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Vol. XXII, No. 2 • Global Edition • September 2015



James Ingebrand
Vice President &
General Manager
3M Oral Care

The Business of Change

We hear about it all the time. Times are changing. Things are changing. Technology is changing. Just when you think you have everything under control, your world changes yet again. Of course some of these changes can be extremely annoying, at least in the short term. Dealing with software upgrades, having your entire CD collection rendered obsolete, etc. Then, of course, there are the changes we all learn to love...eventually. Who would really want to go back to hand-typed memos and faxes in this day of instant communication and power of the Internet in the palm of your hand?

As orthodontic professionals, there is another type of change I think everyone can embrace: Changing a smile and changing a life. 3M Unitek has a long history of helping to make those life-changing transformations possible. These are changes of the most profound and important kind.

For commercial entities to survive and thrive (whether a 100-year-old company or a new practice) they also need to change from time to time. This is especially true when the market is also rapidly evolving. While change can be painful at times, not changing can be even worse. We all can think of examples of companies that were rendered obsolete when they couldn't or wouldn't change fast enough. The answer is not to not change, rather, the trick is to keep all that's good while adapting where one must in order to be well-positioned for the future.

Welcome to 3M Oral Care. You may have heard that 3M Unitek, for decades a part of 3M Company, is now part of 3M Oral Care. This is a small but important change. However, first let me tell you about what is not changing: Our sustained commitment to excellence, a continued flow of new and innovative products, and our dedicated orthodontic sales, customer service and marketing professional service experts. Orthodontic products are still manufactured in our specialized factories and are still shipped directly to your office.

So why change? We want to "up our game" even further when it comes to solving clinical, technical or commercial issues as they arise. We will be better able to leverage the extensive 3M background in science, materials and technologies to bring you advanced and innovative products that help you improve outcomes, and help your practice succeed – sometimes in ways you may never have considered. And with expanded resources, we can deploy more sales and customer support resources closer to our customers.

All of us at 3M Oral Care look forward to being an agent of positive change for you. If you have any questions, please contact your 3M representative.

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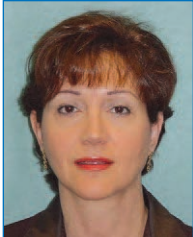
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Victory Series™ Superior Fit Buccal Tubes Update

Now available with APC™ Flash-Free Adhesive

Victory Series™
Superior Fit Buccal Tubes



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 is now Brand Manager responsible for Adhesives, Ligated Appliances, Tubes and Bands, and APC™ Adhesive Systems.

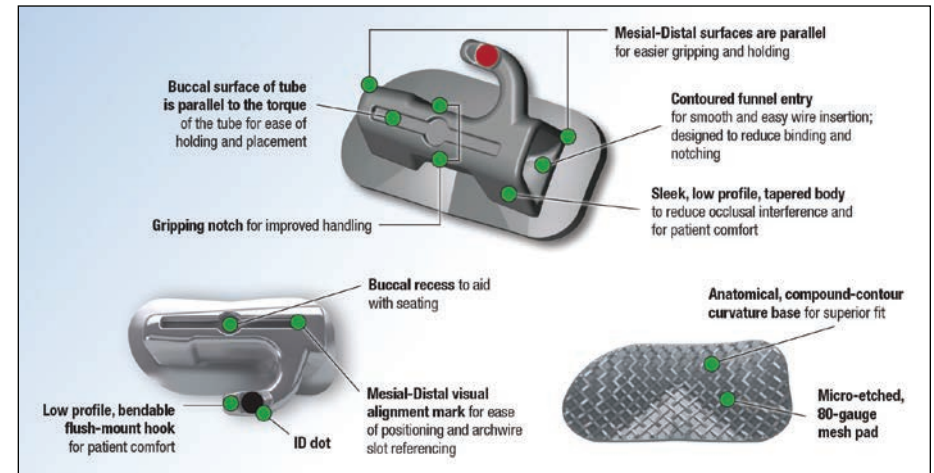


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3M™ Self-Ligating Appliances Technique Guide Now Available Online

Users around the world have spoken. The unique design of the **SmartClip™ Self-Ligating Appliance System**, and its aesthetic counterpart, the **Clarity™ SL Self-Ligating Appliance System**, offers treatment advantages and efficiencies unavailable with other self-ligating appliance types.

From chair time savings to extended appointment intervals, these two appliance systems, incorporating Intelligent Clip Technology, are set apart from competitors. Now with the addition of optional **APC™ Flash-Free Adhesive**, the efficiency available with these systems is even greater.

To see how doctors from around the world treat with SmartClip and Clarity SL Appliances, check out the recently published Technique Guide for 3M™ Self-Ligating Appliances with Intelligent Clip Technology, available on the website in the Self-Ligating Appliances section. An example of the type of information in the guide is shown in the case by Dr. Moe Razavi on page 20.



Treating an Extraction Case Aesthetically with Clarity™ ADVANCED Ceramic Brackets



Dr. Jair Lazarín

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 in 2010 as Professional Services Manager for Latin America.

Introduction

In the past, the treatment characteristics of ceramic brackets were a consideration when deciding what the right choice would be for our patients. Some ceramic brackets had a reputation for clinical deficiencies in terms of friction, fragility and difficult debonding.

Space closure was a challenge for many ceramic brackets due to high friction against the archwire. Sliding resistance is one of the most important considerations in treatment with ceramic brackets, particularly when you treat extraction cases with sliding mechanics.

Today, innovative Clarity™ ADVANCED Ceramic Brackets offer a very pleasing aesthetic treatment experience for both patients and doctors. Clarity ADVANCED Brackets are produced using a special manufacturing process and are made from a fine-grain polycrystalline alumina.¹ This allows Clarity ADVANCED Brackets to feature slim tie-wings with generous under tie-wing space for easy ligation and double ligation, as well as rounded slot edges that, importantly, reduce binding and notching. Clarity ADVANCED Brackets offer excellent sliding mechanics, which lets me easily treat extraction cases the same as with metal brackets.

Following is a case using Clarity ADVANCED Brackets, where extraction was indicated.

Case Presentation

Patient: Female, age 13 years 2 months

Diagnosis: Class I malocclusion, Retreatment

- Skeletal Class I
- Slight high angle tendency
- Molar Class I
- Light maxillary crowding
- Light mandibular crowding
- Proclined upper incisors
- Proclined lower incisors
- Impacted lower second and third molars

Treatment Plan:

- Extraction of upper first and lower second bicusps
- .022 slot Clarity™ ADVANCED Ceramic Brackets, MBT™ Versatile+ Appliance System Rx
- Extraction of upper and lower third molars
- Upright of lower second molars

Initial:



Figure 1A-E: Initial set of pictures.



Figure 2: Initial panoramic X-rays showing impacted second and third molars in the lower arch.

The plan for this treatment was to retract and retrocline the upper and lower incisors in order to improve the soft tissue profile, and to gain some space in the lower arch in order to upright the second molars.

Two weeks after extractions were done, brackets were bonded and .012 Nitinol archwires were placed. Notice in Figure 3 that upper lacebacks are placed, but the cuspids are not attached to the archwire. At this time, the mechanics consist of retracting the cuspids, avoiding any potential intrusion of the upper anterior segment.



Figure 3A-C: After bonding, .012 Nitinol wires and lacebacks were placed.

After eight weeks, .012 Nitinol wires were replaced with .016 Nitinol wires. At that time, the upper cuspids were attached, as they have been retracted and lowered enough to be at the same height as the incisors. Eight weeks later, .018 Australian SS wires were placed in order to flatten the curve of Spee, that at this time was very pronounced.



Figure 4A-C: Australian SS wires to flatten the curve of Spee.

