

## Gingival necrosis in relation to palatal expansion appliance: an unwanted sequelae

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*A palatal expansion appliance is frequently used for the expansion of the palatal arch. The expansion can be rapid or slow. The degree of turn given to the screw of the appliance determines the rapidity and amount of expansion achieved. This report describes a case of necrosis of the palatal gingiva as a result of an attempt to expand the palatal arch rapidly and is of great importance to the pediatric dentist as palatal expansion is done more often in pediatric patients.*

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### INTRODUCTION

A palatal expansion appliance has been used for bilateral expansion of the palate, especially in cases of maxillary insufficiency and constricted upper arch in Class II division 1 cases. Constricted upper arch leads to a tapered arch segment, constriction of the canines and often protrusion of the incisors. This may be accompanied by lateral crossbite. In other instances, a degree of crowding is present in either the anterior or posterior segments of the dental arches. Some of these irregularities are corrected by expansion of the dental arch. The expansion may be performed in three possible directions; anterior, lateral, or posterior. It can be done either surgically with orthodontic treatment or else only orthodontically.

Separation of the midpalatal suture can be performed by either rapid or slow expansion. Storey in 1973<sup>2</sup> has documented experimentally that rapid expansion results in predominantly destructive process in which the sutural connective tissue becomes disrupted and edematous with enlarged blood vessels or hemorrhaging. This is followed by eventual filling in of immature bone as a healing response. The growing of bone of sufficient maturity requires a slow steady rate of formation with lateral separation of bones in the order of 0.5 to 1.0mm per week. Results of experiments by Storey showed that slow separation with continued

physiological growth of bony serrations within the suture provided the best form of retention with the least potential for relapse.<sup>2</sup>

The forces generated by the pitch of one thread of the screw, favors tissue adaptation and remodeling in a biologically acceptable manner. The length of the screw determines its maximum opening and displacement of the palatal segments. When opening the screw, the union of the screw and plate segments has to remain strong and rigid. Careful appliance construction is therefore, important so that controlled and undesired changes can be avoided.<sup>3</sup>

To obtain dental arch expansion, the appliance is activated by turning the screws present in the center of the appliance. The amount of turns given determines the amount and rapidity of the palatal expansion. Too rapid an expansion can at times be deleterious to the gingival tissues as described in the following case report.

### CASE REPORT

A 19 year old female patient, 8th grade student presented with the complaint of pain in the palatal gingiva for four days. History revealed that the patient was undergoing palatal expansion by means of orthodontic expansion plate. She further stated to have activated the appliance by means of quarter turn of expansion screw each day for a period of one week, instead of quarter turn each week; with the hope that the treatment will be faster. She claims to have not followed the instructions given to her. Her parental history revealed that her parents were educated up to 4th grade of school.

Examination revealed halitosis and severe inflammation around the appliance. On removal of the appliance (Figure 1), the region was more accessible for inspection. Gingival necrosis was observed in the palatal gingiva between upper left first and second

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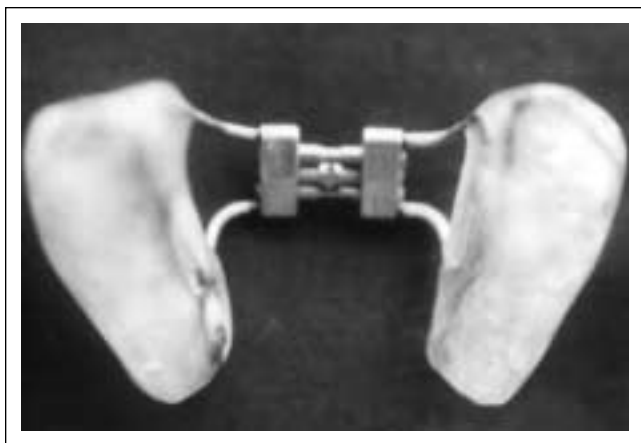


Figure 1. Palatal expansion appliance.

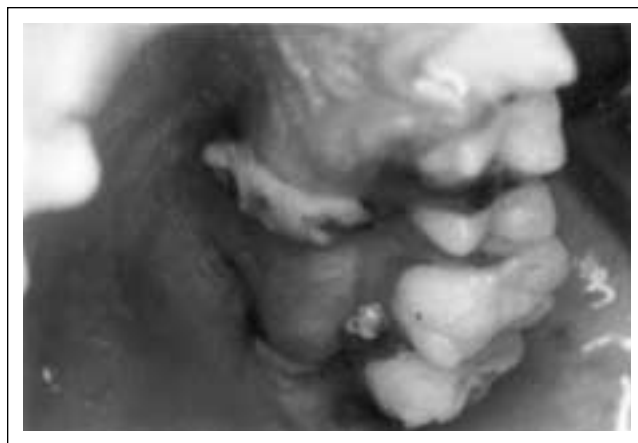


Figure 2. Necrosis of palatal gingiva on left side of maxillary arch.



