

Face Mask (FM) Protraction with Rapid Maxillary Expansion (RME): Is this complicated modality necessary?

The RME/FM approach is very effective for correction of Class III malocclusion, but the method has some disadvantages: heavy force is needed for RME, and the FM requires excellent compliance. This section will pursue the possibility of using relatively simple edgewise mechanics to replace the complicated RME/FM approach. The alternate edgewise treatment option, that is proposed, is predicated on a proper differential diagnosis, emphasis on relatively simple mechanics, avoidance of over-treatment, and providing realistic expectations for the patient, relative to the influence of early treatment on severe prognathic Class III malocclusions. (Int J of Othod Implantol 2014;36:4-21)

1. Development of RME / FM on Class III treatment

In 1944 Oppenheim¹ believed that growth of the mandible could not be controlled, and suggested moving the maxilla forward to counterbalance mandibular protrusion. In the 1960s Delaire et al.² stimulated interest in using a face mask for maxillary protraction. Petit³ modified the Delaire face mask concept, by increasing the amount of force generated by the appliance, thereby decreasing the overall treatment time.

In 1987, McNamara⁴ introduced the use of a bonded expansion appliance, with a bilateral section of acrylic occlusal coverage bonded to all teeth in the buccal segments, as anchorage for maxillary protraction. Turley⁵ suggested that expansion of the maxilla, prior to protraction, “disarticulates” the maxilla and thus facilitates its forward movement when protracted.

2. Treatment timing for the RME / FM approach

The main objective of early face mask treatment is to enhance forward displacement of the maxilla by sutural growth. Histologic studies have shown that the midpalatal suture is broad and smooth during the “infantile” stage (8 to 10 years of age). The suture becomes more squamous and overlapping in the “juvenile” stage (10 to 13 years), and becomes more heavily interdigitated around puberty.⁶ Many reports suggest

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that the optimal time for RME/FM is before the age of 8 years. Other articles claim that there is little difference between early (*before 8-10 years old*) or late (*after 8-10 years old*) relative to RME/FM treatment for severe Class III malocclusions.

The limiting factor for Class III treatment is the lack of a clinical appliance that can stop late mandibular growth. Thus, the earlier a patient is treated, the greater the concern about late mandibular growth. Mild to moderate Class III patients can be managed with early treatment without any significant problems. However, early treatment of severe Class III malocclusions is not effective, because the RME/FM cannot stop or even substantially influence mandibular growth. Observation is probably a better approach than early treatment for severe Class III patients. Difficult skeletal Class III problems cannot be effectively managed until growth is complete, so orthopedics during the growing years risks a long, relatively unproductive course of treatment. The patient may be burned out before definitive treatment can be accomplished.

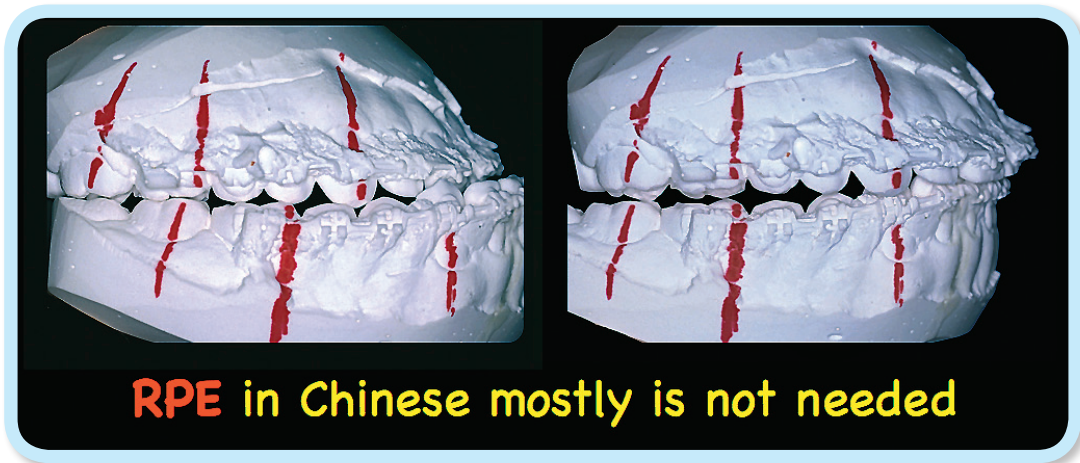
3. Is RME really necessary?

In article about rapid palatal expansion (RPE) Haas⁷ mentions that expansion alone can advance the maxilla. This publication had a profound influence on many orthodontists, who continue to prescribe RPE for Class III maxillary deficient patients, in hopes of achieving advancement. However a follow-up study by Werz et al.⁸ found that maxillary advancement due to RPE treatment is limited and unpredictable; the average amount of advancement was around 0.5mm. So far, there is no definitive, longterm follow-up study that supports substantial maxillary advancement with RPE treatment. However, many orthodontists still believe that RPE combined with face mask protraction (*FM + RPE*) is effective for treating maxillary deficient patients.

