

UNCOMMON MANAGEMENT OF AN OPEN BITE CASE WITH LOWER FIRST MOLAR EXTRACTION : A CASE REPORT

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ABSTRACT

Open bite is a developmental or an acquired malocclusion where there is lack of vertical overlap of the upper and lower teeth. The treatment modalities to correct openbite depend on proper diagnosis and treatment planning. Successful treatment of an anterior openbite malocclusion is considered one of the most challenging areas in orthodontics. A 16 year old female patient with an anterior open bite was treated by extraction of lower 1st permanent molars and upper 1st premolars, followed by MBT mechanotherapy. The therapeutic goal was to correct the malocclusion and to achieve a harmonious soft tissue profile. At the end of the treatment, the patient had her molars in Class II and canine in Class I occlusion, normal overjet and overbite, and stability during the post-treatment period.

KEY WORDS

Open bite, Vertical discrepancy, First molar extraction.

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INTRODUCTION

Open bite is a distinctive and easily recognizable characteristic of some malocclusions; it has significant functional and esthetic consequences. It usually applies to the vertical plane of space, when no overlap of the teeth is present, and the measurement of separation is the amount of open bite.¹ Open bite can apply to individual teeth or groups of teeth, and can be restricted to either or both anterior and posterior dentitions. It is important to note that, the etiology of anterior open bite is often quite different from that of posterior open bite, and so it is important to identify the fundamental cause of the condition in the diagnostic process. Proper diagnosis and determination of etiology, when possible, will always be the best guides to appropriate treatment objectives and optimal treatment plans. Although discrepancies in vertical and sagittal relationships of teeth can be easily recognized, determining their etiology is not that easy. In the case of anterior open bite, which is much more common than posterior open bite, it is important to determine whether it is skeletal in origin and its extent, or whether it is limited to the dentoalveolar complex.

The difference is often in degree or amount, but it certainly will guide treatment decisions, as will the patient's age and growth potential. An anterior skeletal open bite, for example, has been related to reduced posterior facial height, hyperdivergent growth pattern, clockwise or backward rotation of the mandible, and the resultant excessive anterior lower facial height, often described as the "long face syndrome."²⁻⁴ Treatment for this morphology is often directed at controlling maxillary vertical development and posterior dental eruption in the growing patient,⁵ but it might include single or multi-segment LeFort osteotomies to correct the skeletal vertical or transverse discrepancies in the non-growing adult.⁶

In this patient, the etiology was environmental and due to tongue thrusting during swallowing, affecting both sagittal and vertical dimensions. In case, of long term tongue thrusting habit upper and lower anteriors become proclined. The patients must be well chosen so that the treatment is not detrimental to facial esthetics.¹ In this case report, we



Figure 1(A-C): Extra-oral photographs before treatment



Figure 2(A-E): Intra-oral photographs before treatment

describe an adolescent girl nearing the end of jaw growth; camouflage therapy was selected as the treatment of choice.

CASE REPORT

The patient, a girl aged 16 years, came to Department of Orthodontics and Dentofacial Orthopaedics, Dr. R Ahmed Dental College and Hospital, Kolkata. Her chief complaint was that she had forwardly placed upper and lower front teeth. She had no relevant medical history and had a habit of tongue thrusting.

On extra Oral examination, she had a mild convex profile with a mesoprosopic facial type. Lips were incompetent with an inter-labial distance of 6mm. Face was apparently symmetrical with a normal chin and deep mento-labial sulcus. She had no pain or crepitus on temporo-mandibular joint

examination. Upon further clinical examination, no deviation on opening and closing of mandible was observed.(Fig1A-1C)

On Intra-oral examination, Class I molar relationship and class III canine relationship, with 1.0 mm of overjet and 2 mm of open bite was observed. The maxillary and mandibular incisors were proclined. The maxillary dental midline was coincident with the facial midline, but the mandibular dental midline was 0.5 mm to the left of the facial midline. Lower 1st mandibular permanent molars were grossly decayed and maxillary first right premolar was disto-palatally rotated and right second premolar was palatally erupted (Fig 2A- 2E).

