



# IMPLANT AN ABSOLUTE ANCHORAGE: A CASE OF IMPLANT SUPPORTED RETRACTION OF BIMAXILLARY DENTOALVEOLAR PROTRUSION

**Eshan Awasthi<sup>1</sup>, Narendra Sharma<sup>2</sup>, Abhilasha Goyal<sup>1</sup>,  
Deoashish Gupta<sup>3</sup>, Vaibhav Khare<sup>4</sup>**

<sup>1</sup>MDS (Orthodontics and Dentofacial Orthopedics), Senior Lecturer, Department of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India; <sup>2</sup>MDS (Orthodontics and Dentofacial Orthopedics), Associate Professor Department of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India; <sup>3</sup>MDS (Orthodontics and Dentofacial Orthopedics), Senior Lecturer, Department of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India; <sup>4</sup>Post graduate (Orthodontics and Dentofacial Orthopedics), Department of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India; <sup>5</sup>Senior Lecturer (Orthodontics and Dentofacial Orthopedics), Department Of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India.

## ABSTRACT

Studies have shown that orthodontic mini-implants serve as an important anchorage method, for orthodontists at all treatment stages, reducing the patient's compliance and achieving more predictable results. Implant serves as an absolute anchorage taking anchorage from skeleton with no reactionary force on posterior teeth during reaction

**Aim:** This case report describes the treatment of a 31-year-old female who had incompetent lips with severe bimaxillary dentoalveolar protrusion.

**Methodology:** The preferred treatment alternative for such malocclusion is extraction of four first premolars and utilization of extraction spaces retraction of the anterior teeth. To maintain the extraction space, maximum anchorage is required. Mini-implants were used for absolute anchorage to get a good facial profile.

**Conclusion:** Post treatment the profile improved, competency of lips was achieved and cephalometric superimposition revealed that no anchorage loss was seen with all extraction space being utilized for retraction. Hence implant serves as an effective tool as an absolute anchorage

**Key Words:** Implant, Miniscrew, Absolute anchorage

## INTRODUCTION

Protrusiveness and proclination of the maxillary and mandibular incisors along with increased procumbency of the lips is a condition known as bimaxillary dentoalveolar protrusion.<sup>1</sup> This condition is commonly seen in the Asian as well as African– American populations.<sup>2-8</sup> The usual objective of orthodontic treatment of such condition includes the retraction and retroclination of maxillary and mandibular incisors with a resultant decrease in soft tissue procumbency and convexity.<sup>9</sup> The treatment of choice for these patients

is to extract all first bicuspids. In this case, maximum anchorage of the posterior teeth is of great importance for two reasons; to retract the anterior teeth to their greatest extent and increase the chances of correcting the profile. With the introduction of dental implants<sup>10-11</sup>, mini-plates,<sup>12-13</sup> micro-implants and mini-screws/implants as anchorage,<sup>14-19</sup> it has become possible to achieve absolute anchorage<sup>20</sup>.

Therefore, this case report demonstrates the efficacy of mini-implants as an anchorage aid in an adult with severe bimaxillary dentoalveolar protrusion with incompetent lips.

### Corresponding Author:

Dr. Eshan Awasthi, MDS (Orthodontics and Dentofacial Orthopedics), Senior Lecturer, Department of Orthodontics, Sharad Pawar Dental College, Wardha, Maharashtra, India; E-mail: eshaan.awasthi33@gmail.com

Received: 14.08.2015

Revised: 09.09.2015

Accepted: 05.10.2015

## CASE REPORT

A 31-year-old female patient reported in the orthodontic clinic with the chief complaint of poor esthetics due to forwardly placed upper and lower front teeth.

**Extra-oral examination-** The patient had an apparently symmetric face with mesoprosopic face form and incompetent lips. On profile examination patient had a convex facial profile. The smile of the patient was symmetric and consonant with 100% maxillary incisor display on smiling. (Figure 1a)

**Intra-oral examination** – Revealed all teeth in upper and lower arch are present till 2<sup>nd</sup> molar. U shaped upper and lower arch. The gingival health was satisfactory. Class I molar and canine relationship bilaterally. (Figure 1b)

**Functional examination-** Patient showed normal speech pattern, oronasal breathing and a typical swallowing pattern. The path of closure of mandible was normal.

