



From Bonded to Banded: A Smart Hyrax Switch in Growing Class III Cases”

Dr. Aakanksha kedar¹, Dr. Sandeep Jethe², Dr. Varsha Merani³, Dr. Shailesh Dongre⁴, Dr. Arun Mhaske⁵, Dr. Suyog Shendage⁶, Dr. Abdul rehman foujdar⁷, Dr. Sunil Kalyankar⁸

¹PG Student, DY Patil dental school, Lohegaon

²Head of the department, DY Patil dental school, Lohegaon

³Reader, DY Patil dental school, Lohegaon

⁴Reader, DY Patil dental school, Lohegaon

⁵Lecturer, DY Patil dental school, Lohegaon

⁶Lecturer, DY Patil dental school, Lohegaon

⁷Tutor, DY Patil dental school, Lohegaon

⁸PG student, DY Patil dental school, Lohegaon

(Received: 16 May 2025

Revised: 20 June 2025

Accepted: 02 July 2025)

KEYWORDS

Grafting, Ligament
Restoration, Surgery

ABSTRACT:

Aim: A Solution for repeated dislodgement of bonded hyrax in Skeletal Class III mixed dentition case due to multiple missing deciduous teeth or eruptive forces from permanent teeth if the desired maxillary expansion is yet to be achieved.

Managing this problem by modifying bonded hyrax design into banded hyrax or Soldering bands prior to the wire component of bonded hyrax under the acrylic component will be beneficial to reduce further inconvenience - is the context of this article.

INTRODUCTION

Early intervention in Class III malocclusion poses a considerable challenge due to its multifactorial etiology and the unpredictable nature of craniofacial growth. The majority of individuals with Class III malocclusion exhibit maxillary deficiency, which may occur independently or in conjunction with mandibular prognathism.

Studies indicate that maxillary retrognathism is present in approximately 65–67% of Class III cases. This adverse growth pattern often warrants early treatment. A commonly effective approach involves the use of reverse-pull headgear in combination with rapid palatal expansion. Palatal expansion plays a crucial role in modifying the intermaxillary and circummaxillary sutures, promoting forward and downward displacement

of the maxilla. By disrupting these sutures, the appliance may stimulate a cellular response that enhances the effects of protraction forces.

Clinicians who might advise not treating the Class II patients until the late mixed or early permanent dentition often advise treating the Class III malocclusion as soon as it is identified [3]. Early intervention supports the normal development of the dentition, preventing disruptions in facial growth and development that become more established with age. Class III malocclusion patients respond well to treatment with maxillary expansion and facemask therapy.



CASE PRESENTATION

A 10-year 7 months-old female patient came to the Department of Orthodontics with the chief complaint of forwardly placed lower jaw and unpleasant facial appearance. Extra-oral examination revealed a concave profile and slightly obtuse nasolabial angle with a increased Frankfort mandibular plane angle.



Fig.1- Showing pretreatment intraoral photo

Intraoral examination revealed an Angle Class III molar relationship bilaterally. A midline diastema was present, along with a reverse overjet of 2 mm and a constricted maxillary arch.

Cephalometric analysis confirmed a skeletal Class III malocclusion, characterized by a retrognathic maxilla (SNA: 76°), a normal mandibular position (SNB: 80°), and a reduced ANB angle of -4°. The patient exhibited a vertical growth pattern, as indicated by an increased mandibular plane angle (FMA: 30°, SN-GoGn: 38°).

Clinical photographs and diagnostic radiographs (Figure 1) illustrate the patient's skeletal discrepancy and transverse maxillary deficiency.

Treatment plan

The treatment plan was based on the patient's chief complaint and correction of the underlying maxillary retrognathism. Due to vertical growth pattern bonded Hyrax during expansion was planned as it controls the vertical changes in maxilla. Banded hyrax Can cause more vertical change(forward and downward movement of the maxilla) compared to bonded expanders [7].

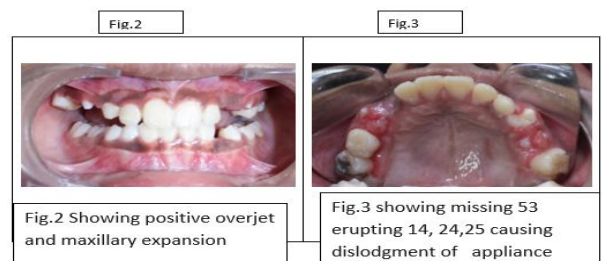
A Petite-type facemask was utilized, with extraoral elastics engaged bilaterally from the hook of an acrylic splint to the crossbow of the facemask

Problem Encountered

During bonded RME therapy, initial Activation (2-3 weeks) with frequency of Twice a day (morning and evening) was advised. A quarter-turn (1/4 turn) of the expansion screw each time. Later continued Activation (2-3 weeks) with Frequency once a day was advised, but during this time patient showed compliance issues and did not show up for 3 months for appointment and refused for activation of RME due to associated pain which delayed the treatment period. Fortunately we managed to counsel the patient started with a quarter-turn (1/4 turn) of the expansion screw each time for 5 weeks. To continue widening the upper jaw. Now after six months, Retention period (3 months) started.

The appliance is left in place, but no further activations are made. But during this phase shedding of 54, 55, 65 deciduous teeth occurred [Figure 3], resulting in repeated dislodgment of the bonded hyrax leading to reduced compliance from the patient side and relapse tendencies. Positive anterior overjet was obtained but the desired expansion was yet to be achieved [figure-2].

