



Bulletin

Case Report

How would you treat
this malocclusion?

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Case Report

How would you treat this malocclusion?

Pretreatment

Case S.B., 18 years, 3 months

S.B. is an 18-year, 3-month female who wants her “teeth straightened and the gap closed between her upper front teeth.” She has a noncontributory medical history with good oral hygiene. She also reported having a dental history of a few dental restorations in the past, and her general dentist told her that she had decalcification on her posterior teeth (mainly maxillary and mandibular molars). Her temporomandibular joints (TMJs) are asymptomatic with no clicking or crepitus upon evaluation. The patient reported that her menarche commenced when she was about 12.5 years old.

Diagnostic Findings

S.B. presents with a convex profile, an acute nasolabial angle, and protrusive lips with a slightly everted lower lip ahead of the E-line. In addition, she has a 90% maxillary incisal display on smiling and a shallow mentolabial fold and shows slight mentalis strain. She also presents with a slightly increased chin-to-throat length. A potential skeletal asymmetry is noted with her chin deviating to the left of her face when viewed frontally (smiling and at repose). This observation is supported by the appearance of double borders of the mandibular plane on the lateral cephalogram. S.B.'s cephalometric evaluation reveals a slight Class III tendency with a Wits appraisal of -2.0 mm, an ANB of 2°, and an increased mandibular plane angle (SN-MP, 39.1°). All four of her third molars are developing with normal angulation (Figures 1 and 2; Table 1).

S.B. has a Class III molar relationship (half cusp on left and full cusp on right) and canine Class III bilaterally. She has an edge-to-edge bite with proclined and protrusive incisors and a mild curve of Spee.



Figure 1. Initial facial and intraoral photographs (S.B., 18 years, 3 months)

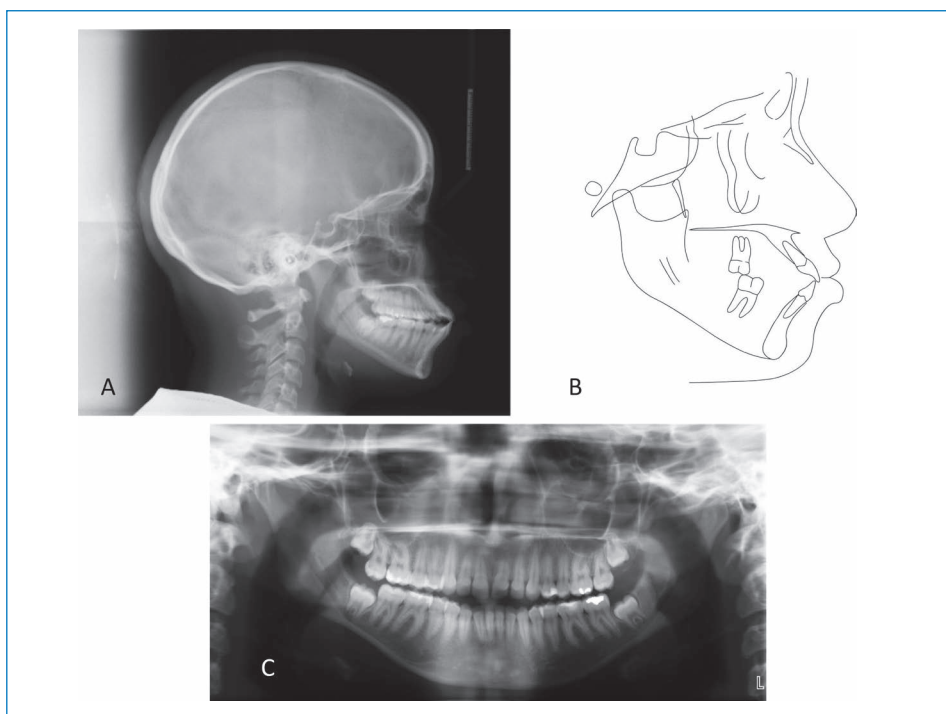


Figure 2. Pretreatment radiographs: (A) lateral cephalogram, (B) cephalometric tracing, (C) panoramic radiograph

