



News and Information

Orthodontic Perspectives

Innova

Clinical Case Studies





Mary Jo Abler

Message from the President 3M Unitek

How fast time goes by. 3M Unitek recently marked a milestone of 1 Million Cases Treated with our ground-breaking Forsus™ Fatigue Resistant Device. Now we celebrate the 10-year anniversary of the unique SmartClip™ Appliance System. These accomplishments say a great deal about the value of these systems in orthodontic treatment, and the benefits that these products bring to both doctors and patients.

Of course, each of these systems has evolved over the years, with input from clinicians and our teams providing pathways toward improvement. We fully understand that this is what must happen to make our products not only the ones you choose, but also those you continue to choose, in an ever-changing treatment environment. Innovation and improvement are the foundation of what we do as a company, and these provide an important difference in making 3M Unitek your choice for products and services.

In this light, I would like to bring to your attention a new 3M information service. The 3MSM Health Care Academy is our recently announced framework for customer education, providing a new and enhanced experience for health care professionals. It draws on 3M's extensive worldwide physical assets, people and ePlatforms across our 3M Health Care Business Group, to deliver high-quality, trusted education. Our goal is to partner with our customers to protect and improve the health of people around the world.

Watch for announcements that include the 3M Health Care Academy name and distinctive look. Over time, we hope that it will become a preferred and trusted resource for quality health care education for you and your staff. Additional information about our upcoming educational opportunities is included in this issue.

Please take a few minutes to enjoy this issue of *Orthodontic Perspectives Innova*. We feature three articles by doctors who have chosen our Clarity™ ADVANCED Ceramic Brackets for their patients, and much more. As always, we encourage you to contact us if you have any questions or comments about the items contained here. And best wishes for the remainder of 2014.

3M
Health
Care
Academy



Orthodontic Perspectives Innova is published periodically by 3M Unitek to provide information to orthodontic practitioners about 3M Unitek products. 3M Unitek welcomes article submissions or article ideas. Contact address: Editor, Orthodontic Perspectives Innova, 3M Unitek, 2724 South Peck Road, Monrovia, CA 91016-5097. To call for more information: In the United States and Puerto Rico, call (800) 852-1990 ext. 4399. In Canada call (800) 443-1661 and ask for extension 4399. Or, call (626) 574-4399 (direct).

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Victory Series™ Active Self-Ligating Brackets Introduced

Victory Series™
Active Self-Ligating Brackets

If you attended the AAO Annual Session this past April, you had the opportunity to be among the first to get a glimpse of this significant new addition to the industry benchmark Victory Series brand. An important addition to the passive self-ligating brackets already available from 3M Unitek, these brackets have been designed from the bottom up to overcome many of the shortfalls of existing active SL brackets that are currently in use.

“Compared to other active SL brackets I have used in the past, the Victory Series™ Active SL Bracket is superior in the areas of door functionality and contouring and adhering to the tooth.”

— Dr. Sabeeh Khan, Merrick, NY, USA

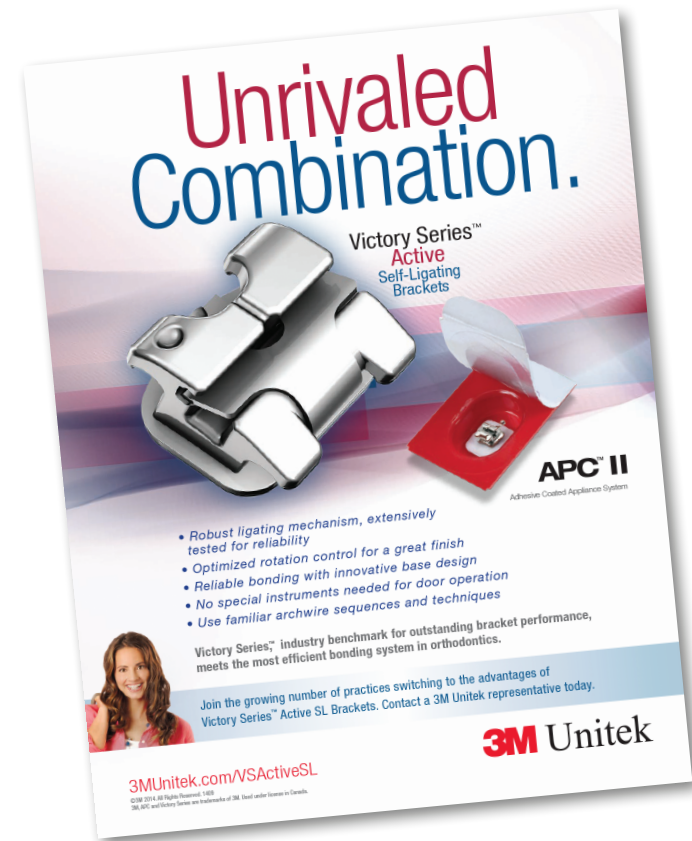
“The Victory Series™ Active SL Bracket is a great design.

The door mechanism seems to open and close very easily. We have had some issues with the competitions' doors getting bent as treatment progresses. Although still early in treatment, we have not noticed this with the Victory Series Active SL Brackets.

It is also very nice having the adhesive on the brackets.

This is by far one of the greatest advantages with all the 3M Brackets.”

— Dr. Jeff Housley, Owasso, OK, USA



>> Learn more about Victory Series Active SL Brackets
on the 3M Unitek website at 3MUnitek.com/VSActiveSL

Clarity™ ADVANCED Ceramic Brackets – More Rx's and Worldwide Availability

CLARITY™ | **ADVANCED**
advanced ceramic brackets

Explosively popular Clarity™ ADVANCED Brackets are now available in the world's three most requested prescriptions, including the MBT™ Appliance System, Roth* and High Torque. All three may be ordered in .018 or .022 slot sizes, with a choice of APC™ Adhesive coating or as uncoated brackets. Clarity ADVANCED Brackets have been teamed recently with APC™ Flash-Free Adhesive, with exciting results for both doctors and patients. A new Parts List is available on the 3M Unitek website. Also, read more about Clarity ADVANCED brackets in articles on pages 6, 14, and 23.

>> Learn more about Clarity ADVANCED Brackets at 3MUnitek.com!



*3M Unitek version of this prescription. No endorsement by the Doctor is implied.

SmartClip™ Self-Ligating Brackets Reach 10-Year Milestone

Now available with APC™ Flash-Free Adhesive!



The SmartClip™ Self-Ligating Appliance System was launched in 2004, with a goal to provide practitioners with an innovative, efficient treatment system and to provide patients with an improved experience and outstanding results.

Over the past decade, we've heard from many users about how the SmartClip System has helped to shorten overall treatment times, decrease the required number of appointments for individual cases, and shorten appointment times. We take pride in hearing these stories, as we know that the SmartClip System has made a positive difference for thousands of clinicians and their patients around the world.

SmartClip Appliances have evolved over time to improve functionality and increase treatment options. Input from users has helped us make the SmartClip™ SL3 System even better than the original. Now, with the addition of APC™ Flash-Free Adhesive to its options, you have more ways than ever to be efficient.

>> Find out more about the SmartClip Self-Ligating System by visiting 3MUnitek.com.

Next Generation 3M™ True Definition Scanner Announced

3M has announced exciting technological transformations to the 3M™ True Definition Scanner. The next generation system includes a revolutionary new wand with a profile so slim that it's the smallest on the market. The new system is being released this fall in tandem with 3M™ True Definition Scanner Software 5.0 that supports faster, easier scanning with the same superior accuracy.

The new 3M True Definition Scanner system was built for fast scanning – once the field is prepared, an adept user can scan a diagnostic arch in as little as 60 seconds. The new wand is designed to fit in the hand like a traditional dental handpiece, with a narrow, angled tip and a slim profile so ergonomically balanced it allows for one-handed scanning. This significantly enhances the reach to the challenging posterior anatomy. The small

profile and fast scan time make scanning with the redesigned 3M True Definition Scanner system more comfortable for dentists, orthodontists, their staff and patients.

The new, next generation 3M True Definition Scanner continues to be more accurate – and more consistently accurate – than leading systems on the market.¹ The outstanding accuracy leads to reduced seating times and has been clinically proven in thousands of cases in the past 12 months, with a fit rate of 99.7%.²

>> Visit 3MUnitek.com for more information.

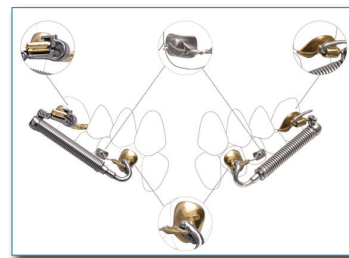


1-2. Data on file.

Incognito™ Appliance System Adds Precision and Customization Enhancements

Users of the Incognito™ Appliance System now have two new resources to add precision and customization to the treatment process. The *Incognito™ Clear Precision Tray* uses the scanned digital data created for the bracket design to create a precision tray which significantly improves the accuracy of bracket placement in indirect bonding. It can also be used as a rebonding “jig” for accurately replacing brackets. Also announced is a customized lower arch labial attachment that permits easy and secure installation of Forsus™ Class II Correctors. Either the Forsus™ EZ2 Module or the L-Pin Module can be used with this attachment.

Contact your 3M Unitek Representative for more information.



Successful outcomes
begin with a precise
start



Clarity™ ADVANCED Ceramic Braces Make a Difference for My Patients

CLARITY™ | ADVANCED
advanced ceramic brackets

APC™ Flash-Free
Adhesive Coated Appliance System



Dr. Emmanuel Dumu, Jr.

A graduate in Dental Science from the Université Libre in Brussels in 2006, Dr. Emmanuel Dumu Jr. has specialized in dento-facial orthopedics since 2010. He continues to devote part of his time to academic work for the university. Dr. Dumu has presented several seminars and run workshops for various dental and orthodontic bodies.

At his own new orthodontic practice and the other three general practices where he practices orthodontics, Dr. Dumu prides himself on finding the best possible solutions for his patients, and using the best available treatment techniques. In this respect, he stresses the importance of creating “a beautiful smile” in the shortest possible time.

It goes without saying that smiling is extremely important in modern society. Through its impact on the child's psychological development,^{1,2} and how adults are perceived by the outside world,^{3,4,5} the smile, and especially the desire to have an attractive smile, has led more and more patients to the orthodontist's practice. This “golden age” of orthodontics is particularly evident in Brussels, at the heart of Europe, where my practice is located.

Many studies have shown that adolescents really want to be able to smile.^{6,7} My prime aim is to put a smile on my patients' faces, and to do so as quickly as possible. For this, I need to work with the finest materials: ones that I can trust, that suit my working methods and meet my patients' wishes.

The prospect of wearing an orthodontic appliance naturally makes patients anxious, and it often takes some time for them to get used to their new image. They increasingly want the appliances they have to wear to be “cosmetic” or “invisible.” That is why Clarity™ ADVANCED Ceramic Brackets have become my braces of choice for use on the upper arch.

What I expect of a cosmetic orthodontic brace:

- Quality: remains intact; retains its color
- Robustness: durability; excellent adhesion; resists deformation of the dental arch
- Performance: allows the teeth to move as necessary (mechanical sliding, torque, tipping, etc.); easily attached
- Patient comfort: small; non-irritant; low profile; rounded edges
- Discreetness: transparent; matches tooth color



All these features can be found in Clarity ADVANCED Brackets.



Figure 1: Class III patient.



Figure 2: Class III patient four months after appliance was placed.



Figure 3: Correction of maxillary occlusion using miniscrews.

Patients do, however, seem increasingly unconcerned by the idea of wearing these remedial appliances. Here are three reasons:

- Members of my own team are asking for them!
- Patients are recommending them to their own family, friends and acquaintances
- My referring dentists are sending me more and more patients!



