

Comparison of dislodgment between two different types of orthodontic separators: An In vivo study

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Abstract:

Aim: The elastomeric separators used in orthodontic practice to create a space between adjacent teeth to aid in the accurate placement of orthodontic bands especially for molars, undoubtedly have several advantages over other types of separators, but their iatrogenic potential is overlooked. The aim of this study is to compare elastomeric separators with kansal separator for dislodgement and subsequent gingival displacement.

Materials And Method: 60 patients, 26 males and 34 females had two different types of separators (elastomeric separators, kansal separators) placed randomly in right and left quadrants. The subjects were examined for the number of separators lost from 2nd to 10th day.

Results: This study shows that the loss of "elastomeric" separators is significantly higher than the "kansal" separators. Subgingival displacement of elastomeric separators was seen in ten patients.

Conclusion: Kansal separator since having a connecting bar proved to be safe and effective for tooth separation with less dislodgement.

Keywords: Separators, Elastomeric Separator, Kansal Separator.

I. Introduction

Malocclusion being so prevalent in present scenario of life, the need and demand for orthodontic treatment has increased to large extent¹. Separation of teeth is invariably required to place bands on teeth, that anchor the appliance, to accomplish interproximal stripping, to facilitate the eruption of partially impacted teeth (especially second molars), to create space for crown restoration on mal aligned molars^{1,2,3}. The average Periodontal Ligament (PDL) space is 0.25 mm, placement of a 0.16mm thick orthodontic band without proper separation risks contracting the alveolar bone, producing hyalinization areas in the PDL and evoking an acute pain response, which hinders the patient from performing routine oral functions.⁴

The ideal separator should be radiolucent, easy to insert, cause minimal discomfort, separate the teeth adequately, should not be lost while chewing the food and remain between the teeth until removed by the orthodontist. During the past 10 years, spring separator and elastomeric separator have been most often used.^{5,6} Elastomeric modules, the separators of choice as they are easily placed and removed but they can loosen and fall out during eating or brushing and the loss is generally unnoticed by the patient. On several occasions, the patient returns to the office without the elastic separators. In most cases, the separators need to be placed again leading to an extra visit to the orthodontic office for band placement.

Many studies regarding the separation effect of elastomeric separators have been undertaken, and few have evaluated the patients' perception of the pain and discomfort related to the same⁷⁻¹³. Of clinical interest is what occurs if the elastomeric separator becomes lost into the gingiva before its intended removal.¹¹ An experimental study investigated the histopathology of periodontal lesions induced by elastics placed in the gingival sulcus of monkeys.¹¹ After 2 to 4 weeks, the inflammation extended to the attached gingiva, and there were bleeding on probing, pockets of 5 to 8 mm, tooth extrusion, and horizontal and vertical bone loss. Even though this event is well reported in the literature, invasion of the periodontal space by rubber separators is not an uncommon finding. Unsupported elastomeric separators creeping into gingival sulcus have been reported frequently in the literature.¹⁴⁻²⁰ Reports citing orthodontic elastic separators as a major iatrogenic cause for loss of periodontal bone support dates back to more than 140 years. Since, serious periodontal problems can arise due wedging of separators into interproximal spaces, radioopaque and brightly colored separators are recommended.²¹

Therefore, the aim of this study is to compare two different types of separators for their dislodgement before banding and subsequent subgingival displacement of the separators.

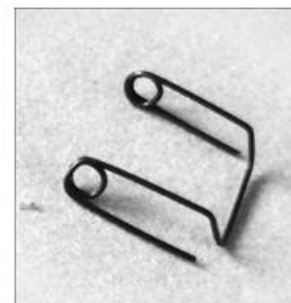
II. Material & Method:

The study sample consisted of 60 patients [26 male and 34 females (14-25 years)] who required orthodontic treatment from Jodhpur Dental college general hospital, Jodhpur, participated in this study. To be included in the study they had to sign an informed consent. They were explained that the procedure was a part of their treatment. The subjects included had no previous history of orthodontic treatment, extraction, had no proximal caries or restorations in posterior teeth with good interproximal contacts.