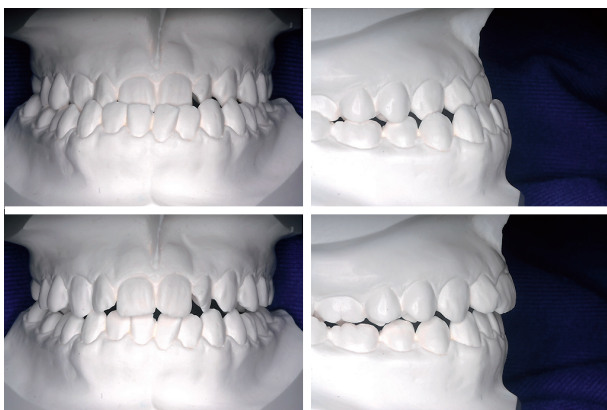
Vaughn⁹ and Tortop¹⁰ compared maxillary protraction therapy for Class III malocclusion, with or without rapid palatal expansion, and showed that both are effective for correcting Class III malocclusion. Sugawara¹¹ used an SAS (*skeletal anchorage system*) mandibular mini-plate to successfully retract the entire mandibular dentition to correct a severe Class III malocclusion. Hugo deClerck¹² prefers maxillary

and mandibular mini-plates, combined with Class III elastics to successfully treat Class III malocclusion. Neither of the latter mini-plate treatment systems used RME (*Rapid Maxillary Expansion*). This review of the literature begs the question: is RME really necessary to effectively treat most Class III malocclusions?

RME or RPE may be necessary for some very narrow upper arches, such as cleft lip and palate patients. However, for most Chinese Class III patients, RME is not needed. In preparation for orthognathic surgery on the Chinese Class III patients, Lin¹³ found little need for expansion of the maxillary arch. On the contrary, RME often resulted in buccal crossbite of upper second molars (Fig. 1). It was concluded that RME was not indicated for most Chinese Class III malocclusions.



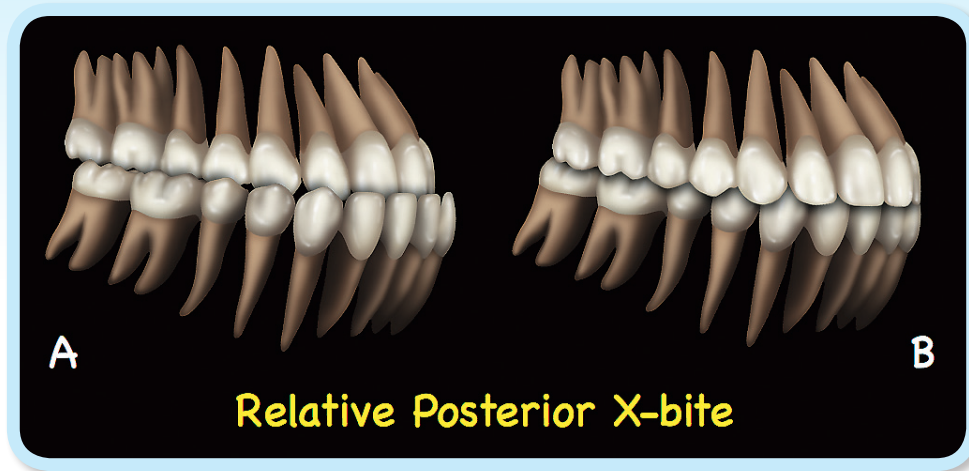
■ **Fig. 1.** A Chinese patient with a severe Class III malocclusion. Before orthognathic surgery, the model was positioned to Class I, but the upper arch not too narrow at all. On the contrary the upper 2nd molars were in buccal crossbite, and orthodontic constriction was needed before orthognathic surgery for optimal arch coordination.



■ **Fig. 2A.** A severe Class III malocclusion with buccal crossbite, but after positioning the model into Class I, the buccal crossbite disappeared.



■ **Fig. 2B.** The Damon system corrected the Class III relationship to Class I without rapid maxillary expansion. When the sagittal discrepancy was corrected to Class I, the buccal crossbite disappeared.



■ **Fig. 3:** A graphic representation shows the relative buccal crossbite associated with Class III malocclusion.
 A. Before treatment, there is a complete crossbite of the entire maxillary arch.
 B. After the Class III buccal segments are corrected to Class I, the crossbite disappears.



■ **Fig. 4:** Using the Damon system, the Class III was corrected to Class I without rapid maxillary expansion. Once the anteroposterior relation was corrected to Class I, the buccal crossbite was gone.



■ **Fig. 5:** The Damon system was used to correct this Class III malocclusion without rapid maxillary expansion. Just after the anteroposterior relation was corrected to Class I, the buccal crossbite gone.

Fig. 2A shows initial casts of a severe Class III malocclusion. When the casts were positioned in a Class I molar relationship, most of the buccal crossbite disappeared. Thus the posterior crossbite is not a transverse but a sagittal problem. Correction of the malocclusion with the Damon system (Fig. 2B) confirmed the prognosis predicted from repositioning the casts (Fig. 2A). A graphic of a relative Class III posterior crossbite shows that when the anterior-posterior aspect of a typical Class III malocclusion is corrected, the buccal crossbite disappears (Figs. 3). Further clinical documentation of this concept is shown in Figs. 4 and 5. Two Class III malocclusions with varying degrees of posterior crossbite, or at least end-to-end occlusion, were treated to Class I. Note, in each instance, the relative buccal crossbite self-corrected after the Class III buccal segments were corrected to Class I.

