Upper Molar Intrusion with Mini-implants to Correct Anterior Skeletal Open Bite: A Case Report
Mohammed A Al-Labani1, Sakhr A Murshid2, Fuad Lutf Almotareb3, Mohammed M Al-Moaleem4

Contributors:
1Assistant Professor, Department of Orthodontics, Faculty of Dentistry, Sana’a University, Sana’a City, Yemen; 2Assistant Professor, Department of Pedodontics, Orthodontics and Preventive Dentistry, Faculty of Dentistry, Thamar University, Thamar City, Yemen; 3Assistant Professor, Department of Prosthetics Dental Science College of Dentistry, Jazan University, Jazan, KSA.

Correspondence:
Dr. Al-Moaleem MM. Department of Prosthetics Dental Science, College of Dentistry, Jazan University, P.O. Box 114, Jazan 45142, Kingdom of Saudi Arabia. Phone: 00966-550599553. Email: drmoaleem2014@gmail.com

How to cite this article:

Abstract:
This article reported a treatment of an adult male patient, his age was 17 years 3 months, his chief complaint was difficulty in chewing, pronunciation, and esthetics. He was diagnosed of having 6 mm of anterior skeletal open bite on skeletal Class II, overjet 5 mm, negative overbite – 4 mm, and tongue trust habit. The patient was successfully treated using mini-implants anchorage, 022 MBT appliance, and muscles exercises. Our results suggested that using mini-implant anchorage, muscles exercises, and repositioning the brackets as needed delivered good final results in skeletal anterior open bite cases.

Key Words: Anterior open bite, Class II, mini-implant, orthodontic treatment

Introduction
Open bite is generally classified in two categories skeletal and dental. The causes are multifactorial which can be developed from genetic and (or) environmental factors. It’s considered one of the most difficult problems to treat.1, 2 The diagnosis is important due to the different treatment modalities; a dental open bite can be treated with orthodontic alone, while skeletal open bite requires a combination of orthodontic and surgical approaches.3

Many therapeutic options have been proposed for the treatment and retention of anterior open bite malocclusion. Conventional orthodontic treatment has been directed at inhibiting the vertical maxillary growth with headgear, chin cups for retarding the mandibular growth, or vertical elastics for extruding anterior teeth,4-6 tongue crib therapy,7 posterior bite blocks,8 posterior magnets,9 vertical corrector activated by magnets,10 and functional appliances.11

The proper treatment approach would be orthognathic surgery during which maxillary anterior teeth are proclined forward to obtain some overjet and move the mandible forward. This type of treatment is suitable to the age of our case, but the financial condition is notable for the fees of surgery.12

Recently, mini-implant is used as skeletal anchorage device for treatment of anterior open bite and with the use of this system, intrusion of upper posterior molars without unfavorable side effects became possible.13 In this article, we will present an adult case of skeletal anterior open bite and its management using mini-implants and muscle exercises.

Case Report
A 17-year-old male, the patient attended to the clinic. The patient complains were a presented vertical facial pattern with Class II molar relationship, an anterior open bite of 6 mm supported by an improper tongue posture, increased overjet, altered occlusal plane, and high mandibular plane angle. The patient’s chief complaint was the poor esthetics and the difficulty in pronunciation and chewing because of his anterior open bite. The medical and oral history were within normal and he had good oral health. The extraoral view showed lip incompetents and improper face proportions (Figure 1a). The intraoral examination showed, open bite, Class II angle molar relationship with group function occlusion (Figure 1b), free caries mouth, and good oral hygiene (Figure 1c and d). While the cephalometric and panoramic pre-operative radiographs X-rays showed clear skeletal abnormality (Figure 2a and b).

A maxillary and mandibular arches impressions were done using dust free alginate. Then pouring of the diagnostic cast, interpretation of the diagnostic data was done, in addition to cephalometric analysis was performed properly.

The treatment objectives, in this case, were an elimination of the tongue trust habit, correction of molar Class II molar and canine relationship, correction of both the overjet and the overbite. In addition to that creating a space to correct the crowding in the anterior region of maxillary teeth. Also decrease the lower facial heights, elimination of functional and speech problems, and finally to stabilize all results together.

