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CASE REPORT

ISW Treatment for the Skeletal Class III with Anterior Crossbite and Minor Facial Asymmetry

Chi-Hsin Tseng, Jian-Hong YU

ABSTRACT

Skeletal class III with anterior crossbite is a very common orthodontic problem in Taiwan. Early diagnosis and treatment are very important to achieve effective correction. This article reports the treatment outcomes using improved superelastic TiNi alloy wire (ISW; developed by Tokyo Medical and Dental University) for a case of skeletal class III malocclusion with anterior crossbite and lower anterior crowding combined minor facial asymmetry. ISW allowed relief of crowding to facilitate correction for this case. In comparison with the traditional treatment with SSW multiple L loops of class III patient, ISW multiloop edgewise archwire (MEAW) can provide a more efficient and easier way for the patient. After 16 months of treatment, a desirable outcome was achieved and patient was satisfied with the treatment procedure and result.

Keywords: Dental journal, Anterior crossbite, ISW MEAW, Class III.

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Conflict of interest: None declared

INTRODUCTION

Improved superelastic TiNi alloy wire (ISW) with low stress hysteresis (LH) has been used in the treatment of orthodontic patients with skeletal class III malocclusion with anterior crossbite and minor facial asymmetry. The properties and characteristics of ISW are distinct, including superelasticity, shape memory, and shock and vibration absorbing. Identification of the structural etiology of anterior crossbite is important for determining appropriate approaches before active treatment.[1-3] This article describes the experience of treating a case with ISW multiloop edgewise archwire (MEAW)[4-7] combined intermaxillary elastics (IME) to correct the transition open bite after leveling. Finally, the correction of minor facial asymmetry was accomplished by correcting the dental midline by asymmetric IME.[6,8,9] After 16 months of treatment, a desirable outcome was achieved and the patient was pleased with the treatment delivered.

HISTORY

A 21-year-old female presented to our dental clinics with chief complaints of poor dental occlusion and mandibular protrusion (Fig. 1). This patient had no remarkable past medical history or dental history.

DIAGNOSIS

Clinical oral examination revealed skeletal class III pattern with an overjet of 1.0 mm, an overbite of 1.0 mm, and a bilateral incisors crossbite with midline deviation of 2.5 mm to left side (Fig. 2). The pretreatment panoramic radiographs showed the existence of #18, #28 and the impaction of #38 (Fig. 3). Intraoral examination revealed the canine discrepancy of 3.5 mm on the right side. The possibility of surgical approach was evaluated after a consultation with the oral surgeon.

TREATMENT

The decision to adopt nonsurgical treatment was made because this patient refused surgery. Tooth extraction was firstly performed to eliminate the impaction tooth of #38. Followed by implementing the full mouth reconstruction using a direct bonding system (DBS) with COBY brackets (standard slot size of 0.018) (Fig. 4). ISW was then used to relieve lower anterior crowding, and with the curve of ISW added to correct upper lateral incisor in crossbite. After 2 months of active treatment, the #47 was rebonded with a bracket upside down (torque: –30° → +30°) to correct lingual tipping (Fig. 5). The presence of an anterior

