ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep1300

Maxillary Full Arch Distalization Using Infrazygomatic Crest Screws in a Prognathic Maxilla: A Case Report

Dr. Sharath Kumar Shetty[1]; Dr. Revanth S. Soonthodu[2]; Dr. Aashiq Iqbal[3]

[1]HOD, [2]Reader, [3]Post Graduate Student

[1,2,3]Department of Orthodontics, KVG Dental College, Sullia.
[1,2,3]KVG Dental College and Hospital

Publication Date: 2025/09/30

Abstract:

- ***Background:***

Management of Class II malocclusion often requires maxillary distalization. Conventional methods are limited by anchorage loss, patient compliance, or dental side effects. Infrazygomatic crest (IZC) screws provide absolute anchorage and enable efficient full-arch distalization.

- ***Case Presentation:***

A 19-year-old female presented with a convex facial profile, Class II molar relationship, and proclined maxillary incisors. Non-extraction management was planned using IZC screws for en-masse distalization of the maxillary arch. IZC screws were inserted bilaterally between the maxillary first and second molars at the infrazygomatic crest region. 220 g of force was applied per side for distalization. Over 12 months, full-arch distalization was achieved, molar relation was corrected to Class I, and incisor proclination was reduced.

- ***Conclusion:***

IZC screws provided reliable anchorage for en-masse distalization, simplifying biomechanics, avoiding extractions, and improving facial esthetics. They represent an effective treatment option for Class II correction when non-extraction therapy is indicated.

Keywords: *Infrazygomatic Crest (IZC) Screws, Distalization, Temporary Anchorage Devices (TADs).*

How to Cite: Dr. Sharath Kumar Shetty; Dr. Revanth S. Soonthodu; Dr. Aashiq Iqbal (2025) Maxillary Full Arch Distalization Using Infrazygomatic Crest Screws in a Prognathic Maxilla: A Case Report. *International Journal of Innovative Science and Research Technology,* 10 (9), 2139-2144. https://doi.org/10.38124/ijisrt/25sep1300

I. INTRODUCTION

Maxillary distalization is a frequently used strategy in the management of Class II malocclusions, particularly in cases with dental protrusion or mild-to-moderate skeletal discrepancy. Conventional distalization methods, such as extraoral headgear, pendulum appliances, and distal jets, are associated with limitations including anchorage loss, patient compliance issues, and undesirable dental side effects such as molar tipping and bite opening[1].

Temporary anchorage devices (TADs) have expanded the scope of orthodontic biomechanics by providing skeletal anchorage. Among these, infrazygomatic crest (IZC) screws have gained popularity due to their extra-alveolar placement in dense cortical bone, which avoids root interference and provides absolute anchorage for maxillary full-arch distalization[2,3].

This case report describes the successful management of a Class II malocclusion using IZC screws for en-masse maxillary distalization, avoiding extractions and minimizing anchorage loss.

II. CASE PRESENTATION

- *Patient Chief Complaint:*

A 19-year-old female reported with a chief complaint of forwardly placed upper front teeth.

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep1300

➢ *Clinical Examination:*

- Convex facial profile with increased overjet of 9mm and overbite of 4mm.
- Prognathic maxilla.
- Potentially incompetent lips.
- Angle's Class II molar and canine relationship bilaterally.
- Proclined maxillary incisors.
- Mild upper and lower anterior crowding.
- Lower midline deviated to right by 2mm.
- Endodontically treated 46 with crown.

Fig 1 Pretreatment Extraoral Photographs

Fig 2 Pretreatment Intraoral Photographs

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep1300

Fig 3 Pretreatment Radiographs: (A) Lateral Cephalogram (B) Orthopantomogram

➢ *Cephalometric Findings:*

- SNA: 95°
- SNB: 84°
- ANB: 11° (skeletal Class II)
- U1-SN: 116° (proclination of maxillary incisors)
- FMA: 14° (Horizontal growth pattern)

➢ *Diagnosis:*

Angles Class II malocclusion on a class II skeletal base, prognathic maxilla, horizontal growth pattern, proclined maxillary and mandibular incisors, increased overjet of 9mm, overbite of 4mm, mild upper and lower anterior crowding, lower midline deviated to left by 2mm.

➢ *Treatment Objectives:*

- Correct maxillary protrusion by distalizing the maxillary arch.
- Achieve Class I molar and canine relationship.
- Achieve optimum overjet and overbite and improve smile esthetics.
- Achieve levelling and alignment.
- Correction of lower midline.

➢ *Treatment Alternatives Considered:*

- Extraction of upper first premolars.
- Miniscrew anchorage in alveolar bone.
- Infrazygomatic crest screws for full-arch distalization after extraction of upper third molars(chosen).

