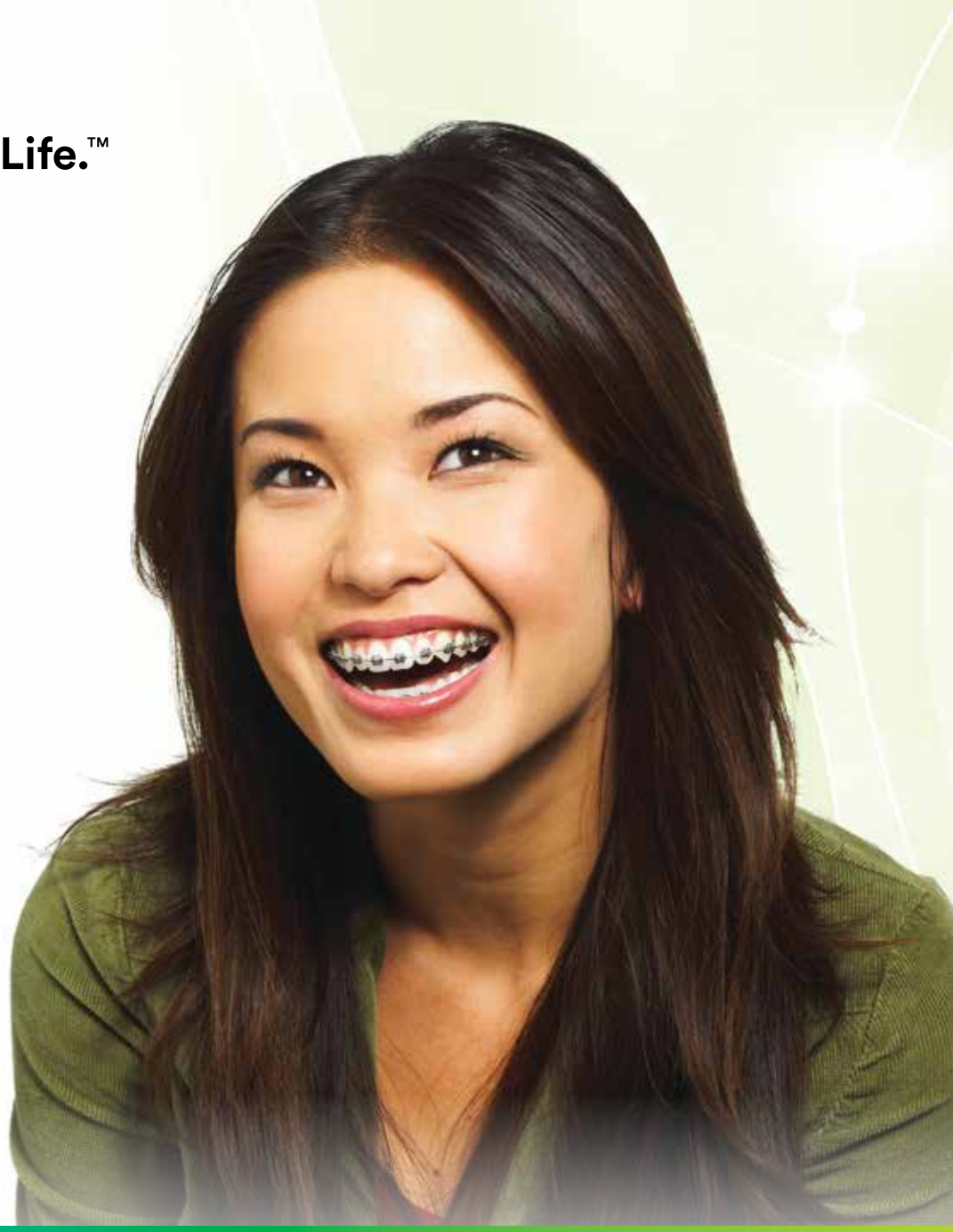
3M Science. Applied to Life.™



3M℠ Health Care Academy

3M™ Self-Ligating Appliances with Intelligent Clip Technology

TECHNIQUE GUIDE

SMARTCLIP™ SL3
SELF-LIGATING APPLIANCE SYSTEM

CLARITY™ SL
SELF-LIGATING APPLIANCE SYSTEM

This comprehensive Technique Guide details how to use 3M™ Self-Ligating Appliance Systems, which feature unique “Intelligent” Clip Technology, to take full advantage of the treatment benefits inherent in their unique design.

Users from around the world report significant improvements in overall efficiency through the use of both SmartClip™ and Clarity™ SL Self-Ligating Appliances. Their experiences form the basis of this guide, which includes Sections on Bracket Handling, Positioning and Debonding, Archwire Techniques and Sequencing, and Treatment Tips and Tricks. The Guide also includes 20 case presentations, and shares user's candid remarks comparing their experiences with 3M Self-Ligating appliances to previous experiences with other brackets.

Table of Contents

Chapter 1

Why Choose 3M™ Self-Ligating Appliances with Intelligent Clip Technology?

Benefits for your Office and Convenience for your Patients

With over one million patients treated over the last decade with the SmartClip™ Self-Ligating Appliance System, and many more when you include the Clarity™ SL Self-Ligating Appliance System, the efficiencies realized by users around the world are immeasurable.

SmartClip Appliance clinicians report shorter treatment time, fewer office visits, reduction in chair time and perceive clinically significant improvements compared to traditionally ligated systems.* These practice benefits with the SmartClip Appliance System result in the ability to provide an improved patient experience.

Below is what users from around the world had to say about the efficiencies they experiences with SmartClip Self-Ligating brackets.*

81% were able to reduce their average treatment time
57% were able to reduce their average treatment time by three or more months

85% were able to eliminate office visits with SmartClip™ Brackets
62% were able to eliminate three or more office visits

68% were able to extend the office appointment interval for patients

79% experienced a reduction in chair time

70% of the respondents perceived clinically significant improvements

These efficiencies set SmartClip Appliance users apart because of the patient benefits they offer. Whether it's for patients or parents, having to take less time away from school and/or work to visit their orthodontist is a key differentiator for any practice.

Read a White Paper on the efficiencies experienced by SmartClip Appliance doctors at 3MUnitek.com/SmartClip.

*3M SmartClip™ Appliance User Survey, 2011

Features that Allow for Efficiencies Like No Other Appliance

The SmartClip™ Bracket design is unlike any other self-ligating appliance system available. With a unique Nitinol clip ligating mechanism, SmartClip and Clarity™ SL Self-Ligating brackets allow orthodontists to realize efficiencies not available with other traditional self-ligating designs.

Additional bracket features allow clinicians to fully take advantage of the flexibility inherent in the SmartClip and Clarity SL Self-Ligating Appliance Systems.

Unique Self-Ligation

With its proprietary self-ligating clips, you won't need to open any doors with the SmartClip and Clarity SL Self-Ligating Appliance systems. And no opening and closing doors can save valuable chair time which will not only improve your office flow, but it will make your patients happy to be in and out of your office quicker.

Individually Designed Nitinol Clips

SmartClip and Clarity SL Self-Ligating Appliances feature intelligent clips which release the archwire if forces are excessive. Each set of clips is uniquely designed to fit the specific bracket which matches in proportion to the size of the tooth. If the archwire forces are too excessive for the malocclusion of the tooth, the clips will release the archwire, relieving the patient from undue forces.

Selective Ligation Capability

Unlike all other self-ligating systems where the door must be shut on the entire archwire slot of the bracket, 3M Self-Ligating Appliances with Intelligent Clip Technology allow you to engage the archwire in a single clip. The system allows clinicians versatility during treatment, especially for severe rotations which make it difficult for archwires to be fully engaged.

Excellent Rotation Control

Rotation control is affected by the mesial-distal size of the archwire slot and the width of the locking mechanism. And with the self-ligating mechanism (clips) of the brackets on the mesial and distal ends of the brackets, the SmartClip and Clarity SL Appliance systems offer more rotation control to help you finish more efficiently.

Four Distinctive Tie-Wings

Having four distinctive tie-wings that are clearly visible and easily accessible, practitioners can use their ligatures and auxiliaries as needed. They can enjoy the benefits of both passive self-ligation and active self-ligation by activating the brackets on-demand. This provides treatment versatility and can ultimately impact the efficiency of the practice.

Improved Hygiene

3M Self-Ligating Appliances with Intelligent Clip Technology are the only self-ligating systems that don't feature a locking mechanism covering the center of the bracket. With this open and accessible design, these bracket systems contribute to improved patient hygiene. When compared to traditionally ligated appliances, the improvement is noticeable with no elastic bands to retain food particles.

Most Efficient Bonding System

3M Self-Ligating Appliances are the only ones in the industry available with APC™ Adhesive Pre-Coated Options. SmartClip and Clarity SL Appliances are offered with three pre-coat options to meet your personal preference. Whether it is APC™ Flash-Free, APC™ PLUS or APC™ II Adhesive, you can enjoy fewer variables and bonding steps, resulting in a more efficient bonding environment.

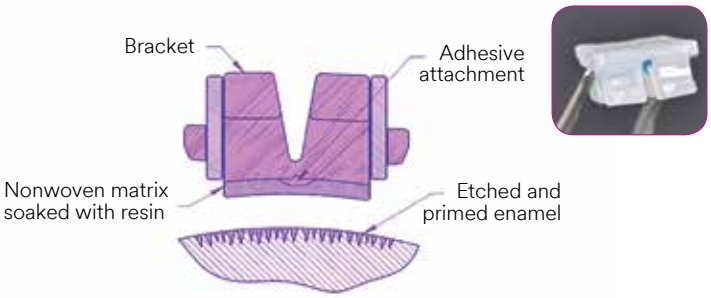
APC™ Flash-Free
Adhesive Coated Appliance System

APC™ PLUS
Adhesive Coated Appliance System

APC™ II
Adhesive Coated Appliance System

Low Bond Failure Rate with APC™ Flash-Free Adhesive

Both SmartClip™ and Clarity™ SL Self-Ligating Appliance Systems are available pre-coated with APC™ Flash-Free adhesive to add even more to practice efficiencies. APC Flash-Free Adhesive removes the flash removal step and has been shown to have a low bond failure rate and save bonding time for the doctor, staff and patient.

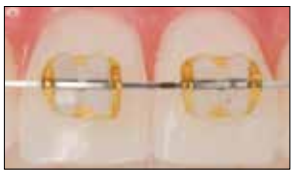


Treatment with Lighter Forces

With no ligatures to secure the archwire in place, there is lower force for the archwire to overcome in order to move teeth. With the clip self-ligating mechanism of the SmartClip and Clarity SL brackets, you can now move teeth with much lower forces compared to traditionally ligated systems. This allows you to provide more comfort to your patients while moving teeth with light forces.

Aesthetics

Fortunately, today's braces are less noticeable than those of the past. And, with the most advanced braces, such as SmartClip Self-Ligating brackets, your patients will not have to wear bulky ligatures that can become stained. As a ceramic option, your patients can enjoy the Clarity SL Self-Ligating brackets which give them great aesthetics still enabling you to enjoy unlimited efficiencies.


Stained ligatures on traditionally ligated brackets.


Clarity™ SL brackets.


Clarity™ SL upper brackets and SmartClip™ lower brackets.


Incognito™ upper lingual brackets and Clarity™ SL lower brackets.

Synchronized Systems Allows for Choices in Treatment

Our doctors have had great success mixing the SmartClip and Clarity SL systems based on treatment requirements. The use of Clarity SL brackets on the maxillary arch in combination with SmartClip brackets on the mandibular arch has worked well where the bite limits the use of ceramic brackets. Additionally, the mix of SmartClip and Clarity SL brackets has been used with the Incognito System, allowing for efficiencies and the ultimate in aesthetics.

Technology that has Evolved with Time

With the backing of 3M innovation, the SmartClip System has evolved continuously since 2004. With enhanced product performance, prescriptions, instruments and educational events, SmartClip System users have all the tools at their disposal to realize the efficiencies provided by this unique appliance system.

Over time, the clip design has been enhanced, offering lighter engagement and disengagement forces for optimum patient comfort as well as ease of use during archwire changes.

An advantage of SmartClip and Clarity SL Systems is their availability with APC™ Flash-Free Adhesive. This revolutionary system allows you to move directly from bracket placement to bracket cure without the need to remove adhesive flash from the bracket.

SmartClip and Clarity SL brackets are the only passive self-ligating brackets on the market with the efficiencies of pre-coated adhesive.

Techniques for Successful Patient Consultations

It is vital that every practice using the unique SmartClip™ and Clarity™ SL Self-Ligating Appliance Systems highlight the benefits that the appliances offer to their patients. Take the time in your office to understand and explain each benefit so that you can look like the hero in choosing to treat with such advanced systems.

Patients can enjoy the following benefits:

Less Time in Braces
SmartClip and Clarity SL braces are self-ligating, which helps teeth move faster, since they don't have ligatures holding the archwire.

Fewer Office Visits
Orthodontists using SmartClip braces report that their patients have to visit the office less often during treatment. Fewer visits means patients [and their parents] can take less time away from busy schedules to attend orthodontic appointments.

More Comfortable Experience
Patients can avoid having to deal with the discomfort of getting their braces "tightened" as there are no "rubber bands" or ligatures to change out at every appointment. These braces also have smooth, rounded edges to minimize irritation inside the mouth.

Easier to Keep Clean
These braces allow for a better oral hygiene since there are no "rubber bands" or ligatures to accumulate plaque. The open slot in the center of these unique self-ligating brackets allows patients to clean their braces thoroughly without any door ligating mechanisms to trap food.

Less Time in Office
Since SmartClip and Clarity SL Self-Ligating Appliance Systems reduce or eliminate the need for ligatures, they allow for quicker adjustments and simpler archwire changes.

Added Efficiencies of the APC™ Adhesive

If you've included the available APC™ Adhesive with your SmartClip and Clarity SL Self-Ligating appliance systems, these are the additional benefits that you and your patients enjoy.

Clinical studies* have shown that using the APC™ Adhesive Coated Appliance System can result in a statistically significant reduction in bonding time and provide fewer bonding steps, resulting in a more efficient bonding environment.

When compared to a conventional bonding system, the APC Adhesive System offers the following advantages:

- Extended working time when compared to chemical cure adhesives
- Optimized and consistent adhesive amount customized to each bracket base
- Reduction in bonding steps
- Reduction in overall bonding time
- Convenient and organized inventory and dispensing system
- Easier training of your staff

In addition to the advantages above, the APC Flash-Free Adhesive system:

- Eliminates the flash removal step
- Saves even more bonding time for doctor, staff and patient
- Has shown a low bond failure rate**
- Protects enamel under the adhesive
- Makes debonding and adhesive remnant clean-up easier
- Improves patient bonding/debonding experience

Bonding Steps – Adhesive Systems

APC™ Flash-Free Adhesive System – 5 Steps

APC™ Adhesive Systems – 6 Steps

Traditional Light Cure Bonding Systems – 11 Steps

*Using Transbond™ Plus Self Etching Primer

APC™ Flash-Free
Adhesive Coated Appliance System

APC™ II
Adhesive Coated Appliance System

APC™ PLUS
Adhesive Coated Appliance System

* "British Journal of Orthodontics" Vol. 23, No. 4, November 1996, Adhesive Pre-coated Brackets, a Comparative Clinical Study, Simon Ash and Norman Hay.

"Angle Orthodontist", Vol. 75, No. 2, 2005 "Comparison of Bonding Time and Shear Bond Strength Between a Conventional and New Integrated Bonding System." Bishara, et al.

"Orthodontic Perspectives" Vol. XIII. No. 2, 2006, The APC™ Adhesive Coated Appliance System, Lars R. Christensen, Tandlaege, PhD MOrth RCS Edin.

** "Orthodontic Perspectives Innova" Vol. XX No. 2., 2013, APC™ Flash-Free Adhesive: The Game Changer in Orthodontic Bonding – Part II, Mohammed Razavi.

5 Must-Do's to be Successful

Our doctors report that they experience the most benefits with SmartClip™ and Clarity™ SL Self-Ligating Appliances when they:

1. **Use the recommended archwires sequences**
   - Avoid inefficiencies of traditional archwire sequences
   - Incorporate tandem archwire technique
   - Recommended archwire sequence listed on pages 23-27

2. **Train staff on using the bracket systems**
   - Take the time to practice on typodonts
   - Take advantage of training from your 3M Sales Representative
   - Use the online educational opportunities at 3MUnitekTraining.com

3. **Extend appointment intervals**
   - Let the archwire "cook" and fully express itself before moving to a larger archwire
   - Enable more efficient management of the office schedule with fewer visits per patient
   - Patients will appreciate taking less time off work or school for appointments

4. **Use APC™ Adhesive pre-coating, and especially, APC™ Flash-Free Adhesive**
   - Reduce bonding time and enjoy fewer bonding steps
   - More efficient bonding environment
   - No flash removal with APC Flash-Free Adhesive

5. **Take advantage of the free time that the system gives**
   - Spend more time with each patient to develop relationship
   - Increase the number of appointments per day
   - Train and develop staff
   - Spend more time on practice marketing
   - Cut down work week to spend time with family

Following these guidelines will allow your practice to optimize your efficiency and experience with the SmartClip and Clarity SL brackets.

What Doctors Tell Us

You don't have to take our word for it, after a million smiles created, here's a sample of what doctors around the world have to say about the SmartClip Self-Ligating Appliance System.

The technology of the SmartClip™ System has allowed us to go from 6-week intervals to 8-week intervals between adjustment appointments. This has freed up a tremendous amount of clinical time which we can now use to see more patients, add training time for our staff, or spend outside the office. Archwire changes are easy and fast for the patients and they also enjoy the increased interval between adjustments.

– Dr. Todd Britt, Sosebee & Britt Orthodontics,
Gainesville, GA, USA

智慧靈巧彈夾矯正裝置系統大大的促進加強我診所臨床矯正治療的效率,並大幅減少臨 床診療時間. 它使得我獲享心靈的平靜 -尤其是在我治療患者最後的微調階段時,令我獲有 許多美好,異想不到的臨床操控能力!

The SmartClip™ Appliance System not only enhances my practice efficiency, saving a lot of my clinical chair time, it also grants me peace and happiness in my mind because of my regaining the power of clinical control in the finishing stage of my daily orthodontic practice.

– Dr. Yeong-Charng Yen,
Pittsburgh Orthodontic Clinic,
Taipei City, Taiwan

El Sistema de Autoligado SmartClip™ reúne lo mejor de los brackets convencionales, autoligables activos y pasivos en un solo sistema. Su versatilidad permite al mismo tiempo deslizar y obtener el máximo control del movimiento dentario en todo tipo de casos y con un stock reducido. Junto a Clarity™ SL, SmartClip™ es mi bracket de elección en técnica vestibular para el 100% de mis pacientes.

The SmartClip™ Appliance system combines the best of conventional, active and passive self-ligating brackets into a single system. Its versatility allows me to simultaneously slide teeth and gain maximum control of tooth movement, in all types of cases and with a reduced inventory. The SmartClip system, along with Clarity™ SL Self-Ligating Brackets, is my choice for labial in 100% of patients.

– Dr. Leandro Fernández,
Malaga, Spain

The SmartClip™ System has served my practice very well over the last 10 years. The bracket is extremely efficient in a busy practice in so many ways, from no ligatures, easy archwire removal, gentle forces on the teeth, and many other aspects. If you have not tried this system you are truly missing out.

– Dr. Don Spillers,
Spillers Orthodontics,
Warner Robins, GA, USA

For more testimonials, visit 3MUnitek.com/SmartClip

Continuing Education

3M provides world-class training resources for you and your staff. Whether you watch a live webinar on the go, or have a 3M representative provide hands-on training during lunch, you can rest assured that you and your staff have access to the tools and resources that will make you successful.

Free On Demand CE

Please visit 3MUnitekTraining.com for on demand training webinars.

- *What has the SmartClip™ System Done for My Practice?* – Dr. Lisa Alvetro
- *Making a Smart Move in Self-Ligation* – Dr. Robert Waugh
- *Variable Prescription Orthodontics: Appliance and Case Selection Part 1 and Part 2* – Dr. Anoop Sondhi
- *The 'Clear' Answer to a Beautiful Smile: Why an all Aesthetic Practice Makes Sense* – Dr. Patrice Pellerin
- Effective Archwire Engagement and Disengagement with 3M™ *Self-Ligating Appliances* – Dr. Lisa Alvetro
- *Variable Prescription Orthodontics: The Concept and its Application* – Dr. Anoop Sondhi
- *The SmartClip™ and Clarity™ SL Self-Ligating Treatment Systems: Recommended Archwire Sequences* – Dr. Anoop Sondhi

Technical Product Tutorials

Animated product demonstration videos can be found on 3MUnitekTraining.com.

- Tandem Archwires
- 3M Self-Ligating Appliance System Instruments
- Clarity™ SL Self-Ligating Appliance System
- SmartClip™ Self-Ligating Appliance System

Literature Resources

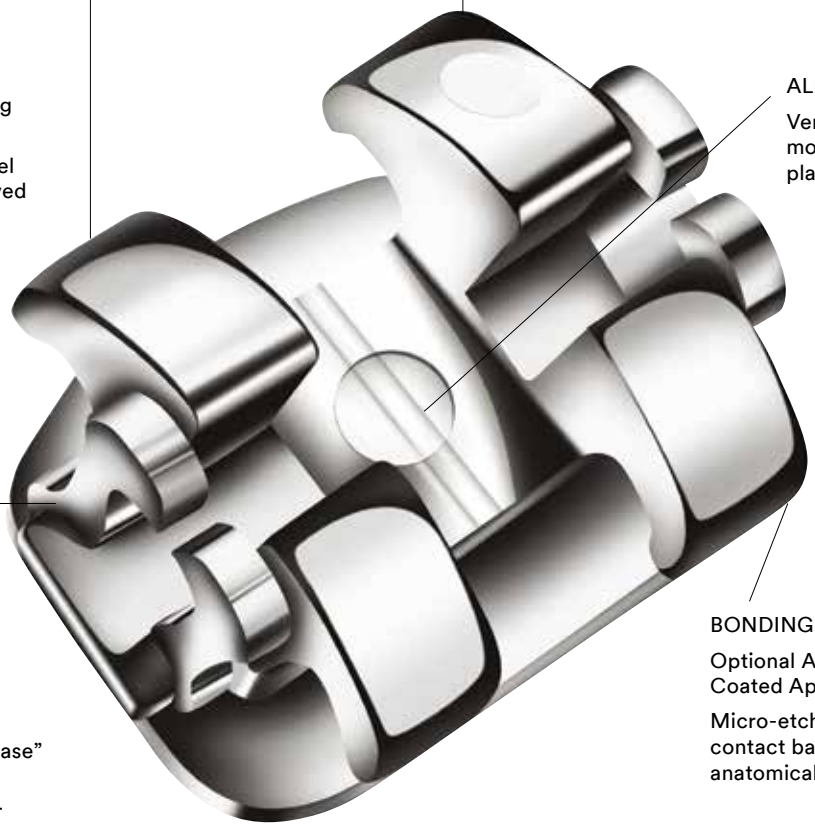
Visit 3M.com/ortho to find available literature as well as many articles available through *Orthodontic Perspectives Innova*.

Chapter 2

3M™ Self-Ligating Appliances with Intelligent Clip Technology

SmartClip™ SL3 Self-Ligating Appliance System

The SmartClip™ Self-Ligating Appliance System revolutionizes self-ligation. An integral nickel-titanium clip permits easy and simple archwire insertion and removal, yet holds the archwire with a pre-programmed "intelligent" force that avoids unintentional disengagement. The SmartClip™ Bracket also features a familiar twin-bracket design and is available in the MBT™ Versatile+ Appliance System. Choose either the APC™ II Adhesive Coated Appliance System, the APC™ PLUS Adhesive Coated Appliance System with color change adhesive, or the APC™ Flash-Free Adhesive Coated Appliance System for enhanced bonding efficiency. These features, exclusively together in the SmartClip Appliance System, combine to bring unmatched efficiencies and more predictable outcomes to orthodontic treatment.



Actual patients wearing SmartClip™ and Clarity™ SL brackets.

SmartClip™ SL3 Molar Brackets

SmartClip™ SL3 Molar Brackets are available to allow for a complete 6×6 system. They have small low profile tie-wings for enhanced treatment flexibility and the design accommodates either steel ligatures for lacebacks and tie-backs or AlastiK™ Ligature Modules. The maxillary 1st molar brackets incorporate the distal offset into the bracket base rather than into the slot, improving archwire retention during treatment.

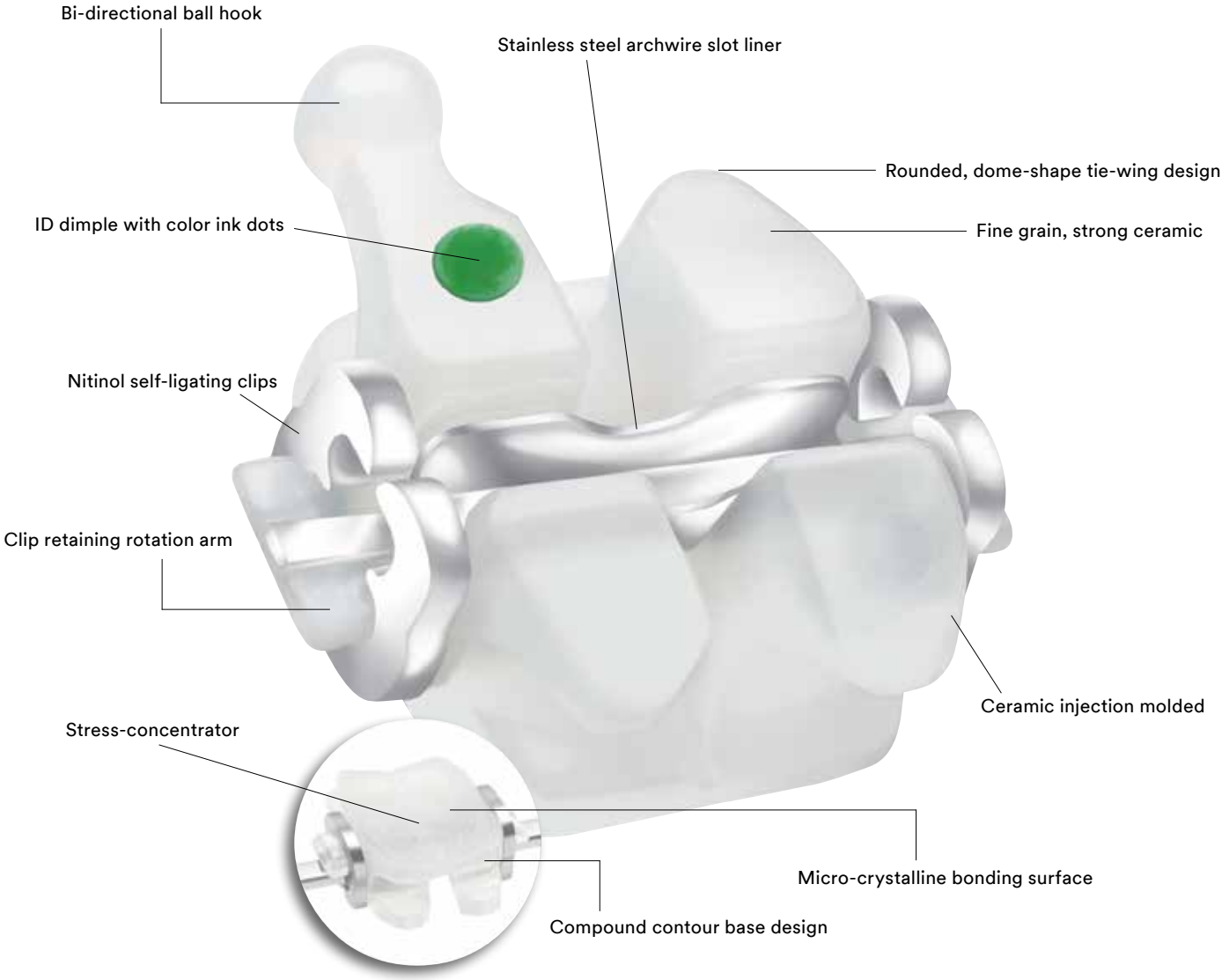
SmartClip™ SL3 Molar Brackets.

Clarity™ SL Self-Ligating Appliance System

At every stage, from patient consultation on through to debonding, Clarity™ SL Self-Ligating Brackets are designed to empower you and your staff. Clarity SL brackets combine the benefits of passive self-ligation, true twin design and hallmark Clarity™ bracket aesthetics to efficiently deliver the results you and your patients expect.

Treatment starts with patient acceptance. That's why the Clarity SL Self-Ligating Appliance is designed to help you tap important patient interests such as aesthetic treatment and convenience without giving up what you want: an appliance that delivers results.

Clip retaining rotation arms enhance rotation control.



Chapter 3

Getting Started

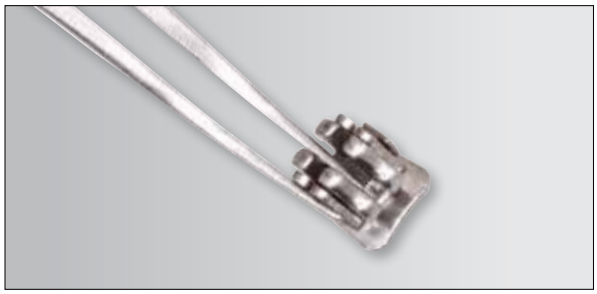
Handling

Although the SmartClip™ SL3 and Clarity™ SL Brackets are designed as true-twin edgewise brackets, the addition of the two Nitinol retaining clips require mesial and distal protrusions to hold the clips in place. These protrusions require the user to apply a different approach to bracket handling with bracket tweezers.

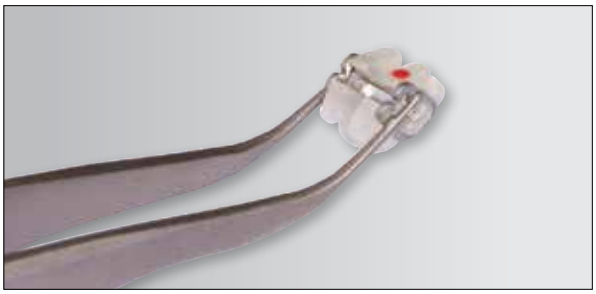
The operator can use either reverse tweezers (like the Unitek™ Bracket Placement Instrument, REF 804-171) or conventional cotton pliers.

Unitek™ Bracket Placement Instrument (REF 804-171).

The bracket should be securely held by grasping in between the tie-wings and on one side of the bracket (mesial or distal). This will still allow the bracket to be securely held without causing the bracket to "flip off" the instrument. The instrument can also be placed just above the protrusions when grasping a bracket from both sides. The reverse-end blade of the Unitek Bracket Placement Instrument can also be used as a positioning and seating tool for adhesive expression.



In-Between Tie-Wing Grip.



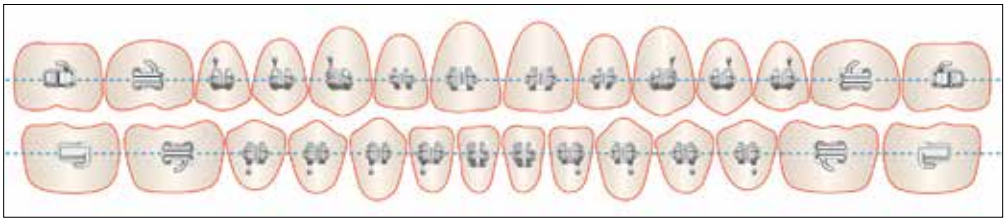
Mesial-Distal Grip.

Positioning

Since both the SmartClip SL3 and Clarity SL Self-Ligating brackets are true-twin brackets, conventional bracket positioning methods can be used. The SmartClip SL3 bracket provides a vertical scribe line to aid in proper bracket angulation, and both systems provide clear vertical and horizontal referencing points. Clinicians can use their current method of bracket height positioning as these systems do not require any special accommodation. If preferred, the clinician may choose to use either Dr. Anoop Sondhi's (Indianapolis, Indiana) atypical bracket positioning charts (shown below) or the MBT™ Versatile+ Appliance System's bracket positioning method (REF 021-102 brochure).

Atypical Bracket Positioning

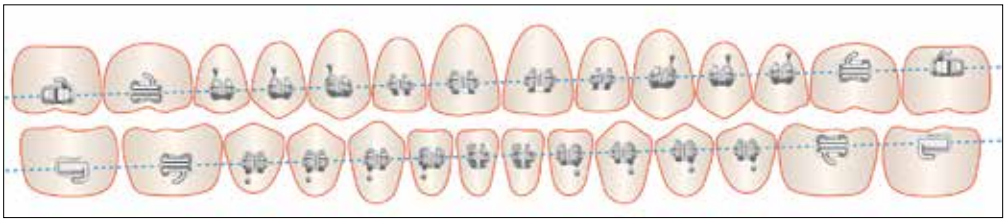
Atypical bracket placement for open bite, deep overbite and canted occlusal plane as recommended by Dr. Anoop Sondhi.



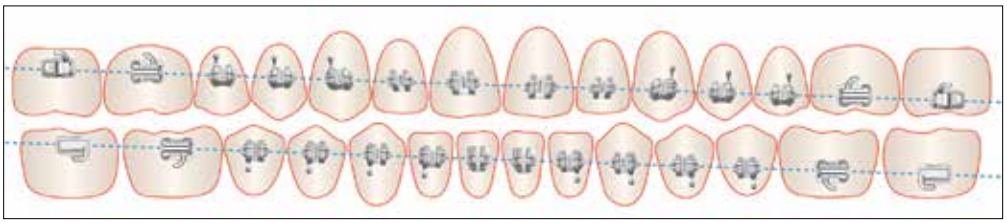
Standard Bracket Placement

Placement For Open Bite

Placement For Deep Overbite



Placement for Occlusal Plane Canted Up On Left Side



Placement for Occlusal Plane Canted Up On Right Side

Archwire Engagement

The most unique feature of the SmartClip™ SL3 and Clarity™ SL Brackets is the self-ligating mechanism. Unlike other self-ligating systems, the mechanism does not require the user to open or close any doors or clips. Rather, the mechanism is a Nitinol clip that opens to the archwire simply by applying pressure to the clips with the archwire. This pressure varies with the individual archwire dimension and material property. Effective and patient friendly archwire engagement is also dependent on proper archwire sequencing (see pages 23-27).

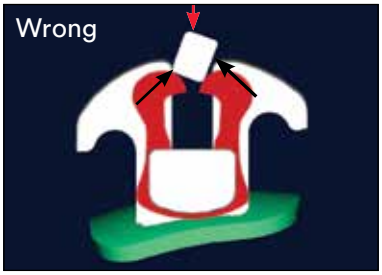
Round Archwires

Round archwires require no special consideration and can be inserted into the bracket slots by using normal finger pressure against the clips. If desired, a ligature director or the Unitek™ Wire Insertion Instrument (REF 804-152 (.022 slot) or 804-153 (.018 slot)) can also be used.

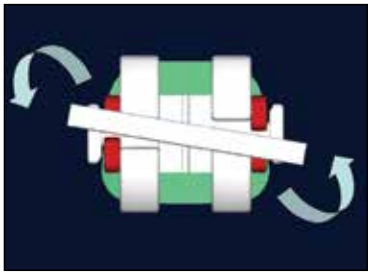
Rectangular Archwires

Before inserting rectangular archwires, it is recommended that all leveling and alignment and rotations be corrected. This will ensure easier archwire insertion requiring less force. Using the Unitek Wire Insertion Instrument as a torquing key will allow the clinician to align the archwire with the torque angle of each bracket. If desired, the clinician can also use a Weingart plier or other torquing key to torque the archwire into the bracket. This alignment allows the Nitinol clip to open with minimal force.

Insert wire perpendicular to the base of the slot. This may require torquing of the wire.



If the wire does not enter the clip correctly, it can create a positive stop (black arrows) and resist easy wire insertion.



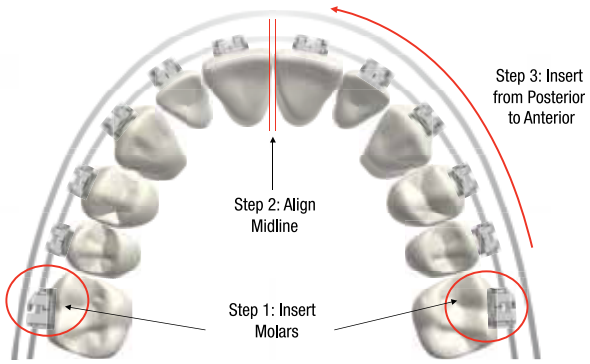
Proper alignment to the slot will also assist in wire engagement.

Single Clip Engagement

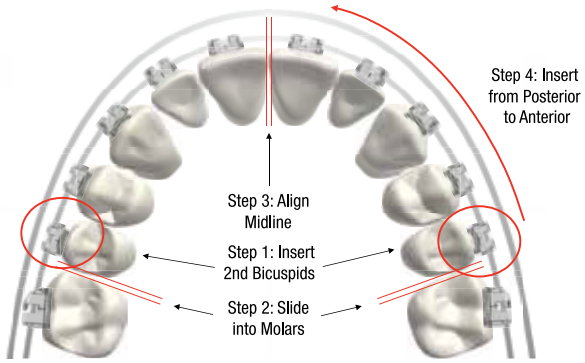
A key feature of the SmartClip SL3 and the Clarity SL brackets is the ability to engage a single clip rather than both clips in initial leveling and alignment. This is especially useful with vertically displaced canines or severely rotated teeth. Engaging only one clip in these situations allows the clinician to increase inter-bracket distances and create a longer lever arm for lighter force corrections. On the next appointment simply engage the remaining clip for final correction. No other self-ligating bracket allows this versatility.

