This article has been peer reviewed

Class III Bilateral Posterior Crossbite with Three Horizontally Impacted Maxillary Anterior Teeth

By Stephen Howard, DDS, MScD, FASDC, FIAO

Abstract: What's in a pretty face? In our world, unfortunately, too much. As orthodontists our goal should be to provide our patients with a stable, functional occlusion. Consider, however, the importance of changing our patients' future by significantly improving their facial esthetics. The combination of a very narrow maxillary arch, three absent upper left incisors, and a protrusive lower jaw provide a platform for dramatic improvement in our patients' facial esthetics.

Key words: *Second molar replacement; multiple horizontal maxillary incisor impactions.*

Clinical Impression (Figure 1)

MC presented with a class III dental malocclusion. There was a bilateral posterior crossbite. The upper and lower anteriors appear detorqued, and more importantly, teeth #9, 10, 11 were absent.

The maxilla and mandible would each require its own time-consuming developmental correction to be made before the final level and aligning could be addressed.

As noted on the initial panorex (Figure 2), the upper left central, lateral and cuspid are horizontally impacted with the lateral most occlusal, the central most gingival, and the cuspid layered in between.

Surgery for the Class III protrusive lower jaw correction was declined by the family. Second molar replacement was chosen with the acknowledgement that both of the lower wisdom teeth might not erupt in a timely manner, would require "long term" observation, and possibly require future orthodontic intervention to correctly align them into occlusion.

Radiographic Evaluation (Figures 3 & 4)

MC indeed was a class III (Wits -8.7) with a Corpus Length of 71.5mm. Horizontal planes, however, had an open tendency (OP, MP, MA). Her upper esophageal airway was narrow (8mm at C2) and partially obstructed. On a positive note, her chin point was flat.

All three "missing" incisors were horizontally impacted with their crowns facing the midline. Wisdom teeth were all present, although adequate space was not available.

Goals

The initial intent was to position the secondary dentition into a serviceable functional and esthetic alignment. This included correction of the bilateral

Figure 1: Initial Photographs

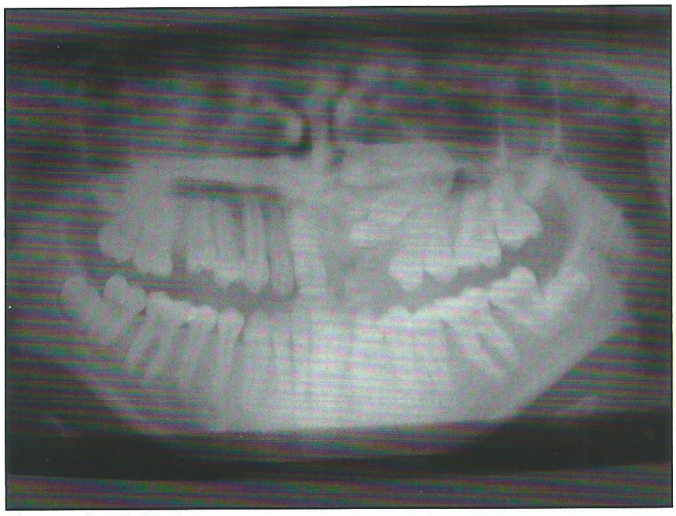


Figure 2: Initial panorex

crossbite, the class III skeletal relationship, and the positioning of teeth #21, 22 and 23 (#9, 10, and 11) into the dental arch.

As treatment progressed, the development of a more ideal end result seemed feasible. Normalizing facial esthetics became very important.

Treatment – Maxilla[1, 2]

Anchorage was accomplished with Delta brackets on all the upper teeth. Arch development to a 19x25 wire was achieved before teeth #21, 22 and 23 (#9, 10, and 11) were exposed. Chains were bonded to the lateral and cuspid (Figures 5 and 6). Access to the central (the most occlusal tooth) was restricted, therefore no chain was placed on this tooth. (a)

The lateral was the first tooth to erupt, followed by the cuspid. The central, which was not chained, followed suit. "Elastomeric traction" from the lateral and cuspid pulled the central into occlusion. This was not by design. An additional surgical procedure to chain the central was anticipated.

Upper arch alignment required expansion circumferentially and adjustment of the midline to the right.