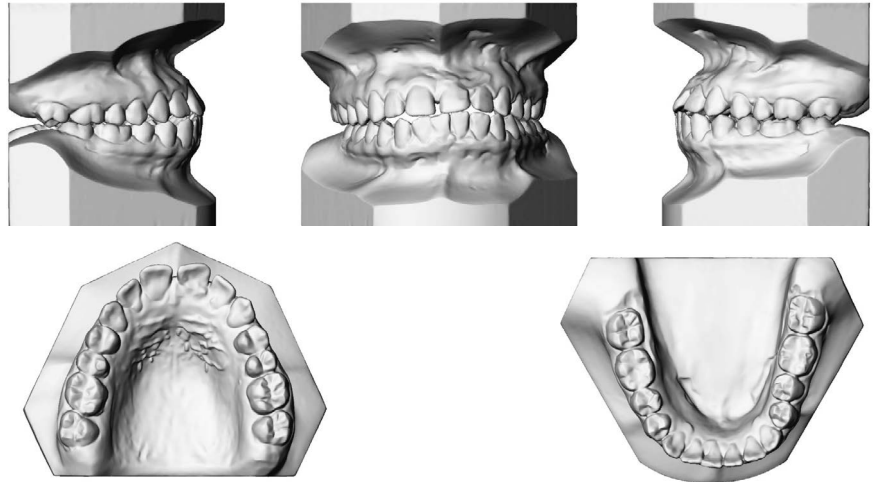


Figure 3. Initial dental models

Table 1. Pretreatment Cephalometric Measures

Variable	Norm	Pretreatment
SNA (°)	82.0	83.4
SNB (°)	80.0	81.4
ANB (°)	2.0	2.0
FMA (FH-MP) (°)	25.0	32.1
SN-MP (°)	32.0	39.2
U1-NA (mm)	4.0	10.1
U1-SN (°)	104.0	120.4
L1-NB (mm)	4.0	11.0
IMPA (L1-MP) (°)	90.0	98.1
Upper lip-E line (mm)	-4.0	-1.0
Lower lip-E line (mm)	-2.0	6.9

Her maxillary midline is coincident with her face, while her mandibular dental midline is 3.5 mm to the left of the facial midline. There is mild spacing in the maxillary arch with a 1.5-mm midline diastema and mild crowding in the mandibular arch (Figures 1 and 3).

Her TMJ function and periodontal status are all within normal limits as confirmed by her general dentist, and neither significant CO-CR shift nor any notable tongue habits are detected. Her case has an ABO DI of 22 (Figure 4).

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EXAM YEAR	ABO DISCREPANCY INDEX	
ABO ID #	CASE#	PATIENT
00000	22	S.B.
TOTAL D.I. SCORE		
OVERJET ≥ 0 to < 1 mm (edge-to-edge) = 1 pt ≥ 1 to ≤ 3 mm = 0 pts > 3 to ≤ 5 mm = 2 pts > 5 to ≤ 7 mm = 3 pts > 7 to ≤ 9 mm = 4 pts > 9 mm = 5 pts Negative Overjet (x-bite): 1 pt per mm per tooth Total 1		
OVERBITE > 1 to ≤ 3 mm = 0 pts > 3 to ≤ 5 mm = 2 pts > 5 to ≤ 7 mm = 3 pts Impinging (100%) = 5 pts Total 0		
ANTERIOR OPEN BITE 0 mm (edge-to-edge), 1 pt per tooth then 1 pt per mm per tooth Total 6		
LATERAL OPEN BITE ≥ 0.5 mm, 2 pts per mm per tooth Total 0		
CROWDING (only one arch) ≥ 0 to ≤ 1 mm = 0 pts > 1 to ≤ 3 mm = 1 pt > 3 to ≤ 5 mm = 2 pts > 5 to ≤ 7 mm = 4 pts > 7 mm = 7 pts Total 1		
OCCUSAL RELATIONSHIP Class I to End On = 0 pts End-to-End Class II or III = 2 pts per side 2 pts Full Class II or III = 4 pts per side 4 pts Beyond Class II or III = 1 pt per mm additional 0 pts Total 6		
LINGUAL POSTERIOR X-BITE > 0 mm, 1 pt per tooth Total 0		
BUCCAL POSTERIOR X-BITE > 0 mm, 2 pts per tooth Total 0		
CEPHALOMETRICS (See Instructions) ANB ≥ 6° or ≤ -2° @4pts = 0 Each full degree > 6° x 1 pt = 0 Each full degree < -2° x 1 pt = 0 SN-MP ≥ 38° @2pts = 2 Each full degree > 38° x 2 pts = 2 ≤ 26° @1pt = 0 Each full degree < 26° x 1 pt = 0 I to MP ≥ 99° @1pt = 0 Each full degree > 99° x 1 pt = 0 Total 4		
OTHER (See Instructions) Supernumerary teeth x 1 pt = 0 Ankylosis of perm. teeth x 2 pts = 0 Anomalous morphology x 2 pts = 0 Impaction (except 3rd molars) x 2 pts = 0 Midline discrepancy (≥3 mm) @ 2 pts = 2 Missing teeth (except 3rd molars) x 1 pt = 0 Missing teeth, congenital x 2 pts = 0 Spacing (4 or more, per arch) x 2 pts = 2 Spacing(mx cent diastema ≥ 2 mm) @ 2 pts = 0 Tooth transposition x 2 pts = 0 Skeletal asymmetry(nonsurgical tx) @ 3 pts = 0 Addl. treatment complexities x 2 pts = 0 Identify: <div style="border: 1px solid black; height: 30px; width: 100%;"></div> Total Other 4		

