

3MSM Health Care Academy

3MTM IncognitoTM Appliance System extraction case study.

IncognitoTM
Appliance System



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Dr. Toru Inami graduated from the Aichigakuin University School of Dentistry in 1976. From 1977 to 1981, he worked as a research associate at the Department of Orthodontics at Aichigakuin University, and in 1981 became the director of the Inami Orthodontic Office. From 2005 to 2007, Dr. Inami served as president of the Japan Lingual Orthodontic Association (JLOA), and has since served as director of the executive committee

of the Japanese Orthodontic Society (JOS and chairman of the Japanese Orthodontic Board (JOB). Dr. Inami has been a clinical professor of the Aichigakuin University Department of Orthodontics since 2013. He is also a board member of the Japan Orthodontic Board, as well as an active member of JLOA, WSLO, and the European Society of Lingual Orthodontics (ESLO)."

Section A: Guidelines for extraction cases using the 3MTM IncognitoTM Appliance System

My practice has successfully used the Incognito Appliance System with adult patients since 2008. Given the needs of our specific patient base, when circumstances indicated, my practice began implementing lingual braces on younger patients. In response to improved treatment times, treatment outcomes and patient acceptance, our percentage of child and adolescent patients has consistently increased each year to where my practice now has an average patient age of 18 years old with this treatment protocol (Figure 1).

As a byproduct of the reduced average age, it was also observed that over 60% of our patient base needed orthodontic extractions accompanying the application of braces. Following are our notes to explain some of the more important aspects of extraction in partnership with the Incognito System.

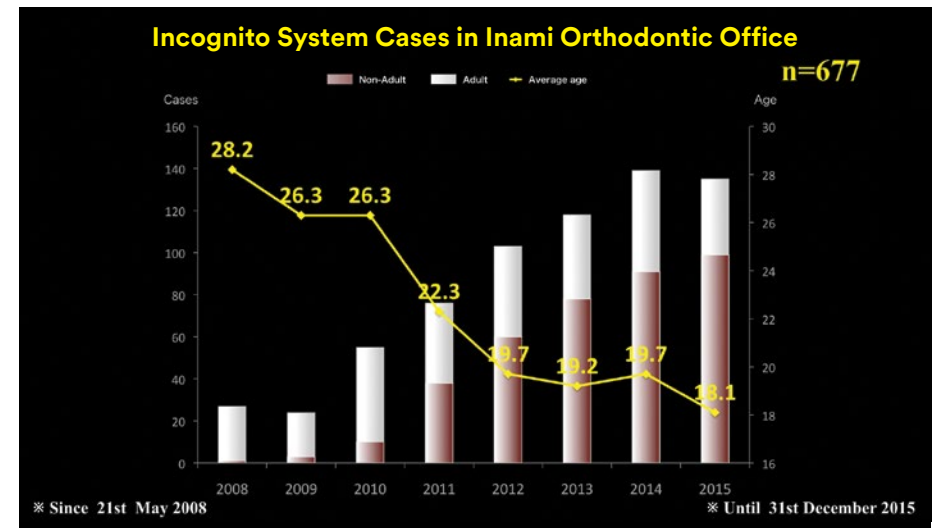


Figure 1

Phase 1: Crowding Control

1. Crowding control

It is important to watch for potential flaring of the incisors when round wires are used in the initial alignment phase, especially in patients with weak lip muscles. As a result, the treatment period is increased to offset the fanning effect. To best control treatment periods, even in cases of severe crowding, I recommend this guideline as reflected in the case study below (Figure 2A-B).

- Use a trans-palatal bar.
- Use rectangular, .016x.022 NiTi, ligating very gently.
- In our study case, we applied O-lasso to central incisors and retracted the canine slowly.

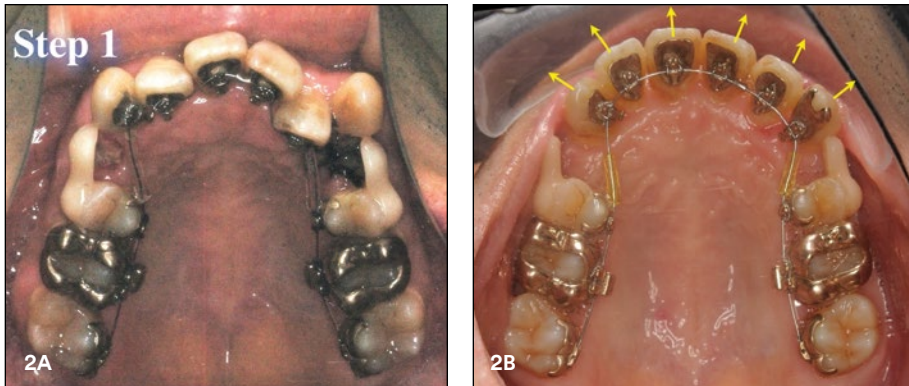


Figure 2A-B: Initial leveling using round wire in severe crowding case. Figure 2A .010 NiTi; Figure 2B .014 NiTi (flare out).

2. Root exposure precaution: required when using initial rectangular wires

When the .016x.022 NiTi wire is inserted forcibly in initial leveling, there is a possibility that exposure of the root can occur in the mandibular anterior teeth. Handling of the initial wire is very important (Figure 3).