Figure 4: Intra-oral view of a fellow dentist wearing Clarity™ ADVANCED Ceramic Brackets.

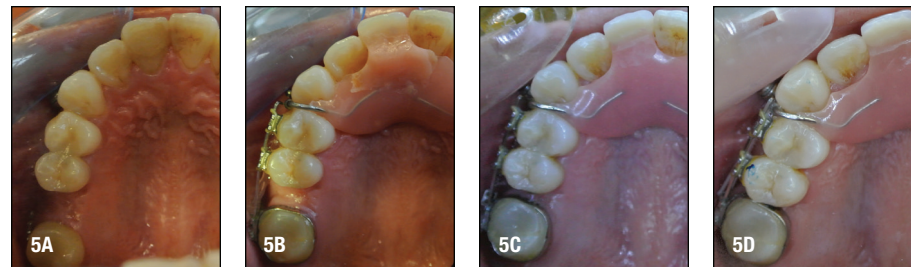


Figure 5A-D: Unfortunately she lost her front central incisor. She's now wearing a prosthetic device plus a miniscrew for space closure.

The availability of APC™ Flash-Free Adhesive with Clarity ADVANCED Brackets has led to many changes in my private practice, some being quite significant.

1. I have experienced much shorter times to attach the brackets. More specifically:

Average bonding times for upper and lower braces:

APC™ Flash-Free vs APC™ PLUS Adhesive: 30 minutes vs. 40 minutes

APC PLUS Adhesive vs Non-APC Adhesive: 40 minutes vs. 50 minutes

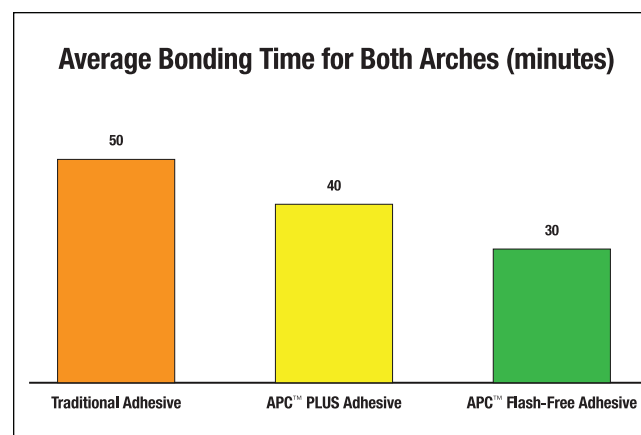


Table 1: Appliance bonding time for a single arch and both arches using Clarity™ ADVANCED Ceramic Brackets with APC™ Flash-Free Adhesive, 0.14 NiTi archwires, on this patient.

There are three things I find particularly attractive with APC Flash-Free Adhesive:

- Primary stability when I position the bracket over the teeth.
- The thin film of adhesive spread when pressing the bracket into its final position.
- There is no need to clean around the bracket before polymerization.

2. Planning appointments:

The patient no longer needs to wait for months before the appliance is fitted. The appointments for fitting the brace are much easier to plan. This is a direct consequence of the time-saving mentioned above! We no longer need to allow for long appointment times!

3. Easier debonding:

I have always been slightly apprehensive of debonding with a ceramic appliance. But thanks to the Stress Concentrator on the Clarity ADVANCED bracket base, this exercise becomes child's play. What's more, it is even easier to clean the teeth, since very little adhesive remains on the teeth.

4. Fewer dental emergencies:

There are fewer cases of a dental brace becoming detached with the APC Adhesive coated Clarity ADVANCED Brackets, which I attribute to a combination of several factors, including better polymerization (light passes more easily through the bracket) and easier maintenance by the patient. Of course, it may simply be argued that patients who wear Clarity ADVANCED brackets are more meticulous!

Taking a sample of 80 of my patients, 40 of whom were fitted with Clarity ADVANCED APC Flash-Free Brackets and 40 with Victory Series™ Low Profile Brackets (metal) with APC™ PLUS Adhesive coating, we found that the rate of detachment for the Clarity ADVANCED Brackets was less than half that of the Victory Series Brackets!

Conclusion

In my practice, we are delighted to be able to include Clarity ADVANCED Ceramic Brackets with APC Flash-Free Adhesive among our range of treatments. These appliances meet patients' expectations and my own treatment requirements. They save me time, thus enabling me to treat more patients, without in anyway forcing me to compromise on efficacy!

Case photos provided by Dr. Emmanuel Dumu, Jr.

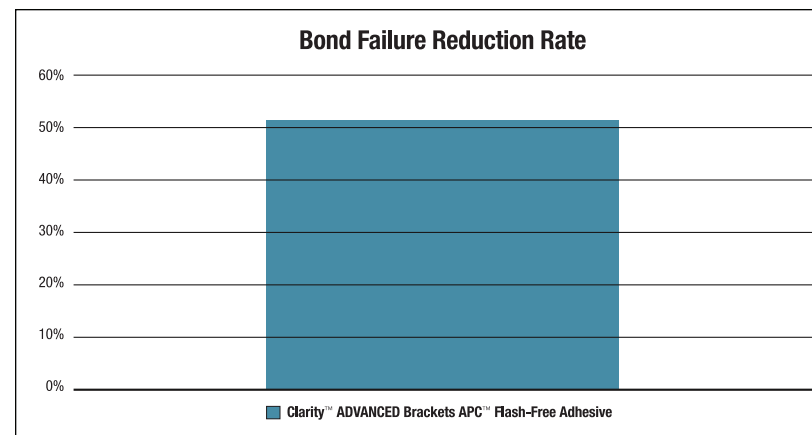


Table 2: Bond failure rate reduction with APC™ Flash-Free Adhesive on Clarity™ ADVANCED Ceramic Braces vs. APC™ PLUS Adhesive on Victory Series™ Metal Brackets in my office. Bias: My patients wearing Clarity ADVANCED Braces are generally older, and can be considered somewhat more conscientious, and ceramic braces are different in construction compared with metal braces.

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7. Bernabe E, Flores-Mir C 2006, Orthodontic treatment need in Peruvian young adults evaluated through dental aesthetic index. *Angle Orthodontist* 76: 417- 421.

Incognito™ Appliance System Courses 2014-2015

Incognito™
Appliance System

Kuching, Sarawak, Malaysia October 15-16, 2014

Speaker

Dr. Wilson Lee
Prof. Young-Guk Park

Language

English

Contact

Malaysian Association of
Orthodontists (MAO),
Pre-Congress for the 9th APOC
+60 82415175
chairperson@9apoc.com,
orgsec@9apoc.com,
secretariat@9apoc.com
www.9apoc.com

Mexico City, Mexico October 23-24, 2014

Speaker

Dr. Eduardo Alvarez

Language

Spanish

Contact

3M Unitek Latin America
Jair Lazarin
+52 55 52700 0400 ext. 1422
jlazarin@mmm.com

Düsseldorf, Germany November 7-8, 2014

Speaker

Dr. Esfandiar Modjahedpour

Language

German

Contact

3M Unitek Germany
Brigitte Mader
+49 8191-9474-5015
brigitte.mader@mmm.com

Hiroshima, Japan December 3-4, 2014

Speaker

Dr. Shoji Sugiyama

Language

Japanese

Contact

3M Unitek Japan
Yuki Nishikawa
+81 3 6409 3637
ynishikawa@mmm.com

Moscow, Russia November 1-2, 2014

Speaker

Dr. Sergey Popov

Language

Russian

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aestelior
+7-921-900-1252
aestelior@yandex.ru

Tokyo, Japan November 12-13, 2014

Speaker

Dr. Keizo Hirose
Dr. Shoji Sugiyama

Language

Japanese

Contact

3M Unitek Japan
Yuki Nishikawa
+81 3 6409 3637
ynishikawa@mmm.com

Seoul, Korea December 6-7, 2014

Speaker

Prof. Young Guk Park
Dr. Jae Sik Hur

Language

Korean

Contact

3M Unitek Korea
Hyemin Park
+82 2 3771 4927
hpark14@mmm.com

New courses are added on a regular basis.
Please refer to www.incognito.net
for the latest version.

Incognito™ Appliance System Courses 2014-2015 *continued*

Incognito™
Appliance System

► Incognito™ Appliance System Advanced Course

Tel Aviv, Israel
October 30, 2014

Speaker
Dr. Adam Schulhof

Language
English

Contact
Anat Lipnik
054-4454748
09-7419325
anat@intertec-ortho.com

► Incognito™ Appliance System Users Meeting

Tokyo, Japan
October 9, 2014

Speaker: Dr. Shoji Sugiyama and Dr. Keizo Hirose

Language: Japanese

Contact: 3M Unitek Japan
Yuki Nishikawa
+81 3 6409 3637
ynishikawa@mmm.com

Paris, France
December 6, 2014

Speaker: Various

Language: French

Contact: Details will follow soon!

Orlando (Florida), USA
March 13-14, 2015

Speaker: Various

Language: English

Contact: 3M Unitek U.S.
Anh Menard
800-852-1990
almenard@mmm.com

Rome, Italy
November 22, 2014

Speaker: Various

Language: English with Italian and Russian translation

Contact: www.cmmevents.net/incognitorome

Register Now!

International Incognito™ Appliance
System Users Meetings

November 22, 2014

Villa Miani; Rome, Italy
www.cmmevents.net/incognitorome

March 13-14, 2015

Hotel Waldorf Astoria; Orlando, Florida USA
3MUnitek.cvent.com/incognitoorlando

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regular basis. Please refer to
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Treating Class II: The Incognito™ Appliance System with Forsus™ Class II Correctors

Presenter: Dr. Beyza Kircelli

In this CE webinar, Dr. Beyza Kircelli reviews options for lingual Class II treatment. She shares successful aesthetic and compliance-free treatment results with the recently introduced Incognito™ System for Forsus™ Fatigue Resistant Device, which includes a new lower labial attachment.

Live Webinar Schedule

CEU: 1

Fri 10/10/14: 12:00 PM ET
11:00 AM CT
9:00 AM PT
Fri 10/10/14: 4:00 PM UTC

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Anterior-posterior Control with the Unitek™ Temporary Anchorage Device (TAD) System: Part 2

Presenter: Dr. Mohammad Razavi

Continuing his exploration of the Unitek™ Temporary Anchorage Device System, Dr. Moe Razavi describes the use of indirect anchorage to protract posterior dental segments in both the maxillary and mandibular arches. Specifically, he presents how to utilize a combined TransPalatal Arch (TPA) / TAD system to protract maxillary posterior segments in canine substitution cases, as well as protraction of mandibular molars using indirect anchorage to close the space of congenitally missing second premolar teeth.

Live Webinar Schedule

CEU: 1

Fri 10/17/14: 12:00 PM ET
11:00 AM CT
9:00 AM PT
Fri 10/17/14: 4:00 PM UTC

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What has the SmartClip™ Appliance System Done for My Practice?

Presenter: Dr. Anoop Sondhi

Celebrating the 10 year anniversary of the SmartClip™ Self-Ligating Appliance System, Dr. Anoop Sondhi shares his experience with this unique self-ligating system. Dr. Sondhi has built his practice on efficiency and in this webinar shares how the SmartClip System has contributed to his success. Dr. Sondhi also shares tips on how you can realize efficiencies such as shorter overall treatment time, shorter chairtime and fewer appointments when treating with the SmartClip System.