On examination of the Radiographs, the panoramic radiograph showed a complete permanent dentition with the maxillary and mandibular third molars in erupting stage (Fig.4). The lateral cephalogram confirmed the Class I skeletal base with average growth pattern (Fig. 5) and (Table 1).

PROBLEM LIST

Soft tissue problems:

1. Incompetent lip pattern.
2. Convex soft tissue profile.
3. Deep mentolabial sulcus.

Dental problems:

1. Anterior open bite extending from 13 to 24 region.
2. Proclined maxillary and mandibular incisors.
3. Palatally placed 15
4. Bucally placed distopalatally rotated 14
5. Grossly carious 36 and 46.

TREATMENT OBJECTIVES

Treatment objectives and planning were the following:

- Cessation of the tongue thrusting habit and establishment of proper overbite and overjet relationships for improved function and esthetics were of great importance for this patient.
- Closure of the open bite without producing excessive tooth display by overjet closure was deemed crucial to improving masticatory efficiency and facial appearance.
- Her non-growing status and maxillary and mandibular dental protrusion strongly dictated the extraction of the maxillary and mandibular first premolars. However, the decision to extract the lower 1st permanent molars was taken because they were grossly decayed, making their extraction justified over the healthy 1st premolars of the lower arch.
- Thus it was planned to establish a functional Class II occlusion, with Class I canines and Class II molars.

The treatment alternatives were:

All 1st permanent molar extraction followed by retraction of anteriors. However, this option wasn't chosen since the patient didn't want to extract her upper molars.

TREATMENT PROGRESS

After obtaining an informed consent. The patient was then referred to the Oral and Maxillofacial Surgery Department at Dr. R Ahmed Dental College and Hospital, for extraction of the maxillary first premolars, after which the mandibular 1st molars were extracted.

MBT prescription brackets were bonded. Leveling and alignment of the maxillary and mandibular arch proceeded. While the patient was in nickel-titanium wires, the canines were lacebacks to begin their movement. Then, by using sliding mechanics on a 19x25 stainless steel archwire, Incisor retraction was initiated. For the upper arch retraction was done by using active tie-back. In the mandibular arch two 6 mm long and 1.5 mm diameter mini implants were placed between 2nd premolar and 2nd molar with self-drilling method bilaterally. The mandibular incisors were retracted using Mini Implants as site of anchorage by closed niti coil springs (Fig. 3).

After achieving Class I canine relationship bilaterally, the mandibular 2nd molars were mesialised. This was done by using indirect anchorage with the help of mini implants by securing the lower 2nd premolars. Thus a premolar to premolar anchorage unit was prepared and the molars were mesialised by using sliding mechanics (Fig. 7).

After achieving space closure, settling was done. On the day of debonding, upper fixed retainer was given. Patient was asked to come for regular checkups every 6 weeks.

TREATMENT RESULT

After upper premolar and lower 1st molar extractions, the anterior segment was retracted leading to establishment of 2mm overbite. The molar relationship was Class II and the canines Class I, with a mutually protected canine rise established in lateral function and anterior dis-occlusion upon mandibular protrusive movements. Upon mesialisation of lower second molars, sufficient space was achieved to allow the lower third molars to erupt onto the occlusal table. The patient did not have excessive display of gingival tissues on smiling. Fullness of the lips was reduced, and a pleasing profile was established. Lip