Archwire Engagement Sequence

When using SmartClip™ SL3 Molar Brackets:

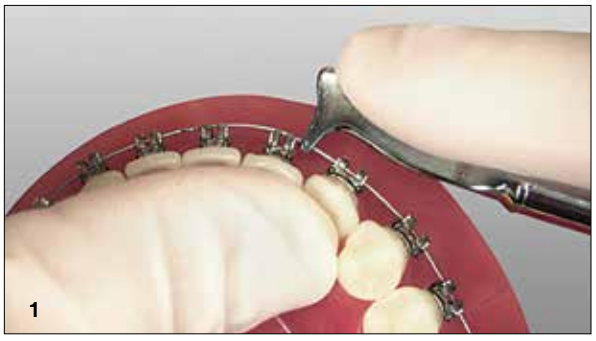


When using traditional molar brackets:



Using the Unitek™ Wire Insertion Instrument

REF 804-152 (.022 slot) or 804-153 (.018 slot).



Technique using SINGLE END TORQUING KEY:

1. Align archwire over clip opening and bracket slot (Figure 1).
2. Position instrument on archwire on either mesial or distal side of bracket.
3. Torque the archwire if necessary.
4. Push instrument gently while providing lingual support to the teeth.

Technique using DOUBLE END TORQUING KEY:

1. Align archwire over clip opening and bracket slot (Figure 2).
2. Position instrument on archwire so that torquing key straddles bracket.
3. Torque the archwire if necessary.
4. Push instrument gently while providing lingual support to the teeth.

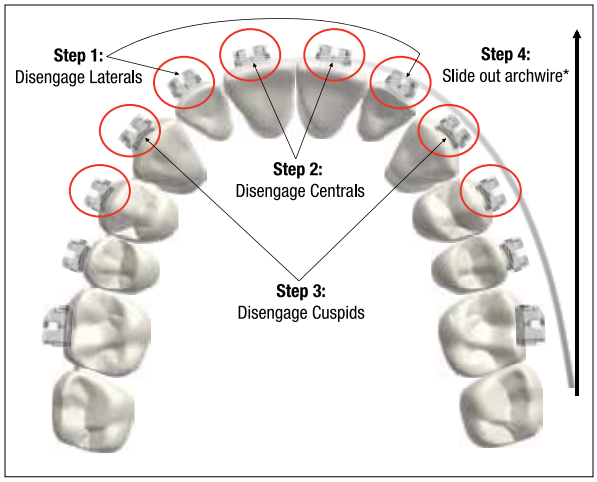
Tips for Archwire Engagement

- Always provide lingual support for enhanced patient comfort.

- For sensitive patients, have patient bite down on cotton roll before engaging and disengaging archwire to provide occlusal support.

Archwire Disengagement

Recommended Disengagement Sequence



*If the archwire has step bends, disengage all remaining brackets.

As you begin to change archwires in the SmartClip™ SL3 and Clarity™ SL Appliance Systems, make sure that the existing archwire is completely passive and sliding freely before moving into larger archwires. This will ensure that the current archwire has fully expressed itself with the lightest possible amount of force. The ability to use minimal force to move teeth is a key benefit of the 3M™ Self-Ligating Appliance Systems.

SmartClip™ Appliance Wire Disengagement Hand Instrument (REF 804-160).

Round Archwires

To remove round archwires simply cut the archwire at the midline and slide out the two sections of wire. If the archwire is to be used again, use the SmartClip™ Appliance Wire Disengagement Hand Instrument (REF 804-160) to disengage the anterior brackets and slide out archwire.

Rectangular Archwires

Rectangular archwires should be removed using the SmartClip Appliance Wire Disengagement Hand Instrument. This instrument provides reciprocal force against the bracket and pulls the archwire out of the bracket slot. Please see instructions below on how to use the hand instrument.

If desired, the user can also remove rectangular archwires by disengaging the anterior brackets then sliding the archwire out of the remaining posterior brackets.

Using the SmartClip™ Appliance Wire Disengagement Hand Instrument (REF 804-160)

1. Approach archwire with disengagement instrument from occlusal or gingival side.

2. Place instrument hooks under archwire keeping the bracket between the instrument hooks.

3. Gently squeeze handles (squeeze until the point of release).

Tips for Archwire Disengagement

- Always provide lingual support for enhanced patient comfort.
- For sensitive patients, have patient bite down on cotton roll before engaging and disengaging archwire to provide occlusal support.
- Avoid the mesial and distal protrusions and tie-wings when disengaging Clarity™ SL Brackets to avoid breakage.



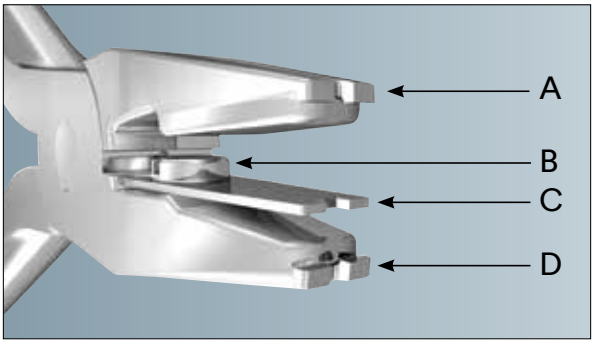
Bracket Debonding

The debonding procedure for the SmartClip™ Brackets requires no change from your current debonding procedure; conventional methods used with any traditionally ligated metal bracket can be applied.

Clarity™ SL Self-Ligating Brackets feature the same stress concentrator as the ligated Clarity™ ADVANCED Ceramic Brackets, making debonding easy and efficient. When debonding Clarity SL brackets, it is recommended to use the Unitek™ Self-Ligating Bracket Debonding Instrument (REF 804-170). Using this Debonding Instrument will allow the clinician to debond with the archwire removed or in place to hold together the pieces of the bracket.

Unitek™ Self-Ligating Bracket Debonding Instrument (REF 804-170).

Using the Unitek™ Self-Ligating Bracket Debonding Instrument (REF 804-170)

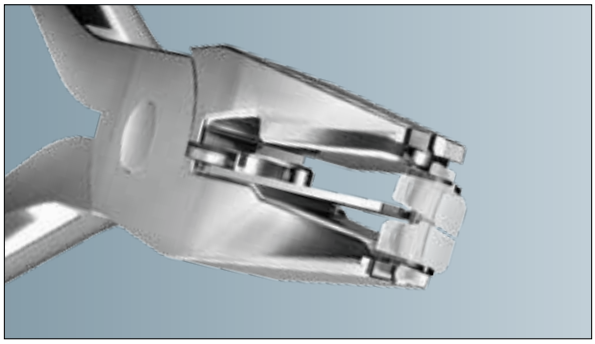


A. Archwire Slot

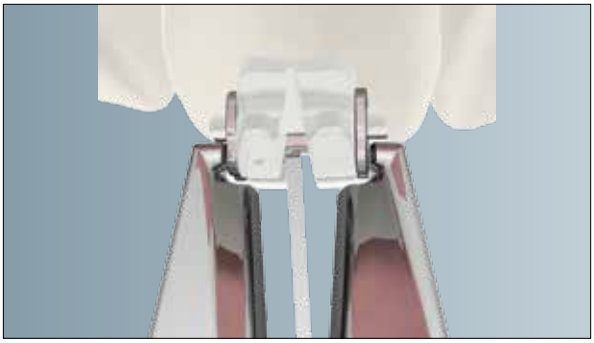
B. Screw holding Nitinol Insert in place

C. Nitinol Insert

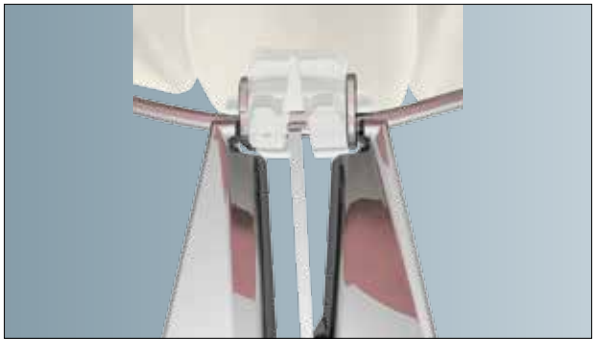
D. Bracket Gripping Shelf



Self-Ligating Bracket retained between Nitinol Insert and the instrument tips.



Gingival-Occlusal view of Instrument, with Bracket Gripping Shelf (D) embracing the bracket mesial/distally without archwire in place. Nitinol Insert (C) is placed vertically into the bracket.



Gingival-Occlusal view of Instrument, with Bracket Gripping Shelf (D) embracing the bracket mesial/distally with archwire in place.

Archwire Sequences

Archwire Sequencing

Initial archwire sequencing with the SmartClip™ SL3 and Clarity™ SL Brackets is critical to the success of the appliances. Because of the passive nature and low frictional resistance of these appliances, light resilient archwires should be used for initial leveling and alignment. By using small dimensional round wires, the reduction in binding friction can be optimized without compromising control.

As each patient's malocclusion presents its own treatment requirements, archwire sequences should always be modified to best treat each individual case. Below is a generic archwire sequence for your use.

Treatment Phase	.018 Slot	.022 Slot
Initial Phase Getting Organized • leveling • aligning **Necessary Wire Criteria** • low forces • low modulus • low friction	Nitinol SE .012 or .014	Nitinol SE .014
Intermediate Phase Working the Big Picture • arch form correction • occlusal plane leveling • rotating • tipping **Necessary Wire Criteria** • medium forces • medium working range • medium modulus • medium malleability • low friction	Nitinol SE .014 with Nitinol Classic .014 tandem	Nitinol SE .014 with Nitinol SE .016 tandem
Finishing Phase Getting Down to Details • vertical detailing • space closure • refine interdigitation • retention **Necessary Wire Criteria** • medium forces • short working range • high modulus • high malleability	Beta III Titanium .016 × .025 .017 × .025	Nitinol SE .017 × .025 Nitinol SE .019 × .025 Beta III Titanium .019 × .025

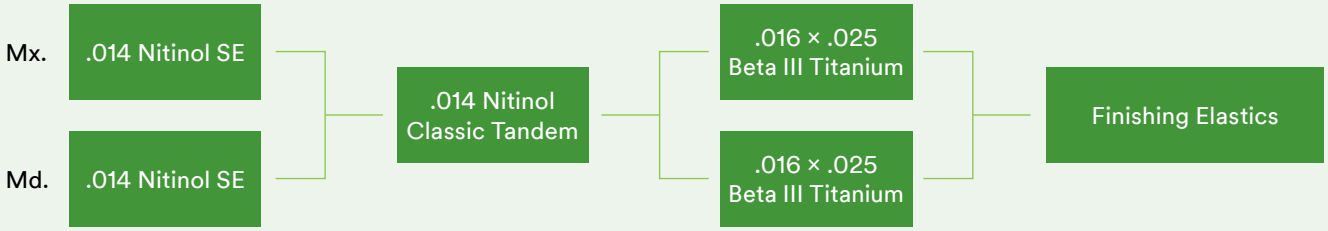
Archwire Sequence Recommendations – .018 Slot

Recommendations by Dr. Anoop Sondhi for various types of malocclusions.

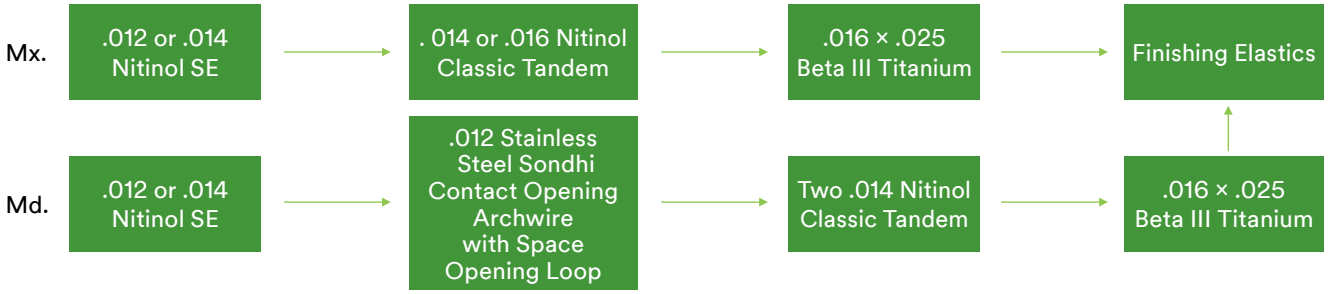
Overview

Archwire	Appointment Interval	Total Duration	Function
.012 or .014 Nitinol Super-Elastic	8 weeks	8 weeks	Preliminary alignment, leveling and rotation
.014 or .016 Nitinol Classic Tandem	8 weeks	8 weeks	Complete alignment, leveling and rotation
.016 × .025 Beta III Titanium	8-10 weeks	16-30 weeks	Provide torque control, arch consolidation, use of inter-arch elastics
Retraction Arches	6-8 weeks	12-24 weeks	Space closure, retraction into extraction sites

Class I, Minor Crowding, Non Extraction

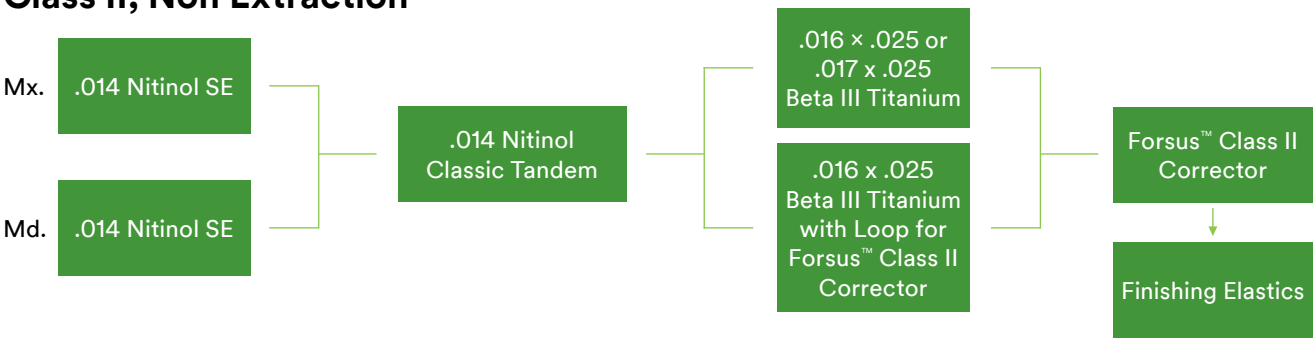


Class I, Moderate Crowding, Non Extraction

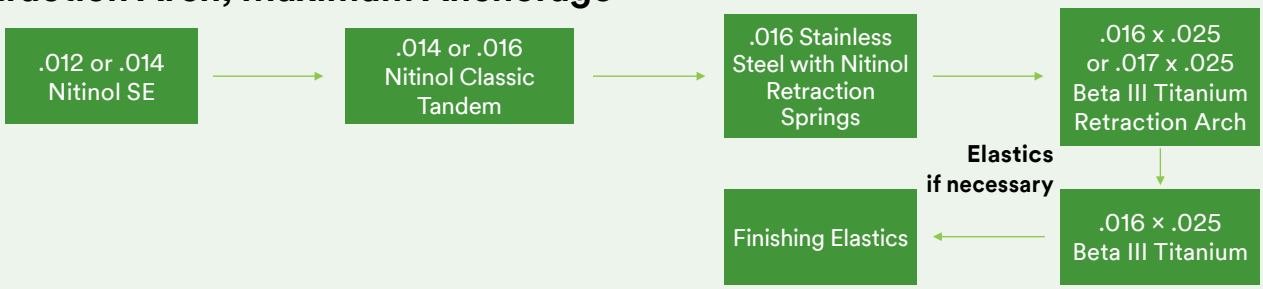


Archwire Sequence Recommendations – .018 Slot (continued)

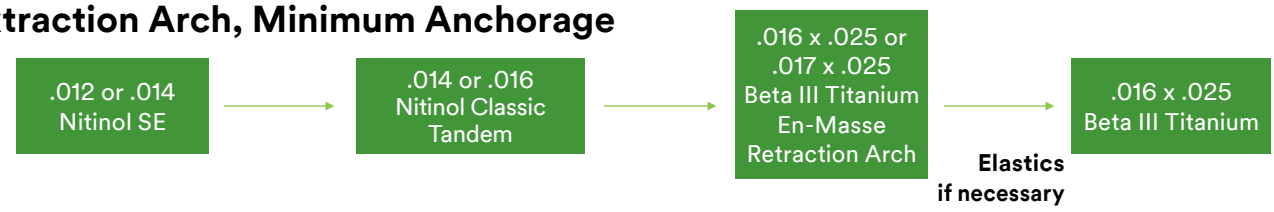
Class II, Non Extraction



Extraction Arch, Maximum Anchorage



Extraction Arch, Minimum Anchorage



For additional details, please view the CE Class titled the “SmartClip™ and Clarity™ SL Self-Ligating Treatment Systems: Recommended Archwire Sequences” presentation on 3MUnitekTraining.com.

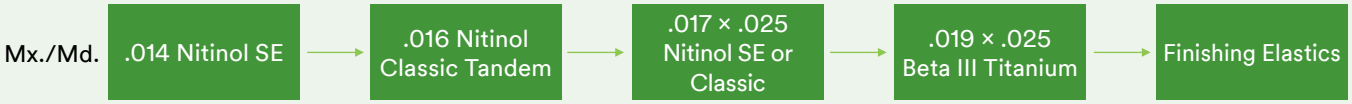
Archwire Sequence Recommendations – .022 Slot

Recommended by Dr. Lisa Alvetro for various types of malocclusions.

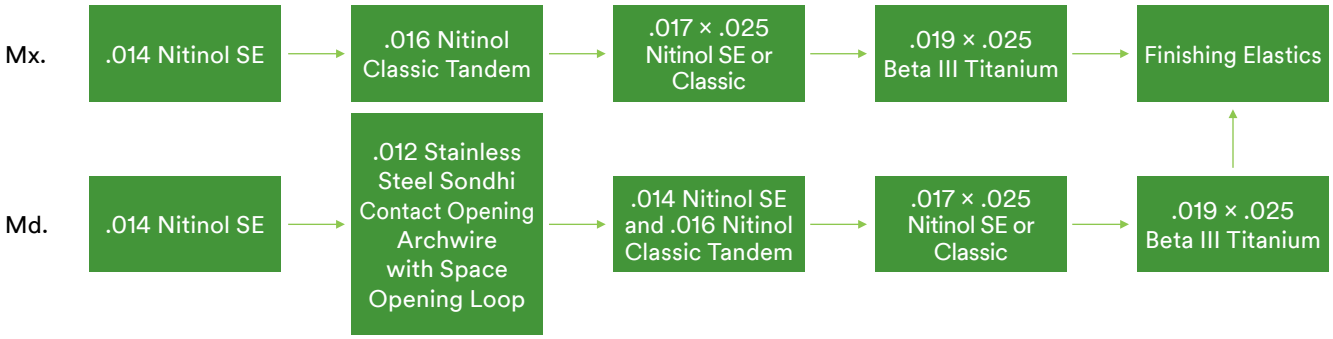
Overview

Archwire	Appointment Interval	Total Duration	Function
.012 or .014 Nitinol Super-Elastic	8 weeks	8 weeks	Preliminary alignment, leveling and rotation
.014 or .016 Nitinol Classic Tandem	8 weeks	8 weeks	Complete alignment, leveling and rotation
.017 × .025 Beta III Titanium	8-10 weeks	16-30 weeks	Provide torque control, arch consolidation, use of inter-arch elastics
.019 × .025 Beta III Titanium or Stainless Steel	8-10 weeks	16-30 weeks	
Retraction Arches	6-8 weeks	12-24 weeks	Space closure, retraction into extraction sites

Class I, Minor Crowding, Non Extraction

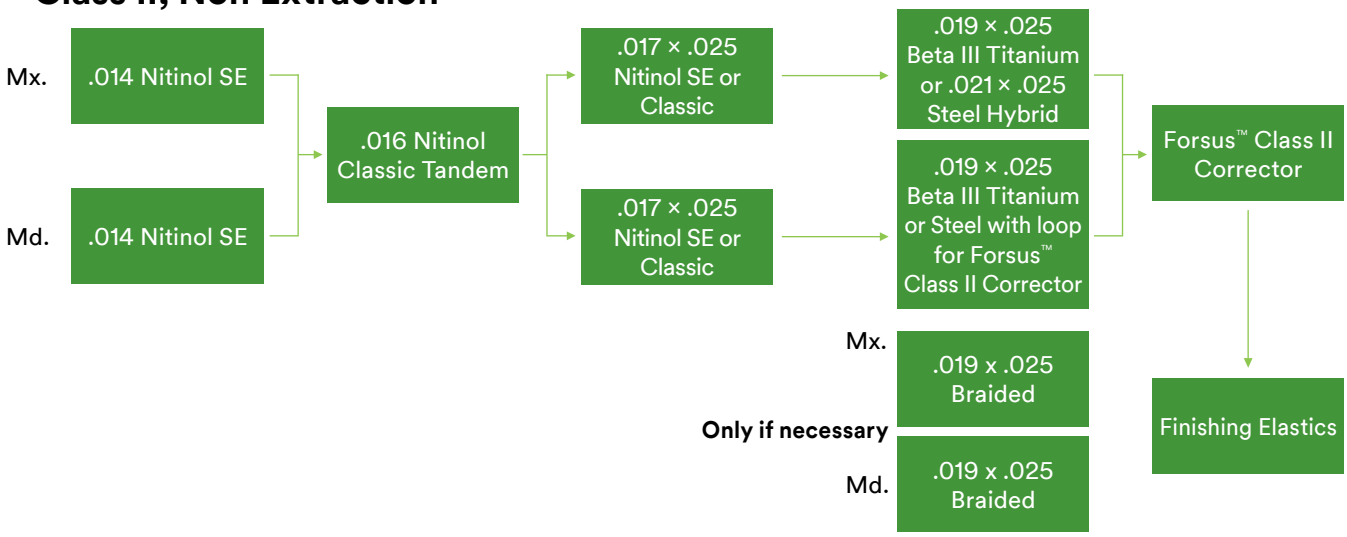


Class I, Moderate Crowding, Non Extraction

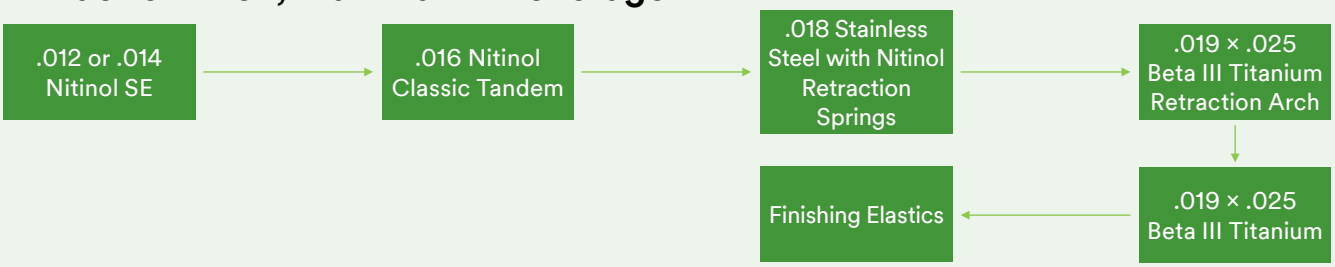


Archwire Sequence Recommendations – .022 Slot (continued)

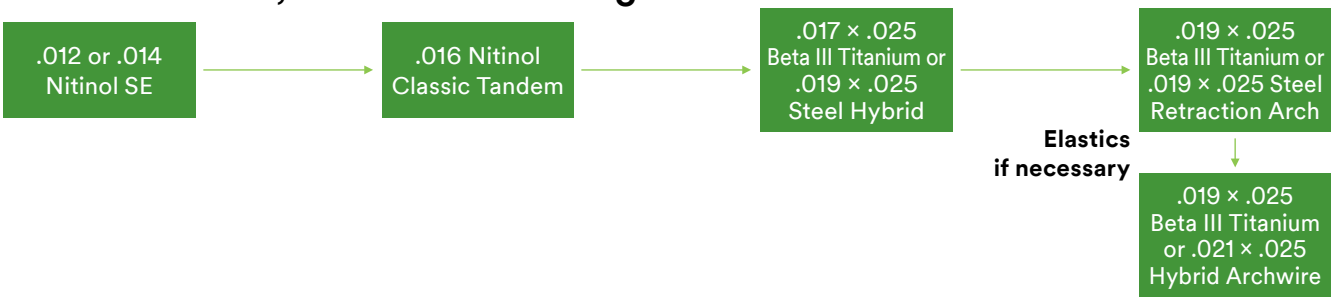
Class II, Non Extraction



Extraction Arch, Maximum Anchorage



Extraction Arch, Minimum Anchorage



For details, please view the CE Class titled the "SmartClip™ and Clarity™ SL Self-Ligating Treatment Systems: Recommended Archwire Sequences" presentation on 3MUnitekTraining.com.

Tandem Archwires

The use of Tandem Archwires is important in the leveling and alignment phase of treatment for the SmartClip™ SL3 and Clarity™ SL Appliance Systems. Following the initial archwire (typically .014 Nitinol SE) the clinician is recommended to insert a second round Nitinol Classic Archwire, .014 in the .018 slot, or .016 in the .022 slot. In other words, when the initial archwires are completely passive, rather than removing these archwires, a second archwire is to be placed directly on top of the initial archwire, forming a tandem archwire.

The combination of these two round archwires provides maximum control of the vertical, horizontal, and rotational dimension. Proceeding to rectangular archwires should never begin until the tandem archwires have been placed and have expressed themselves. Use of the tandem archwire technique allows for simple and easy insertion of a rectangular archwire.

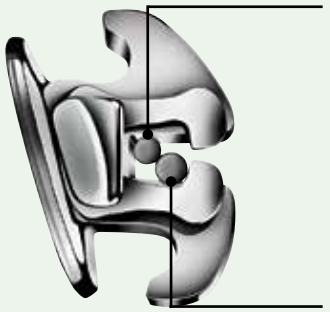
Clinical Tips

- There is no need to disengage the initial archwire; simply engage tandem archwire over initial archwire.
- Tandem archwires can also be used in segments rather than as a continuous archwire.
- Do not insert the tandem archwire until the initial archwire is completely passive.
- Do not move to rectangular archwires until all rotations and vertical corrections are complete with tandem archwires.

Tandem Archwire Combinations

The choice of tandem archwire combination depends on the slot size and degree of rotational deflection. In most cases, the following combination can be used:

	0.018 Slot	0.022 Slot
Initial Archwire	Nitinol SE .014	Nitinol SE .014
Tandem Archwire	Nitinol Classic .014	Nitinol Classic .016



Initial Archwire

The tandem archwire should be inserted directly on top of the initial archwire used in treatment.

Tandem Archwire

Prior to Tandem Archwire.

Tandem Archwire Working.

Tandem Archwire Complete.

Chapter 4

User Tips & Tricks

Bracket Positioning/Interproximal Reduction (IPR)

- Position the bracket slightly off-center on the tooth to help with rotational control. (Figure 1)
- When direct bonding, a plastic filling instrument (PFI-3) works well for bracket positioning. (Figures 2-3)
- All bracket repositioning and IPR should be accomplished early in treatment.


1


2


3

Archwires

1. Complete all alignment activations in light archwires. Avoid skipping intermediate archwires or getting into larger steel archwires until preliminary alignment has been achieved.
2. When removing light archwire, assure that it is passive, then a) segment archwire at midline and slide out, or b) disengage anterior teeth only, then slide out.
3. Only use rectangular archwires when existing round archwire is passive. To insert rectangular archwire, engage 2nd bicuspids, slide into buccal tubes, then slide posterior from the midline and engage from posterior to anterior.
4. The majority of finishing details can be achieved in Beta III Titanium archwires.
5. Archwire segment should not cross edentulous span or non-bracketed teeth. (Figure 4)
6. If having difficulty inserting larger rectangular wires, make sure to: a) establish vertical alignment of teeth and brackets with tandem archwires, b) complete all rotation corrections with tandem archwires and c) verify that the torque factor is not overly active. If large rectangular wires are still difficult to insert, step down to a smaller rectangular wire. (Figure 5)
7. To correct difficult rotations in the lower anteriors: a) use tandem archwires; b) open the contacts in the mandibular anterior segment with a .012 SS wire with loop; c) offset brackets by 0.5 mm towards the rotation; and d) avoid uneven resin thickness under the bracket bases.

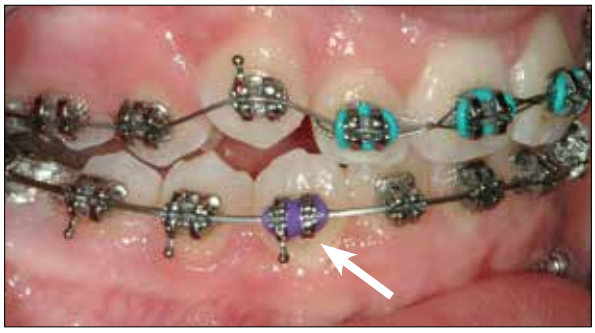

4


5

Friction

The twin design of the SmartClip™ and Clarity™ SL Appliance Systems allows for intimate control of friction when desired. Here are several recommended techniques that take full advantage of the versatile bracket design:

Prevent Sliding: To stabilize and prevent the archwire from sliding, apply an AlastiK™ Ligature Tie on the most anterior tooth that needs the least amount of correction.



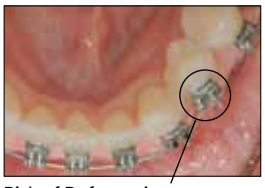
Secure Rotations: Secure previously corrected rotations when stepping back to a smaller archwire.

Selective Friction: Friction can be useful. Whether it's maintaining midlines, for torque control or maintaining rotation control, determine where it works best, and secure the bracket.

Create Space: Use open coil to create space on initial wires.

Selective Clip Engagement

One clip engaged.



Risk of Deformation.

Use the flexibility of the twin wing and clip design to selectively engage the archwire for severe rotations. Begin by engaging only one clip until preliminary rotation correction is achieved. Forcing in an archwire will increase the risk of distortion and spontaneous disengagement.

Tandem Archwires

- Use tandem archwires to correct residual rotations and level and align arches. The tandem archwires will allow you to do bracket repositioning early in treatment. (Figures 6-8)

Before.

During.

After.

- Use reverse curve archwires as part of the tandem arch when necessary. (Figure 9)

- Use segmented tandem archwires where more correction is needed. (Figures 10-11)

Tandem archwires.

21 days with tandem archwires.

Mechanics

- Reduced friction enhances sliding mechanics for initial space closure using lace backs.

- Chain to adjacent teeth to correct rotations.

- Express full rotation correction with a small step bend or offset while still in light round archwires.

Prior to NiTi springs.

Eight weeks after NiTi springs.

- Use NiTi springs to slide teeth along archwire. They deliver consistent, constant force. Attach to bracket hooks or posted archwires.

- Chain to control arch width instead of stainless steel wire. This helps seat the archwire against the bracket base.

- Bond mandibular 3-3 retainer as initial stage of finishing. The retainer secures incisor position and facilitates bicuspid settling.
- For closing small spaces with 3M™ SL Appliances, avoid using powerchains as they may be inefficient, redundant and unhygienic. Simple, crimpable hooks and AlastiK™ Ligature Modules are effective for closing small spaces. For generalized space closure, however, powerchains are still useful.

Chapter 5

Case Examples

We have compiled a collection of clinical cases from doctors around the world to showcase the treatment plans and techniques used to treat a variety for of diagnoses using 3M™ Self-Ligating Appliances.

Contributing Doctors

Dr. Lisa Alvetro

After receiving her DDS summa cum laude from Ohio State University, Dr. Alvetro completed her residency at Case Western Reserve University and now lectures there as an Associate Clinical Professor teaching Practice Management. With more than 18 years of private practice in Sidney, Ohio, Dr. Alvetro continues to focus on team development, innovative experience in products and efficient processes to sustain a quality practice.

Dr. Jose Chaqués-Asensi

Dr. Jose Chaqués-Asensi received his MD degree in 1980 and a Specialist in Stomatology degree (DDS) in 1986 from the University of Seville. In 1990, he received a master's degree from Case Western Reserve University, Cleveland, Ohio and in 1995 received a PhD degree from the University of Seville. He has published numerous papers of major impact in national and international orthodontic journals, and has given oral presentations and lectures at the Congress of the Spanish Orthodontic Society (SEDO), the European Orthodontic Society (EOS), the American Association of Orthodontists and in the World Orthodontic Congress of San Francisco (1995) and Chicago (2000). He has been a guest speaker for National Orthodontic Societies in Europe and the Middle East, and for Universities in Spain, Europe and the USA. He is an active member of the American Association of Orthodontists (AAO), a Diplomate member of the Spanish Orthodontic Society (SEDO), board-certified in the European Orthodontic Society, and an active member of the Angle Society of Europe (ASE). Since 1990, he has worked at his othodontic practice in Seville, Spain.

Dr. Lorenzo Franchi

Dr. Lorenzo Franchi is presently Assistant Professor at the University of Florence, Italy, and "Thomas M. Graber Visiting Scholar", The Department of Orthodontics and Pediatric Dentistry, School of Dentistry, at the University of Michigan, Ann Arbor. In 1997, he completed a PhD Course in Preventive Orthodontics at the University of Florence. He has been published extensively in the international literature and has lectured at international congresses and symposia on orthodontics and dentofacial orthopedics.

Dr. Luis Huanca

Dr. Luis Huanca received his DDS in 2006 and his MS and Specialist in Orthodontics in 2009 from the University of Milan. In 2013, he completed his PhD in Health Sciences from the University of Milan. He is an author and referee for several international journals, and he also speaks at Italian and international meetings. His private practices are located in Albino, Italy and Lausanne, Switzerland.

Dr. Jose Maria Llamas

Dr. Llamas received his MD degree from the University of Seville. He completed his post-graduate degree and master's degree in Orthodontics at the University of Valencia and a degree in Stomatology (DDS) and PhD in Oral Sciences at the University of Seville. He continues to teach as an associate professor at the University of Seville. He is an active member of the Angle Society of Europe and a member of the European Board of Orthodontics, the Spanish Board of Orthodontics, and the Spanish Association of Specialized Orthodontists (AESOR). He received the "J. A. Canut" Award and the "Costa del Rio" Award from the Spanish Orthodontics Society.

Dr. Moe Razavi

Dr. Razavi received his DDS degree in 2002 and his Orthodontic Certificate and MSD in 2005 from Case Western Reserve University. He is board-certified as a Diplomate of the American Board of Orthodontics and as a Fellow of the Royal College of Dentists in Canada. He is also a member of the Canadian Association of Orthodontists, the Ontario Association of Orthodontists, the American Association of Orthodontists, and other professional organizations. Dr. Razavi's private practice is located in Kanata, Canada.

Dr. Anoop Sondhi

An internationally acclaimed speaker and lecturer, Dr. Sondhi provides insight on a wide variety of topics including hyper-efficient treatment using Variable Prescription Orthodontics (VPO), orthodontic biomechanics, management of TM Disorders, as well as the business side of a practice. Dr. Sondhi maintains his private practice in Indianapolis, IN.

Dr. Hugo Trevisi

Dr. Trevisi has a full-time orthodontic practice in Presidente Prudente, Brazil and is a faculty member at the University of Odontology and Dentistry. He has lectured extensively around the world and maintains his own orthodontic teaching facility. Dr. Trevisi is one of the founders of the MBT™ Appliance System.

Dr. Robert Waugh

Dr. Waugh graduated from Georgia Health Sciences University (GHSU) in 1987 with both a DMD and a Masters in Oral Biology and was elected to OKU, dentistry's honor society. He earned his orthodontic certification and a second Masters degree at Baylor University in 1989. In 2000, he became board-certified by the American Board of Orthodontics. Dr. Waugh has served as President of the Georgia Association of Orthodontists and is a member of the International and American Colleges of Dentists. He enjoys speaking internationally on contemporary orthodontic topics that include 3-D imaging, the use of the dental laser, and about advanced topics in aesthetics.Dr. Waugh's private practice is located in Athens, Georgia.

Dr. Reginaldo Zanelato

An international speaker on the topics of MBT™ Appliance System philosophy, self-ligation and ortho-implants. Dr. Zanelato received his bachelor's degree in Dentistry from the Universidad del Oeste Paulista in Presidente Prudente, Brazil. He completed his residency in Orthodontics at the University of Sao Paulo and completed his Master's Degree in Orthodontics from the Methodist University in Sao Paulo, Brazil. He is a Professor of Orthodontics at Asociación Paulista de Cirujanos Dentistas (APCD) in Sao Paulo, Brazil and also at Universidad del Desarrollo, Chile. He is co-author of the book *State of the Art in Orthodontics* with Dr. Hugo Trevisi. His private practice is located in Presidente Prudente, Brazil.