4. RME/FM Treatment for Class III Malocclusions

(A) Most popular method for early Class III treatment

Chin cap therapy does not change the inherent growth pattern,¹⁴ so it is difficult to achieve a favorable profile for patients with a severe mandibular protrusion. The obvious alternate strategy is to enhance the growth expression of the maxilla. The Delaire² face mask method was modified and popularized by Petit,³ McNamara,⁴ and Turley.⁵ As summarized in Fig. 6, RME/FM has become the most popular method for early treatment of Class III.^{15,16,17,18}

#	Name	Year	Journal	Samples No Original Final	Years of Follow-up (Age range)	Success rate	Research group
1	Hagg	2003	EJO	30 21	8yrs follow-up (8.4y-16.4y)	67%	Hong Kong
2	Westwood	2003	AJODO	34 34	6yrs 7mo follow-up (8y3m-14y4m)	76%	Michigan
3	Wells	2006	Angle O	41 41 41 22	5yrs (age?) 10yrs (age?)	75% 70%	North Carolina
4	Masucci	2011	AJODO	30 22	8.5yrs follow-up (9.2y-18.7y)	73%	Italy

■ Fig. 6: Long term follow up studies of RME/FM show that the failure rate is proportional to the length of the follow-up period.

(B) Lack of a randomized clinical trial

Most of the RME/FM studies are based on Caucasian patients, so the samples are small because Class III malocclusions are rare in this ethnic group. So it is difficult to collect a large unbiased sample from any office or institution. Currently most of the RME/FM treatment recommendations are based on reports from small and often poorly controlled studies.^{19,20} No well designed, randomized clinical trials have been reported for any ethnic groups.

(C) The problems with RME/FM studies

(1) Appropriate diagnosis

There are no standard methods for Class III patient selection. Thus, simple dentoalveolar problems are included with severe skeletal Class III cases. So, the same RME/FM treatment method has been used on all subjects regardless of the specific characteristics or severity of there Class III malocclusions.

(a) Profile assessment in CR

No published RME/FM studies have used the facial profile in CR to distinguish the severity of the malocclusion. Without an appropriate differential diagnosis, relative simple Class III cases are treated with the complicated RME/FM method, when a simple fixed orthodontics appliance may be more appropriate. Conversely, RME/FM treatment for a severe skeletal Class III malocclusion may be a waste of time and effort, for both the patient and the doctor, because the treatment will relapse and eventually require surgery anyway.

When planning a surgical correction, it is advantageous to begin with a stable malocclusion rather than one that is relapsing from an unstable correction. There may be a place for the RME/FM method, but it will probably be patients with moderate Class III malocclusions that are too severe for orthodontics alone, but not so severe that they will require surgery. The problem has been a lack of the routine application of a reliable differential diagnosis method to assign patients to the most appropriate treatment method.

(b) Class III molar relationship

The intermaxillary occlusal relationship can be evaluated in many ways, such as classification of the molars, canine relationships, and overjet. Most of the published studies only mention the Angle molar classification for Class III evaluation. Since not all Class III patients have an anterior crossbite, the molar classification is usually considered to be the most reliable index for assessing the intermaxillary discrepancy. It is proposed that modest Class III molar relationships can be treated with routine fixed orthodontics appliances, and the complex RME/FM is not indicated.

(c) Functional shift

The presence or absence of a functional shift is rarely mentioned in RME/FM reports. The greater the functional shift, relative to the intermaxillary discrepancy, decreases the indication for RME/FM intervention. Some studies^{15,18} considered a functional shift to be an exclusion criteria. This approach excludes many Class III cases because most young Class III patients have a functional shift. Excluding patients with functional shifts tends to bias the sample toward more severe, skeletal malocclusions, that are less likely to respond favorably to RPE/FM intervention for early orthopedic correction.

(d) Unreliable Wits appraisals

Wits analysis has been used for screening Class III patients, but the reliability of this index has been questioned.²¹ Westwood¹⁶ used -1.5mm or less, and Masucci¹⁸ favored -2.0mm or less, as an indicator for skeletal Class III malocclusion. However, it is currently proposed that Wits is not a consistent and reliable index for assigning Class III malocclusions for RME/FM treatment.

(e) Cephalometric evaluation.

There are no specific cephalometric standards for selection of Class III patients for RME/FM treatment. The most common criteria has been a normal mandible and deficient maxilla, but that approach is a relatively subjective criteria for selecting a specific treatment modality.

From the current review of literature, it appears that the criteria for RME/FM is based on anterior crossbite or Class III molars in CO. This approach fails to differentially diagnose the relatively simple from very difficult Class III malocclusions. A reliable differential diagnosis is essential to realistically assign patients to treatment methods, and reliably interpret the results.

(2) Late mandibular growth

Wells¹⁷ reported that the failure rate for correction of Class III malocclusion with RME/FM at 5 year recall was 20%, and it increased to 25% at 10 year recall. Late mandibular growth was the primary contributing factor.

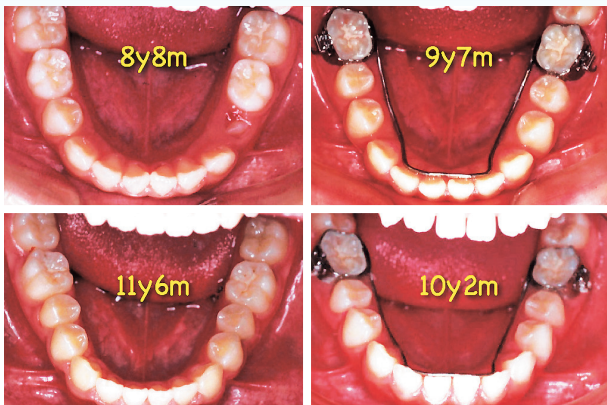
At present, there is no dentofacial orthopedic appliance that can control late mandibular growth. This is the major problem for early RME/FM treatment. Lack of an adequate differential diagnosis results in a relatively high failure rate for severe Class III malocclusions. It would be better to determine which patients are unlikely to have a satisfactory longterm result with RME/FM, and then delay definitive treatment until growth is complete.