Figure 3: Mid-Treatment photographs

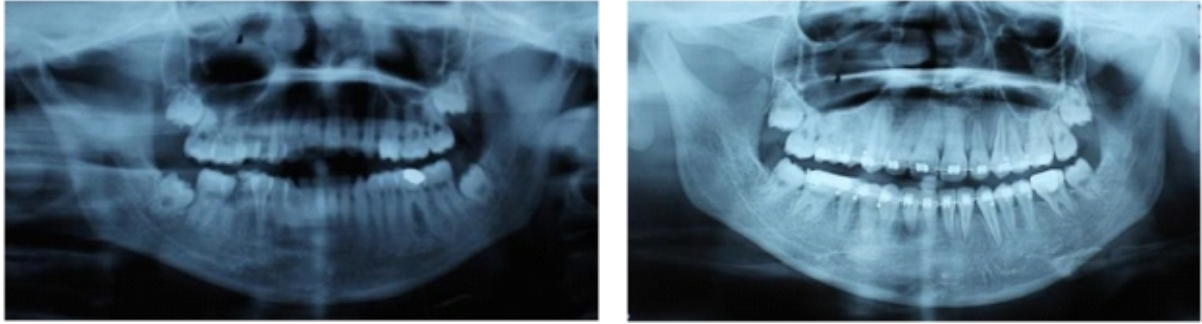


Figure 4: Pre & Post treatment Orthopantomogram

competence was present without mentalis strain (Fig. 6). The treatment goals and objectives were accomplished, and the patient and her parents were pleased with the final result. Figure 9 shows the results after 24 months of retention.

DISCUSSION

The open bite, with or without overjet, is almost always due to environmental causes such as oral or digital habits that prevent proper tooth eruption and maxilla-mandibular development. Many remedies or treatments for correction of oral or tongue thrusting habits are discussed in the literature.

The methodologies can vary widely, but we generally agree that such habits before the eruption of the permanent dentition are of no major consequence. If, these habits persist, malocclusion characterized by procline and spaced maxillary and mandibular incisors, anterior open bite, and even narrowing of the maxillary arch can result. The amount or degree of such dentoalveolar or skeletal alteration is related to the daily and the long-term duration of the habit. But, irrespective of the corrective method, it must be corrected before the start of comprehensive therapy.

Much has been written in the orthodontic and surgical literature about the diagnosis and treatment of open bite related to the “long-face syndrome”

patient. Treatment can involve removable or fixed functional appliances, or extra-oral headgear traction to accomplish correction by growth modification in the actively growing and compliant patient.¹⁰⁻¹⁴

It might also involve maxillary molar distalization appliances at the right time or after second molar removal, followed by anterior retraction¹⁵⁻¹⁶. It can be accomplished with extraction of premolars or differential extraction patterns, followed by space closure to establish proper occlusion and eliminate overjet. It can also be corrected by surgical advancement of the mandible in a non-growing patient through bilateral sagittal split osteotomies.¹⁷ Or it can be camouflaged by extraction of the maxillary premolars only, involving anterior retraction while maintaining the Class II molar relationship, but establishing a Class I canine relationship.

Age and skeletal maturation are important factors, along with crowding in the arch and patient's facial proportions should be considered before taking extraction decision. Good alignment is beneficial so that extraction spaces can be used for antero-posterior displacement, rather than relieving crowding.

Extraction of teeth can often help to achieve lip competence, because of the bite-deepening mechanics required to close extraction spaces. But thinning of the lips and other soft-tissue changes



Figure 5: Pre and Post-treatment Cephalogram

Cephalometric Treatment changes:(Table 1)

Cephalometric values	Pre	Post
SNA	76°	75°
SNB	75°	73.5°
ANB	1°	1.5°
WITS APPRAISAL	-1mm	+1mm
UI-NA	11mm/42°	6.5mm/27°
UI-pal	117°	109°
IMPA	94°	87°
Na per -pt A	1mm	-0.5mm
Na per-pog	1mm	-2mm
FMA	28°	28°
LAFH	63mm	62.5mm
Inter incisal angle	110°	129°
Y- axis	57°	57°
Nasolabial angle	106°	110°