Case 1 – Class I with Mild to Moderate Crowding

Patient
Male: age 12 years, 11 months

Diagnosis
Class I Malocclusion

- Mild maxillary crowding
- Moderate mandibular crowding
- Congenitally missing mandibular second premolar teeth
- Partial anterior crossbite of UR3/LR3
- Mandibular midline to the right 3 mm

Treatment Timeframe

Treatment Start:	01/20/2011
TAD Placement:	07/07/2011
TAD Removal:	03/12/2012
Treatment End:	10/29/2012
Treatment Time:	21 months, 1 week

Treatment Plan
- SmartClip™ Self-Ligating Brackets (.022 slot), VPO Appliance System Rx, High Torque Maxillary and Mandibular incisors
- Extraction of mandibular second deciduous molars
- Unitek™ Temporary Anchorage Device (TAD) system for protraction of the mandibular first and second molar teeth
- Class II elastics

Maxillary Arch
- .014 SE NiTi – 9 weeks
- .014/.016 SE NiTi Tandem – 8 weeks
- .019×.025 HA NiTi – 52 weeks
- .014/.016 SE NiTi Tandem – 8 weeks (Pan & Repo)
- .019×.025 Beta-Titanium – 17 weeks

Mandibular Arch
- .014 SE NiTi – 9 weeks
- .014/.016 SE NiTi Tandem – 8 weeks
- .019×.025 HA NiTi – 8 weeks
- .019×.025 SS Hybrid – 44 weeks (MSI Placed, and removed after 36 weeks) (Class II elastics started after MSI Removal)
- .019×.025 HA NiTi – 8 weeks
- .019×.025 Beta-Titanium – 17 weeks (Class II elastics Stopped, Settling elastics started)

Initial

Initial ABO Analysis				
Maxilla to Cranial Base				
SNA (°)	83.4	82.0	3.5	0.4
Mandible to Cranial Base				
SNB (°)	79.4	80.9	3.4	-0.4
SN – GoGn (°)	31.5	32.9	5.2	-0.3
FMA (MP-FH) (°)	28.7	24.6	4.5	0.9
Maxillo-Mandibular				
ANB (°)	4.0	1.6	1.5	1.6 *
Maxillary Dentition				
U1 – NA (mm)	-1.8	4.3	2.7	-2.3 **
U1 – SN (°)	87.3	102.6	5.5	-2.8 **
Mandibular Dentition				
L1 – NB (mm)	0.0	4.0	1.8	-2.2 **
L1 – GoGn (°)	79.5	93.0	6.0	-2.3 **
Soft Tissue				
Lower Lip to E-Plane (mm)	-2.2	-2.0	2.0	-0.1
Upper Lip to E-Plane (mm)	-4.2	-4.6	2.0	0.2

Table 1: Initial ABO analysis.

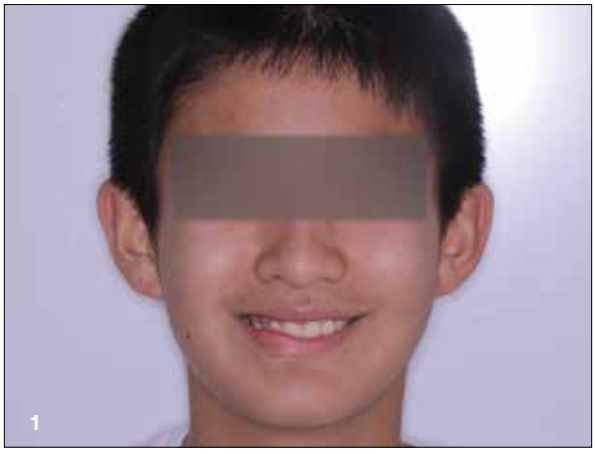


Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

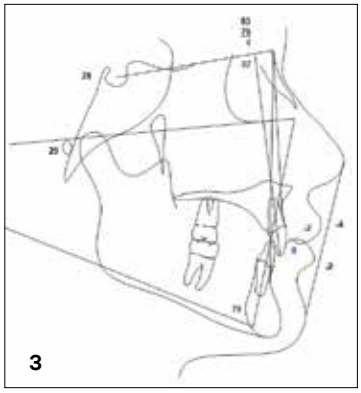
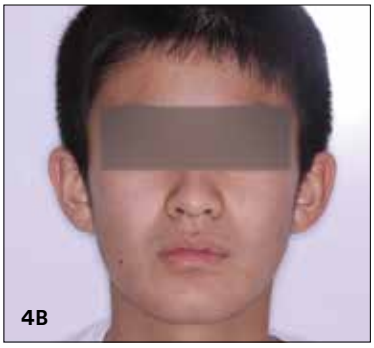


Figure 3: Initial lateral tracing.

Treatment Start – 1/20/2011



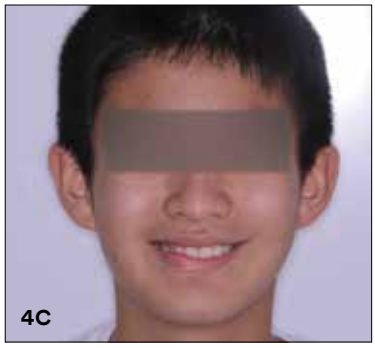


Figure 4A-H: Initial intraoral photographs.

7/7/2011

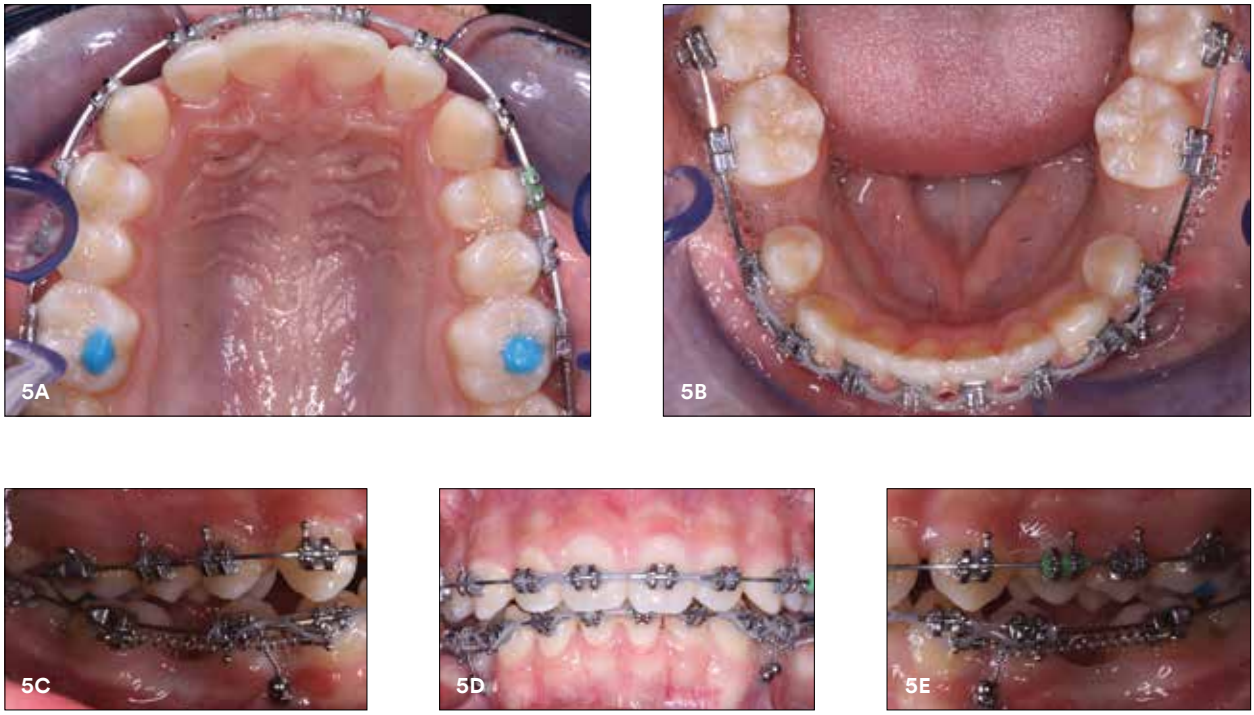


Figure 5A-E: TAD Placement, Mx/Md .019×.025 HA NiTi.

3/12/2012

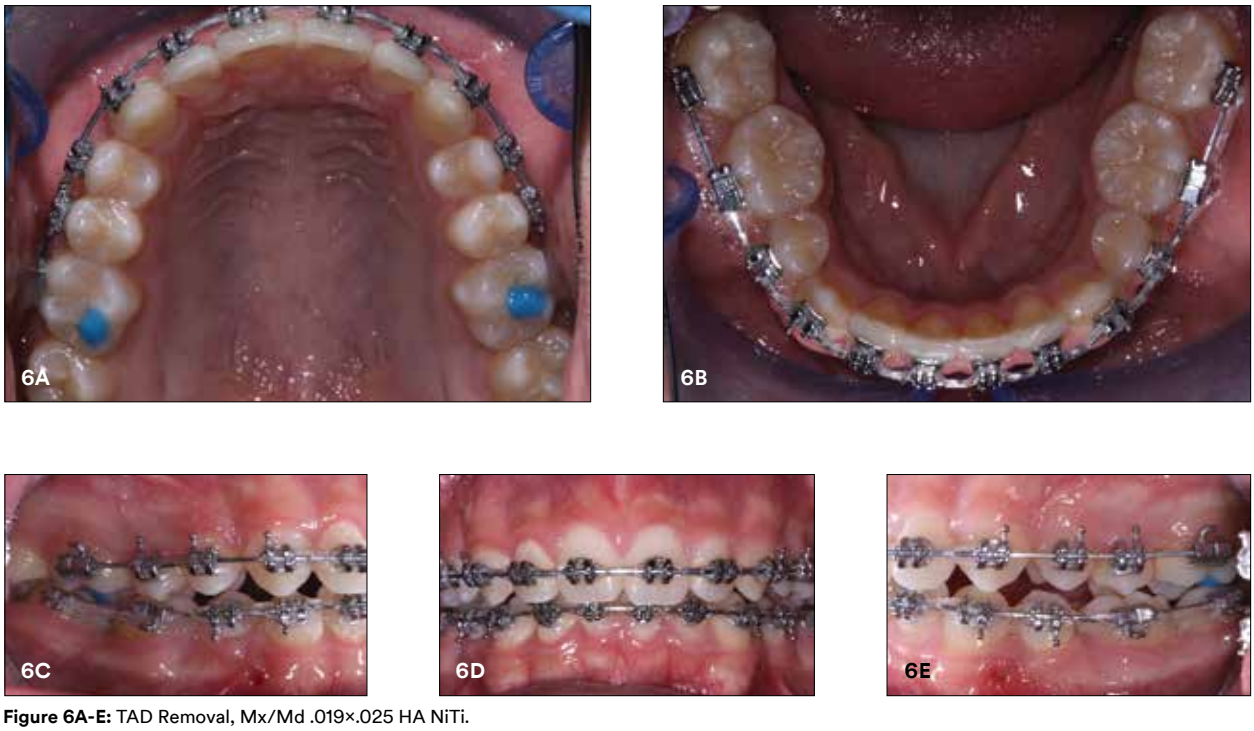
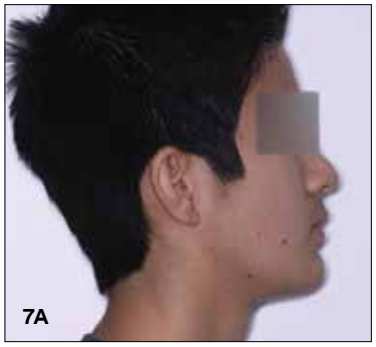


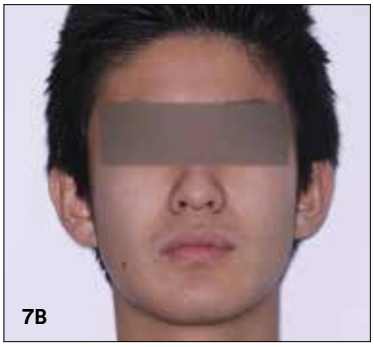
Figure 6A-E: TAD Removal, Mx/Md .019×.025 HA NiTi.

Clinical Tip

The use of SmartClip™ brackets provides for a low friction environment allowing for efficient space closure.

Final – 10/29/2012





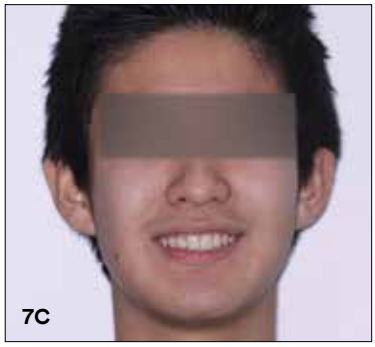


Figure 7A-H: Final intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

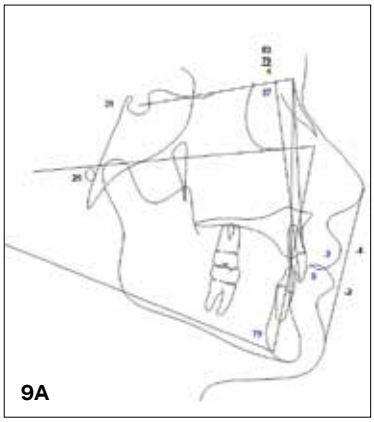


Figure 9A: Initial lateral tracing.

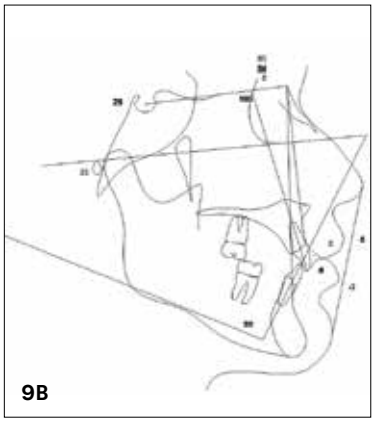


Figure 9B: Final lateral tracing.

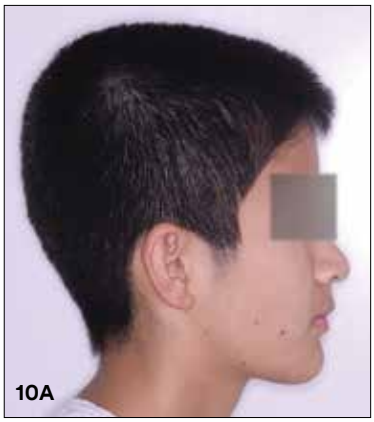


Figure 10A: Initial facial profile.

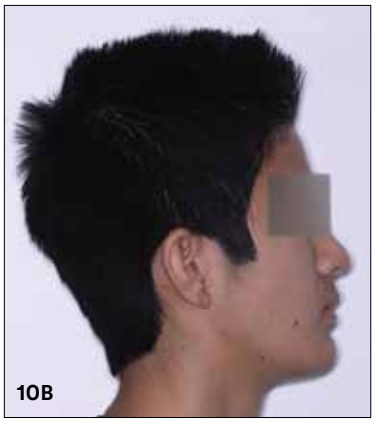


Figure 10B: Final facial profile.

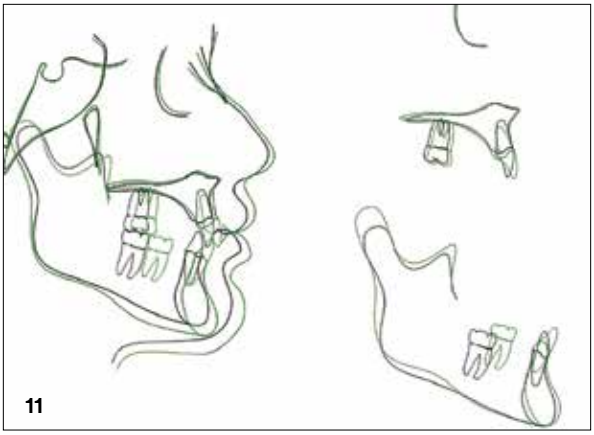


Figure 11: Superimpositions.

Final ABO Analysis				
Maxilla to Cranial Base				
SNA (°)	88.8	82.0	3.5	2.0 *
Mandible to Cranial Base				
SNB (°)	84.0	80.9	3.4	0.9
SN – GoGn (°)	29.3	32.9	5.2	-0.7
FMA (MP-FH) (°)	29.2	23.9	4.5	1.2 *
Maxillo-Mandibular				
ANB (°)	4.8	1.6	1.5	2.1 **
Maxillary Dentition				
U1 – NA (mm)	0.0	4.3	2.7	-1.6 *
U1 – SN (°)	99.8	102.8	5.5	-0.6
Mandibular Dentition				
L1 – NB (mm)	4.4	4.0	1.8	0.2
L1 – GoGn (°)	94.9	93.0	6.0	0.3
Soft Tissue				
Lower Lip to E-Plane (mm)	-2.1	-2.0	2.0	-0.1
Upper Lip to E-Plane (mm)	-4.6	-6.0	2.0	0.7

Table 2: Final ABO analysis.

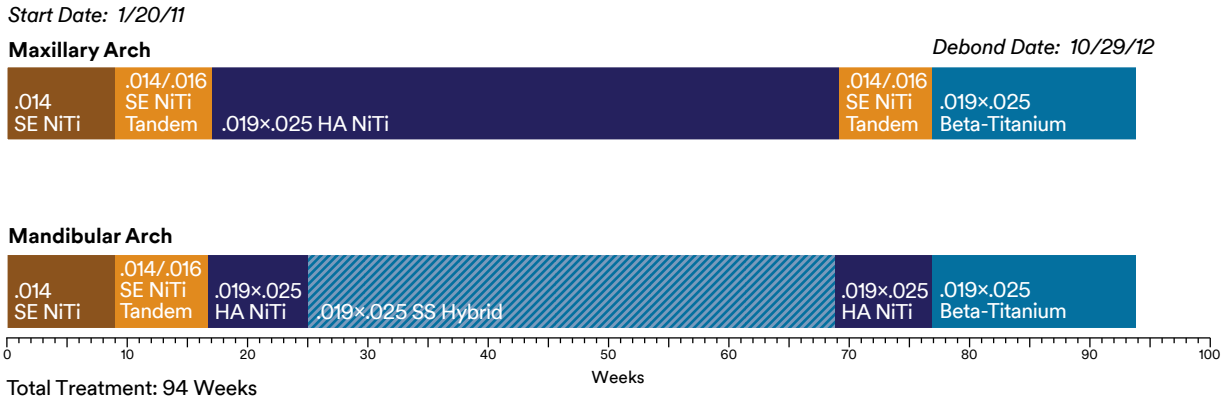


Figure 12: Treatment Timeline.

Case 2 – Class I with Posterior Crossbite

Patient
Female: 14 years, 8 months

Diagnosis
Class I malocclusion

- Narrow constricted maxillary arch
- Severe mandibular asymmetry
- Unilateral posterior crossbite
- Enamel dysplasia upper central incisors
- Large teeth (upper 3-3 = 49.2 mm)

Treatment Timeframe

Treatment Start:	10/15/2010
Treatment End:	5/17/2012
Treatment Time:	19 months

Treatment Plan
- SmartClip™ Self-Ligating Appliances (.022 slot)
- Elastics: vertical 3-3 from the start
- Lateral Development Archwires (R28/R26)
- Low torque brackets upper 2-2s

Maxillary Arch
- .014 SE NiTi – 9 weeks
- .016 SE NiTi – 12 weeks
- .018 SE NiTi – 8 weeks
- .014×.025 HA NiTi (R28) – 8 weeks
- .018×.025 HA NiTi (R28) – 18 weeks
- .019×.025 Beta-Titanium (R28) – 6 weeks

Mandibular Arch
- .014 SE NiTi – 9 weeks
- .016 SE NiTi – 12 weeks
- .018 SE NiTi – 8 weeks
- .014×.025 HA NiTi (R28) – 8 weeks
- .018×.025 HA NiTi (R28) – 18 weeks
- .019×.025 Beta-Titanium (R28) – 6 weeks

Initial

Initial ABO Analysis					
Maxilla to Cranial Base	**Low**	**Value**	**High**	**Range Low**	**Range High**
SNA (°)	-1.6	79.1		80.7	88.1
Mandible to Cranial Base					
SNB (°)		79.5		75.7	83.1
SN – GoGn (°)		37.9		31.4	41.2
FMA (MP-FH) (°)		24.9		23.7	34.5
Maxillo-Mandibular					
ANB (°)	-2.7	0.4		3.1	7.1
Maxillary Dentition					
U1 – NA (mm)		8.8		5.2	9.0
U1 – SN (°)		105.5		102.4	115.0
Mandibular Dentition					
L1 – NB (mm)		5.4	1.4	4.0	4.0
L1 – GoGn (°)	-8.6	85.4		94.0	104.8
Soft Tissue					
Lower Lip to E-Plane (mm)		0.9	0.9	-4.0	0.0
Upper Lip to E-Plane (mm)		-3.1	0.9	-4.0	-4.0

Table 1: Initial ABO analysis.

Figure 1: Initial Smile Photo.

Figure 2:
Initial cephalometric X-ray.

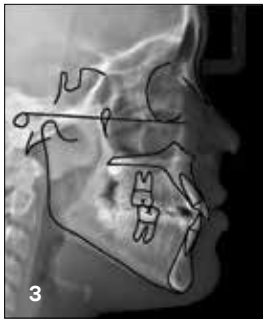


Figure 3: Initial lateral tracing.

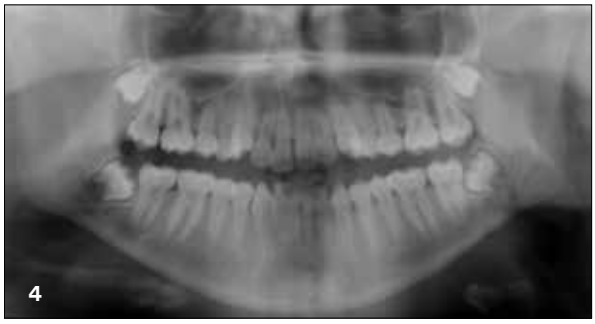


Figure 4: Initial panoramic X-ray.

Treatment Start - 10/15/2010

Figure 5A-H: Initial intraoral photographs.

1/7/2011

Figure 6A-E: Progress photos; Mx/Md .016 SE NiTi.

3/15/2011

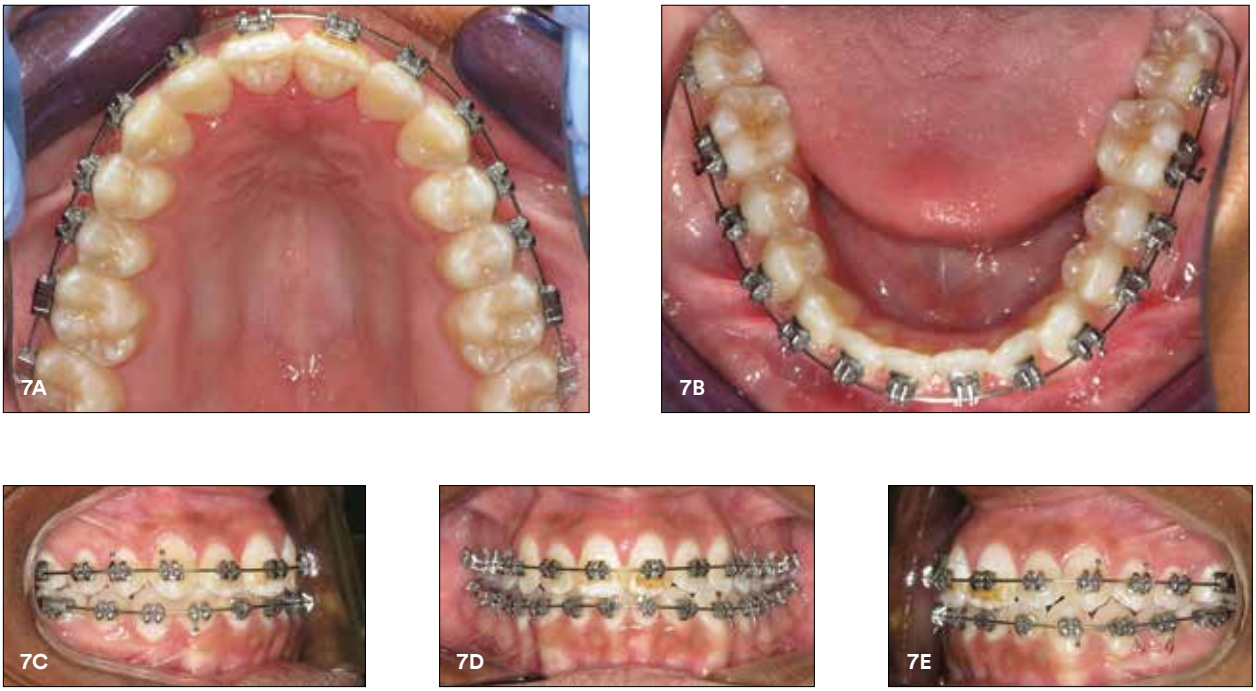


Figure 7A-E: .018 SE NiTi.

Final - 5/17/2012

Figure 8A-H: Final intraoral photographs.

Figure 9A: Final cephalometric X-ray.

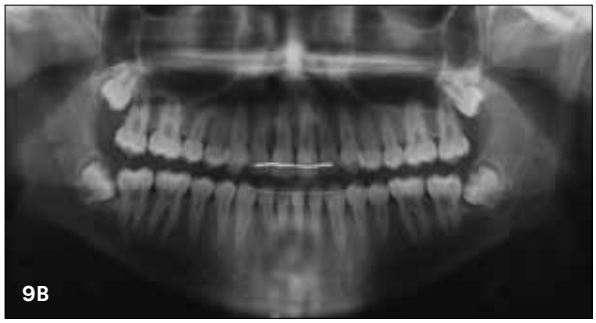


Figure 9B: Final panoramic X-ray.

Retention Photos: 04/13/2013

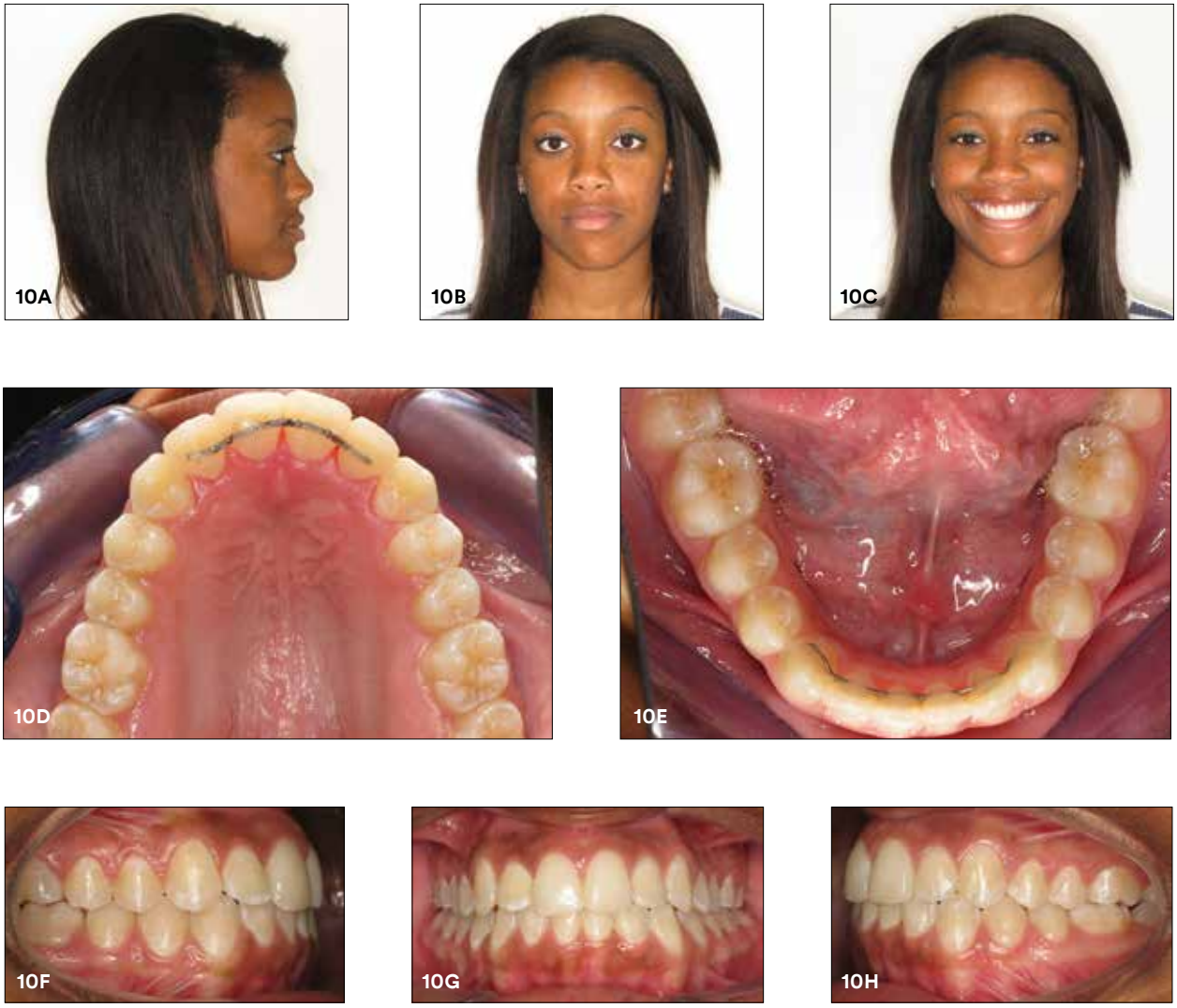


Figure 10A-H: Retention photos.

Figure 11A: Initial cephalometric X-ray.

Figure 11B: Final cephalometric X-ray.

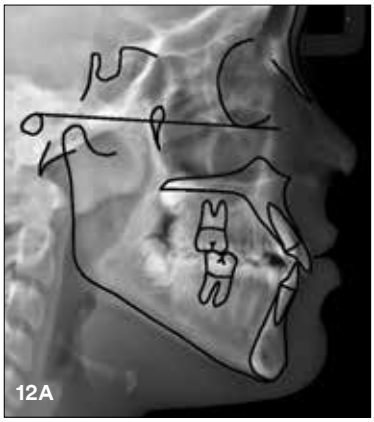


Figure 12A: Initial cephalometric tracing.

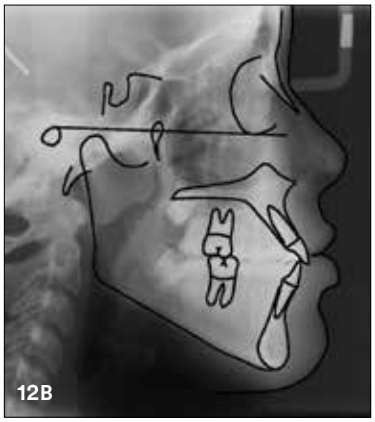


Figure 12B: Final cephalometric tracing.

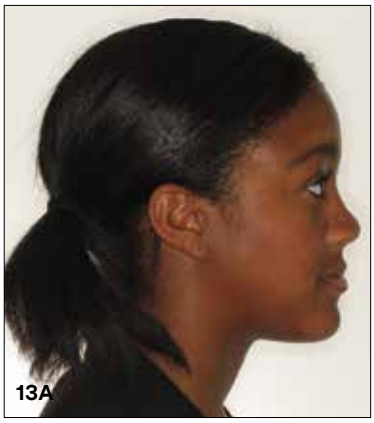


Figure 13A: Initial profile.

Figure 13B: Final profile.

Figure 14: Superimpositions.

Final ABO Analysis					
Maxilla to Cranial Base	**Low**	**Value**	**High**	**Range Low**	**Range High**
SNA (°)	-0.6	80.1		80.7	88.1
Mandible to Cranial Base					
SNB (°)		78.5		75.7	83.1
SN – GoGn (°)		40.5		31.4	41.2
FMA (MP-FH) (°)		24.6		23.7	34.5
Maxillo-Mandibular					
ANB (°)	-1.5	1.6		3.1	7.1
Maxillary Dentition					
U1 – NA (mm)		7.0	3.8	5.2	9.0
U1 – SN (°)		109.3		102.4	115.0
Mandibular Dentition					
L1 – NB (mm)		6.6	2.6	4.0	4.0
L1 – GoGn (°)	-3.3	90.7		94.0	104.8
Soft Tissue					
Lower Lip to E-Plane (mm)		2.3	2.3	-4.0	0.0
Upper Lip to E-Plane (mm)		-1.2	2.8	-4.0	-4.0

Table 2: Final ABO analysis.

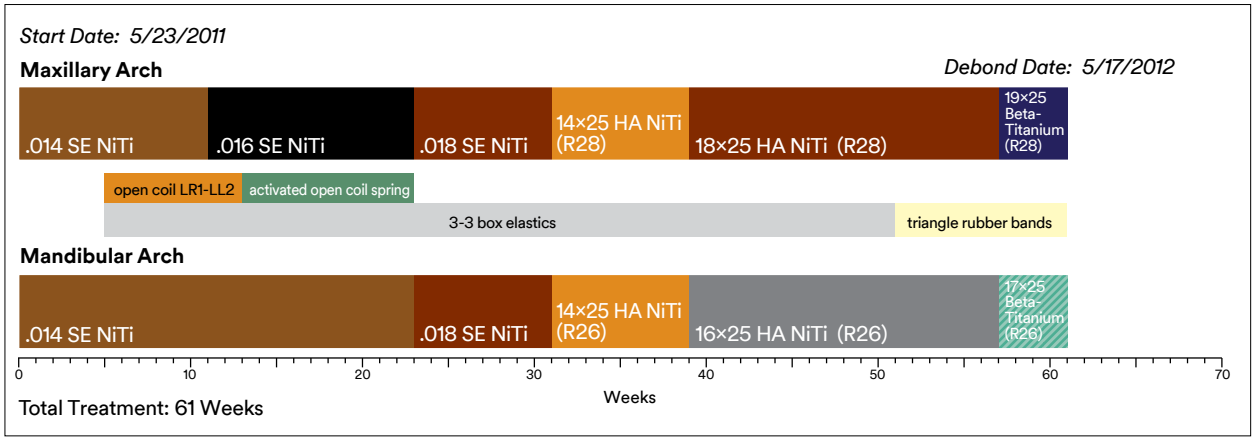


Figure 15: Treatment Timeline.

Case 3 – Severe Midline Discrepancy

Patient
Female: 37 years, 2 months

Treatment Timeframe

Treatment Start:	02/16/2012
Treatment End:	04/02/2013
Treatment Time:	14 months

Diagnosis
- Class I skeletal pattern
- Class I dental pattern, with moderate maxillary and mandibular arch length deficiencies
- Significant asymmetry, with a unilateral anterior crossbite on the right side
- Severe midline discrepancy

Treatment Plan
- SmartClip™ Self-Ligating Appliance System (.018 slot)
- Placement of High Torque brackets on teeth #5, 6 and 7 in the maxillary arch, with Low Torque brackets placed on teeth #26, 27 and 28 in the mandibular arch
- Inter-maxillary elastics

Maxillary Arch
- .014 NiTi – 8 weeks
- .014/.014 NiTi Tandem – 6 weeks
- .016×.025 Beta-Titanium – 45 weeks

Mandibular Arch
- .014 NiTi – 8 weeks
- .014/.014 NiTi Tandem – 6 weeks
- .016×.025 Beta-Titanium – 45 weeks

Initial

Initial ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	78.2	82	3.5	-1.1
Mandible to Cranial Base				
SNB (°)	77.1	80.9	3.4	-1.1
SN – MP (°)	36.2	32.9	5.2	0.6
FMA (MP-FH) (°)	30.2	23.9	4.5	1.4
Maxillo-Mandibular				
ANB (°)	1.2	1.6	1.5	-0.3
Maxillary Dentition				
U1 – NA (mm)	5.3	4.3	2.7	0.4
U1 – SN (°)	103.1	102.8	5.5	0.1
Mandibular Dentition				
L1 – NB (mm)	4.3	4	1.8	0.2
L1 – MP (°)	80.5	95	7	-2.1
Soft Tissue				
Lower Lip to E-Plane (mm)	-6.8	-2	2	-2.4
Upper Lip to E-Plane (mm)	-12.3	-6	2	-3.1

Table 1: Initial ABO analysis.

Figure 2: Initial cephalometric X-ray.

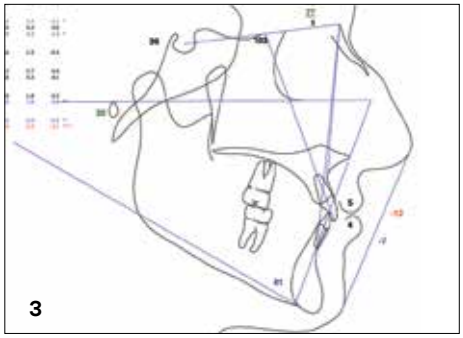


Figure 3: Initial lateral tracing.

Treatment Start – 02/16/2012

Figure 4A-H: Initial intraoral photographs.

04/10/2012

Figure 5A-E: Mx/Md .014/.014 NiTi Tandem. This is the initial leveling archwire.

12/13/2012

Figure 6A-E: Mx/Md .016×.025 Beta-Titanium.

Clinical Tip

Please note the expression of high torque in the maxillary teeth on the right side, in conjunction with the expression of low torque on the mandibular teeth on the right side.

Final – 04/02/2013

Figure 7A-H: Final facial and intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

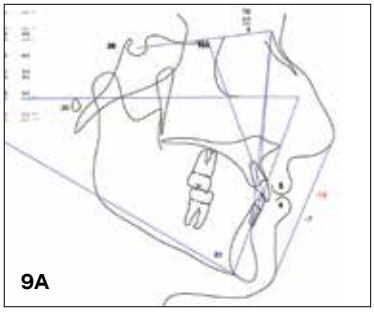


Figure 9A: Initial lateral tracing.