Live Webinar Schedule

CEU: 1

Fri 10/24/14: 12:00 PM ET
11:00 AM CT
9:00 AM PT
Fri 10/24/14: 4:00 PM UTC

3M Unitek Live Webinar Schedule *continued*



Precision Taken to the Next Level: Lingual Treatment with the Incognito™ Clear Precision Tray

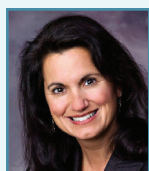
Presenter: Dr. Dagmar Ibe

Reliable and precise placement of brackets is essential for an ideal treatment result in lingual treatment. Now accuracy can be further improved with a new bonding tray. In this CE webinar, Dr. Dagmar Ibe shares how the Incognito™ Clear Precision Tray has helped make her lingual cases easier to finish, and more accurate. She demonstrates clinical tips and tricks to optimize the usage of the Incognito Clear Precision Tray.

Live Webinar Schedule

CEU: 1

Fri 11/7/14: 12:00 PM ET
 11:00 AM CT
 9:00 AM PT
 Fri 11/7/14: 5:00 PM UTC



What has the SmartClip™ Appliance System Done for My Practice?

Presenter: Dr. Lisa Alvetro

Dr. Lisa Alvetro relies on the efficiencies of the SmartClip™ Self-Ligating Appliance System as her appliance of choice. In fact, her team wouldn't want it any other way. Dr. Alvetro shares her team's experience with the efficiencies of this unique self-ligating system. Celebrating the 10 year anniversary of the SmartClip™ Self-Ligating Appliance System, Dr. Alvetro will also share tips on how you can realize efficiencies such as less effort to achieve optimal results, shorter chairtime and fewer appointments when treating with the SmartClip System.

Live Webinar Schedule

CEU: 1

Fri 11/14/14: 12:00 PM ET
 11:00 AM CT
 9:00 AM PT
 Fri 11/14/14: 5:00 PM UTC

Additional webinars are added on a regular basis. Check 3MUnitekTraining.com for additional information and updates.

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Dr. Patrice Pellerin

Creating an Aesthetic Practice with Innovative Solutions

Topics Include:

- How ceramic brackets compare to metal brackets: torque expression and finishing
- Comparing the average patient's smile: percentages of teeth seen when the patient smiles, and how this varies from adolescents to adults
- Using your patient as a walking, talking advertisement and advocate in your community
- Increasing patient referrals and increasing conversion rate
- Making the case to waive upgrade fees on ceramic brackets
- The importance of staff training and ensuring everyone is on the same page

Non-Surgical Correction of a Skeletal Class II Anterior Open Bite Malocclusion Utilizing TADs for Posterior Dental Intrusion



Dr. Shane Langley

Cranford Shane Langley received his DMD from the University of Alabama School of Dentistry and an MS and Orthodontic Specialty Certificate from the University of Alabama at Birmingham.

Dr. Langley has been in private practice since 2009, and is currently an Adj. Asst. Professor in the Department of Orthodontics at the University of Alabama.

Introduction

Anterior open bite malocclusions are universally considered to be challenging cases. They are traditionally treated surgically with a Le Fort I maxillary impaction. Surgery comes with many risks and inconveniences. Surgery is also very expensive and in some instances cost prohibitive, oftentimes causing patients to be reluctant or completely resistant to orthognathic surgery. Non-surgical orthodontic correction of anterior open bite malocclusion is commonly achieved by dental extrusion either through the use of inter-maxillary elastics or a combination of extractions and elastic wear. This type of treatment has proven to be inherently unstable, frequently resulting in relapse of the anterior open bite.

An alternative non-surgical approach to anterior open bite correction is posterior dental intrusion using skeletal anchorage. This treatment approach has been more favorable with regard to relapse. It also has allowed for “skeletal change” through autorotation of the mandible. The ability to change the mandibular plane angle, lower facial height and chin projection is very useful in the correction of class II malocclusions which frequently accompany anterior open bite.



Figure 1A-C: Initial.

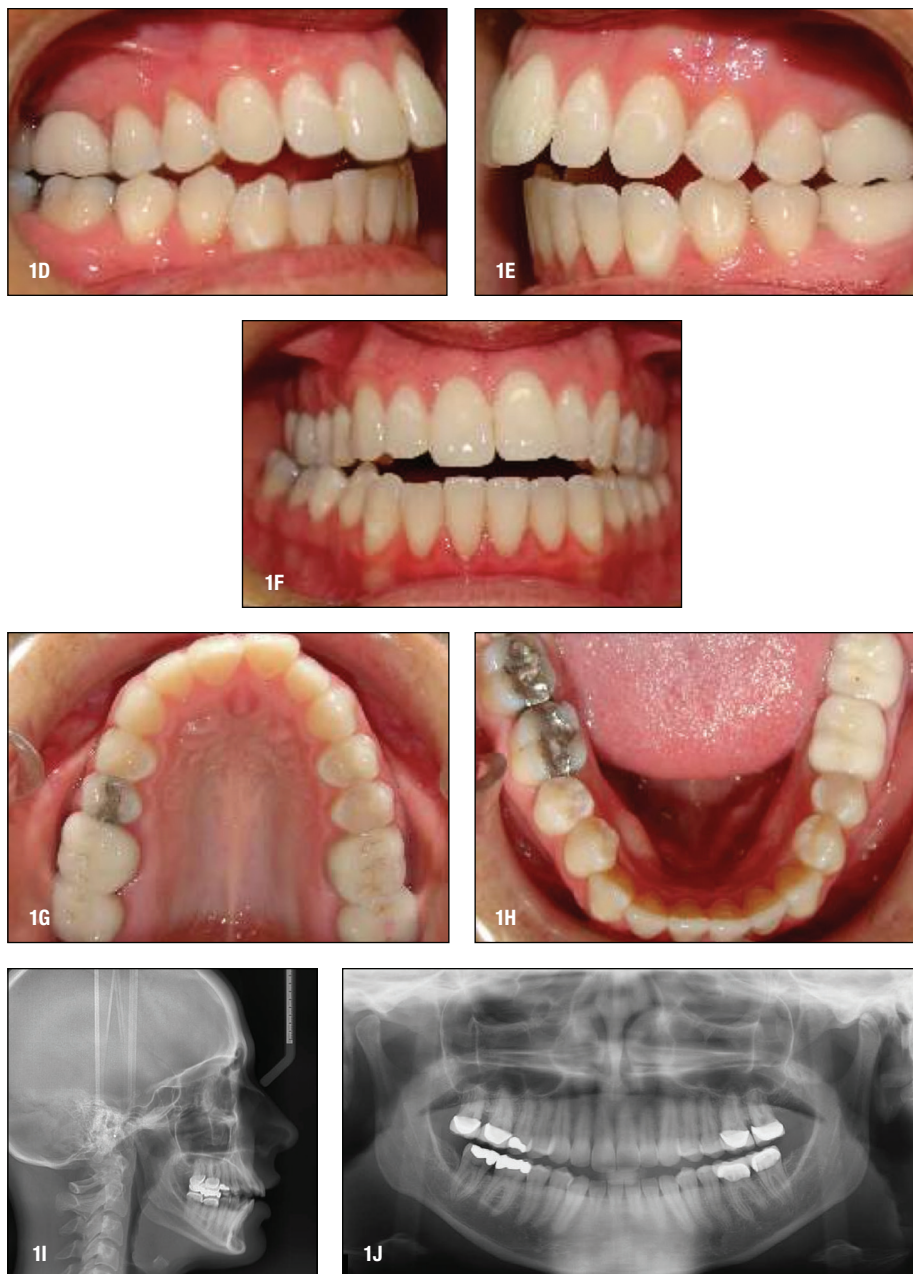


Figure 1D-J: Initial, continued.

Name	Low	Value	High
Skeletal (Anterior-Posterior)			
SNA Angle	-1.1	78.9°	5.2
A to N Perpendicular		7.2 mm	
SNB Angle	-9.7	72.3°	
Po to N Perpendicular		-3.6 mm	
ANB Angle		6.6°	2.6
Wits Analysis		6.6 mm	3.6
Skeletal (Vertical)			
SN-MP Angle		42.7°	4.7
Upper Face Height %		53.4%	3.4
Lower Face Height %	-2.8	47.2%	
Dental			
MN 1 to AP Line		2.0 mm	
MX 1 to N Perpendicular		4.2 mm	
Interincisal Angle	-0.7	123.3°	

Table 1: Initial measurements.

Diagnosis

A 32-year-old female presents for her third orthodontic opinion. The patient has a history of orthodontic treatment as an adolescent and reports changes in her bite and the appearance of her smile since the completion of previous treatment, consistent with relapse. She presents with both a skeletal and dental class II relationship, a narrow maxilla relative to the mandible resulting in a unilateral posterior cross-bite, and an anterior open bite. Both previous orthodontist's treatment plans consisted of comprehensive fixed orthodontics in conjunction with orthognathic surgery involving a 2 piece Le Fort I maxillary impaction to correct the open bite and narrow maxilla and a mandibular bilateral sagittal split osteotomy for the A-P correction. The patient was adamantly opposed to surgery.

Treatment Plan

Comprehensive non-extraction orthodontic treatment with Clarity™ ADVANCED Ceramic Brackets with APC™ Flash-Free Adhesive and TAD assisted intrusion of the posterior dentition to facilitate Class II and anterior open bite correction through mandibular autorotation.



Figure 2A-C: Three month progress; day of TAD placement.



Figure 3A-C: Eight month progress.

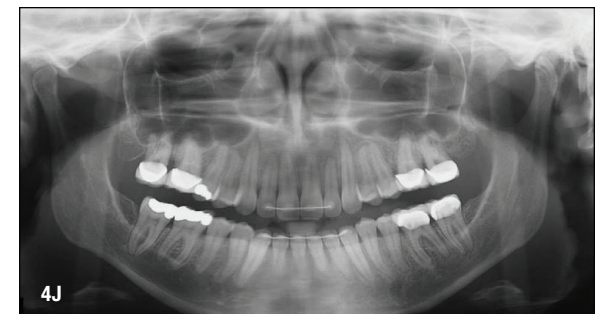
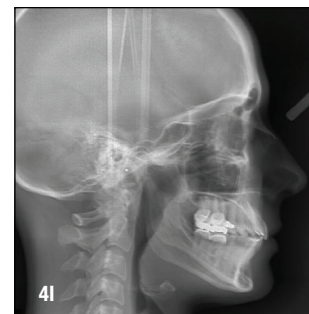


Figure 4A-J: Final – 12 months.

Name	Low	Value	High
Skeletal (Anterior-Posterior)			
SNA Angle	-1.1	78.9°	1.8
A to N Perpendicular		3.8 mm	
SNB Angle	-7.2	74.8°	0.2
Po to N Perpendicular		-5.1 mm	
ANB Angle		4.2°	
Wits Analysis		-1.7 mm	
Skeletal (Vertical)			
SN-MP Angle		36.7°	5.1
Upper Face Height %		55.1%	
Lower Face Height %	-5.0	45.0%	
Dental			
MN 1 to AP Line		6.6 mm	3.6
MX 1 to N Perpendicular		7.5 mm	1.5
Interincisal Angle	-3.7	120.3°	

Table 1: Final measurements.

Discussion

Treatment duration was one year. Class II inter-maxillary elastics were not used to correct the Class II discrepancy and vertical elastics were not used to close the anterior open bite. Inter-maxillary elastics were used during finishing stage to help settle and detail the occlusion. Changes in cephalometric measurements between the initial and final time points in a non-growing patient help to illustrate what occurred solely as a result of treatment. Class II skeletal indicators: ANB was reduced from 6.6 degrees to 4.2 degrees. The Wits analysis was reduced from 6.6 mm to -1.7 mm. Vertical skeletal indicators: MP-SN was reduced from 42.7 degrees to 36.7 degrees. The occlusal plane steepened from 22 degrees to 26 degrees, indicating intrusion of the posterior dentition and resultant mandibular autorotation. Of course, there will be some compromises without orthognathic surgery. The primary compromise in this case was the transverse discrepancy and resultant torque discrepancies in the posterior dentition. In conclusion, posterior dental intrusion using skeletal anchorage is a useful tool for stable, predictable, non-surgical correction of anterior open bite malocclusion.