Twelve weeks after the Australian wires were placed, the curve was flat enough to insert .019x.025 SS wires. These wires remained passive for another eight weeks before starting retraction, in order to keep flattening the curve of Spee. During this time, the segments 3-to-3 were consolidated, and the lower third molars were extracted.



Figure 5A-C: .019 x .025 SS wires remained passive for eight weeks prior to the retraction.

Once the curve of Spee was flat, we proceed to close the spaces by using Nitinol retraction springs. I can't say a numerical value, but I can say the behavior of the brackets was the same as that you can feel with metal brackets. The time to close the spaces was three months, and during that period the midline was centered.



Figure 6A-C: Space closure took three months.

Once the extraction spaces were closed, we proceeded with double archwire mechanics in the lower arch in order to upright the lower second molars. The mechanics consisted of placing a .019x.025 SS wire and over it a .014 Nitinol wire with open coil springs that reached minitubes bonded to the second molars.

Sixteen weeks later, the lower second molars were in perfect position and in good occlusion with the upper molars.



Figure 7: Panoramic X-rays showing up-righted lower second molars.

After molars were in good occlusion, the lower right cuspid bracket was repositioned in order to get better root parallelism, and 12 weeks later brackets were removed.



Figure 8A-C: Final result.

Discussion

Aesthetic treatment with ceramic brackets is no longer more difficult than treatment with metal appliances. Modern ceramic appliances, such as Clarity™ ADVANCED Ceramic Brackets, bring us two major benefits: the first is that you can manage them just as if they were metal appliances, and the second is that patient satisfaction can be much higher compared to treatment with metal appliances.

Patients, by far, prefer aesthetic braces over traditional metal appliances.² Since changes we implement in our practice should have a focus on improving patient satisfaction, offering aesthetic ceramic braces is a great way to have happy patients without having to alter our regular clinical procedures.

Case photos provided by Dr. Jair Lazarín.

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1. Wagner N, Wyllie B, Thorstenson G. Clarity™ ADVANCED Ceramic Brackets: A Technical Perspective. *Orthodontic Perspectives* Vol XVIII No. 2 September 2011 pp 6-8.
2. Shih-Hsuan S, Greenlee G, Kim J, Smith C, Huang G. Assessment of perceived orthodontic appliance attractiveness. *Am J Orthod Dentofacial Orthop* 2008;133:S68-78.

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Speaker
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Spanish

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Clinical Cases



Surgical Class III Case Using SmartClipTM Self-Ligating Appliance and Variable Prescriptions



Dr. Denis Protsenko

Dr. Denis Protsenko graduated from Moscow State University of Medicine and Dentistry in 1993 and completed his postgraduate study as an orthodontist in 1997 at the Russian Medical Academy of Postgraduate Education.

Since 2005 he has also been a speaker for 3M in the Russian Federation. His main orthodontic interests are: skeletal anchorage, digital technologies and software for orthodontists, adult orthodontic treatment, and complex treatment.

Introduction

There is a growing interest for orthodontic treatment among adult patients. This is due to many factors, such as new technologies (self-ligation, customized appliances, lingual and aesthetic orthodontics), which allow practitioners to optimize treatment and make it almost invisible. It is also due to changes in general dentistry, where in many cases it's no longer possible to achieve quality results without orthodontic treatment. Beauty and health are also gaining interest among the modern population. Taking into account those factors today and according to our clinic data, we can say that 50% of patients seeking orthodontic treatment are adults.

One of the groups interested in orthodontic treatment are patients with skeletal anomalies. In such cases, there are two treatment possibilities for the doctor and patient to consider: 1) compromised orthodontic treatment, or 2) orthognathic surgery, depending on the severity of the malocclusion. Compromised treatment makes treatment longer and can introduce risks such as periodontal

disease, facial harmony/balance and TMD. That is why it is very important to take into account all factors and find the most efficient way to treat. When an orthodontist's aim to achieve good occlusion is combined with a patient's desire to preserve or even improve facial aesthetics, orthognathic surgery often becomes the method of choice.

Another factor which can influence the patient's decision is treatment time. Many orthodontists believe that by using specific braces they can significantly shorten treatment time, although there is no supporting data in literature. Treatment time is a multi-factorial process and can be influenced by diagnosis, treatment plan, treatment progress, appliance, patient cooperation, etc. As you can see, treatment time is a very complex index which can be shortened by appliance selection and lengthened by other factors. Only the combined efforts of the orthodontist and patient may optimize treatment time.

Diagnosis and Treatment Planning

A male patient came to our clinic seeking orthodontic treatment at the age of 16 (see Figure 1A-H, 2, 3, 4, 5). His clinical examination revealed the following:

1. Previously extracted tooth #24 due to orthodontic indications
2. Skeletal Class III
3. Deviation of midlines (upper midline is deviated to the left; lower midline is deviated to the right)
4. Asymmetry
5. Proclination of upper incisors
6. Retroclination of lower incisors
7. No overbite
8. Cross bite on right side
9. Narrow arches

Patient was presented with two treatment options: 1) compromised extraction treatment (extraction of three remaining first premolars), or 2) combined treatment (extraction of teeth #14, #38, #48, combined with orthognathic surgery). After surgical consultation, patient decided on the combined treatment plan. Due partly to the extractions, his treatment was delayed for 13 months. After this time there was a repeat examination.

Approved treatment plan:

1. Extraction of tooth #14, #38, #48
2. Center upper midline
3. Incisors decompensation
4. Surgery
5. Finishing orthodontics



Figure 1A-H: Initial photos.

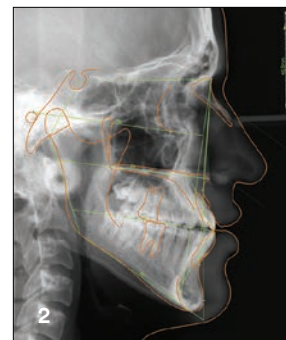


Figure 2: Cephalometric analysis.

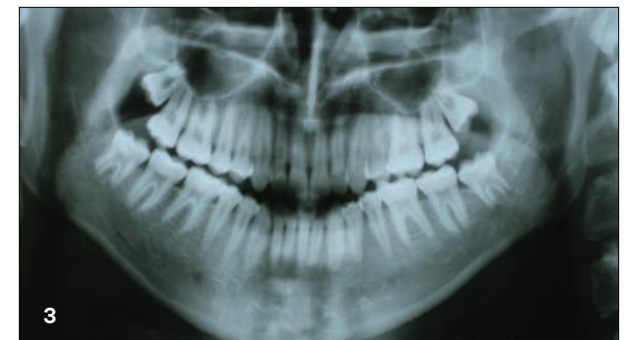
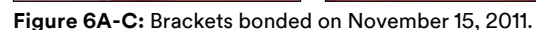


Figure 3: Initial panoramic X-ray.

Figure 4: Cephalometric analysis.



In order to optimize achievement of some treatment needs (incisors decompensation, midline shift) the SmartClip™ SL3 Self-Ligating Appliance (.022 slot) was chosen utilizing Variable Prescription Orthodontics. Specifically, I was able to choose high torque for lower incisors, standard torque for upper incisors and 0° torque for upper canines which allowed me to achieve the treatment goals. Initial archwires were .014 Nitinol SE where a laceback was placed in the 2nd quadrant (Figure 6A-C). One year into treatment, spaces were closed, midline was improved, and a control examination was performed (Figure 7A-C).



Upper: .014 Nitinol SE, .018x.018 Nitinol SE, .019x.025 Nitinol Classic,
.019x.025 SS

Lower: .014 Nitinol SE, Tandem .014 Nitinol SE / .016 Nitinol Classic,
.019x.025 Nitinol SE, .019x.025 SS

Fourteen months after treatment began, space closure was complete on the upper jaw and the patient was sent to the surgeon for bimaxillary surgery¹ (Figures 8A-C, 9, 10, 11, 12). The surgical plan was to change position of upper and lower jaw according to numbers presented in both planes (vertical and sagittal) on the profile plan (VTO in Figure 5). Forward movement of upper jaw (incisors) by 5.3 mm. Vertical movement of lower incisors by 6.4 mm aiming to decrease vertical face height. This profile plan does not reflect transversal asymmetry correction.