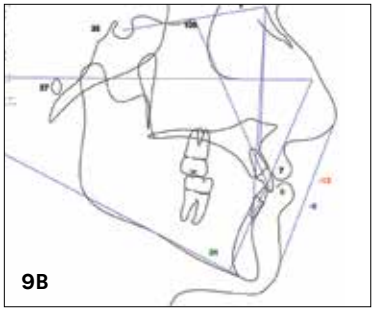


Figure 9B: Final lateral tracing.

Figure 10A: Initial facial profile.

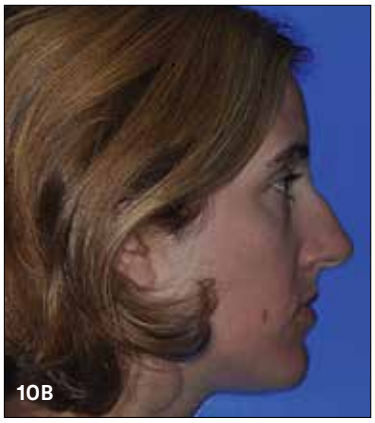


Figure 10B: Final facial profile.

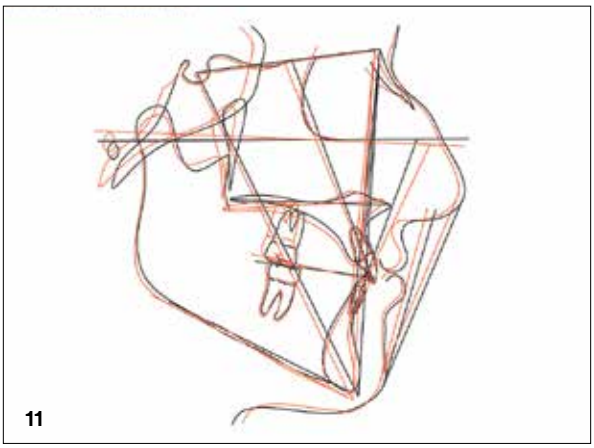


Figure 11: Superimpositions: Black initial, Red final.

Final ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	78.6	82	3.5	-1.0
Mandible to Cranial Base				
SNB (°)	77.2	80.9	3.4	-1.1
SN – MP (°)	35.4	32.9	5.2	0.5
FMA (MP-FH) (°)	27	23.9	4.5	0.7
Maxillo-Mandibular				
ANB (°)	1.4	1.6	1.5	-0.2
Maxillary Dentition				
U1 – NA (mm)	6.5	4.3	2.7	0.8
U1 – SN (°)	104.6	102.8	5.5	0.3
Mandibular Dentition				
L1 – NB (mm)	5.9	4	1.8	1.1
L1 – MP (°)	86	95	7	-1.3
Soft Tissue				
Lower Lip to E-Plane (mm)	-6.1	-2	2	-2
Upper Lip to E-Plane (mm)	-12.8	-6	2	-3.4

Table 2: Final ABO analysis.

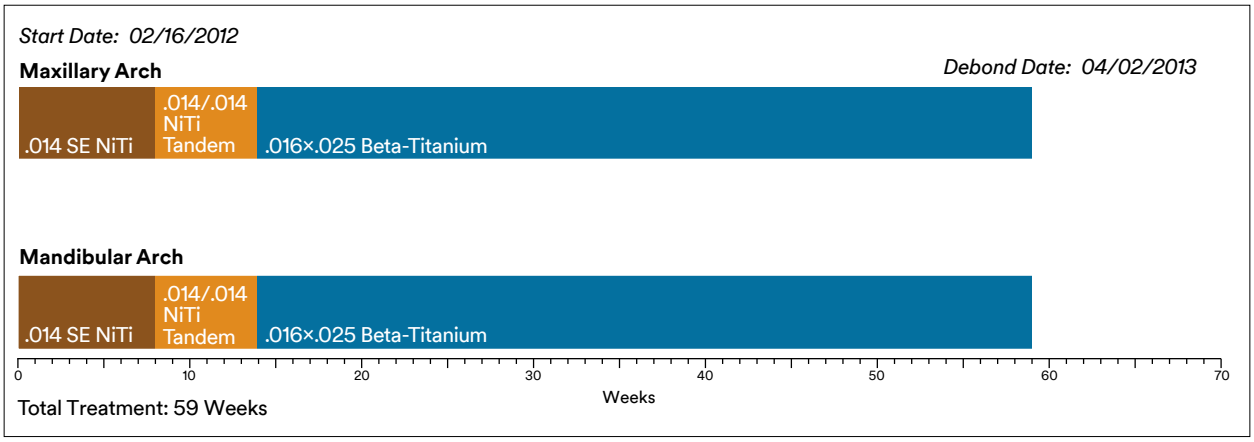


Figure 12: Treatment Timeline.

Case 4 – Moderate Arch Length Deficiency

Patient
Female: 41 years, 11 months

Treatment Timeframe

Treatment Start:	08/15/2012
Treatment End:	01/12/2014
Treatment Time:	17 months

Diagnosis
- Class I dental pattern
- Class I skeletal pattern
- Moderate maxillary and mandibular arch length deficiency
- Unilateral crossbite tooth #10
- Teeth #12, 21 and 28 previously extracted
- Maxillary midline deflected to the left

Treatment Plan
- SmartClip™ Self-Ligating Appliance System (.018 slot)
- Extract tooth #5
- Sliding mechanics to move the maxillary anterior segment to the right
- Extraction site to be closed by resolving asymmetry, with no planned significant retraction of the maxillary anterior teeth

Maxillary Arch
- .012 NiTi – 6 weeks
- .016 SS – 8 weeks
- .016 SS – 28 weeks
- .016×.025 Beta-Titanium – 31 weeks

Mandibular Arch
- .014 NiTi – 6 weeks
- .014/.014 NiTi Tandem – 8 weeks
- .016×.025 Beta-Titanium – 28 weeks
- .016×.025 Beta-Titanium – 31 weeks

Initial

Initial ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	93.1	82	3.5	3.2
Mandible to Cranial Base				
SNB (°)	84.3	80.9	3.4	1.0
SN – MP (°)	34.2	32.9	5.2	0.3
FMA (MP-FH) (°)	25.8	23.9	4.5	0.4
Maxillo-Mandibular				
ANB (°)	8.8	1.6	1.5	4.8
Maxillary Dentition				
U1 – NA (mm)	3.1	4.3	2.7	-0.4
U1 – SN (°)	118	102.8	5.5	2.8
Mandibular Dentition				
L1 – NB (mm)	12	4	1.8	4.4
L1 – MP (°)	92.1	95	7	-0.4
Soft Tissue				
Lower Lip to E-Plane (mm)	4.8	-2	2	3.4
Upper Lip to E-Plane (mm)	2.3	-6	2	4.2

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

Figure 3: Initial lateral tracing.

Treatment Start – 08/15/2012

Figure 4A-H: Initial intraoral photographs.

01/09/2013


5A


5B


5C


5D


5E

Figure 5A-E: Mx .016 Stainless Steel, Md .016×.025 Beta-Titanium archwire.

Clinical Tip

Retraction of the maxillary right canine is accomplished with a Nitinol closed coil spring, and the use of the .016 steel archwires allows uninhibited retraction of the canine.

06/19/2013


6A


6B


6C


6D


6E

Figure 6A-E: Mx/Md .016×.025 Beta-Titanium.

Final – 04/02/2013

Figure 7A-H: Final facial and intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

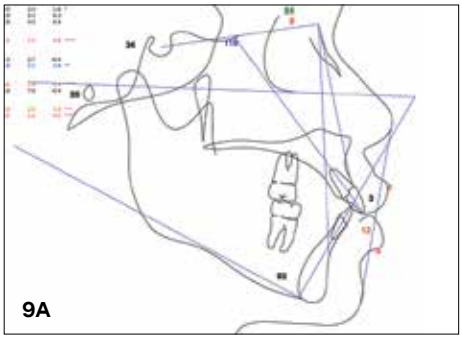


Figure 9A: Initial lateral tracing.

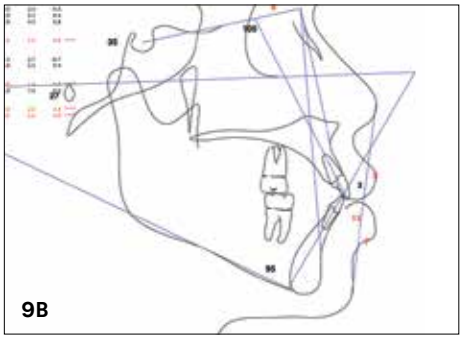


Figure 9B: Final lateral tracing.

Figure 10A: Initial facial profile.

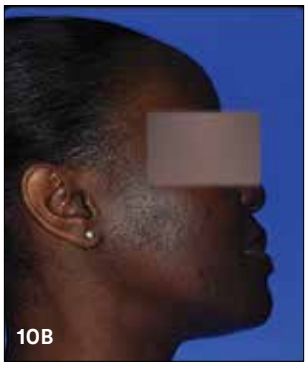


Figure 10B: Final facial profile.

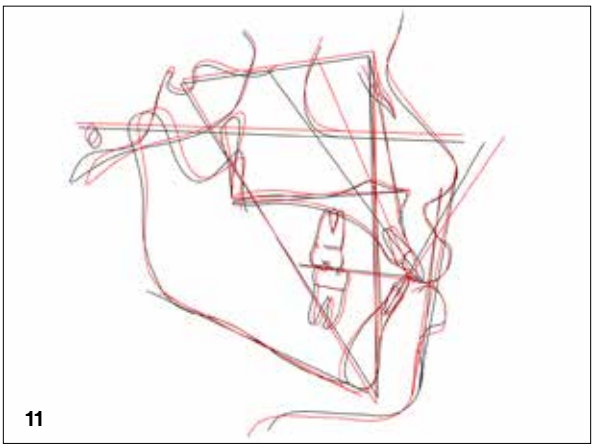


Figure 11: Superimpositions: Black initial, Red final.

Final ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	90.2	82	3.5	2.4
Mandible to Cranial Base				
SNB (°)	82.7	80.9	3.4	0.5
SN – MP (°)	34.8	32.9	5.2	0.4
FMA (MP-FH) (°)	27.3	23.9	4.5	0.8
Maxillo-Mandibular				
ANB (°)	7.6	1.6	1.5	4.0
Maxillary Dentition				
U1 – NA (mm)	2.5	4.3	2.7	-0.7
U1 – SN (°)	105.1	102.8	5.5	0.4
Mandibular Dentition				
L1 – NB (mm)	12.9	4	1.8	4.9
L1 – MP (°)	95	95	7	0
Soft Tissue				
Lower Lip to E-Plane (mm)	6.6	-2	2	4.3
Upper Lip to E-Plane (mm)	3.5	-6	2	4.8

Table 2: Final ABO analysis.

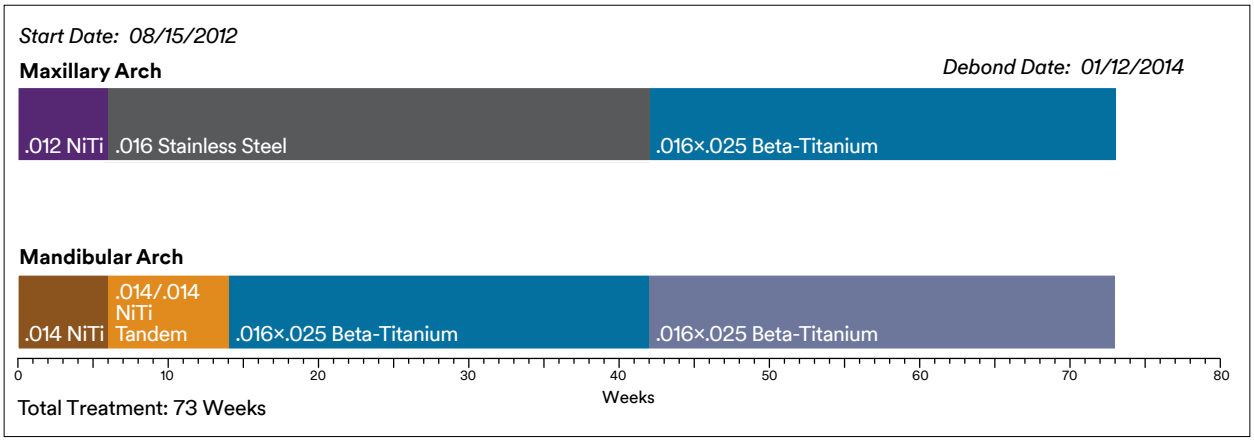


Figure 12: Treatment Timeline.

Case 5 – Class II Division 1, TAD Assisted Distalization

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 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

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

Mandibular Arch
- .014 SE NiTi – 8 weeks
- .014/.016 SE NiTi Tandem – 8 weeks
- .019×.025 HA NiTi – 53 weeks
- .019×.025 Beta-Titanium – 15 weeks (Class II elastics Started and stopped for the last 3 weeks when Settling elastics started)

Initial

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 1: Initial.

Figure 2: Initial cephalometric X-ray.

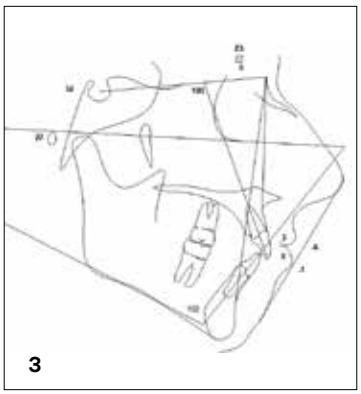


Figure 3: Initial lateral tracing.

Treatment Start – 5/5/2010

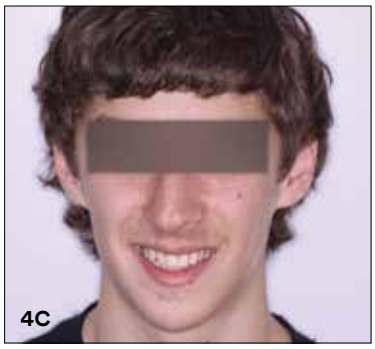


Figure 4A-H: Initial intraoral photographs.

9/13/2010

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

2/2/2011

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

Final – 12/15/2011

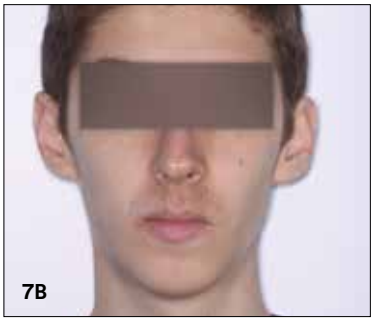


Figure 7A-H: Final intraoral photographs.

TPA Design

Figure 8A: TPA Distalization Initiated.

Table 8B: TPA Retraction Initiated.

Figure 9A: Initial cephalometric X-ray.

Figure 9B: Final cephalometric X-ray.

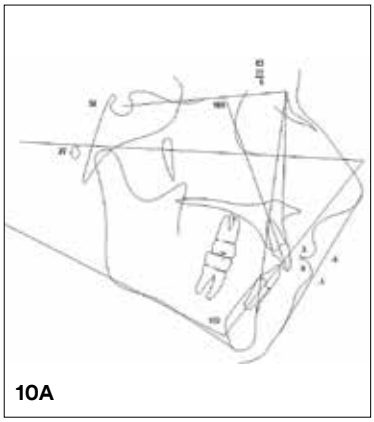


Figure 10A: Initial lateral tracing.

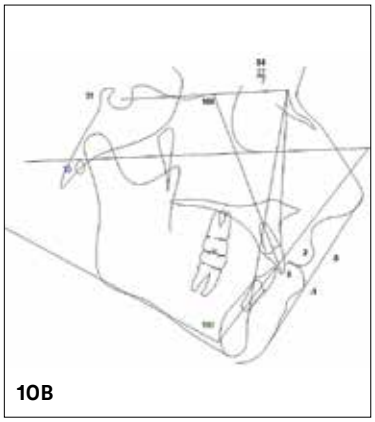


Figure 10B: Final lateral tracing.

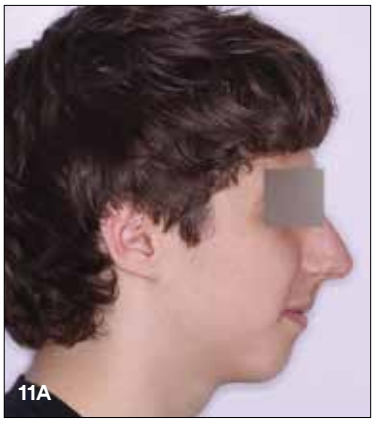


Figure 11A: Initial facial profile.

Figure 11B: Final facial profile.

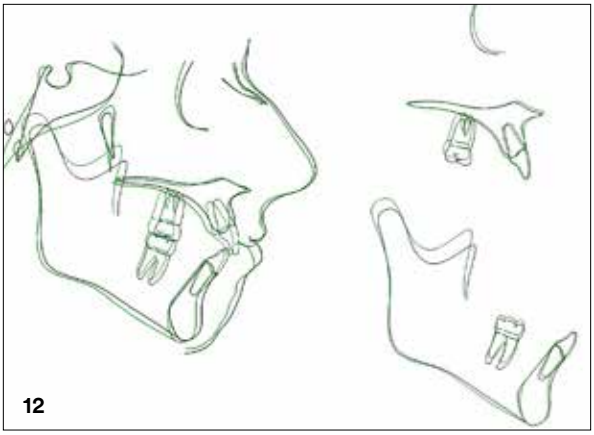


Figure 12: Superimpositions.

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.

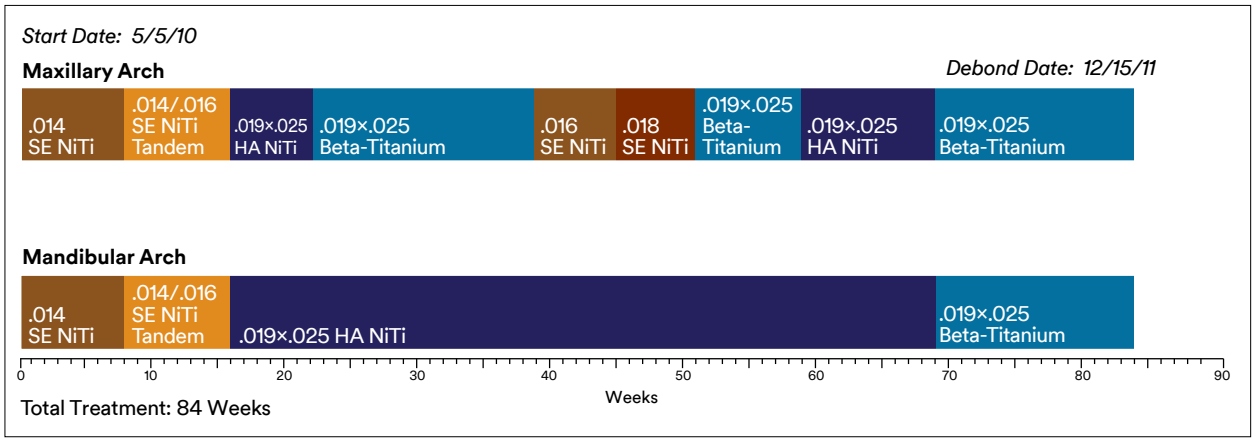


Figure 13: Treatment Timeline.

Case 6 – Class II Elastics

Patient
Male: age 13 years, 6 months

Diagnosis
Class II Malocclusion

- Mild maxillary and mandibular crowding
- Retrognathic mandible
- Vertical growth pattern

Treatment Timeframe

Treatment Start:	10/15/2010
Treatment End:	05/17/2012
Treatment Time:	19 months

Treatment Plan
- SmartClip™ Self-Ligating Brackets (.022 slot), MBT™ Appliance System Rx, with Low Torque Mandibular incisors
- Class II elastics

Maxillary Arch
- .014 SE NiTi – 13 weeks
- .014/.016 SE NiTi Tandem – 7 weeks (Started Class II elastics)
- .019×.025 Beta-Titanium – 33 weeks
- .019×.025 HA NiTi – 9 weeks (Pan & Repo)
- .019×.025 Beta-Titanium– 19 weeks (Class II elastics stopped 3 weeks before debond to start settling elastics)

Mandibular Arch
- .014 SE NiTi – 13 weeks
- .014/.016 SE NiTi Tandem – 7 weeks
- .019×.025 Beta-Titanium – 33 weeks
- .019×.025 HA NiTi – 9 weeks
- .019×.025 Beta-Titanium – 19 weeks (Settling elastics started for last 3 weeks)

Initial

Initial ABO Analysis					
Maxilla to Cranial Base					
SNA (°)	80.9	82.0	3.5	-0.3	
Mandible to Cranial Base					
SNB (°)	75.9	80.9	3.4	-1.5	*
SN – GoGn (°)	31.9	32.9	5.2	-0.2	
FMA (MP-FH) (°)	30.8	24.4	4.5	1.4	*
Maxillo-Mandibular					
ANB (°)	5.0	1.6	1.5	2.2	**
Maxillary Dentition					
U1 – NA (mm)	7.1	4.3	2.7	1.0	*
U1 – SN (°)	113.6	102.6	5.5	2.0	*
Mandibular Dentition					
L1 – NB (mm)	7.8	4.0	1.8	2.1	**
L1 – GoGn (°)	101.4	93.0	6.0	1.4	*
Soft Tissue					
Lower Lip to E-Plane (mm)	-1.8	-2.0	2.0	0.1	
Upper Lip to E-Plane (mm)	-4.9	-5.0	2.0	0.1	

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

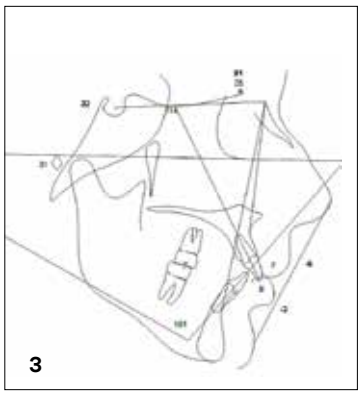


Figure 3: Initial lateral tracing.

Treatment Start – 10/15/2010

Figure 4A-H: Initial intraoral photographs.

1/17/2011

Figure 5A-E: Class II Elastics, .014/.016 SE NiTi Tandem.

11/2/2011

Figure 6A-E: Progress Panaramic x-ray & Reposition, .019×.025 HA NiTi.

Final – 5/17/2012

Figure 7A-H: Final intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

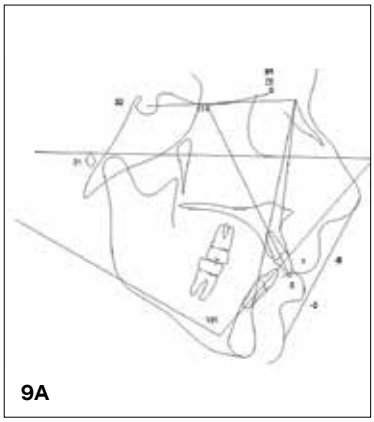


Figure 9A: Initial lateral tracing.

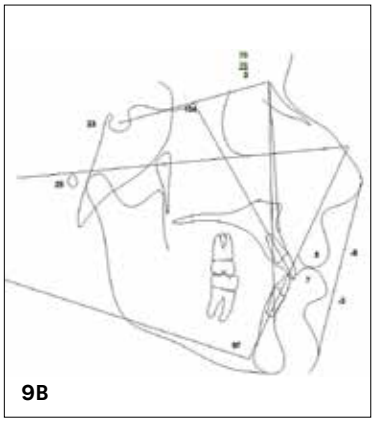


Figure 9B: Final lateral tracing.

Figure 10A: Initial facial profile.

Figure 10B: Final facial profile.

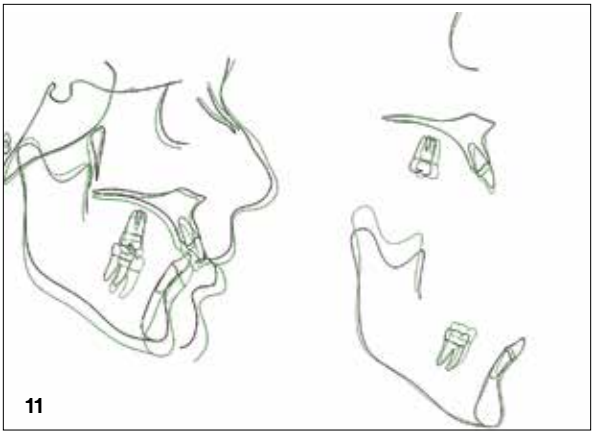


Figure 11: Superimpositions.

Final ABO Analysis				
Maxilla to Cranial Base				
SNA (°)	78.4	82.0	3.5	-1.0 *
Mandible to Cranial Base				
SNB (°)	75.8	80.9	3.4	-1.5 *
SN – GoGn (°)	33.4	32.9	5.2	0.1
FMA (MP-FH) (°)	26.4	23.7	4.5	0.6
Maxillo-Mandibular				
ANB (°)	2.7	1.6	1.5	0.7
Maxillary Dentition				
U1 – NA (mm)	5.1	4.3	2.7	0.3
U1 – SN (°)	104.2	102.8	5.5	0.3
Mandibular Dentition				
L1 – NB (mm)	6.9	4.0	1.8	1.6 *
L1 – GoGn (°)	97.1	93.0	6.0	0.7
Soft Tissue				
Lower Lip to E-Plane (mm)	-3.0	-2.0	2.0	-0.5
Upper Lip to E-Plane (mm)	-7.5	-6.3	2.0	-0.6

Table 2: Final ABO analysis.

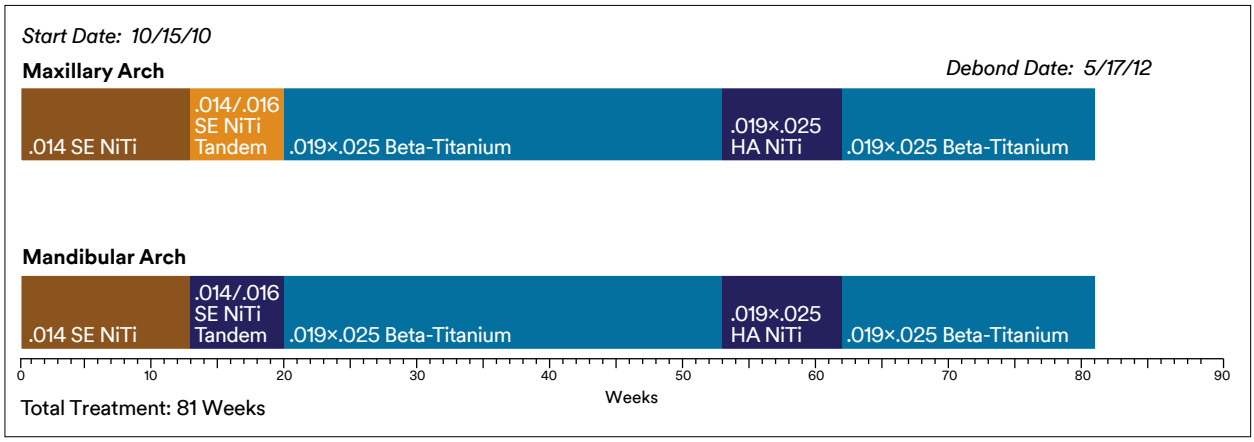


Figure 12: Treatment Timeline.

Case 7 – Class II – Severe Overbite with Forsus™ Class II Correctors

Patient
Female: age 14 years, 1 month

Diagnosis
- Deep bite
- Mild mandibular crowding
- Retrocline mandibular incisors
- Ectopically erupting maxillary cuspids
- Vertical maxillary excess

Treatment Timeframe

Treatment Start:	01/19/2009
Forsus™ Correctors Placed:	01/13/2010
Forsus Correctors Removed:	07/14/2010
Forsus Correctors Duration:	5 months, 2 weeks
Treatment End:	02/10/2011
Treatment Time:	24 months, 3 weeks

Treatment Plan
- SmartClip™ Self-Ligating Brackets (.022 slot), MBT™ Appliance System Rx with -6 degrees of torque in mandibular incisors
- Forsus™ Fatigue Resistant Device to correct Class II relationship and aid in bite opening in the mandibular arch
- Maxillary arch will be chained molar to molar while the Forsus Appliance is in place

Maxillary Arch
- .014 SE NiTi – 8 weeks
- .014×.016 SE NiTi Tandem – 8 weeks
- .017×.025 SE NiTi – 8 weeks
- .019×.025 SE NiTi – 52 weeks
- .021×.025 SE NiTi – 31 weeks

Mandibular Arch
- .014 SE NiTi – 8 weeks
- .014×.016 SE NiTi Reverse Curve Tandem – 16 weeks
- .017×.025 SE NiTi – 12 weeks
- .019×.025 SE NiTi – 6 weeks
- .019×.025 Beta-Titanium – 34 weeks
- .017×.025 SE Niti – 31 weeks

Initial

Initial ABO Analysis					
Maxilla to Cranial Base					
SNA (°)	81.4	82.0	3.5	-0.2	
Mandible to Cranial Base					
SNB (°)	75.9	80.9	3.4	-1.5	*
SN – GoGn (°)	23.6	32.9	5.2	-1.8	*
FMA (MP-FH) (°)	20.7	24.2	4.5	-0.8	
Maxillo-Mandibular					
ANB (°)	5.5	1.6	1.5	2.6	**
Maxillary Dentition					
U1 – NA (mm)	-0.6	4.3	2.7	-1.8	*
U1 – SN (°)	85.9	102.7	5.5	-3.1	***
Mandibular Dentition					
L1 – NB (mm)	2.5	4.0	1.8	-0.9	
L1 – GoGn (°)	92.4	93.0	6.0	-0.1	
Soft Tissue					
Lower Lip to E-Plane (mm)	-3.8	-2.0	2.0	-0.9	
Upper Lip to E-Plane (mm)	-5.5	-5.3	2.0	-0.1	

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

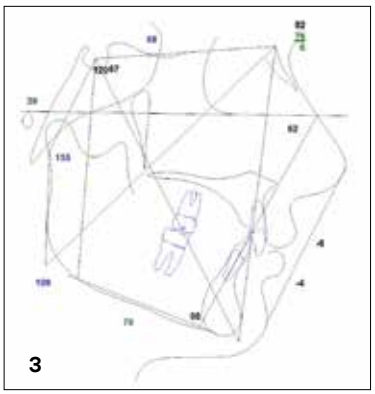


Figure 3: Initial lateral tracing.

Figure 4: Panoramic X-ray.

Treatment Start – 1/19/2009

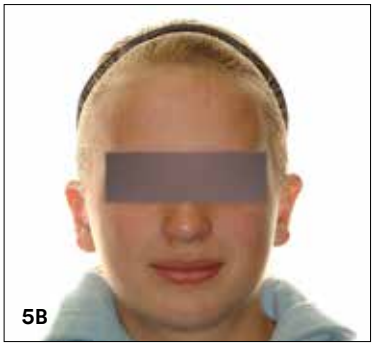


Figure 5A-H: Initial intraoral photographs.

7/17/2009

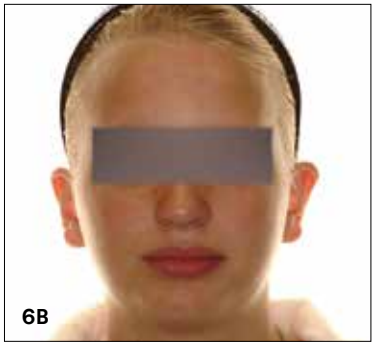


Figure 6A-H: Mx .019×.025 SE NiTi, Md .017×.025 SE NiTi.

3/19/2010

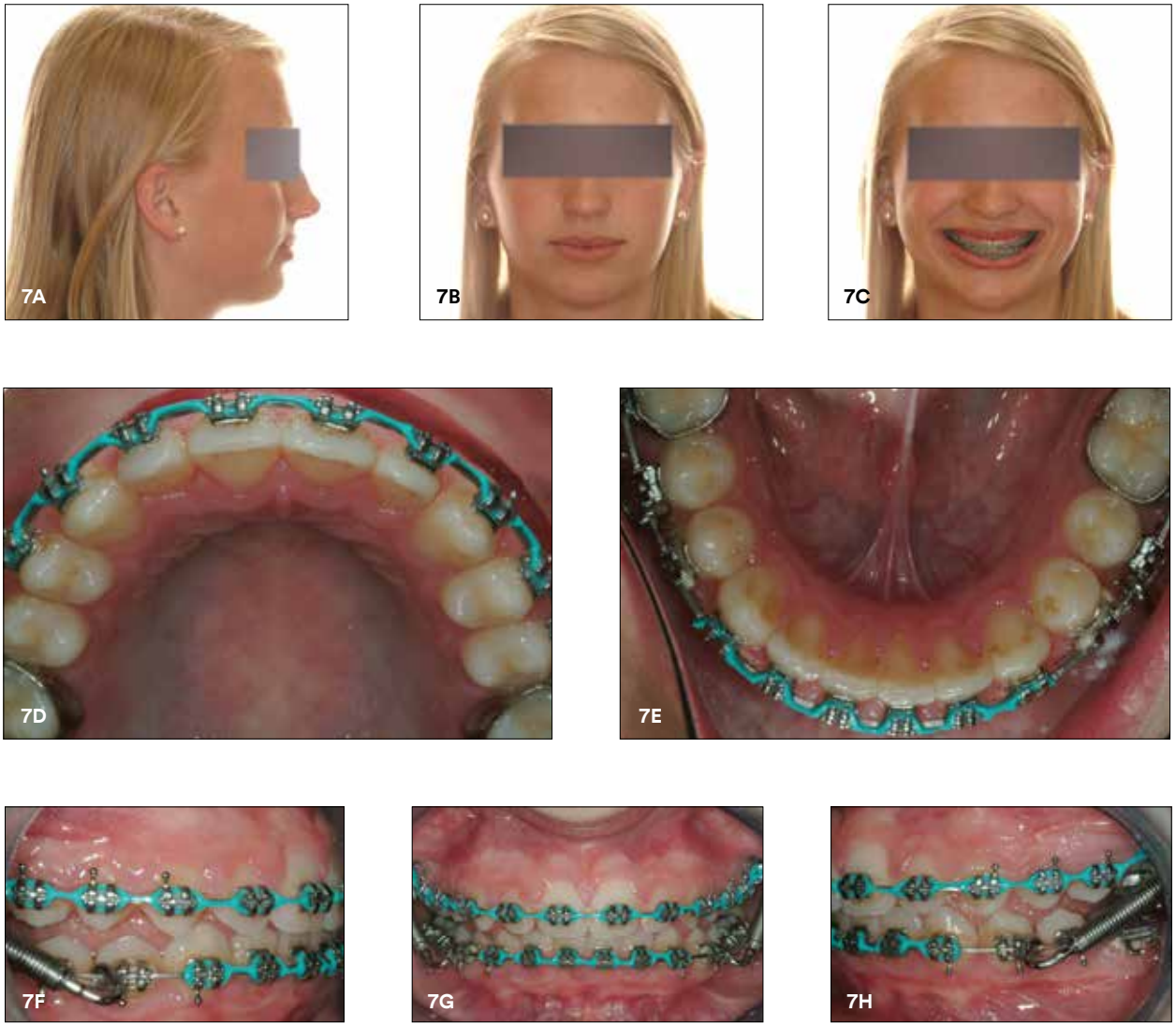


Figure 7A-H: Activated Forsus; Mx .019×.025 SE NiTi, Md .019×.025 Beta-Titanium.

Clinical Tip

Elastic chain used mx 6-6 for resistance and to prevent dental distilization of the maxillary molars during use of Forsus™ Correctors. Elastic chain used mandibular 3-3 for resistance and mandibular incisor control.