**Examination of study casts-** Showed apparently symmetrical arches with a Class I molar and canine relationship. There was 5mm overjet and 4mm overbite.

**Cephalometric analysis-** Revealed that patient was in CVMI stage VI (completion) and had Class II skeletal bases with average angle case and, proclined upper and lower incisors. The soft tissue analysis revealed a protrusive upper lip and lower lip with an acute nasolabial angle.

**Diagnosis:** Skeletal Class II malocclusion with average growth pattern. Angle's Class I, Dewey's type 1

### Problem List

- Convex facial profile
- Incompetent lips
- Upper and lower proclination
- Increased overjet and overbite

### Treatment Objectives

- To improve facial profile
- To correction proclination of upper and lower arch.
- To achieve normal Overjet and Overbite

### Treatment progress:

MBT 0.022 in prescription was bonded to upper and lower arch. All 1<sup>st</sup> premolar were extracted. Initial leveling and alignment was carried out with wire sequence was 0.016 in, 0.016 x 0.022 in, 0.017 x 0.025 in HANT, 0.016 x 0.022 in, 0.017 x 0.025 in, 0.019 x 0.025 in, 0.021 x 0.025 in SS wire.

Mini screw implant (1.3mm diameter, 6mm long) were placed in all four quadrants interdental between 2<sup>nd</sup> premolar and 1<sup>st</sup> molar. Retraction was done using a crimpable hook distal to lateral incisor in a 0.019 x 0.025 in SS wire (Figure 2)

## RESULTS

The active retraction continued for eight months and the total treatment duration was 18 months. At the end of the treatment the profile of the patient improved, competency of the lips was achieved, proclination corrected and normal overjet and overbite was attained. (Figure 3a-b, 4)

## DISCUSSION

Bimaxillary dentoalveolar protrusion, which is characterized by dentoalveolar flaring of both the maxillary and mandibular anterior teeth, with resultant protrusion of the lips and convexity of the face, is commonly seen in Asian populations.<sup>2</sup> It is accepted in orthodontics that extraction of permanent teeth reduces facial convexity<sup>3,4,21</sup>. On the basis of the patient's chief complaint and the diagnosis of the malocclusion, extracting the maxillary and mandibular first bicuspids is a valid and viable option to decrease lip procumbency. The advances in the utilizing bone anchorage such as retromolar implant,<sup>11</sup> onplants<sup>22,23</sup>, palatal implants<sup>24,25</sup>, mini-plates<sup>26</sup>, mini-screws<sup>27</sup> and mini-implants<sup>20</sup> make it possible to overcome previous limitation of orthodontic tooth movement and perform en masse movement in the desired direction. As shown in the reported case, the use of mini-implants provided absolute anchorage for the desired tooth movement. To date, clinical efficacy<sup>14,20,28,29,30</sup> and stability<sup>29,31</sup> of temporary orthodontic skeletal anchorage devices have been widely described. With the use of the mini-implants, maximum en masse retraction of the maxillary and mandibular anterior teeth was possible without patient compliance. As can be seen in the current report, the use of mini-implants provided a better system for controlling anchorage and facilitating our mechanics.

## CONCLUSION

- Mini-implants in this case report showed significant improvement in correction of proclination, profile and competency of lips also improved.
- Mini-implants proved as an absolute anchorage for en masse retraction of the anterior teeth.
- Mini-implants can be used to simplify the treatment in such Class I bimaxillary dentoalveolar protrusion by reducing the patient's compliance.

## ACKNOWLEDGEMENT

Our sincere thanks to Dr Sunita Shrivastav and Dr RH Kamble for their guidance.