Figure 4. ABO discrepancy index

How would you treat this malocclusion?

Posttreatment

Case S.B. 21 years, 2 months

Treatment Objectives

The treatment objectives for S.B. were to address her chief complaints: to align her teeth and close her diastema, reduce her lip protrusion, achieve a Class I occlusion with ideal overbite and overjet, and coincide her dental midlines.

Treatment Options

The following treatment options were presented:

- Option 1: Comprehensive orthodontic treatment with full fixed orthodontic appliances, extraction of the maxillary second premolars, mandibular left second and right first premolars
- Option 2: Comprehensive orthodontic treatment with full fixed orthodontic appliances, extraction of the maxillary second premolars and mandibular first premolars
- Option 3: Nonextraction treatment with full fixed orthodontic appliances with Class III elastics; this plan was presented with the caveat that her chief complaint would not be completely addressed

Treatment Plan

As the patient expressed preference for orthodontic camouflage, an asymmetric Class III extraction pattern was chosen to effectively manage the mandibular dental midline correction. This involved removal of the maxillary second premolars, mandibular left second premolar, and right first premolar (Option 1). The rationale for the extractions was to reduce profile convexity and lip protrusion through retroclination and retraction of the incisors.

Treatment Progress

Fixed edgewise appliances with 0.018-inch slots were bonded (7-7), and arches were leveled and aligned using progressively larger nickel-titanium wires, followed by stainless



Figure 5. Progress intraoral photographs; during treatment, differential elastics were applied

steel (SS) wires during space closure. The treatment relied on the use of differential elastics to reinforce the anchorage prior to the space closure. Mandibular space closure was initiated on the right side segmentally using Class III elastics to minimize anchorage loss and to coincide the midlines. Once Class I canines and coincidental midlines were achieved, space closure was performed reciprocally. After bracket repositioning, the archwires were increased back up to 0.016 × 0.025-inch SS for finishing.

The basic mechanics included running a Class II elastic on the left side and Class III elastic on the right side with selective use of elastomeric chains on both arches to shift the mandibular dental midline to the right and maxillary dental midline to the left until the midlines were corrected and canine Class I was achieved. Then, Class III elastics were used to mesialize the maxillary posterior teeth and help close the residual spaces. For normal space closure, ¼-inch, 4.5-oz elastics were used, but if heavier force was needed on one side than on the other (asymmetric force elastics), the elastics were doubled up or ⅜-inch, 6-oz elastics were used on that side, leaving the ¼-inch, 4.5-oz elastics on the other side. Finally, ¼-inch, 6-oz elastics were used in the finishing stage to improve the patient's interdiggitation (Figure 5).