Final – 2/10/2011

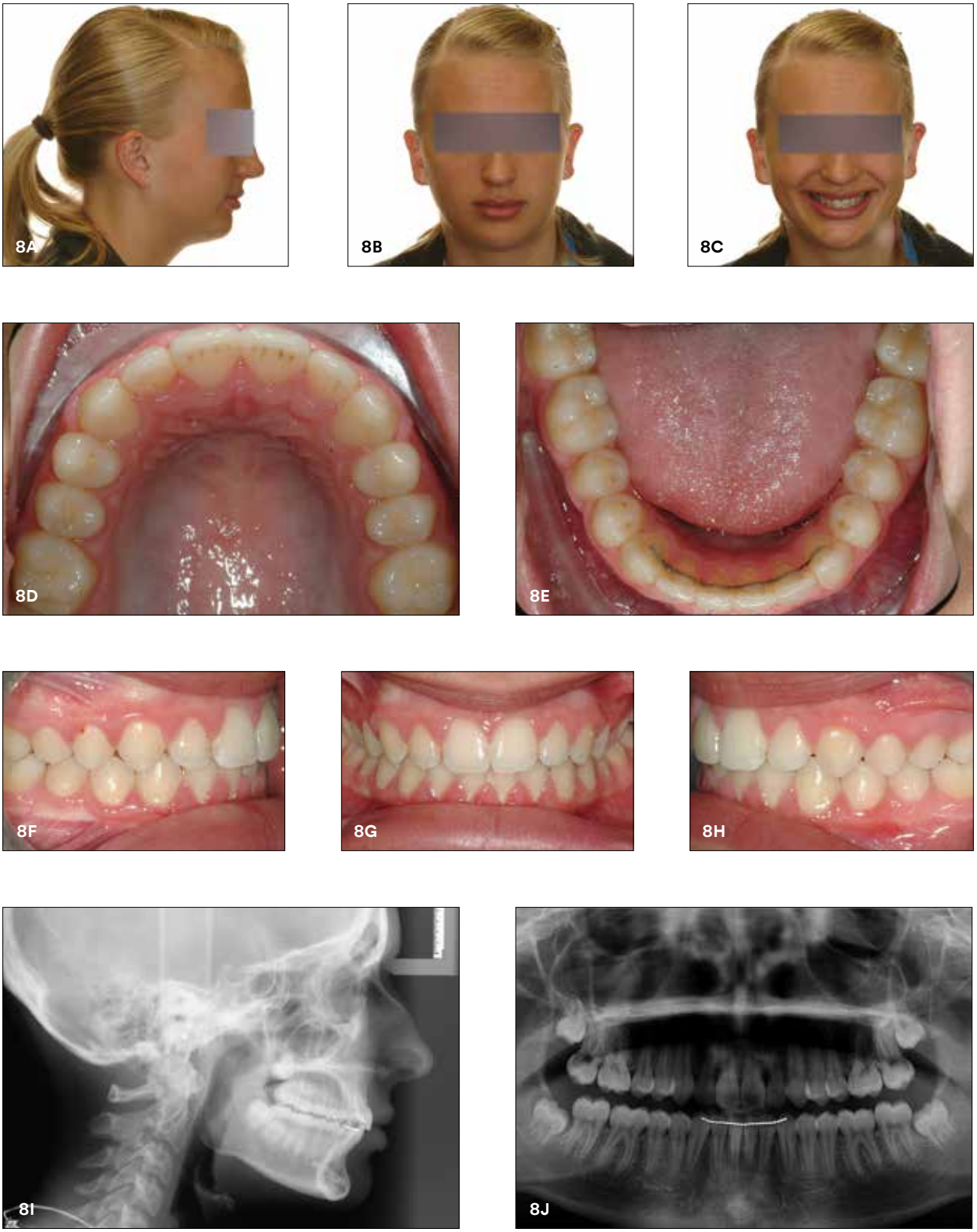


Figure 8A-J: Final intraoral photographs.

Figure 9A: Initial cephalometric X-ray.

Figure 9B: Final cephalometric X-ray.

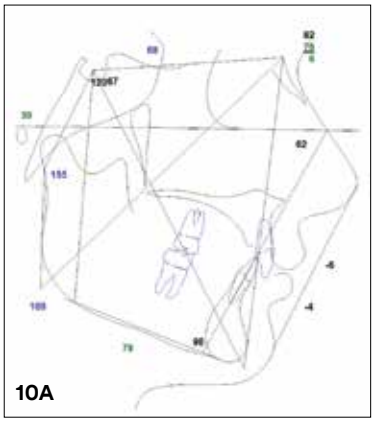


Figure 10A: Initial lateral tracing.

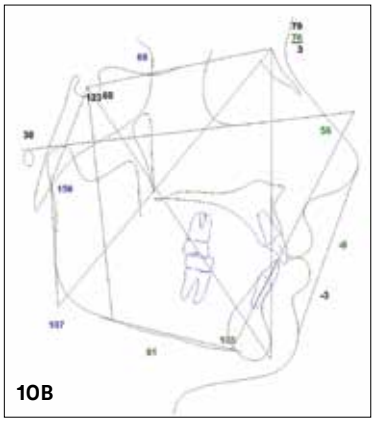


Figure 10B: Final lateral tracing.

Figure 11A: Initial facial profile.

Figure 11B: Final facial profile.

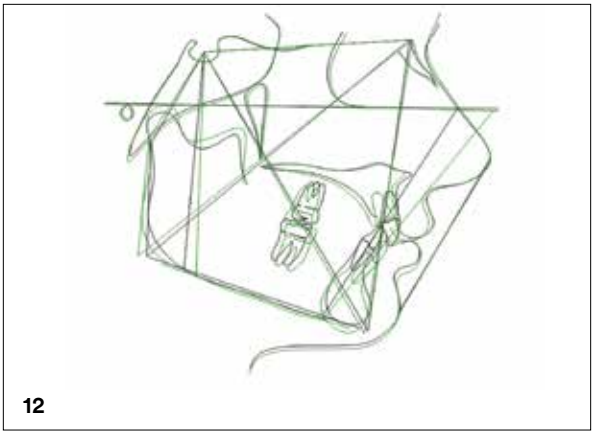


Figure 12: Superimpositions: Black initial. Green final treatment.

Final ABO Analysis					
Maxilla to Cranial Base					
SNA (°)	78.7	82.0	3.5	-0.9	
Mandible to Cranial Base					
SNB (°)	74.7	80.9	3.4	-1.8	*
SN – GoGn (°)	25.3	32.9	5.2	-1.5	*
FMA (MP-FH) (°)	22.4	23.4	4.5	-0.2	
Maxillo-Mandibular					
ANB (°)	4.0	1.6	1.5	1.6	*
Maxillary Dentition					
U1 – NA (mm)	3.1	4.3	2.7	-0.4	
U1 – SN (°)	102.7	102.9	5.5	-0.0	
Mandibular Dentition					
L1 – NB (mm)	6.3	4.0	1.8	1.3	*
L1 – GoGn (°)	108.4	93.0	6.0	2.6	**
Soft Tissue					
Lower Lip to E-Plane (mm)	-3.0	-2.0	2.0	-0.5	
Upper Lip to E-Plane (mm)	-6.3	-6.9	2.0	0.3	

Table 2: Final ABO analysis.

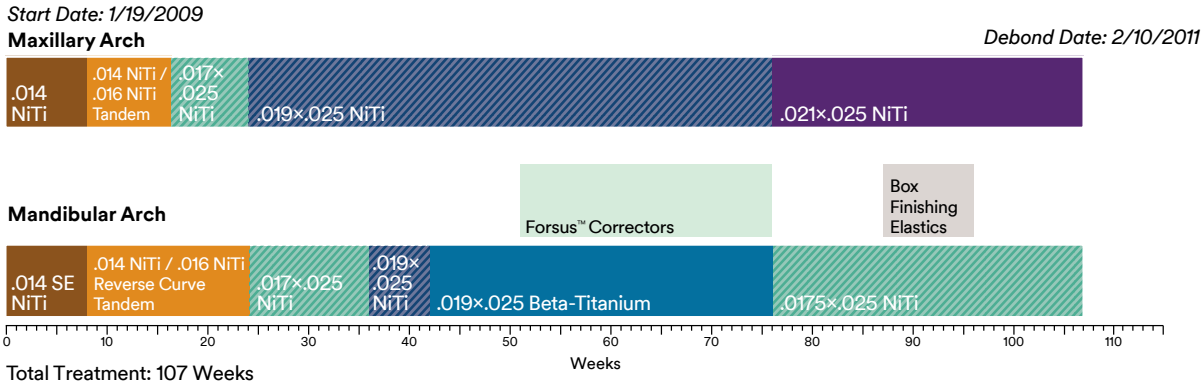


Figure 13: Treatment Timeline and Archwire Sequence.

Case 8 – Class I Right, Class II Left

Patient
Female: age 12 years, 9 months

Diagnosis
Class I right, Class II left

- Maxillary midline right
- Deep overbite
- Moderate md crowding
- Blocked out UR3

Treatment Plan
- SmartClip™ Self-Ligating Brackets (.022 slot)
- Class II elastics
- UR3 open coil spring

Treatment Timeframe

Treatment Start:	02/01/2010
Treatment End:	01/05/2012
Treatment Time:	23 months

Maxillary Arch
- .014 NiTi – 6 weeks
- .014/.016 NiTi Tandem – 6 weeks
- .017×.025 NiTi, open coil UR3 – 12 weeks
- .019×.025 NiTi – 10 weeks
- .016 NiTi (Bonded UR3) – 8 weeks
- .017×.025 NiTi – 24 weeks
- .019×.025 NiTi – 34 weeks
  (Class II boxes at night only after 6 weeks)

Mandibular Arch
- .014 NiTi – 6 weeks
- .014/.016 NiTi Tandem – 6 weeks
- .017×.025 NiTi – 12 weeks
- .019×.025 Reverse Curve NiTi – 42 weeks
- .019×.025 NiTi – 34 weeks
  (Class II boxes at night only after 6 weeks)

Initial

Initial ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	81.8	82	3.5	-0.0
Mandible to Cranial Base				
SNB (°)	81.2	80.9	3.4	0.1
SN – MP (°)	26.8	32.9	5.2	-1.2
FMA (MP-FH) (°)	21.6	24.9	4.5	-0.7
Maxillo-Mandibular				
ANB (°)	0.7	1.6	1.5	-0.6
Maxillary Dentition				
U1 – NA (mm)	4.8	4.3	2.7	0.2
U1 – SN (°)	110	102.5	5.5	1.4
Mandibular Dentition				
L1 – NB (mm)	1.9	4	1.8	-1.2
L1 – GoGn (°)	88.8	95	7	-0.9
Soft Tissue				
Lower Lip to E-Plane (mm)	-1.7	-2	2	0.1
Upper Lip to E-Plane (mm)	-2.7	-4	2	0.7

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

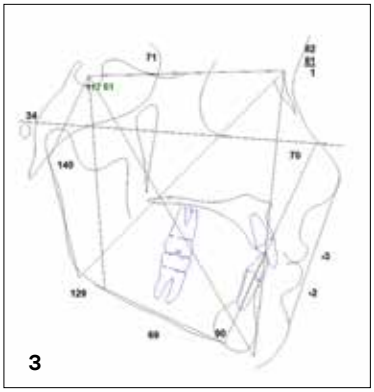
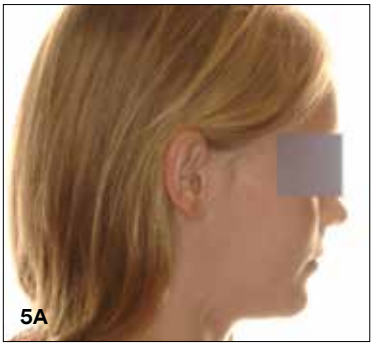
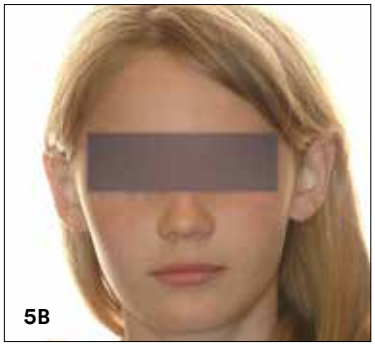


Figure 3: Initial lateral tracing.

Figure 4: Panoramic X-ray.

Treatment Start – 2/1/2010





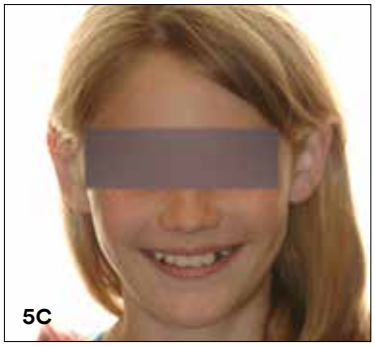


Figure 5A-H: Initial intraoral photographs.

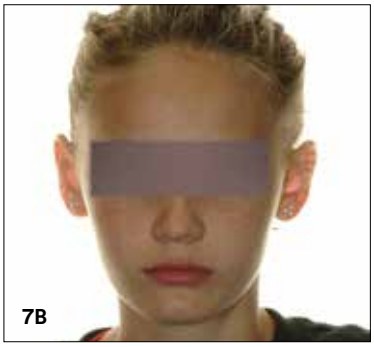
Figure 5I-K: Elastomeric guards placed on mandibular central and lateral incisors at treatment start to aid in bite opening and reduce occlusal interference.

3/19/2010

Figure 6A-H: Mx .014 SE NiTi/.016 SE NiTi Tandem, Md .014 SE NiTi/.016 RC NiTi Tandem.

4/29/2010


7A


7B


7C


7D


7E

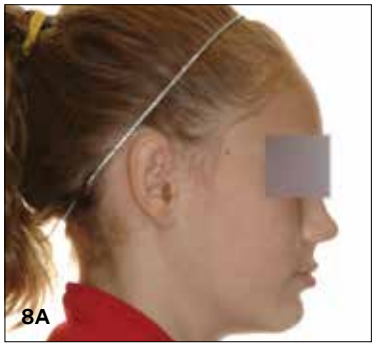

7F

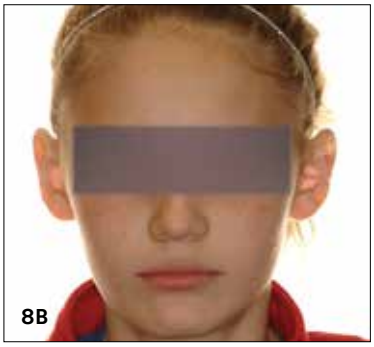

7G

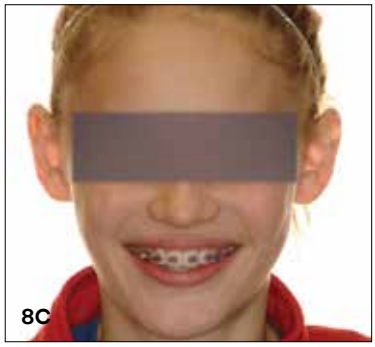

7H

Figure 7A-H: Mx .017×.025 SE NiTi Open coil UR3, Md .017×.025 SE NiTi.

9/30/2010


8A


8B


8C


8D


8E


8F


8G


8H

Figure 8A-H: Bonded UR3, Mx .016 NiTi.

5/11/2011

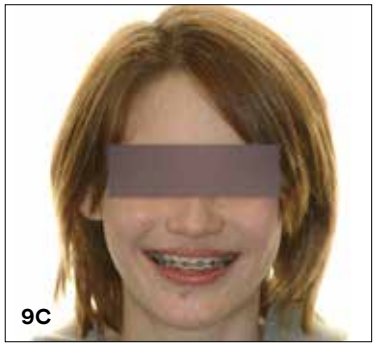
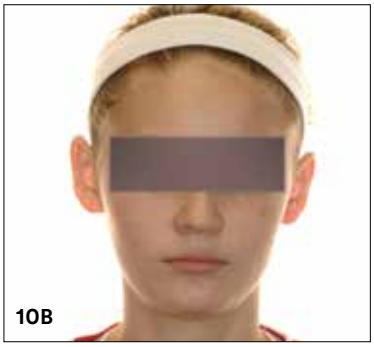
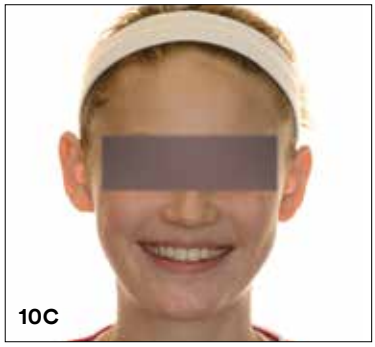


Figure 9A-H: Mx/Md .019×.025 NiTi.

Final – 1/5/2012


10A


10B


10C


10D


10E


10F


10G


10H


10I


10J

Figure 10A-J: Final intraoral photographs.

Figure 11A: Initial cephalometric X-ray.

Figure 11B: Final cephalometric X-ray.

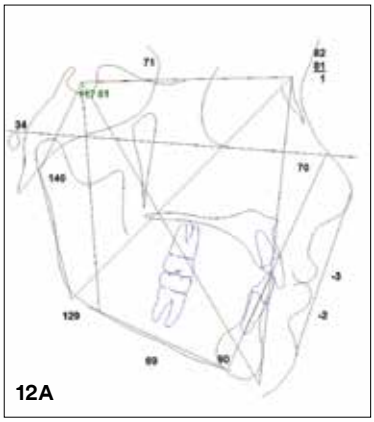


Figure 12A: Initial lateral tracing.

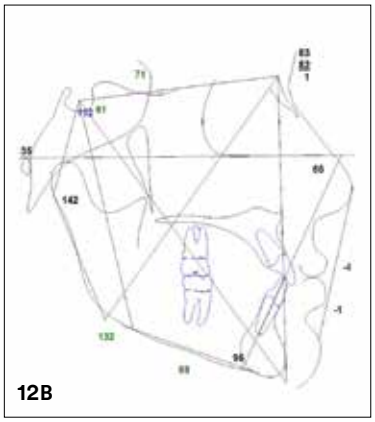


Figure 12B: Final lateral tracing.

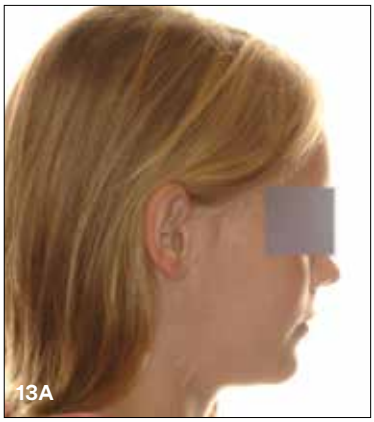


Figure 13A: Initial facial profile.

Figure 13B: Final facial profile.

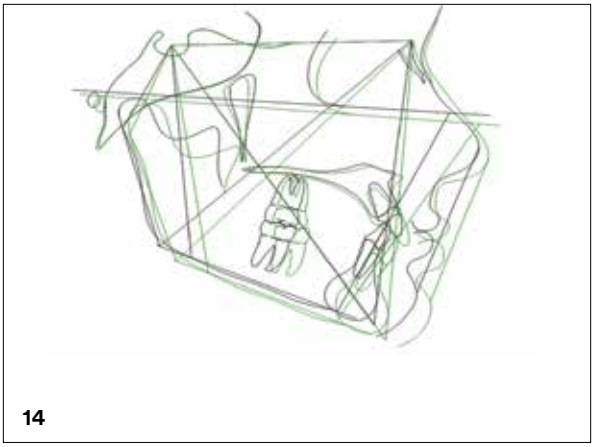


Figure 14: Superimpositions: Black initial. Green final treatment.

Final ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	82.6	82	3.5	0.2
Mandible to Cranial Base				
SNB (°)	82.1	80.9	3.4	0.4
SN – MP (°)	26.9	32.9	5.2	-1.2
FMA (MP-FH) (°)	21.9	24	4.5	-0.5
Maxillo-Mandibular				
ANB (°)	0.5	1.6	1.5	-0.7
Maxillary Dentition				
U1 – NA (mm)	5.9	4.3	2.7	0.6
U1 – SN (°)	115.3	102.8	5.5	2.3
Mandibular Dentition				
L1 – NB (mm)	3.4	4	1.8	-0.3
L1 – GoGn (°)	93.4	95	7	-0.2
Soft Tissue				
Lower Lip to E-Plane (mm)	-1.3	-2	2	0.4
Upper Lip to E-Plane (mm)	-3.5	-5.7	2	1.1

Table 2: Final ABO analysis.

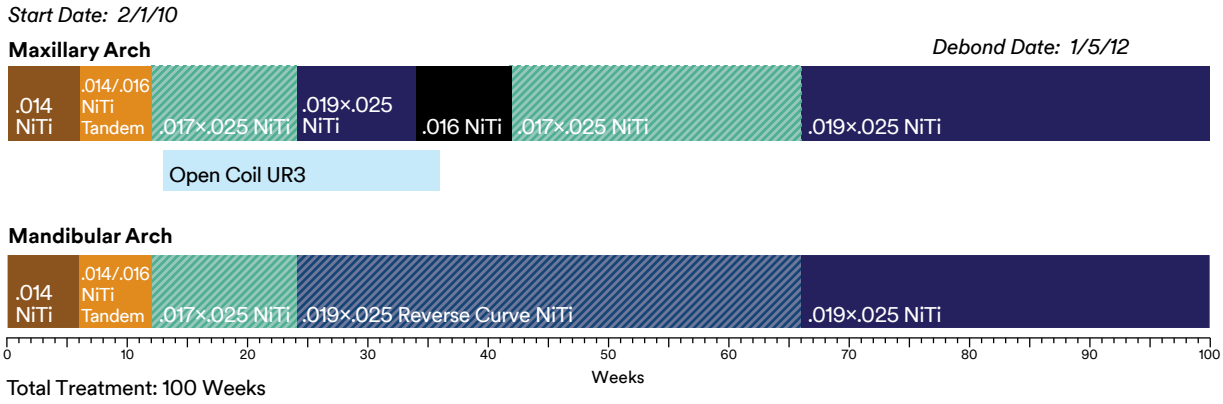


Figure 15: Treatment Timeline.

Case 9 – Class II with Severe Maxillary Arch Length Deficiency

Patient
Female: 18 years, 4 months

Diagnosis
- Class I skeletal pattern
- Class II dental pattern, with a full cusp Class II discrepancy in the buccal segment
- Severe maxillary arch length deficiency with teeth #6 and 11 blocked out of the dental arch
- No mandibular arch length deficiency
- Bilateral constriction of the maxillary arch

Treatment Timeframe

RME Placement:	09/19/2012
RME Removal:	02/21/2013
Treatment Start:	03/12/2013
Treatment End:	08/18/2014
Treatment Time:	23 months

Treatment Plan
- SmartClip™ Self-Ligating Appliance System (.018 slot)
- Expansion of the maxillary arch with RME
- Following expansion of the maxillary arch, reassess the advisability of extracting teeth #5 and 12 to resolve the arch length deficiency
- Avoid extractions in the mandibular arch in order to avoid any reduction of the lip profile
- Following RME, and mandibular response, we decided against extraction of teeth #5 and 12

Maxillary Arch
- RME – 22 weeks
- .012 NiTi – 8 weeks
- .014 NiTi – 8 weeks
- .014/.014 NiTi Tandem – 8 weeks
- .016×.025 Beta-Titanium – 53 weeks

Mandibular Arch
- .012 NiTi – 8 weeks
- .014 NiTi – 8 weeks
- .014/.014 NiTi Tandem – 8 weeks
- .016×.025 Beta-Titanium – 53 weeks

Initial

Initial ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	80.8	82	3.5	-0.3
Mandible to Cranial Base				
SNB (°)	75.3	80.9	3.4	-1.6
SN – MP (°)	34.1	32.9	5.2	0.2
FMA (MP-FH) (°)	24.1	23.9	4.5	0.1
Maxillo-Mandibular				
ANB (°)	5.5	1.6	1.5	2.6
Maxillary Dentition				
U1 – NA (mm)	-0.7	4.3	2.7	-1.8
U1 – SN (°)	89.5	102.8	5.5	-2.4
Mandibular Dentition				
L1 – NB (mm)	4.1	4	1.8	0
L1 – MP (°)	90.8	95	7	-0.6
Soft Tissue				
Lower Lip to E-Plane (mm)	-5.4	-2	2	-1.7
Upper Lip to E-Plane (mm)	-7.2	-6	2	-0.6

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

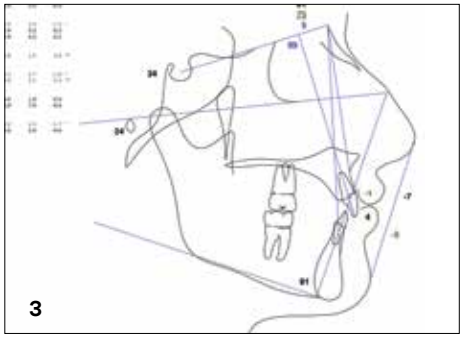


Figure 3: Initial lateral tracing.

Pre-Treatment Records: 03/12/2012

Figure 4A-H: Initial intraoral photographs.

11/26/2012

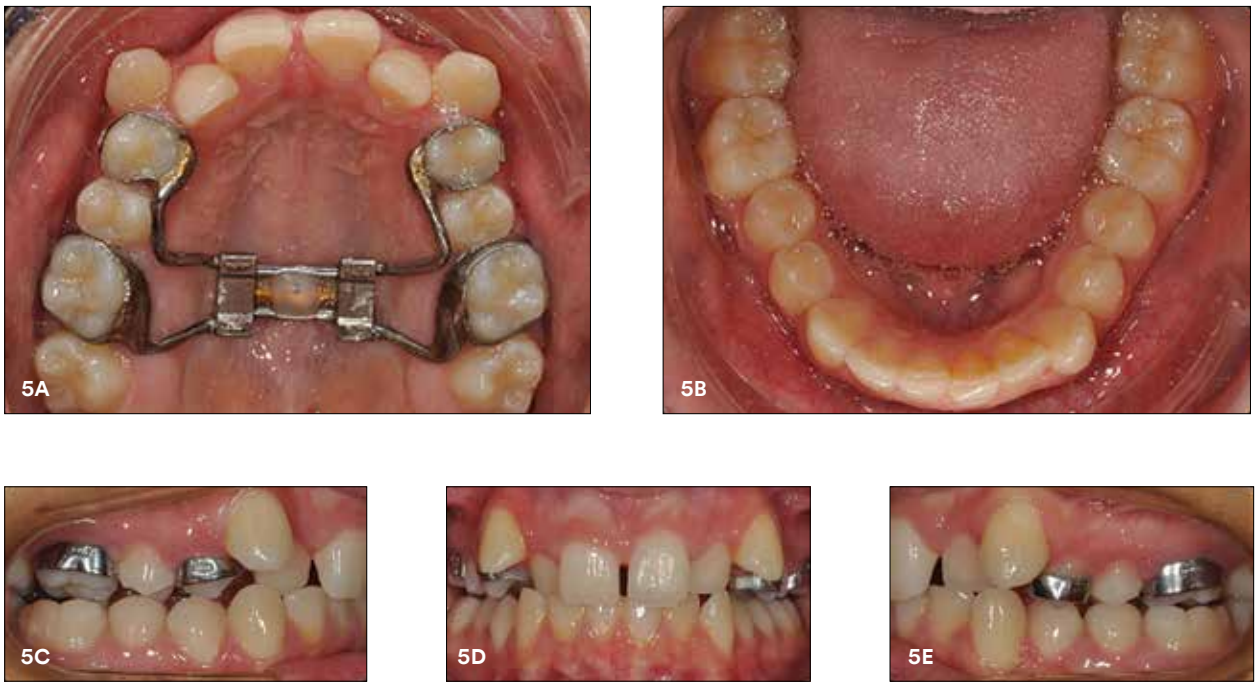


Figure 5A-E: Expansion of the Mx arch with RME, starting on 9/19/2012. The expander is in place for a total of 22 weeks and removed on 2/21/2013.

03/12/2013

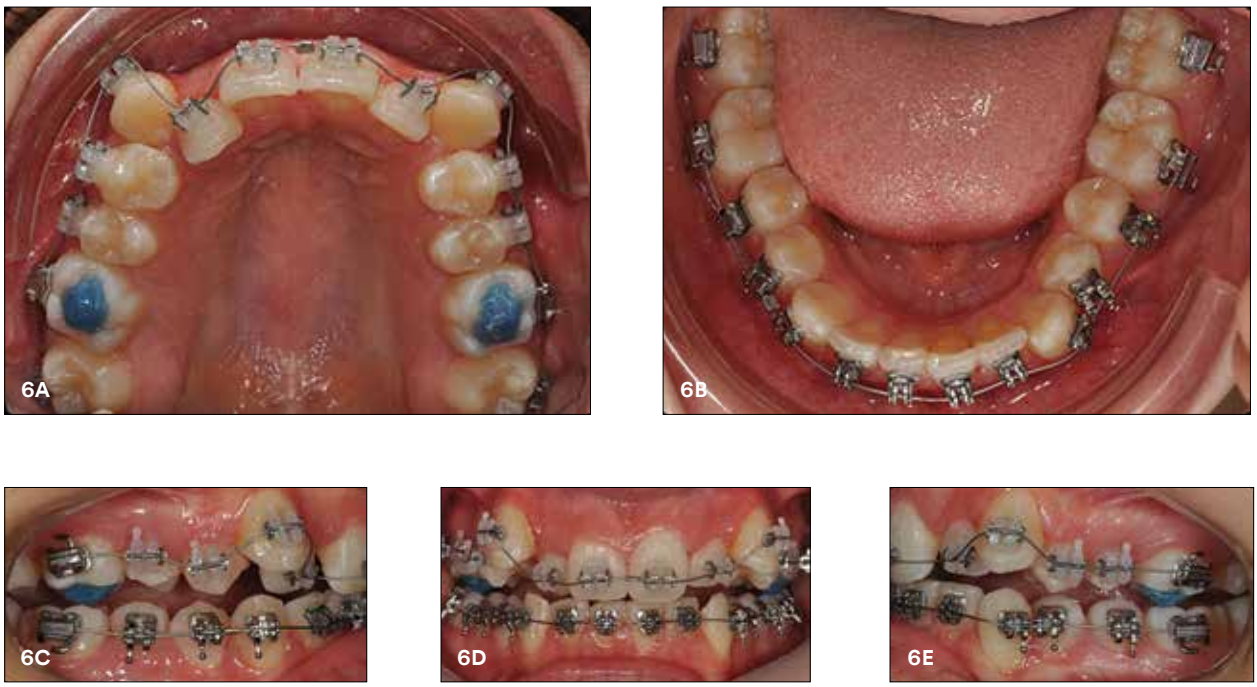


Figure 6A-E: Mx/Md .012 NiTi. The maxillary and mandibular arches are bonded after removal of the RME.

8/26/2013

Figure 7A-E: .014/.014 NiTi Tandem.

07/21/2014

Figure 8A-E: .016×.025 Beta-Titanium.

Final – 08/18/2014

Figure 9A-H: Final facial and intraoral photographs.

Figure 10A: Initial cephalometric X-ray.

Figure 10B: Final cephalometric X-ray.

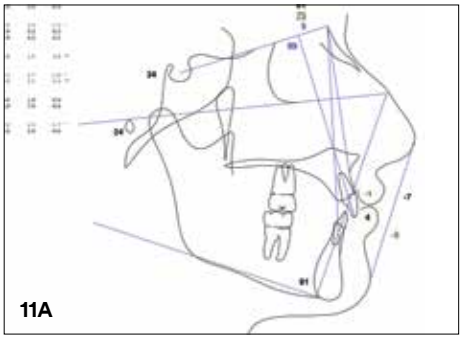


Figure 11A: Initial lateral tracing.

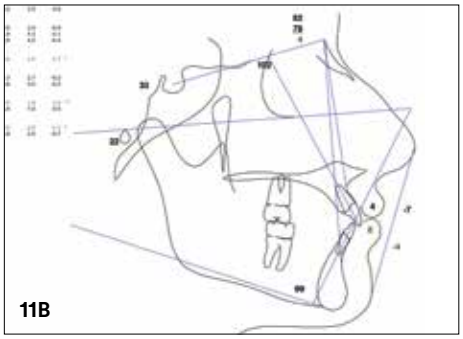


Figure 11B: Final lateral tracing.

Figure 12A: Initial facial profile.

Figure 12B: Final facial profile.

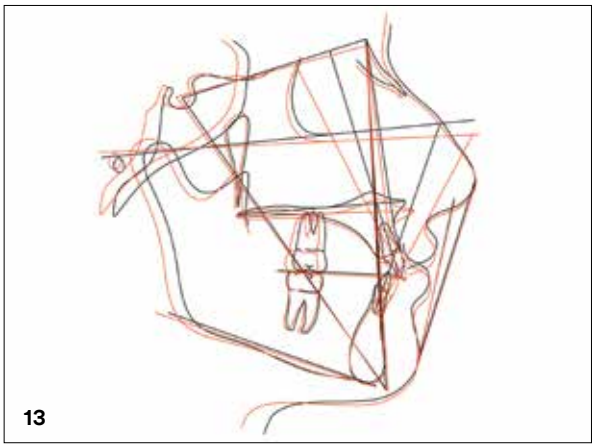


Figure 13: Superimpositions: Black initial, Red final.

Final ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	82	82	3.5	0
Mandible to Cranial Base				
SNB (°)	77.9	80.9	3.4	-0.9
SN – MP (°)	33.5	32.9	5.2	0.1
FMA (MP-FH) (°)	22.3	23.9	4.5	-0.4
Maxillo-Mandibular				
ANB (°)	4.2	1.6	1.5	1.7
Maxillary Dentition				
U1 – NA (mm)	3.7	4.3	2.7	-0.2
U1 – SN (°)	101.7	102.8	5.5	-0.2
Mandibular Dentition				
L1 – NB (mm)	7.5	4	1.8	2
L1 – MP (°)	98.6	95	7	0.5
Soft Tissue				
Lower Lip to E-Plane (mm)	-4.4	-2	2	-1.2
Upper Lip to E-Plane (mm)	-7.3	-6	2	-0.7

Table 2: Final ABO analysis.

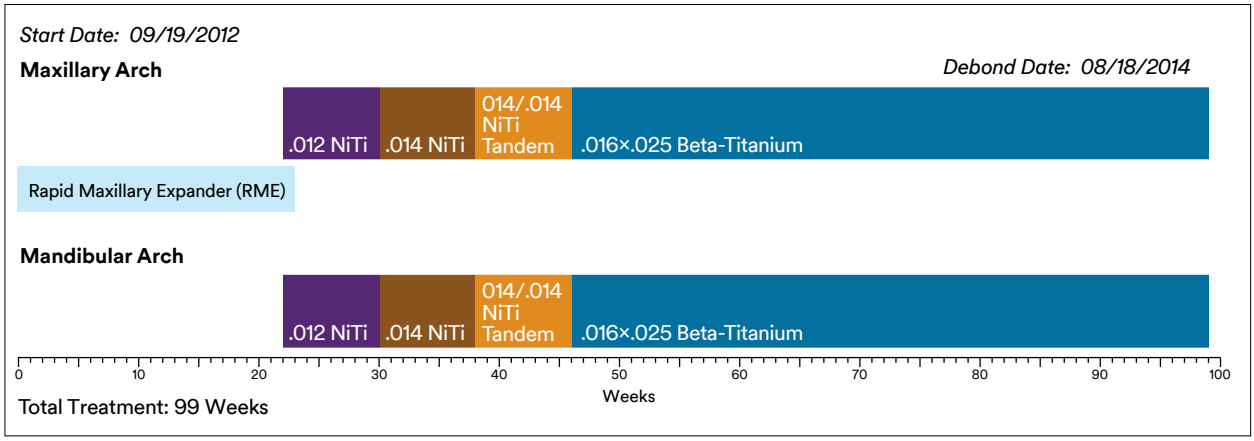


Figure 14: Treatment Timeline.

Case 10 – Class III Surgery

Patient
Male: age 32 years, 3 months

Diagnosis
Class III Malocclusion

- Facial Pattern: Dolicofacial
- Anterior edge-to-edge bite
- Mandibular prognathism

Treatment Timeframe

Treatment Start:	8/15/2007
Treatment End:	12/10/2008
Treatment Time:	16 months

Treatment Plan
- SmartClip™ Self-Ligating Appliance (.022 slot)
- Leveling and aligning
- Dental decompensation for orthognathic surgery
- Finishing and detailing
- Hawley retainer on the upper arch
- 3×3 retainer on the lower arch

Maxillary Arch
- .016 SE NiTi – 8 weeks
- .018 SE NiTi – 8 weeks
- .017×.025 SE NiTi – 4 weeks
- .019×.025 SE NiTi – 8 weeks
- .019×.025 SS – 28 weeks
- .019×.025 Braided – 8 weeks

Mandibular Arch
- .016 SE NiTi – 8 weeks
- .018 SE NiTi – 8 weeks
- .017×.025 SE NiTi – 4 weeks
- .019×.025 SE NiTi – 8 weeks
- .019×.025 SS – 28 weeks
- .019×.025 Braided – 8 weeks

Initial

Initial ABO Analysis		
	Normal Clinical	Initial
SNA	82°	72°
SNB	80°	74°
ANB	2°	-2°
WITS	0 mm	-7 mm
MM	28°	32°
1.PLMX	110°	115°
1.APO	4 mm	6 mm
1.PLMD	96°	82°
1.APO	4 mm	6 mm
AFAI		85 mm

Table 1: Initial ABO analysis.

Figure 1: Initial.

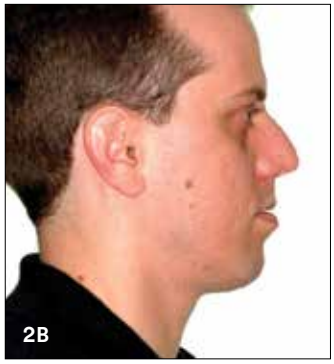


Figure 2A-B: Initial facial photographs.

Figure 3: Initial cephalometric X-ray.

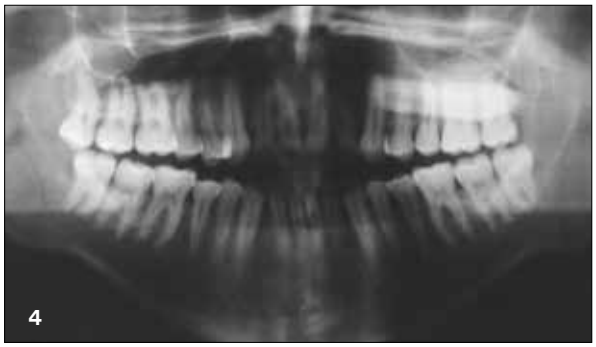


Figure 4: Initial panoramic X-ray.

Figure 5A-E: Initial study models.

Treatment Start - 8/15/2007

Figure 6A-E: Initial stage of treatment – SmartClip™ Self-Ligating Appliance, Mx/Md .014 NiTi.

1/2/2008

Figure 7A-C: Presurgical state of treatment, Mx/Md .019×.025 SE NiTi.