Authors acknowledge the immense help received from the scholars whose articles are cited and in-

cluded in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

## REFERENCES

1. Proffit, W.R., Fields, H.W., Sarver, D.M., Contemporary Orthodontics, 2007. fourth ed. Mosby Elsevier, St. Louis, MO.
2. Lamberton, C.M., Reichart, P.A., Triratananimit, P. Bimaxillary protrusion as a pathologic problem in the Thai. *Am. J. Orthod.* 1980; 77 (3), 320–329.
3. Lew, K. Profile changes following orthodontic treatment of bimaxillary protrusion in adults with the Begg appliance. *Eur. J. Orthod.* 1989; 11 (4), 375–381.
4. Tan, T.J. Profile changes following orthodontic correction of bimaxillary protrusion with a preadjusted edgewise appliance. *Int. J. Adult Orthod. Orthognath. Surg.* 1996; 11 (3), 239–251.
5. Fonseca, R.J., Klein, W.D. A cephalometric evaluation of American Negro women. *Am. J. Orthod.* 1978; 73 (2), 152–160.
6. Rosa, R.A., Arvystas, M.G. An epidemiologic survey of malocclusions among American Negroes and American Hispanics. *Am. J. Orthod.* 1978; 73 (3), 258–273.
7. Farrow, A.L., Zarrinnia, K., Azizi, K. Bimaxillary protrusion in black Americans – an esthetic evaluation and the treatment considerations. *Am. J. Orthod. Dentofacial Orthop.* 1993; 104 (3), 240–250.
8. Scott, S.H., Johnston Jr., L.E. The perceived impact of extraction and nonextraction treatments on matched samples of African American patients. *Am. J. Orthod. Dentofacial Orthop.* 1999; 116 (3), 352–360.
9. Bills, D.A., Handelman, C.S., BeGole, E.A. Bimaxillary dentoalveolar protrusion: traits and orthodontic correction. *Angle Orthod.* 2005; 75 (3), 333–339.
10. Roberts, W.E., Helm, F.R., Marshall, K.J., Gongloff, R.K. Rigid endosseous implants for orthodontic and orthopedic anchorage. *Angle Orthod.* 1989; 59 (4), 247–256.
11. Roberts, W.E., Marshall, K.J., Mozsary, P.G. Rigid endosseous implant utilized as anchorage to protract molars and close an atrophic extraction site. *Angle Orthod.* 1990; 60 (2), 135–152.
12. Sugawara, J., Daimaruya, T., Umemori, M., et al. Distal movement of mandibular molars in adult patients with the skeletal anchorage system. *Am. J. Orthod. Dentofacial Orthop.* 2004; 125 (2), 130–138.
13. Choi, B.H., Zhu, S.J., Kim, Y.H. A clinical evaluation of titanium miniplates as anchors for orthodontic treatment. *Am. J. Orthod. Dentofacial Orthop.* 2005; 128 (3), 382–384.
14. Park, H.S., Kwon, T.G. Sliding mechanics with microscrew implant anchorage. *Angle Orthod.* 2004; 74 (5), 703–710.
15. Park, H.S., Bae, S.M., Kyung, H.M., Sung, J.H. Micro-implant anchorage for treatment of skeletal Class I bialveolar protrusion. *J. Clin. Orthod.* 2001; 35 (7), 417–422.
16. Park, H.S., Kwon, O.W., Sung, J.H. Microscrew implant anchorage sliding mechanics. *World J. Orthod.* 2005a; 6 (3), 265–274.
17. Park, H.S., Lee, S.K., Kwon, O.W. Group distal movement of teeth using microscrew implant anchorage. *Angle Orthod.* 2005b; 75 (4), 602–609.
18. Park, Y.C., Chu, J.H., Choi, Y.J., Choi, N.C. Extraction space closure with vacuum-formed splints and miniscrew anchorage. *J. Clin. Orthod.* 2005c; 39 (2), 76–79.
19. Park, H.S., Yoon, D.Y., Park, C.S., Jeoung, S.H. Treatment effects and anchorage potential of sliding mechanics with titanium screws compared with the Tweed-Merrifield technique. *Am. J. Orthod. Dentofacial Orthop.* 2008; 133 (4), 593–600.
20. Kanomi, R. Mini-implant for orthodontic anchorage. *J. Clin. Orthod.* 1997; 31 (11), 763–767.
21. Kurz, C. The use of lingual appliances for correction of bimaxillary protrusion (four premolars extraction). *Am. J. Orthod. Dentofacial Orthop.* 1997; 112 (4), 357–363.
22. Block, M.S., Hoffman, D.R. A new device for absolute anchorage for orthodontics. *Am. J. Orthod. Dentofacial Orthop.* 1995; 107 (3), 251–258.
23. Armbruster, P.C., Block, M.S. Onplant-supported orthodontic anchorage. *Atlas Oral Maxillofac. Surg. Clin. North Am.* 2001; 9 (1), 53–74.
24. Wehrbein, H., Glatzmaier, J., Mundwiler, U., Diedrich, P. The Orthosystem – a new implant system for orthodontic anchorage in the palate. *J. Orofac. Orthop.* 1996a.; 57 (3), 142–153.
25. Wehrbein, H., Merz, B.R., Diedrich, P., Glatzmaier, J. The use of palatal implants for orthodontic anchorage. Design and clinical application of the orthosystem. *Clin. Oral Implants Res.* 1996b; 7 (4), 410–416.
26. Umemori, M., Sugawara, J., Mitani, H., Nagasaka, H., Kawamura, H. Skeletal anchorage system for open-bite correction. *Am. J. Orthod. Dentofacial Orthop.* 1999; 115 (2), 166–174.
27. Costa, A., Raffaini, M., Melsen, B. Miniscrews as orthodontic anchorage: a preliminary report. *Int. J. Adult Orthod. Orthognath. Surg.* 1998; 13 (3), 201–209.
28. Creekmore, T.D., Eklund, M.K. The possibility of skeletal anchorage. *J. Clin. Orthod.* 1983; 17 (4), 266–269.
29. De Pauw, G.A., Dermaut, L., De Bruyn, H., Johansson, C. Stability of implants as anchorage for orthopedic traction. *Angle Orthod.* 1999; 69 (5), 401–407.
30. Chae, J.M. A new protocol of Tweed-Merrifield directional force technology with microimplant anchorage. *Am. J. Orthod. Dentofacial Orthop.* 2006 ; 130 (1), 100–109.
31. Miyawaki, S., Koyama, I., Inoue, M., Mishima, K., Sugahara, T., Takano-Yamamoto, T. Factors associated with the stability of titanium screws placed in the posterior region for orthodontic anchorage. *Am. J. Orthod. Dentofacial Orthop.* 2003; 124 (4), 373–378.