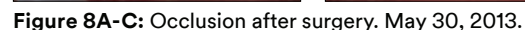




Figure 9: Pre-surgical panoramic X-ray.

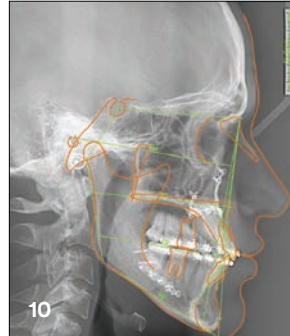


Figure 10: Post-surgical cephalometric analysis.

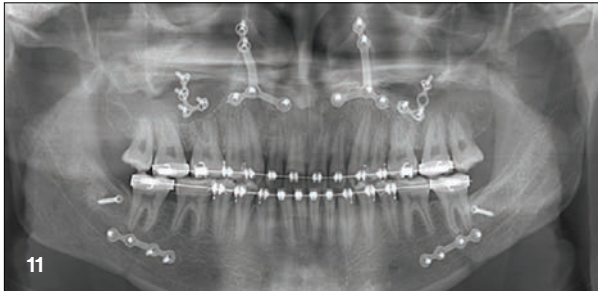


Figure 11: Post-surgical panoramic X-ray.

SNA	82,0±3,5°	87,8°	+2,3	
SNB	80,0±3°	86,8°	+3,8	
ANB	2,0±2,4°	1,0°	0,0	
A / NP	0,0±3,1mm	3,5mm	+0,4	
Po / NP	-4,0±5,3mm	9,0mm	+7,7	
WITS	0,0±1mm	-0,1mm	0,0	
SN / MP	32,0±5°	28,5°	0,0	
FH / MP	26,0±5°	22,9°	0,0	
PP / MP	28,0±6°	27,0°	0,0	
PP / OP	10,0±4°	3,5°	-2,5	
MP / OP	17,4±5°	23,5°	+1,1	
U1 / A Po	6,0±2,2mm	5,5mm	0,0	
L1 / A Po	2,0±2,3mm	2,6mm	0,0	
U1 / PP	110,0±5°	114,9°	0,0	
L1 / MP	95,0±7°	93,0°	0,0	
U1 / OP	57,5±7°	61,6°	0,0	
L1 / OP	72,0±5°	63,4°	-3,6	

Figure 12: Post-treatment cephalometric analysis.

Completing Treatment

Following the surgery, finishing orthodontics took about five months. In order to get optimal occlusion, some treatment elements were added and changed, including molar bands and archwires (Figure 13A-C).



Figure 13A-C: Treatment progress on July 12, 2013.

It took 16 appointments to treat this patient who presented with a skeletal Class III malocclusion. If the patient was more compliant, the total treatment time might have been reduced by at least 2-3 months. In order to prepare patient for surgery, extraction of one premolar and midline shift were needed, which meant movement of multiple teeth. In such a clinical situation, the use of a self-ligating appliance is helpful to optimize treatment progress.

Figure 14A-H shows the case after completion of orthodontic treatment. Figures 15A-I and 16A-D show before and after treatment.



Figure 14A-H: Upon completion. October 14, 2013.

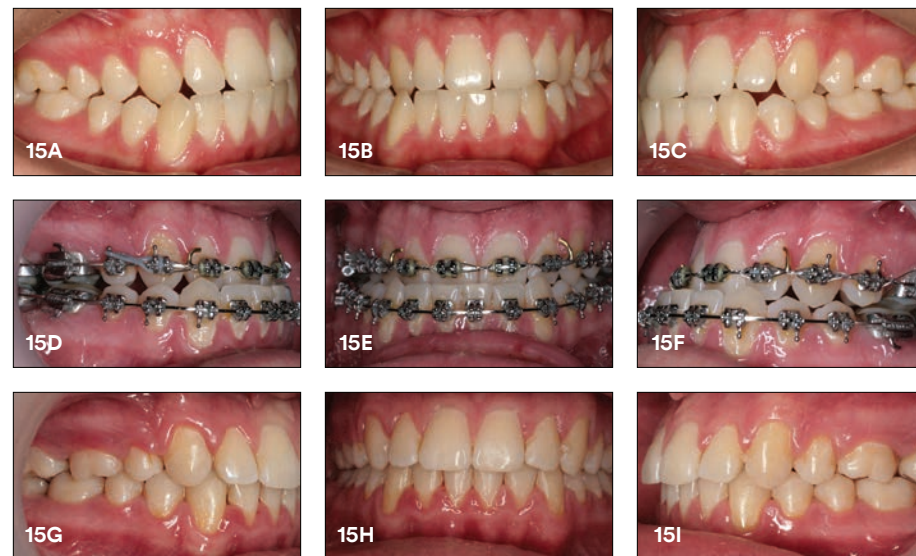


Figure 15A-C: Initial. Figure 15D-E: Pre-surgery. Figure 15F-I: Final.



Figure 16A-D: Before/after profile.

The result is stable after one year of retention (Figure 17A-C). Today, taking into account my experience with the SmartClip™ SL3 Self-Ligating Appliance, I would recommend placing Stainless Steel archwires as soon as possible (for example .018, .020, .017×.025 hybrid, .019×.025 hybrid) and using skeletal anchorage. In the case of torque and angulation loss it is better to re-gain it using full size archwires after linear tooth movement.



Figure 17A-C: One year after treatment.

High torque for lower incisors helped decompensate their position before surgery. The movement and retraction of the standard torque brackets on upper incisors also helped decompensate lower incisor position. Application of 0° offset molar tubes helped to create tight occlusal contacts.

In retrospect, I would have preferred to improve the angulation of tooth #21.

Case Summary

Initial Exam: Oct. 12, 2010

Treatment Start: Nov. 15, 2011

Surgery: May 2013

Treatment End: Nov. 14, 2013

Treatment Time: 24 months

Archwire Sequence			
Maxillary		Mandibular	
.014 Nitinol SE	9 weeks	.014 Nitinol SE	8 weeks
.018×.018 Nitinol SE	10 weeks	Tandem .014 Nitinol SE / .016 Nitinol Classic	10 weeks
.019×.025 Nitinol Classic	12 weeks	.019×.025 Nitinol Classic	12 weeks
.019×.025 Stainless Steel	6 months to close spaces	.019×.025 Stainless Steel	6 months to close spaces
.019×.025 Nitinol SE	8 weeks	.019×.025 Nitinol SE	8 weeks
.019×.025 Beta Titanium	12 weeks	.019×.025 Beta Titanium	12 weeks

References

1. Oral Surgeon was Andrey Senyuk in Moscow, Russian Federation.

Case photos provided by Dr. Denis Protsenko.

Clarity™ ADVANCED Ceramic Brackets: A Clinical Study of Bonding Failure Rates and Bracket Breakage



Dr. Jae-Joon Lee

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Incognito™ System certified, Korea
Invisalign® certified, Korea
National Dental Board, USA

Introduction

As orthodontic patients' aesthetic needs increase, brackets to match various colors of the teeth have been developed. Ceramic brackets, especially, produce the highest aesthetic effect. Since 2000, I have been using ceramic brackets manufactured by a number of companies including 3M's ceramic bracket series. In 2012, I started using the new Clarity™ ADVANCED Ceramic Brackets. As reported in previously published articles, these brackets have a number of advantages. In this study, I investigated bracket bonding failure rate and breakage, which are commonly experienced by patients while receiving orthodontic treatment.



