after about nine months of use.

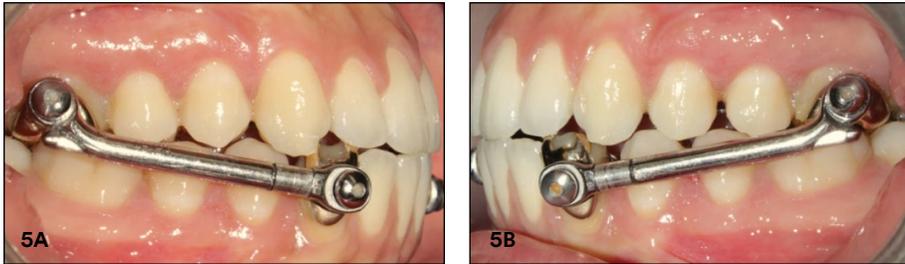


Figure 5A-B: Lateral intraoral photos.

Afterwards, about two months of Class II elastics (3/16", 4.5 oz) were used, from labial lower 6s, to lingual upper 3s.

Finishing and detailing procedures were accomplished by means of Beta III Titanium 0.182x0.182 in. archwires.

Final occlusal pictures show the outcome that was achieved. (Figure 6A-J).

Final Cephalometric Analysis			
Sagittal Sk. Relations	V.N.	Pre-Treatment	Post-Treatment
S.N./A	82° +/- 3.5°	84°	85°
S.N./Pg	80° +/- 3.5°	76°	83°
A.N./Pg	2° +/- 2.5°	8°	2°
Vertical Sk. Relations			
S.N./ANS-PNS	8° +/- 3.0°	11°	12°
S.N./Go.Gn	33° +/- 2.5°	39°	36°
ANS.PNS/Go.Gn	25° +/- 6.0°	28°	24°
Dento-Basal Relations			
+1/ANS.PNS	110° +/- 6.0°	118°	113°
-1/GoGn	94° +/- 7.0°	104°	101°
-1/A.Pg (mm)	2 +/- 2 mm	0	2
Dental Relations			
OVJ (mm)	3.5 +/- 2.5	8	1
OVB (mm)	3.5 +/- 2.5	0	1
-1/+1	132° +/- 6°	111°	126°

Table 2: Final cephalometric analysis.



Figure 6A-J: Final intraoral photos, final lateral X-ray and tracing confirm the corrections accomplished.

Extraoral photos, and the comparison “before and after” show the big change in the patient’s face, mainly evident in the frontal smile and from the lateral point of view (Figure 7A-B).



Figure 7A-B: Before and after.

#### In detail:

S.N.Pg value was increased from 76° to 83°, showing the advancement of Pg point.

Before treatment postero-anterior skeletal discrepancy (A.N.Pg) was 8°. It was reduced at 2°.

The mandible growing direction was not worsened during the treatment, rather the final value showed a slight reduction (S.N./Go.Gn went from 39° to 36°).

Due to the initial proclination (-1/Go.Gn=104°) and to the use of Class II biomechanics, lower incisor control was a very important target to achieve, as stated in literature.<sup>(4)</sup>

In this case, IMPA was very well controlled, and at the end it resulted even slightly reduced (101°).

Sagittal dental relations were all corrected, particularly the overjet was drastically reduced to 1 mm (8 mm at the beginning).

#### Conclusions

The use of Incognito Lingual System in combination with Herbst appliance to correct Class II malocclusions has been widely used and published in literature.

The corrections achieved in this patient are in accordance with the data published in the main orthodontic scientific journals<sup>(5, 6, 7)</sup>.

In this specific clinical case, this combination proved to be very effective, with a very strict and precise control over all the teeth.