Case photos provided by Dr. Shane Langley.

Orthodontic Treatment That Leads to Patient Satisfaction

CLARITY™ SL
SELF-LIGATING APPLIANCE SYSTEM

APC™ Flash-Free
Adhesive Coated Appliance System



Dr. Moe Razavi

Dr. Razavi received his dental training at Case Western Reserve University – DDS ('02), orthodontic certificate ('05), and MSD ('05).

Upon completion of his orthodontic training, he was invited to join the department as an assistant clinical professor, where he founded and directed the Skeletal Anchorage Clinic, and has integrated various TAD systems into the training program.

He served as the orthodontist for the Cleveland Browns, and is currently a member of the clinical staff at the University of Alberta.

Dr. Razavi is a diplomate of the American Board of Orthodontists, a Fellow of the Royal College of Dentists in Canada, and an ad hoc reviewer for the American Journal of Orthodontics, and the Journal of Clinical Orthodontics.

Dr. Razavi maintains a private practice in Ottawa, Canada.

Introduction

In an ever-changing marketplace, more and more adults are pursuing improved smile aesthetics through orthodontic treatment. Today, adults see their smile and dentition as an important contributor to their self-confidence. Consequently, the incidence of adults seeking orthodontic treatment in the U.S. has steadily increased from 5% in the 70s to 25% in the 90s.¹ These orthodontic patients, however, express concern about traditional metal orthodontic appliances, and often request alternative aesthetic orthodontic appliances, mainly due to the fact that adults consider the face a main focus of attention during social interactions.² Moreover, orthodontic appliances have been reported to negatively affect a patient's self-perception when they view themselves in the mirror.³

To complicate matters further, adult patients often "burn-out" quickly during orthodontic treatment and are often not prepared to proceed with treatment plans that last two to three years. Adult patients are often employed in occupations that limit their availability for routine orthodontic adjustments. As a result, they often seek out treatment options that are shorter,

with fewer adjustment appointments, and no unplanned appointments, such as for broken brackets and poking wires. The following case report demonstrates a combination of aesthetic Clarity™ SL Self-Ligating Brackets with the technology of APC™ Flash-Free Adhesive to provide effective and efficient orthodontic treatment in an adult patient.

Diagnosis and Treatment Plan

A 44-year-old female presented with the chief complaint of crowding and slanted tilt of the upper and lower incisor teeth (Figure 1A-J). Having worked in the dental field for over 20 years, the patient expressed concerns about orthodontic treatment that could last in excess of two to three years. Clinical examination revealed Class II division 1, subdivision right malocclusion with 50% overbite and 6 mm overjet and mild maxillary and moderate mandibular tooth-size-arch-length discrepancy (Figure 3, Table 1). The mandibular right lateral incisor tooth was fully blocked out and tipped distally. The maxillary right first premolar tooth was extracted years ago, resulting in the shift of the maxillary midline to the right by 4 mm.

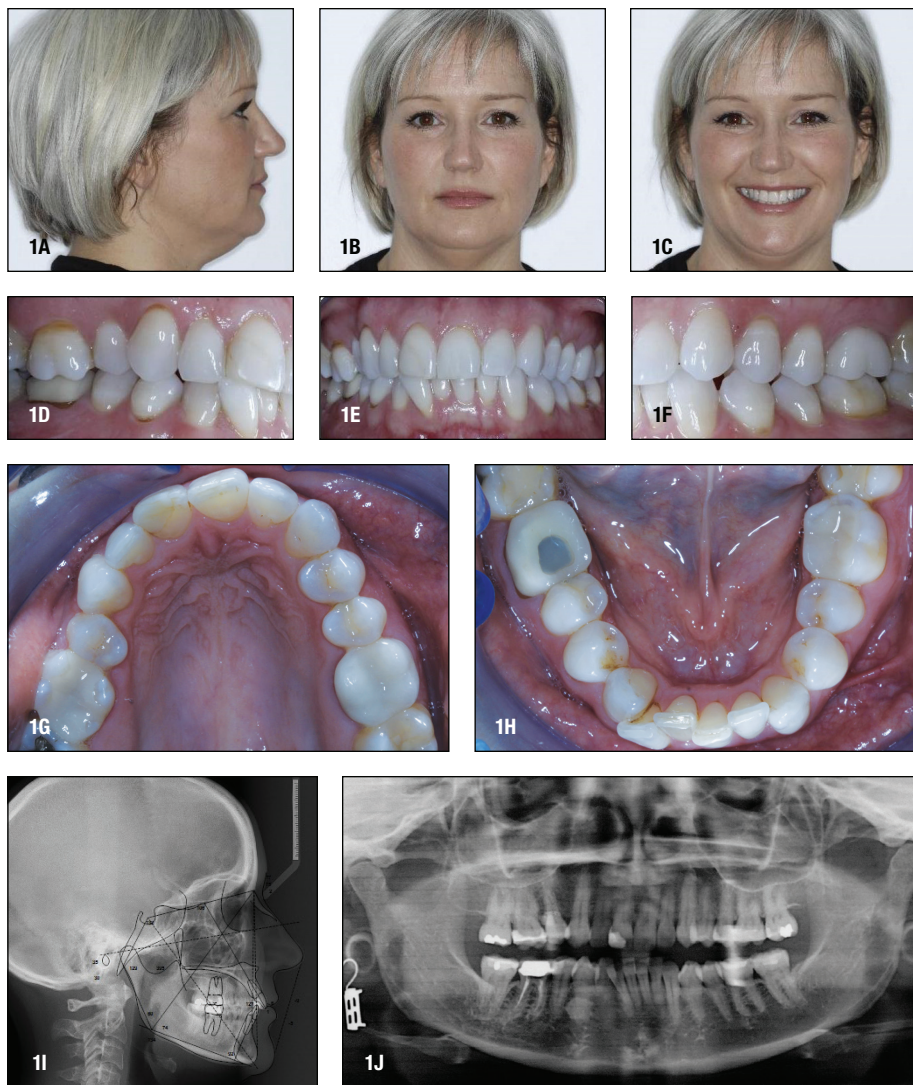


Figure 1A-J: Pretreatment photographs, panoramic and cephalometric radiographs.

Profile analysis revealed well-balanced facial proportions. Cephalometric evaluation revealed well-balanced skeletal relationship. TMJ analysis was within normal limits. Comprehensive orthodontic treatment options were discussed and the patient expressed her desire to avoid

traditional metal brackets as the treatment modality. The finalized treatment plan including the extraction of the remaining first premolar teeth in the maxillary left to allow for improvement of the maxillary midline position, and mandibular right and left to assist in resolving the tooth-size-arch-length discrepancy. The patient expressed her fears of extraction treatment leading to collapse of smile width and lip support, however, she understood the limitation of treatment options given the current malocclusion. An alternative treatment plan to create space for the previously extracted maxillary right first premolar and its future restoration using a dental implant was rejected.

Treatment Progress

Fixed appliances (.022 slot Clarity™ SL Self-Ligating* Brackets) were bonded, and leveling and aligning was initiated. The passive self-ligating appliances were chosen as they provided an aesthetic treatment option, while providing the advantage of elimination of friction which often occurs during space closure mechanics when ligated appliances are used. This property would provide an environment for more rapid space closure due to the lack of friction and hence address the patient's desire of limiting treatment time to less than two years.

The brackets used were part of our initial trial series of the APC Flash-Free Adhesive, where instead of traditional filled composite cement, the brackets are lined with a non-woven mesh that is impregnated with lightly filled resin (Figure 2A-B), and hence no flash is left behind

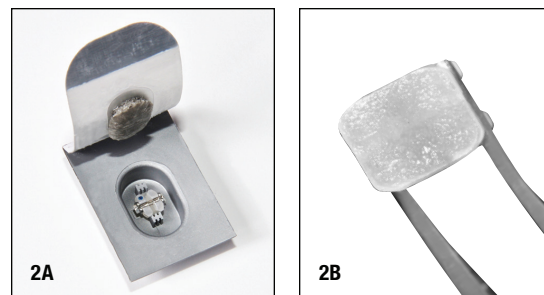


Figure 2A-B: Clarity™ SL Self-Ligating Bracket and bracket base showing adhesive coating.

around the bracket margins. The lack of flash leads to improved hygiene with no staining around the bracket margins, as the resin is hydrophobic, and therefore impermeable to the colored solutes in ingested foods and liquids.^{4,5} This was a main concern for the patient, as she is a regular coffee drinker and was concerned about the long-term aesthetics of the ceramic brackets. Clarity SL Ceramic Brackets are made of a material that has been

shown not to stain. Furthermore, the initial bonding appointment can be reduced in time as there is no time devoted to flash clean-up.

Light chain modules were used on the mandibular arch to allow for distalization of the mandibular canines on the initial .014 Super Elastic Nitinol wires (Figure 3). The case was completed using .019×.025 Heat Activated Nitinol for the maxillary and .019×.025 Beta Titanium wires, with slight reverse curve of Spee in the mandibular arch during space closure.

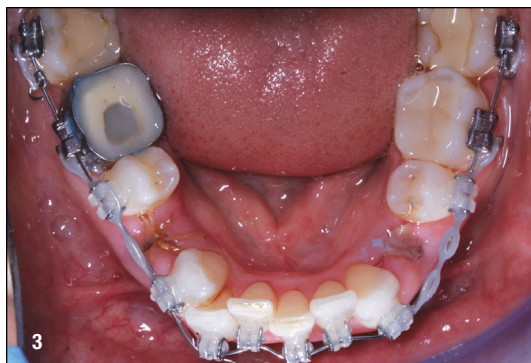


Figure 3: Using light chain modules to retract the mandibular canines on .014 SE NiTi archwire, to create space for alignment of the mandibular incisor teeth.

All spaces were closed in the first 10 months of treatment (Figure 4A-E) and a mid-treatment panorex was used to assess root parallelism in order to commence the detailing and finishing stage of the treatment. Elastics were used to settle the posterior occlusion. Fixed mandibular lingual retainers were placed, and the patient was debonded. During the debond appointment, we noted the ease with which the cement clean-up was achieved. The non-woven mesh pad remains on the tooth, and it can be easily removed using a slow-speed handpiece. Cement clean-up was quick and did not lead to patient discomfort, compared to using high-speed handpieces which can lead to discomfort due to the high pressure of cold air expressed by the turbine of the handpiece and potential post-operative sensitivity.