Fig. 1: Pretreatment intraoral views

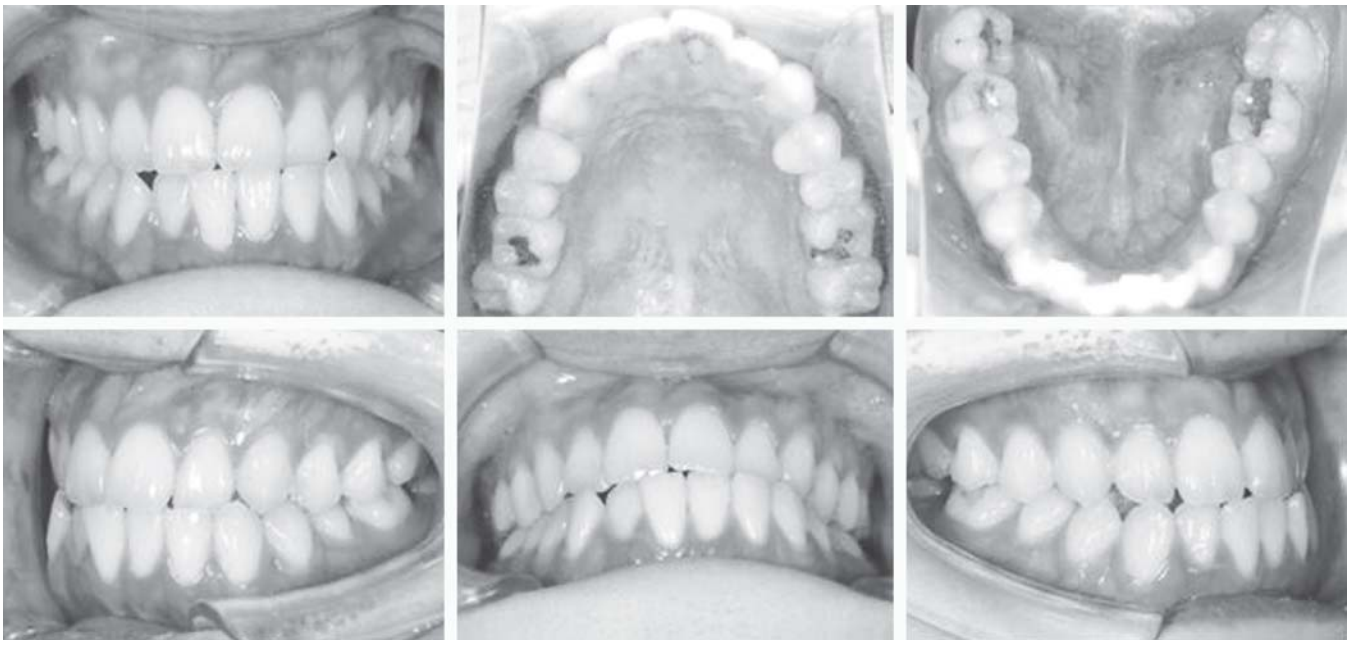


Fig. 2: Pretreatment intraoral views

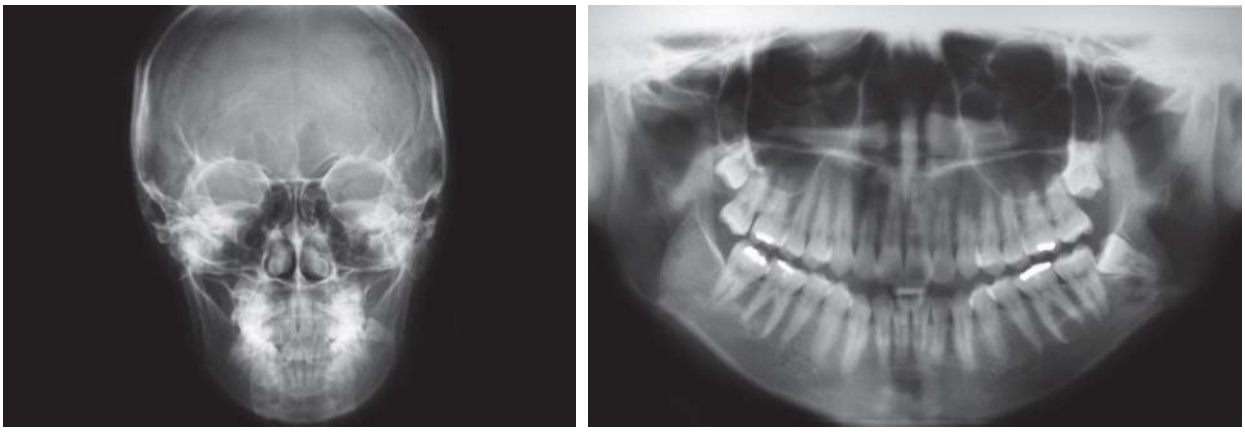


Fig. 3: Pretreatment panoramic radiographs show the midline off and minor facial asymmetry