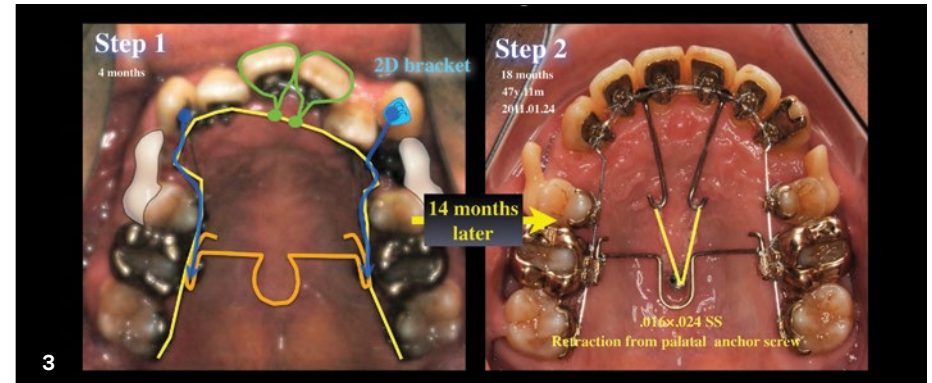


Figure 3: Recommended initial leveling in severe crowding case.

Figures 4A-D, Figure 5 and Figures 6A-B demonstrate results after using the .016x.022 NiTi initial archwire actively engaged in the anterior slots. Figure 5 demonstrates the root exposure as shown in CT scan images. In response, I used the round wire for recovery. The right side of Figure 5 illustrates recovery of root exposure.

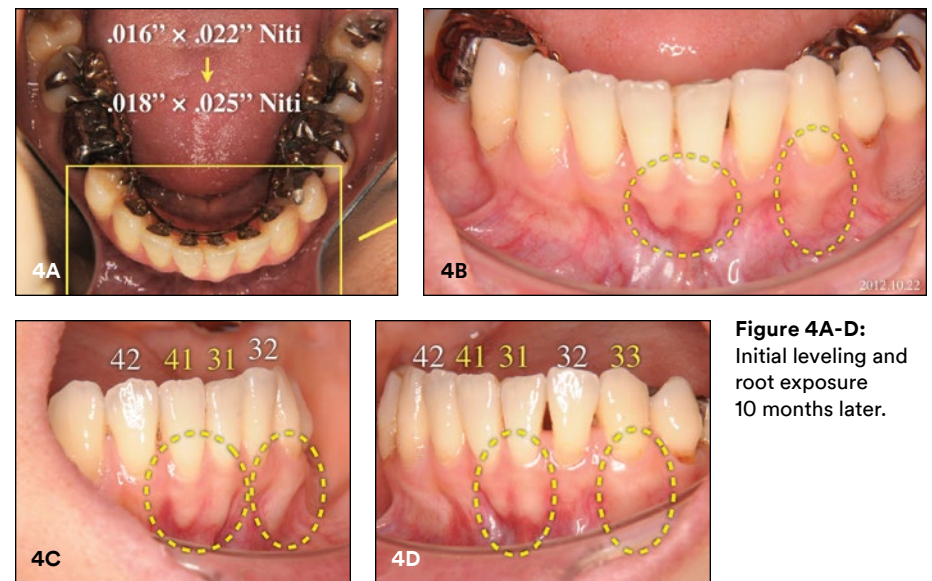


Figure 4A-D: Initial leveling and root exposure 10 months later.

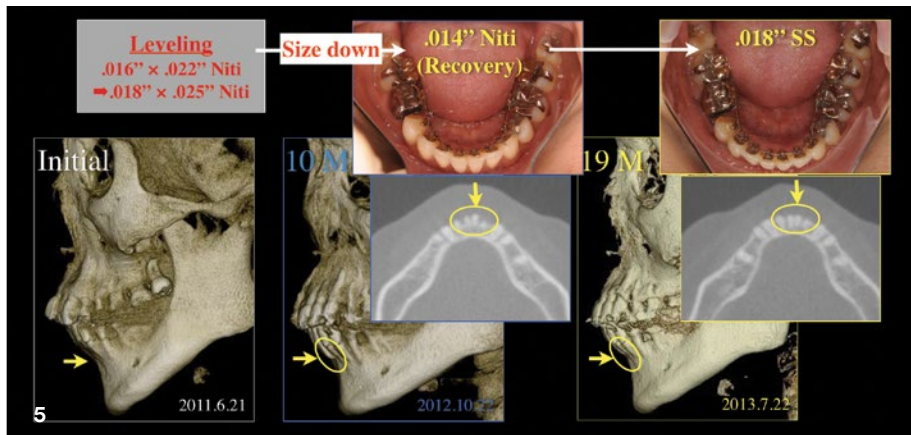


Figure 5: Torque control – an example of uncontrolled torque.