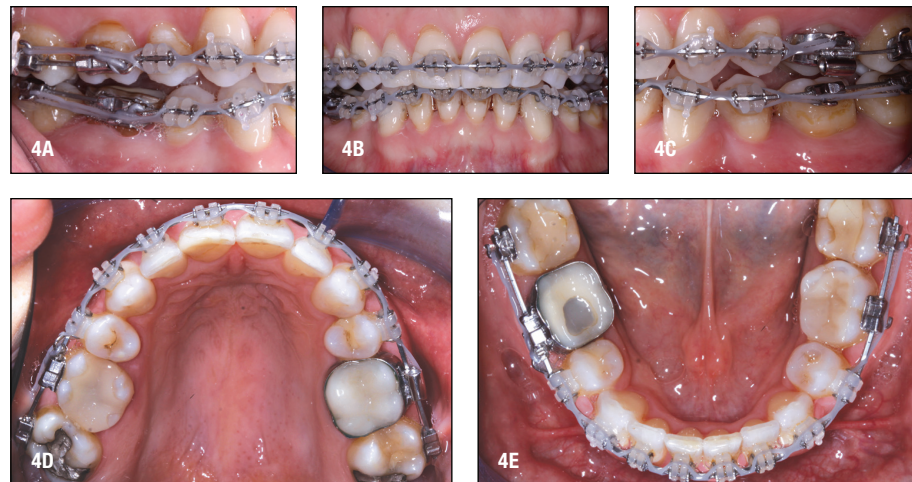


Figure 4A-E

Treatment Results and Discussion

The patient was seen for a total of 13 appointments during the 19-month active treatment period. Robb *et al.*, reported a mean treatment of 30.6 ± 8.0 months in a group of adults with mainly Class I malocclusion that underwent 4 premolar extraction.⁶ The reduction in treatment time could be attributed to the efficiencies gained through the use of self-ligating appliances. The patient was pleasantly surprised by the 1.5 year treatment time, compared to the two to three years she had anticipated at the time she sought out her orthodontic consultation in our office.

No brackets were inadvertently debonded. This has been the most impressive aspect during our transition to APC Flash-Free Adhesive. Prior to using this system, our bond failure rate was 2.91% when using APC™ II Adhesive, a value significantly lower than the industry average of 5%.⁷ However, since the transition, the overall bond failure rate for both APC II and APC Flash-Free Adhesive in our office has diminished to 1.73%. This drop in unplanned appointments has not only improved the overall patient experience by nearly eliminating the number of emergency visits to the office for bracket failure, but has allowed the clinic to run without the stress of having to fit these patients into an otherwise busy day.

Post treatment records revealed a Class I molar relationship with ideal overjet and overbite (Figure 5A-J, Table 1). Cephalometric superimposition indicated slight retroclination of the maxillary incisors (Figure 6), however, the overall superimposition reveals no flattening of the



Figure 5A-J: Post-treatment photographs, panoramic and cephalometric radiographs.

Cephalometric Measurements			
Measurements	Norm Values	Initial	Final
SNA (°)	82.0	76.6	77.0
SNB (°)	80.9	74.6	72.9
ANB (°)	1.6	2.0	4.1
SN – GoGn (°)	32.9	32.7	33.9
FMA (MP – FH) (°)	23.9	29.7	30.0
U1 – NA (mm)	4.3	5.9	0.5
U1 – SN (°)	102.8	105.7	91.4
L1 – NB (mm)	4.0	3.2	2.9
L1 – GoGN (°)	93.0	94.3	93.1
Upper Lip to E-Plane (mm)	-6.0	-9.2	-7.1
Lower Lip to E-Plane (mm)	-2.0	-5.2	-6.3

Table 1: Pretreatment and post-treatment cephalometric measurements.

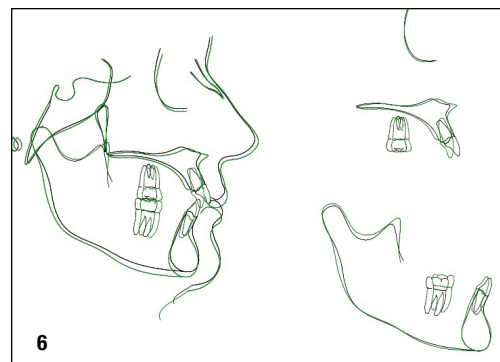


Figure 6: Superimposition of final cephalometric radiograph (green) on the initial cephalometric radiograph (black).

profile and retraction of the upper lip. Historically, premolar extraction has been associated with such unflattering facial results, in addition to larger buccal corridors and a less aesthetic smile.⁸ However, careful treatment mechanics and the use of broad archforms wires, prevented these undesirable results in this patient (Figure 7).



Figure 7: Smile photo revealing an aesthetic smile, without increased buccal corridor space as a result of extraction treatment.

*“Eternally grateful to Dr. Razavi for giving me a smile I’ve waited 25 years for!
He is a magician and he has the most skilled team in the business!
Thank you, thank you, thank you!!!”*

Overall, the patient was extremely satisfied by the treatment results. In her own words, the patient remarked, “Eternally grateful to Dr. Razavi for giving me a smile I’ve waited 25 years for! He is a magician and he has the most skilled team in the business! Thank you, thank you, thank you!!!”

In our profession, we can often get consumed by treatment mechanics, bracket types, tips, torque, overhead costs, and can too often lose sight of the overall patient experience. As clinicians we should aim to arm ourselves with the tools that can provide our patients an aesthetic and functional smile, in a painless, effective and efficient manner. Combining Clarity SL Brackets and APC Flash-Free Adhesive allowed us to exceed this patient’s expectations.

Case photos provided by Dr. Moe Razavi.

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Footnote

*3M Unitek, 2724 South Peck Rd, Monrovia, CA 91016; www.3MUnitek.com

Aesthetic Treatment Assisted by Forsus™ Class II Correctors

CLARITY™ | ADVANCED
advanced ceramic brackets



Dr. Jair Lazarín San Esteban

Dr. Jair Lazarín received his post graduate Certificate in Orthodontics in 2005 from “Dr. Manuel Gea González” Hospital in Mexico City. In 2009, he received his Master Degree in Bio Material Science from the Mexican National University, UNAM, and is continuing with PhD studies in Clinical Research at the same University.

Since 2005, Dr. Lazarín has been working at his private practice in Mexico City. He has lectured across Latin America about orthodontics,

Class II treatment, self-ligation, distraction osteogenesis, orthognatic surgery, and the MBT™ Versatile+ Appliance System philosophy.

He joined 3M Unitek in 2010 as Professional Services Manager for Latin America.

Introduction

We live in a world that is increasingly concerned about aesthetics. If we take a look around, aesthetics is everywhere and is something that everyone desires. Obviously, this includes a person's smile and the overall aesthetics of the face.

Some months ago I read an article about patient preferences regarding orthodontic appliances, and the results were quite interesting. Patients would rather not have brackets on their teeth, or they would want to have something that is very aesthetic, like aligners or lingual appliances. Their second choice is aesthetic brackets, and their last choice is metal, including self-ligated appliances.¹

Unfortunately, available treatment choices typically involve benefit trade-offs for both the patient and the doctor. For example, despite the fact that aligners are nearly invisible, they have poor mechanics and often can't achieve orthodontic goals, not to mention the role of patient compliance in reaching goals. Lingual appliances are sometimes difficult to manage, except with individualized systems like the Incognito™ Appliance System, and can be more time consuming and expensive than other treatment choices.

Aesthetic brackets are my first choice for almost all routine orthodontic treatment, offering both appearance and treatment advantages. My preference is Clarity™ ADVANCED Ceramic Brackets; I truly believe they are the best ceramic brackets available. Figure 1 shows the slim tie-wing design, the large under tie-wing area, the deep slot, and perfectly parallel slot walls of Clarity ADVANCED Brackets, with a competitive bracket as a comparison.

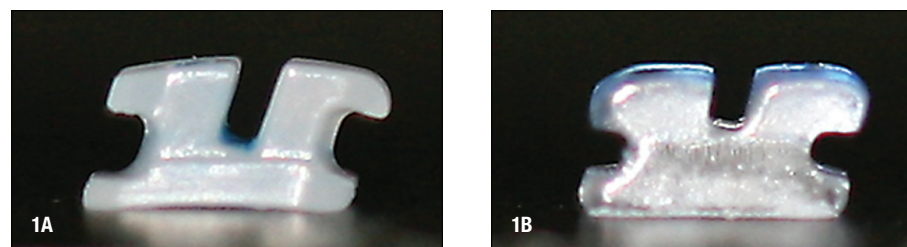


Figure 1A-B: A) Clarity™ ADVANCED Ceramic Bracket, B) Pure® Sapphire Bracket for comparison.

Following is a recent case where I was able to use Clarity™ ADVANCED Brackets in conjunction with Class II correction.

Case Presentation

Patient: Female, age 39 years 5 months

Diagnosis: Class II malocclusion

- Skeletal Class I
- Slight high angle tendency
- Dental Class II
- Mild maxillary crowding
- Mild mandibular crowding
- Moderate overbite
- 4.50 mm overjet
- 91.12° IMPA

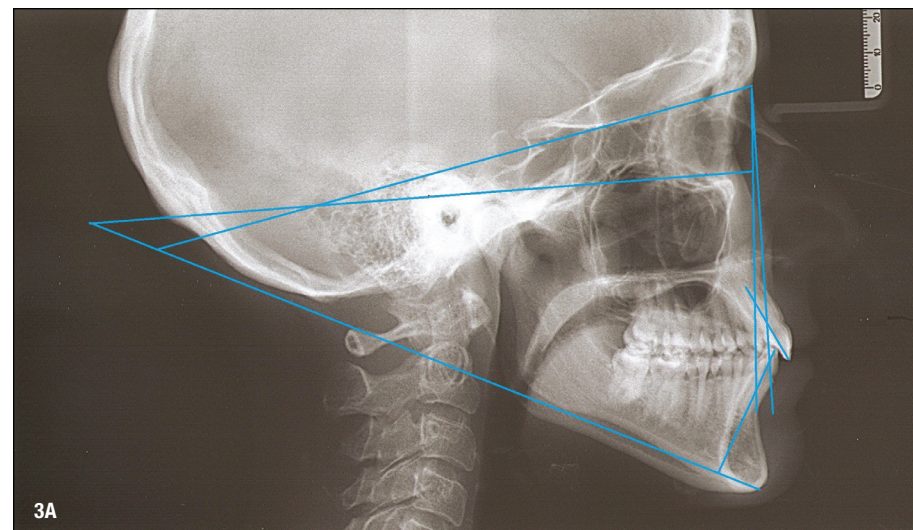
Treatment Plan:

- .022 slot Clarity ADVANCED Brackets, MBT™ Appliance System Rx, with -6° of torque in lower incisors
- Forsus™ Fatigue Resistant Device to correct Class II relationship

Initial:



Figure 2A-E: Initial set of pictures.



Lateral Cephalometric Analysis				
	Value	Norm	Low Range	High Range
Maxilla to cranial base				
SNA (°)	78.54	82.00	78.00	84.00
Mandible to cranial base				
SNB (°)	75.63	80.00	72.00	80.00
SN – GoGn (°)	36.75	32.00	22.00	36.00
FMA (MP – FH) (°)	26.94	21.90	23.50	33.90
Maxillo – Mandibular				
ANB (°)	2.99	2.00	1.50	6.00
Maxillary dentition				
U1 – NA (mm)	6.17	4.00	-2.00	8.00
U1 – NA (°)	26.31	22.00	3.00	31.00
Mandibular dentition				
L1 – NB (mm)	5.85	4.00	2.00	6.00
L1 – GoGN (°)	91.12	93.00	88.70	101.90
3B				

Figure 3A-B: Initial X-rays and lateral cephalometric analysis.

The patient demanded treatment with aesthetic brackets. Of course, I liked the idea from the first moment, because as I mentioned before, Clarity ADVANCED Brackets have very nice aesthetics and mechanical features that efficiently help reach treatment goals. Also, I would have the opportunity to try them together with the Forsus Fatigue Resistant Device.

