

# Non Surgical Management of a Mutilated Skeletal Class II Malocclusion with an Open Bite: A Case Report

Amit Dahiya<sup>1</sup>, Gurkeerat Singh<sup>2</sup>, Dayashankar<sup>3</sup>, Minakshi Rana<sup>4</sup>, Davendar Kumar<sup>5</sup>

1- Senior Resident, Department of Orthodontics and Dentofacial Orthopedics, Post Graduate Institute of Dental Sciences Rohtak, (Haryana) India. 2- Sr. Prof. and Head, Deptt. of Orthodontics and Dentofacial Orthopedics, Sudha Rustagi College of Dental Sciences and Research, Faridabad (Haryana). 3- Consultant orthodontist (MDS, Hajipur (Bihar) India. 4- Post-Graduate Student, Department of Periodontology, Manav Rachna Dental College, Faridabad (Haryana). 5- Assistant Professor, Department of Orthodontics and Dentofacial Orthopedics, Post Graduate Institute of Dental Sciences Rohtak (Haryana) India.

Correspondence to:  
Dr. Amit Dahiya, Senior Resident, Department of Orthodontics and Dentofacial Orthopedics, Post Graduate Institute of Dental Sciences Rohtak, (Haryana) India.

## ABSTRACT

A case report describing the treatment of a 22- year- old male with open bite malocclusion is presented. His chief complaint was spacing in the upper front teeth. The patient was diagnosed to have a skeletal and dental Class II relationship with tongue thrust habit, hyper-divergent mandibular plane angle and skeletal open bite. The treatment plan consisted of camouflage plan with the extraction of a single left upper first premolars using fixed orthodontic treatment. During 24 months of treatment, good facial esthetics and function were obtained.

**KEYWORDS:** Open Bite, Non-Surgical, Tongue Thrust Habit

## INTRODUCTION

Open bite malocclusion is considered to be one of the difficult problems to treat.<sup>1</sup> Its prevalence ranges from 1.5% to 11% among different ages and ethnic groups. Approximately 17% of orthodontic patients are suffering from open bite malocclusion.<sup>2</sup> The cause of open bite malocclusion is multi-factorial, which may develop from genetic and /or environmental factors.<sup>3</sup> The diagnosis is important because of different treatment approaches. Open bites are classified as skeletal or dental. Dental open bite is an open bite without facial disfigurement, and the skeletal open bite is with a divergence of the sagittal occlusal plane.

Various treatment options for open bite malocclusion include high-pull headgear<sup>4-7</sup>, chin cups<sup>7</sup>, bite blocks<sup>8,9</sup>, functional appliances<sup>10</sup>, extractions, multi-loop edgewise archwires<sup>1</sup>, mini-implants, and orthognathic surgery<sup>11</sup>. Generally dental openbite can be treated with orthodontic alone and skeletal openbite require the combination of orthodontics and surgery.<sup>12</sup> This case report describes a case of non-surgical management of a patient with skeletal class II malocclusion with an open bite

## CASE REPORT

A 22-year-old male patient reported to the Department of Orthodontics and Dentofacial Orthopedics, Sudha Rustagi College of Dental Sciences and Research, Faridabad for orthodontic treatment. His chief complaint was “spacings in the upper front teeth”. Family and medical history were obtained and found to be non-

contributory. Dental history of the patient revealed trauma on the left maxillary central incisor with a cricket ball 7-8 years back, and the patient underwent root canal treatment for the same. He was also undergoing orthodontic treatment in some outside hospital with removable appliances since last 6 months. During that treatment with removable appliances proximal stripping was done in the mandibular arch (between canine and first premolar region) and in the maxillary arch (between incisors, canine and premolars followed by extraction of right maxillary lateral incisor) to relieve the crowding. After having been mal-treated for last 6 months, he reported to our department to get his treatment completed. Extra-oral examination revealed a convex facial profile, deficient chin with potentially incompetent lips and hyperactive mentalis (Fig. 1 A to H). On intraoral examination Angle’s Class II molar relationship, Class II canine relationship, overjet of 5 mm, anterior open bite of 3 mm, spacing of 1.5 mm in the maxillary arch, moderate crowding (6 mm) in the mandibular arch was found. The maxillary dental midline was shifted 4 mm to the right side, and the mandibular dental midline was found to be coincident with respect to the facial midline. A habit of tongue thrusting and generalized fluorosis was seen in all the teeth. There were no temporomandibular joint symptoms and the mandibular movements were normal. Pre-treatment ortho-pantomogram (Fig. 2), lateral cephalogram (Fig. 3) and dental casts were obtained to assist in reaching a final diagnosis of the case. Panoramic radiograph confirmed a

*How to cite this article:*

Dahiya A, Singh G, Dayashankar, Rana M, Kumar D. Non Surgical Management of a Mutilated Skeletal Class II Malocclusion with an Open Bite: A Case Report. *Int J Dent Med Res* 2015;1(6):79-82.

missing right lateral incisor; root canal treated left maxillary central incisor, impacted mandibular molars.