Treatment – Mandible

Second Molar Replacement[3, 4] involves the removal of the second molars with the subsequent distalization of the mesial teeth into the extraction site such that the upper to lower interdigitation provides for appropriate function. Mesial growth and development of the lower wisdom teeth would complete the posterior occlusion.

A Distalizer 2000 (DynaFlex Laboratory, St. Louis, Missouri)* was placed on both lower first molars. Additional anchorage was provided by bonded "Y" occlusal rests to the four bicuspids. Both lower second molars were then removed. Once the lower first molars were distalized, the second bicuspids were released from their "Y" bondings and retracted.

Timing of the removal of the second molars is important as it has been shown that if the wisdom teeth are not at a particular developmental stage they may not develop, or develop much later in life.[4]

Delta brackets were placed to complete the alignment of the lower arch. The lower arch was then used as anchorage for vertical elastics to help extrude teeth #21, 22 and 23 (#9, 10 and 11). Anterior cross elastics (maxillary cuspid to the contralateral mandibular cuspid) aided in midline adjustments.

Results

Esthetically MC has had a wonderful facial make-over. Her eyes are full of life. Other than a slight thinness of the upper lip relative to her lower lip, the soft tissue contours of her cheeks, nose and lips are esthetically pleasing (Figures 7 and 8).

The final occlusion is a Class I with a posterior crossbite of the upper first molars and second bicuspids. Both the upper and lower arches have been rounded out, but this posterior crossbite has contributed to dark triangles in the right and left buccal corridors. The upper and lower dental midlines have been adjusted to the facial midline. The overbite is 10%, and the overjet is 0. With careful observation you will note that the gingival margins of the upper left central and lateral are somewhat more gingival then their antomers.

From a cephalometric perspective (Figures 9 and 10)

