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## Case Report

# How would you treat this malocclusion? Pre-Treatment

**Case C.H. 16 years, 1 month**

A video of this case can be found at [www.pcsortho.org](http://www.pcsortho.org)

### Extraoral and Intraoral Findings

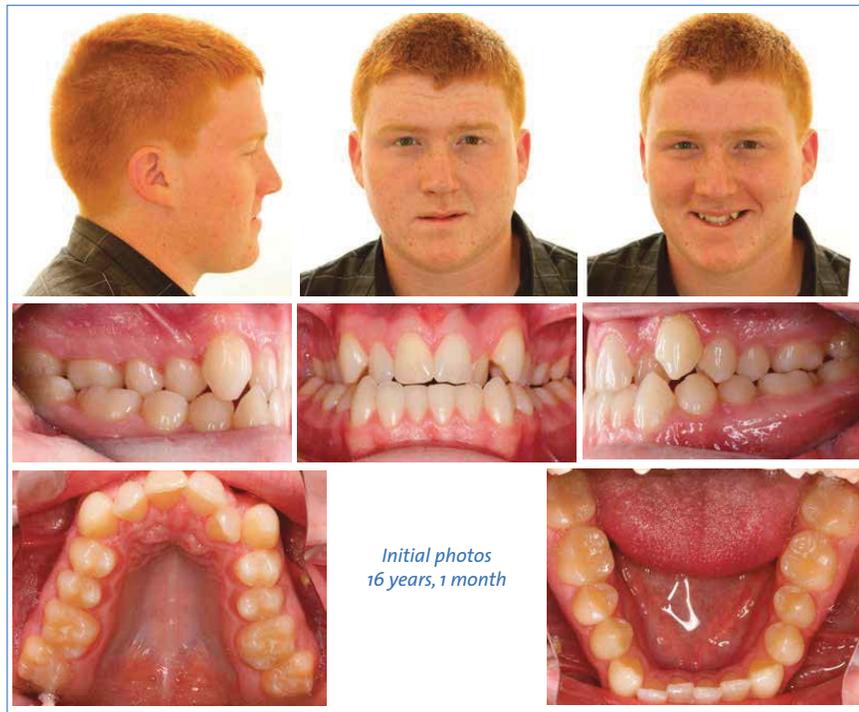
A 16-year-old male patient presents in good health, with a non-contributory medical history and excellent oral hygiene. His chief complaint is, "my teeth are very crooked, and I want straight teeth."

The clinical examination shows a symmetric face with a slightly concave profile, competent lips, obtuse nasolabial angle, and a strong chin. He exhibits 50% maxillary incisor display upon smiling, with a flat smile arc. He has a Class I molar relationship on the left side and an end-on Class III molar relationship on the right. He also has a constricted maxilla with bilateral posterior crossbite, minimal overjet, and overbite with maxillary lateral incisors in crossbite.

His lips are retruded in reference to the E-line: upper lip  $-10.3$  mm and lower lip  $-5.8$  mm. He also has severe maxillary crowding (8 mm) and mild mandibular crowding (3 mm). His maxillary midline is coincident with his facial midline, and his mandibular midline is deviated 2 mm to the right. His ABO Discrepancy Index (DI) score is 23.

### Radiographic Findings

A panoramic radiograph shows that all wisdom teeth are missing except UL8. The lateral cephalometric tracing shows a skeletal Class III pattern ( $ANB = -3.4^\circ$ ) with a relatively high mandibular plane ( $SN-MP = 38.4^\circ$ ,  $FMA = 28.0^\circ$ ). The patient is in cervical vertebral maturation stage 6; his peak mandibular growth ended at least two years before this stage.



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## Case Report

### Treatment Options

The following treatment options were presented to the patient and his parents:

**Option #1:** Comprehensive orthodontic treatment, non-extraction with orthognathic surgery.

**Option #2:** Comprehensive orthodontic treatment, non-surgical camouflage treatment with a

palatal expander and temporary skeletal anchorage devices (TSADs) on the mandibular arch for total arch distalization.

