Bilateral Sagittal Split Osteotomy for Mandibular Retrognathism: Two Case Reports

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INTRODUCTION

Skeletal Class II malocclusion with mandibular deficiency is one of the most common problems that patients seek treatment. Adult patients with severe skeletal Class II malocclusion need orthognathic surgery for successful treatment. Bilateral sagittal split osteotomy (BSSO) is the most often preferred technique for these patients. This procedure includes three phases: (1) presurgical orthodontic phase, (2) surgical phase, and (3) postsurgical orthodontic phase. BSSO along with orthodontic treatment improves hard-tissue relationship along with soft-tissue profile improvement.

Two cases treated with BSSO and orthodontic treatments are presented in this article.

CASE REPORTS

Case 1

An 18-year-old female patient reported to the Department of Orthodontics with a chief complaint of forwardly placed upper front teeth. Clinical examination revealed Angle Class II div I malocclusion with brachyfacial pattern with 6 mm of interlabial gap at rest, a convex profile, an acute nasolabial angle, and a deep mentolabial sulcus. There were interdental spacings in the upper anterior region, Class II molar and canine relationship, 13 mm of overjet and 60% overbite with exaggerated curve of Spee [Figure 1].

The cephalometric analysis revealed a skeletal Class II due to mandibular retrognathism, hypodivergent growth pattern, reduced lower anterior facial height, proclined upper and lower anterior teeth [Figure 2 and Table 1].

Treatment plan

Treatment goals were set to improve the facial profile by reducing facial convexity, to increase lower facial height, and to achieve a Class I molar and canine relationship with normal overjet and overbite. Because of the presence of large interdental spaces in the upper anterior region, to achieve the above goals, a nonextraction treatment plan and BSSO with mandibular advancement was planned and was suggested both to the patient and her parents, and a written informed consent was obtained.

Treatment progress

Both the upper and lower arches were banded and bonded with 0.022" slot preadjusted MBT bracket prescription (McLaughlin, Bennett, and Trevisi). Upper and lower arches were leveled and aligned using the nickel–titanium (NiTi) wires. Wire sequence was 0.016” NiTi, 0.018” NiTi, 0.016” × 0.022” NiTi, and 0.019” × 0.025” NiTi. Space closure was done on 0.019” × 0.025” stainless steel wires.

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steel wires, and 0.020” × 0.028” stainless steel stabilizing wires were placed in upper and lower arches. Presurgical records were taken [Figures 3 and 4], models were mounted, mock surgery was done, and a surgical splint was fabricated. Mandibular advancement of 7 mm with BSSO was performed, and osteotomy cuts were secured with titanium plates. Finishing and detailing was done for 4 months, and debonding was done after achieving the preset treatment goals [Figures 5 and 6]. An upper wraparound retainer and a lower fixed bonded lingual retainer were given.

**Case 2**

A 17-year-old male patient reported to the Department of Orthodontics with a chief complaint of forwardly placed upper front teeth. Clinical examination revealed Angle Class I malocclusion with brachyfacial pattern with 6 mm of interlabial gap at rest, a convex profile, an acute nasolabial angle, and a deep mentolabial fold. The patient had 10 mm of overjet, 40% overbite and crowding in the lower anterior region [Figure 7].

The cephalometric analysis showed skeletal Class II due to mandibular retrognathism, hypodivergent growth pattern, reduced lower anterior facial height, proclined upper and lower anterior teeth [Figure 8 and Table 2].

**Treatment plan**

Treatment goals were set to improve the facial profile by reducing facial convexity, to increase lower facial height, and to achieve normal overjet and overbite. To achieve these goals, extraction of upper 5’s and lower 4’s along with BSSO with mandibular advancement was planned and was suggested to the patient and his parents. Written informed consent was obtained.

**Treatment progress**

Both upper and lower arches were banded and bonded with 0.022” slot preadjusted MBT bracket system. Upper and
lower arch leveling and aligning was done using NiTi wires with 0.016" NiTi, 0.018" NiTi, 0.016" × 0.022" NiTi, and 0.019" × 0.025" NiTi wire sequence. Space closure was done on 0.019" × 0.025" stainless steel wires by lower anterior retraction and protraction of upper molars. In the upper arch, mini-implants were used to reinforce the anchorage during molar protraction. Following space closure, presurgical records were made [Figures 9 and 10], models were mounted, a mock surgery was done, and a surgical splint was fabricated. Mandibular advancement of 7 mm with BSSO was performed, and osteotomy cuts were secured with titanium plates. Finishing and detailing was done for 6 months, and the appliance was debonded [Figures 11 and 12]. Upper wraparound retainer and lower fixed bonded lingual retainers were given.