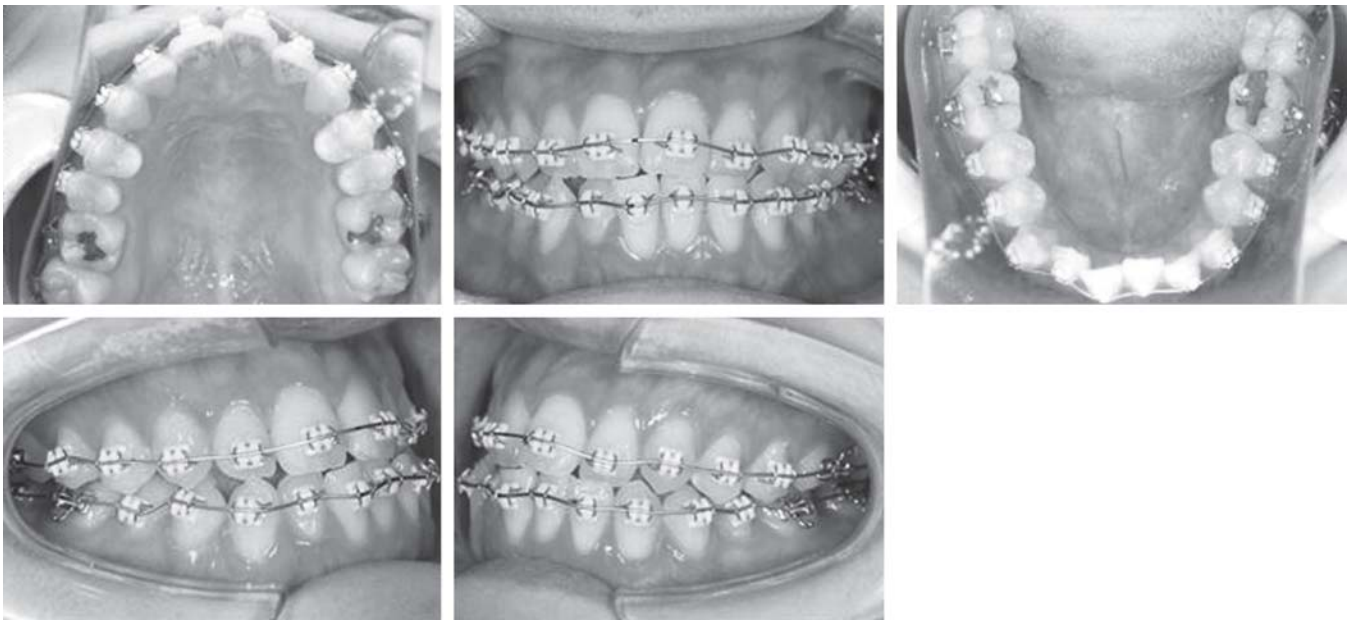


Fig. 4: These photographs show the brackets with CoBY standard slot size of 0.018 was used during treatment

Fig. 5: The tooth was rebonded with a bracket upside down to correct the lingual tipping

