

Functional Bonded Hyrax Appliance: A Newer Appliance Design

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ABSTRACT

Background: Narrow maxilla is commonly found in orthodontic problem & its leads to transverse malocclusion. Number of orthodontic appliances has been invented for correction of this kind of maxillary transverse malocclusion. The most famous is Hyrax expansion screw appliance that could be either banded hyrax or bonded hyrax screw design. The original design of bonded hyrax includes flat acrylic cover to teeth, this flatness is not comfortable to patient particular flatness lead to chewing difficult. We have modified the design to remove flatness & make it more in articulation so it's more comfortable in chewing. Present article introduces new & more comfortable design of bonded Hyrax appliance: functional bonded hyrax.

Keywords: Bonded Hyrax, Transverse malocclusion, flatness.

INTRODUCTION

Transverse maxillary deficiency is the result of a multitude of factors: genetic, environmental, traumatic, and iatrogenic. Many constricted maxillae are caused by abnormal function such as mouth breathing and sucking behaviors¹ which have been shown to create a characteristic malocclusion with a narrow maxilla and posterior cross bite, anterior open bite, proclined maxillary incisors and retroclined mandibular incisors.² For treatment of transverse maxillary deficiency requiring maxillary expansion procedure. From the time of Angell's³ description of maxillary expansion in the treatment of transverse deficiencies to the present, investigators have used a variety of maxillary expanders with differing force levels and durations.⁴

Rapid maxillary expansion (RME) also referred to as rapid palatal expansion (RPE), in both adolescents and adults may involve fracturing of the bony interdigitations. RPE is one the routine procedure carried out but by an orthodontist for

correcting narrow maxilla⁵. There are many different type of maxillary expanders as shown in figure 1.

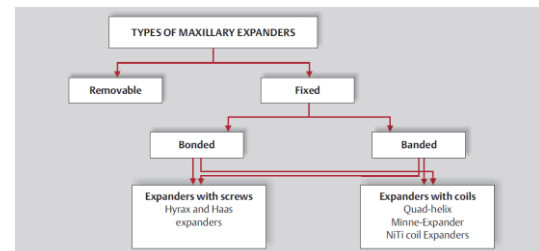


Fig 1: Different types of maxillary expanders.

Most comely use is expander with Hyrax screw as fixed expanders can be retentive on bands (banded expander) (Fig. 2) or on acrylic blocks (bonded expander). (Fig. 3) In bonded expander the acrylic component of the plate should cover the crowns of the teeth, leaving only 1mm of clearance at the gingival margins along the buccal and palatal aspects. This ensures a maximum surface area for retention and sufficient clearance at the gingival margins to allow maintenance of good oral hygiene. The Bonded hyrax screw is comely use for vertical

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grower or long face type to cover posterior teeth with acrylic bite block, thus its prevent posterior teeth extrusion, tipping and control vertical height of face. Since the introduction of bonded expander, mostly flat acrylic bite block is given to cover molar, but with this flat bite block is not comfortable for chewing of patient thus patient compliance is reduce. We have done modification to remove flat acrylic bite block & make it more tooth shape so we try to get maximum occlusion for better chewing affiances & improve patient compliance.



Fig 2: Bonded expanders.



Fig 3: Bonded expanders with flat acrylic bite block

Appliance Design

With the use of minster pressure moulding machine⁸ we have made temporary crown from 1 mm thickness duran sheet.



Fig 4: Temporary crown made from 1mm duran sheet.

Cut posterior segment which include first pre-molar, second pre-molar, and first molar, right & left side. Adapt Leone hyrax screw and 0.9 mm thickness wire surrounding the post segment both side. This wire segment is solder with hyrax.



Fig 5: Solder with hyrax with temporary crown.

Articulate upper and lower model with proper bite registration, remove wax bite and apply separating media on upper arch. Attach solder assembly to upper arch, now fill cold cure acrylic in the temporary bite block and attach it with this solder assembly, check proper articulation and wait to set cold cure.



Fig 6: Temporary crown put into occlusal surface.



Fig 7: Temporary crown & hyrax fill with acrylic.

After set cold cure remove all and finishing & polishing function bonded hyrax screw and fit in patient mouth. Check bilaterally proper occlusal contact point with articulating paper and get maximum occlusion. (Pic 5, 6, 7, 8)



Fig 8: Functional bonded hyrax cemented on teeth.



Fig 9: From front view.



Fig 10: Right side view.



Fig 11: Left side view.

DISCUSSION

Bonded Hyrax appliance is being used since last more than 45 years for correction of narrow maxillary malocclusion. But in this appliance design, patients are facing masticatory problems due to flat bite blocks. To overcome this problem, we have introduced newer design of Bonded Hyrax appliance. By doing this patient can chew properly with this kind of bite block & thus patient compliance improve.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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