#### References

1. Wiechmann D1, Schwestka-Polly R, Pancherz H, Hohoff A. Control of mandibular incisors with the combined Herbst and completely customized lingual appliance—a pilot study. *Head Face Med.* 2010; 11: 6-3.
2. Niko C. Bock, Sabine Ruf, Dirk Wiechmann and Theresa Jilek. Herbst plus Lingual versus Herbst plus Labial: a comparison of occlusal outcome and gingival health. *European Journal of Orthodontics*, 2016, 1–7.
3. Tiziano Baccetti, Lorenzo Franchi, James A. McNamara Jr. An Improved Version of the Cervical Vertebral Maturation (CVM) Method for the Assessment of Mandibular Growth. *Angle Orthodontist.* 2002; 72(4):316-23.
4. Weschler D1, Pancherz H. Efficiency of three mandibular anchorage forms in Herbst treatment: a cephalometric investigation. *Angle Orthod.* 2005; 75(1):23-7.
5. Wiechmann D1, Schwestka-Polly R, Pancherz H, Hohoff A. Control of mandibular incisors with the combined Herbst and completely customized lingual appliance—a pilot study. *Head Face Med.* 2010 (11); 6:3.
6. Alouini O, Wiechmann D. Completely-customized lingual orthodontics to correct Class II malocclusion in adolescents *Orthod Fr.* 2018 Mar;89(1):3-19.
7. Bock NC, Ruf S, Wiechmann D, Jilek T. Herbst plus Lingual versus Herbst plus Labial: a comparison of occlusal outcome and gingival health. *Eur J Orthod.* 2016 Oct;38(5):478-84.

Case photos provided by Dr. Roberto Stradi.

# Crowding and protrusion treated by unusual extractions



## Gianluigi Fiorillo, DDS

Dr. Gianluigi Fiorillo received his degree in Dentistry from La Sapienza University of Rome in 1992 and postgraduate Certificate in Orthodontics in 2000 from the University of Ferrara. Since 2007 he has been a visiting professor of D'Annunzio University of Chieti, also in 2015 at the Second University of Naples and in 2016 at the University of Catania.

He coordinates (in Italy) the 3M<sup>TM</sup> MBT<sup>TM</sup> Versatile+ Appliance System study group and is the author of the orthodontic blog [mbteam.co](http://mbteam.co). Dr. Fiorillo lives and works in Rome, dealing exclusively in orthodontics. Dr. Fiorillo has a private practice in Rome, Italy.

## Abstract

*A 16-year-old male with Class II malocclusion, anterior open bite, crowding and labial inclination of incisors with the treatment plan for avoiding upper premolars extraction because of bad conditions of first upper molars. The choice was four extractions and specifically upper first molars and lower first premolars. TADs were used in mesial area of upper second molars and applied usual sliding MBT mechanics with lacebacks and posted/tie-backs. In upper arch the tie-backs were from head of TAD to hook of wire, in order to allow the exclusive movement in distal direction of upper anterior teeth. Once the canine Class I is obtained, the TADs have been unscrewed, and the tie-backs anchored to the molar tubes. Sliding is achieved without difficulty and the case – after a brief period of occlusal settling – was completed in 19 months.*

## Introduction

The use of extractions in an orthodontic treatment is generally due to the absence of space and the obtainment of canine and molar keys. The teeth that are most frequently subjected to extractions are the premolars. However, on some occasions it's convenient to extract other teeth, for example teeth with destructive caries, with root canal treatments, impacted or with compromised periodontium. Choosing unusual extractions is made easier by good anchorage control due to the widespread use of TADs. Furthermore, it is necessary to associate efficient brackets that allow sliding biomechanics to provide low friction and resistance to breakage and detachments.