Characteristics of Clarity™ ADVANCED Ceramic Brackets

I divide the characteristics of Clarity ADVANCED Brackets into two groups. The first is from a practitioner's point of view. These brackets are created through injection molding of the polycrystalline alumina of a finer grain size (0.9 micron) and have smooth and rounded corners with increased ceramic strength. Brackets with smooth and rounded corners reduce binding and notching, which obstruct wire sliding during orthodontic treatment, and thus increase treatment efficiency. In addition, these brackets have a smaller and lower profile than previous 3M ceramic brackets. Therefore, when these brackets are attached to the mandibular anterior teeth, occlusal interference is minimized and inter-bracket distance increases.



The second group is from a patient's point of view. Clarity™ ADVANCED Brackets are made with a translucent fine-grained alumina material in a low profile design. Therefore, these brackets match well with the different colors of the teeth, and thus produce excellent aesthetic effect. In addition, the brackets minimize patients' discomfort.

Bracket Bonding and Bonding Failure

Reattaching a detached bracket or a cracked bracket lowers the efficiency of orthodontic treatment. It increases unnecessary chair time of patients and material cost. This, in turn, increases practitioners' treatment time and, in some cases, results in an extension of treatment period.

To find out how often detaching or cracking occurs in Clarity ADVANCED Brackets, and thus how often reattachment of the brackets becomes necessary, I conducted an investigation on the patients that received treatment in my clinic (Cheongju, Korea). The study was conducted in May 2015.

The total number of patients investigated was 435, which are divided into 92 male (21.1%) and 343 female (78.9%) patients. For bracket bonding, 3M's Transbond™ XT Light Cure Adhesive and Ortholux™ Luminous Curing Light were used.

The number of teeth to which brackets were attached was 6,808 in total and bond failures occurred in 157 teeth (2.31%) (Table 1). Of the attached brackets, only 10 were cracked (Table 2). The extremely low rate of bracket cracking in comparison to the number of all brackets attached indicates that Clarity ADVANCED Brackets are very resistant against cracking. Comparative bond failure rates for maxillary and mandibular teeth are shown in Tables 3 and 4.

Clinically, when bending or torquing is applied to the rectangular stainless steel wire, I experienced that almost no cracking occurred in Clarity ADVANCED Brackets in comparison to the sapphire type ceramic brackets.

Two additional observations, the rates of bond failure and cracking were higher in male patients than female (Table 5). As for patients experiencing bond failures by age group, it was higher in younger patients, and it decreased in the order of those in their 10s, 20s, 40s and 30s (Table 6). This result indicates that education in preparation for detached brackets is necessary for younger patients.

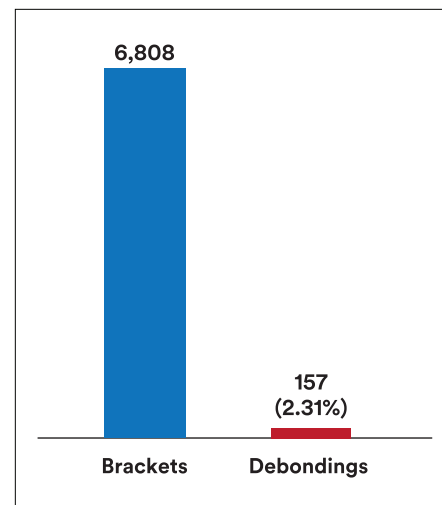


Table 1: Bonding failure rate of Clarity™ ADVANCED Ceramic Brackets in study.

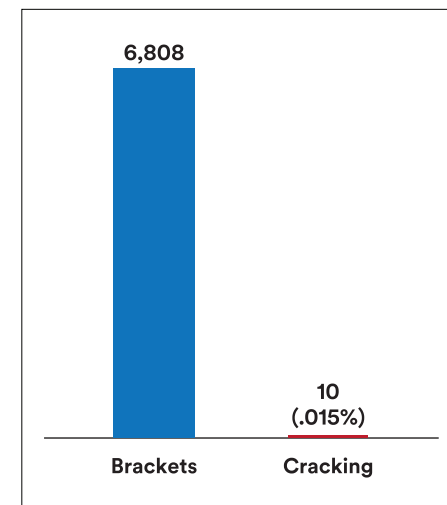


Table 2: Cracking of Clarity™ ADVANCED Ceramic Brackets in study.

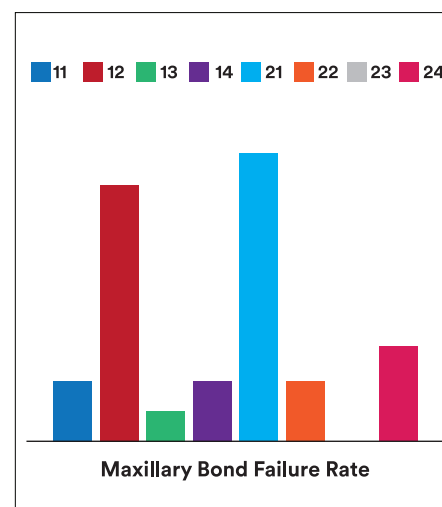


Table 3: Maxillary bond failure rate.

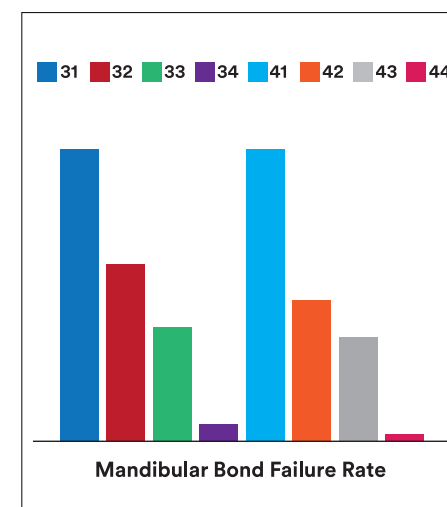


Table 4: Mandibular bond failure rate.

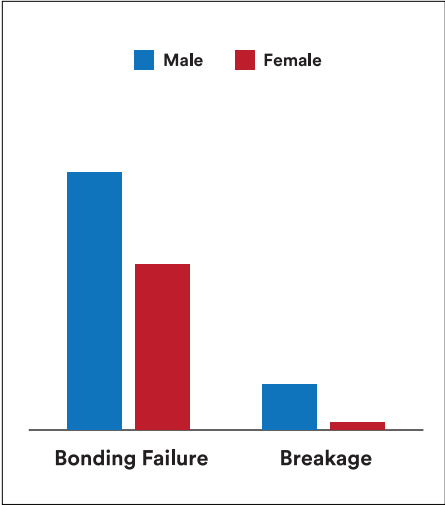


Table 5: Comparison of bond failure rate between male and female patients.

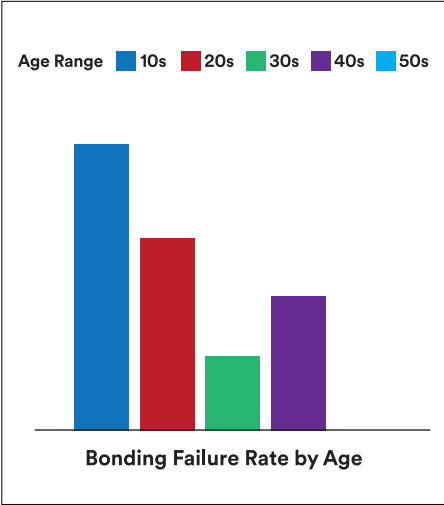


Table 6: Bonding failure rate by age.

Conclusion

Clinically, the rate of ceramic brackets made with polycrystalline alumina of finer grain size requiring reattachment by reason of exclusion or cracking was low.

By age group, the frequency of bracket reattachment was the highest in teenage patients. In addition, bracket exclusion occurred more frequently in the anterior teeth than canine teeth or premolars and in the mandible than the maxillary. The rate of bond failures in the mandible was found to be higher than that in the maxillary by approximately 48% (Table 3, Table 4).