(3) Early treatment and the waste of the precious E space

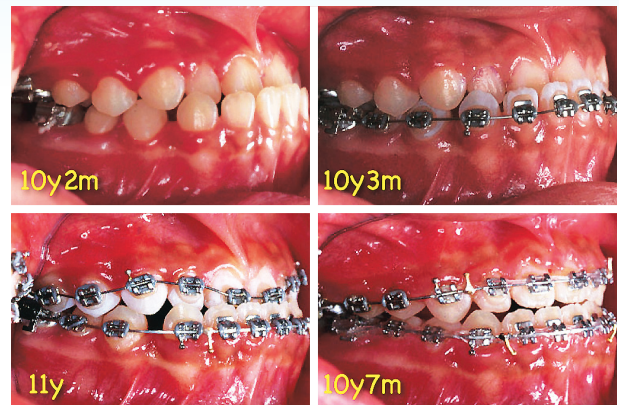
According to Delaire,² Class III Caucasian patients should be treated around age 8 to 10 years old to obtain the optimal orthopedic effect. This approach was deemed appropriate because the axial inclination of the maxillary incisors was usually normal, or lingually inclined, and the nasolabial angle was normal to obtuse. However, Asian Class III malocclusions usually are characterized by flared (*labially inclined*) upper incisors and an acute nasolabial angle. Early face mask protraction, usually tips the upper incisors labially, producing upper lip protrusion and a more acute nasolabial angle.

In Ngan's²² Chinese Class III treatment sample the upper incisor angulation from 93.5 to 103.0°. For a similar Korean RME/FM sample, Sung's²³ post-treatment patient records showed upper incisor flaring, maxillary lip protrusion and a more acute nasolabial angle. The patients may become bimaxillary protrusions, and extractions are necessary to correct the facial profile. These results question the value of early treatment with RME/FM.

An alternate approach to Class III treatment for patients, with labially inclined incisors and a acute nasolabial angle, is to preserve the E space with a lingual holding arch. After the lower permanent teeth have erupted, retract the mandibular anterior segment to correct the anterior crossbite without flaring the maxillary incisors. By utilizing the lower E-spaces, the protrusion of the upper lip and the decrease in the nasolabial angle are avoided. This approach decreases the risk that a second phase of extraction treatment will be needed (Fig 7).



■ Fig. 7A:
 In a anterior crossbite patient, the lower E-space was preserved with a lower lingual arch at the age of 8y8m. By 9y7m there is plenty of E-space for retracting the incisors to correct anterior crossbite.



■ Fig. 7B:
 After waiting until most of the permanent teeth erupted, the anterior crossbite was corrected mostly by closure of lower E-space. The upper incisor position was maintained.



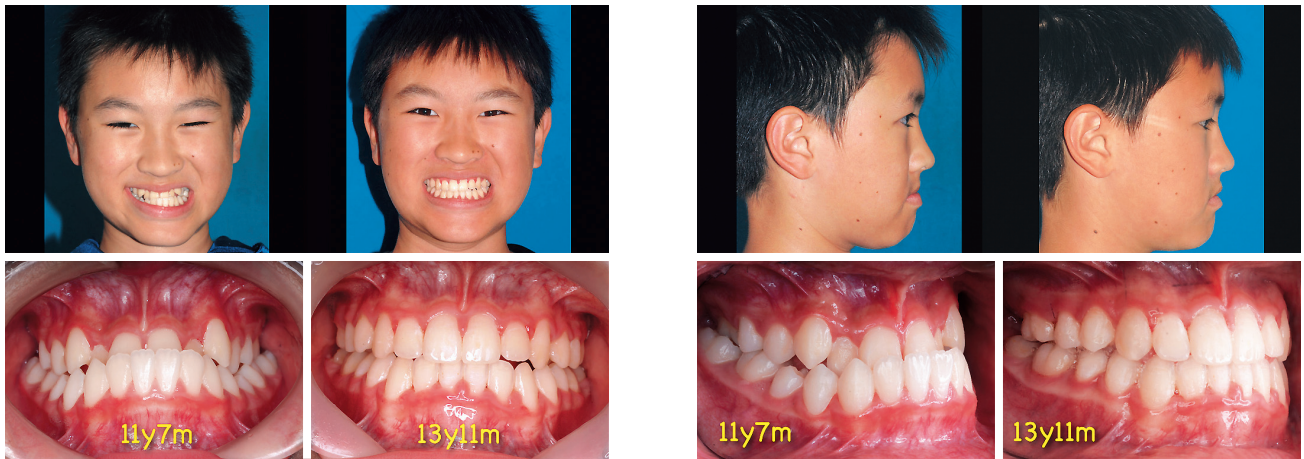
■ Fig. 7C:
 By using the lower E-space, the anterior crossbite was corrected by retracting the lower incisors. The upper incisor inclination and acute nasolabial angle were maintained. Due to late use of the E-space, extraction treatment can be avoided.