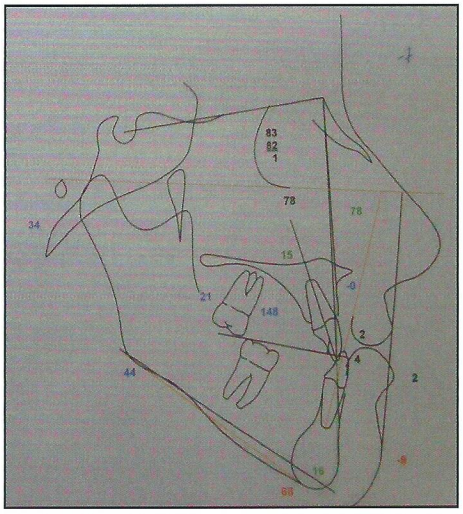


Figure 3: Initial Steiner Tracing

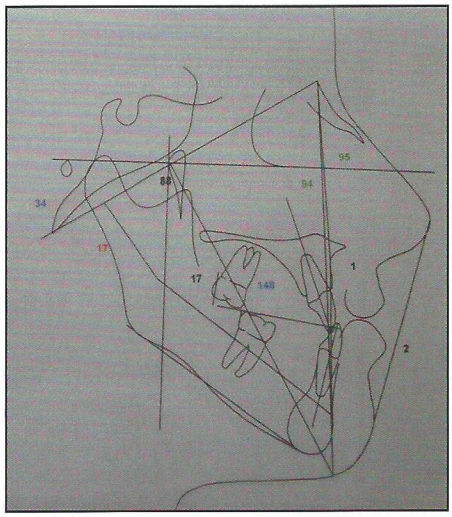


Figure 4: Initial Ricketts Tracing

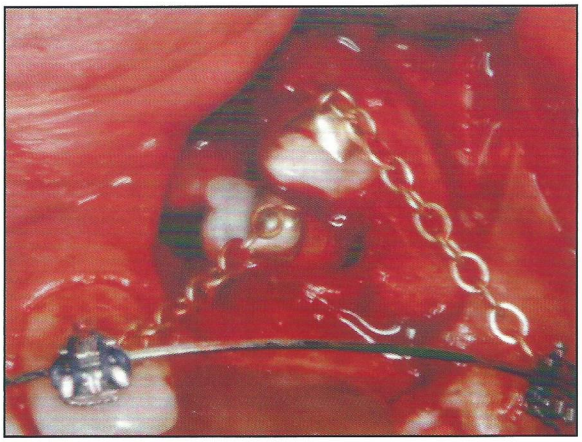


Figure 5: Initial Bonding Gold chains

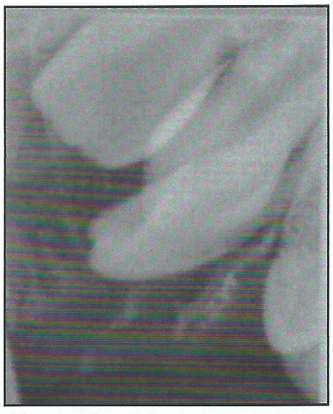


Figure 6: PA x-ray impacted incisors

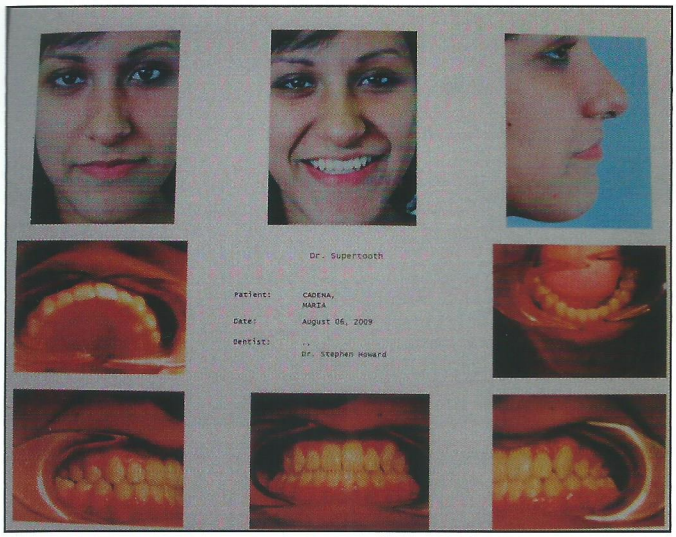


Figure 7: Final Photographs

most of the numerics have been normalized. The Wits finished at a -5.2 (origninally -8.7). A flat chin point and somewhat upright lower incisors (18 degrees) aides in masking this skeletal discrepancy. Table 1 and Figure 11 provide a before and after cephalometric analysis.

Periodontal Evaluation

One month (9/15/09) after the removal of the fixed appliances a periodontal evaluation was performed. (b) At this time MC was wearing upper and lower Hawley retainers. The periodontist used the "final" panorex for reference. His evaluation addressed three concerns: the mobility of the upper left anteriors, the shortened root of tooth #22 (#10), and the bony defect between teeth #22 and 23 (#10 and 11).

The periodontist's recommendation was to observe the area for a period of six months in hopes of seeing improved bone remodeling, which would increase the stability of these teeth.

Retainer compliance turned out to be non-existant. Within one month an EZ bond retainer was placed on the lower anterior teeth (Figure 12), brackets were replaced on the upper anterior six teeth for three months, and then an EZ bond retainer was placed on the upper anterior teeth.

The periodontist re-evaluated MC 6/23/10 but was unable to make a determination of the mobility/stability due to the fixed nature of the retention system.

A panorex taken 8/10/10 (Figure 11) showed the distal aspect of tooth #22 (#10) with a bony defect that had filled in to some degree (vs panorex 8/6/09; Figure 8). There will be continued radiographic evaluation of this site.

Discussion

This is an interesting case in that it poses three distinct problems that could potentially compromise the results of the case. There is a maxillary transverse deficiency; three horizontally impacted maxillary incisors; and a class III skeletal/dental malocclusion. The key to success is

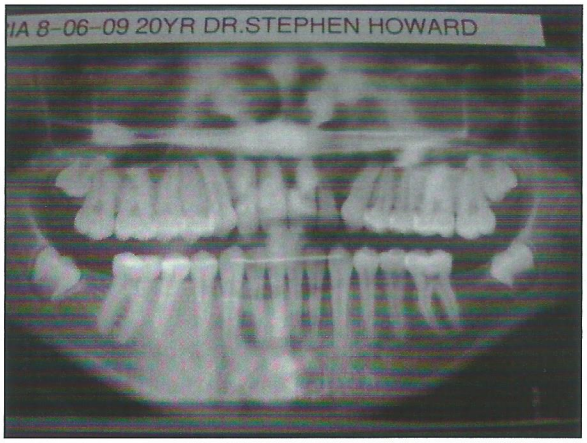


Figure 8: Panorex taken 8-0-09.