Patient was also refusing to wear bonded hyrax due to discomfort and the parents refused to pay for other appliance.



CONVERTING BONDED HYRAX INTO BANDED

1. Trying to manage this scenario we removed the acrylic portion on the bonded hyrax as shown in figure [5].
2. Placed bands on molar as shown in figure [4].
3. Soldered the framework on the band using silver Figure[7].



4. Intraoral installation of modified banded Hyrex in Figure [8] [9].



Fig.4-Showing cast with metal bands



Fig.5 – Dislodged Bonded RME



Fig. 6- Removal of acrylic portion from RME



Fig.7-RME framework. Positioned on cast with metal bands for soldering



Fig.8



Fig.9

Conclusion

Interceptive orthodontics aims to halt the progression of malocclusion and reroute it toward physiological development.

When maxillary insufficiency was recognized as the primary factor contributing to skeletal Class III malocclusion, the use of facemask therapy in orthodontics increased. Maxillary forward movement and sutural remodeling are the mechanisms of action of facemask therapy.

Due to multiple missing deciduous teeth and the eruptive forces from permanent teeth as in this case a problem of repeated dislodgment of bonded RME might occur. In such situation converting bonded hyrax design into banded if feasible would be a beneficial option till desired expansion is achieved or during retention phase

of Class III treatment for facemask attachment on the hooks shown in figure [8].

During this interceptive phase clinician may encounter various problems like patient compliance, budget restraint from the patient, discomfort due to the bulky appliance etc.

So designing the wire component under the acrylic as shown in the figure [7] might help converting bonded hyrax into banded for the future if you encounter a scenario as explained in this article, or Soldering bands prior to the wire component itself under the acrylic component will be beneficial to reduce further inconvenience of the clinician.

This will reduce the need for additional appliances and extra lab costs, as the clinician can **simply remove the acrylic component of the bonded Hyrax directly** in the clinic and reinstall the already band soldered metal framework with hyrax screw in mouth the same day.

Conflicts of Interest

The author(s) declare(s) that they have no conflicts of interest.

No Funding

REFERENCES

1. Olivera JML, Zanini SEM, Dutra ALT et al. Palatal expansion and maxillary protraction: case report. *J Health Sci Inst.* 2010; 28 (2): 125-8
2. Saadia M, Torres E. Saggital changes after maxillary protraction with expansion in Class III patients in the primary, mixed and late mixed dentitions: A longitudinal retrospective study. *Am J Orthod Dentofacial Orthop.* 2000; 117 (6): 669-80.
3. Turley PK. Treatment of the Class III malocclusion with Maxillary Expansion and Protraction. *Seminars in Ortho.* 2007; 13 (3): 143-157.
4. Turley PK. Managing the developing Class III malocclusion with palatal expansion and facemask therapy. *Am J Orthod Dentofacial Orthop.* 2002; 122 (4): 349-352.
5. Skeletal effects of early treatment of Class III malocclusion with maxillary expansion and face-mask therapy. Baccetti T, McGill JS, Franchi L, McNamara JA Jr, Tollaro I. *Am J Orthod*



- Dentofacial Orthop. 1998;113:333–343. doi: 10.1016/s0889-5406(98)70306-3.
6. Orthosurgical management of class III malocclusion emphasizing the pivotal role of CBCT. Singh GP, Nehra K, Mitra R, Nakra O, Singla A. *J Indian Orthod Soc.* 2020;54:69–76.
7. Asanza S, Cisneros GJ, Nieberg LG. Comparison of Hyrax and bonded expansion appliances. *Angle Orthod.* 1997;67(1):15-22. doi: 10.1043/0003-3219(1997)067<0015:COHABE>2.3.CO;2. PMID: 9046395.
8. Azamian Z, Shirban F. Treatment options for class III malocclusion in growing patients with emphasis on maxillary protraction. *Scientifica.* 2016;2016:8105163.
9. Büyükçavus, MH, Sari ÖF, Findik Y. Correction of late adolescent skeletal Class III using the Alt-RAMEC protocol and skeletal anchorage. *Korean Journal of Orthodontics.* 2023;53(1):54-64. Available from: <https://doi.org/10.4041/kjod21.337>.
10. Proffit WR, Fields HW, Sarver DM. *Contemporary orthodontics.* 4th ed. Mosby Elsevier; St. Louis: 2007.
11. Ngan PW, Deguchi T, Roberts EW. *Orthodontic treatment of class III malocclusion.* Bentham Science Publishers; 2014. -
12. Westwood PV, McNamara JA, Jr, Baccetti T, Franchi L, Sarver DM. Long-term effects of Class III treatment with rapid maxillary expansion and facemask therapy followed by fixed appliances. *Am J Orthod Dentofacial Orthop.* 2003;123:306–20. doi: 10.1067/mod.2003.44. -
13. Nanda R. *Esthetics and biomechanics in orthodontics.* 2nd ed. Elsevier/Saunders; St Louis: 2015. -
14. Cha BK, Choi DS, Ngan P, Jost-Brinkmann PG, Kim SM, Jang IS. Maxillary protraction with miniplates providing skeletal anchorage in a growing Class III patient. *Am J Orthod Dentofacial Orthop.* 2011;139:99–112. doi: 10.1016/j.ajodo.2009.06.025.
15. Buyukcavus MH, Kale B, Aydemir B. Comparison of treatment effects of different maxillary protraction methods in skeletal class III patients. *Orthod Craniofac Res.* 2020;23:445–54. doi: 10.1111/ocr.12389