(4) Conservative edgewise treatment may be superior to RME/FM

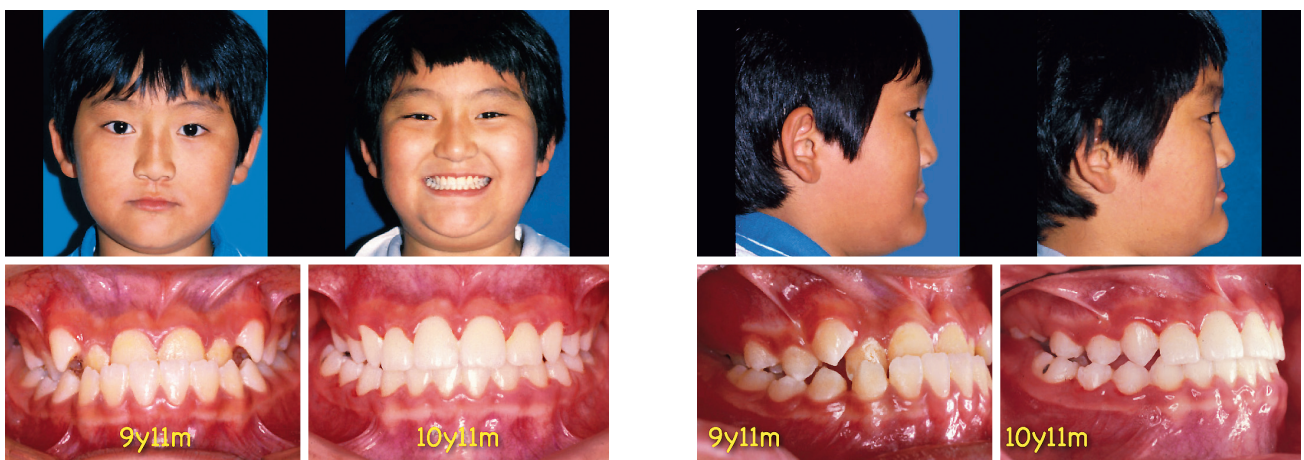
In a RME/FM study reported by Westwood,¹⁶ the pre-treatment molar relationship were mild Class III or even Class I, compared to the control group. In that study, it appears that the easier Class III malocclusions were selected for RME/FM treatment. Four long term follow up studies, of RME/FM intervention, report ~24-33% failure rate.^{15,16,17,18} Retreatment with extractions and/or orthognathic surgery is needed for the patients who experienced failure. It can be concluded that many of

the patients, who received early intervention, would have been better served with conservative edgewise therapy. The latter is clearly indicated for patients with an orthognathic profile in CR.

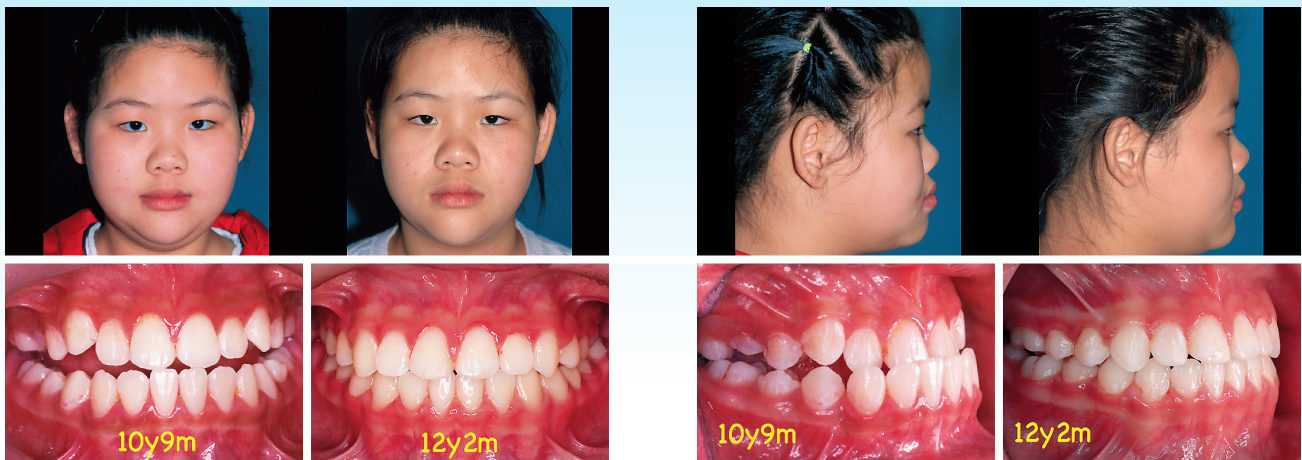
Figs. 8-10 document the diagnosis and conservative edgewise treatment for three severe Class III patients, who would not normally be candidates for this approach. However, the patient and their parents requested early treatment with a fixed orthodontic appliance. All the three patients were treated to Class I. They can enjoy the improved esthetics and function afforded by early treatment, but may still require additional treatment due to expression of late mandibular growth. There was no need to use the RME/FM approach to achieve the same result.



■ Fig. 8: The severe Class III was corrected to Class I with the Damon system. RME/FM treatment was not needed.



■ Fig. 9: A severe Class III case, was treated to Class I occlusion with a standard edgewise appliance without using any complicated RME/FM treatment.



■ Fig. 10:

A severe Class III case, was corrected to Class I with the Damon system, without using any complicated RME/FM treatment.