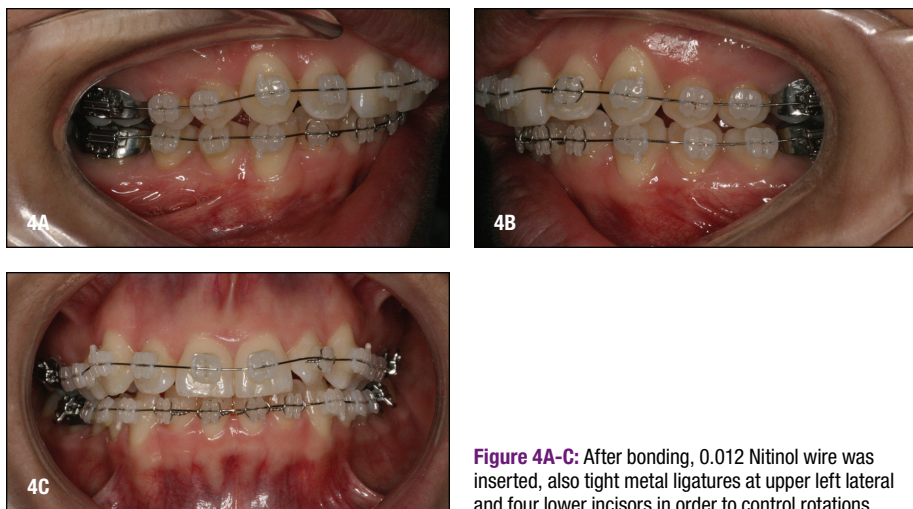


Figure 4A-C: After bonding, 0.012 Nitinol wire was inserted, also tight metal ligatures at upper left lateral and four lower incisors in order to control rotations.

.022 MBT System Clarity ADVANCED brackets were bonded using an indirect bonding technique. At the beginning, .012 Classic Nitinol wires were inserted and after eight weeks, they were replaced with .016 Classic Nitinol wires.

Once rotations were controlled, the next treatment objective was to control curve of Spee, so .022 SS wires were placed. After eight weeks, .019x.025 SS wires were placed. As we know, rectangular wires are the ones that express prescription torque, so at this point we got the -6° of torque in the lower incisors in order to prevent later risk of proclination in conjunction with the Class II correction.

In preparation for Forsus Corrector placement, we need to:

- Cinch back the lower arch (to prevent incisor proclination)
- Ligate 6 to 6 with metal ligature in the lower arch (to avoid spacing)
- Put “8” shape modules in the four lower incisors (to prevent rotations)

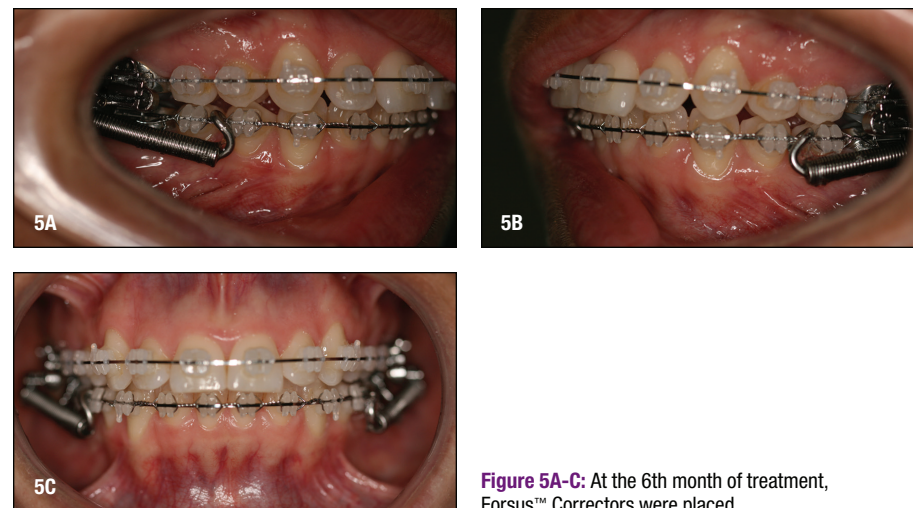


Figure 5A-C: At the 6th month of treatment, Forsus™ Correctors were placed.

The Forsus device is comfortable for patients, it's easy to keep clean, and does not interfere with lateral movements or mouth opening. Over all, it is discreet, especially if you place the spring between the lower bicuspid, as with this method, the device gets shorter. Another advantage of this placement is that lower incisor proclination tendency is reduced.



Figure 6A-C: Class II correction was achieved within 12 months.

Class II correction was achieved in only 5 months, and the total time was 12 months. The Forsus Device is fast, as it works 24/7.

I was very pleased with the performance of the Clarity ADVANCED Ceramic Brackets; none of them debonded or broke during treatment.

Discussion

Class II treatment with the Forsus Device is effective, fast and reliable. Clarity ADVANCED Brackets have proven strength, mainly due to a small particle size material and a new manufacturing process. Therefore, I feel confident using them together with Forsus Correctors.

Class II treatment with Forsus Corrector is effective, but we should be aware that most of its effect is dento-alveolar.²

Importantly, the Forsus Appliance is safe to use and is not a risk factor for the development of TMJ dysfunction.³

Case photos provided by Dr. Jair Lazarin San Esteban.

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Advantages of Digital Technologies in Lingual Orthodontics



Prof. Dr. Dietmar Segner, Hamburg, Germany

Dr. Dietmar Segner earned his specialty in orthodontics from Hamburg University, Germany, and also received his PhD from that institution. He worked as professor of orthodontics at the university clinic and now works in his private practice in Hamburg specializing in the treatment of adults using aesthetic appliances. For two decades he has lectured all over the world on adult orthodontic treatment, and results of his research into biomechanical and ortho materials.

Is the Implementation of Digital Technologies in My Office Worth the Investment?

This is a question most of us might ask, regardless of whether we are hunting for the latest Internet telephone or evaluating new equipment for day-to-day operations. We may possibly even think that we can live without all these gadgets.

I am a practicing orthodontist, so in this article I will discuss the real benefits of implementing digital technologies into the office workflow, and also touch on the improvements digital technology offers in the manufacturing of orthodontic appliances.

Reflecting on my daily routine practicing lingual orthodontics, I do see several points in the process that I have found, or still find, cumbersome. These are mainly impression taking, communication with the lab and review of my setup models during treatment planning. Fortunately, several new developments in digital workflows have helped me overcome these issues, and have made my office more efficient (or will do so in the near future).



Figure 1: 3M™ True Definition Scanner (3M Unitek) in the author's office.

Note that I am focusing on the Incognito™ Appliance System, which I use, and which has the longest history of – at least partial – digital manufacturing. Nevertheless, since both orthodontist and patient want to arrive at good treatment results most efficiently, basically all of today's lingual appliances are based on a planned target setup and use indirect bonding to transfer the planned bracket position into the mouth as accurately as possible.

Looking at all the steps needed from the first patient consultation until I bond the appliance into the patient's mouth, I found several big improvements through digitization.

Impression Taking

Impression taking is something we love to delegate, even though an accurate PVS impression is the foundation of a well-fitting appliance, since it is totally custom-made to the patient's teeth. If we are unlucky, we only hear about a flaw in the impression once it is sent to the lab. This is a horrible waste of time and patient trust.

In recent years, many intraoral scanners have come to the market, including the 3M™ True Definition Scanner that we have started to use in our office (Figure 1). The main advantage of an intraoral scan versus our previous PVS impression is the immediate control of the impression on the large 21.5-inch (diagonal) screen. This can save a lot of frustration later.

According to Ralf Paehl, lead development engineer with 3M Unitek, the manufacturer of the Incognito appliance, not all scans from all scanners are the same quality. Ralf supported me in this article by answering my numerous questions with “insider information.”

“Data from different scanners vary in precision and data structure. Therefore we have implemented a validation process for the scanners that are currently in the market, to ensure we are receiving data with sufficient quality to manufacture an Incognito appliance according to our traditional quality standards, and to ensure the data is compatible with our downstream processes. Today we are already accepting data from three different scanners and have established a special lab section with experts for handling the intraoral scan data.”

Data Transfer

Rather than sending a PVS impression, or in special cases, even sending the stone models mounted in an articulator, we transfer the data from the scanner directly to the laboratory. There is no need for us to manipulate the data, the transfer happens automatically. 3M Unitek confirmed that the servers and data storage comply with all legal requirements for handling patient data.

Ideally, the data can be processed in the laboratory the next day. Compare this to my impressions, which after being shipped, are disinfected and then poured twice and scanned with a model scanner, a process requiring several days.

Setup and Review

The setup reflects the treatment target of the orthodontist and is built by a dental technician. Therefore, perfect communication between orthodontist and technician is crucial. Traditionally for the setup, the cast gypsum arch was separated and the target setup mounted in wax. If I really wanted to control this, I needed to hold the models in my hands, requiring the articulated models to be sent physically with time loss and the risk of damage. So, to save time, I often looked at photos of my setups, not being able to bring it together with the malocclusion.

With the introduction of the digital setup lab, fortunately, this process became significantly more efficient and effective for me. Still, a trained lab technician segments the teeth digitally and moves them into the target position, but with more tools! Measurements, zoom, movements without gravity in molten wax and the ability to instantly reverse a movement that was made makes this process more reproducible, and at the same time more flexible to accommodate my wishes.

Most importantly, though, I can now review the setup digitally, superimpose the malocclusion (see Figure 2), and give detailed requests back to my technician (see also clinical case 1). All with hardly any time loss, and independent of the time zone by email or in a dedicated treatment management software (Unitek™ Treatment Management Portal | TMP 4.2).

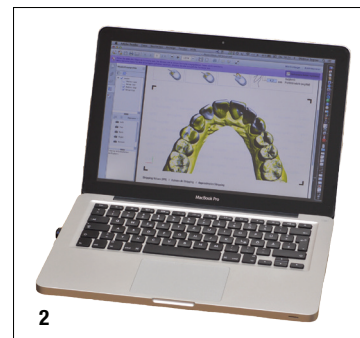


Figure 2: Digital setup reviewed on computer.

Bracket Design and Manufacturing

Due to the complexity of fully individualized bracket body and pads in the Incognito Appliance, the brackets were designed digitally right from the start (CAD). Similarly, the templates for creating a cast mold are produced digitally (CAM). In fact, digital technology only enabled the rise of the modern generation of lingual appliances in the years after 2000.

Regarding the Incognito System, *“Fully individualized means that the bracket pad, the bracket body and hooks and wings are designed and manufactured individually each time for every tooth. So to accommodate full flexibility and functionality, each bracket consists of 20-30 single digital components. This enables us to realize brackets optimized for treatment outcome and flattest profile”* (Ralf Paehl, 3M Unitek).

Incognito brackets are cast in gold alloy, a manual process. With the rapid development of more and more sophisticated 3D printing technologies, I am convinced we will see the brackets printed from suitable metal in the future. Today, however, I am not aware of any technology that is precise enough for orthodontic applications, yet.

Bracket Positioning and Production of Indirect Transfer Trays

For better efficiency in the office, most orthodontists who are working with lingual appliances use the indirect bonding technique, bonding all brackets of one arch with the help of a transfer tray. Of course, the transfer tray should deliver the brackets in exactly the position that was determined in the digital setup and bracket design.

To position the brackets on the tooth, manufacturers use different techniques. Some use a manual process, making use of the fit of corresponding surfaces of bracket pad and a model of the patient's malocclusion, with visual aids. Some use a robotic arm for placement on the malocclusion model, etc. I personally have recently switched to the Incognito™ Clear Precision Tray (Figure 3). According to Ralf Paehl, this tray is manufactured directly from digital data, completely eliminating the need for a malocclusion model and manual positioning steps. So the manufacturing of this tray is both less material intensive and more precise.

