Section A: Guidelines for extraction cases using the 3M™ Incognito™ 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.
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).

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

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

When the .016×.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 2A-B: Initial leveling using round wire in severe crowding case. Figure 2A .010 NiTi; Figure 2B .014 NiTi (flare out).](image1)

![Figure 3: Recommended initial leveling in severe crowding case. Figures 4A-D, Figure 5 and Figures 6A-B demonstrate results after using the .016×.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.](image2)
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.

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

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

**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.

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).

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

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 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 82 (angulation play) becomes calculated as 5-6°.

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.

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 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.

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*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.

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

**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.](image1)

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).

![Figure 22: Horizontal bowing effect occurs easily.](image2)

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 23A-B: Horizontal bowing effect solution: power chain from buccal side.](image3)
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).

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).
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).

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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.