(5) Failure of RME/FM may be related to treating severe Class III patients

From the published composite cephalometric tracings, it is clear in Wells¹⁷ report that the failure group had a larger Class III molar relationship initially. It appears that the successfully treated group was predominately mild Class III patients, while the failure group was largely more difficult Class III malocclusions. This is another example where the successful group was composed of relatively mild malocclusions, amenable to conservative treatment with routine fixed appliances. A passive self-ligating bracket system can effectively treat these mild Class III cases in an expeditious manner. The more difficult Class III can also be treated early with conservative mechanics, but follow-up evaluation is recommended after mandibular growth is completed. As previously discussed, RME/FM is not helpful for severe Class III patients in the long term because they usually require definitive treatment after growth is complete.

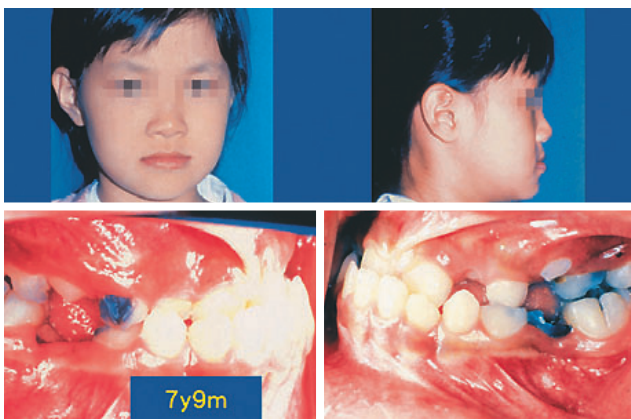
(6) Normalization of growth for skeletal Class III malocclusions

Burns et al.²⁴ considered the limits for Class III camouflage treatment. They suggested that it was important to use a chin cap or protraction face mask, to normalize the underlying skeletal discrepancy. However, clinical trials of the "normalization" concept have failed to produce consistent results. Sugawara¹⁴ concluded that it is difficult to achieve a favorable profile correction with orthopedic chin cap therapy in patients who have severe mandibular protrusion. A series of long term follow up studies of RME/FM treatment show that early intervention fails to achieve a satisfactory correction in up to a third of Class III malocclusions.^{13,14,15,16} These clinical data indicate that normalization the skeletal growth pattern in Class III patients is unlikely.

For mild Class III problems, it may be possible to achieve an adequate camouflage result, that will be satisfactory longterm. However, if early treatment is desired for a skeletal Class III malocclusion,

it is important for the clinician to emphasize that treatment, prior to completion of mandibular growth, is usually temporary. If patients and the family have unrealistic expectations, they will not only be dissatisfied with the predictable relapse, but will probably also lose confidence in the clinician.

According to the cases documented in Figs. 11 and 12, RME/FM is capable of advancing the maxilla in a short period of time to improve the mid face concavity (Figs. 11A-C). However, this treatment does not normalize the growth pattern. It is a short-term camouflage effect that is likely to relapse with additional mandibular growth (Fig.11D). Fig. 12 shows a 7y1m male, treated to a good result at

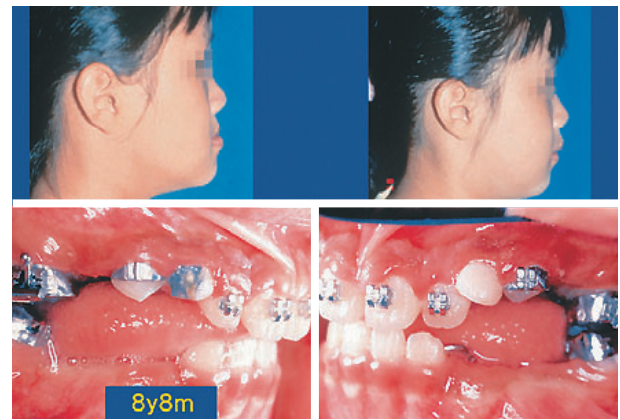


■ Fig. 11A: 7y9m

Profile : Prognathic.
Class : Severe Class III molar
Functional Shift: Yes

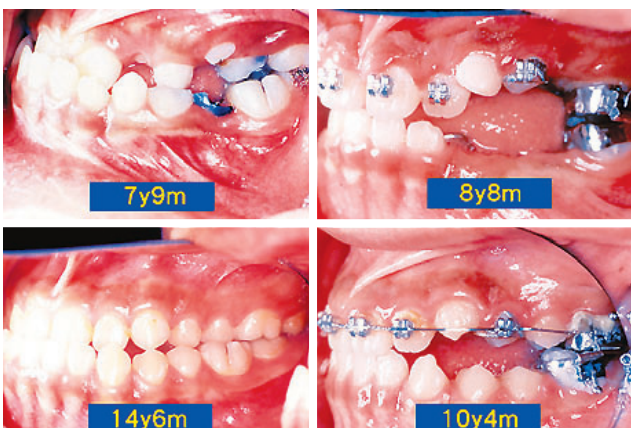
A severe Class III patient with prognathic profile in CR and a functional shift. The prognosis is not good.

(Courtesy Dr. Tony Wu).



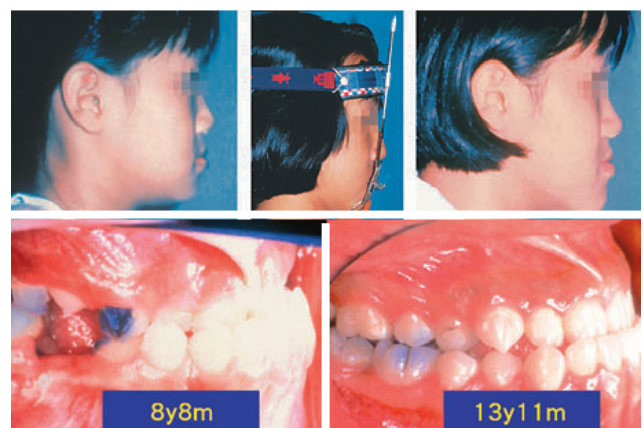
■ Fig. 11B: 8y8m

The patient shown in Fig. 11A had received RME/FM treatment. The profile became orthognathic within a short period of time. Hence, using RME/FM can produce a short-term orthopedic effect.