The cephalometric analysis (table 1) showed a skeletal Class II relationship with hyper-divergent jaw bases. It was indicated by the FMA – 41 degrees and SN-Go-Gn angle (48 degrees). Cephalometrics for orthognathic surgery (COGS) analysis revealed increased posterior vertical height of the maxilla as compared to the anterior height of the maxilla. The lower anterior facial height was normal (LAFH = 57 mm). Dentally the maxillary incisors were moderately protrusive (Upper incisor to FH plane = 113 degrees) and the mandibular incisors were almost normally inclined (Incisor mandibular plane angle = 92 degrees).



Fig. 1(A-H): Pre-treatment extraoral and intraoral photographs



Fig. 2: Pre-treatment orthopantomogram



Fig. 3: Pre-treatment lateral cephalogram

| Cephalometric Parameters | Pre-treatment values | Post treatment values |
|--------------------------|----------------------|-----------------------|
| SNA                      | 75                   | 74                    |
| SNB                      | 71                   | 71                    |
| Witts AO-BO              | 5                    | 3                     |
| ANB                      | 4                    | 3                     |
| Angle of convexity       | 9                    | 10                    |
| FMA                      | 41                   | 40                    |
| SN-Go-Gn                 | 48                   | 48                    |
| Jarabak's ratio          | 56.1                 | 58.8                  |
| LAFH                     | 83                   | 83                    |
| Base plane angle         | 41                   | 38                    |
| SND                      | 68                   | 69                    |
| Upper inc. / NA          | 39/9                 | 31/6                  |
| Upper inc. to A -vert.   | 6                    | 3                     |
|                          | 113                  | 111                   |
| Upper inc. to SN         | 104                  | 98                    |
| Lower inc. to NB         | 30 / 11              | 28 / 11               |
| IMPA                     | 92                   | 91                    |
| Lower inc. to A-Pog      | 7                    | 7                     |
| Interincisal             | 115                  | 126                   |
| Lip strain               | 4                    | 2                     |
| Upper lip to S - line    | 5                    | 2                     |
| Lower lip to S- line     | 4                    | 3                     |

Table. 1: Comparison of pre – and post – treatment cephalometric values.

### TREATMENT OBJECTIVES

The objectives of the treatment were: (1) To control the tongue thrust habit (2) Achievement of proper overjet and overbite, (3) Establishment of a proper smile esthetics (4) Achievement of a pleasant soft tissue profile.

### TREATMENT ALTERNATIVES

The optimal treatment plan including the orthognathic surgery which was presented to the patient, but the patient refused to undergo an orthognathic surgical procedure. The second alternative was an orthodontic camouflage plan to which the patient and his parents accepted it, so it was decided to extract maxillary left side first premolar (which would correct the midline as well).

### TREATMENT PROGRESSION

Firstly, a fixed tongue crib appliance was given to the patient for six months (Fig. 4). After 6 months, the case was strapped up with 0.022 slot brackets of MBT prescription. Maxillary left upper first premolar was extracted. Both arches were bracketed, and the wire was placed in the sequence of 0.016 Nickel-Titanium super elastic round wires for the alignment of the teeth followed by 0.018 stainless steel wire. During the leveling and aligning stage, a vertical holding appliance consisting of an acrylic button in the trans-palatal arch was given in the

maxillary molars to control the extrusion of the maxillary molars. The round wires were followed by 0.019x0.025 stainless steel wires for initial torque control and better alignment. Then the cantilever mechanics were used on the left side of the maxillary incisors to shift the midline to the left side (Fig. 5). A segmental 0.019 x 0.025 stainless steel was placed in the maxillary incisors during use of segmental cantilever mechanics. After the correction of the maxillary dental midline, a 0.018 stainless steel wire with vertical helices was placed, and simultaneous Class II elastics were given for the closure of the spaces in the maxillary arch. After 16 months of treatment, the extraction spaces were closed, maxillary dental midline was corrected, proper overjet and overbite were established. The finishing and detailing took another 2 months.

## RETENTION

The appliances were removed after 24 months of treatment time. Lingually bonded fixed retainers were given instead of removable retainers as the former are less likely to have the possibility of relapse.

## TREATMENT RESULTS

A well-aligned dentition and harmonious facial balance were achieved (Fig 6 A-H). A Class II molar relationship with ideal overjet and overbite were achieved. A stable Class I canine relationship was established. The dental midlines were coincident. The panoramic film showed no significant root resorption or alveolar bone loss (Fig. 6 I-J). Cephalometric superimposition of the pre- and post-treatment tracings (Fig. 7) showed that the maxillary incisors were retracted, and the molars were protracted; the profile was almost same, and the mandibular plane was maintained.