Camouflage with upper first premolar was avoided because of low smile line and limited upper incisor visibility. Miniscrew anchorage was not chosen because of limited distalization possible.

III. TREATMENT PROGRESS

The upper third molars were extracted bilaterally before starting the treatment for efficient distaliszation of maxillary arch.

➢ *Initial Phase:*

Pre-adjusted edgewise appliance (0.022” MBT prescription) was bonded in both arches. Initial alignment and leveling were done with 0.014” and 0.016” NiTi wires, followed by progression to 0.019 x 0.025” stainless steel wires for maximum anchorage control.

➢ *IZC Screw Placement:*

Two titanium alloy IZC screws (JJ orthodontics) (2 mm diameter, 12 mm length) were placed bilaterally in the infrazygomatic crest region, approximately 13 mm above the maxillary occlusal plane, between the roots of the first and second molars[4]. Placement was confirmed radiographically.

➢ *Distalization Mechanics:*

Elastic chains were attached from the IZC screws to hooks crimped between the maxillary lateral incisors and canines, delivering 220 g of force per side[5].

➢ *Monitoring:*

The patient was reviewed every 4 weeks. Gradual distalization of the maxillary dentition was observed without anchorage loss in the mandibular arch.

➢ *Final Phase:*

After 12 months of distalization, the maxillary dentition was distalized by 6 mm. Class I molar and canine

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep1300

relationships were achieved. Finishing and detailing were completed and settling done with elastics.

IV. RESULTS

- Molar and canine relationship corrected to Class I bilaterally.
- Overjet reduced to 3 mm and overbite to 2.5mm.
- Cephalometric superimposition showed distal movement of maxillary dentition with minimal skeletal change.
- Facial profile improved with better lip competence.
- Total treatment duration was 24 months.