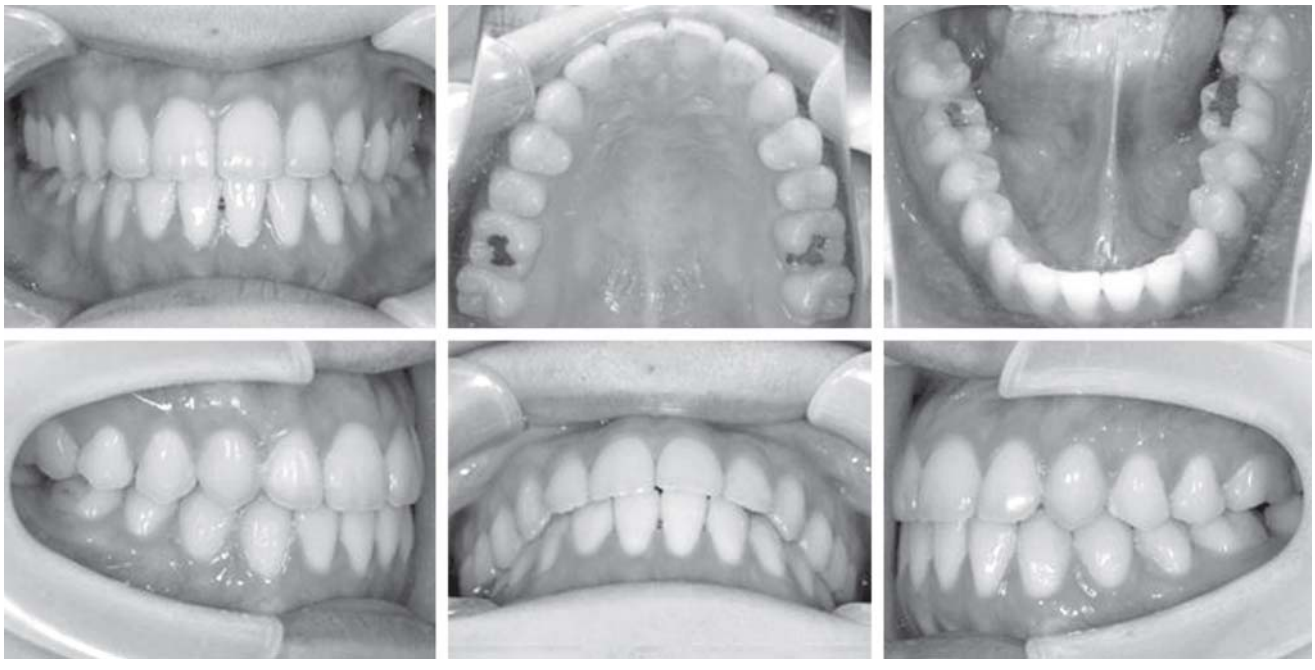


Fig. 6: Post-treatment intraoral views

transitional open bite was observed after the correction of anterior crossbite. Therefore, IME and ISW MEAW were used to correct the transitional open bite. After bite control, differential ISW MEAW (R > L) was applied over the lower arch, anterior retraction was subjected to differential forces (R: 150 gf/L: 100 gf) and IME for midline was adjusted in the period of 8 months. Finally, the treatment was completed within 16 months and a stable occlusion was achieved after the active treatment.

RESULTS

The correction of anterior crossbite was more efficient and simple with the use of ISW curve. In addition to using ISW curve, IME and ISW MEAW for bite control; differential ISW MEAW (R > L), anterior retraction with differential forces (R: 150 gf/L: 100 gf) combined IME for midline and facial asymmetry correction were also applied during the treatment procedure. After 16 months of therapy, a desirable occlusion of adequate overjet and overbite was achieved through a clean and efficient treatment (Figs 6 and 7). A desirable outcome was achieved and the patient was very pleased with the active treatment result.

Radiographs showed that both the upper and lower dentitions were displayed on the proper position without root resorption. The mandible was rotated to the right side for facial asymmetry correction (Fig. 8).

DISCUSSION

Some special ISW mechanics were used to correct the problems appeared in this case and were discussed individually, as follows:

1. Bite control with up and down IME and ISW MEAW (Fig. 9): During the treatment period, there were some possible reasons causing transitional open bite. Firstly,