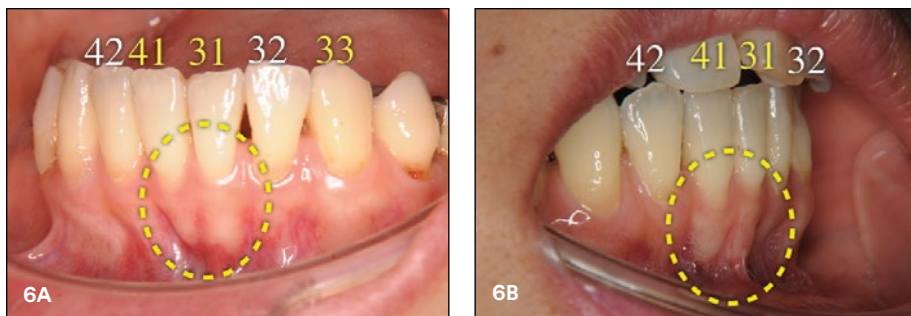


Figure 6A-B: Ten months later in initial leveling.

3. When a partial canine retraction is recommended ...

Option 1. Caution is urged to prevent excessive canine retraction, since, in this case, engaging the next wire from canine to canine is not possible. In this case, at every visit, I reduced by 1 mm, the composite within the retraction space (Figure 7 and Figure 8).

In the case of partial canine retraction there are 5 key elements.

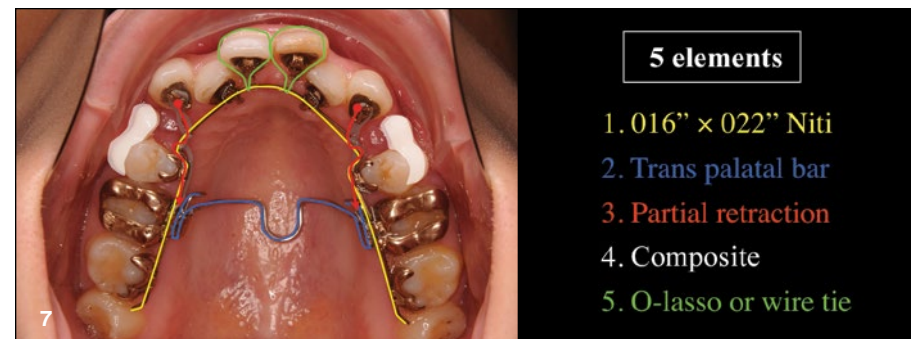


Figure 7: Recommended method of canine retraction.



Figure 8: Pay attention to excessive canine retraction. Reduce 1 mm composite for retraction space.

Option 2. Another method of canine retraction is wire selection. This photo (Figure 9) shows NiTi wire cut at the severe crowding region.



Figure 9:
Another method of canine retraction – wire selection. .016x.022 NiTi wire cut at the severe crowding region.

Option 3. An alternative wire selection. This photo demonstrates the use of sectional Stainless Steel wire from second molar to canine, placed to avoid the severe crowding area (Figure 10).

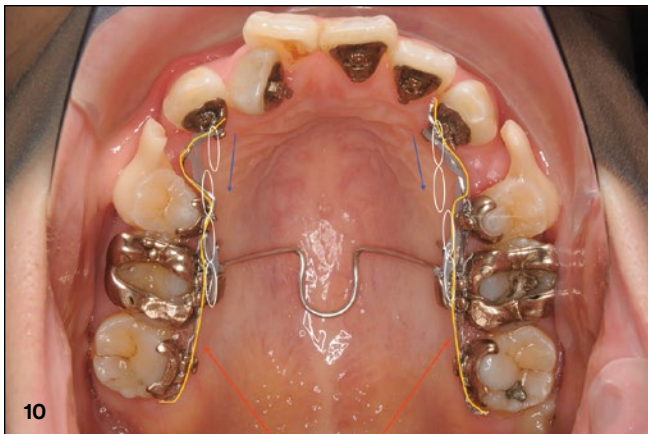


Figure 10:
Another method of canine retraction – wire selection .016x.022 SS sectional wire.

Option 4. Canine retraction using the tandem technique as illustrated (Figure 11).

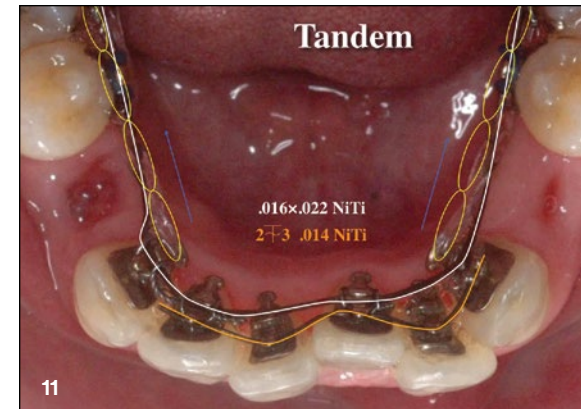


Figure 11:
Tandem technique.

Phase 2: Anterior Retraction

4. Tip Control

During en masse retraction, some of the maxillary anterior teeth may tip distally in the process.

The anterior tooth tends to distal tipping in the Step 2 retraction stage. I refer to this as the Anterior Fan Shaped Phenomenon (Figure 12).