Fig 4 Infrazygomatic Crest Screws in Position During Treatment

Fig 5 Post Treatment Extra Oral Photographs

Fig 6 Post Treatment Intra Oral Photographs

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep1300

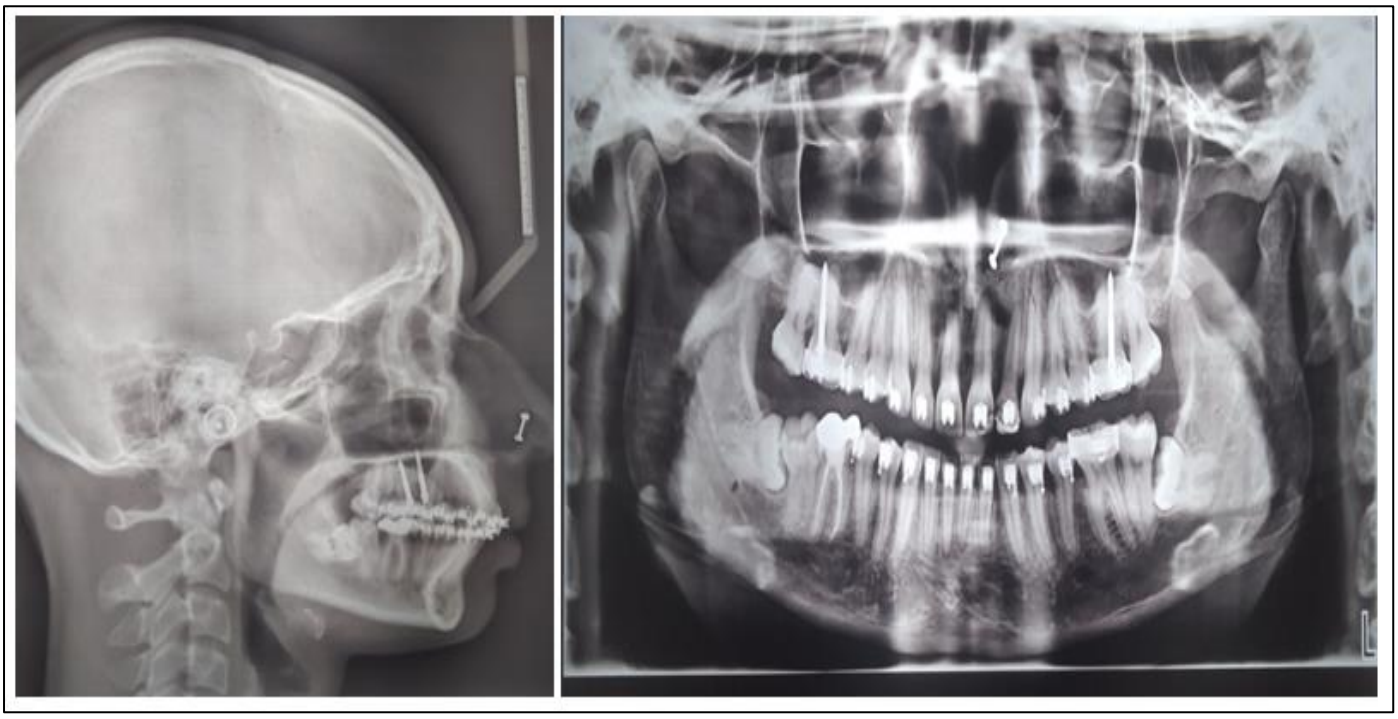

Fig 7 Post Treatment Radiographs

Superimposition was done to evaluate the changes. The table below shows pre and post treatment values:

Table 1 Comparison of Pretreatment and Post Treatment Values

Parameter	Mean	Pretreatment	Post treatment
SNA angle	82˚	95˚	91˚
SNB angle	80˚	84˚	83˚
ANB	2˚	11˚	8˚
Angle of inclination	85˚	85˚	85
N perpendicular to pog	0 to -4mm	1mm	-2mm˚
U1 to NA (mm)	4mm	7mm	2mm
L1 to NB (mm)	4mm	8mm	6mm
U1 to SN	102˚	116˚	106˚
L1 to mand. plane	90˚	112˚	110˚
S line to UL	-2mm	4mm	1mm
S line to LL	0mm	2mm	2mm

V. DISCUSSION

The case illustrates the efficiency of IZC screws in providing absolute anchorage for en-masse maxillary distalization. Compared to conventional distalization methods, IZC screws:

- Avoid reciprocal anterior anchorage loss.
- Provide 3D control over tooth movement.
- Reduce treatment duration.
- Eliminate dependence on patient compliance.

Biomechanically, IZC screws permit distalization by directing force vectors closer to the center of resistance of the maxillary dentition, minimizing tipping and bite opening[6]. In this case, 5 mm of distalization was achieved without extractions or significant vertical changes.

Potential complications include sinus perforation, screw loosening, and soft tissue irritation, but none were observed in this case. Proper site selection and insertion angle are crucial to avoid such complications[7].

This case aligns with reports by Liou et al. and Lin & Roberts, who demonstrated reliable distalization using IZC screws[8,9]. The stable treatment outcome and improved esthetics emphasize the clinical utility of this approach in borderline Class II malocclusions.

VI. CONCLUSION

Infrazygomatic crest screws are a valuable tool for full-arch maxillary distalization in Class II malocclusion management. They provide absolute anchorage, reduce the need for extractions, and allow for efficient, predictable results with minimal side effects. Careful case selection and precise placement ensure high success rates.

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep1300

REFERENCES

[1]. Liou EJW, Chen PH, Wang YC, Lin JC. A computed tomographic image study on the thickness of the infrazygomatic crest of the maxilla and its clinical implications for miniscrew insertion. *Am J Orthod Dentofacial Orthop*. 2007;131(3):352–356.

[2]. Chang CH, Liu SSY, Roberts WE. Primary failure rate for 1,638 consecutively placed orthodontic miniscrews in Taiwan. *Int J Oral Maxillofac Implants*. 2007;22(6):955–962.

[3]. Wilmes B, Ludwig B, Vasudavan S, Nienkemper M, Drescher D. The T-Zone: median paramedian insertion of palatal mini-implants and clinical results. *J Clin Orthod*. 2016;50(4):194–204.

[4]. Lin JJ, Roberts WE. Guided infrazygomatic screws: reliable maxillary arch retraction. *Int J Orthod Implantol*. 2013; 32:4–18.

[5]. Liou EJW. Clinical applications of orthodontic miniscrews in the infrazygomatic crest area. *Prog Orthod*. 2011;12(2):123–132.

[6]. Chang CH, Lin JS, Roberts WE. Orthodontic bone screws: biomechanics and clinical application. *Int J Orthod Implantol*. 2012; 27:18–28.

[7]. Yao CCJ, Lai EH, Chang JZ, Chen I, Chen YJ. Comparison of treatment outcomes between skeletal anchorage and extraoral anchorage in adults with maxillary dentoalveolar protrusion. *Am J Orthod Dentofacial Orthop*. 2008;134(5):615–624.

[8]. Lin JJ, Yeh HY, Roberts WE. Distalization with extra-alveolar bone screws: biomechanics and clinical outcomes. *Semin Orthod*. 2018;24(1):38–50.

[9]. Chang CH, Roberts WE. Evidence-based clinical application of IZC screws for distalization. *Int J Orthod Implantol*. 2017; 45:72–82.