Reattachment of brackets due to cracking was more frequent in male patients. However, the number was insignificant.

Based on the results above, it is considered that Clarity ADVANCED Brackets have a characteristic of aesthetic and functional excellence. For a more accurate assessment, a comparative study with metal brackets or resin brackets will be necessary.

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Class II Division 1, TAD Assisted Distalization

SMARTCLIP^{SL3}
SELF-LIGATING APPLIANCE SYSTEM

CLARITY^{SL}
SELF-LIGATING APPLIANCE SYSTEM



Dr. Moe Razavi

Dr. Moe 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.

This article is an example of the cases available in the newly released 3MSM Self-Ligating Appliances with Intelligent Clip Technology – Technique Guide.



Introduction

A fifteen year old male presented for an orthodontic consultation with the chief concern of “overlapping front teeth”. Clinical exam revealed a Class II division 1, subdivision right malocclusion, primary as a result of mesial drift of the maxillary buccal segments. Tooth #4 was excessively rotated. Overlap of the maxillary central incisors had resulted in the displacement of the maxillary midline 3 mm to the left, with no space present in the maxillary right quadrant to allow for the midline correction. Mild maxillary and mandibular crowding was noted. Radiographic analysis revealed mild mandibular retrognathia, combined with a vertical growth pattern. Panoramic evaluation was unremarkable, with the formation of all third molars in a vertical eruption pattern.

The original treatment plan was the extraction of teeth #3, 16, 17 and 32. Continuous arch mechanics were to be utilized to mesialize tooth #2 into a class I molar position, while retracting the right buccal segment to improve the maxillary midline. This would be easily achieved through reciprocal space closure. Upon return from the oral surgeon's office, it was noted that the surgeon removed tooth #1 instead of tooth #3. The alternative treatment plan was proposed to distalize the maxillary right buccal segment using indirect skeletal anchorage.

Orthodontic appliances were bonded: 022 slot, ClaritySM SL Self-Ligating Brackets, MBTSM Appliance System prescription, in the maxillary arch and SmartClipSM Self-Ligating Brackets in the mandibular arch. Archwire sequence started with .014 Nitinol SE, to .014/.016 Nitinol SE tandem, to .019x.025 Nitinol HA archwires.

A miniscrew supported transpalatal arch was fabricated to stabilize the maxillary arch from teeth #5 to 15 as a single unit, and to provide sufficient anchorage for the distalization of teeth #2 and 3. A 6 mm UnitekSM TAD miniscrew was placed in the paramedian area. The TPA fabrication has been described in previous publications. A .019x.025 Beta-Titanium archwire was used in the maxillary arch as the working wire. Once there was sufficient distalization, the TPA design was altered to stabilize tooth #3 in its new position, during the retraction stage of treatment.

Final result reveals a 1 mm midline discrepancy, however given the circumstances, the final treatment results are both aesthetic and functional. Moreover, the patient was pleased with the treatment results.

Patient

Male: age 15 years, 8 months

Diagnosis

Class II division 1, Subdivision Right Malocclusion

- Mild maxillary and mandibular crowding
- Excessive rotation of UR5
- Mesial drift of UR6 & 7 leading to Class II molar relationship
- Maxillary midline to Left 3 mm

Treatment Plan

- Clarity™ SL Self-Ligating Brackets (.022 slot) on maxillary arch, SmartClip™ Self-Ligating Brackets (.022 slot) on mandibular arch, MBT™ Appliance System, Low Torque Mandibular incisors
- TAD assisted Distalization TPA to distalize UR molars using Unitek™ Temporary Anchorage Device (TAD) system
- Alteration of TPA to stabilize new molar position and retract maxillary right teeth to correct maxillary midline
- Class II elastics

Maxillary Arch

- .014 SE NiTi – 8 weeks
- .014/.016 SE NiTi Tandem – 8 weeks
- .019x.025 HA NiTi – 6 weeks
- .019x.025 Beta-Titanium – 17 weeks (Distalization for entire 17 weeks)
- .016 SE NiTi – 6 weeks (Retraction initiated)
- .018 SE NiTi – 6 weeks
- .019x.025 Beta-Titanium – 8 weeks (Retraction ends at the end of this wire placement)
- .019x.025 HA NiTi – 10 weeks (Pan & Repo)
- .019x.025 Beta-Titanium – 15 weeks

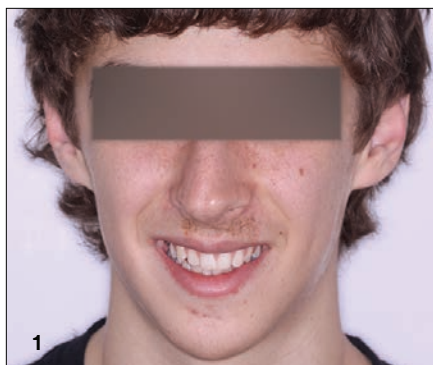


Figure 1: Initial.

Treatment Timeframe

Treatment Start:	05/05/2010
TAD Placement:	09/13/2010
Distalization Initiated:	10/07/2010
Retraction Initiated:	02/02/2011
TAD Removal:	06/22/2011
Treatment End:	12/15/2011
Treatment Time:	19 months, 1 week

Mandibular Arch

- .014 SE NiTi – 8 weeks
- .014/.016 SE NiTi Tandem – 8 weeks
- .019x.025 HA NiTi – 53 weeks
- .019x.025 Beta-Titanium – 15 weeks (Class II elastics started and stopped for the last three weeks when Settling elastics started)

Initial ABO Analysis				
Maxilla to Cranial Base				
SNA (°)	83.2	82.0	3.5	0.3
Mandible to Cranial Base				
SNB (°)	77.2	80.9	3.4	-1.1 *
SN – GoGn (°)	32.1	32.9	5.2	-0.2
FMA (MP-FH) (°)	26.8	23.8	4.5	0.7
Maxillo-Mandibular				
ANB (°)	6.0	1.6	1.5	2.9 **
Maxillary Dentition				
U1 – NA (mm)	3.2	4.3	2.7	-0.4
U1 – SN (°)	104.8	102.8	5.5	0.4
Mandibular Dentition				
L1 – NB (mm)	8.1	4.0	1.8	2.3 **
L1 – GoGn (°)	101.5	93.0	6.0	1.4 *
Soft Tissue				
Lower Lip to E-Plane (mm)	-0.9	-2.0	2.0	0.5
Upper Lip to E-Plane (mm)	-5.6	-6.1	2.0	0.2

Table 1: Initial ABO analysis.



Figure 2: Initial cephalometric X-ray.

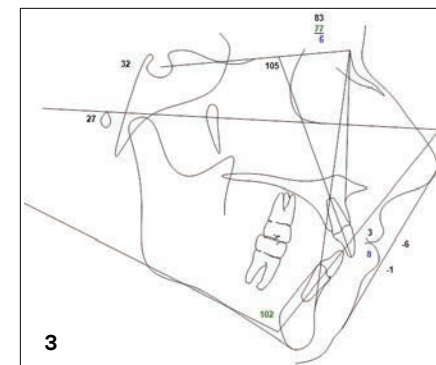


Figure 3: Initial lateral tracing.

Treatment Start – 5/5/2010



Figure 4A-H: Initial intraoral photographs.