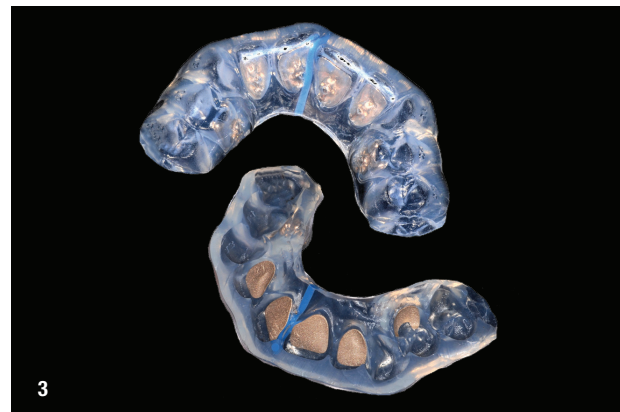


Figure 3: Indirect transfer tray for bonding – “Incognito™ Clear Precision Tray” (3M Unitek).

The Incognito Clear Precision tray is highly transparent and allows the use of light curing materials. In our office, we use RelyX™ Unicem 2 Automix Self-Adhesive Resin Cement, the bonding material recommended by 3M Unitek. RelyX Cement can be used on both tooth and restorations, and is dual cure, thus ensuring full polymerization also under large bracket pads for example on non-transparent metal crowns.

An additional feature we like about this new tray is the option to segment it and use it for precisely rebonding a bracket after an occasional debond.

Any special requirements to implement digital technologies in the office?

The answer is: not really. For the biggest increase in efficiency, the real-time digital communication about the treatment plan, just an internet connection and free software is required. Intraoral scanners, of course, do require additional investments that need to be considered individually.

Example Patient 1

Patient 1 (Figure 4A-E) disliked the irregularities in the front in both upper and lower arch. The case was a Slight Angle Class III and lacking one anterior tooth in the lower arch. The gap, however, was completely closed. Tooth 2.1 displayed distal crown tipping. Teeth 1.3 and 4.4 were oriented palatally/lingually. Several other teeth showed rotations. So when ordering the appliance, the request to the setup technician was as follows:

- Move tooth 1.3 in buccal direction and add positive torque
- Add +5° mesial tip to both upper central incisors
- IPR on lower teeth bicuspid, canines and lateral incisors
- Move 4.4 buccally and rotate distally
- Extrude 4.3 slightly
- Intrude all 3 lower incisors in relation to the canines



Figure 4A-E: Patient 1 before treatment.

The setup (Figure 5A-G) delivered harmonious arches. The free three-dimensional rotation of the setup allows me to always choose the best angle to analyze the tooth positions, similarly to holding a model in my hand. So it is easily visible in the digital setup that increased overjet will persist due to the missing lower incisor (Figure 5F), and the canines will not have

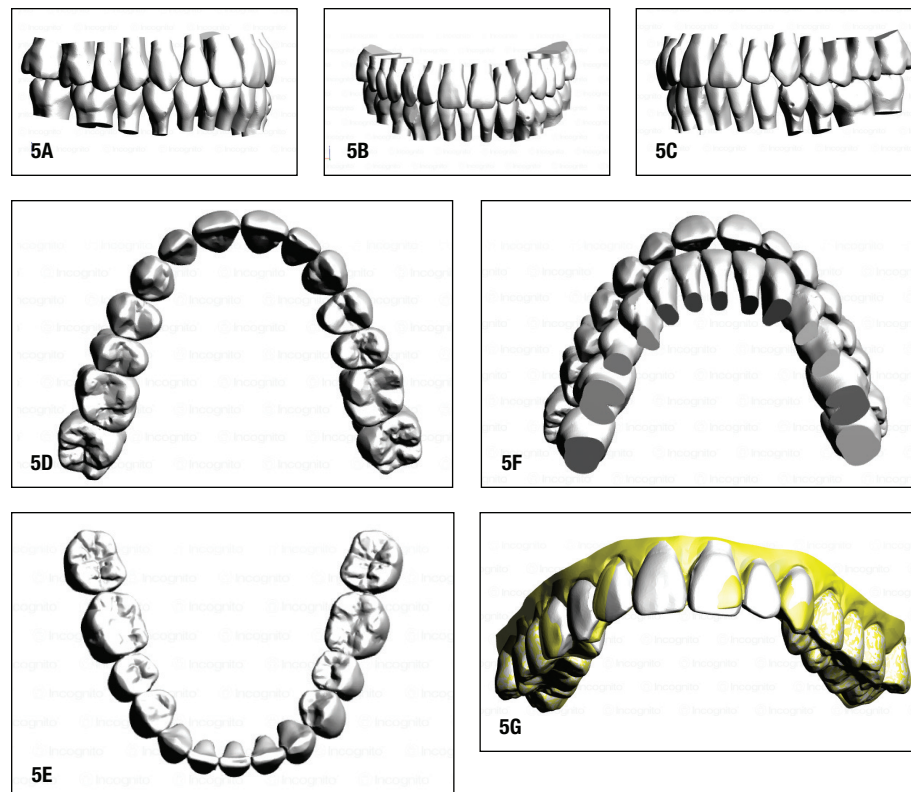


Figure 5A-G: Digital Setup of Patient 1. The digital setup can be rotated in all 3 dimensions. 5A-D shows the perspectives I find most useful. 5F shows clearly that a slightly increased horizontal step will remain after treatment because of the missing lower incisor, and despite of the slight Class III occlusion. 5G shows the superimposition of initial malocclusion (yellow) and the planned treatment outcome (white).

occlusal contact due to the remaining Class III tendency. My requests regarding torque and tip corrections in the upper front were adequately translated into the setup, best visible in the superimposition of initial malocclusion and setup (Figure 5G).

Especially the superimposition, a clear advancement in comparison to a physical model, helps me to judge tooth movements immediately, for example if teeth that were requested to remain in their position, such as implants, really remained in place.

With a simple email I could approve the setup, and the appliance was manufactured.

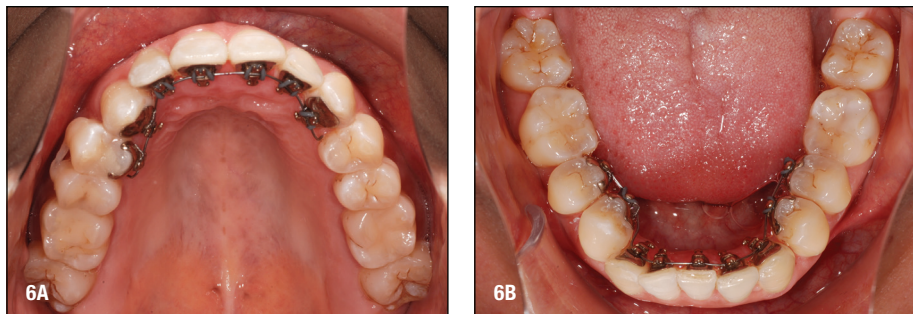


Figure 6A-B: Appliance *in situ*.

The appliance *in situ* (Figure 6A-B), 4-3 in the maxilla, and 5-5 in the mandible.

After 12 months treatment time, most of which was spent on correcting the lower right first bicuspid, the brackets were debonded and a retainer fixed 3-3 in both arches (Figure 7A-E). Comparing the treatment outcome with the initial setup, the distance between the upper and lower incisors remained as forecast, but all treatment goals could be obtained.



Figure 7A-E: Patient 1 after treatment: The treatment goals were achieved and the final result reflects the situation planned in the setup.

Example Patient 2

Patient 2 (Figures 8 and 9A-E) also required correction of the highly irregular and crowded front. Tooth 31 was extracted and IPR and de-rotations were required in the upper arch. Figure 10 shows the digital setup of the maxilla, apparently ideal. Looking closer however, I preferred slightly more derotation (3°) of the central incisors in the sense of a subtle overcorrection. After emailing the request to the lab, I received a modified setup only a few hours later (Figure 11). In the superimposition of both setups (Figure 12), you can see the slight but precise movements that were made. Figure 13 shows the treatment result on the maxilla after 8 months.



Figure 8: Patient 2 before treatment.



Figure 9A-E: Intraoral situation of Patient 2 pre-treatment: Crowding of the lower anteriors and outward rotated upper left incisor in almost Class I occlusion.

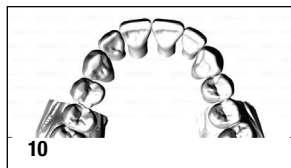


Figure 10: Digital Setup of the upper anteriors. Teeth 11 and 12 need slightly more distal rotation for the author.

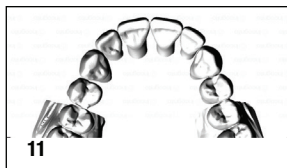


Figure 11: Modified setup of the upper anteriors with ideal position of the central incisors.

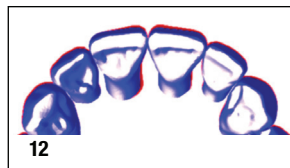


Figure 12: Superimposition of the setups of Figure 10 (initial, blue) and 11 (modified, red). Fine detailed corrections can be accurately reproduced with the digital setup.



Figure 13A-B: Treatment result after 8 months.



The Benefits of Digital Technology in My Lingual Orthodontic Treatments

The three major benefits for me are optimized treatment planning, 100% perfect transfer of planned bracket position to transfer tray and more accurate rebonding, if needed:

1. The digital setup, with the possibility for quick and precise modifications by the technician and fast communication, enables me to bring my treatment plan and idea of the final outcome into closest possible match with the setup for the appliance manufacturing. As manual bends in the finishing wire are hard and time-consuming, especially regarding arch form and axial tipping, it is a big advantage to optimize those values right from the start.
2. Second, it is a major advantage to start treatment with maximum accuracy of intraoral bracket position in reference to the planned position. This further reduces a later need for correction bends to the wire. Potential tiny errors in manual positioning the brackets to the malocclusion model that could be amplified in later treatment stages are eliminated by digitally determining the bracket position in the transfer tray (Incognito Clear Precision Tray).

A laboratory study of the manufacturer showed a reduction of the maximum positioning error by half with digital positioning. For this, they superimposed scans of the actual brackets bonded to a malocclusion with the bracket position determined by the digital setup and design (Figure 14).

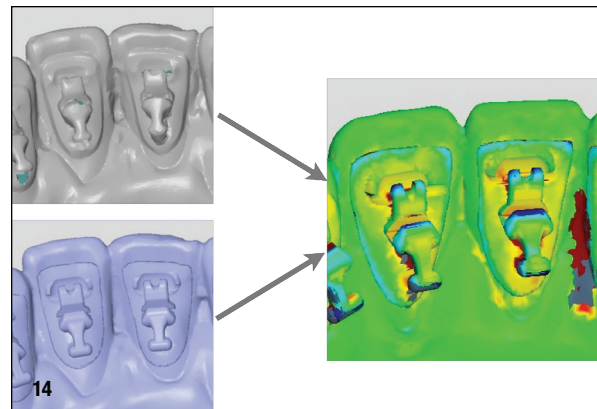


Figure 14: Superimposition of 3D data of the bonded brackets (scanned, in gray) and the design data (blue). The superimposition is color coded: green= identical, red = significant deviation. Picture courtesy of TOP-Service for Lingualtechnik, GmbH).

3. The transfer tray offers an additional feature – the easy repositioning of the bracket into its matching cavity in the tray. This is an advantage in case a bracket debonds during treatment. The tray can be segmented and the bracket easily inserted into the tray in its original place by slightly bending the silicone. If the teeth have not yet moved significantly, repositioning of the tray into the mouth is a bit easier if the tray segment includes not only the target tooth, but also small part of the neighboring teeth (Figure 15).

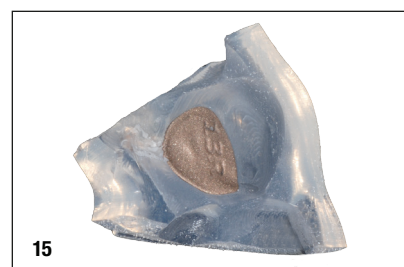


Figure 15: Rebonding a bracket using the Incognito™ Clear Precision Tray.