3/1/2008

Figure 8A-E: Postsurgical stage of treatment - space closure, Mx/Md .019×.025 Stainless Steel.

Final – 12/10/2008

Figure 9A-E: Final intraoral photographs.

Figure 10: Final cephalometric X-ray.

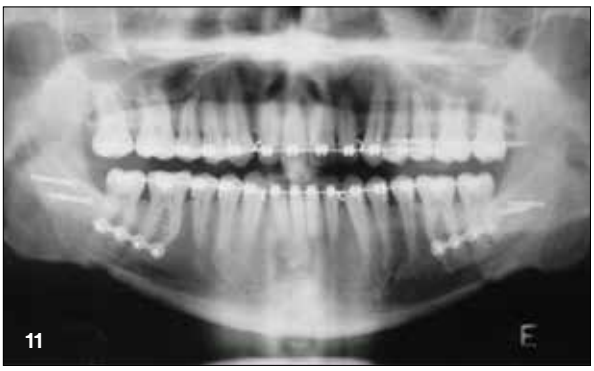


Figure 11: Final panoramic X-ray.

Figure 12A-B: Final facial photographs.

Final ABO Analysis			
	Normal Clinical	**Initial**	**Final**
SNA	82°	72°	72°
SNB	80°	74°	70°
ANB	2°	-2°	2°
WITS	0 mm	-7 mm	3 mm
MM	28°	32°	28°
1.PLMX	110°	115°	122°
1.APO	4 mm	6 mm	7 mm
1.PLMD	96°	82°	94°
1.APO	4 mm	6 mm	3 mm
AFAI		85 mm	78 mm

Table 2: Final ABO analysis.

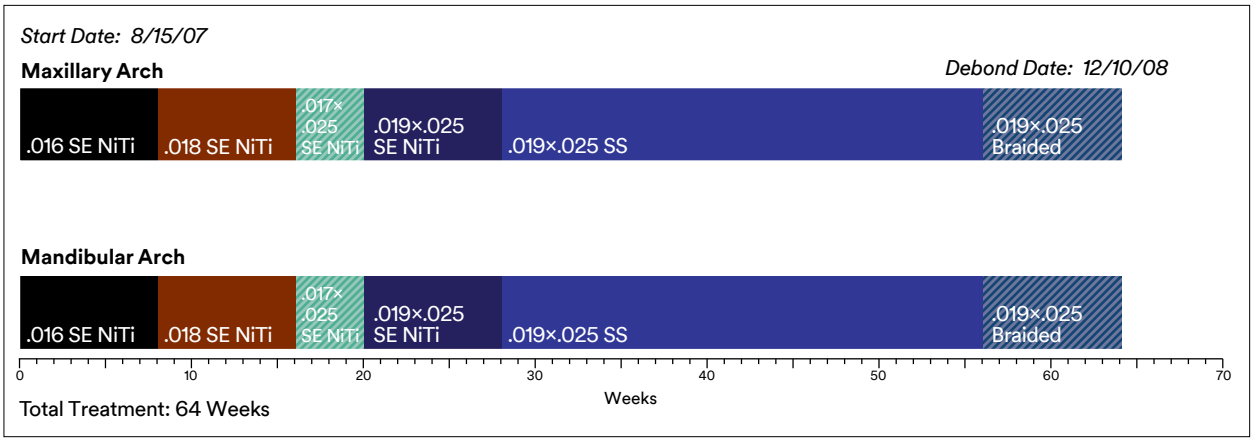


Figure 13: Treatment Timeline.

Case 11 – Class III Anterior Crossbite

Patient
Male: 39 years, 5 months

Treatment Timeframe

Treatment Start:	12/08/2011
Treatment End:	04/25/2013
Treatment Time:	17 months

Diagnosis
- Class III dental pattern
- Class III skeletal pattern
- Minor maxillary and mandibular arch length deficiencies
- Anterior crossbite, with secondary incisal wear on the maxillary and mandibular incisors
- Significant root resorption on teeth #7, 8 and 9, exacerbated by an apicoectomy on tooth #8

Treatment Plan
- SmartClip™ Self-Ligating Appliance System (.018 slot)
- High Torque brackets in the maxillary arch; Low Torque brackets on the mandibular arch
- Class III elastics
- Monitor root resorption maxillary anterior segment

Maxillary Arch
- .014 NiTi – 7 weeks
- .014/.014 NiTi Tandem – 7 weeks
- .014/.014 NiTi Tandem – 5 weeks
- .016×.025 Beta-Titanium – 11 months
- .016×.025 Beta-Titanium Segment – 42 weeks

Mandibular Arch
- .012 NiTi – 7 weeks
- .012/.016 NiTi Tandem – 7 weeks
- .014/.014 NiTi Tandem – 5 weeks
- .016×.025 Beta-Titanium – 11 months
- .016×.025 Beta-Titanium – 42 weeks

Initial

Initial ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	88.4	82	3.5	1.8
Mandible to Cranial Base				
SNB (°)	90.4	80.9	3.4	2.8
SN – MP (°)	18.7	32.9	5.2	-2.7
FMA (MP-FH) (°)	17.8	22.9	4.5	-1.1
Maxillo-Mandibular				
ANB (°)	-1.9	1.6	1.5	-2.4
Maxillary Dentition				
U1 – NA (mm)	2.8	4.3	2.7	-0.5
U1 – SN (°)	113.8	103.1	5.5	1.9
Mandibular Dentition				
L1 – NB (mm)	1.2	4	1.8	-1.6
L1 – MP (°)	79.7	95	7	-2.2
Soft Tissue				
Lower Lip to E-Plane (mm)	-7.1	-2	2	-2.6
Upper Lip to E-Plane (mm)	-10.4	-8	2	-1.2

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

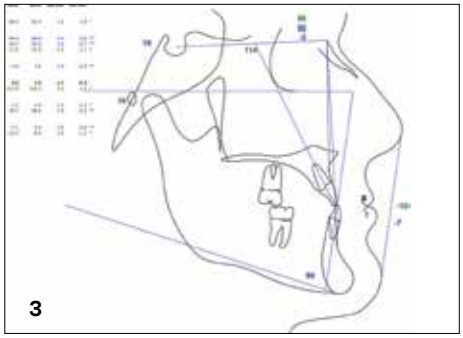


Figure 3: Initial lateral tracing.

Treatment Start - 12/8/2011

Figure 4A-H: Initial intraoral photographs.

1/25/2012

Figure 5A-E: Mx .014/.014 NiTi Tandem, Md .012/.016 NiTi Tandem.

Clinical Tip

The Class III short pull elastics can be started while the patient is in tandem archwires.

12/17/2012

Figure 6A-E: Mx/Md .016×.025 Beta-Titanium. The Class III short pull elastics can continue when the patient is in the Beta-Titanium finishing archwires.

Final – 04/25/2013

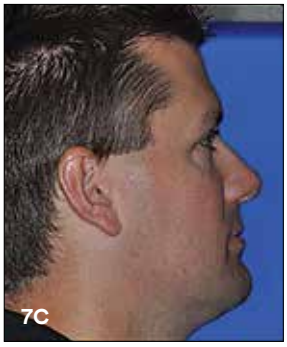


Figure 7A-H: Final facial and intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

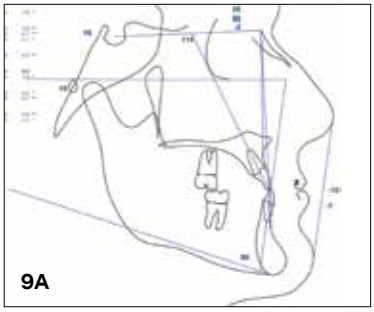


Figure 9A: Initial lateral tracing.

Figure 9B: Final lateral tracing.

Figure 10A: Initial facial profile.

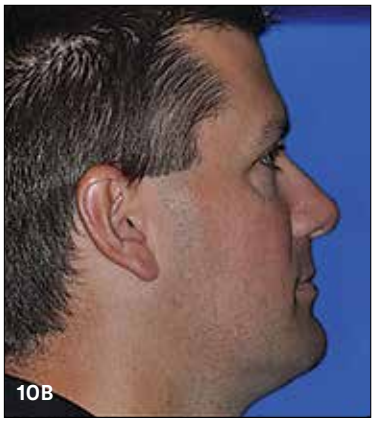


Figure 10B: Final facial profile.

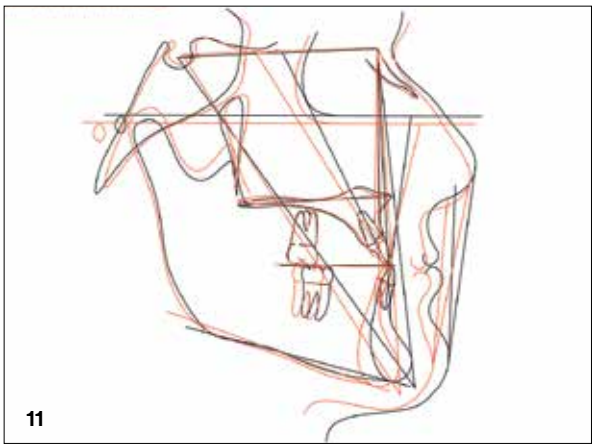


Figure 11: Superimpositions: Black initial, Red final.

Final ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	87.1	82	3.5	1.5
Mandible to Cranial Base				
SNB (°)	88.5	80.9	3.4	2.2
SN – MP (°)	21.3	32.9	5.2	-2.2
FMA (MP-FH) (°)	21.8	22.9	4.5	-0.2
Maxillo-Mandibular				
ANB (°)	-1.4	1.6	1.5	-2.0
Maxillary Dentition				
U1 – NA (mm)	7	4.3	2.7	1.0
U1 – SN (°)	120	103.1	5.5	3.1
Mandibular Dentition				
L1 – NB (mm)	2.8	4	1.8	-0.6
L1 – MP (°)	81.5	95	7	-1.9
Soft Tissue				
Lower Lip to E-Plane (mm)	-7.8	-2	2	-2.9
Upper Lip to E-Plane (mm)	-11.2	-8	2	-1.6

Table 2: Final ABO analysis.

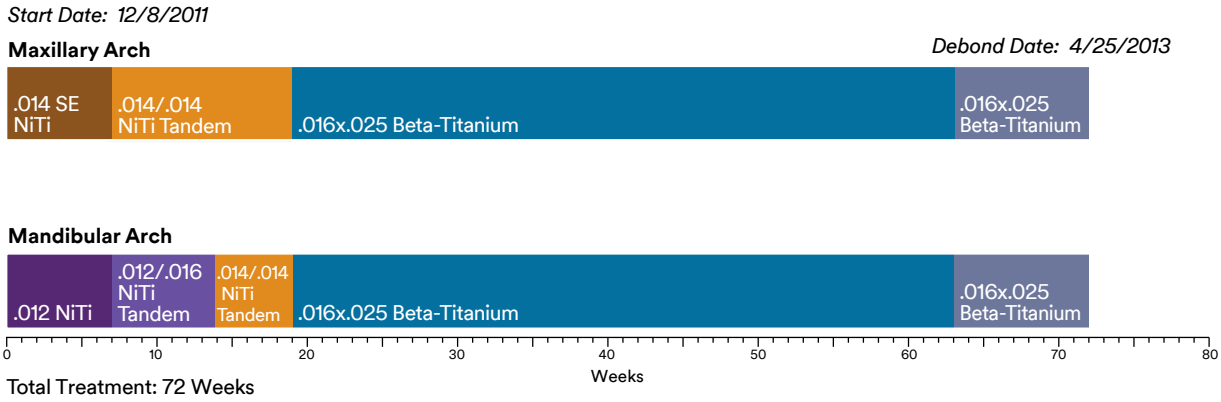


Figure 12: Treatment Timeline.

Case 12 – Upper and Lower Bicuspid Extraction

Patient
Female: age 14 years, 6 months

Diagnosis
- Class I malocclusion
- Bi-protrusion
- Moderate open bite

Treatment Timeframe

Treatment Start:	02/13/2010
Aligning and Leveling:	4 months
Space Close:	14 months
Finishing and Detailing	2 months
Treatment End:	10/21/2011
Treatment Time:	20 months, 1 week

Treatment Plan
- Clarity™ SL Self-Ligating Brackets (.022 slot), MBT™ Appliance System
- Extraction of upper and lower 1st bicuspids after leveling
- Sliding biomechanics

Maxillary Arch
- .014 SE NiTi – 5 weeks
- .014/.016 SE NiTi Tandem – 6 weeks
- .019×.025 NiTi Classic – 8 weeks
- .019×.025 SS Archwire – 64 weeks
- .019×.025 Braided Archwire – 7 weeks

Mandibular Arch
- .014 SE NiTi – 5 weeks
- .014/.016 SE NiTi Tandem – 6 weeks
- .019×.025 NiTi Classic – 8 weeks
- .019×.025 SS Archwire – 64 weeks
- .019×.025 Braided Archwire – 7 weeks

Initial

Initial/Final ASE Analysis		
Value	**Initial**	**Final**
SNA ∠	81°	81°
SNB ∠	78°	78°
ANB ∠	3°	3°
A-N ⊥FH	-2 mm	0 mm
Po-N ⊥FH	-4 mm	-5 mm
Wits	-4 mm	-2 mm
GoGn SN ∠	36°	36°
FH Mx ∠	1°	1°
FH Md ∠	30°	29°
U1 to A-Po	10 mm	5 mm
L1 to A-Po	9 mm	3 mm
U1 to Mx plane ∠	124°	119°
L1 to Md plane ∠	103°	89°
Facial Analysis		
Nasolabial	106°	119°
NA ⊥nose	33 mm	32 mm
Lip thickness	10 mm	11 mm

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric radiograph.

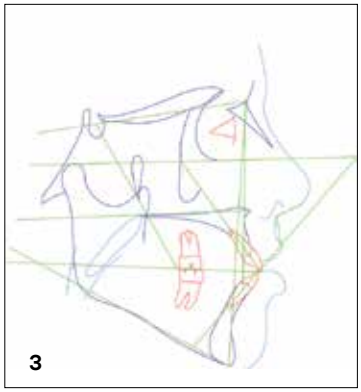


Figure 3: Initial lateral tracing.

Treatment Start – 2/13/2010

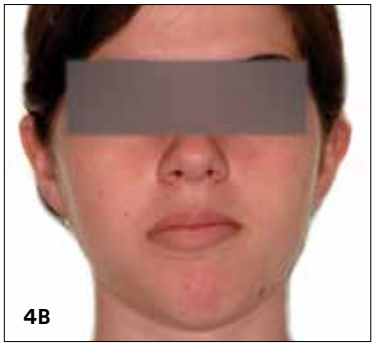


Figure 4A-G: Initial intraoral photographs.

3/20/2010

Figure 5A-C: Aligning with .014 and .016 SE NiTi Tandem.

5/1/2010

Figure 6A-C: Leveling with rectangular .019×.025 NiTi Classic.

6/26/2010

Figure 7A-C: Starting space closure with rectangular .019×.015 Stainless Steel

Clinical Tip

Front and side views showing rectangular .019×.025 steel archwires in place with hooks welded to the mesial of canines at the beginning of the space closure phase after extraction of the first upper and lower premolars.

9/17/2011

Figure 8A-C: After space closure with rectangular .019×.025 Stainless Steel.

Final – 10/21/2011

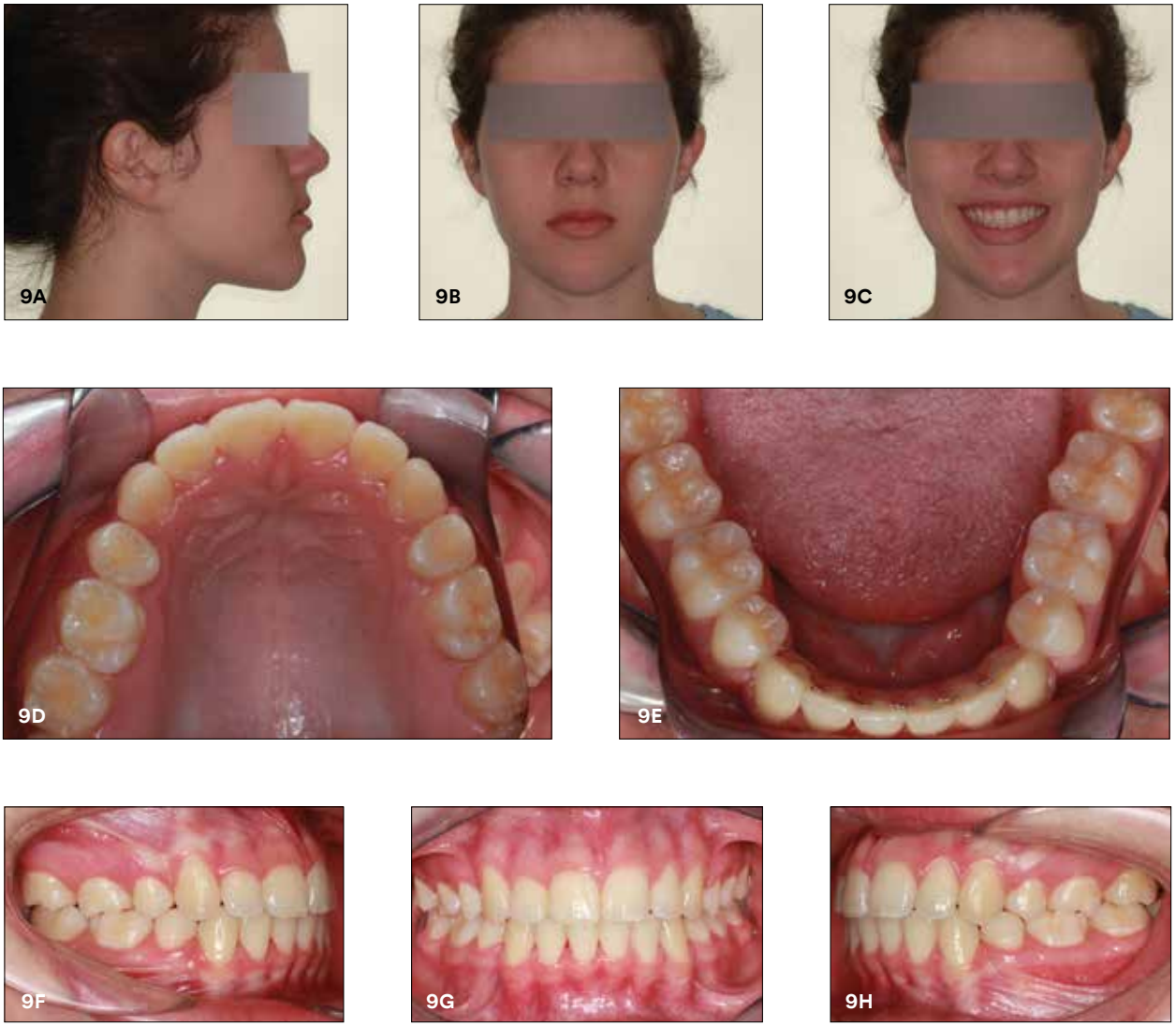


Figure 9A-H: Final intraoral photographs.

Figure 10A: Initial cephalometric radiograph.

Figure 10B: Final cephalometric radiograph.

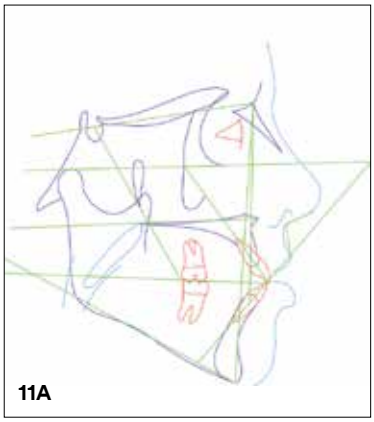


Figure 11A: Initial lateral tracing.

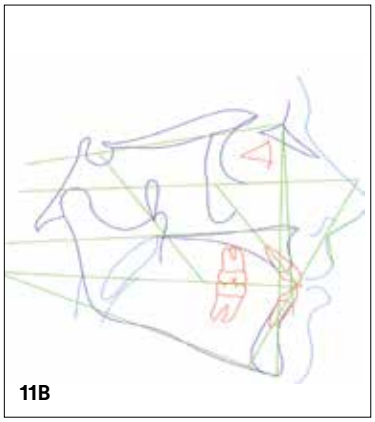


Figure 11B: Final lateral tracing.

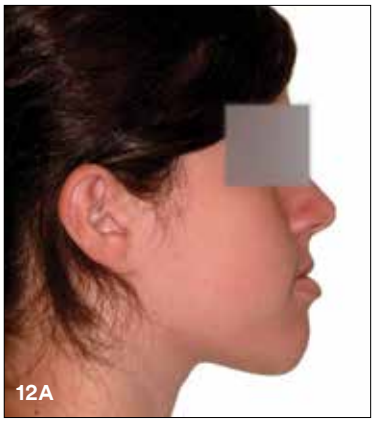


Figure 12A: Initial facial profile.

Figure 12B: Final facial profile.

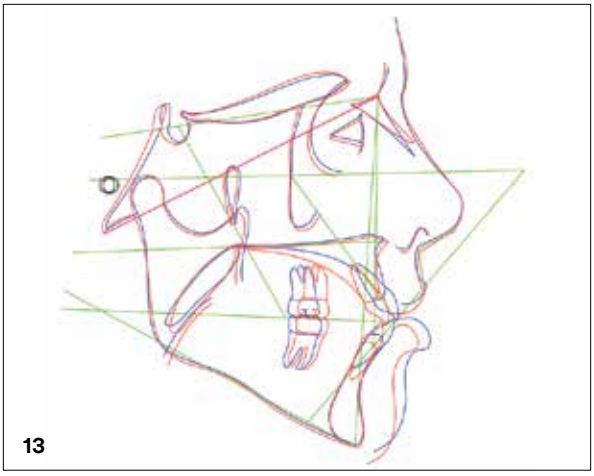


Figure 13: Superimposition.

Initial/Final ASE Analysis		
Value	**Initial**	**Final**
SNA ∠	81°	81°
SNB ∠	78°	78°
ANB ∠	3°	3°
A-N ⊥FH	-2 mm	0 mm
Po-N ⊥FH	-4 mm	-5 mm
Wits	-4 mm	-2 mm
GoGn SN ∠	36°	36°
FH Mx ∠	1°	1°
FH Md ∠	30°	29°
U1 to A-Po	10 mm	5 mm
L1 to A-Po	9 mm	3 mm
U1 to Mx plane ∠	124°	119°
L1 to Md plane ∠	103°	89°
Facial Analysis		
Nasolabial	106°	119°
NA ⊥nose	33 mm	32 mm
Lip thickness	10 mm	11 mm

Table 2: Final ABO analysis.

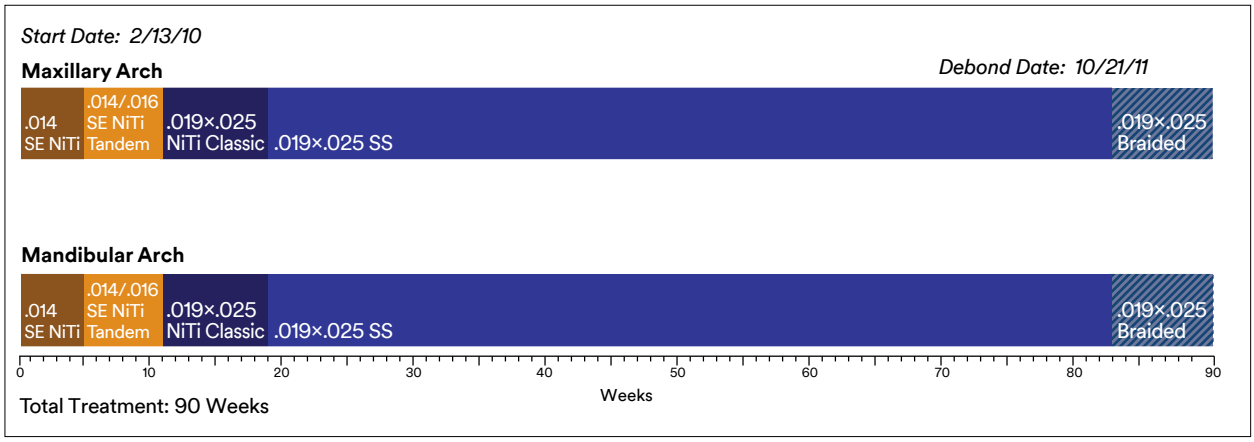


Figure 14: Treatment Timeline.

Case 13 – Class III Skeletal Asymmetry (First Bicuspid Extraction)

Patient
Male: age 23 years, 7 months

Diagnosis
Class III (moderate on the left side, severe on the right side)

- Posterior crossbite
- Anterior crossbite of the central incisors
- Anterior open bite
- Lower midline deviation 5 mm to the left
- Upper and lower crowding
- Mesial inclination-retention of the lower right second molar

Treatment Timeframe

Treatment Start:	04/10/2010
Hyrax Placement:	05/14/2010
Hyrax Removal:	04/07/2011
Treatment End:	10/15/2012
Treatment Time:	30 months

Treatment Plan
- SmartClip™ Self-Ligating Brackets (.022 slot). High Torque Maxillary incisors. Low torque lower posterior teeth. Full Smile System.
- Rapid Maxillary Expansion
- Full banding and bonding
- Extraction of the lower right first bicuspid
- Lower space closure
- Short Class III and vertical elastics if needed

Maxillary Arch
- Hyrax. Activation 3 times/week for 12 weeks. Retention 6 months
- .016 NiTi – 12 weeks
- Composite build-ups of the upper central incisors
- .018 NiTi – 12 weeks
- .017×.025 NiTi – 28 weeks
- .019×.025 SS – 32 weeks
- .016 SS – 8 weeks (finishing bends)

Mandibular Arch
- .014 NiTi – 12 weeks
- Brass separator between 46 and 47
- .016 NiTi – 12 weeks
- .017×.025 NiTi – 25 weeks
- .019×.025 SS – 24 weeks (space closure)
- .017×.025 Braided archwire – 8 weeks (short elastics for setting)
- .016 SS – 8 weeks (finishing bends)

Initial

Initial ASE Analysis				
Value		**Mean**	**Day**	**Initial**
Sagittal Relations				
Maxillary Position	SNA (°)	82	3.5	77
Mandibular Position	SNPg (°)	80	3.5	81
Sagittal Jaw Relationship	ANPg (°)	2	2.5	-4
Vertical Relation				
Maxillary Inclination	SN/ANS-PNS (°)	8	3.0	5
Mandibular Inclination	SN/GoGn (°)	33	2.5	33
	ANS/PNS/GoGn (°)	25	6.0	28
Dentobasal Relations				
Max. Inc. Inclination	Upper 1/ANS-PNS (°)	110	6.0	100
Mand. Inc. Inclination	Lower 1/GoGn (°)	94	7.0	85
Man. Inc. Compensation	Lower 1/A-Pg (mm)	2	2.0	4

Table 1: Initial ASE analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

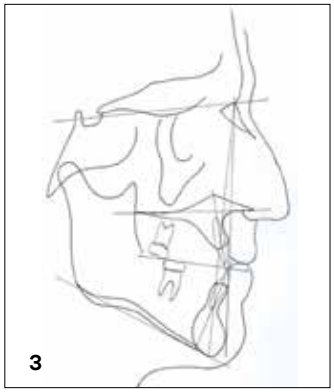
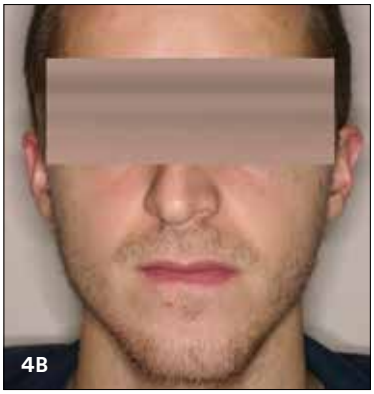


Figure 3: Initial lateral tracing.

Treatment Start – 4/10/2010



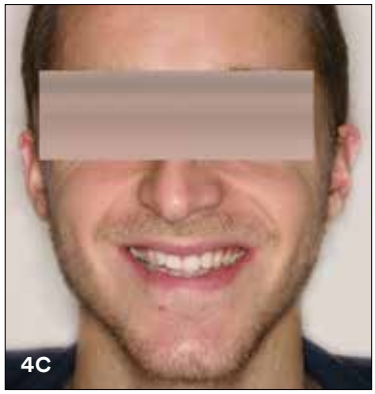


Figure 4A-H: Initial intraoral photographs.

5/14/2010

Figure 5A-E: Hyrax placed. End or RPE. Mx/Md .016 NiTi.

10/1/2010

Figure 6A-C: Mx .018 NiTi, Md .017×.025 NiTi.

7/2/2011

Figure 7A-C: Mx .017×.025 NiTi, Md .019×.025 SS.

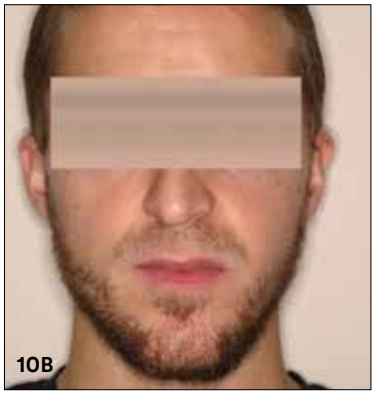
2/15/2012

Figure 8A-C: Mx .019×.025 SS, Md .017×.025 Braided.

8/20/2012

Figure 9A-C: Mx .016 SS with final bends, Md .017×.025 Braided; Vertical elastics.

Final – 10/15/2012



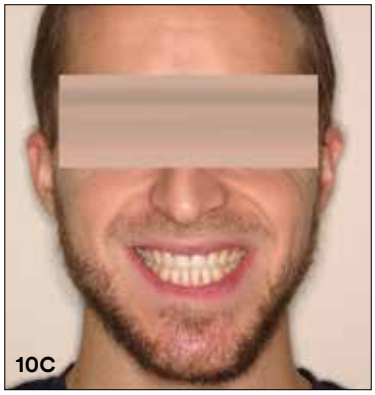


Figure 10A-H: Final intraoral photographs.

Figure 11A: Initial cephalometric X-ray.

Figure 11B: Final cephalometric X-ray.

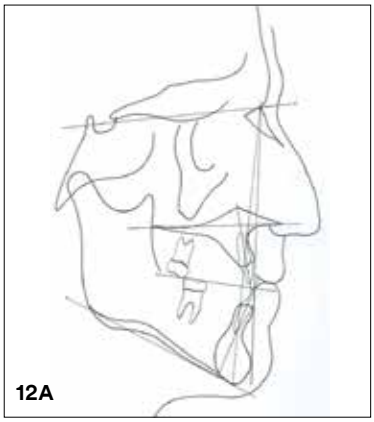


Figure 12A: Initial lateral tracing.

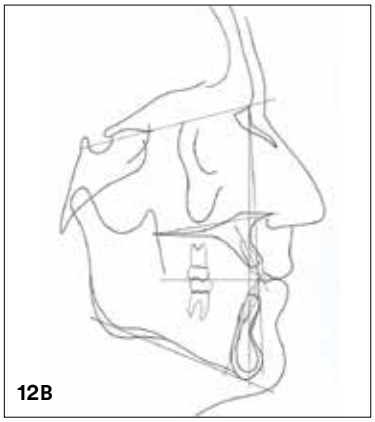


Figure 12B: Final lateral tracing.

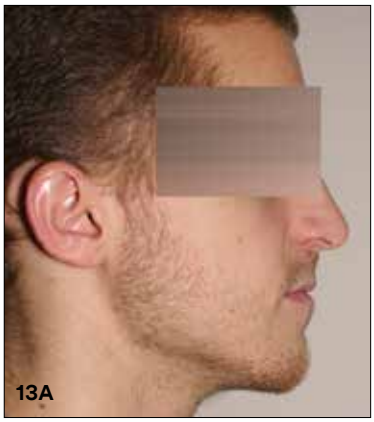


Figure 13A: Initial facial profile.

Figure 13B: Final facial profile.

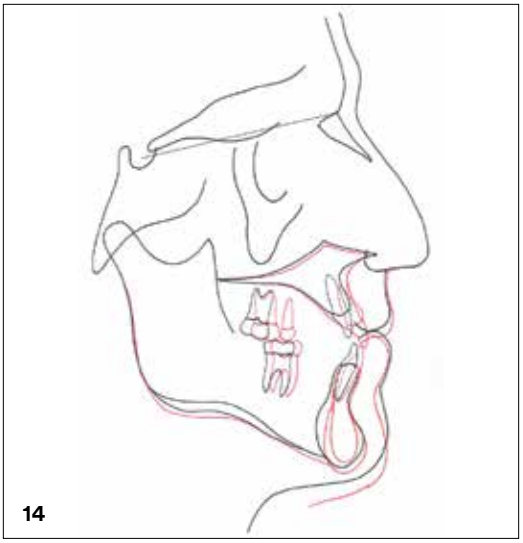


Figure 14: Superimpositions. Black initial. Red final.

Final ASE Analysis					
Value		**Mean**	**Day**	**Initial**	**Final**
Sagittal Relations					
Maxillary Position	SNA (°)	82	3.5	77	78
Mandibular Position	SNPg (°)	80	3.5	81	81
Sagittal Jaw Relationship	ANPg (°)	2	2.5	-4	-3
Vertical Relation					
Maxillary Inclination	SN/ANS-PNS (°)	8	3.0	5	5
Mandibular Inclination	SN/GoGn (°)	33	2.5	33	35
	ANS/PNS/GoGn (°)	25	6.0	28	30
Dentobasal Relations					
Max. Inc. Inclination	Upper 1/ANS-PNS (°)	110	6.0	100	112
Mand. Inc. Inclination	Lower 1/GoGn (°)	94	7.0	85	90
Man. Inc. Compensation	Lower 1/A-Pg (mm)	2	2.0	4	4

Table 2: Final ASE analysis.

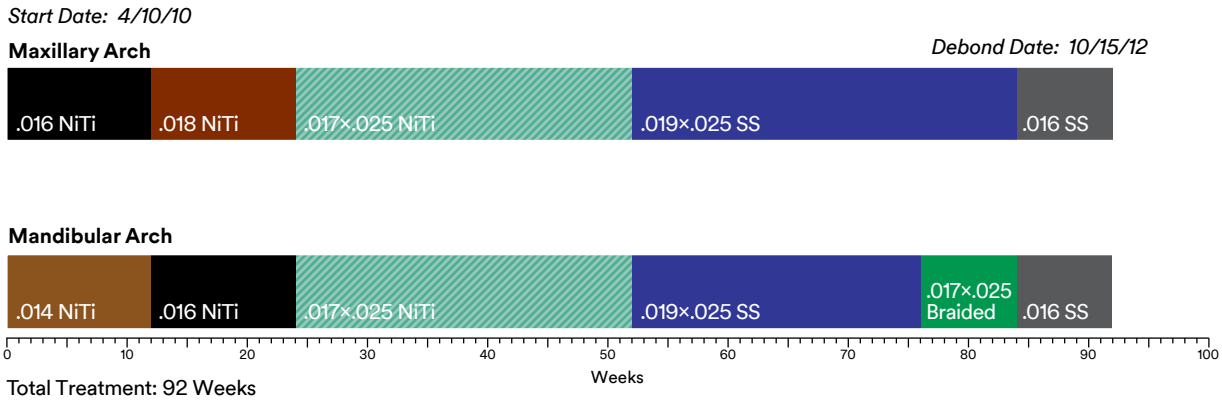


Figure 15: Treatment Timeline.

Case 14 – Class III with Second Molar Extraction

Patient
Female: age 15 years, 8 months

Diagnosis
Class III Malocclusion

- Upper anterior crowding
- Upper Midline shifted to the left
- Anterior crossbite
- Bilateral posterior crossbite

Treatment Timeframe

Treatment Start:	2/27/2007
Lip Bumper Placed:	3/27/2007
Lip Bumper Removed:	11/20/2007
Lip Bumper Duration:	8 months
Treatment End:	11/18/2008
Treatment Time:	18 months

Treatment Plan
- Extraction of maxilliary and mandibular 2nd molars
- Lip plate for mandibular anterior
- Lingual button to uncross the bite
- SmartClip™ MBT™ Appliance System Rx (.022 slot)
- Class III Intermaxilary Elastics
- Hawley retainer on the upper arch
- 3×3 lower retainer

Maxillary Arch
- .014 SE NiTi – 8 weeks
- .016 SE NiTi – 12 weeks
- .017×.025 SE NiTi – 12 weeks
- .019×.025 SS – 32 weeks
- .019×.025 Braided – 8 weeks

Mandibular Arch
- .014 SE NiTi – 8 weeks
- .016 SE NiTi – 12 weeks
- .017×.025 SE NiTi – 12 weeks
- .019×.025 SS – 32 weeks
- .019×.025 Braided – 8 weeks

Initial

Initial ABO Analysis		
	Normal Clinical	Initial
SNA	82°	89°
SNB	80°	87°
ANB	2°	2°
WITS	0 mm	-5 mm
MM	28°	19°
1.PLMX	110°	120°
1.APO	4 mm	4 mm
1.PLMD	96°	91°
1.APO	4 mm	6 mm
AFAI		59 mm

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

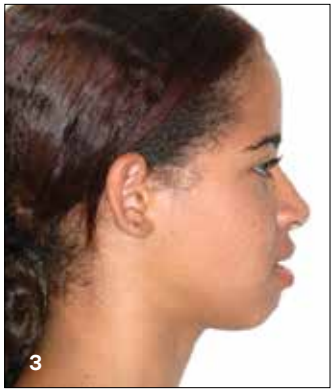


Figure 3: Initial profile.