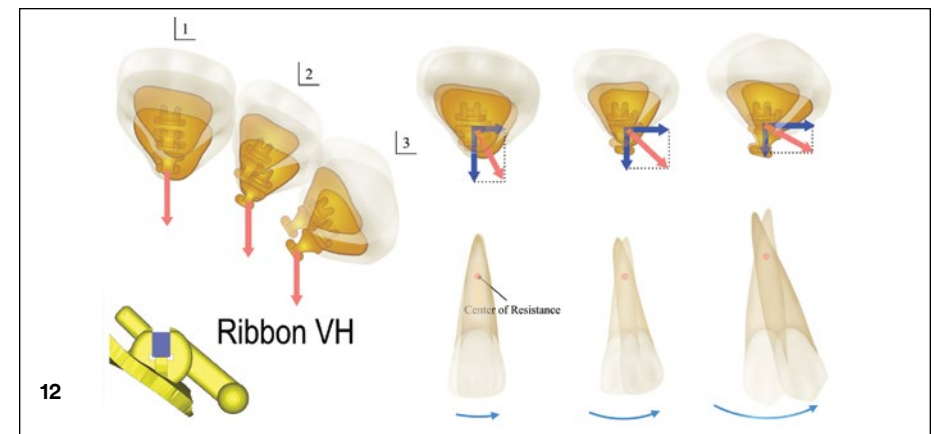


Figure 12: Anterior Fan Shaped Phenomenon.

Figure 13 shows the play between the Incognito Bracket slot and .016x.024 Stainless Steel wire. The narrower the right bracket width becomes, the bigger the play. When the right slot length is 1.6 mm $\theta 2$ (angulation play) becomes calculated as 5-6°.

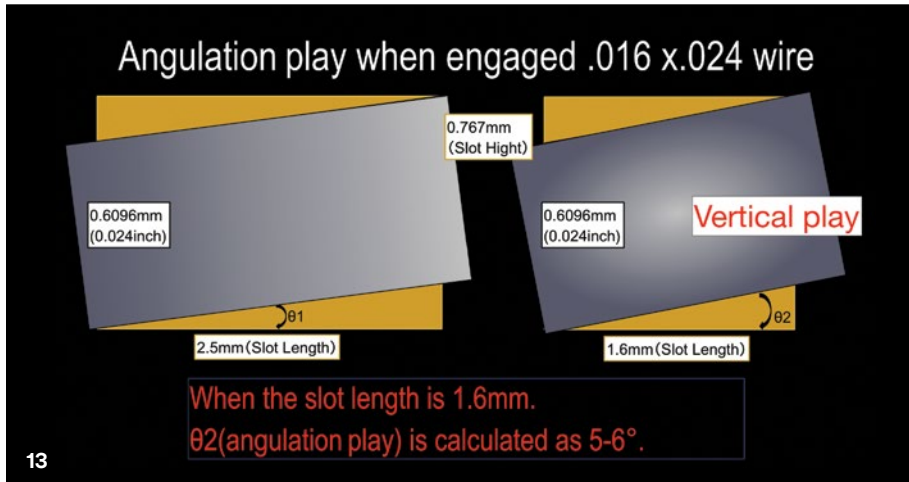


Figure 13

The question of most effective correction to the Anterior Shaped Phenomenon requires consideration. The original protocol recommends alignment correction through a power-tie in the detailing stage. In my experience, a better course of action is to utilize Beta Titanium wire or Stainless Steel wire with over-correction tip bend of the respective 2°, 4°, 6° in anterior teeth.

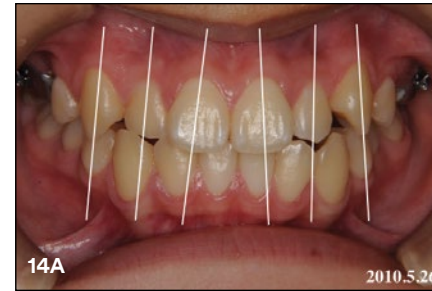


Figure 14A: Initial.

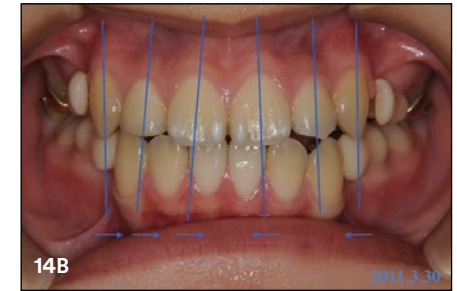


Figure 14B: Before retraction; well controlled with NiTi.

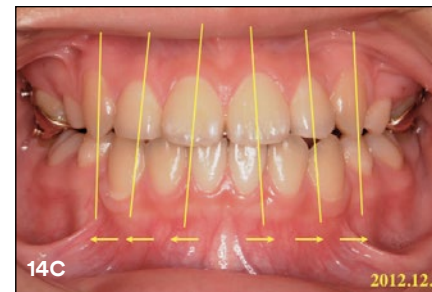
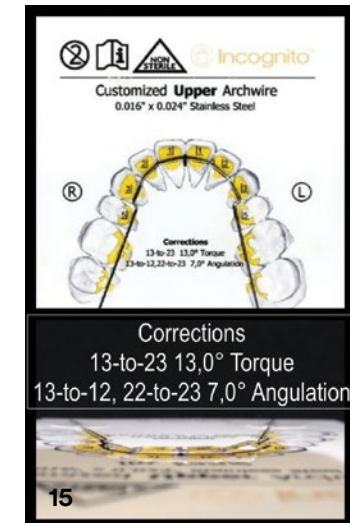


Figure 14C: During retraction; tip distal (fan shaped).