**Discussion**

Clinical and cephalometric findings of the two patients in this case report had skeletal Class II bases due to retrognathic mandible and orthognathic maxilla, with proclination of the upper and lower anterior teeth. Different extraction patterns were followed in the two cases presented here. As clinical examination revealed a Class I molar relationship in case 2, upper second premolars were extracted and upper molars were protracted to achieve a Class II molar relationship before the surgery. Upper molars were protracted using temporary anchorage devices. Lower first premolar extraction space was utilized for decrowding...
the lower anterior teeth which were crowded. However, Case 1 was treated by the nonextraction method because molars were in full cusp Class II relationship to start with and sufficient interdental anterior spacings were present which can be used for alignment and retraction. After the completion of presurgical orthodontic phase in both the cases, mock surgery was done [Figure 13]. Later, BSSO advancement was done.

Superimposition of pretreatment and posttreatment lateral cephalometric tracings was done for both the cases [Figures 14 and 15]. There was a change of 7° for SNB and ANB for Case 1 and 4° for Case 2 with no change in maxillary position and an increase in mandibular plane angle in both the cases, demonstrating both sagittal and vertical skeletal changes, which translated into a reduced facial convexity and an increased lower facial height [Tables 1 and 2] and a pleasing soft-tissue facial profile. Molars and canines were finished in Class I with ideal overjet and overbite.

| Table 2: Pre- and posttreatment cephalometric values |
|---------------------------------------------------|
| **Measurement** | **Pretreatment** | **Posttreatment** |
| SNA | 81° | 81° |
| SNB | 75° | 79° |
| ANB | 6° | 2° |
| N-A-Pog | 7° | −1° |
| Pn - A (mm) | 1 | 1 |
| SN-Go-Gn | 21° | 26° |
| FMA | 19° | 23° |
| Max1- SN | 124° | 114° |
| Max1- NA (mm) | 42° | 30° |
| | 10 | 4 |
| IMPA | 108° | 100° |
| L1 – NB (mm) | 29° | 23° |
| | 7 | 4 |
| Nasolabial angle | 106° | 107° |
| Upper lip to E line (mm) | 2 | −2 |
| Lower lip to E line (mm) | 3 | −2 |
| Upper lip to S line (mm) | 3 | 0 |
| Lower lip to S line (mm) | 3 | 0 |
| Mentolabial sulcus (mm) | −6 | −3 |

**Figure 11:** Posttreatment intraoral and extraoral photographs of case report 2

**Figure 12:** Posttreatment radiographs of case report 2

**Figure 13:** (a-c) Mock surgery for case report 1 and (d-f) mock surgery for case report 2
CONCLUSION

A skeletal Class II malocclusion treated with proper diagnosis and treatment planning improves the esthetic value of the patient. In the present article, two skeletal Class II cases with orthognathic maxilla, retrognathic mandible, and reduced lower anterior facial height treated with BSSO were presented which not only improved the overall facial esthetics but also resulted in good occlusion.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

REFERENCES

1. McNeill RW, West RA. Severe mandibular retrognathism: Orthodontic versus surgical orthodontic treatment. Am J Orthod 1977;72:176-82.
2. Proffit WR, White RP Jr. Mandibular deficiency in patients with normal or short face height. In: Proffit WR, White RP Jr., editors. Surgical-Orthodontic Treatment. St. Louis: C. V. Mosby; 1990. p. 334-77.
3. Bailey LJ, Proffit WR. Combined surgical and orthodontic treatment. In: Proffit WR, Fields HW Jr., editors. Contemporary Orthodontics. 3rd ed. St. Louis, MO: Mosby; 1999. p. 674-709.
4. Villanueva JJ, Estrada HA, Carvallo JR, Garcia MG. Surgical-orthodontic treatment in a Class II malocclusion patient. Case report. Rev Mex Ortod 2016;4:e85-92.
5. Shelly AD, Southard TE, Southard KA, Casko JS, Jakobsen JR, Fridrich KL, et al. Evaluation of profile esthetic change with mandibular advancement surgery. Am J Orthod Dentofacial Orthop 2000;117:630-7.