

Case Category: Non-extraction, Class II

Patients Name: Jacob Wilson
Age: 12.11 years
Starting Date: 10-4-05

Deband Date: 9-25-07
Age: 14.10 years

Total Treatment Time: 23 months
Retention Period: 9 months until now

History:

- A. Chief Complaint – “Overbite” and “My lower teeth are getting more crooked”
- B. Medical History – Healthy, pubertal male
- C. Dental History – Mild localized gingivitis, previous root canal treatment and crown placement on #19
- D. Habits – No contributory habits
- E. Speech – Within normal limits

DIAGNOSIS:

Clinical

- Molar relationship in centric relation: Full cusp CI II Angle Classification on the right side, end-on Class II on the left side. Cuspid relationship in centric relation: Full cusp Class II on the right side, end on Class II on the left side
- Three millimeter A-P discrepancy between centric relation and centric occlusion
- A forward functional shift of the mandible occurs following initial tooth contact during closure with a slight horizontal component to the right
- Deep overbite (90%)
- There is a 7 mm overjet in centric relation
- There is a 4 mm discrepancy between the upper and lower dental midlines. The upper midline is 2 mm to the left of the mid-sagittal plane and the lower midline is 2 mm to the right of the mid-sagittal plane.
- The maxillary archform appears symmetrically constricted in the bicuspid region. The mandibular archform is constricted on the right side in the bicuspid region.
- Inadequate arch length exists in both the upper and lower dental arches
- The crowding in the upper arch is 2mm and the crowding in the lower arch is more severe, measuring 4.5 mm
- Beginning signs of gingival recession on the labial of tooth #6 and #24
- Convex profile
- Slightly obtuse nasolabial angle

Radiographic

- Appropriate dental development relative to chronological age
- Left and right mandibular rami, bodies and condyles appear to be symmetric
- There is good root to crown ratio on all the teeth with adequate bone level
- The third molars are developing but appear to have little room for favorable eruption

PRE-TREATMENT CEPHALOMETRIC ANALYSIS

Skeletal Pattern

- Retrognathic maxilla (79°) and mandible (73°)
- Increased sagittal jaw relationship (ANB = 6° , Witts=2)

Dental Pattern

- Maxillary incisors are mildly retroclined; NA-1 linear / NA-1 angular = 2.5mm/ 20°
- Mandibular incisors are mildly proclined; NB-1 linear / NB-1 angular = 4.5mm/ 27° and IMPA = 97°

Profile Pattern

- Convex
- Mandibular Retrognathism
- Obtuse nasolabial angle

DIAGNOSTIC SUMMARY

1. Increased sagittal jaw discrepancy
2. Class II, Bimaxillary retrognathic
3. Class II more severe on the right side
4. CR-CO discrepancy of about 3mm A-P and a subtle lateral shift of the mandible to the right
5. Maxillary and mandibular midline discrepancy
6. Deep overbite
7. Moderate lower anterior crowding
8. Irregular maxillary and mandibular archforms
9. Early signs of recession on #6 and 24
10. Convex soft tissue profile

TREATMENT OBJECTIVES

- A. Establish Class I molars and canines bilaterally
- B. Eliminate CR-CO slide

- C. Establish ideal overbite and overjet
- D. Relieve upper and lower crowding
- E. Improve maxillary and mandibular archforms
- F. Establish coincident maxillary and mandibular midlines
- G. Do not exacerbate existing gingival recessions
- H. Strive for acceptable post treatment facial esthetics
- I. Establish cuspid rise and anterior guided occlusion

TREATMENT OPTIONS

1. Bimaxillary surgery (Lefort I and BSSO) to address bimaxillary retrusion, non-extraction treatment, full fixed appliances. This option would necessitate periodic observation over a course of a few years, and postponing active treatment until growth is stable as confirmed by serial cephalometric evaluation
2. Surgically assisted, lower first bicuspid extraction treatment. Full fixed appliances, achieve class III molar and class I cuspid relationship via BSSO mandibular advancement only. This option would necessitate periodic observation over a course of a few years, and postponing active treatment until growth is stable as confirmed by serial cephalometric evaluation
3. Non-extraction treatment, full fixed appliances with mechanics designed for distalization of the maxillary molars and vertical control of these molars during and after distalization
4. Upper first bicuspid extractions, full fixed appliances, treat to Class I cuspid and Class II molar relationship
5. Upper right first and upper left second bicuspid extraction for easier midline correction, full fixed appliances, treat to Class I cuspid and CI II molar relationship

TREATMENT PLAN

1. Periodontal evaluation of areas of recession prior to initiation of orthodontic treatment
2. Maxillary molar distalization appliance (modified Cetlin plate) in conjunction with full fixed appliances
3. Transpalatal arch (TPA) and highpull headgear (10-12 hours) for vertical control during and after distalization
4. Intra and inter-arch mechanics to close the remaining spaces after distalization and correct the A-P discrepancy
5. Differential space closure and elastic pattern to compensate for asymmetric molar and canine relationships
6. Detailing and finishing
7. Retain

Treatment Progress:

1. A thorough office consultation with parents took place describing the pros and cons of the various treatment options outlined above. Particular focus was placed on esthetic goals. In light of retrognathic maxilla and mandible and unpredictable growth response, the two surgical correction options were presented as the best options to establish a more ideal profile. Due to the already obtuse nasolabial angle, the extraction options were presented as possible alternative plans but concern was raised in terms of a less than ideal esthetic result if the maxillary teeth had be retracted too much to close the extraction spaces. The non-extraction option was presented as a good middle of the road option in terms of achieving dental goals but perhaps having the least undesirable facial effects among the non-surgical options.
2. Parents refused the surgical option and opted for the non-surgical, non-extraction option.
3. There were a total of 4 missed and 2 cancelled appointments