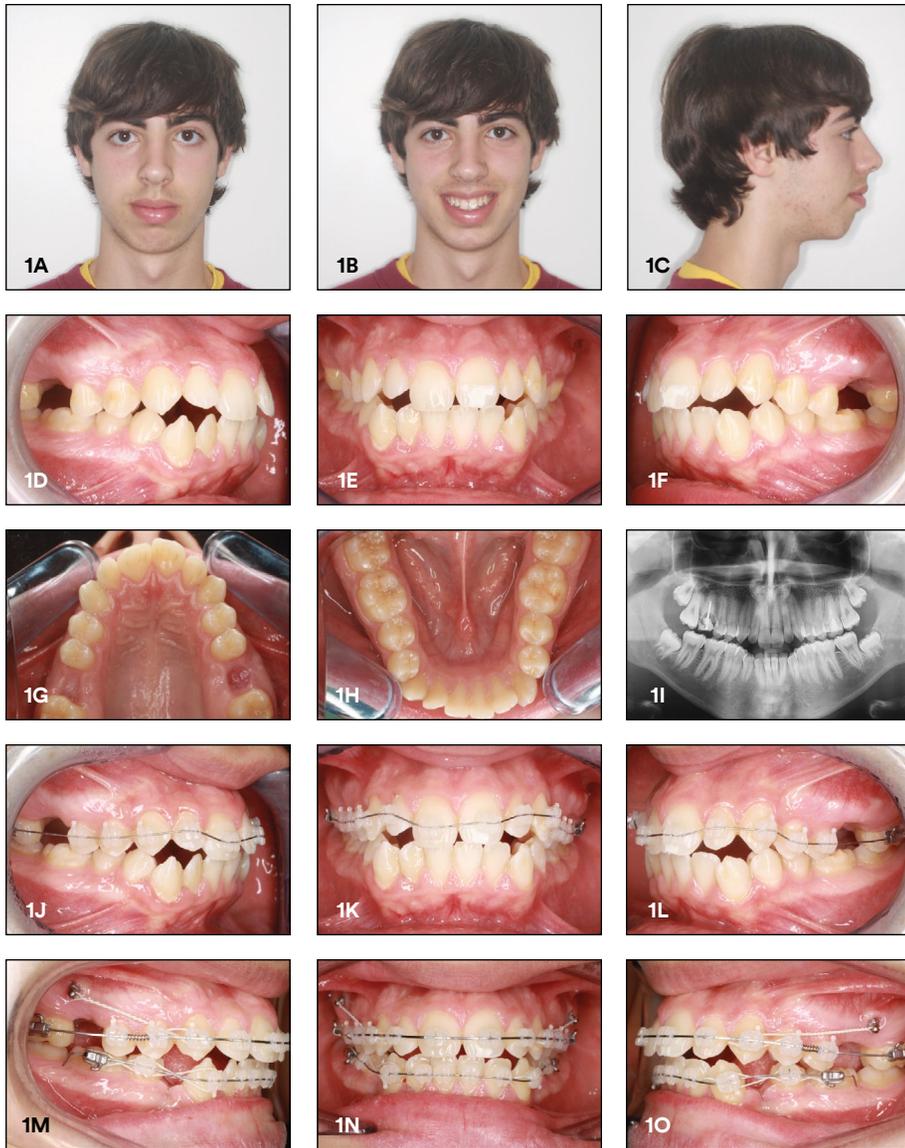


Figure 1A-O

## Case Report

The case shown is a 16-year-old male with Class II skeletal characteristics and Class I dental relations. The intraoral clinical description is completed with crowding, incisors protrusion, negative overbite, positive overjet, upper compromised first molars and, in extraoral aspect, labial incompetence and back position of the chin. The analysis of space and the evaluation of the profile suggest for an extractive treatment and, despite the initial choice about the extraction of four first premolars, it has been decided to sacrifice the first upper molars and the first lower premolars. This idea requires great attention to anchorage control and for this reason it is established that two TADs will be used in the buccal area mesially to the second upper molars.