Dr. Keizo Hirose, my colleague and the practitioner for this case, requested 3M to create a customized archwire .016x.024 SS with anti angulation bend on lateral incisor and canine 7° mesial tipping for this specific case (Figure 14A-C). A copy of that request is included in Figure 15.

Figure 15 shows a copy of an archwire template showing the customization of a .016x.024 Stainless Steel wire with mesial tipping on lateral and canine of 7°.



5. Torque control and vertical bowing effect control

Torque control and vertical control are very important issues.

Figures 16 and 17 demonstrate a comparison of treatments with the Incognito System vs the Kurz™ System.* Both the Incognito and Kurz System groups will show

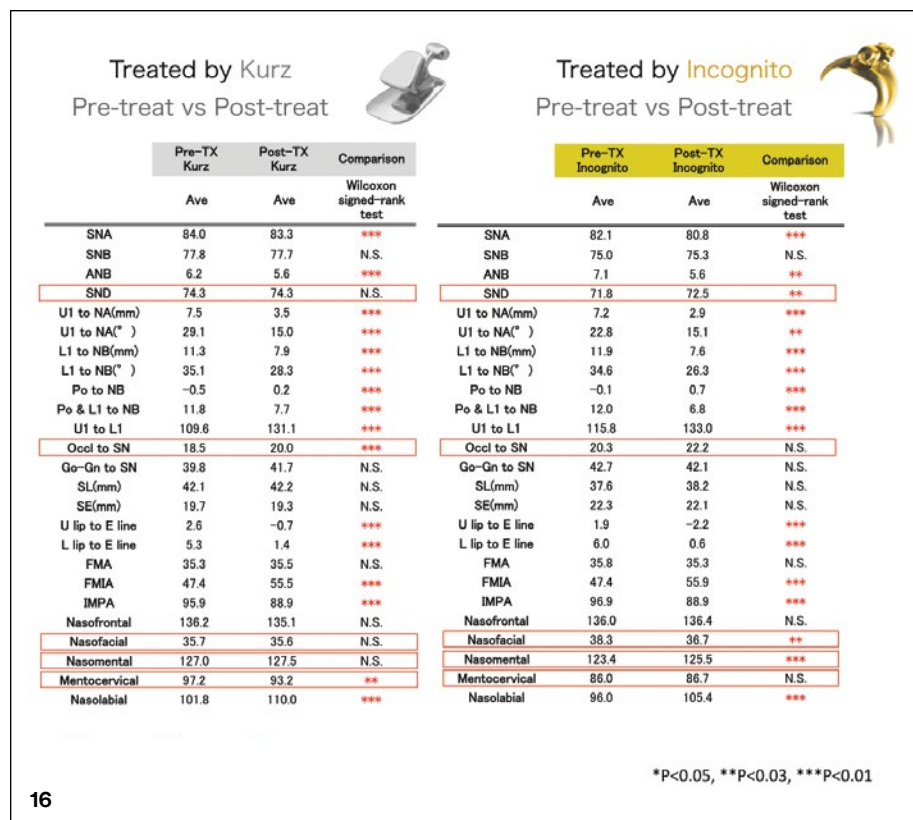


Figure 16

favorable treatment results. In the case of the Incognito System, the vertical slots for the anterior teeth are highly accurate, dimensionally, and as such may better limit the vertical bowing effect, as well as the tendency for proclination. In addition, the high dimensional accuracy of the slot may permit more precise alignment of the teeth without excessive torque loss and thereby increase the accuracy of treatment.