10/05	Upper distalization appliance (Cetlin plate), U6 bands and TPA, and lower fixed appliances (6-6)
10/05-3/06	Activation of the Cetlin appliance and TPA to distalize molars, lower arch leveling & Alignment
03/06	Discontinued the Cetlin plate and delivered a high pull headgear (12 hours/day) to maintain molar position and allow distal drifting of the bicuspids
05/06	Placed upper fixed appliances (6-6), banded L7's
05-08/06	Leveling and alignment
08/06	Bracket repositioning based on clinical and radiographic findings, banded U7's
08-11/06	Post-reset re-leveling and re-alignment
11/06-04/07	Working archwires and space closure/intraoral elastics to titrate space closure in light of midline discrepancy
04-08/07	Detailing and finishing/intraoral elastics (more Class II use on the right)
08/07	Settling archwires
09/07	Remove fixed appliances and retain with upper and lower Hawley retainers

Retention: Three months of full time retainer wear immediately after appliance removal. The retainers were worn 12 hours a day for the following 6 months. Bed-time wear only thereafter. Patient was referred to the oral surgeon for removal of all four third molars shortly after appliance removal. The third molars were removed in early 08.

RESULTS

- A. Skeletal: The sagittal jaw discrepancy was reduced. There is reduction of the ANB angle, reduction of the Witts value, as a result of forward growth of the mandible and minimal forward growth of the maxilla.

The vertical jaw relationship has increased slightly, mainly due to a more vertical growth pattern. Differential growth of the mandible was an important part of the changes that were realized. Greater vertical than horizontal growth can be seen in the overall cephalometric superimpositions.

- B. Dental: There was significant improvement in maxillary and mandibular archforms. Crowding in both arches was resolved nicely. The upper incisor inclination was idealized however the lower incisor proclination increased during treatment. Given the fact that we had to accept the skeletal A-P discrepancy, modest proclination of the lower incisors was necessary as part of our strategy to compensate for, rather than to fully correct the skeletal A-P discrepancy. As a result of this dentoalveolar camouflage, ideal overjet and overbite relationships were achieved. The overbite was corrected as a result of leveling the lower curve of Spee, distalization of the maxillary molars, and mild proclination of the lower incisors. The upper and lower dental midlines were both coincident with the facial midline at the end of treatment. Since the Class II relationship was more significant on the right side, asymmetric distalization of the maxillary molars was necessary to achieve midline correction. Despite the bite opening characteristics of molar distalization, excessive extrusion of the maxillary molars and clockwise rotation of the mandible was well controlled by the use of a TPA and a high pull headgear. Excessive extrusion of lower molars was avoided by the use of short Class II elastic patterns thereby not placing extrusive forces directly on the first molars. Furthermore, patience in leveling with very light forces to allow for counteracting forces from the occlusion was also largely responsible for our ability to level without much extrusion. During function, the cuspids and incisors provide the needed coupling and guidance of the teeth to achieve cuspid rise and anterior guidance.
- C. Soft Tissue: There has been little change in lip position and profile after treatment. There was no worsening of the muco-gingival problems during treatment. The recession on #24 improved significantly as the crowding was resolved and the tooth was moved lingually. There was no worsening of the mild recession on #6 during treatment. Overall, gingival tissues appeared healthier at the end of treatment which may, in part, be due to resolution of crowding and improved oral hygiene habits enforced throughout the course of treatment.

CEPHALOMETRIC RESULTS

- A. Maxillary Incisor Position: The upper incisors position was improved (1-NA linear/angular = 2.5mm/20° to 3mm/23° with 3mm/21° being the goal in cases where the ANB angle is 3°).
- B. Mandibular Incisor Position: Lower incisor proclination increased to compensate for the A-P skeletal discrepancy (1 – NB = 4.5mm/27° to 5mm/31° with a goal of 4.5mm/28° in cases with ANB angles of 3°). The angular position of the lower incisors also increased at the end of treatment with the IMPA changing from 97° to 100°.
- C. Upper and Lower Molar Positions: 4mm of distal molar movement was accommodated in the upper arch while the horizontal position of the lower molar did not change much. Despite distalization of the upper molar, there has been relatively little molar extrusion due to good vertical control provided by the TPA and the high pull headgear. There has been little extrusion of the lower molars due to the use of short Class II elastic patterns.

Superimposition of the pre-treatment and post-treatment cephalometric tracings shows that most of the growth was expressed vertically.

CRITICAL ANALYSIS

- Lower incisors forward of their ideal positions
- Little improvement of the profile despite significant improvement of occlusion
- Mild mesial rotation of #7 in the final finish
- Excessive distal root angulation of #12 in the final panorex
- Mucogingival problems did not worsen. #24 actually improved
- Significant improvement in overjet and overbite despite little help from growth
- Successful correction of midline discrepancy
- Good vertical control of the posterior teeth despite challenging mechanics

Comments:

Anterior periapical x-rays are not routinely taken as part of our diagnostic and progress records. They are ordered as needed. There were no compelling clinical reasons to order them for this patient; therefore, these records are not available for evaluation.

The lower third molars were impacted and developing with excessive mesial angulation. The extraction of all third molars was requested shortly after appliance removal. The patient proceeded with extraction of these teeth about 6 months into retention.

Paul Kasrovi
Angle Society, '08