Retention was planned with an upper bonded wire from U2-2 with an overlay Hawley retainer and a lower Hawley retainer.

Treatment Results

The vertical dimensions of the maxillary arch were controlled by incisal placement of the brackets as well as placement of bite turbos (acting like bonded posterior bite blocks) on the U6s and U7s. Retroclination was accomplished by using elastomeric chains on the mandibular incisors with an 0.018-inch SS round wire, cinching back of the wire, and stepping down bends on the maxillary arch to increase the overbite.

S.B. showed excellent compliance with the elastics during treatment. Although we had planned for temporary skeletal anchorage devices (TSADs) as a contingency for additional anchorage, they were not needed. Our treatment objectives were achieved with good dental, functional and facial esthetic results. Closure of the maxillary midline diastema was achieved with coincident midlines, Class I canines, super Class I molars, and an optimal overbite and overjet. S.B.'s incisors were significantly retracted, helping to reduce her overall lip protrusiveness and slightly increase the maxillary incisor display on smiling (Table 2). Her posttreatment pan-

Case Report

Table 2. Comparison of Pretreatment and Posttreatment Cephalometric Measures

Cephalometric measurement	Norm	Pretreatment	Posttreatment
SNA (°)	82.0	83.4	81.4
SNB (°)	80.0	81.4	79.0
ANB (°)	2.0	2.0	2.4
FMA (FH-MP) (°)	25.0	32.1	34.0
SN-MP (°)	32.0	39.2	41.3
U1-NA (mm)	4.0	10.1	4.9
U1-SN (°)	104.0	120.4	102.6
L1-NB (mm)	4.0	11.0	6.0
IMPA (L1-MP) (°)	90.0	98.1	80.8
Upper lip to E-line (mm)	-4.0	-1.0	-2.2
Lower lip to E-line (mm)	-2.0	6.9	1.6

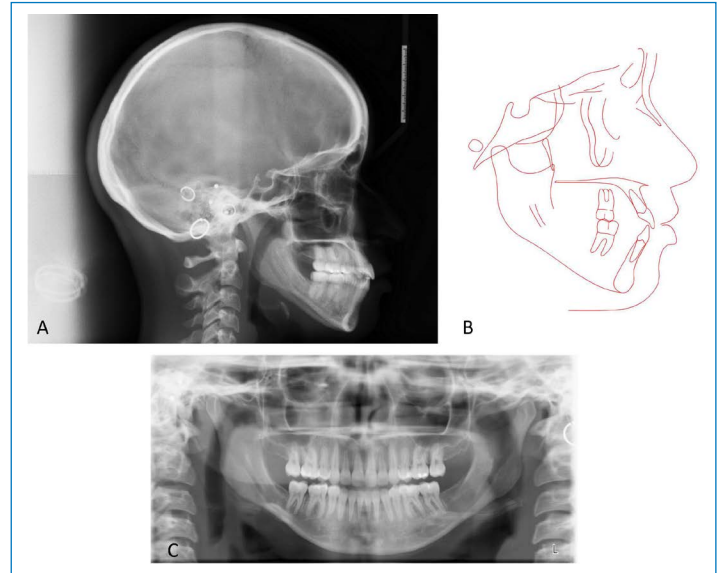


Figure 8. Posttreatment radiographs: (A) lateral cephalogram, (B) cephalometric tracing, (C) panoramic radiograph



Figure 6. Final facial and intraoral photographs (S.B., 21 years, 2 months)

