

Modified anterior maxillary distraction using “Winged Osteotomy”: A technical note

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ABSTRACT

Hypoplasia of the maxilla is common in cleft lip and palate (CLP) deformities. Orthognathic surgery has been the traditional method of correction in such developmental anomalies since 1970's, with Le-Fort I advancement as its long-established management modality, which results in significant speech alteration and relapse rate. In contrast, anterior maxillary distraction (AMD) has the advantage of lesser chances of relapse, velopharyngeal insufficiency, and alteration of speech. This modified AMD technique carries a handful of its advantages as it is an easier procedure compared to the Le-Fort I osteotomy as it gives positive soft tissue changes by improving the projection of the nose and the upper lip, normalizes naso-labial angle, and changes the facial prominence from concave to convex simultaneously as it gives nasolabial and sub-malar prominence post-operatively due to the extension of horizontal cuts up to the zygomatic region, leading to lesser complications. Also, the hollowing caused by the conventional AMD osteotomy cuts is eliminated by the extension of the winged osteotomy.

Hypoplasia of the maxilla is common in cleft lip and palate (CLP) deformities. Orthognathic surgery has been the traditional method of correction in such developmental anomalies since 1970's, with Le-Fort I advancement as its long-established management modality, which results in significant speech alteration and relapse rate. In contrast, anterior maxillary distraction (AMD) has the advantage of lesser chances of relapse, velopharyngeal insufficiency, and alteration of speech.¹

Modified AMD involves using “Winged Osteotomy” followed by conventional appliance fixation. Cohn-Stock performed and reported the first segmental anterior maxillary osteotomy (AMO) in 1921.² Several AMO techniques have been advocated like Wassmund's (1927), Wunderer's (1963), and Cupar's (1954), which is mostly preferred by surgeons as it allows direct access for the removal of the bone through the floor of the nose. The bone from the lateral, superior, and posterior palatal surfaces are removed in slice until the pre-maxillary segment is placed in the pre-determined position.³

1. Surgical technique of “Winged Osteotomy”

Once oro-endotracheal intubation is completed and general anaesthesia is induced, local anaesthesia is infiltrated, followed by split labial incision from maxillary second pre-molar to central incisor on both the

sides. Full thickness mucoperiosteal flap is raised to expose pyriform aperture and infra-orbital foramen. The osteotomy cut starts from the inter-dental region between the two premolars, extending laterally up to the malar prominence, and converging at the region of pyriform aperture (Fig. 1a–d). This modification is done to achieve augmentation of zygoma post-operatively. Placement of the palatal cut was facilitated via tunneling through the muco-periosteum, taking care to guard the palatal mucosa with the help of the finger. The customized tooth-borne “double Hyrax screw AMD appliance” is fixed using Glass Ionomer Cement (GIC), and device was activated to check the movement between the segments (Fig. 1e). The septo-premaxillary ligament is affixed to the nasal spine anteriorly with a 2–0 prolene suture. A V–Y closure is then done in two layers with 3–0 vicryl suture. The distraction was done for 10–15 days based on requirement of the patient, with about 25% over-correction, as the relapse rate is found to be around 15–20%. The patient was followed up for 2 years.

This modified AMD technique carries a handful of its advantages as it is an easier procedure compared to the Le-Fort I osteotomy because the osteotomy involves only the anterior component of occlusion and the malar area, sparing the posterior maxillary segment, which reduces the chances of velopharyngeal insufficiency; and also decreases the risk of neurovascular damage. Therefore, it gives a positive soft tissue

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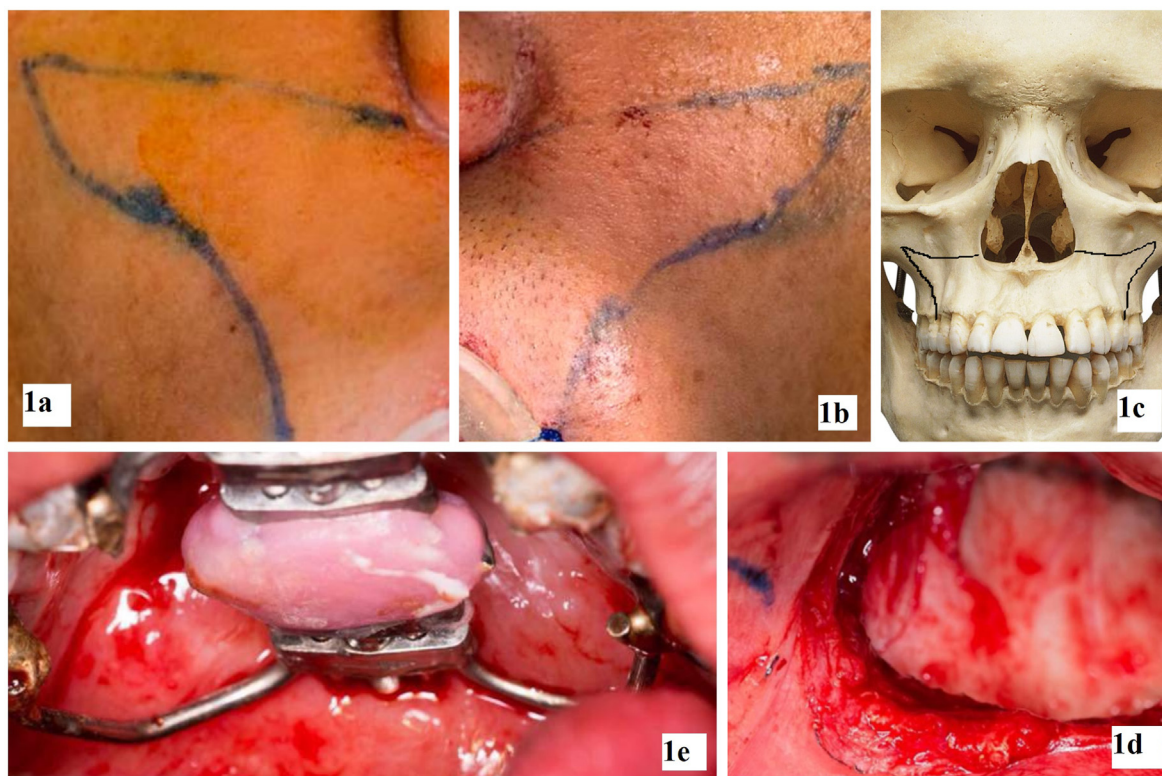