■ Fig. 11C:

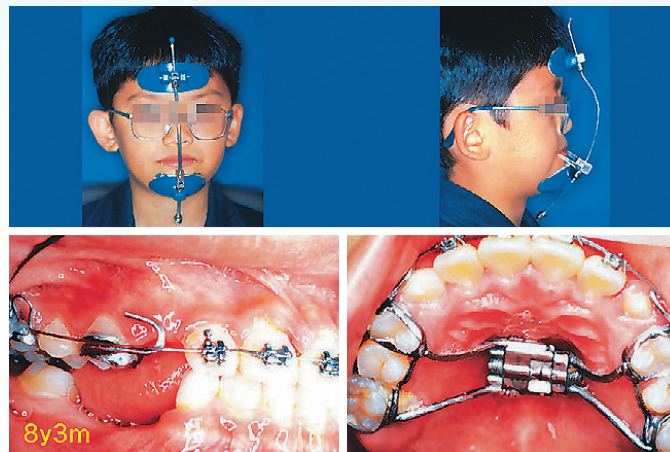
7y9m~14y6m: This Class III malocclusion patient underwent RME/FM treatment to achieve a Class II occlusion. At 1y8m later (age 10y4m), this patient had a Class I occlusion with shallow anterior overbite. By 14y6m of age, a complete relapse had occurred and the resulting Class III occlusion had severity similar to the pre-treatment condition.



■ Fig. 11D:

8y8m~13y11m: Although RME/FM produced an adequate treatment result short-term, but long-term follow-up showed a complete relapse to a severe Class III malocclusion with a prognathic profile.

age 10y5m with RME/FM treatment, who subsequently relapses to a severe Class III malocclusion by about 22 years of age. These results demonstrate that RME/FM treatment is not capable of normalizing growth to produce a satisfactory, long-term orthopedic effect. RME/FM treatment in the mixed and early permanent dentition should be considered a temporary measure.



■ Fig. 12A:

A Class III patient with a severe Class III molar relationship and prognathic profile, received early RME/FM treatment. (Courtesy Dr. Mogan Shen)



■ Fig. 12B: 7y1m

Profile : Severe Prognathic

Class : Severe Class III malocclusion

Functional Shift : No

This is a patient had a severe prognathic profile and Class III malocclusion, but no functional shift. He was treated with RME/FM.

10y5m: 6 months after RME/FM treatment, the crossbite was corrected, overbite was decreased, and the facial profile was only slightly prognathic.

14y6m: Follow-up 4y and 1m after treatment, showed that the molar and canine had relapsed to Class III occlusion, and the original prognathic profile had returned.

22y5m: Mandible continued to grow and develop into a severe Class III malocclusion with a prognathic profile that is worse than when the patient was younger. This patient requires retreatment with orthognathic surgery.

(7) Summary of RME/FM

In the short term, the RME/FM appliance appears to produce a substantial orthopedic effect, but long term, this favorable response is usually negated by the late mandibular growth. A better approach is to perform a differential diagnosis, to separate the mild from the severe Class III malocclusions, rather than performing early orthopedic RME/FM treatment on all of them.

Patients who are Class I or slightly Class III in CR are best treated with fixed appliances. More severe Class III patients will probably require definitive treatment with orthognathic surgery once growth is complete. If the more severe Class III patients request early treatment, and understand that the result is likely to be temporary, they are best treated with a fixed appliance like the Damon system. The RME/FM approach is more complex and cooperation dependent.

Facts about RME/FM Treatment

Short term orthopedics (+)

Long term orthoepdics (-)

Useful on easy mild Class III

Useless on severe Class III

■ Fig. 13:

RME/FM treatment: mild Class III can be treated with fixed appliances, but severe Class III must wait for growth to cease.

(8) Mini-plate protraction of the maxilla

TADs technology cannot replace proper diagnosis. Fig. 14 is a brief analysis of three published reports outlining the treatment of anterior crossbite. The first report³⁵ is about Le Fort I surgery combined with maxillary protraction. The second article²⁶ uses maxillary mini-plates for maxillary protraction. The third article¹² employs four mini-plates for skeletal anchorage to treat a Class III malocclusion: the plates are placed bilaterally in both the posterior maxilla and anterior mandible (*lower canine*) areas:

	Article	Malocclusion Type	Critique
1	Küçükkeleş N, et al 2011 (Le Fort I+RME/FM)	Class I anterior crossbite.	Should be an easy anterior crossbite treatment, by using the E-space; there is no need for Le Fort I surgery.
2	Cha et al. 2011 (mini-plate/FM)	A skeletal Class III with maxillary deficiency and mandibular prognathism. 8y5m - age 14y?	<ul style="list-style-type: none"> • Lack of long term follow up • Age of patient was not provided • Waste of precious lower E-space
3	Hugo De Clerck (mini-plate/mini-plate)	Case 1: Class III, functional shift 10y - 11y8m	No beginning CR profile, should be an easy orthodontic case.
		Case 2: Class I, 10y2m - 12y1m	Creates CII problem. Over treatment to Class II, no need.
		Case 3: Severe Class III sub 11y - 15y9m	Severe one, the prognathic profile and asymmetry will relapse.