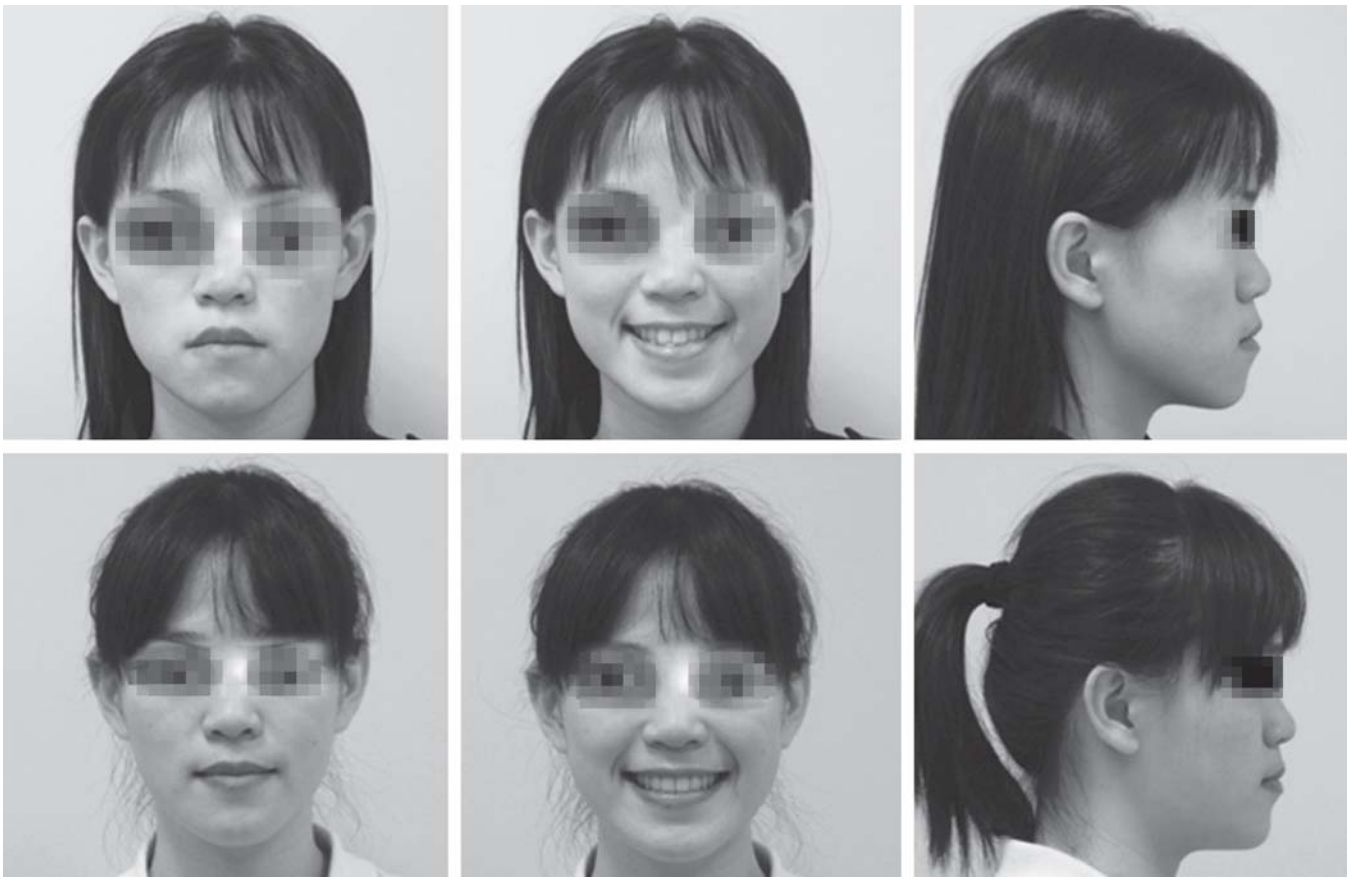


Fig. 7: Comparison of pretreatment and post-treatment facial photographs

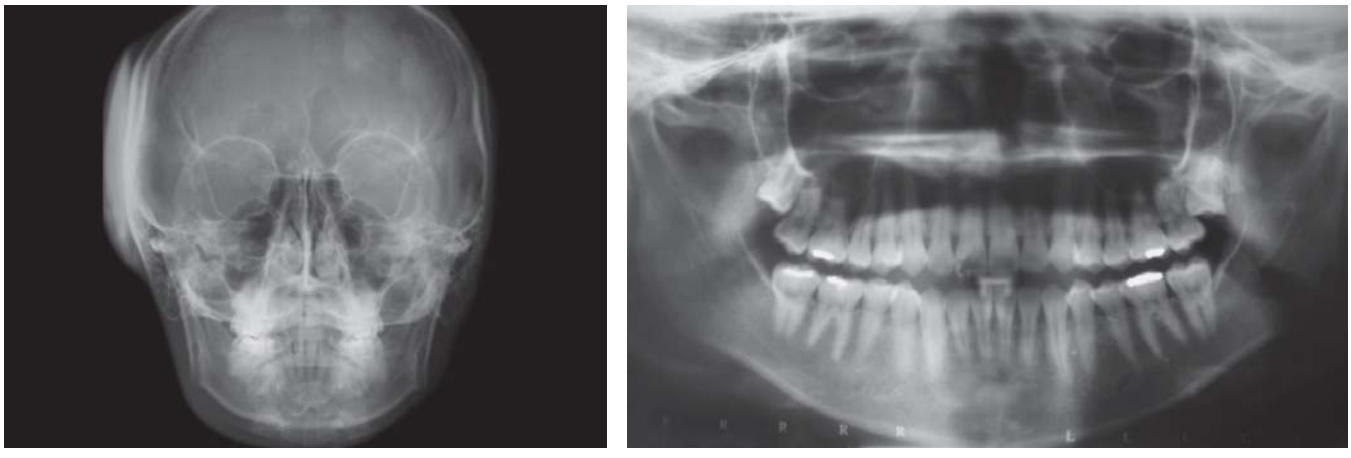


Fig. 8: Post-treatment panoramic radiographs

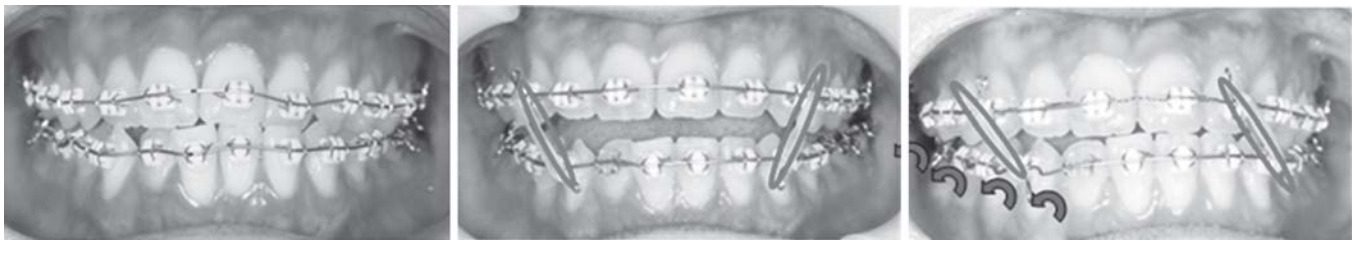
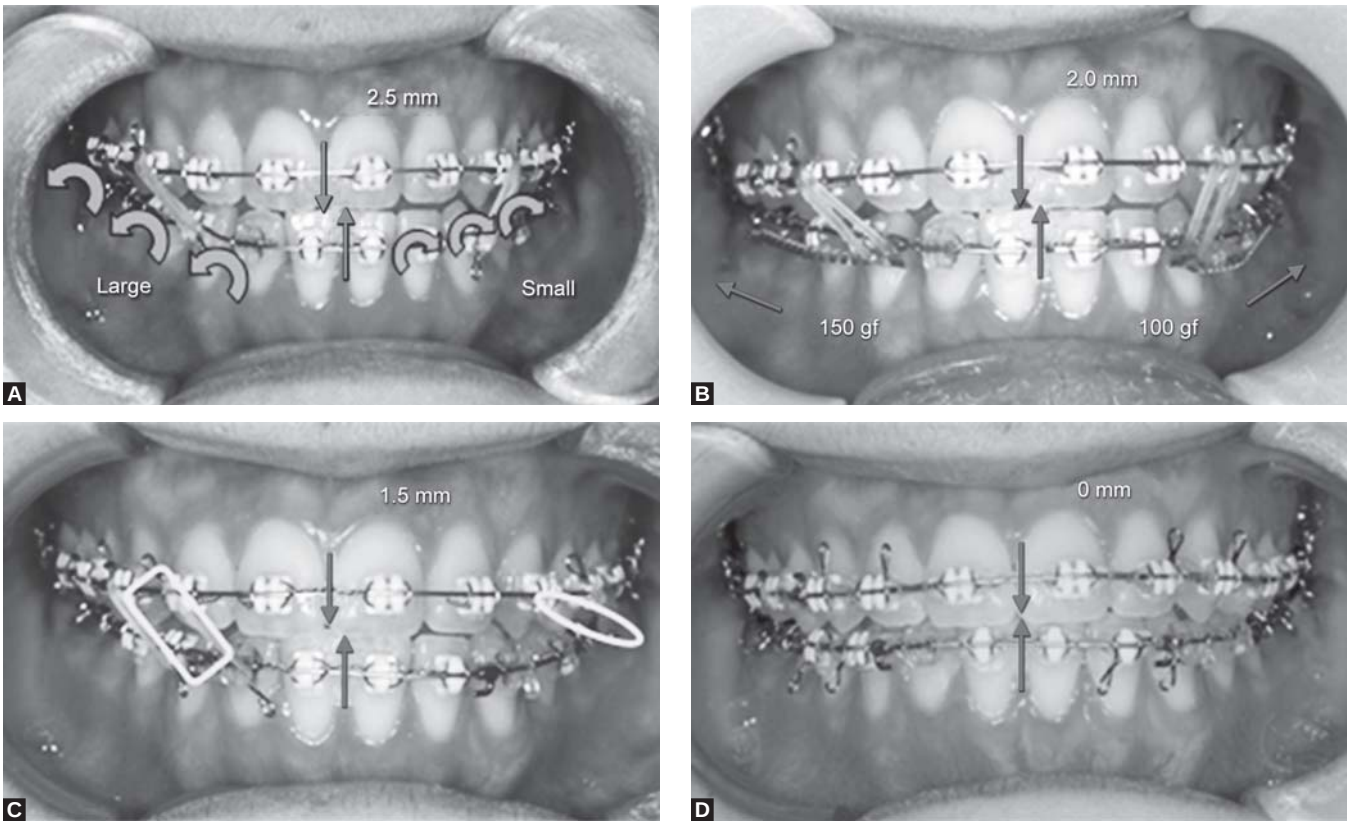


Fig. 9: Up and down IME combined with ISW MEAW was used to achieve bite control



Figs 10A to D: (A) Differential MEAW was used to tip teeth backward by varied degrees during the 8th month, (B) anterior retraction with differential forces (R > L) to correct midline during the 10th month, (C) IME for midline adjustment during the 11th month and (D) midline correction during the 13th month