**Option #3:** Comprehensive orthodontic treatment, non-surgical camouflage treatment with a palatal expander, and the extraction of one mandibular incisor.



*Initial models*



*Initial panoramic radiograph and lateral cephalogram*



## Case Report

### Initial Lateral Cephalometric Measurements

| Variable              | Norm  | Pre-Treatment |
|-----------------------|-------|---------------|
| SNA (°)               | 82.0  | 77.2          |
| SNB (°)               | 80.0  | 80.6          |
| ANB (°)               | 2.0   | -3.4          |
| FMA (FH-MP) (°)       | 25.0  | 28.0          |
| SN-MP (°)             | 32.0  | 38.4          |
| U1-NA (mm)            | 4.0   | 10.0          |
| U1-SN (°)             | 104.0 | 104.5         |
| L1-NB (mm)            | 4.0   | 2.0           |
| IMPA (L1-MP) (°)      | 90.0  | 79.2          |
| Upper Lip-E Line (mm) | -4.0  | -10.3         |
| Lower Lip-E Line (mm) | -2.0  | -5.8          |

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EXAM YEAR  ABO DISCREPANCY INDEX

ABO ID #  CASE#  PATIENT

**TOTAL D.I. SCORE**  Examiners will verify measurements in each parameter.

**OVERJET**

0 - 0.9 mm. (edge-to-edge) = 1 pt.  
 1 - 3 mm. = 0 pts.  
 3.1 - 5 mm. = 2 pts.  
 5.1 - 7 mm. = 3 pts.  
 7.1 - 9 mm. = 4 pts.  
 > 9 mm. = 5 pts.

Negative Overjet (x-bite):  
 1 pt. per mm. per tooth =  pts.  
 Total

**OVERBITE**

0 - 3 mm. = 0 pts.  
 3.1 - 5 mm. = 2 pts.  
 5.1 - 7 mm. = 3 pts.  
 Impinging (100%) = 5 pts.  
 Total

**ANTERIOR OPEN BITE**

0 mm. (edge-to-edge), 1 pt. per tooth =  pts.  
 then 1 pt. per additional full mm. per tooth =  pts.  
 Total

**LATERAL OPEN BITE**

2 pts. per mm. per tooth  
 Total

**CROWDING** (only one arch)

0 - 1 mm. = 0 pts.  
 1.1 - 3 mm. = 1 pts.  
 3.1 - 5 mm. = 2 pts.  
 5.1 - 7 mm. = 4 pts.  
 > 7 mm. = 7 pts.  
 Total

**OCCCLUSION**

Class I to end on = 0 pts.  
 End-to-End Class II or III = 2 pts. per side  pts.  
 Full Class II or III = 4 pts. per side  pts.  
 Beyond Class II or III = 1 pt. per mm additional  pts.  
 Total

**LINGUAL POSTERIOR X-BITE**

1 pt. per tooth  
 Total

**BUCCAL POSTERIOR X-BITE**

2 pts. per tooth  
 Total

**CEPHALOMETRICS** (See Instructions)

ANB  $\geq 6^\circ$  or  $\leq -2^\circ$  @4pts. =   
 Each degree  $> 6^\circ$  \_\_\_ x 1 pt. =   
 Each degree  $< -2^\circ$  \_\_\_ x 1 pt. =   
 SN-MP  $\geq 38^\circ$  @2pts. =   
 Each degree  $> 38^\circ$  \_\_\_ x 2pts. =   
 $\leq 26^\circ$  @1pt. =   
 Each degree  $< 26^\circ$  \_\_\_ x 1pt. =   
 $\bar{I}$  to MP  $\geq 99^\circ$  @1pt. =   
 Each degree  $> 99^\circ$  \_\_\_ x 1 pt. =   
 Total