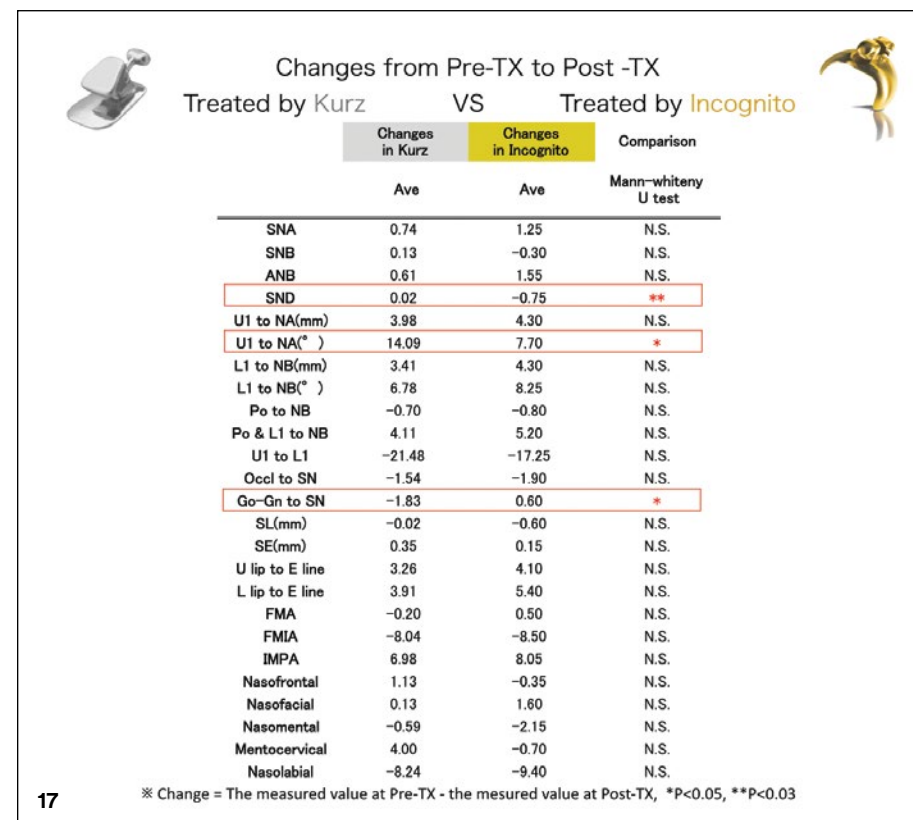


Figure 17

*Note: The comparison shown here is intended to demonstrate a difference in mechanics between a bracket system with a horizontal slot and the Incognito Appliance System's vertical slot. – Editor

Figures 19A-B compare the same patient's pre-treatment and post-treatment lateral cephalograms. The anterior protrusion represents the ideal correction.

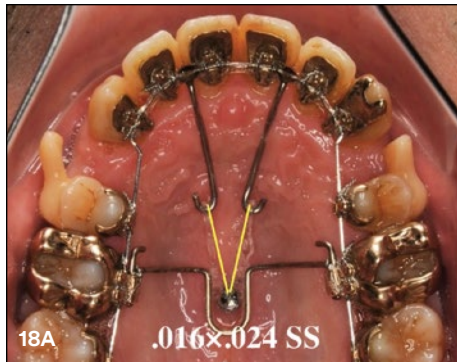
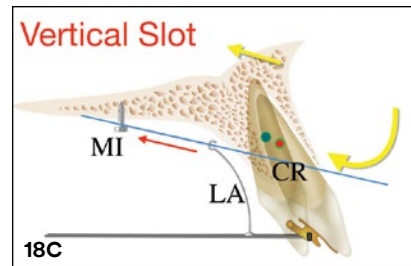
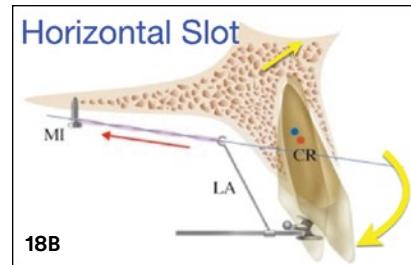


Figure 18A-C: Step 3; Retraction from palatal anchor screw; 47y 11m.



From pre- and post-treatment cephalometric tracing superimposed, upper anterior were retracted bodily and upper first molar were depressed. Torque control for anterior and vertical control for posterior, were established (Figure 19A-B and Figure 20A-B).

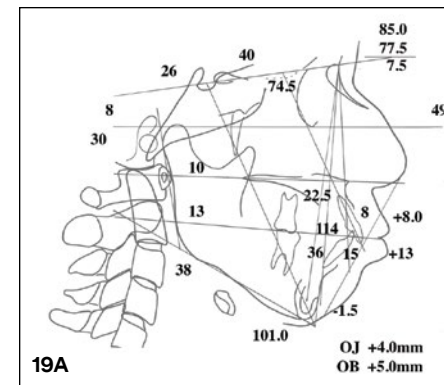


Figure 19A: Lateral cephalogram trace: pre-treatment (2008.12.25, 45y 10m).

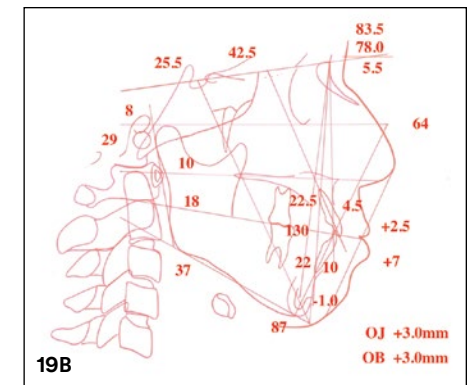


Figure 19B: Lateral cephalogram trace: post-treatment (2013.03.22; 50y 01m).

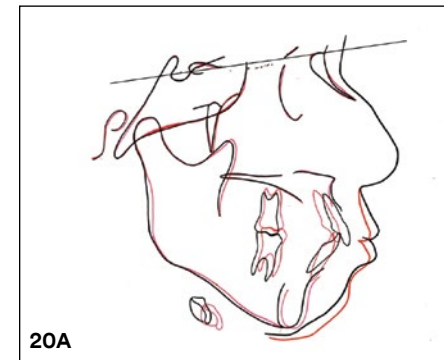


Figure 20A: Superimposition: pre-treatment (2008.12.25, 45y 10m).

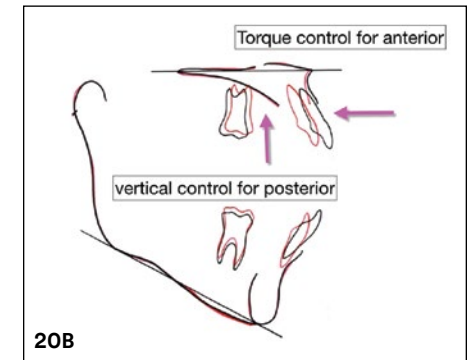


Figure 20B: Superimposition: post-treatment (2013.03.22, 50y 01m).