9/13/2010

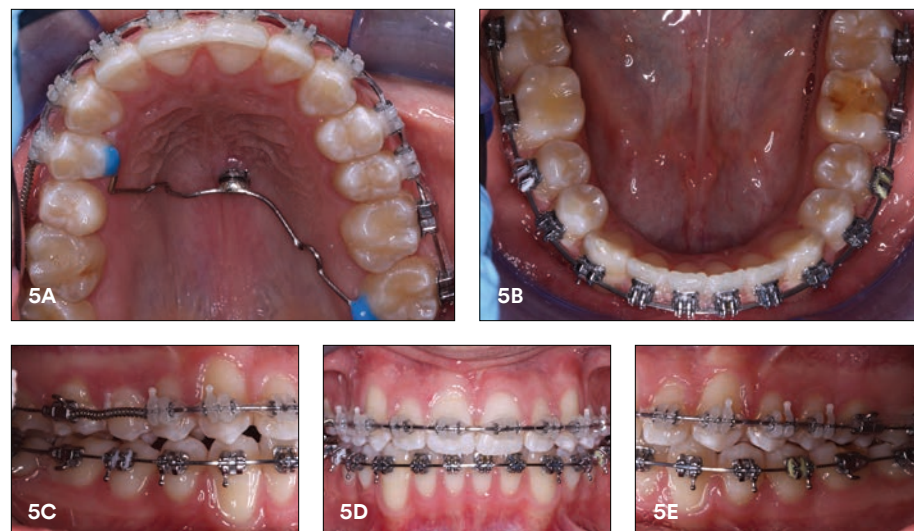


Figure 5A-E: TAD Placement Distalization, .019x.025 HA NiTi.

2/2/2011

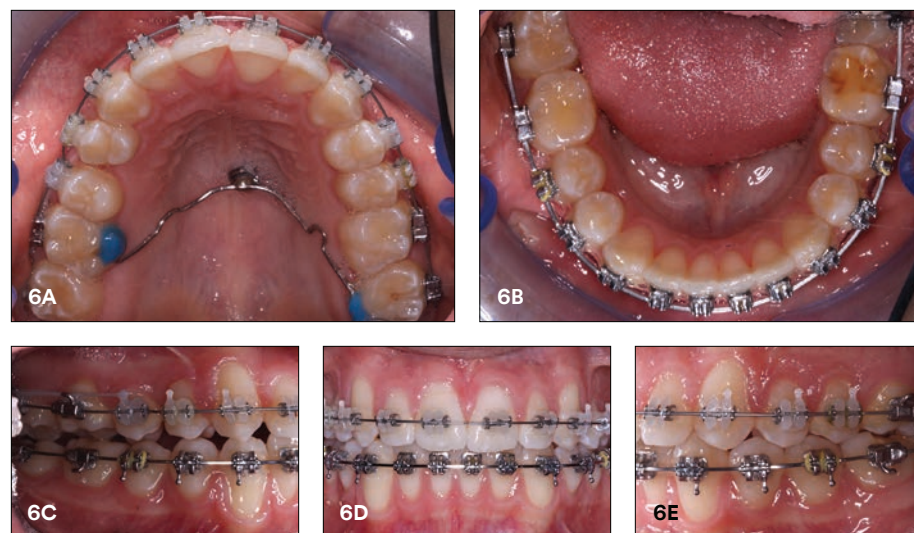


Figure 6A-E: Retraction; .016 SE NiTi.

Final – 12/15/2011

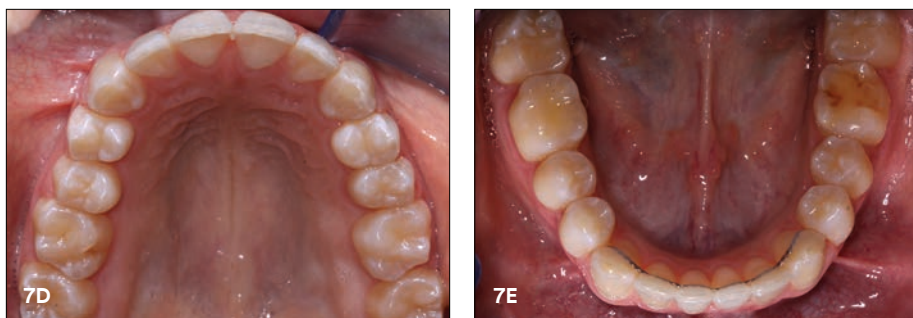
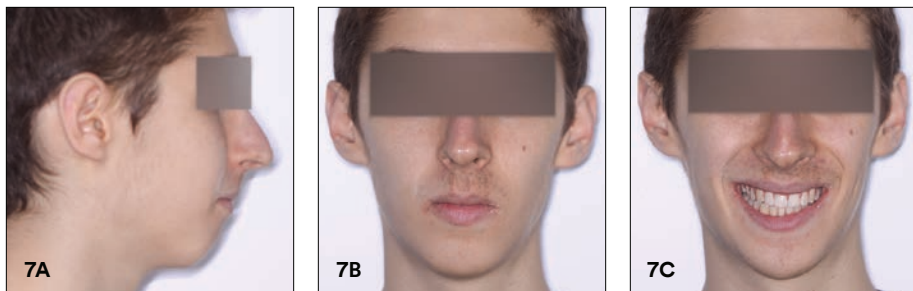


Figure 7A-H: Final intraoral photographs.

TPA Design

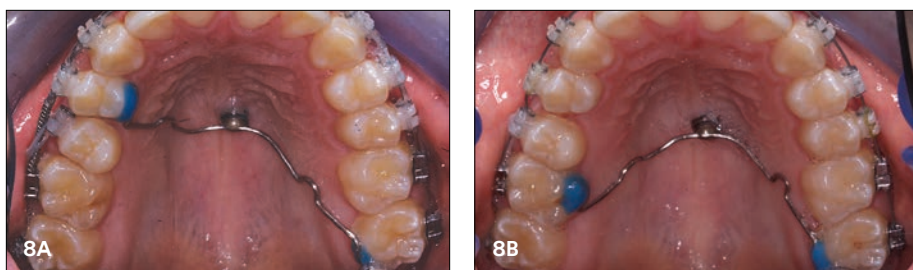


Figure 8A: TPA distalization initiated.

Figure 8B: TPA retraction initiated.



Figure 9A: Initial cephalometric X-ray.



Figure 9B: Final cephalometric X-ray.

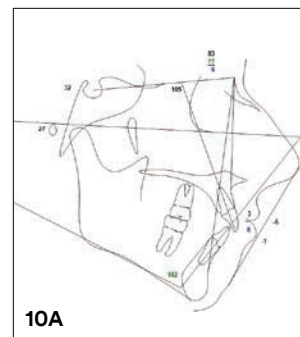


Figure 10A: Initial lateral tracing.

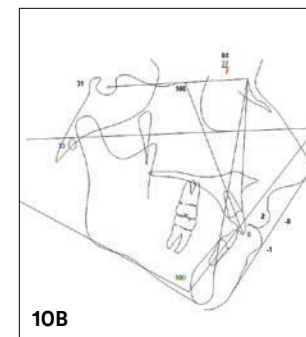


Figure 10B: Final lateral tracing.



Figure 11A: Initial facial profile.



Figure 11B: Final facial profile.