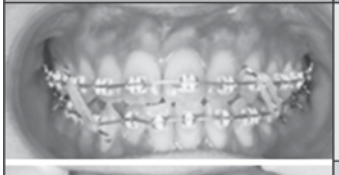
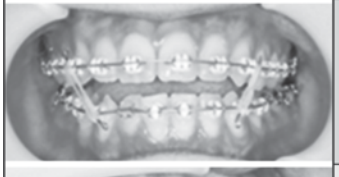
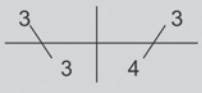
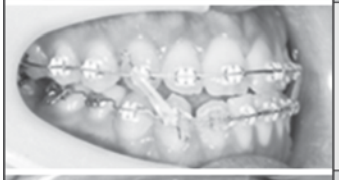
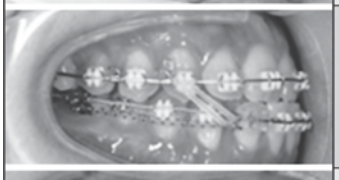
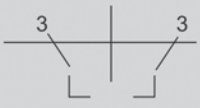
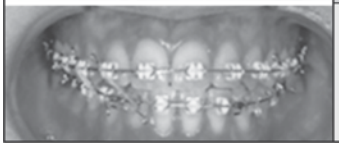
	Position	Existing problem	Explanation
		Anterior crossbite and midline inconsistency	Move lower anterior teeth to the right side and facilitate correction of mild facial symmetry
		Open bite	Bite closing
		Poor canine interdigitation	Facilitate canine cuspal interrdigitation and reinforce class III MEAW effect
		Anterior retraction	Facilitate anterior retraction
		Midline inconsistency	Improve canine relationship midline correction

Fig. 11: IME used in this case

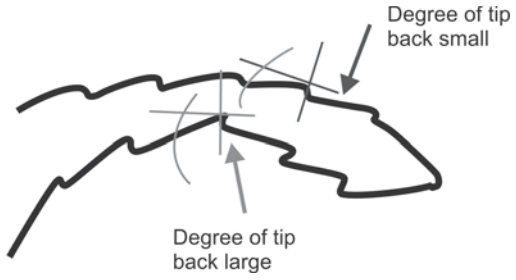


Fig. 12: ISW differential MEAW can make teeth have different tip-back moments and amounts of intrusion

the bonding position of molar bracket was too close to the gingiva, which led to a temporary extrusion of molar after leveling. Secondly, the other reasons were likely to be associated with the process of molar scissors-bite correction, and occlusal interference, and other unrevealed causes.

There are a few traditional approaches which can be used to correct transitional open bite. Apart from using high-pull headgear to intrude and tip-back the upper first molar, using miniscrew to intrude molars is another alternative. With the use of SSW multiple L loops to tip-back molar crown is also a choice; however, it needs more complicated laboratory or wire bending procedures. Transitional open bite in this case was likely due to the process of anterior crossbite correction and the process of #47 lingual tipping correction. Up and down IME combined with ISW MEAW was used to perform correction. The outcome of an increase of 4.0 mm in overbite was achieved through ISW MEAW with up and down elastics.

2. These techniques used to correct midline and achieved satisfied outcomes for this case including (Fig. 10A)

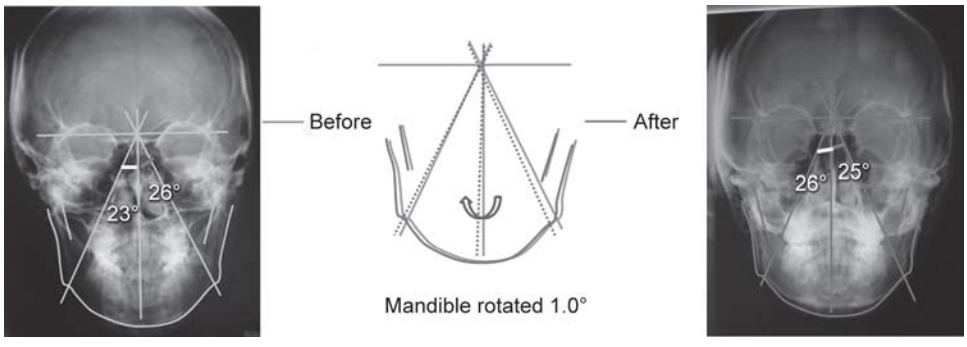


Fig. 13: Differential ISW MEAW combined IME was used to correct the minor facial asymmetry. The mandible was rotated about 1.0 to right side