6. Horizontal bowing effect control

In performing the en masse retraction of anterior teeth, there is some possibility that the molars may tilt to the lingual side; that is to say, a horizontal bowing effect may occur (Figure 21A-B).



Figure 21A-B: Horizontal bowing effect.

The ribbon-wise wire has almost two times the stiffness of the edgewise wire, based on mechanical calculation. In extraction cases, the horizontal bowing effect occurs easily even if we use optimum force in anterior retraction (Figure 22).

Therefore, in order to prevent the bowing effect, I recommend using either double cable retraction or retraction from the buccal side as shown (Figure 23A-B).

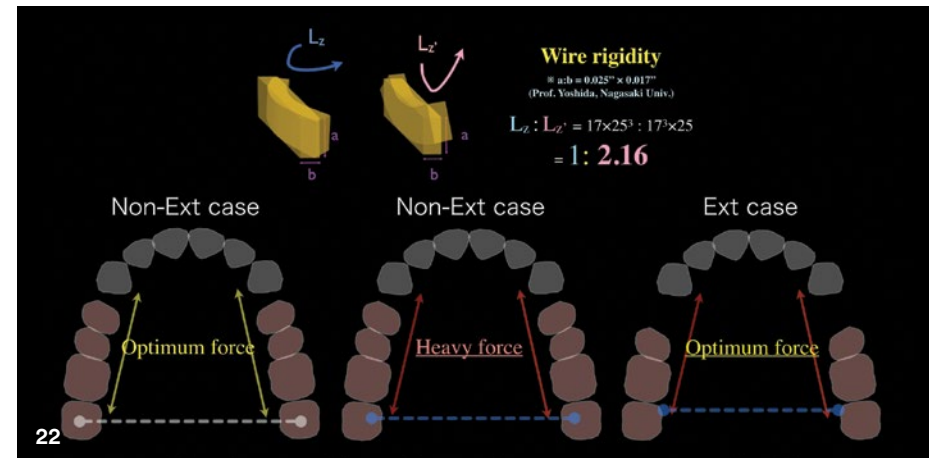


Figure 22: Horizontal bowing effect occurs easily.

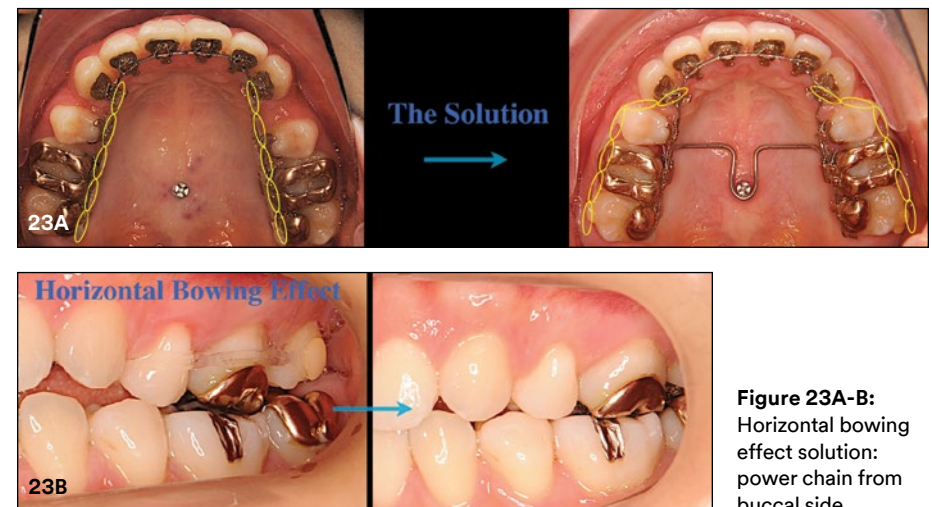


Figure 23A-B: Horizontal bowing effect solution: power chain from buccal side.

7. The molar lingual cusp during realignment

It is important to pay attention to the potential loss of lingual cusp seating during anterior retraction (Figure 24).

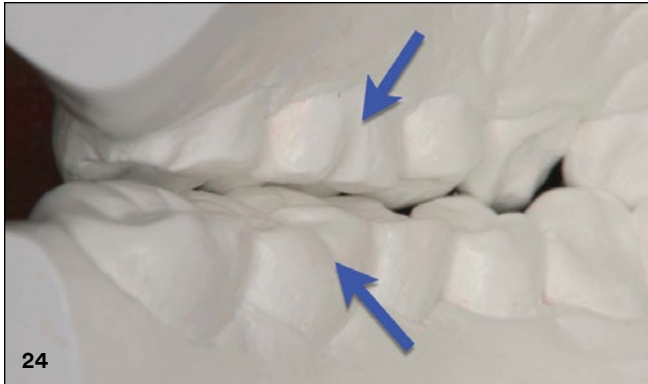


Figure 24

When anterior teeth are retracted in response to the effect of the alveolar-bone screw, the force of the lingual inclination tends to occur to the anterior. However, if ribbon-wise wire and the vertical slot is used, the counterforce caused by anterior teeth proclination is unlikely to occur. The lingual cusp of the molar is depressed with lingual crown torque, due to the stiffness of the wire (Figure 25A-B).