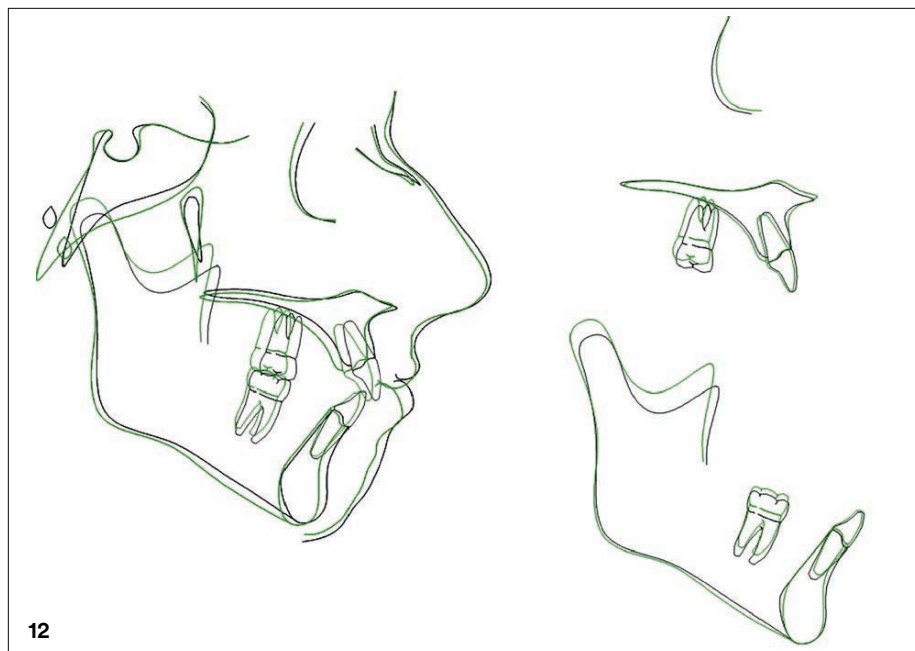


Figure 12: Superimpositions.

Final ABO Analysis				
Maxilla to Cranial Base				
SNA (°)	83.6	82.0	3.5	0.5
Mandible to Cranial Base				
SNB (°)	76.9	80.9	3.4	-1.2 *
SN – GoGn (°)	31.5	32.9	5.2	-0.3
FMA (MP-FH) (°)	33.2	23.0	4.5	2.3 **
Maxillo-Mandibular				
ANB (°)	6.7	1.6	1.5	3.4 ***
Maxillary Dentition				
U1 – NA (mm)	2.0	4.3	2.7	-0.8
U1 – SN (°)	107.6	103.1	5.5	0.8
Mandibular Dentition				
L1 – NB (mm)	8.4	4.0	1.8	2.4 **
L1 – GoGn (°)	99.7	93.0	6.0	1.1 *
Soft Tissue				
Lower Lip to E-Plane (mm)	-0.5	-2.0	2.0	0.7
Upper Lip to E-Plane (mm)	-7.9	-7.8	2.0	-0.1

Table 2: Final ABO analysis.

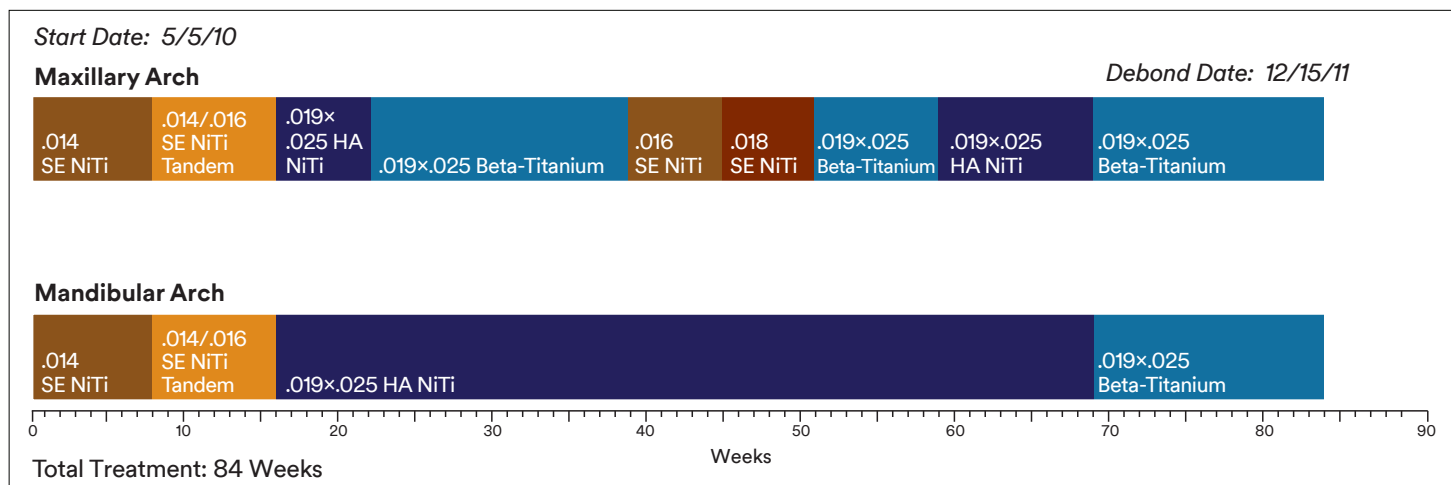


Figure 13: Treatment Timeline.

Case photos provided by Dr. Moe Razavi.

3MSM Health Care Academy

Incognito™ Lite Lingual Orthodontic Appliance: Enhancing the Scope of Targeted Mechanics with Customized Computer-Aided Design/Computer-Aided Manufacturing Therapy

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Introduction

Orthodontics is interestingly juxtaposed globally! Practices are yearning for growth, and orthodontic education is looking at reinventing itself to face the times. Clinical perfection as a goal today, cannot be isolated from patient needs and patient “centric appliances.”¹ In an aspirational society, orthodontic patients have become more knowledgeable of treatment options and appliances, and their demands are getting more specific. Not only do they want excellent treatment results, they also want faster treatment, efficient mechanics and invisible orthodontic appliances.

On the invisible orthodontic appliance marketplace, Invisalign has invested the largest amount of resources in marketing and advertising, and created a demand for these services. A lot of patients today approach specialist clinics requesting aligner services, assuming that they are comprehensive orthodontic solutions for all orthodontic cases. As orthodontic specialists, we all know that removable invisible orthodontic appliances have their limitations in controlling tooth movement in three-dimensions (3D). A well-referenced study has shown that the mean

accuracy of tooth movement for Invisalign® is only 47%.² The advent of computer-aided design/computer-aided manufacturing (CAD/CAM) technology in lingual orthodontics, allows clinicians to provide patients invisible treatment options, which are accurate and more predictable.

The Incognito™ lingual appliance has positioned itself as an excellent choice from amongst the vast galaxy of lingual systems available. However, some patients may not want to go through extensive and comprehensive treatment, and prefer a solution that is faster, more affordable but predictable as well. This article will illustrate with cases that can be treated with a sectional lingual fixed appliance, which is an excellent option for adjunctive orthodontic treatment.

Segmental appliances and mechanics that “target” the malocclusion, without involving teeth that do not require tooth movement are gaining popularity globally. Reciprocal and unwanted effects of orthodontic force systems can thus be prevented, and more predictable results can be achieved in a shorter time span.

Incognito™ lingual orthodontic appliance or “Incognito™” is amongst the most popular lingual appliance. Lingual appliances are only prescribed by a “specialist in orthodontics” since it is very technique sensitive, and requires specialist training before certified to use it. Lingual braces are not visible from the outside, and there is little or no esthetic impairment of a patient’s smile during treatment. The disadvantages would be initial tongue discomfort and speech disturbances.³

Incognito™ Lingual Orthodontic Appliance

Dr. Dirk Wiechmann of Germany invented the Incognito lingual appliance in late 1990’s and has created enormous interests in the lingual appliance in the last decade.^{4,5,6,7} His company and technique were subsequently acquired by 3M Unitek in 2009. The appliance is distinguished from other bracket systems because both the brackets and the wires are custom made for individual patients and fabricated using state-of-the-art CAD/CAM technology and wire bending robots.