**OTHER** (See Instructions)

Supernumerary teeth \_\_\_ x 1 pt. =   
 Ankylosis of perm. teeth \_\_\_ x 2 pts. =   
 Anomalous morphology \_\_\_ x 2 pts. =   
 Impaction (except 3rd molars) \_\_\_ x 2 pts. =   
 Midline discrepancy ( $\geq 3$  mm) @ 2 pts. =   
 Missing teeth (except 3rd molars) \_\_\_ x 1 pt. =   
 Missing teeth, congenital \_\_\_ x 2 pts. =   
 Spacing (4 or more, per arch) \_\_\_ x 2 pts. =   
 Spacing (mx cent diastema  $\geq 2$  mm) @ 2 pts. =   
 Tooth transposition \_\_\_ x 2 pts. =   
 Skeletal asymmetry (nonsurgical tx.) @ 3 pts. =   
 Addl. treatment complexities \_\_\_ x 2 pts. =   
 Identify:

Total Other

## How would you treat this malocclusion? Post-Treatment

Case C.H. 18 years, 7 months

### Treatment Plan

Treatment options were discussed with the patient. The patient and his parents declined the surgical option, but they agreed to the use of TSADs. Therefore, we chose Option #2: comprehensive orthodontic treatment, non-surgical camouflage treatment with a palatal expander and TSADs on the mandibular arch for total arch distalization.

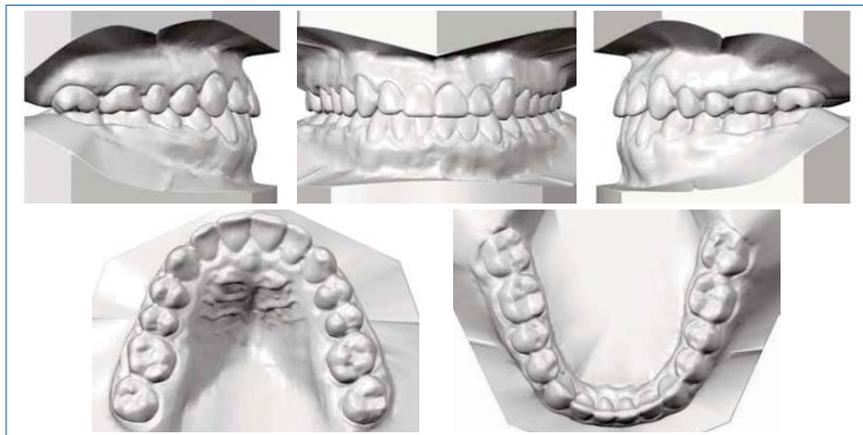
### Treatment Progress

Treatment was started with the placement of an expander with slow palatal expansion (one turn every three days). 0.022" slot brackets with an MBT prescription were bonded to the patient's maxillary teeth. After expansion of the maxillary arch, the mandibular arch was bonded.

Leveling and alignment were performed using a normal wire sequence. The expander was removed after a six-month retention phase. TSADs (12 mm in length, 2 mm in diameter; VictorTAS miniscrew, Orange, CA) were installed in the buccal shelves between the mandibular first and second molars, parallel to the adjacent roots. Nickel titanium closed coil springs were used from the TSADs to the crimped hooks distal to the mandibular canines using 0.017" x 0.025" stainless steel wire. The retraction force was continued for seven months to encourage over-correction and midline improvement. During the finishing stage, a lingual root crown torque of maxillary incisors was also achieved, using a 0.021" x 0.025" stainless steel wire.