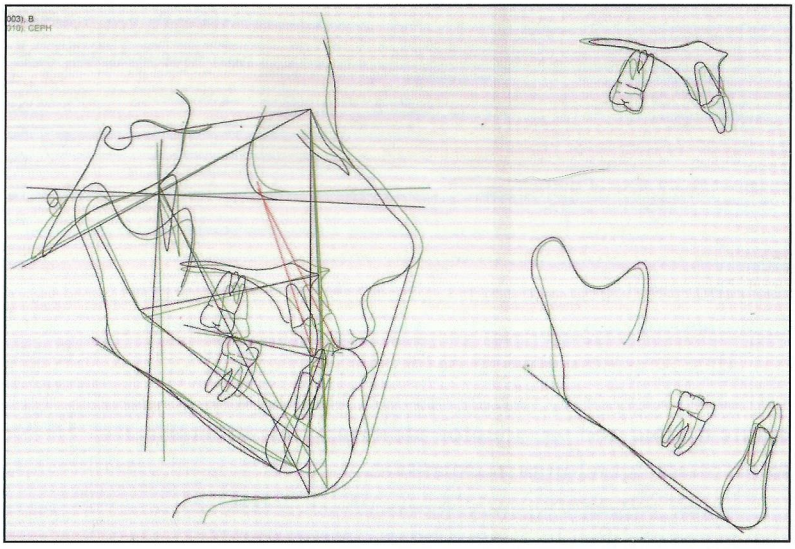


Figure 11: Superimposition

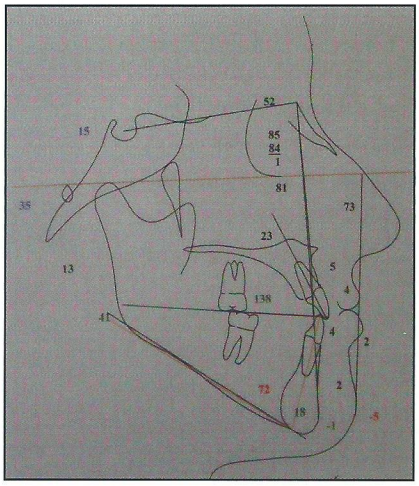


Figure 9: Final Steiner Tracing

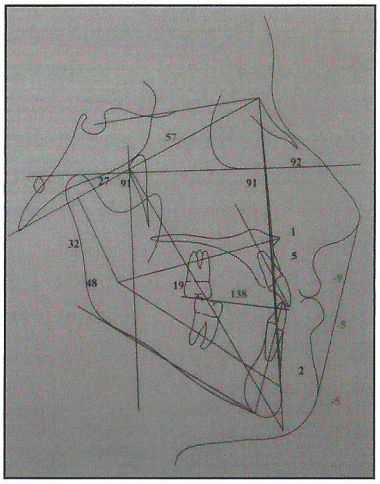


Figure 10: Final Ricketts Tracing

Table 1- Cephalometric Measurements

	Norm	Pretreatment	Posttreatment
Maxilla to Cranial Base (SNA)	82	82.9	84.8
Mandible to Cranial Base (SNB)	80	82.0	84.1
Maxilla to Mandible (Wits)	-1.0	-8.7	-5.2
Convexity Pt. A (A-NPo)	1.0	1.5	1.0
Mandibular Arc (degrees)	30	17.3	31.9
Corpus length (Xi-PM)	-	71	72
U1 – NA (degrees)	22	14.9	23.1
Li – NB (degrees)	25	16.4	18.3
Occlusal Plane – SN	14	20.7	13.3
Mandibular Plane (GoGn-SN)	32	43.5	40.6