The first choice of treatment was discussed with the patient. Which includes the extraction of two first maxillary bicuspids to correct the anterior open bite and the increased overjet. Considerations over the unpredictable effect in the facial profile
were made, including the necessity of orthognathic surgery after the space closure and facial reevaluation. The patient and his parents did agree with this sequence of treatments, the second option was presented to them, and it was related to the use of mini-implant to provide skeletal anchorage and intrude the upper molars.

After scaling and polishing of teeth, trans-palatal arch was delivered 2 mm off the palate to intrude the buccal and palatal cusps of maxillary six molars. 022 slot MBT brackets system was used, the archwire sequence progressed to 0.19 × 0.25 S.S to stabilize the arch. 3 months into treatment box elastics were used, then after 6 months into treatment triangular elastics were used as needed to help in closing anterior open bite (Figure 3a and b). Regarding muscles exercises, the patient asked to clench isometrically for five seconds and rest for five seconds for one minute five to six times a day.

At 11 months from the beginning of the treatment, two mini-implant (Jeil Medical Corp, Seoul, Korea), with 8 mm in length, and 1.4 mm in diameters were inserted between upper first molars and second premolars as inferiorly as possible. 2 weeks later mini-implant on the right side was removed due to loosening and changes the position. Repositioning the brackets of upper incisors and detailing was complete, so all fixed appliance and mini-implants were removed (Figure 3c).

The results of the treatment were obvious and clear as shown in the post-operative views (extraoral and intraoral views), the anterior open bite no longer exists and it is possible to note the improvement in the occlusal plane position and in the tongue posture. Furthermore, it is possible to notice the profile improvement and the smile arc in harmony with the length of the lower face (Figure 4a-d). The speech, function, and esthetic had improved significantly. Furthermore, it is clear in the post-operative radiographs (Figure 5a and b).

The patient was recalled for 6 months (once per month) to evaluate the stability of the case. A maxillary and mandibular fixed maintainers were used for retention. The patient was instructed to continue the muscle exercises, proper oral hygiene with different cleaning aids.

Figure 1: (a-d) Extraoral and intraoral pre-operative view.

Figure 2: (a and b) Cephalometric and panoramic pre-operative view.

Figure 3: (a-c) During treatment progress with mini-implants and regular band.
Discussion
A skeletal open bite is considered to be one of the most complicated malocclusion and its treatment depends on the severity of the skeletal discrepancies. Orthognathic surgery is usually the preferred treatment option for a severe skeletal anterior bite with deficient chin. Camouflage treatment with premolar extraction is a common alternative option, but in our case, it was refused by the patient. The patient was opposed to surgery of any teeth; therefore, he accepted the treatment with mini-implants.

The use of mini-implant as a temporary anchorage for skeletal anchorage is clearly not a replacement for other proven anchorage systems. Skeletal anchorage should serve merely to expand the orthodontic services we can offer our patients. Multi-loop edgewise archwire is effective for correcting the case but it was not selected because it is not capable of decreasing the lower facial high wire bending time. The most significant problem encountered where the failure of initial mini-implant on the right side and continued breakage of brackets of lower seconds premolars due to biting exercises, but this has been corrected after 4 time of breakage.

The clinical significant of treating this case first, from the orthodontic biomechanics point of view if we used conventional methods, by extruding of the interior teeth this may lead to compromising the smile line by extrusion of incisors ending by a gummy smile. But by the using of a micro-implant, we can intrude posterior teeth, allowing the mandible to auto-rotate counterclockwise direction, thus closing the open bite without jaberising the esthetic of the patient. The second decreased the treatment time, as well as the cost of the treatment since we did not go for orthognathic surgery. In addition to that, we preserved the aesthetic of the patient since the incisor had shown acceptable alignments at the beginning of the treatment.

Conclusion
The skeletal anterior open bite, in this case, was treated successfully as documented by photos and cephalometric X-rays. Mini-implant with good orthodontic biomechanics was effective tools to treat this skeletal anterior open bite cases conservatively although we may achieve the same result with orthognathic or extraction of teeth.

References
11. Fränkel R, Fränkel C. A functional approach to treatment...