■ Fig. 14: Critique of published reports of Class III treatment

(1) Küçükkeleş et al. Report

"Rapid maxillary expansion compared to surgery for assistance in maxillary face mask protraction. Küçükkeleş N, et al Angle Orthod 2011 Jan;81(1):42-49."

Basic Information:

This study compared 18 cases treated by RME/FM versus 16 cases treated by incomplete Le Fort I osteotomy and RME/FM. The conclusion of this study finds that the surgically assisted FM treatment was more rapid and effective in maxillary protraction compared to the RME and FM treatment.

Critique:

1. In this article, only one case was treated with an incomplete Le Fort I osteotomy plus RME/FM. The female patient had a straight profile, plenty of E-space, Class I molar, and an anterior crossbite. *This case could be corrected with routine orthodontics by conserving the E-space, for retraction of the lower incisors, to help correct the crossbite.*

2. An appropriate method for differential diagnosis helps avoid invasive surgical treatment if there is not a clear indication. This finding highlights the importance of carefully examining case reports relative to case classification, diagnosis and long-term results.
3. When a Class I or slight Class III patient with an anterior crossbite is treated with RME/FM, the correction often results in the buccal segments becoming Class II. If there was a substantial functional shift at the start of treatment, an excessive overjet and retrognathic profile can occur, indicating the RME/FM approach was inappropriate. Thus, a reliable differential diagnosis before beginning treatment is critical to efficient management of anterior crossbite malocclusions.

(2) Cha et al. Report

"Maxillary protraction with miniplates providing skeletal anchorage in a growing Class III patient. Cha BK, et al. Am J Orthod Dentofacial Orthop 2011 Jan;139(1):99-112."

Basic Information:

This is a case report for a female with a Class III subdivision malocclusion. The patient was aged 8 years and 5 months and her chin deviated to the right side. She underwent 14 months of miniplate/FM protraction followed by finishing with fixed appliances. The patient was followed for 27 months after treatment. No precise age was provided for the final records, but it is estimated that she was ~14 years old.

Critique:

1. The facial profile photograph appears to be a bimaxillary protrusion. If that was the chief complaint, four quadrants of asymmetric premolar extraction might be a better treatment option. That would be a simpler and less invasive solution, compared to miniplates and face mask.
2. If the patient preferred nonextraction treatment, then a lingual arch could be placed to preserve the large mandibular E-spaces. Once the buccal segments erupted, the anterior crossbite could be corrected primarily by retraction of the lower anterior segment using the E-spaces for anchorage. Using this approach, the lips could be retracted and there would be no need for invasive mini-plate/FM treatment.
3. The original diagnosis overemphasized maxillary deficiency and failed to consider the original dental and skeletal asymmetry. After 14 months of protraction treatment, the skeletal and dental midlines

were still asymmetric, and remained so at 27 months after appliance removal. In this patient, the invasive mini-plate and protraction treatment did not lead to an optimal result. Routine orthodontics mechanics utilizing the E-spaces, and/or asymmetric extraction of premolars would probably have produced a better result.

(3) De Clerck Report.

"Orthopedic traction of the maxilla with miniplates: a new perspective for treatment of midface deficiency. De Clerck H, et al. J Oral Maxillofac Surg 2009;67:2123-9."

Basic Information:

Case 1: The patient has a functional shift and presents with a mild Class III relationship. There is no facial profile in CR, so the three rings differential diagnosis is not possible. If the facial profile was orthognathic in CR, a relatively simple orthodontics treatment plan would have been possible.

Case 2: There was a very small mesial step, so it classified as a borderline Class I case.

Case 3: Indeed, this is a very severe Class III asymmetric malocclusion.

Comments:

Case 1: This appears to be a mild Class III, amenable to routine orthodontics treatment, without invasive mini-plates for skeletal anchorage.

Case 2: This is basically a Class I case that was treated to Class II, with an overjet.

Case 3: This is a very severe Class III malocclusion; invasive mini-plates are warranted.



■ Fig. 15:

From the superimposition of Hugo De Clerck's case 3, at age 15y9m, the mandible grew forward a great deal, even though the Class III elastics between the miniplates had protracted the maxilla considerably. The treatment did not stop late mandibular growth. (diagram made from Hugo De Clerck's published records)

Critique:

1. Placing mini-plates over in the posterior maxilla avoids problems with teeth, but the bone is thin, so there is concern about failure. In young patients it is difficult to place a mini-plate in the mandibular anterior region because of the potential to damage the developing canines. Overall, mini-plates in young patients is a technic sensitive surgery, requiring a well trained and experienced surgeon. Few orthodontists have access to such surgeons.
2. Mini-plates and long periods of elastics wear is worthwhile if a severe prognathic Class III patient can be corrected permanently. However, the results of case 3 appear to be only a temporary solution. The follow up records indicate the overjet was substantially reduced at the age of 15y9m, and in future follow up, a more asymmetrical and prognathic profile is expected (Fig 4).
3. Cases 1 and 2 did not require invasive surgery. Routine orthodontic mechanics, such as the Damon system, could treat these patients to a satisfactory result without surgery.
4. The mini-plate anchorage protocol can produce amazing skeletal results, but it is curious that no RME was used. RME is usually necessary for treatment of skeletal Class III, Caucasian patients.

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