Two weeks after the first molars were extracted, the 3M™ Clarity™ Advanced Brackets using the 3M™ MBT™ System prescription were applied in the upper jaw in combination with a 0.014" NiTi SE archwire. No laceback was applied to avoid unwanted mesialization of the second molars. The extractions of first lower premolars were performed within two weeks of upper bracketing, but no braces were applied to allow distal driftodontics of canines. At the fourth month, the braces were also applied in the lower arch in combination with lacebacks and archwire 0.014 NiTi SE; in the meantime, in the upper arch, the sequence was 0.016 NiTi SE and 0.017"×0.025" NiTi with tie-back from TADs to canines to anchor them and open coil spring between first and second premolars. The open coil spring causes a desired action on the second premolar which can distalize and the unwanted reactive force is neutralized by the tie-back.



Figure 2A-E

At the sixth month, the second premolar reached the final position with the palatal cusp in contact with the central area of the mesio-distal sulcus of the first lower molar; the closure of the extractive space, already partially realized for spontaneous movement, continues thanks to the laceback in esthetic coated wire 0.012". The backward movement of the other upper dental elements takes place with an elastic long chain connecting the TADs to the canines, while the premolars are tied by preformed coated 0.012" ligature to reduce friction. The long chain is pulled as little as possible, to avoid canine's negative tip and bowing effect on the arch. The incisors follow the distal movement of the canines through the pressure of the lip.

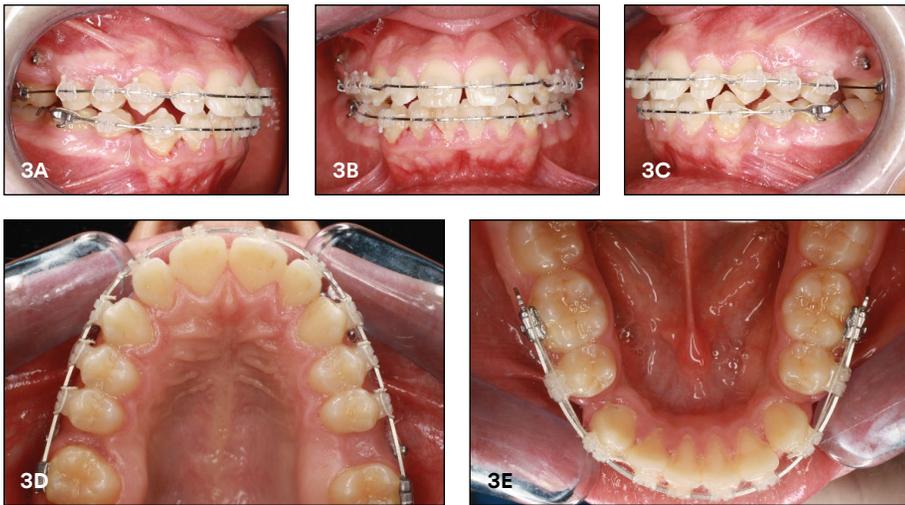


Figure 3A-E

In the seventh month, the lower spaces are reduced to about 2 mm per side and the biomechanics continues with laceback and 0.017"×0.025" NiTi HA archwire. In the upper arch, instead, a long elastic chain connects the TADs to all six anterior teeth, while a step-up using archwire 0.017"×0.025" NiTi HA compensates for the possible bowing effect and the reduction of incisors' inclination.