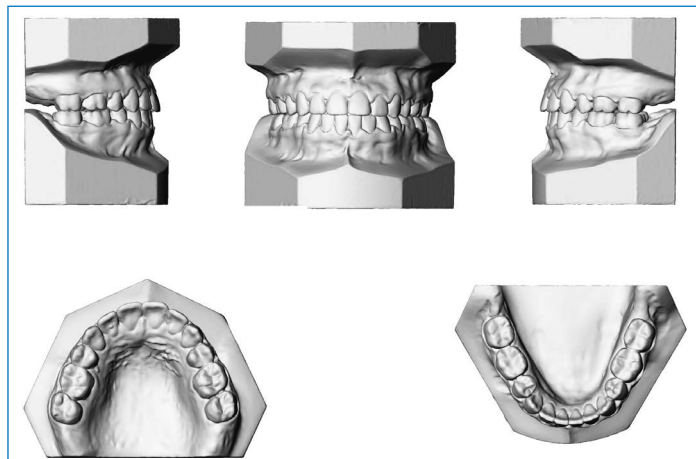


Figure 7. Final digital models

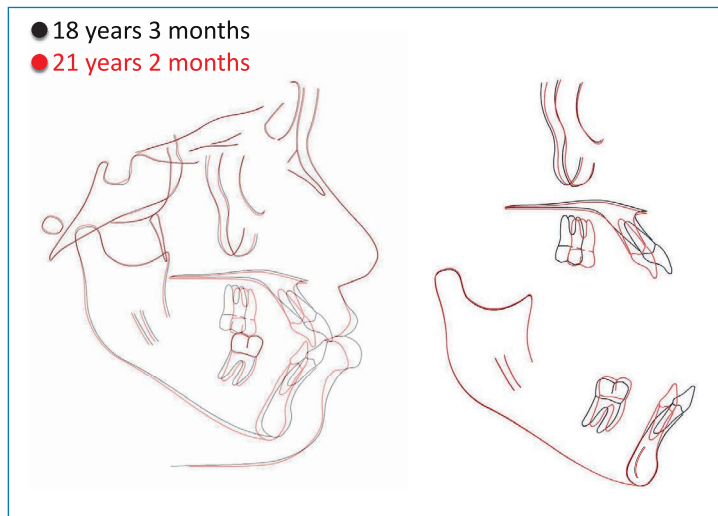


Figure 9. Overall superimposition (left), maxillary (top right) and mandibular (bottom right) superimpositions (black, pretreatment; red, posttreatment)

oramic radiograph showed acceptable root parallelism, while clinical and periodontal charting showed a healthy periodontium. Unfortunately, as her general dentist had observed, there were small areas of decalcification on several posterior teeth (Figures 6–9). Fortunately, this had been discussed with the patient before treatment. Her ABO cast radiograph evaluation score was 21 (Figure 10). The patient was very satisfied with the final results.

Editor's Comments

This case demonstrates how an adult female patient with dental Class III malocclusion and protrusive incisors and lips was successfully treated with a conventional orthodontic approach by carefully

Case Report

4-12-2010 for print use only.
For electronic submission requirement –
use ABO Case Report Work File (pdf).

ABO Cast-Radiograph Evaluation

Case # Patient

Total C-R Eval Score:

Alignment/ Rotations

Marginal Ridges

Buccolingual Inclination

Overjet

Occlusal Contacts

Occlusal Relationships

Interproximal Contacts

Root Angulation

INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

Figure 10. ABO cast-radiograph evaluation

managing anchorage and selectively using differential elastics and round SS archwires. Her vertical dimension was well controlled, and the extrusion of her posterior teeth was minimized by bonding bite turbos. Although the application of TSADs is gaining in popularity, presenting this case might have value, especially for our young orthodontists.



Dr. Samuel Tam
Dr. Tam (DDS, MSc) is a dual-trained pediatric dentist and orthodontist who graduated from the University of British Columbia Faculty of Dentistry and Oral Health Science Postgraduate Orthodontic Program.

He currently practices in Vancouver, British Columbia, and is a Diplomate of the American Board of Orthodontics.



Dr. Siddharth Vora
Dr. Vora (BDS, PhD, MSc) is an assistant professor at the University of British Columbia Postgraduate Orthodontic Program.

Call For Submitting Cases



Dr. Zhang, editor of the PCSO *Bulletin* Case Report column, sincerely invites you to send your case—either well treated or failed for any reason(s)—to be featured in an upcoming issue. This column welcomes any cases where there is an element of uniqueness regarding the malocclusion itself or the treatment and that can't easily be found in orthodontic textbooks. The editor also welcomes any comments or feedback on the published cases, preferably the Case Report featured in the most recent issue. If you have questions about submitting your case or sending your comments, please contact me at xingzhongzhang@atsu.edu.

Thank you,
John (Xingzhong) Zhang, DDS, MSD, PhD
Mesa, AZ