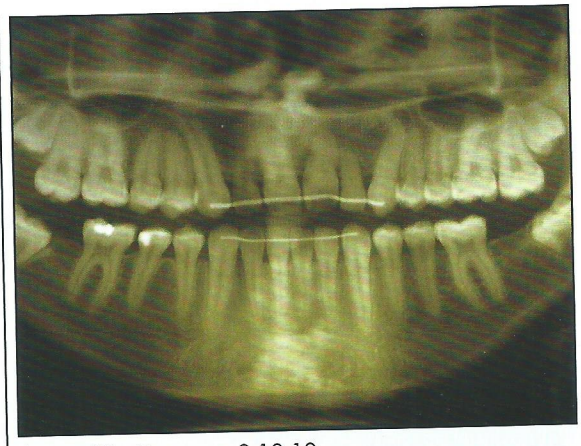


Figure 13: Panorex 8.10.10

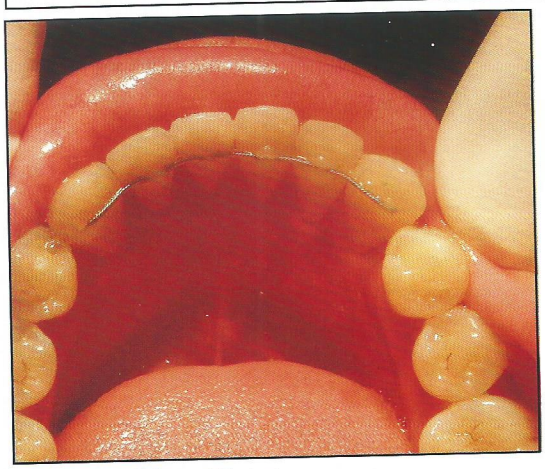


Figure12: EZ Bond Retainer

breaking each problem into separate entities, resolving each independently and then unifying the dentition in a final phase of treatment.

Transverse development of the maxillary arch at an early age (5 to 7 years old) by opening the midpalatine suture is rapid and provides for additional time to retreat, as necessary, for additional expansion.

Earlier intervention would have probably reduced the degree of difficulty created by the impacted upper anteriors. MC did not, however, seek orthodontic therapy until age 15.11 years.

Class III treatment via mandibular 2MR requires that skeletal/dental development is monitored into later stages of growth and development, and treated when the appropriate development of the lower wisdom teeth is reached. Literature has shown that 2MR treatment at too early a stage can impede the development of mandibular wisdom teeth.

The concerns for the development of the lower wisdom teeth has unfortunately come to fruition (Figure 13). Both lower wisdom teeth are in the advanced "cap" stage, will require continued observation, and more than likely require some orthodontic intervention in the future.

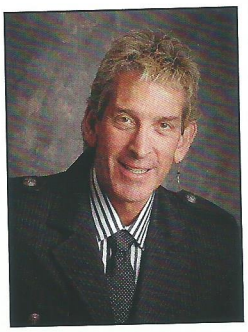
Finally, with regard to this "final" panorex: both upper cuspids exhibit distal root torque (due most likely to a bracketing error). Fortunately, their esthetic presentation is very satisfactory. The upper wisdom teeth are also in the advanced "cap" stage, and are scheduled for removal due to a shortage of arch length. The upper second molars will be controlled to avoid supra eruption and problems with lower wisdom teeth eruption.

References

1. Bayram: Maxillary canine impactions related to impacted central incisors: two case reports, *J Contemporary Dental Practice*, 2007 Sept 1;8(6):72-81.
2. Swart: Orthodontics in general Practice 4. Impaction of maxillary front teeth, Ned Tijdschr Tandheelknd, 2008 May: 115(5):252-8.
3. Bishara: Second Molar Extractions, *AJO* 89:415-424, 1986.
4. Broadbent: Second molar replacement applied to dentofacial orthopedics. *Functional Orthodontics*; 1999 Jul-Sept;16(3); 17-41.

(a) Dr. George Maranon, DDS, Practice Limited to Oral & Maxillofacial Surgery, Encino, California.

(b) Dr. Gordon Fingerman, DDS Practice Limited to Periodontics, Tarzana, California.



Dr. Stephen Jay Howard has been in practice since 1977 in Los Angeles, California. He is an alumni of New York University College of Dentistry (1974), & Boston University School of Graduate Dentistry (Pediatrics, 1976). He has both a Mastership & Fellowship in Pediatric Dentistry, and a Fellowship in Orthodontics through the IOA. Dr. Howard is a Certified IOA Instructor.

* DynaFlex; PO Box 99, St. Ann, MO; 63074-0090; www.dynaflex.com