Figure 1a: Pre treatment extra-oral and intra-oral frontal



Figure 1b: Pre treatment intra-oral occlusal and occlusion

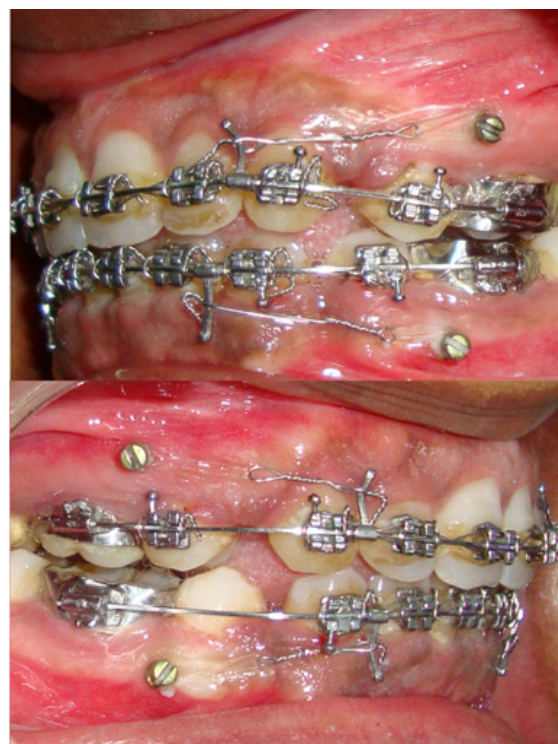


Figure 2: Implant supported retraction



Figure 3A: Post treatment extra-oral and intra-oral frontal



**Figure 3B:** Post treatment intra-oral occlusal and occlusion



**Figure 4:** Cephalometric superimposition  
Red-pre treatment  
Blue-post treatment