In summary, those three features of digital technology result in potentially faster treatment with more precise outcome, less effort required from the orthodontist and less chair time.

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Canine Extrusion Technique with SmartClip[™] Self-Ligating Brackets



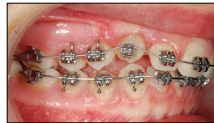
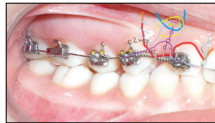
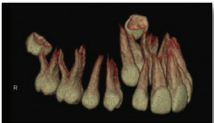
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Diagnosis

Unerupted canines

Introduction

Focusing on the management of unerupted or apically displaced canines, the authors propose a simple technique to bring canines into the arch early in the treatment using self-ligating brackets in conjunction with highly resilient Nickel Titanium archwires.

Self-Ligation Advantages

The ability to manage unerupted canines early in the treatment represents a clinical advantage as an alternative to waiting until the stainless steel wire phase of treatment to engage the unerupted canines (exceptions noted on page 34).

When an archwire is directly engaged in the self-ligating bracket of an apically displaced canine, a light force is expressed and it contacts the edges of the brackets of the canine and of the neighboring teeth (binding phenomenon). However, it is free to slide through all the other brackets of the dental arch. Consequently, the system is not locked, as compared to conventional ligated systems¹, and relatively low forces are exerted on the canine and neighboring teeth, as shown in an in vitro model by Fok.² Low forces exerted by the archwire are consistent with the biology of dental movement with healthy periodontal support. In comparison, an arch bonded with traditionally ligated brackets causes the entire system to have higher levels of force and friction.³

Furthermore, as the light force that drives the canine towards the arch is delivered by the deflected .013/.014 Nitinol archwire, appointments are mainly used to check the effectiveness of the system (i.e. canine approaching the dental arch and absent or slight side effects). Therefore, the clinical management of the unerupted canine is less time consuming without the need to reactivate canine traction.

The lower force levels, shorter chairtime and early management of impacted canines show some specific clinical advantages of self-ligating brackets that are not available with conventionally ligated brackets.

Case Selection (Figure 1A-C)

The majority of unerupted canines can be approached using the noted technique with the exception of unerupted canines that require preliminary traction to eliminate possible injuries of neighboring roots (see Figure 1C).⁴ In addition, severely displaced canines (eg. horizontal canines) need a stronger anchor to be moved closer to the occlusal plane before the engagement into a self-ligating system (not shown).

Use extrusion technique

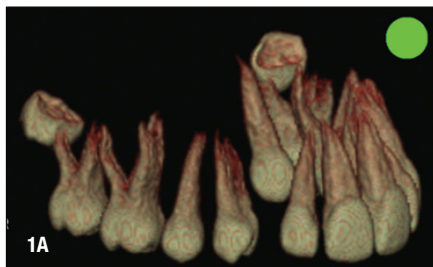


Figure 1A: Unerupted canines that lie in center of the alveolar ridge, or buccally erupted canines, may be approached with the self-ligation extrusion technique **if** their vertical position is within the cervical third of the roots of the neighboring teeth.

Check for obstructions first

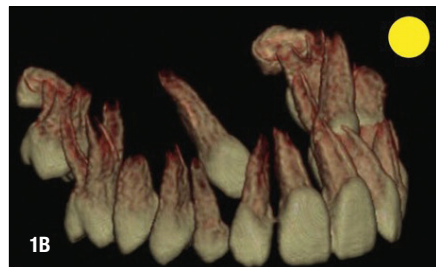


Figure 1B: Unerupted palatal canines may be approached with self-ligation extrusion technique after checking for the absence of any major obstacle (i.e. neighboring teeth roots) on the route from palatal position to the alveolar ridge. If preliminary palatal traction is necessary to increase the distance between the canine and the incisor roots, the self-ligation extrusion technique may be used **after** the canine has reached a “safe zone” with respect to the incisors.

Do not use extrusion technique

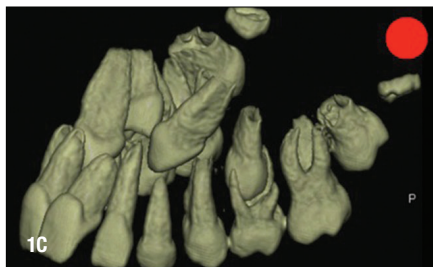


Figure 1C: Unerupted canines vertically displaced at the level of root apex of the neighboring teeth **should not** be approached with the self-ligation extrusion technique. A strong anchorage with stainless steel archwires engaged in the full arch or miniscrew systems are recommended.

Canine Extrusion Treatment Plan with Self-Ligation

Materials

- Bracket System: SmartClip™ Self-Ligating Brackets
- Archwires: .013 or .014 Nitinol or Copper-Nitinol Archwires

Technique

- Complete leveling and alignment phase with .014 or .016 before engaging impacted canine to eliminate major wire deflections except for the engaged canine
- If necessary, use lightly compressed open coil spring to open space for impacted canine prior to canine engagement
- Bond appliance onto upper impacted canine (Use lower incisor bracket if canine is close to alveolar ridge and use button if canine is far from occlusal plane)
- It is not recommended to exceed a 1:1 ratio between wire deflection (red) and mesio-distal space present in the arch (blue) (Figure 2)

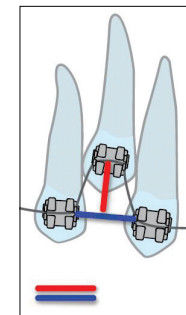


Figure 2

Clinical Cases

Case 1: Displaced Canine in Center of Alveolar Crest

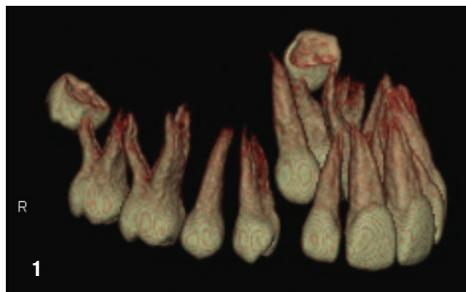


Figure 1: Unerupted canine located in center of alveolar crest.

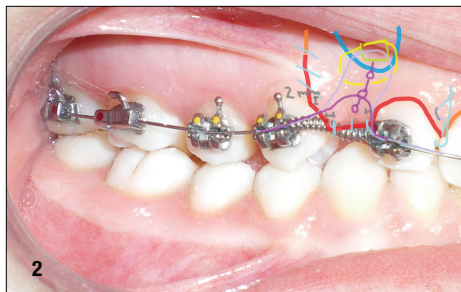


Figure 2: Nitinol spring on .014 Nitinol archwire to open space.



Figure 3: Surgical exposure and bonding of lower incisor SmartClip™ Bracket; direct engagement of canine with .013 Nitinol archwire.



Figure 4: Gingival flap recontoured with no tension on soft tissue.

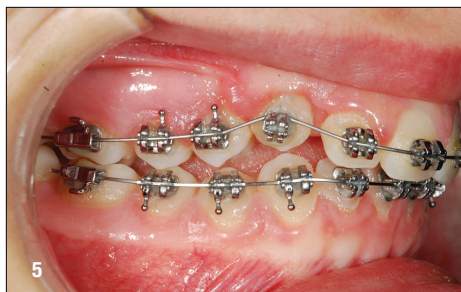


Figure 5: At week 6, the canine has been extruded.

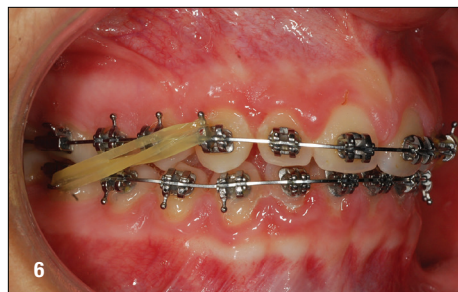


Figure 6: Temporary overjet corrected with Class II elastics.



Figure 7: Case completed in 14 months.

Case 2: Palatally Displaced Canine



Figure 1: Upper right canine was palatally displaced with the deciduous canine still present in the arch.



Figure 2: CBCT horizontal view.



Figure 3: Button with a ligature bonded to the distobuccal surface.



Figure 4: .014 Nitinol archwire engaged. (Note: It was not necessary to open additional space as the deciduous canine preserved some space in arch. Also, the deflection of the archwire tended to act as a spring, creating some space while recovering the canine.)

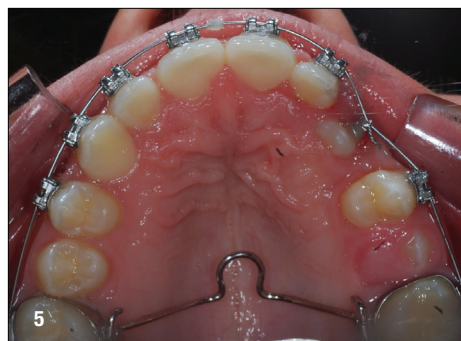


Figure 5: After two months it was only necessary to cut the archwire that was excessive distal to the upper first right molar.

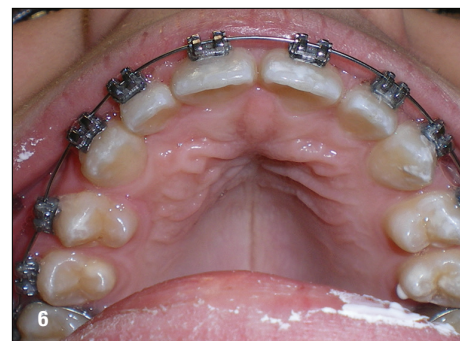


Figure 6: After two additional months it was possible to bond the canine bracket to the center of the buccal surface.



Figure 7: Case completed in 16 months.

Case 3: Displaced Canine in Center of Alveolar Crest in a Division 2 Case



Figure 1: Unerupted canine in the center of the alveolar bridge in a CL I/Div. 2 patient.

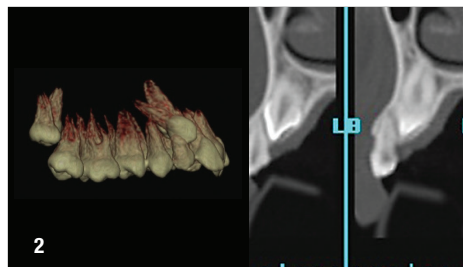


Figure 2: CBCT showed that the proximity of the canine crown to the lateral incisor root was not harmful. Thus, the lateral incisor was engaged. The post-extractive alveolus of the deciduous canine was used for a vestibular traction approach.



Figure 3: Surgical exposure of canine.

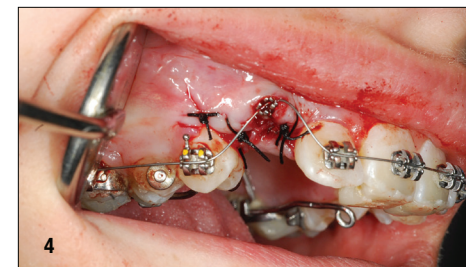


Figure 4: Bonded lower incisor SmartClip™ Bracket onto canine, providing early control and mesio-distal tip.



Figure 5: After four months with 0.014 Nitinol (4 months into treatment).



Figure 6: After two additional months, the case was simple to manage (6 months into treatment).



Figure 7: Case completed in 20 months.

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This article and many others like it may be found in a new 3M™ Self-Ligating Appliance System Treatment Guide, which will be available online in late 2014. The new guide will include sections on Bracket Handling, Positioning and Debonding, Archwire Techniques and Sequencing, and Treatment Tips and Tricks. More than 20 case presentations will be included.

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