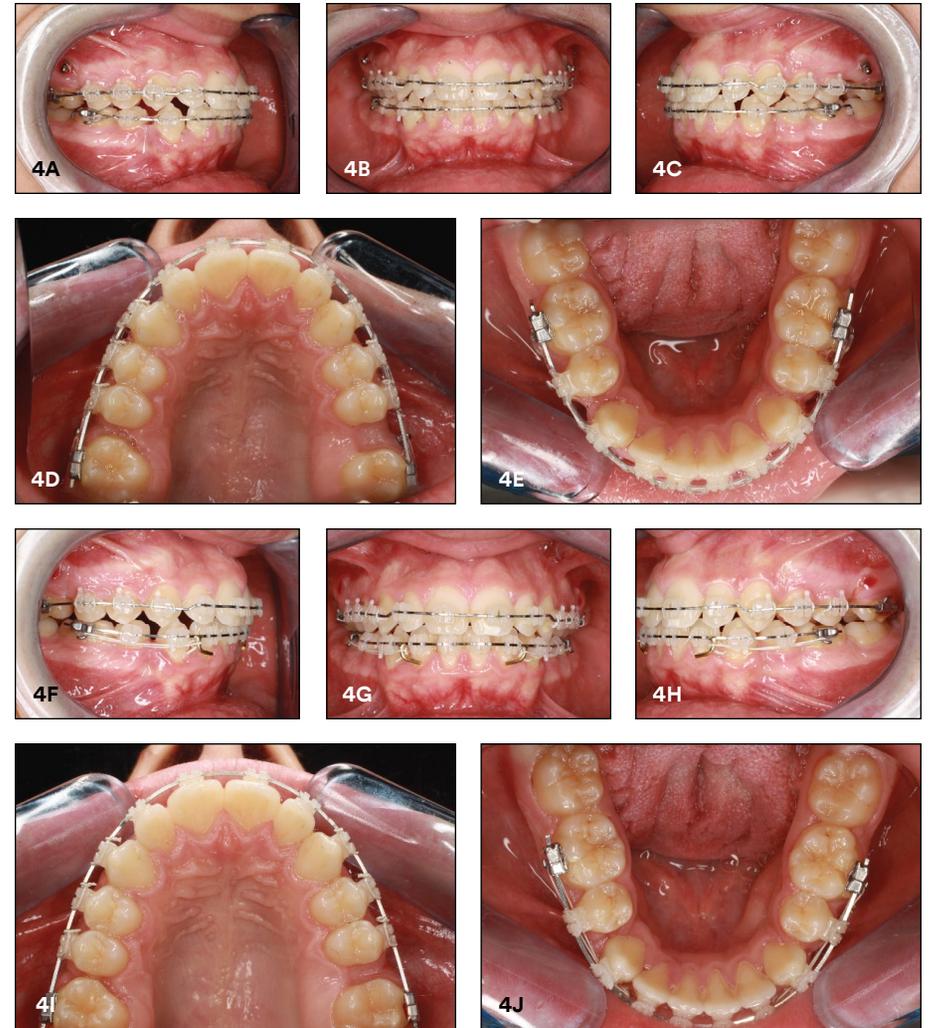


Figure 4A-J

At the eighth month, a 0.019"×0.025" posted archwire, with classic passive Teflon coated 0.012" wire tie-backs, is applied in the lower arch. In the upper arch a 0.019"×0.025" NiTi Super Elastic archwire with step-up on the incisors and bend backs to maintain the arch length during leveling and anterior torquing. Both miniscrews (Ortho Implant, 8 mm) are removed because they have finished their function. Having sped up the closure of the spaces compared to the usual MBT method, at this point it is necessary to, as they say, let it cook.

In the 10th month, a posted archwire 0.019"×0.025" is also applied in the upper arch, and also on this thread the step-up is done: the alternative would have been to reposition the braces on the incisors. At the same time the patient applies intermassellar Class II elastics (3/16", 6 oz), to improve the molar and canine keys. In both arches, elastic tie-backs are present to close the remaining extraction spaces.