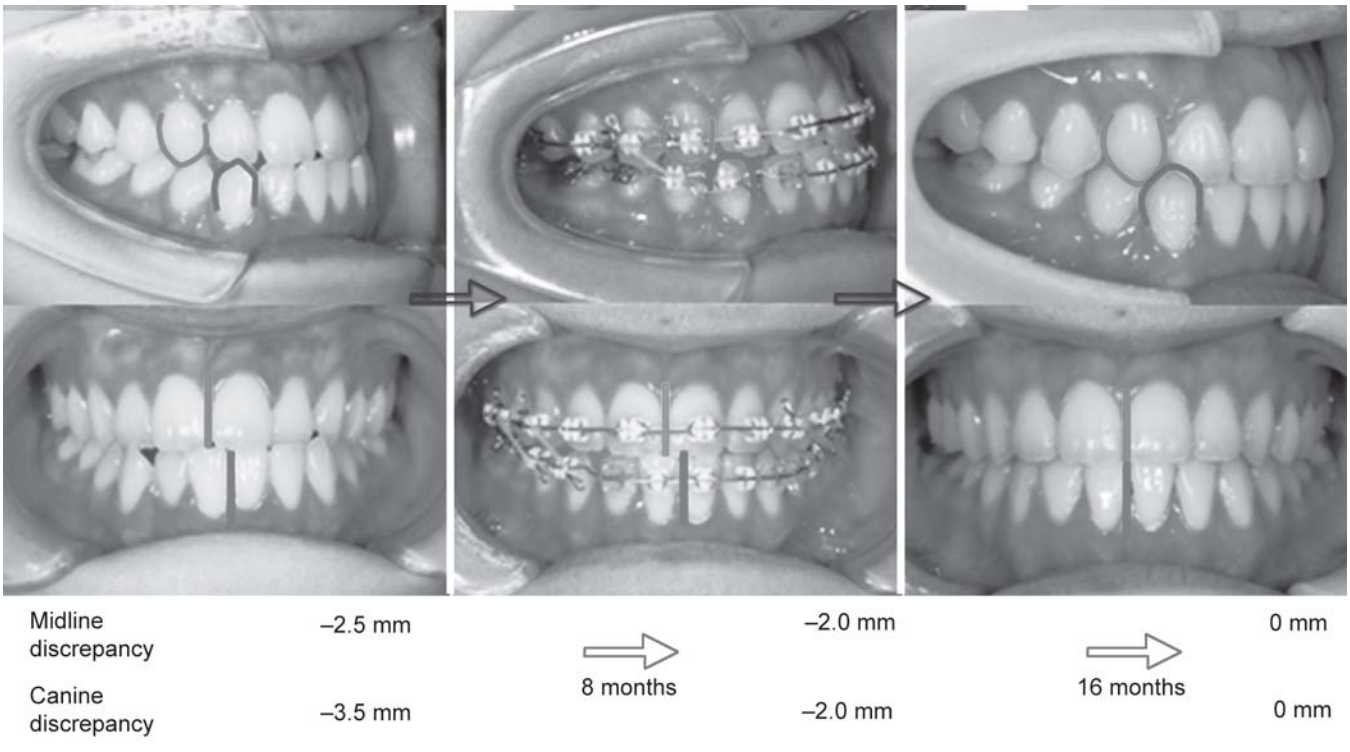


Fig. 14: The duration to facilitate correction of canine discrepancy and midline discrepancy was 8 months. ISW MEAW combined IME was useful to facilitate intercuspal interdigitation, midline correction and facial asymmetry correction at the same time

differential ISW MEAW (R > L) over the lower arch to create differential space, followed by anterior retraction with differential forces (R: 150 gf/L: 100 gf) over the lower arch to rotate the lower arch (Fig. 10B), and then IME was used for midline adjustment (Figs 10 C and D).

3. IME was largely used to correct some dental discrepancy for this case (Fig. 11).
4. ISW MEAW was very useful in treating this case.

The differential ISW MEAW (MEAW can provide tip-back mechanics to and intrude teeth, Fig. 12) combined with IMEs were used to correct facial asymmetry (Fig. 13), which is useful to facilitate the corrections of intercuspal interdigitation, midline correction and facial asymmetry (Fig. 14) at the same time.

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