The technological advances in Incognito lingual appliance helps solving the three major problems in lingual orthodontics:

1. Improve patient comfort and speech adaptation as the appliance is custom made and adapted to the tooth surface as flat as possible.
2. Improve accuracy of rebonding as the custom made bracket base covers most of the lingual tooth surface, this allows the ease of direct rebonding of a bracket without need of any jig or positioning aids.
3. Improve ease of finishing and detailing of a case based on the final set-up models, the custom made brackets and prefabricated archwires according to the arch form have improved accuracy in finishing the case as close as to the set up models as possible.^{8,9}

Archwire Production

The 3D geometry of each archwire is calculated with the CAD/CAM software, and the information is transferred to the state-of-the-art archwire bending robot. All the archwires in the sequence of treatment have the same geometry to obtain the final position of the teeth in the setup model. Although the archwires are custom made and bent, it is still up to the orthodontists to do some final adjustments and detailing on chair side. The orthodontist has full control in finishing and detailing, and there is no need to take more impressions for refinement as in removable aligners cases. The Orthodontist decides all the selection of wires. For Incognito™ Lite appliance, three standard wires suggested and included are 0.014-inch super elastic (SE) nickel-titanium (NiTi) wire, 0.016×0.022-inch SE NiTi wire and 0.0182×0.0182-inch titanium molybdenum alloy wire which are sufficient for most of the adjunctive cases.

Case Presentation

Three cases are presented herewith, showcasing the range of conditions that the appliance can address.

Case 1

Adult female with a chief complaint of malaligned front teeth due to orthodontic relapse. Treatment time with Incognito™ Lite was seven months (Figure 1A-L).

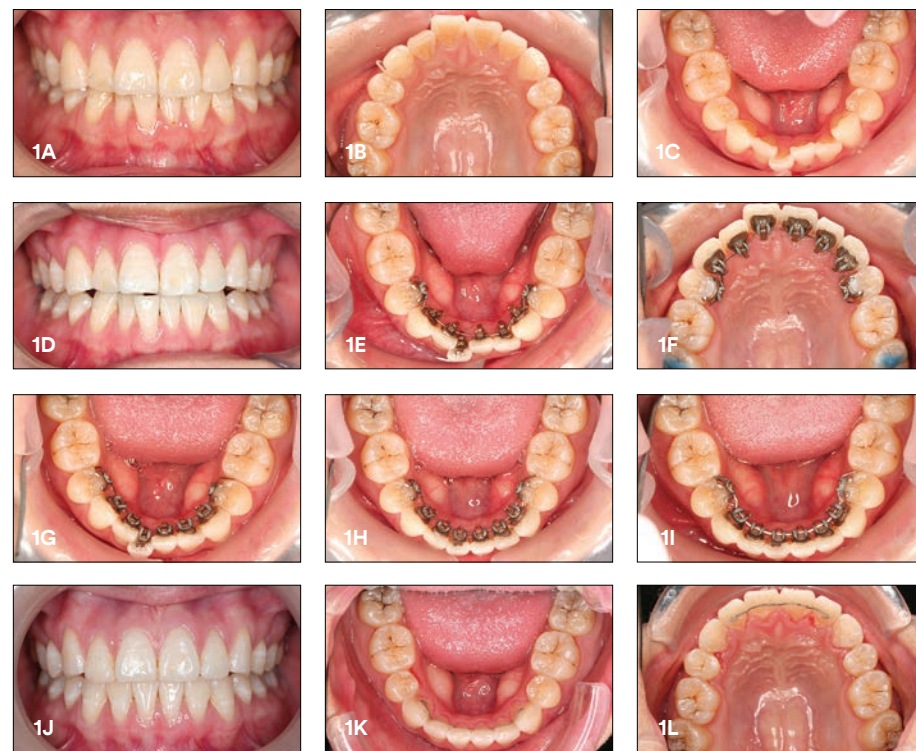


Figure 1A-L: Adult female with a chief complaint of malaligned front teeth due to orthodontic relapse. Treatment time with Incognito™ Lite was 7 months.

Case 2

Adult female with a chief complaint of crooked front teeth. She has a missing lower incisor. The treatment plan was with Incognito™ Lite lingual appliance without extraction of any teeth. Treatment time was 9 months (Figure 2A-R).



Figure 2A-R: Adult female with a chief complaint of crooked front teeth. She has a missing lower incisor. Treatment plan was with Incognito™ Lite lingual appliance without extraction of any teeth. Notice the presence of the “splinted” premolars brackets for improved stability of posterior teeth and anchorage reinforcement. Treatment time was nine months.

Case 3

Adult male with a chief complaint of upper and lower crowding. Treatment with an Incognito™ Lite lingual appliance without extraction of any teeth. Treatment duration was 6 months (Figure 3A-L).

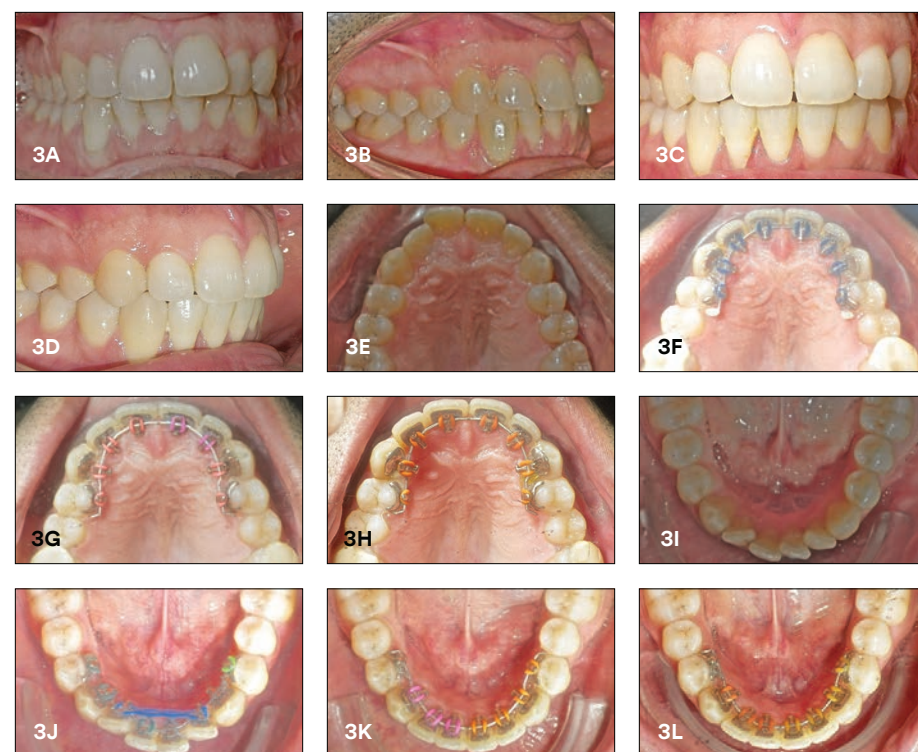


Figure 3A-D: Pre- and post-frontal and right lateral changes. **Figure 3E-H:** Upper progress. **Figure 3I-L:** Lower progress.

The Scope

Incognito™ is generally suitable for treatment of all malocclusion regardless of age, as long as the patient has a permanent dentition with a healthy periodontium. Incognito™ Lite, however, has the following general indications:

- Nonextraction.
- Stable buccal posterior occlusion.
- Mild-to-Moderate overbite.
- Mild-to-moderate crowding.

The clinical cases presented showcase the efficacy and efficiency of the concept.

Conclusions

Incognito™ Lite lingual orthodontic appliance has created interests in orthodontic patients who look for invisible braces, which can deliver a quick and efficient way to straighten the teeth. It is the only customized, individually fabricated, fixed and invisible lingual orthodontic appliance, which is segmental. The advantages of easier bonding protocols with individually fitted bracket bases, makes it operator friendly as well. Wire bending is reduced with prefabricated archwires provided, thus increasing accuracy. Tooth movements and incisor torque and tip control are also improved with Incognito™ compared with the removable orthodontic aligners. Incognito™ Lite lingual appliance is an excellent orthodontic appliance, and definitely provides predictable orthodontic solutions, in dedicated time spans.

“Customization” and “targeted mechanics” are important attributes in the dream appliances of the future, and the Incognito™ Lite heralds the confluence of the two concepts.

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