



CASE REPORT

Non-Extraction Treatment in the Late Mixed Dentition

*Diana C. Fong, D.D.S.
Oakland, California*

Dr. Fong graduated from the University of Southern California School of Dentistry in 1989. She began her orthodontic studies in 1995 with the AAGO series of courses and has been a member of GOOD Seminars from 1996 to present. Dr. Fong completed the BioBloc Mini-Residency with Dr. William Hang in 2007. She was a founding member of the NAAFO. She practices in Oakland, California with her husband, Stephen Lee, who is also a general dentist, and they have two children Crystal and Claudia.

ABSTRACT

Late Mixed Dentition Treatment is a challenge. There is usually an urgent need for space for the erupting permanent teeth or an impending loss of the primary second molars of which many Phase I treatment modalities rely on for anchorage. Another setback occurs when the second molars begin to erupt, making it difficult to place molar bands on the first molars and the possibility of extended treatment at having to treat the second molars if they erupt out of alignment. While many girls begin to mature physically at age 9-10 and are done with the adolescent growth spurt by age 11-12, many orthodontists still recommend a single phase of treatment past this growth period for efficiency and predictability.

CHIEF COMPLAINT

A 10 year old girl presented with a chief concern of a blocked out lower canine and lower anterior crowding (Fig 1). She had a prior orthodontic consultation and was given a 2 year extraction treatment plan when all of her permanent teeth came in. Her mother requested a second opinion and accepted treatment only if it did not require any permanent teeth extractions. A decision was made to begin treatment at this time based on the following criteria:

- The patient had a right unilateral E-space remaining
- The patient's oral hygiene was good and she was cooperative
- The cervical vertebrae on the ceph appeared immature and indicated that the patient had long period of skeletal and facial growth potential despite early eruption of the canines and premolar
- The deep overbite could lead to future mandibular entrapment
- The unerupted second molars had space to erupt and were not impacted

MEDICAL HISTORY

Her medical history was non-contributory and there were no reported allergies, snoring, airway or TMJ issues. The patient was physically fit and excelled academically.

ETIOLOGY

The patient's right primary second molars teeth were retained. There was adequate E-space on the panorex. A premature loss of the lower right primary canine at age 9 and interruption in the permanent teeth eruption sequence caused the lower right permanent first premolar to erupt mesially into the canine space. (Fig 2)

DIAGNOSIS

Facial: Her cosmetic line measured 34.5 mm from the edge of the upper central incisor to the tip of the nose. The ideal cosmetic line was 33mm for a 10 year girl. Her face appeared full but it was not a concern to the patient or her parents. She kept her lips together because she did not like the appearance of her teeth. The patient had no mentalis muscle strain. (Table 1)

Skeletal and Dental: The patient had a skeletal and dental class I relationship. The cephalometric xray appeared normal for patient's age and growth (Fig. 3) The posterior airway space was 9 mm. The overbite was 75% and overjet was 2mm. There was a 2mm lower midline shift to the right.

TMJ: The patient reported no clicking or popping of the joints. Her mouth opening range of motion was 25mm – 48mm. There was no report of bruxism or clenching.

Oral Hygiene and Nutrition: The patient's oral hygiene was generally good but there were times when it needed improvement. She had a hygiene visit every six months. She ate healthy, home cooked meals. She had no caries during treatment.



Figure 1 - Pre-Tx gallery 2006

Date	Actual	Ideal for Age
3/28/2007	34.5 mm	Age 10 = 33 mm
5/2/2007	34mm	Age 10 = 33 mm
7/5/2017	38 mm	Adult 38 mm-42 mm
8/1/2020	38 mm	Adult 38 mm-42 mm

Table 1: The Cosmetic Line or Mew Indicator Line measurement identifies a patient whose facial and dental development is growing within normal limits or unfavorably ($23\text{mm} + \text{age of patient} = \text{Ideal Number}$)



Figure 2 - Pre-Tx Pano 2006

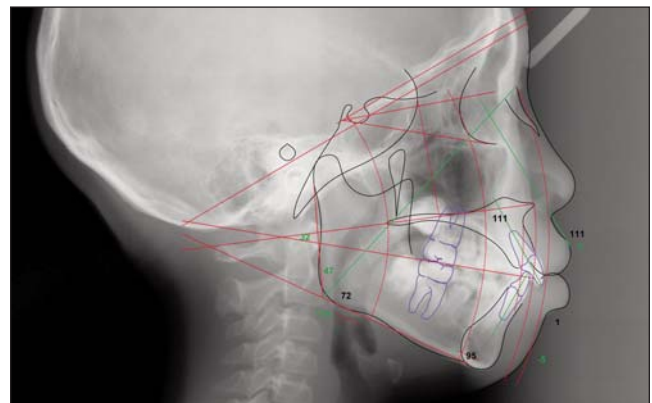


Figure 3 - Pre-Tx ceph 2006



Figure 4 - Sectional alignment wire

TREATMENT OBJECTIVES

1. Arch develop to create space
2. Level and align teeth
3. Correct the deep bite
4. Correct the lower 2mm midline shift to the right side
5. Monitor the growth and development of the teeth, face, and jaws
6. Evaluate for possible third molar extraction at a later age.

TREATMENT PLAN

A non-extraction approach using removable and fixed appliances was presented. A rest period was factored into the treatment to observe teeth stability and bite settling while the fixed archwires were removed for six weeks. The parents and treating dentist had a mutual agreement that treatment would be terminated due to poor oral hygiene or non cooperation.

PROGRESS OF TREATMENT SUMMARY

1/3/2007 A lower lingual holding arch was cemented on the six year molars to preserve E-space.