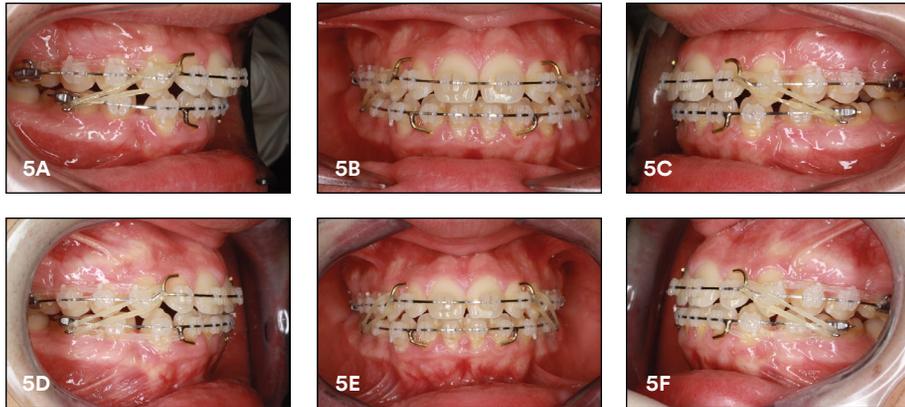


Figure 5A-F

At the 13th month, we are in the finishing phase: in the lower arch we recapitulate by applying again an 0.017"×0.0125" NiTi HA archwire, on which we can model second order bends on the right side to obtain the occlusal landing. To achieve this, a 1.5 mm step plier was used. The lower second molars are excluded on the device because they show a good alignment with a good coincidence of the marginal ridges.

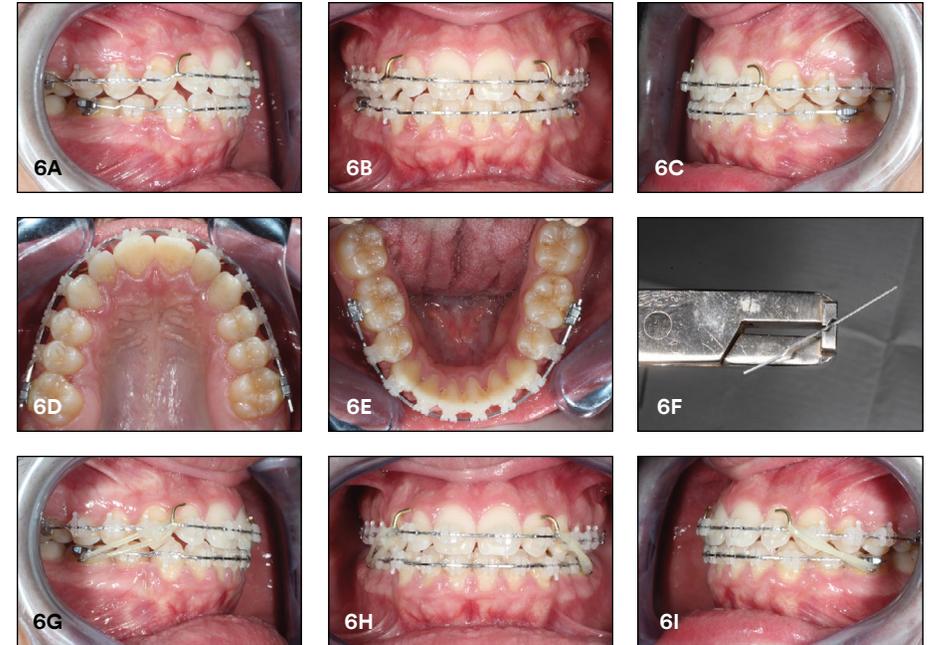


Figure 6A-I

## Conclusions

The treatment is carried out in a very short time for an extractive case in which some of the extractive spaces correspond to about 10 mm.

The total duration of the treatment was 16 months, with a final result that is characterized by a good Class I canine relationship, a desired hyper Class III molar, coincidence of the midlines, good control of the incisor torque and consequent good support of the lips and functional labial competence.

During the treatment, there were only two detachments of molar tubes and a bracket of the second right lower premolar, no breakage and the closure of the spaces in sliding mechanics occurred without delay to the apparent and usual speed of about 1 mm per month. The choice to exploit driftodontics initially proves to be effective especially in cases of protrusion and crowding where labial pressure can be exploited; moreover, the choice of extracting the upper molars allowed not to disturb the smile for a long period – considering the “social moment” of the teen patient. In the meantime, the third molars have found space to make their appearance in the arch. To conclude, it should be pointed out that without the skeletal anchorage, obtained with two 8 mm mini screws, we would not have been able to distalize five teeth per side leaving the second molars in the initial position.