Figure 6(A-C): Post-treatment intraoral photographs

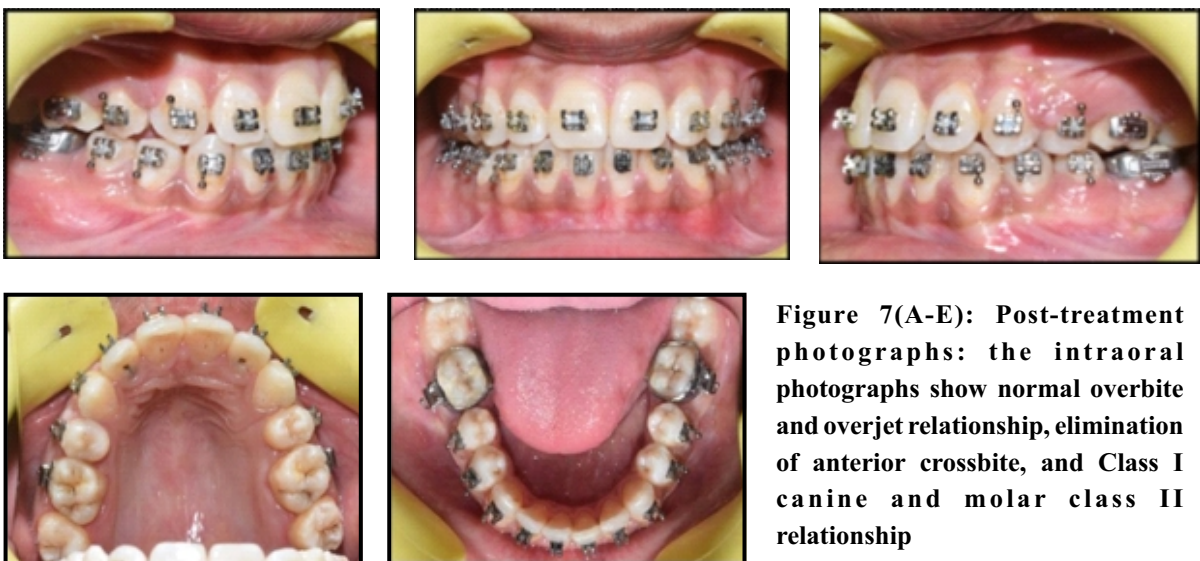


Figure 7(A-E): Post-treatment photographs: the intraoral photographs show normal overbite and overjet relationship, elimination of anterior crossbite, and Class I canine and molar class II relationship

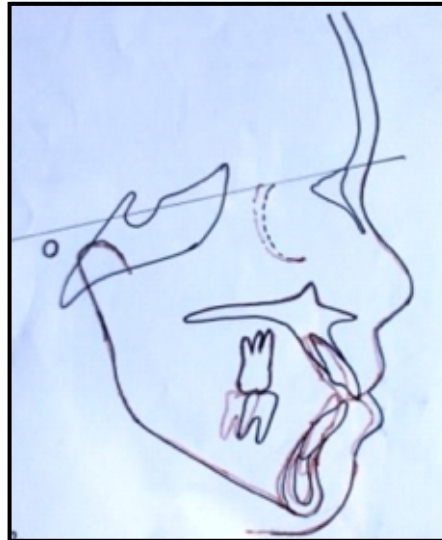


Figure 8: Superimposition of final tracings on SN, centered on S.
(Blue:- Pre-Treatment and Red:- Post-Treatment)



Figure 9 (A-H): Post Retention Extra oral and Intra oral photographs

caused by unnecessary extractions are sometimes undesirable esthetic results and are important factors when contemplating removal of teeth. Another related factor to consider is the pretreatment tooth-to-lip measurement, because extraction of the maxillary premolars and their subsequent retraction by tipping can potentially lead to an excessive display of tooth structure. Camouflage therapy is a treatment option, but obviously it has its indications and contraindications. As explained by Proffit and Fields,² it is attempted and more successful in patients with mild to moderate skeletal discrepancies with little growth modification potential.

CONCLUSION

Anterior open bite can be of environmental origin and due to oral-digital or tongue thrusting habits that restrict normal dental eruption and dentoalveolar development, and sometimes maxilla-mandibular growth. Correction of the habit before orthodontic therapy is crucial to the treatment and the long-term stability of the result. The patient's age and growth potential, as well as the hard-tissue and soft-tissue relationships, should be evaluated carefully in diagnosing and treatment planning this type of patient.

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