Fig. 4: Fixed tongue crib appliance



Fig. 5: Cantilever mechanics used for the correction of midline



Fig. 6(A-H): Post-treatment intra- and extra-oral photographs



Fig. 6 I: Post-treatment orthopantomogram



Fig. 6 J: Post-treatment lateral cephalogram, Fig. 7: Superimpositions between pre- and post-treatment cephalogram

## DISCUSSION

Management of an adult skeletal class II patient having an open bite with vertical growth pattern and a deficient chin is a challenging task. The esthetic problem in open bite patients treated non-surgically is often the presence of “gummy smile”, due to the maxillary vertical excess. If the patient’s major concern is the “gummy smile” than surgery remains the only option, because this is the only option to reduce vertical bone height.

Esthetics in the maxillary anterior region were maintained by reshaping of maxillary right canine to the lateral incisor and maxillary right first premolar to canine to provide a proper Class I canine guided occlusion. Maxillary incisors which were proximally stripped in

some outside hospital were built up with componeer.<sup>13</sup> Co-incident dental midline and lip competency was achieved. The result was slightly compromised as full inter-digitation of the posterior teeth in the left buccal region was not established.

When the pre-and post-treatment cephalometric tracings were compared, it was seen that the open bite problem was corrected by extrusion and tipping backward of the maxillary incisors, the lower incisor slightly extruded and tipped backward, the maxillary first molars were mesialized. The transpalatal arch with a vertical holding appliance helped in maintaining the mandibular plane angle as it prevented the extrusion of the maxillary molars. Patient had competent lips without lip strain. Not much of an improvement was seen in the facial profile was noted as the changes achieved were orthodontic only.

Treatment strategy involved the treatment of the etiological factors such as tongue thrust because it is one of important factor that influence the long-term stability. Tongue thrust may have made retention of corrected occlusion more difficult because any retraction of anterior teeth could have violated the tongue space. Stability of the post-treatment occlusion was acceptable to the patient during few month of the fixed retainer. Lingually bonded fixed retainers were given instead of removable retainers as the former are less likely to have the possibility of relapse.

This case report document the successful non-surgical orthodontic treatment of an adult patient with skeletal Class II malocclusion characterized by open bite and tongue thrusting habit.

## CONCLUSION

A Class II patient with a skeletal open bite, a high mandibular plane angle, and an unstable midline shift was successfully treated with simple, sound appliances and mechanics. The treatment was successful because of a proper diagnosis and treatment plan. A novel and innovative technique are an important part of the

diagnosis in this type of typical and complex cases.

## REFERENCES

1. Kim YH, Han UK, Lim DD, Serraon ML. Stability of anterior open bite correction with multiloop edgewise archwire therapy: A cephalometric follow up study. *Am J Orthod Dentofacial Orthop* 2000;118:43-54.
2. Gile RA. A longitudinal cephalometric evaluation of orthodontically treated anterior open-bite cases [thesis]. Seattle: University of Washington; 1972.
3. McLaughlin RP, Bennett JC, Trevisi HJ. Systemized orthodontic treatment mechanics. 1<sup>st</sup> ed. Edinburg: Mosby;2001.
4. Watson WG. A computerized appraisal of the high-pull face-bow. *Am J Orthod* 1972;62:561-79.
5. Kuhn RJ. Control of anterior vertical dimension and proper selection of extraoral anchorage. *Angle Orthod* 1968;38:340-9.
6. Poulton DR. The influence of extraoral traction. *Am J Orthod* 1967;53:8-18.
7. Pearson LE. Vertical control in treatment of patients having backward- rotational growth tendencies. *Angle Orthod* 1978;48:132-40.
8. Iscan HN, Akkaya S, Koralp E. The effects of the spring-loaded posterior bite-block on the maxillo-facial morphology. *Eur J Orthod* 1992;14:54-60.
9. Ngan P, Fields HW. Open bite: a review of etiology and management. *Pediatr Dent* 1997;19:91-8.
10. Frankel R, Frankel C. A functional approach to treatment of skeletal open bite. *Am J Orthod* 1983;84:54-68.
11. Lo FM, Shapiro PA. Effect of presurgical incisor extrusion on stability of anterior open bite malocclusion treated with orthognathic surgery. *Int J Adult Orthod Orthognath Surg* 1998;13:23-34.
12. Beane RA. Non surgical management of the anterior open bite: A review of the options. *Sem in Orthod* 1999;5:275-283.
13. Ruscher G: Direct restoration of lower anteriors with componeer by coltene. Available from: <http://www.coltene.com>

Source of Support: Nil  
Conflict of Interest: Nil