11/20/2007 Bonded and bracketed a 2 x 4 partial fixed appliance with .016 CN wires

12/10/2007 Bracketed lower right canine and lower right premolars with a .016CN piggyback wire on the lower incisors under an .020 SS wire to the molars.

1/9/2008 .014 NeoSentilloy lower archwire to engage all bracketed teeth, .016 CN wire on upper arch. Patient's oral hygiene was poor during this period.

4/19/2008 Tip back bends on an upper .020 SS wire to correct the overbite, lower .016CN wire

5/17/2008 Button bonded to #28 lingual and chain elastic was used to correct rotations and the midline. Upper .020 SS, Lower .018 SS archwires

7/15/2008 Center bend to close upper diastema between #8 and #9.

11/5/2008 Bracketed upper canines and premolars. Upper .016CN, Lower 17 x 25CN

2/11/2009 Right side upper and lower out bends, Left side molar toe in bends + out bends using Mulligan Molar Control Mechanics and .020 SS wires.

4/29/2009 Deactivated all Mulligan mechanics. Upper and Lower .020 SS wires

6/30/2009 After a 6 week rest period, patient wore a 18 x 25 SS wire on the maxillary arch and a 17 x 25 SS wire on the lower arch.

10/28/2009 Braces were removed. Upper and lower invisalign retainers delivered.

12/3/2012 Patient returned with re-crowding and relapse of lower incisors and admitted to irregular retainer wear. She requested retreatment. Re-bonded #22-24. #23 was lingually displaced. An .018CN sectional wire was used.

2/13/2013 Changed wire to .020 stainless steel sectional wire

4/17/2013 Changed wire to 17 x 25 CN sectional wire

8/23/2013 Changed wire to 17 x 25 stainless steel sectional wire (Fig.4)

12/9/2013 Bonded lingual retainer placed on lower canines. Brackets removed. Final impressions for retainers

1/7/2014 Deliver upper Hawley wrap around retainer

3/27/2015 Final Records two years later demonstrate case stability

RESULTS ACHIEVED

The objectives in this case were to correct the mother's chief concern of the lower canine crowding without extractions. The patient's profile became more balanced with facial growth with good oral posture. A Class I canine and molar dental occlusion was achieved. The overbite and midline were corrected. The 42mm intermolar width was maintained. (Fig. 5)

RETENTION

The patient's lower teeth were stable after the bonded retainer was placed from #22-27. The case would not have required a 12 month retreatment if the bonded

lingual retainer was utilized in the first place. The red flag was the lost removable appliances at the beginning of treatment.



Figure 5 - Post-Tx gallery 2015



Figure 6 - Post-Tx Pano 2015

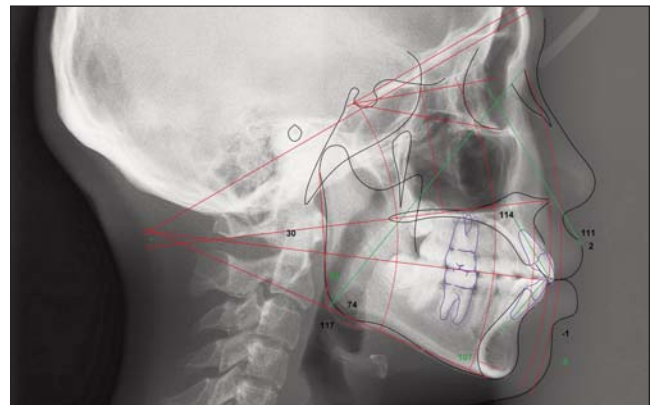


Figure 7 - Post-Tx ceph 2015

FINAL EVALUATION

The chief concern was addressed without extractions. The final Panorex showed root parallelism and impacted lower 3rd molars. (Fig. 6) The final Cephalometric xray showed an airway space of 14mm, a 5mm increase. (Fig. 7) Superimpositions show the changes achieved with treatment (Fig. 8). The patient returned August 2020 for routine care and orthodontic retention evaluation. She is 24 years old, remains caries free, reports consistent retainer wear and has a very stable result. (Fig. 9)

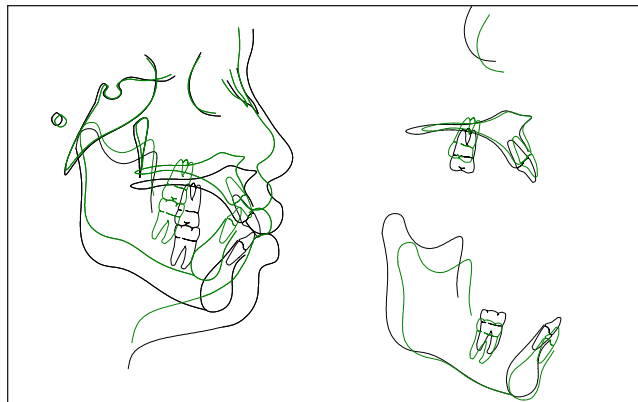


Figure 8 - Superimpositions



Figure 9 - Five year follow up

The Airway Mini-Residency keeps getting better!



- 24 hours of live lectures
- 36 hours of online lectures
- 35 Lesson online Clinical Training in Assessment, Case Reporting, and Advanced Learning
- 36 Live, online, case review sessions
- 24/7 Online forum for discussions, tutorials and much more.

All for the low tuition of \$7,000 (includes a 3-month membership to the AMR Advanced platform)

Also, ongoing support services, telemedicine services, and more. Plus, we will be introducing an Electronic Medical Records service for collaboration in the near future.

Come join the most advanced Airway academy in dentistry now.

Mark A. Cruz, DDS, Barry D Raphael, DMD - directors