Treatment Start – 2/27/2007

Figure 4A-C: Initial intraoral photographs.

Figure 5A-C: Initial study models.

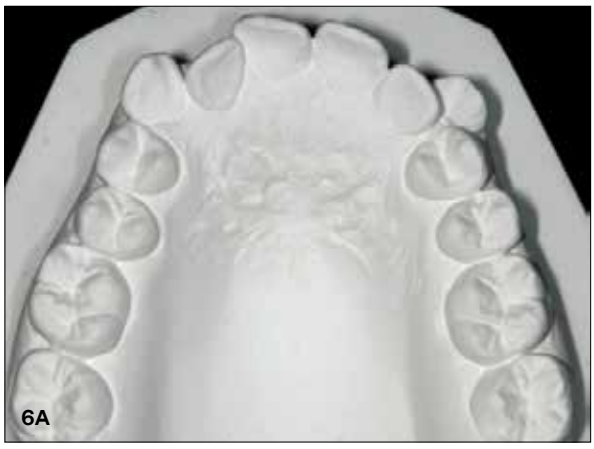


Figure 6A-B: Occlusal view – Initial study models.

Figure 7: Initial panoramic X-ray.

3/27/2007

Figure 8A-E: SmartClip™ Self-Ligating Appliance on the upper arch and lip bumper on the lower arch.

5/22/2007

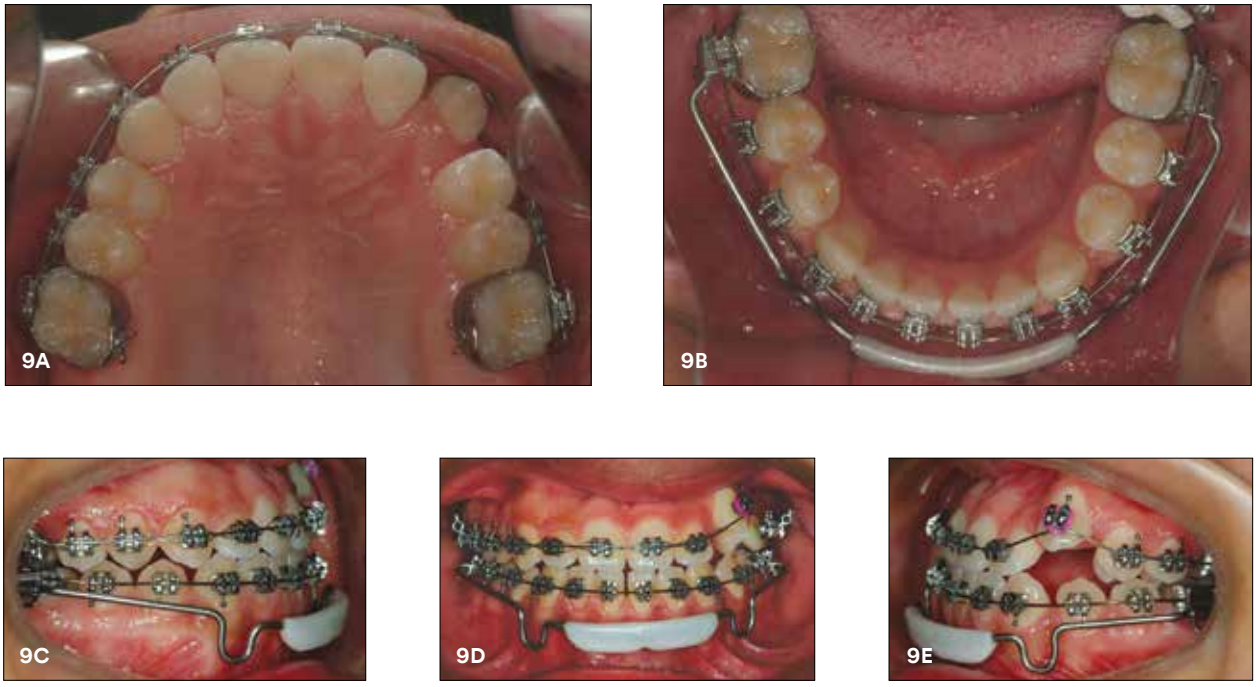


Figure 9A-E: Leveling and aligning stages, Mx .014 SE NiTi.

9/23/2008

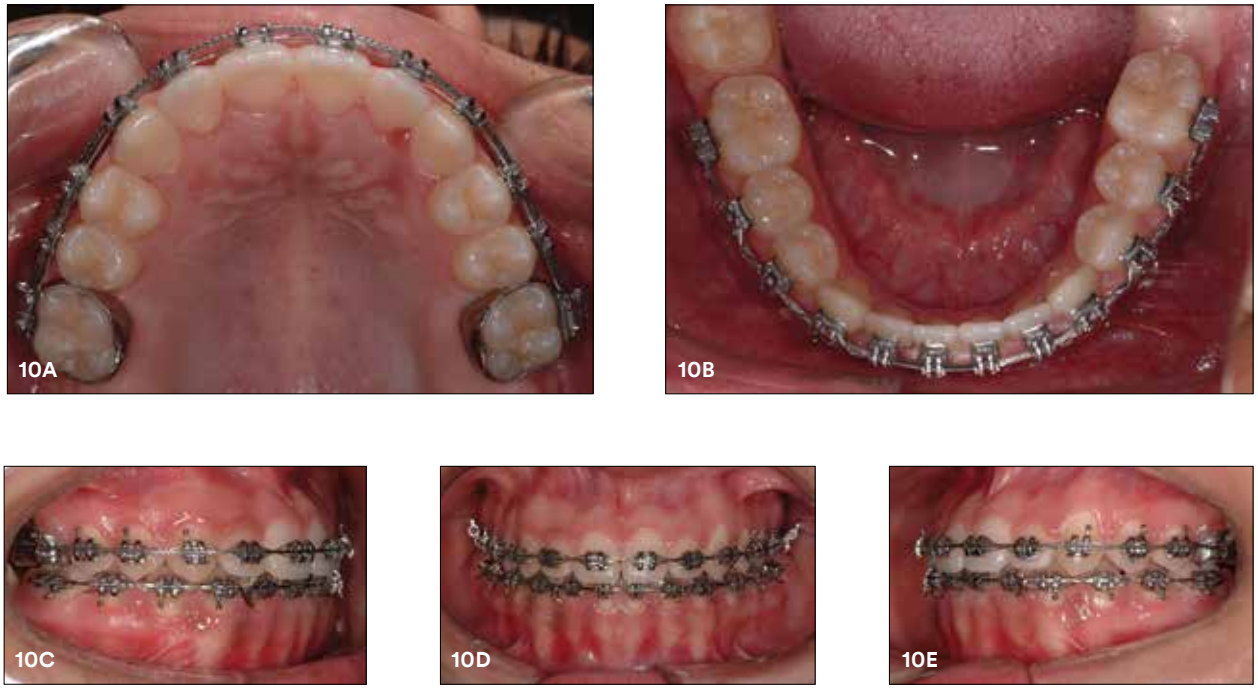


Figure 10A-E: Detailing and finishing stages. Mx/Md .019×.025 braided archwire.

Final – 11/18/2008

Figure 11A-E: Final intraoral photographs.

Figure 12A-B: Final facial photographs.

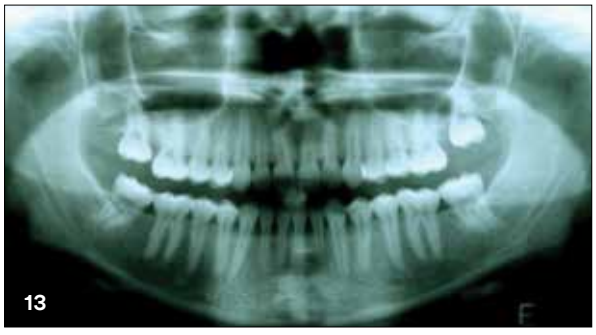


Figure 13: Final panoramic X-ray.

Figure 14: Final cephalometric X-ray.

Final ABO Analysis			
	Normal Clinical	**Initial**	**Final**
SNA	82°	89°	88°
SNB	80°	87°	86°
ANB	2°	2°	2°
WITS	0 mm	-5 mm	-2 mm
MM	28°	19°	20°
1.PLMX	110°	120°	126°
1.APO	4 mm	4 mm	5 mm
1.PLMD	96°	91°	85°
1.APO	4 mm	6 mm	2 mm
AFAI		59 mm	60 mm

Table 2: Final ABO analysis.

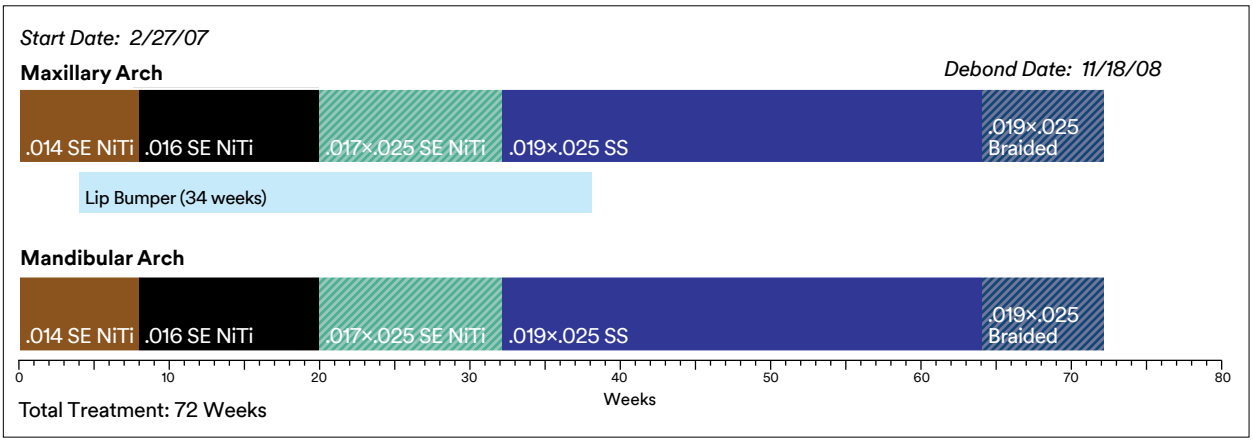


Figure 15: Treatment Timeline.

Case 15 – Class III Skeletal Asymmetry (First Molar Extraction)

Patient
Female: age 18 years, 6 months

Diagnosis
Class III malocclusion

- High facial lower third
- Dental Class III
- Skeletal Class III
- Anterior open bite
- Lower midline deviation 2 mm to the right
- Upper and lower crowding
- First molars restored

Treatment Timeframe

Treatment Start:	10/1/2008
Treatment End:	12/1/2010
Treatment Time:	26 months

Treatment Plan
- SmartClip™ Self-Ligating Brackets (.018 slot). High Torque Maxillary incisors. Low torque lower posterior teeth. Full Smile System.
- Full banding and bonding
- Extraction of the first molars
- Space closure
- Short Class III and vertical elastics if needed
- Lower third molars uprighting
- Finishing and upper incisors rebuilded

Maxillary Arch
- .012 NiTi – 12 weeks
- .016 NiTi – 12 weeks
- .016×.022 NiTi – 24 weeks
- .016×.022 SS – 40 weeks (space closure)
- .016 SS – 8 weeks (finishing bends)

Mandibular Arch
- .012 NiTi – 12 weeks
- .016 NiTi – 12 weeks
- .016×.022 NiTi – 25 weeks
- .016×.022 SS – 40 weeks (space closure and sectional uprighting)
- .016 SS – 8 weeks (finishing bends)

Initial

FADO Analysis					
Variable	9 Years	18 Years	Deviation	Patient	Interpretation
sna	78°	76°	3°	85°	protruded
sng	76°	75°	3°	82°	protruded
ang	5°	1°	3°	3°	class I
eje facial	67°	67°	4°	72°	dolico
pmand	35°	33°	5°	39°	dolico
agon	128°	125°	5°	134°	dolico
pmax	7°	7°	3°	5°	normal
max/mand	28°	25°	5°	37°	dolico
1	120°	120°	3°	120°	normal
-1	93°	93°	5°	87°	retruded
-1	127°	127°	5°	120°	opened

Table 1: Initial FADO analysis.

Figure 1A-B: Initial.

Figure 2: Initial cephalometric X-ray.

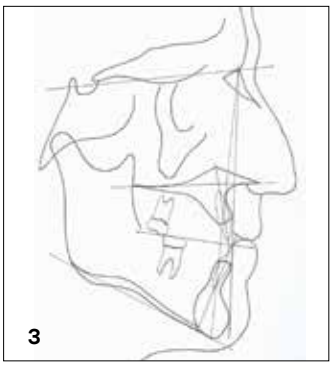


Figure 3: Initial lateral tracing.

Figure 4: Initial panoramic X-ray.

Figure 5: Initial right condyle concentric, left condyle distalized.

Treatment Start - 10/1/2008

Figure 6A-E: Initial study models and intraoral photographs.

9/5/2009

Figure 7A-C: Mx/md .016x.022 Stainless Steel.

6/23/2010

Figure 8A-B: Uprighting 3rd molars.

Clinical Tip

You can see an active device for uprighting the third molars after the closing of the first lower molar extraction spaces. It is easily engaged and stopped inmediately mesial to the clip.

Final – 12/1/2010

Figure 9A-E: Final intraoral photographs.

Final (continued)

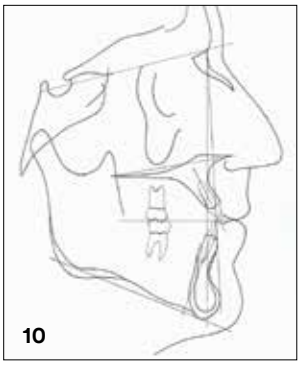


Figure 10: Final lateral tracing.

Figure 11: Final panoramic X-ray.

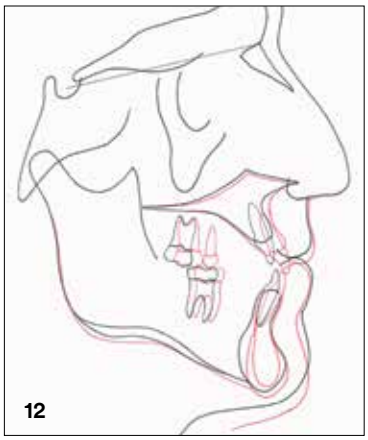


Figure 12: Superimpositions. Black initial. Red Final.

Final ASE Analysis					
Value		**Mean**	**Day**	**Initial**	**Final**
Sagittal Relations					
Maxillary Position	SNA (°)	82	3.5	77	78
Mandibular Position	SNPg (°)	80	3.5	81	81
Sagittal Jaw Relationship	ANPg (°)	2	2.5	-4	-3
Vertical Relation					
Maxillary Inclination	SN/ANS-PNS (°)	8	3.0	5	5
Mandibular Inclination	SN/GoGn (°)	33	2.5	33	35
	ANS/PNS/GoGn (°)	25	6.0	28	30
Dentobasal Relations					
Max. Inc. Inclination	Upper 1/ANS-PNS (°)	110	6.0	100	112
Mand. Inc. Inclination	Lower 1/GoGn (°)	94	7.0	85	90
Man. Inc. Compensation	Lower 1/A-Pg (mm)	2	2.0	4	4

Table 2: Final ASE analysis.

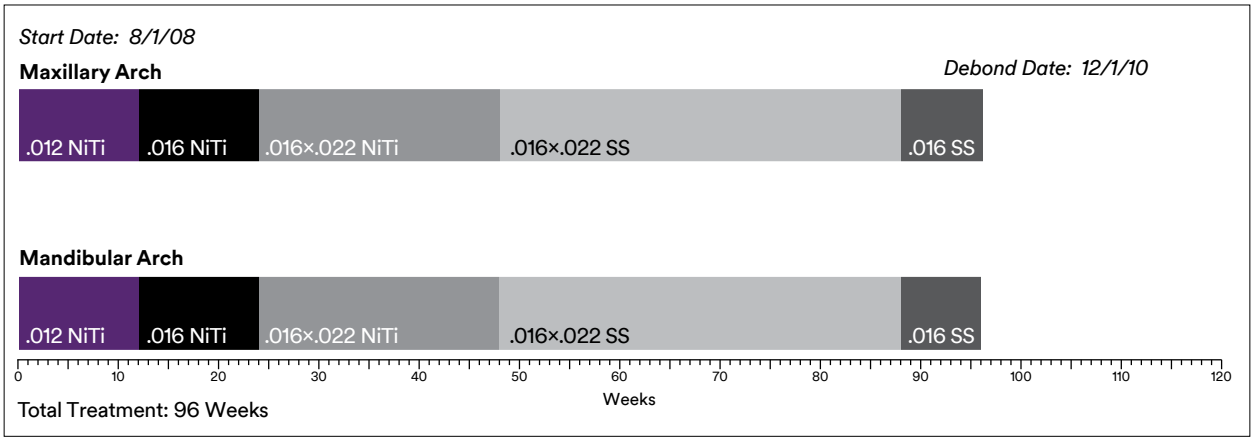


Figure 13: Treatment Timeline.

Case 16 – Major Arch Length Deficiency

Patient
Male: 15 years, 9 months

Treatment Timeframe

Treatment Start:	12/22/2008
Treatment End:	05/20/2010
Treatment Time:	18 months

Diagnosis
- Class I dental pattern
- Class I skeletal pattern
- Major maxillary arch length deficiency
- Major mandibular arch length deficiency
- Narrow gingival attachment in the mandibular anterior segment

Treatment Plan
- SmartClip™ Self-Ligating Brackets (.018 slot)
- High Torque maxillary and mandibular anterior segments
- Extract teeth #5, 12, 21 and 28 to resolve arch length deficiency
- Minimum anchorage to preserve lip profile

Maxillary Arch
- .014 NiTi – 9 weeks
- .014/.014 NiTi Tandem – 6 weeks
- .016×.025 Beta-Titanium – 31 weeks (Retraction)
- .016 SS – 14 weeks
- .016×.025 Beta-Titanium – 13 weeks

Mandibular Arch
- .014 NiTi – 9 weeks
- .014/.014 NiTi Tandem – 6 weeks
- .016×.025 Beta-Titanium – 31 weeks (Retraction)
- .016×.025 Beta-Titanium – 27 weeks

Initial

Initial ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	83.4	82	3.5	0.4
Mandible to Cranial Base				
SNB (°)	78.8	80.9	3.4	-0.6
SN – MP (°)	28.7	32.9	5.2	-0.8
FMA (MP-FH) (°)	22.4	24	4.5	-0.4
Maxillo-Mandibular				
ANB (°)	4.6	1.6	1.5	2.0
Maxillary Dentition				
U1 – NA (mm)	7.7	4.3	2.7	1.3
U1 – SN (°)	112.5	102.8	5.5	1.8
Mandibular Dentition				
L1 – NB (mm)	7.9	4	1.8	2.2
L1 – MP (°)	93	95	7	-0.3
Soft Tissue				
Lower Lip to E-Plane (mm)	-0.2	-2	2	0.9
Upper Lip to E-Plane (mm)	-2.3	-5.8	2	1.8

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

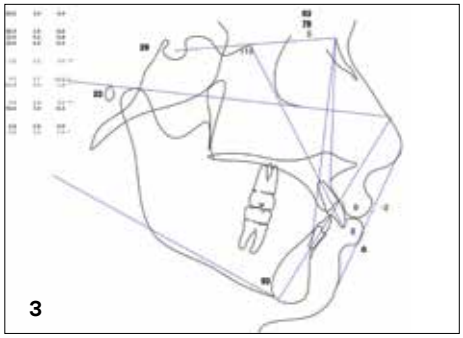


Figure 3: Initial lateral tracing.

Treatment Start – 12/22/2008

Figure 4A-H: Initial intraoral photographs.

03/24/2009

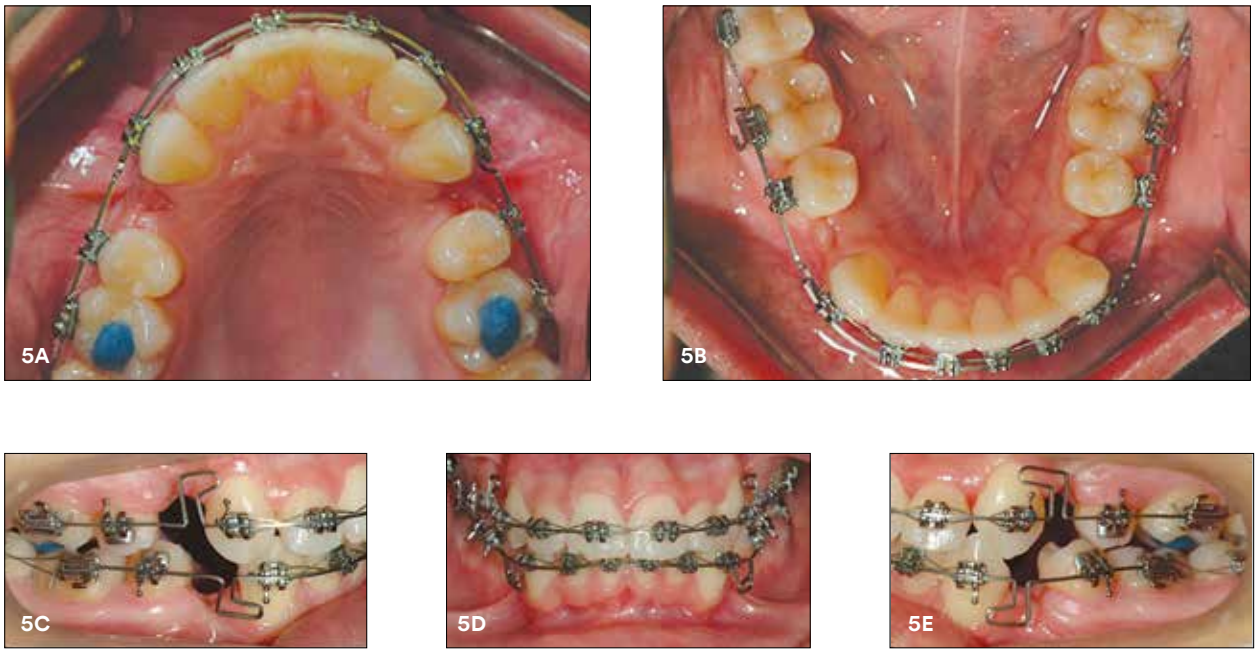


Figure 5A-E: .016×.025 Beta-Titanium Retraction.

07/26/2009

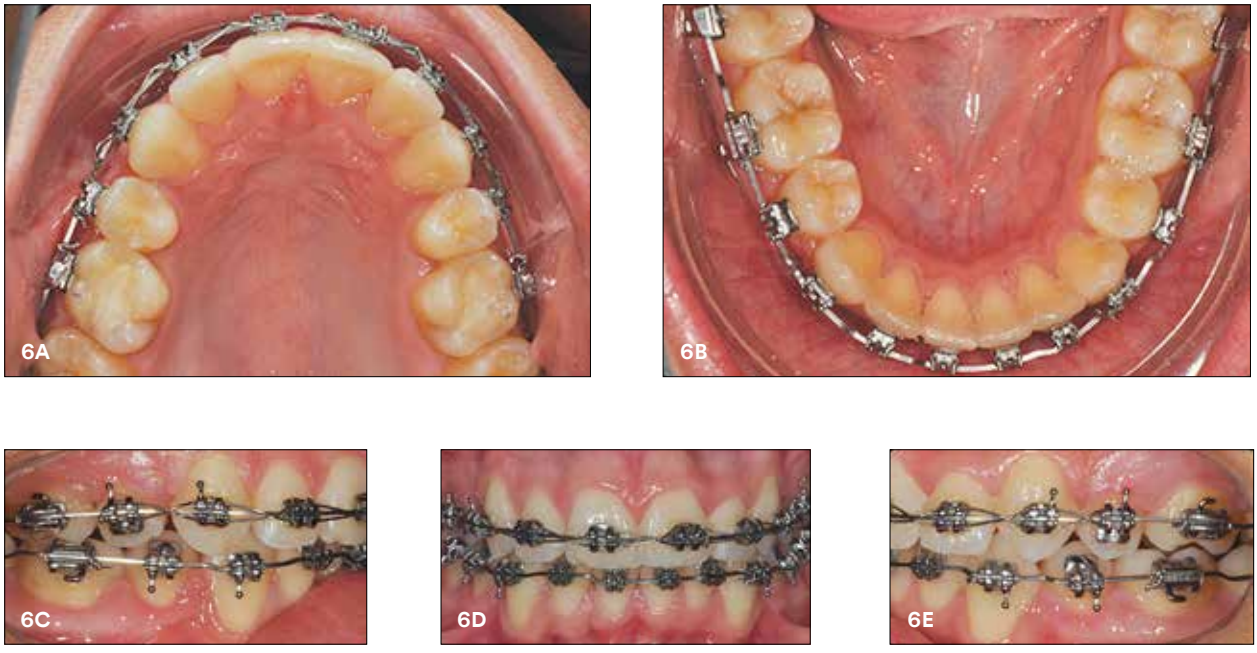
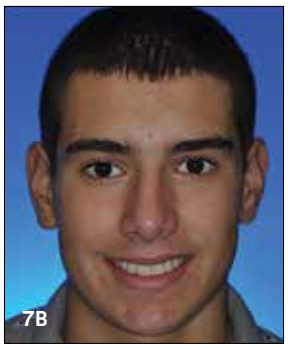


Figure 6A-E: .016×.025 Beta-Titanium.

Clinical Tip

These retraction loops must be active with 40° Alpha and Beta activation to permit control of the root angulations. The retraction arches are activated approximately 2 mm every 6-8 weeks.

Final – 05/20/2010



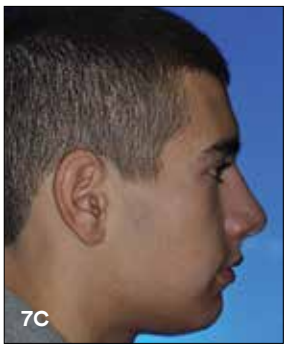


Figure 7A-H: Final facial and intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

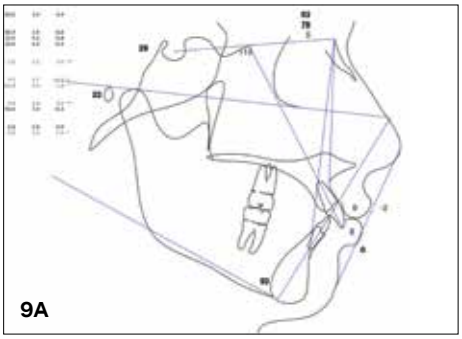


Figure 9A: Initial lateral tracing.

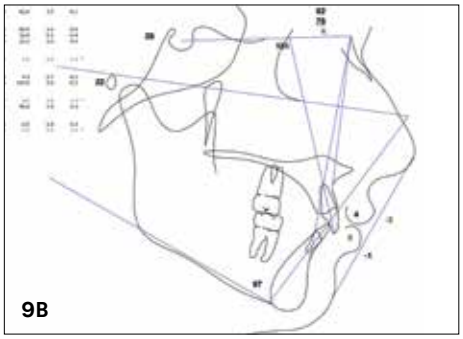


Figure 9B: Final lateral tracing.

Figure 10A: Initial facial profile.

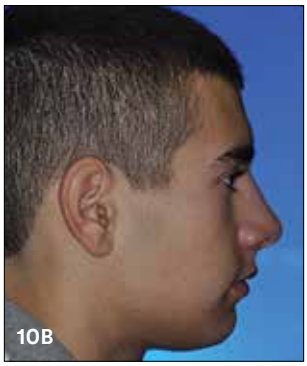


Figure 10B: Final facial profile.

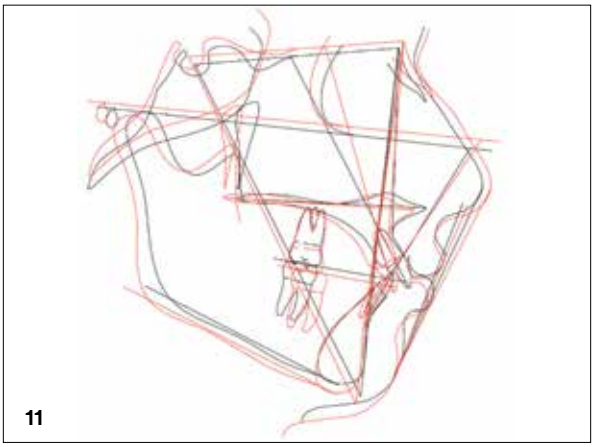


Figure 11: Superimpositions: Black initial, Red final.

Final ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	81.5	82	3.5	-0.1
Mandible to Cranial Base				
SNB (°)	78	80.9	3.4	-0.9
SN – MP (°)	28.4	32.9	5.2	-0.9
FMA (MP-FH) (°)	21.5	23.3	4.5	-0.4
Maxillo-Mandibular				
ANB (°)	3.5	1.6	1.5	1.3
Maxillary Dentition				
U1 – NA (mm)	3.9	4.3	2.7	-0.2
U1 – SN (°)	101.4	103	5.5	-0.3
Mandibular Dentition				
L1 – NB (mm)	6.3	4	1.8	1.3
L1 – MP (°)	97.1	95	7	0.3
Soft Tissue				
Lower Lip to E-Plane (mm)	-1.5	-2	2	0.3
Upper Lip to E-Plane (mm)	-3.4	-7.2	2	1.9

Table 2: Final ABO analysis.

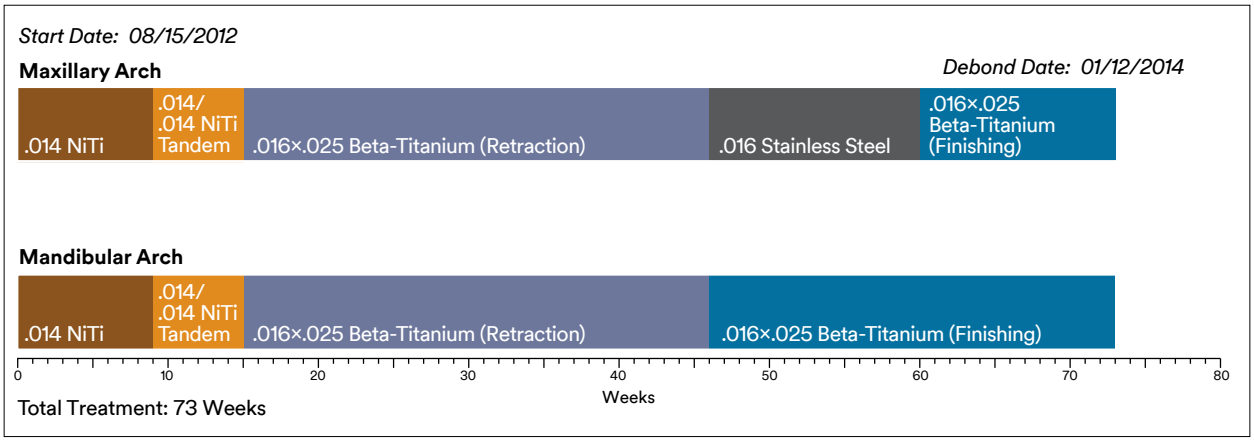


Figure 12: Treatment Timeline.

Case 17 – Anterior Crossbite

Patient
Male: age 19 years, 10 months

Diagnosis
Class I Malocclusion

- Moderate maxillary and mandibular crowding
- Partial anterior crossbite of UR2, UR1, UL1
- Mandibular midline to the right 2 mm

Treatment Timeframe

Treatment Start:	01/26/2011
Treatment End:	05/24/2012
Treatment Time:	16 months

Treatment Plan
- Clarity™ SL Self-Ligating Brackets (.022 slot) on maxillary arch, SmartClip™ Self-Ligating Brackets (.022 slot) on mandibular arch, VPO Appliance System Rx, High Torque Maxillary, Low Torque Mandibular incisors
- Class III elastics

Maxillary Arch
- .014 SE NiTi – 7 weeks
- .014/.016 SE NiTi Tandem – 14 weeks
- .019×.025 HA NiTi – 23 weeks
- .019×.025 Beta-Titanium – 25 weeks

Mandibular Arch
- .014 SE NiTi – 7 weeks
- .014/.016 SE NiTi Tandem – 14 weeks (Class III elastics started)
- .019×.025 HA NiTi – 8 weeks
- .016 SE NiTi – 8 weeks (Pan & Repo, elastics Stopped)
- .014/.016 SE NiTi Tandem – 7 weeks
- .019×.025 Beta-Titanium – 25 weeks (Settling elastics started last 3 weeks)

Initial

Initial ABO Analysis					
Maxilla to Cranial Base					
SNA (°)	86.5	82.0	3.5	1.3	*
Mandible to Cranial Base					
SNB (°)	88.7	80.9	3.4	2.3	**
SN – GoGn (°)	21.6	32.9	5.2	-2.2	**
FMA (MP-FH) (°)	18.1	22.9	4.5	-1.1	*
Maxillo-Mandibular					
ANB (°)	-2.2	1.6	1.5	-2.5	**
Maxillary Dentition					
U1 – NA (mm)	6.2	4.3	2.7	0.7	
U1 – SN (°)	120.5	103.1	5.5	3.2	***
Mandibular Dentition					
L1 – NB (mm)	4.4	4.0	1.8	0.2	
L1 – GoGn (°)	93.6	93.0	6.0	0.1	
Soft Tissue					
Lower Lip to E-Plane (mm)	-3.3	-2.0	2.0	-0.7	
Upper Lip to E-Plane (mm)	-8.4	-8.0	2.0	-0.2	

Table 1: Initial ABO analysis.

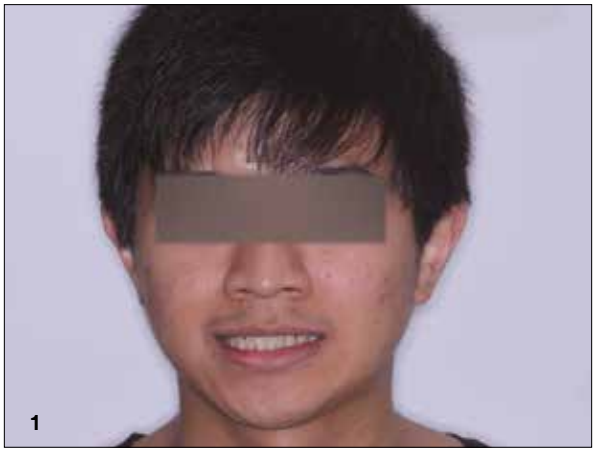


Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

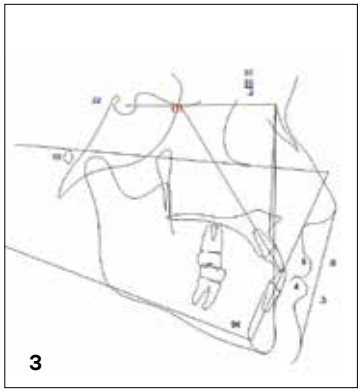
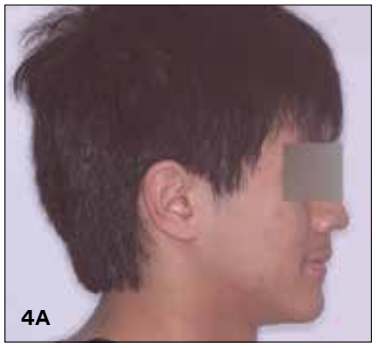
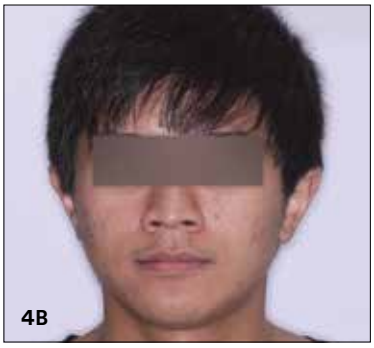


Figure 3: Initial lateral tracing.

Treatment Start – 1/26/2011





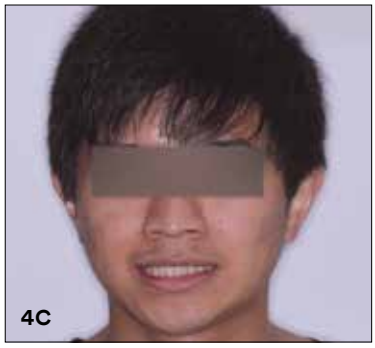


Figure 4A-H: Initial intraoral photographs.

6/7/2011

Figure 5A-E: .019×.025 HA NiTi.

8/4/2011

Figure 6A-E: Progress 2 Pan & Reposition, .019×.025 HA NiTi.

Clinical Tip

High Torque maxillary incisors prescription and low torque mandibular incisors prescription was used to allow for efficient treatment mechanics and achieving positive overjet.