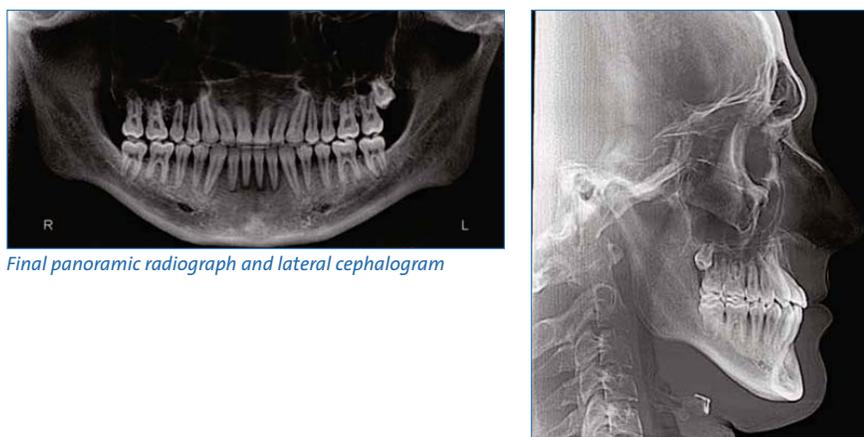
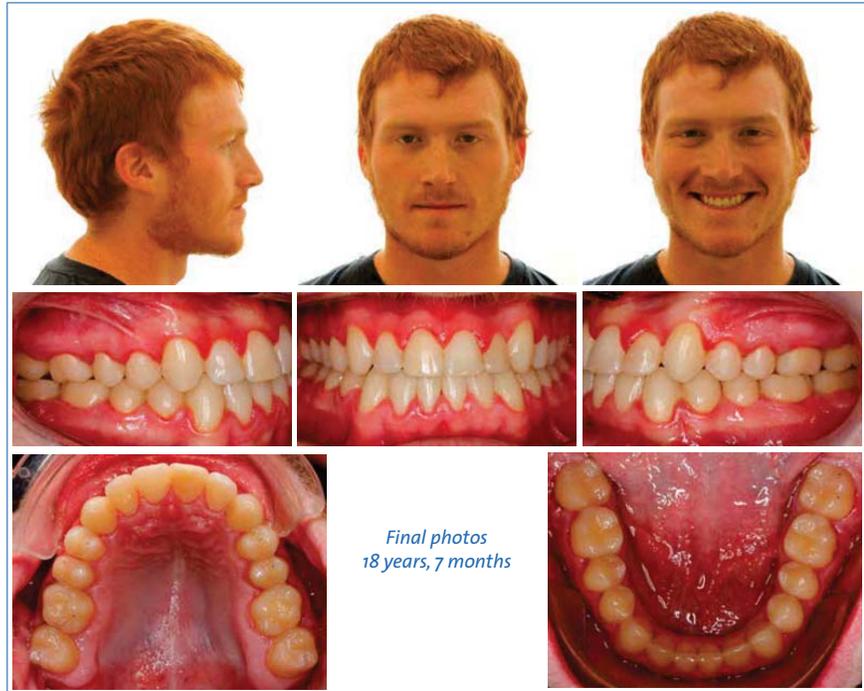
Progress photos