Figure 3. Necrosis of palatal gingiva on right side of maxillary arch.

premolar (15mm-6mm)(Figure 2), between upper left first molar and second molar (15mm-5mm)(Figure 2) and in relation to upper right molar (15mm-5mm)(Figure 3). Midline of the palate also showed beginnings of necrotic changes. The necrotic area corresponded to the region of the metal bars of the appliance. The marginal and interdental gingiva in relation to the above teeth were also inflamed, bled on probing and appeared ulcerated.

Under local anesthesia, the necrotic tissue was trimmed and curetted till the healthy tissue was visible. Patient was put on a course of antibiotics and analgesics and was advised to use chlorhexidine mouthrinses twice daily. She was also advised to discontinue the appliance.

Patient was recalled every two days and irrigation of the area was done with an antiseptic solution. It was observed that the healing was uneventful (Figure 4, 5).

## DISCUSSION

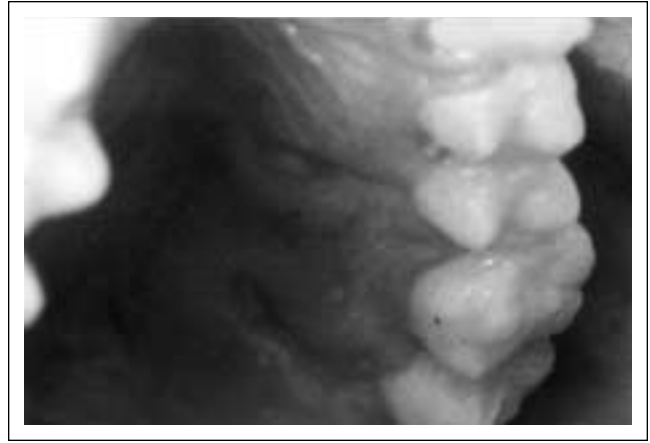
Expansion of the maxillary arch or of the palate is done by means of a palatal expansion appliance. Anatomically, limitation of the palatal expansion appliance is

not due to the fusion of the midpalate, but changes in the morphology of the suture caused by maturation. As the patient ages further intercuspation and interdigitation of the bony serrations take place until the suture becomes mechanically difficult to expand at older ages. These changes in sutural morphology may occur at 13 to 14 years of age.

Joodeph and Riedel believe that early expansion with light forces, done before these maturation changes will allow maximum skeletal separation, with normal physiological deposition enhancing the long term stability.<sup>4</sup> Our patient reported the need for orthodontic treatment at the age of nineteen, which is beyond the recommended age.

Various types of appliances have been proposed for expansion and one of the design was recommended, which consists of two halves of acrylic holding the jackscrew of hyrax screw between them by means of metallic bars. The appliance is fastened to the maxillary buccal teeth. The screw in position, a small key is inserted into holes in the center of the screw, which allows for one-quarter turn increment exactly in the midline oriented on the median raphe. The appliance given to our patient was on accordance to the design proposed.

To obtain tooth movement or dental arch expansion without conflicting harm to the tissues, the pitch of the screw thread is set so that a complete 360° turn of the screw will produce a separation of 0.8 to 1.0mm. Following placement of the appliance in the oral cavity, the patient is advised to give a 90° quarter turn each week thereby allowing a 0.1mm expansion per side.<sup>3</sup> The appliance was fabricated and given to her with the screw in a passive form. She was advised to give the screw a quarter turn each week. This was not followed by her. Due to excessive turning, the metallic bars of the appliance compressed on the palatal tissue leading to obliteration of blood vessel, lack of oxygen supply, resulting in necrosis.



Figures 4 and 5. Healing tissue following treatment.

No matter what treatment is being instituted, care of the gingival tissues is of utmost importance. Our finding reported gingival necrosis, as a result of a tightly fitting palatal expansion appliance.

#### **CONCLUSION**

From the above case following conclusion can be drawn:

It has to be explained to the patient about the need for quarter turn of the screw of the palatal expansion appliance and if not done accordingly the undue effect it could have on the palatal tissues.

Selection of the case at the recommended age is important.

Finally the educational level of the patients and the parents must be considered, if the patient has to do the activation of the expansion screw.

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