Final – 5/24/2012

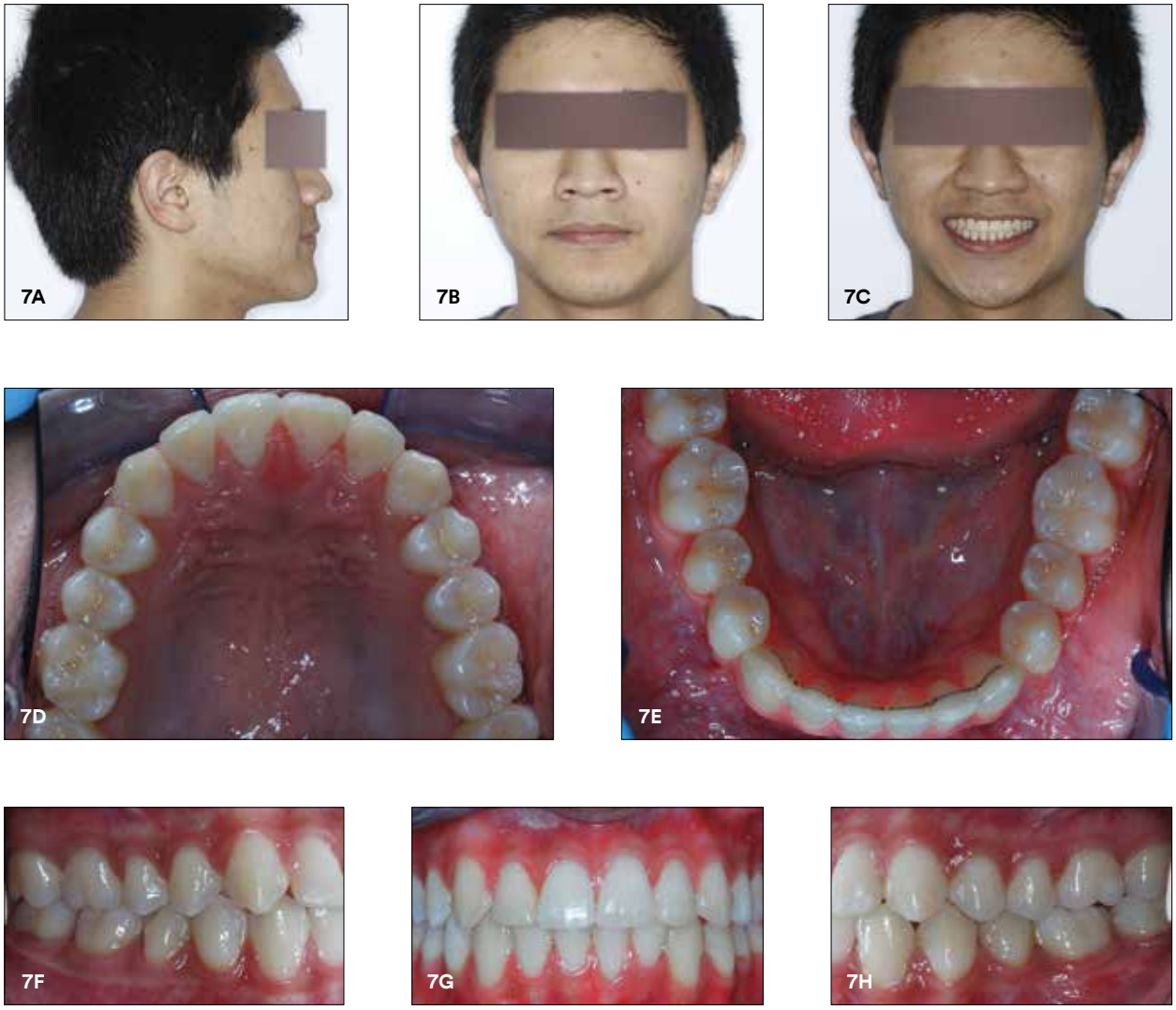


Figure 7A-H: Final intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

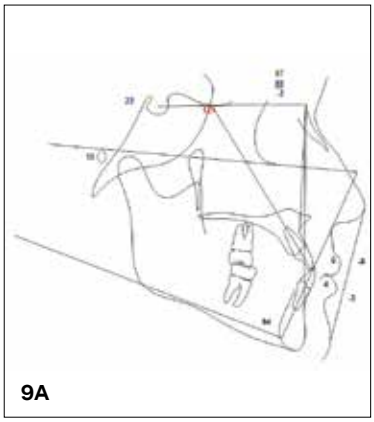


Figure 9A: Initial lateral tracing.

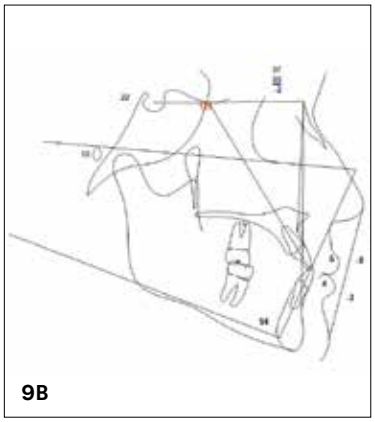


Figure 9B: Final lateral tracing.

Figure 10A: Initial facial profile.

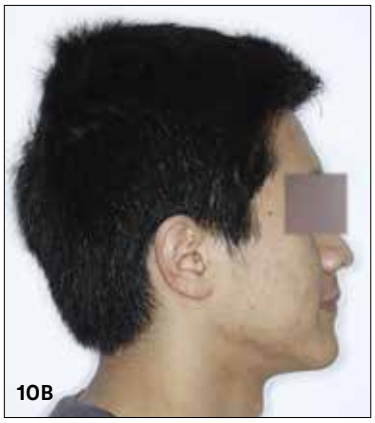


Figure 10B: Final facial profile.

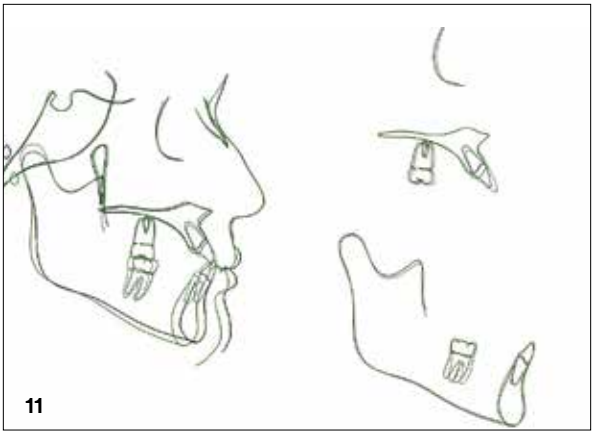


Figure 11: Superimpositions.

Final ABO Analysis				
Maxilla to Cranial Base				
SNA (°)	86.5	82.0	3.5	1.3 *
Mandible to Cranial Base				
SNB (°)	88.7	80.9	3.4	2.3 **
SN – GoGn (°)	21.6	32.9	5.2	-2.2 **
FMA (MP-FH) (°)	18.1	22.9	4.5	-1.1 *
Maxillo-Mandibular				
ANB (°)	-2.2	1.6	1.5	-2.5 **
Maxillary Dentition				
U1 – NA (mm)	6.2	4.3	2.7	0.7
U1 – SN (°)	120.5	103.1	5.5	3.2 ***
Mandibular Dentition				
L1 – NB (mm)	4.4	4.0	1.8	0.2
L1 – GoGn (°)	93.6	93.0	6.0	0.1
Soft Tissue				
Lower Lip to E-Plane (mm)	-3.3	-2.0	2.0	-0.7
Upper Lip to E-Plane (mm)	-8.4	-8.0	2.0	-0.2

Table 2: Final ABO analysis.

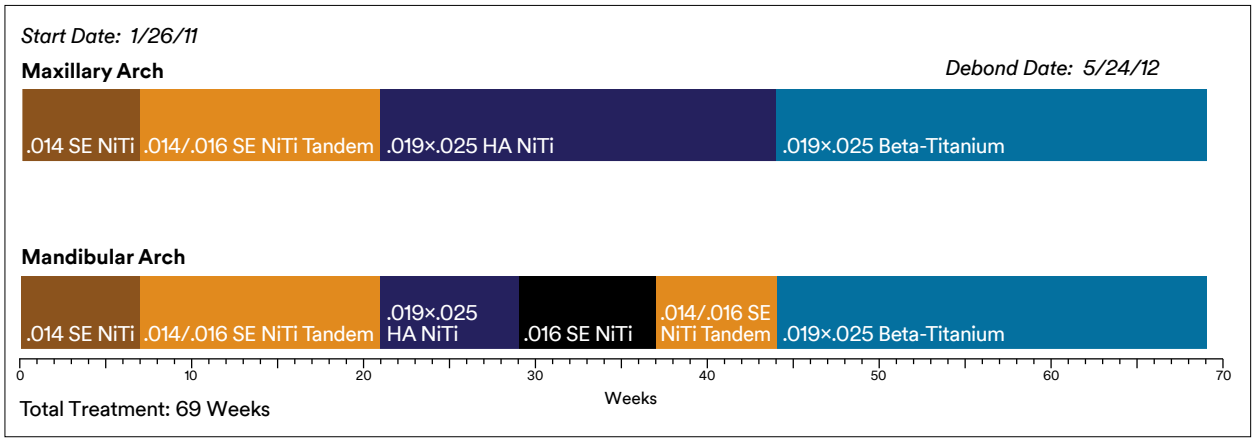


Figure 12: Treatment Timeline.

Case 18 – Open Bite Correction

Patient
Female: age 17 years, 8 months

Diagnosis
Class I Malocclusion

- Mild maxillary and mandibular crowding
- Anterior open bite 2 mm
- Constricted maxillary archform leading to bilateral posterior crossbite tendency
- Severe rotation of LL5
- Partial anterior crossbite of UR3/LR3
- Mandibular midline to the left 2 mm

Treatment Timeframe

Treatment Start:	02/24/2010 (Expander inserted)
Brackets Bonded:	04/14/2010
TAD Placement:	09/28/2010
TAD Removal:	03/24/2011
Treatment End:	12/15/2011
Treatment Time:	22 months

Treatment Plan
- Maxillary Slow Expansion to upright posterior teeth
- 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
- TPA to maintain expansion during molar intrusion using Unitek™ Temporary Anchorage Device (TAD) system
- Class II triangle elastics

Maxillary Arch
- .014 SE NiTi – 7 weeks
- .014/.016 SE NiTi Tandem – 14 weeks
- .019×.025 HA NiTi (Pan & Repo) – 34 weeks
- .019×.025 Beta-Titanium – 30 weeks

Mandibular Arch
- .014 SE NiTi – 14 weeks
- .014/.016 SE NiTi Tandem – 7 weeks
- .019×.025 HA NiTi – 34 weeks
- .019×.025 Beta-Titanium – 30 weeks (Class II elastics started and stopped in exchange for Settling elastics started for the last 3 weeks)

Initial

Initial ABO Analysis					
Maxilla to Cranial Base					
SNA (°)	85.4	82.0	3.5	1.0	
Mandible to Cranial Base					
SNB (°)	80.4	80.9	3.4	-0.2	
SN – GoGn (°)	33.9	32.9	5.2	0.2	
FMA (MP-FH) (°)	29.0	23.9	4.5	1.1	*
Maxillo-Mandibular					
ANB (°)	5.0	1.6	1.5	2.3	**
Maxillary Dentition					
U1 – NA (mm)	5.3	4.3	2.7	0.4	
U1 – SN (°)	109.0	102.8	5.5	1.1	*
Mandibular Dentition					
L1 – NB (mm)	6.8	4.0	1.8	1.6	*
L1 – GoGn (°)	97.2	93.0	6.0	0.7	
Soft Tissue					
Lower Lip to E-Plane (mm)	-1.8	-2.0	2.0	0.1	
Upper Lip to E-Plane (mm)	-4.7	-6.0	2.0	0.7	

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

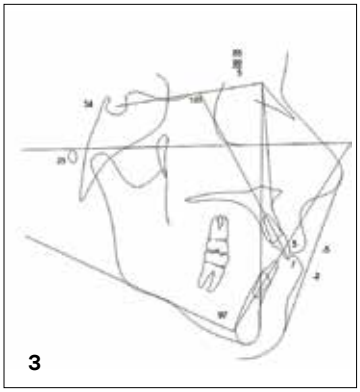


Figure 3: Initial lateral tracing.

Treatment Start – 2/24/2010

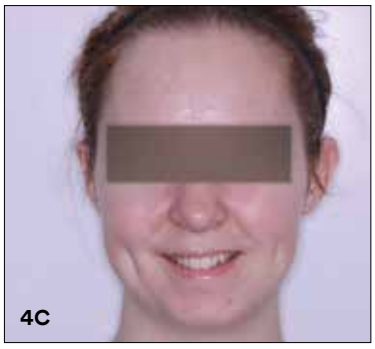


Figure 4A-H: Initial intraoral photographs.

9/28/2010

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

3/24/2011

Figure 6A-E: TAD Removal, .019×.025 Beta-Titanium.

Final – 12/15/2011

Figure 7A-H: Final intraoral photographs.

Figure 8A: Initial cephalometric X-ray.

Figure 8B: Final cephalometric X-ray.

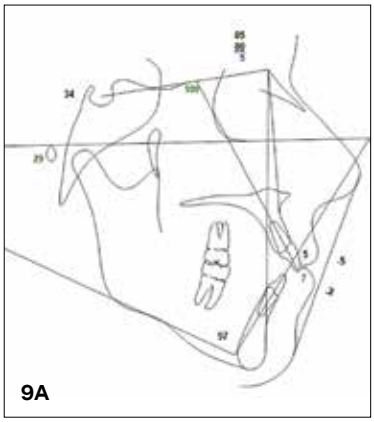


Figure 9A: Initial lateral tracing.

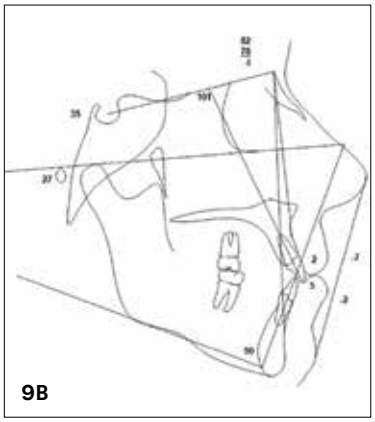


Figure 9B: Final lateral tracing.

Figure 10A: Initial facial profile.

Figure 10B: Final facial profile.

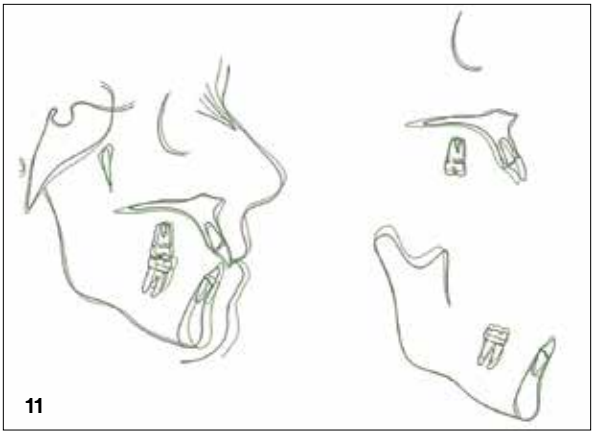


Figure 11: Superimpositions.

Final ABO Analysis				
Maxilla to Cranial Base				
SNA (°)	81.9	82.0	3.5	0.0
Mandible to Cranial Base				
SNB (°)	77.9	80.9	3.4	-0.9
SN – GoGn (°)	34.9	32.9	5.2	0.4
FMA (MP-FH) (°)	27.3	23.9	4.5	0.8
Maxillo-Mandibular				
ANB (°)	3.9	1.6	1.5	1.5 *
Maxillary Dentition				
U1 – NA (mm)	2.3	4.3	2.7	-0.7
U1 – SN (°)	101.4	102.8	5.5	-0.3
Mandibular Dentition				
L1 – NB (mm)	5.0	4.0	1.8	0.6
L1 – GoGn (°)	89.7	93.0	6.0	-0.6
Soft Tissue				
Lower Lip to E-Plane (mm)	-2.3	-2.0	2.0	-0.2
Upper Lip to E-Plane (mm)	-7.5	-6.0	2.0	-0.7

Table 2: Final ABO analysis.

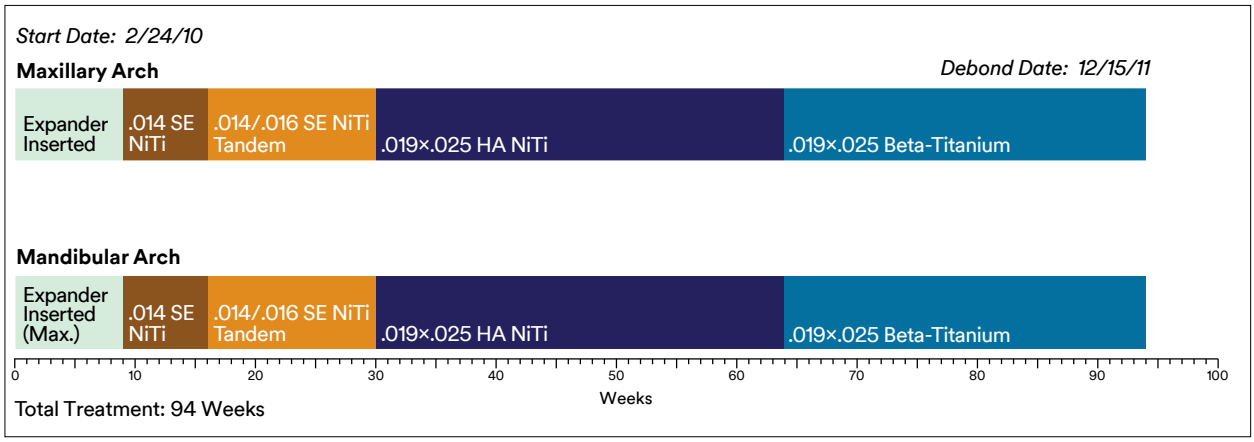


Figure 12: Treatment Timeline.

Case 19 – Class I with Deep Overbite, U/L Bicuspid Extraction

Patient
Female: age 12 years, 3 months

Diagnosis
Class I

- Deep overbite
- Moderate overjet
- Midline deviation
- Severe mx/md crowding
- Ectopically erupting cuspids
- Maxillary and Mandibular 1st bicuspid extraction

Treatment Plan
- Maxillary and Mandibular 1st bicuspid extraction
- SmartClip™ Self-Ligating Appliances (.022 slot)
- Class II elastics

Treatment Timeframe

Treatment Start:	08/09/2010
Treatment End:	07/12/2012
Treatment Time:	23 months

Maxillary Arch
- .014 SE NiTi – 15 weeks
- .014/.016 SE NiTi Tandem – 16 weeks
- .019×.025 SE NiTi – 19 weeks
- .021×.025 SE NiTi – 26 weeks
- .019×.025 SE NiTi – 18 weeks

Mandibular Arch
- .014 SE NiTi – 15 weeks
- .014/.016 SE NiTi Tandem – 35 weeks (open coil placed LR1-LR3)
- .019×.025 SE NiTi, start Class II elastics – 44 weeks

Initial

Initial ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	79.7	82	3.5	-0.7
Mandible to Cranial Base				
SNB (°)	76.7	80.9	3.4	-1.2
SN – MP (°)	36.5	32.9	5.2	0.7
FMA (MP-FH) (°)	32.9	24.8	4.5	1.8
Maxillo-Mandibular				
ANB (°)	3	1.6	1.5	0.9
Maxillary Dentition				
U1 – NA (mm)	1.8	4.3	2.7	-0.9
U1 – SN (°)	97.9	102.5	5.5	-0.8
Mandibular Dentition				
L1 – NB (mm)	2.3	4	1.8	-0.9
L1 – GoGn (°)	86.2	95	7	-1.3
Soft Tissue				
Lower Lip to E-Plane (mm)	-3.2	-2	2	-0.6
Upper Lip to E-Plane (mm)	-4.9	-4.1	2	-0.4

Table 1: Initial ABO analysis.

Figure 1: Initial.

Figure 2: Initial cephalometric X-ray.

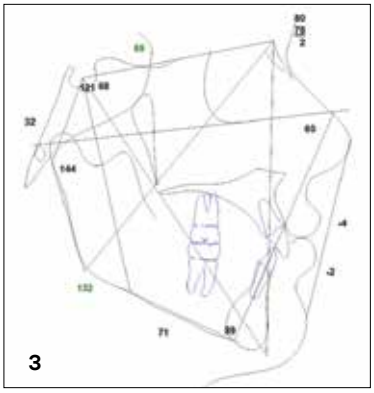
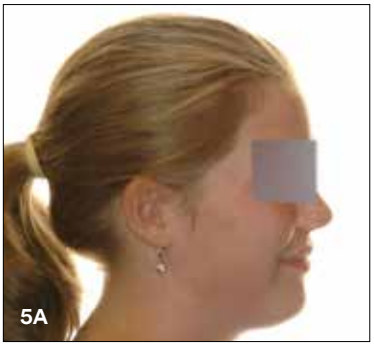


Figure 3: Initial lateral tracing.

Figure 4: Panoramic X-ray.

Treatment Start – 8/9/2010



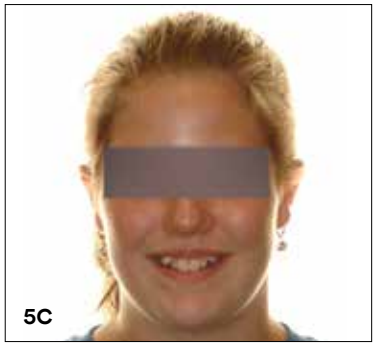


Figure 5A-H: Initial intraoral photographs.

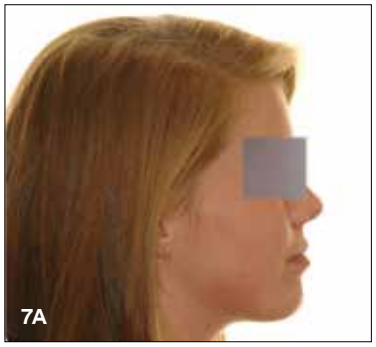
11/24/2010

Figure 6A-H: Mx .014/.016 SE NiTi Tandem, Md .014/.016 RC SE NiTi Tandem, open coil on LR2.

Clinical Tip

Tandem arch with open coil placed from cuspid to central incisor on a .016 SE NiTi to create space. The .014 SE NiTi portion of the tandem arch was selectively engaged into the lingually displaced lateral incisor. A single, crisscrossed elastic ligature tie was placed on the mandibular right cuspid to act as a stop to prevent distal movement of the cuspid from open coil, allowing for the open coil to push the incisors mesial. The result was space creation, partial alignment and midline correction.

2/27/2012



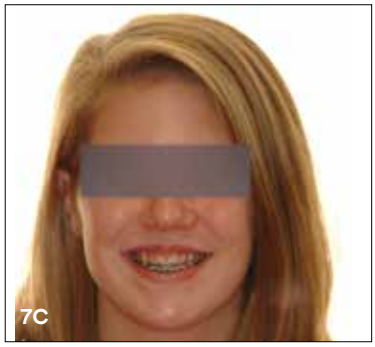


Figure 7A-H: Mx and Md .019×.025 SE NiTi.

Final – 7/12/2012

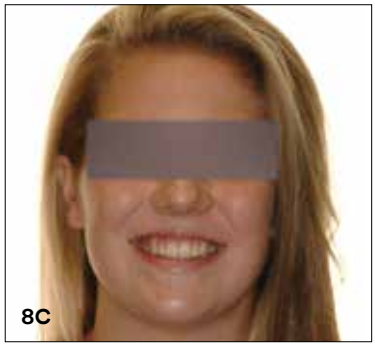


Figure 8A-J: Final intraoral photographs.

Retention Photos

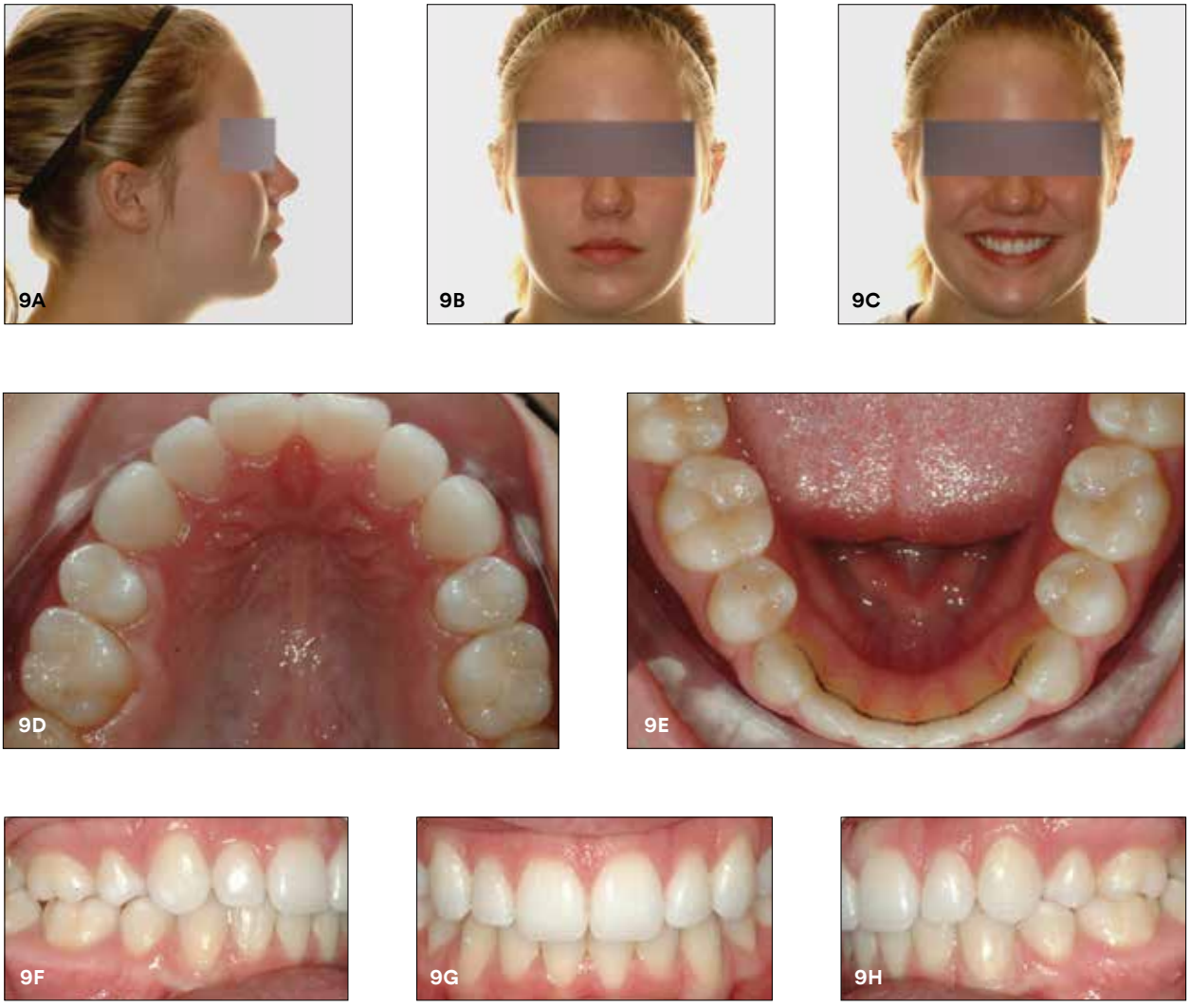


Figure 9A-H: 1/15/2013 Retention photos.

Figure 10A: Initial cephalometric X-ray.

Figure 10B: Final cephalometric X-ray.

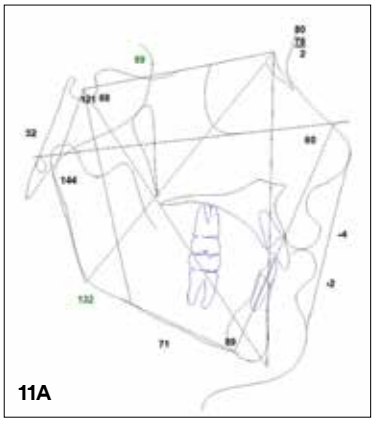


Figure 11A: Initial lateral tracing.

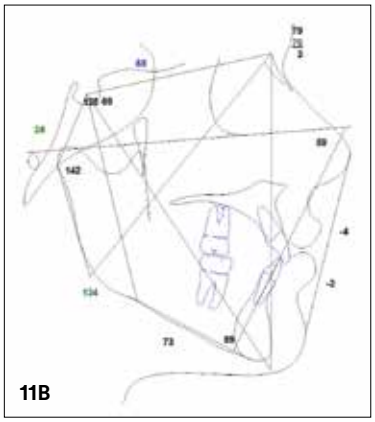


Figure 11B: Final lateral tracing.

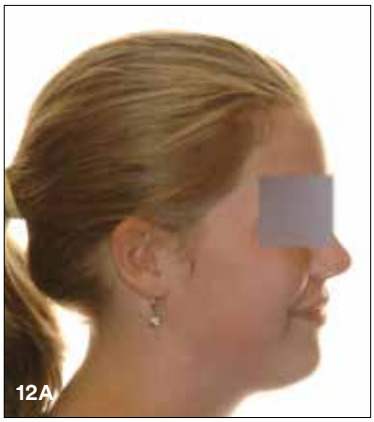


Figure 12A: Initial facial profile.

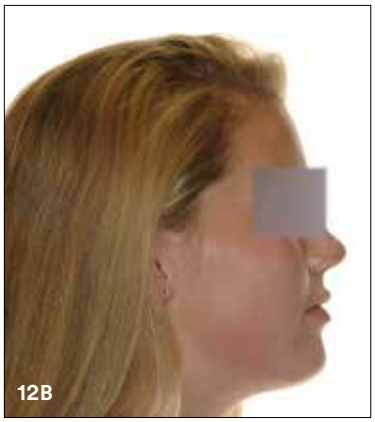


Figure 12B: Final facial profile.

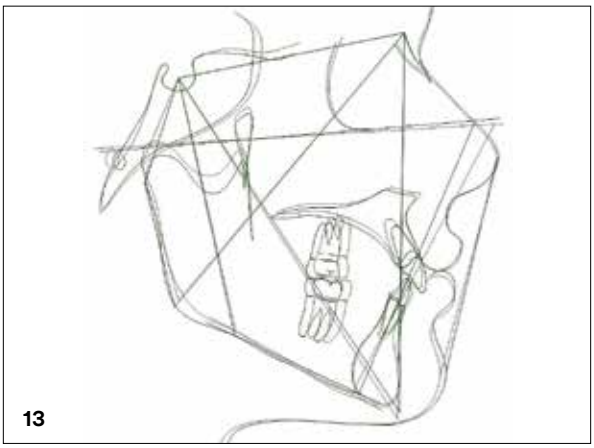


Figure 13: Superimpositions: Black initial. Green final treatment.

Final ABO Analysis				
Maxilla to Cranial Base	**Value**	**Norm**	**Std Dev**	**Dev Norm**
SNA (°)	79.5	82	3.5	-0.7
Mandible to Cranial Base				
SNB (°)	76.1	80.9	3.4	-1.4
SN – MP (°)	36.4	32.9	5.2	0.7
FMA (MP-FH) (°)	29.9	24.2	4.5	1.3
Maxillo-Mandibular				
ANB (°)	3.4	1.6	1.5	1.2
Maxillary Dentition				
U1 – NA (mm)	1.8	4.3	2.7	-0.9
U1 – SN (°)	96.6	102.7	5.5	-1.1
Mandibular Dentition				
L1 – NB (mm)	4.5	4	1.8	0.3
L1 – GoGn (°)	91.3	95	7	-0.5
Soft Tissue				
Lower Lip to E-Plane (mm)	-1.9	-2	2	0.1
Upper Lip to E-Plane (mm)	-3.7	-5.4	2	0.8

Table 2: Final ABO analysis.

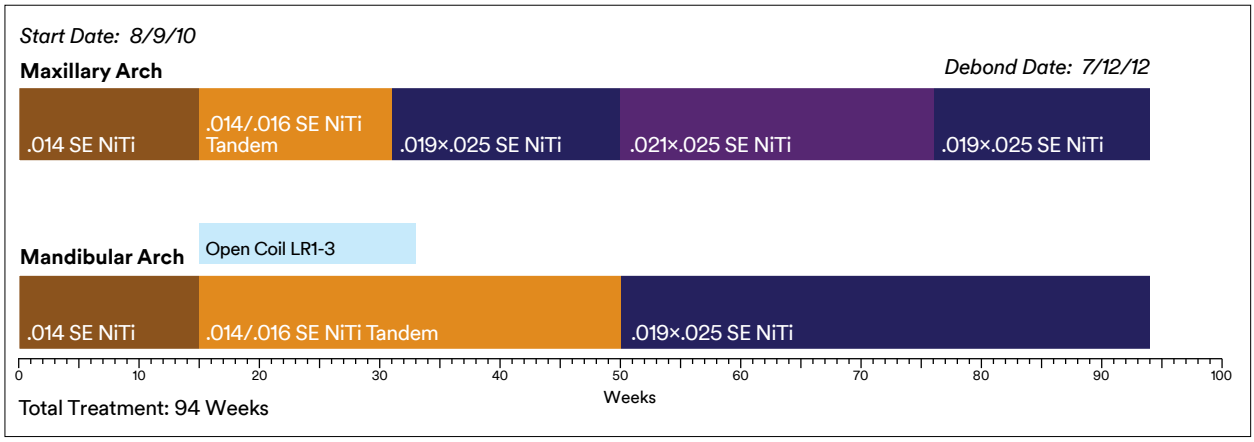


Figure 14: Treatment Timeline.

Special Feature

by Dr. Luis Huanca Ghislanzoni and Dr. Lorenzo Franchi

Canine Extrusion Technique with Self-Ligation

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 in Case Selection section).

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 systems[1], 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

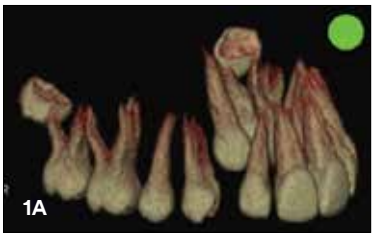


Figure 1A: Unerupted canines that lie in center of the alveolar ridge, or buccally erupted canines, may be approached with the self-ligation extrusion technique **if** their vertical position is within the cervical third of the roots of the neighboring teeth.

Check for obstructions first

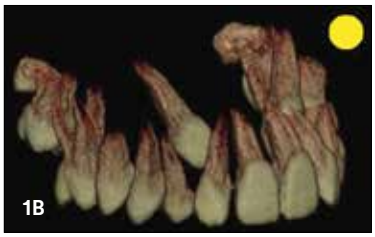


Figure 1B: Unerupted palatal canines may be approached with self-ligation extrusion technique after checking for the absence of any major obstacle (i.e. neighboring teeth roots) on the route from palatal position to the alveolar ridge. If preliminary palatal traction is necessary to increase the distance 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)

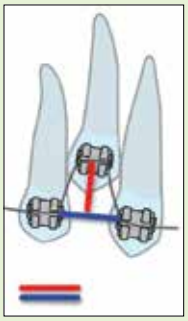


Figure 2

Clinical Cases

Case 1: Displaced Canine in Center of Aveolar Crest

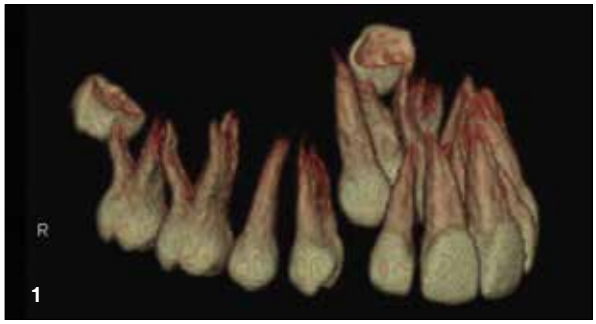


Figure 1: Unerupted canine located in center of alveolar crest.

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 Aveolar Crest in a Division 2 Case

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

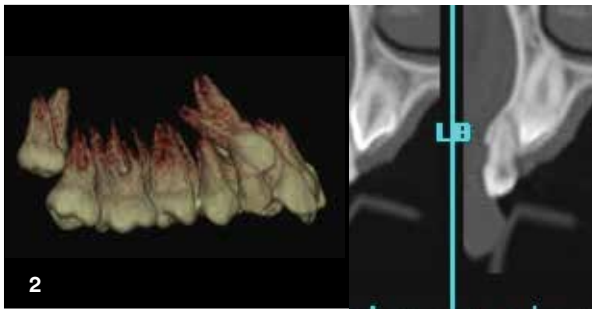


Figure 2: CBCT showed that the proximity of the canine crown to the lateral incisor root was not harmful. Thus, the lateral incisor was engaged. The post-extractive alveolus of the deciduous canine was used for a vestibular traction approach.

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.

References

1. Baccetti T, Franchi L, Camporesi M, Defraia E. Orthodontic forces released by low-friction versus conventional systems during alignment of apically or buccally malposed teeth. Eur J Orthod. 2011;33(1):50–4.
2. Fok J, Toogood RW, Badawi H, Carey JP, Major PW. Analysis of maxillary arch force/couple systems for a simulated high canine malocclusion: Part 1. Passive ligation. Angle Orthod. 2011;81(6):953–59.
3. Fok J, Toogood R, Badawi H. Analysis of maxillary arch force/couple systems for a simulated high canine malocclusion: Part 2. Elastic ligation. Angle Orthod. 2011;81(6):960–65.
4. Ericson S, Kurol J. Incisor root resorptions due to ectopic maxillary canines imaged by computerized tomography: a comparative study in extracted teeth. Angle Orthod. 2000;70(4):276–83.

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