### References

1. Effects of first molar extraction on third molar angulation and eruption space. M.Bayram, M.Özer, S.Arici. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology,. Volume 107, Issue 2, 2009, Pages 14-20
2. Upper Canine Extractions in Adult Cases with Unusual Malocclusions. G.Fiorillo, F.Festa, C.Grassi. Journal of clinical Orthodontics. Feb 2012, Pages 102-110
3. Stability of anterior open-bite extraction and nonextraction treatment in the permanent dentition. G.Janson, F. Pinelli Velarelli, R.Targino Beltrao, M.R.de Freitas, J.F.Castanha Henriques. American Journal and Dentofacial Orthopedics, Volume 129, Issue 6, June 2006, Pages 768-774
4. A cost-effectiveness analysis of anchorage reinforcement with miniscrews and molar blocks in adolescents: a randomized controlled trial. Ni. Ganzer, I. Feldmann, S. Petrán, La. Bondemark. European Journal of Orthodontics. June 2018

Case photos provided by Dr. Gianluigi Fiorillo.

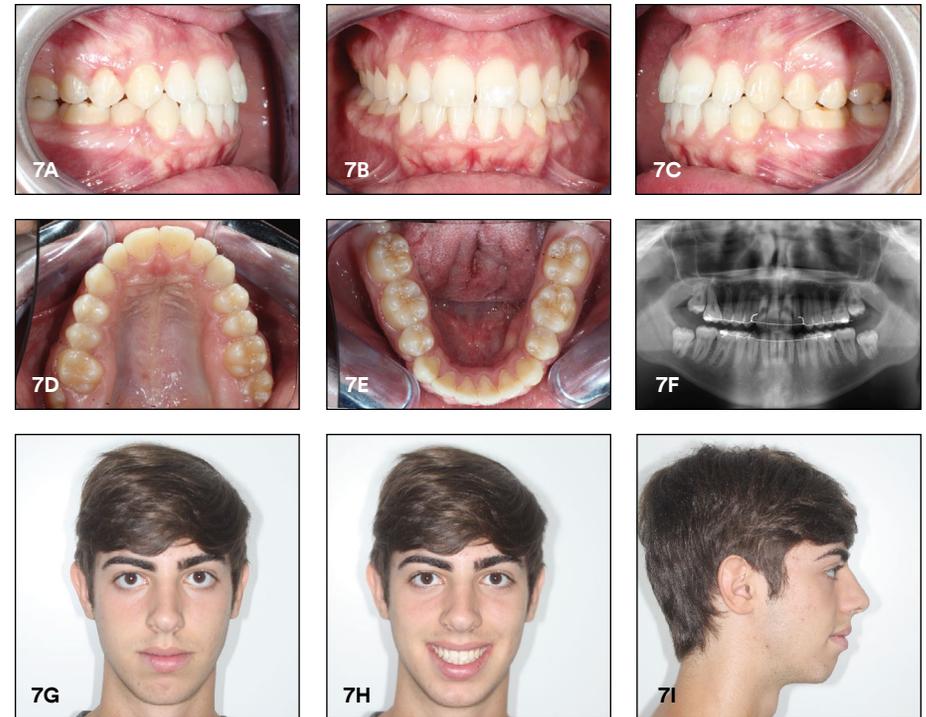
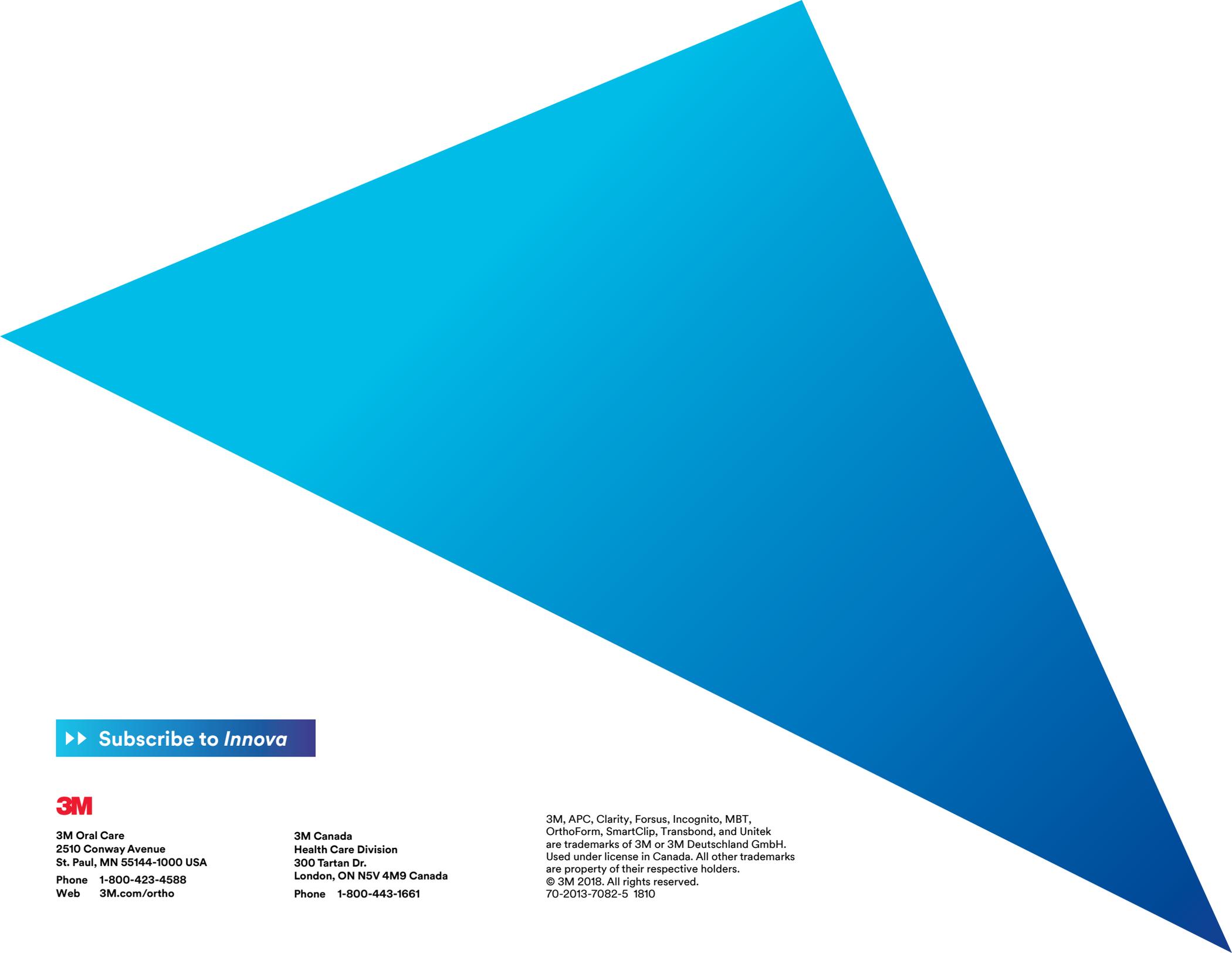


Figure 7A-I



▶▶ **Subscribe to *Innova***

**3M**

**3M Oral Care**  
2510 Conway Avenue  
St. Paul, MN 55144-1000 USA  
Phone 1-800-423-4588  
Web [3M.com/ortho](http://3M.com/ortho)

**3M Canada**  
Health Care Division  
300 Tartan Dr.  
London, ON N5V 4M9 Canada  
Phone 1-800-443-1661

3M, APC, Clarity, Forsus, Incognito, MBT, OrthoForm, SmartClip, Transbond, and Unitek are trademarks of 3M or 3M Deutschland GmbH. Used under license in Canada. All other trademarks are property of their respective holders.  
© 3M 2018. All rights reserved.  
70-2013-7082-5 1810