



## Clinical Innovation -Butterfly Appliance.

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**ABSTRACT:** Skeletal anterior open bite can be treated with mini-screws since they provide an absolute anchorage to correct it through maxillary molar intrusion. With an adequate control a bite block was used in this case to help correct the malocclusion. The treatment option selected for the patient depends on the esthetic and functional considerations. Treatment of anterior open bite by extrusion of the maxillary anterior teeth in a patient with good incisor show can lead to increased gingival display. TAD-based intrusion of the posterior teeth in open bite cases has been found to be considerably stable. With the introduction of TADs, orthognathic surgery could be avoided for select anterior open bite cases. This appliance made of cast metal alloy with palatal TAD's was successfully used to treat the skeletal anterior open bite.

**Key words:** TAD , Skeletal open bite, molar intrusion

### I. INTRODUCTION:

Anterior open bite is considered to be one of the most difficult problems to treat in orthodontics. In conventional orthodontic treatment, various treatment modalities for the correction of an anterior open bite have been proposed such as extrusion of the anterior teeth using intermaxillary elastics.<sup>1,2</sup> Skeletal anterior open bite is a complicated malocclusion characterized mainly by overgrowth of the maxillary and mandibular posterior dentoalveolar heights, resulting in a longer vertical facial dimension and a steeper mandibular plane.<sup>4,5</sup> With the absolute intrusion of the posterior teeth, it is possible to autorotate the mandible in a

closing counterclockwise direction, close the open bite, and reduce the anterior facial height without the need for surgical intervention. Miniscrews have many advantages over other various temporary anchorage devices. Miniscrews are relatively simple and easy to insert, less traumatic, stable for the optimal force, and make it possible to apply a force immediately after insertion.<sup>3</sup> The treatment mechanics of anterior open bite with posterior intrusion by using micro screw implants were effective but still require a proper retention protocol.<sup>6</sup> The intrusion of the maxillary molars with miniscrews is an interesting option in selected cases of skeletal anterior open bite. The retention protocol however, should be specific in these cases.<sup>7</sup>

**Appliance Design:** The 'Butterfly appliance' consists of two parts a) Cobalt chromium metal casting<sup>8</sup> on the occlusal surfaces of 25,26,27 and 15,16,17 b) I shaped casting metal placed towards the palate for the engagement of the miniscrews. (Fig:2)

Cobalt chromium metal casting engaging the occlusal surfaces of 25,26,27 and 15,16,17 is given along with a separate 'I' shaped cobalt chromium metal casting for the engagement of the miniscrews in the palatal region. The cobalt chromium occlusal casting consists of two circular holes in the connection bars for the engagement of the e-chain which in turn connects to the I shaped metal flange. The I shaped metal flange consists of hooks on the open ends for connecting the E chain which in turn applies a intrusive force on the molars.



Fig 1: Intraoral patient models showing anterior open bite.



Fig 2: Butterfly appliance fabricated on the master cast.

**Case Description:** A male patient aged about 22 years reported to the department with the chief complaint of forwardly placed upper and lower incisors, anterior open bite, spacing i.r.t 11-12, 21-22, 22-23, rotation i.r.t 12,14,15,24, 25,42, 33,34, 35, 44 and 45 with positive lip step, hypotonic upper lip and hyperactive mentalis muscle. Post a detailed analysis of the case it was decided to treat

the case with non-extraction line of treatment, implant assisted intrusion of the posterior teeth for correction of anterior open bite using the 'Butterfly appliance', (Fig:3& Fig:4) followed by leveling and aligning, retraction and space closure, finishing and detailing with fixed retainers given in the upper and lower arch.



Fig 3: Butterfly appliance cemented introrally and power chain used for intrusion engaged to the 'I' bar.



Fig 4: Intraoral pictures with the butterfly appliance cemented on the second premolar and first and second molars.

#### Advantages:

- 1.The appliance is customized according to the patients dental arch and is rigid and fixed.
- 2.Provides absolute intrusion in skeletal open bite cases.
- 3.Can be easily activated using E-chains.
- 4.Faster treatment results.

#### Drawback:

- 1.Posterior teeth cannot be bonded.
- 2.Chances of developing posterior crossbite
- 3.Cannot be used to bring about any other tooth movement except intrusion.
- 4.Cannot be used in periodontally compromised cases and patients with multiple missing posterior teeth.
- 4.Needs to be prefabricated in the laboratory.

## II. DISCUSSION :

Miniscrew anchorage has the advantages of being a simpler procedure, being minimally invasive, and requiring least patient cooperation. In

this case we have used miniscrews along with the cast metal butterfly appliance with the I shaped metal flange to bring about true intrusion of the molar as the patient reported with skeletal open bite followed by positive lip step and hypotonic upper lip. It is noted that post intrusion of the molars the anterior open bite was reduced and a positive overjet was established with lip competency being achieved.

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