Two different types of separators were placed i.e Kansal separator and Elastomeric separator. Each type were placed randomly by coin toss method in the left and right quadrants of upper 1st molars to avoid bias with the help of separator placing plier and light wire plier respectively. All separators were placed by a single investigator. The loss of separator is determined by evaluating the patients for 10 days .Statistical analysis was done using paired t test.



Elastomeric separators



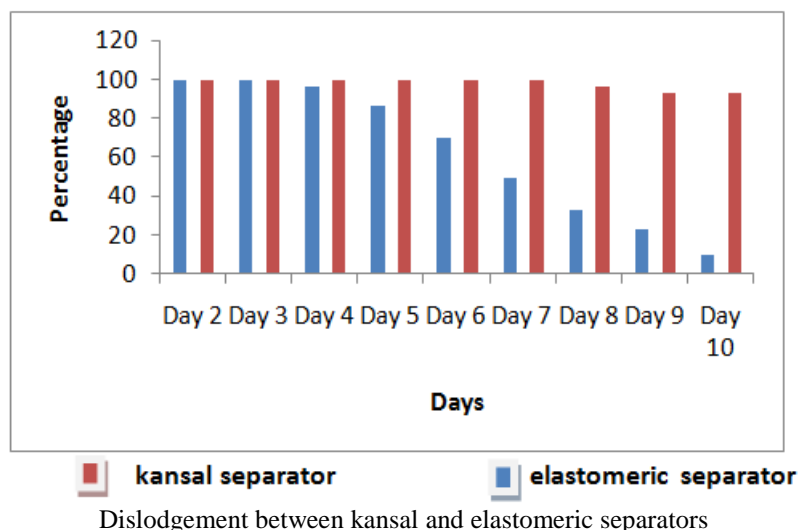
Kansal Separators



Image of maxillary arch with elastomeric separator on the right side and kansal separator on the left side

III. Results

All 60 patients completed the study. All patients were reviewed from the 2nd to 10th day, the number and each type of separators lost were recorded. The remaining separators were removed on 10th day using an explorer and light wire plier, the interdental sulcus was thoroughly examined for the presence of any dislodged separators. The total number of lost elastomeric separators is significant when compared to kansal separators which showed less dislodgement.



IV. Discussion

Although the space gained after separator placement was not directly measured in this study, it was assumed from previous studies that elastomeric separators produce sufficient separation.^{8-13,22} Provided they stay in place, elastomeric separators produce more tooth separation than any other type of separators. From the standpoint of patients comfort, they must be maintained for atleast 3 days prior to attempt of banding the tooth which is enough time to promote separation between the teeth.

A gradual reduction of contact point tightness often permits separator loss before the banding appointment. This can occur during eating or brushing and results in rebounding of teeth and return to the initial contact point thickness²². It was found in this study that the number of Elastomeric separators were dislodged significantly when compared to Kansal separators.

On the other hand, a separator is lost when the space gained is wide enough so that during mastication, the occlusal part of the elastomeric ring is compressed below the contact point and gets embedded into the gingival sulcus²². Such elastomeric separators may cause a localized periodontitis, particularly when they are displaced interproximally and bacteremia which contraindicate their use in patients with systemic disorders.²³ Thus, Patients who present with missing separators at the banding appointment must be asked if they actually viewed the separator and if not, interdental region must be carefully inspected. A shorter time of rubber separators in the mouth could be a better measure to prevent accidents reported in the literature¹⁴⁻²⁰. In this study, elastomeric separators were found embedded subgingivally in ten patients. Although insignificant, their iatrogenic potential should not be overlooked considering their potency of causing severe periodontal destruction in otherwise healthy individuals leading to irreversible loss of supporting tissues and permanent damage as reported in the literature.

V. Conclusion

Elastomeric separators were lost more than kansal separators, thereby the use of type elastomeric separators may lead to an extra visit of a patient to the orthodontic clinic for reinsertion of separators to gain space for band placement. Also, elastomeric separators were found to be iatrogenic to induce localized periodontitis (trauma) due to subgingival displacement. This study serves to highlight the importance of vigilance in ensuring the separators are removed or accounted for once they have served their purpose. Kansal separators having a connecting bar between the two springs proved to be safe and effective for tooth separation with less dislodgment.

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