Alveolar-bone screw vs Mid-palatal screw

Aim

Differences in treatment outcome between Alveolar-bone screw and Mid-palatal screw

25A



25B

Alveolar-bone screw + No Lever-arm

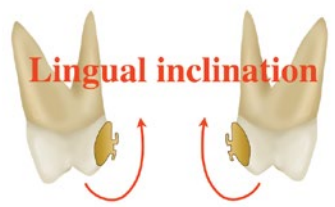


Figure 25A-B: Alveolar-bone screw vs. mid-palatal screw.

Section B: Treatment guideline of extraction cases

In Japan, there are many high angle, severe crowding and bi-maxillary protrusion patients. The ratio of the extraction cases is running at approximately 50%. Based on our experience, my colleagues and I have devised a treatment guidebook (Figure 26) for extraction cases. Included is a summary of situational recommendations for insertion sites for TADs in Incognito System cases, per my recommendation. Refer to the graphic guide that follows for those recommendations (Figure 27 and Figure 28).

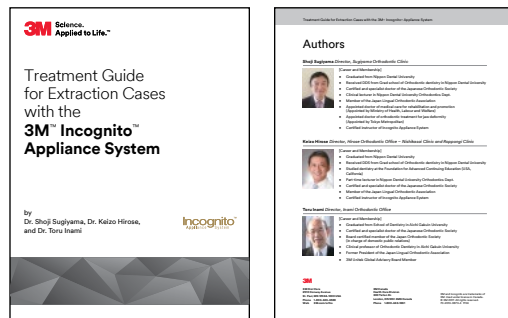


Figure 26:
Treatment Guide for Extraction Cases with the 3M™ Incognito™ Appliance System.

Mechanics Pattern of the En-Masse Retraction

Power chain 3 to 7	Light Anti Bowing Curve	Anti Bowing Curve	Anti Bowing Curve	Power chain TAD to TPA
Double cable	TPA (recommend)	Eight tie TAD to 15,25	Medium Power Hook	TPA (recommend)
Eight tie 13-33	Power chain 3 to 7	Power chain 3 to 6	Power chain P-H to TAD	Power chain 3 to 7
Eight tie 13-33,16-17,26-27 12,13,22,23 Anti Tipping bend 7 degree				

	Conventional Mechanics	Mechanics Type I-a Ext case with no TAD	Mechanics Type II-a Ext case with TAD	Mechanics Type II-b Ext case with TAD	Mechanics Type II-c Ext case with TAD
TAD	Non	Non	TAD (alveolar)	TAD (alveolar)	TAD (alveolar)
TPA	Non	TPA	Non	Non	TPA
Horizontal Anchorage	Weak	Maximum	Weak	Weak	Maximum
Vertical Anchorage	Moderate	Heavy	Moderate	Weak	Heavy
Anterior/Post Anchorage	Weak	Moderate	Heavy	Maximum	Maximum

Figure 27


Mechanics Pattern of the En-Masse Retraction					
					
Long Power Hook		Long Power Hook	Short Power Hook		
Light Anti Bowing Curve		Light Anti Bowing Curve	Light Anti Bowing Curve	Light Anti Bowing Curve	Light Anti Bowing Curve
		TPA (recommend)	i-Station	i-Station (multi)	AGUPB
Power chain P-H to TAD		Power chain P-H to TAD	Power chain P-H to TAD LA	Power chain 3 to 7	Power chain P-H to TAD
Eight tie 13-33 12, 13, 22, 23 Anti Tipping bend 7 degree					
	Mechanics Type III-a Ext case with TAD	Mechanics Type III-b Ext case with TAD	Mechanics Type III-c Ext case with i-Station	Mechanics Type III-d Ext case with i-Station	Mechanics Type III-e Ext case with AGPB
TAD	TAD (palatal)	TAD (palatal)	TAD (palatal)	TAD (palatal)	TAD (palatal)
TPA	Non	TPA	i-Station	i-Station (multi)	AGUPB
Horizontal Anchorage	Moderate	Maximum	Weak	Maximum	Maximum
Vertical Anchorage	Moderate	Maximum	Weak	Maximum	Maximum
Anterior/Post Anchorage	Heavy	Maximum	Maximum/Dist. move	Maximum/Dist. move	Maximum/Dist. move

Figure 28

Section C: Case documentations

Learning Objectives

Accurate torque control and robust standardized archwires are the most notable clinical advantages of this fully customized ribbon-wise lingual system. These advantages are the results of a perfectly customized bracket base, extremely accurate bracket slot, and ribbon-wise archwires allowing the achievement of reliable torque control without vertical bowing effect. Our goal is to demonstrate effective, efficient controls for any bowing effect using various sites of the Temporary Anchorage Devices (TADs) in the conjunction with the Incognito System – a fully customized ribbon-wise lingual bracket appliance system.

Key Points

- The Incognito System is a fully customized ribbon-wise lingual bracket appliance system.
- It provides improved accuracy in tooth positioning, as well as improved control over vertical and horizontal bowing effects.
- Included is a chart of optimal insertion sites for TADs, per my recommendation.

Case photos provided by Dr. Toru Inami.