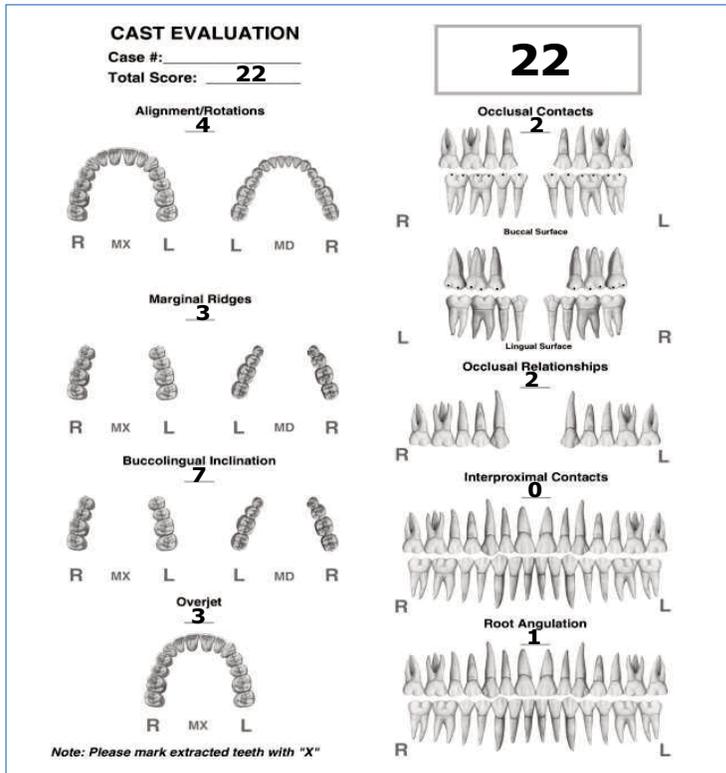
Final models

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*Case Report*



## Case Report

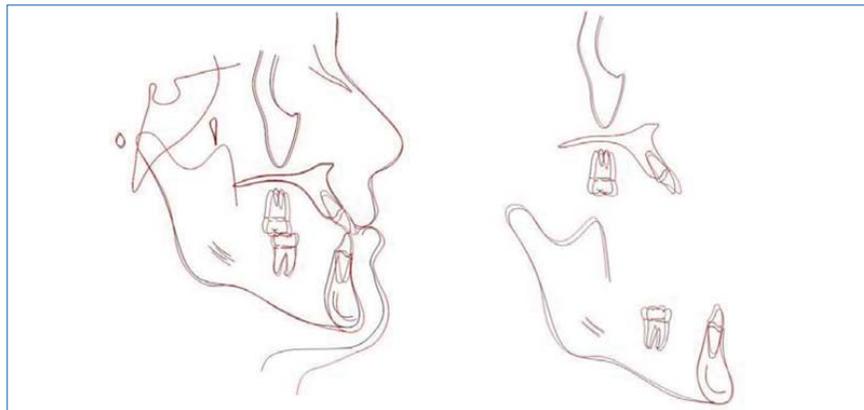


Detailed wire bending and seating elastics were used for the finishing stage. Upon completion of treatment, upper and lower Essix retainers were delivered for retention and the patient was referred to his dentist for dental care and evaluation of the maxillary third molar for possible extraction. Total treatment time for this case was 24 months.

### Treatment Results

Anterior overbite and overjet were achieved, crowding was eliminated, and transverse discrepancies were corrected with an expander. Optimal esthetic and functional results were achieved. A stable Class I occlusion was obtained, and the patient's dental midline was coincident. His maxillary second molars could have been positioned in better occlusion, but the patient refused to stay in braces any longer. To correct his overjet, the maxillary incisors were proclined. A post-treatment panoramic radiograph showed acceptable root parallelism; there were no significant signs of root resorption or alveolar bone resorption. Clinical and periodontal evaluations showed healthy periodontium and stable dentition. His ABO Cast-Radiograph Evaluation (C-R Eval) score was 22.

*Cephalometric superimposition  
 Pre-treatment (black),  
 Post-treatment (red)*



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## Case Report

### Initial and Final Lateral Cephalometric Measurements

| Variable              | Norm  | Pre-Treatment | Post-Treatment |
|-----------------------|-------|---------------|----------------|
| SNA (°)               | 82.0  | 77.2          | 78.6           |
| SNB (°)               | 80.0  | 80.6          | 81.9           |
| ANB (°)               | 2.0   | -3.4          | -3.2           |
| FMA (FH-MP) (°)       | 25.0  | 28.0          | 27.0           |
| SN-MP (°)             | 32.0  | 38.4          | 36.5           |
| U1-NA (mm)            | 4.0   | 10.0          | 11.0           |
| U1-SN (°)             | 104.0 | 104.5         | 113.7          |
| L1-NB (mm)            | 4.0   | 2.0           | 3.0            |
| IMPA (L1-MP) (°)      | 90.0  | 79.2          | 77.3           |
| Upper Lip-E Line (mm) | -4.0  | -10.3         | -9.0           |
| Lower Lip-E Line (mm) | -2.0  | -5.8          | -4.6           |

#### Editor's Notes

This case was treated well with two miniscrews that were placed on buccal shelves. When TSADs are placed on buccal shelves, there is no need to relocate them during total arch distalization of the mandible. After treatment, the patient showed good functional occlusion with an esthetic smile. ♦



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Dr. Owtad, editor of the PCSO Bulletin Case Report column, invites you to send your case to be featured in an upcoming issue. He is looking for cases that exhibit unique skeletal, dental, or occlusal problems and allow for more than one treatment option. If you have a case that may be a good fit, or if you have any questions about submitting a case, please contact Dr. Owtad at [paowtad@atsu.edu](mailto:paowtad@atsu.edu).