Fig. 1. A-c) Diagrammatic representation of modified AMD with “Winged Osteotomy”; d) Intra-operative picture showing “Winged Osteotomy” cuts; e) Intra-operative picture showing tooth-borne “double Hyrax screw AMD appliance”.

prominence by improving the projection of the nose and the upper lip, thus achieving prominence almost equal to Le-Fort I osteotomy, even

without disturbing the stable posterior molar occlusion. Stretch caused on the palatal musculature in Le-Fort I advancement worsens the

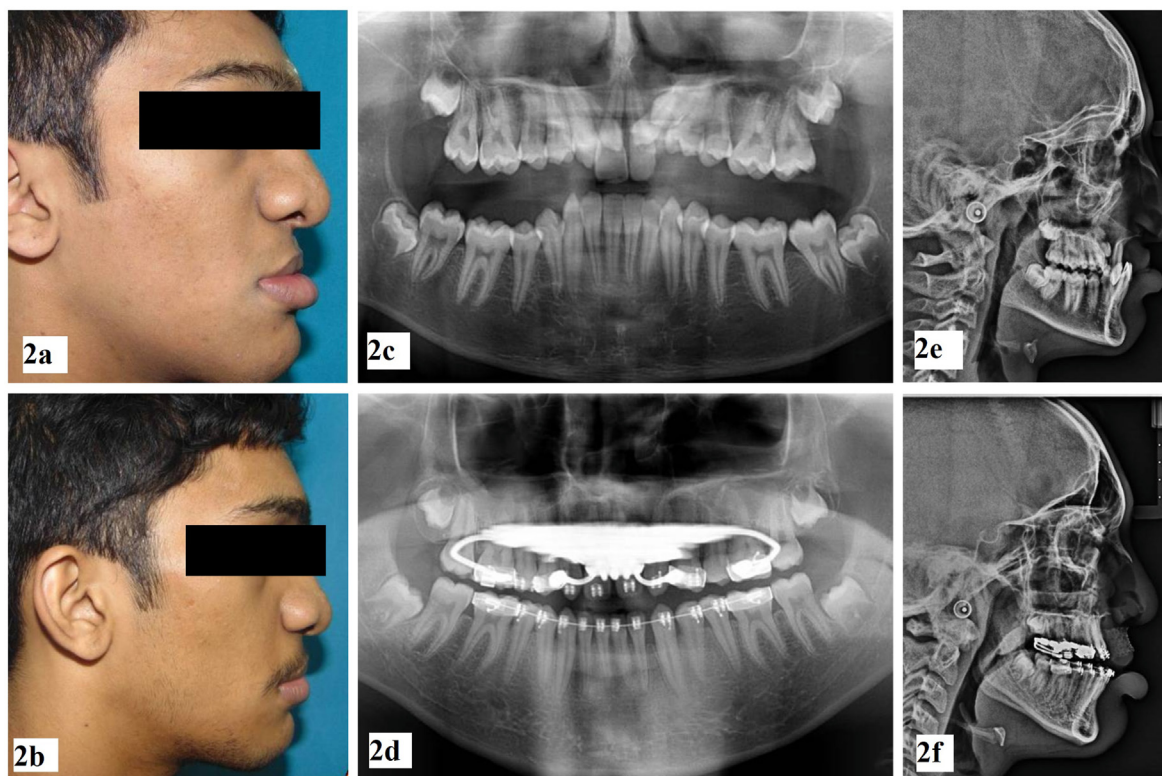


Fig. 2. A-b) Pre and post-operative lateral facial profile; c-d) Pre and post-operative orthopantomogram of the patient; e-f) Pre and post-operative lateral cephalogram of the patient.

velopharyngeal incompetence, and therefore the speech.⁴ When compared to conventional AMO, the modified technique also normalizes naso-labial angle, and changes the facial prominence from concave to convex simultaneously as it gives prominence in the naso-labial and sub-malar area post-operatively, due to the extension of horizontal cuts up to the zygomatic region.⁵ (Fig. 2a–f). Also, the hollowing caused by the conventional AMD osteotomy cuts is eliminated by the extension of the winged osteotomy.⁴

In conclusion, Modified AMD using “Winged Osteotomy” could improve the mid-facial skeletal and soft tissue profile similar to Rigid External Distractor (RED). It can also be applied to the CLP patients as a less invasive surgical alternative with similar soft tissue improvement and no negative impact on the velopharyngeal function.

The work has been carried out in accordance with the Code of the Ethics of the World Medical Association. Written and informed consent was obtained from the patient and the parents for the treatment and for the publication of the case and the images.

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Declaration of competing interest

There is no conflict of interest to declare from any of the authors.

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