

To Assess Separation Effect of Different Types of Separators in Orthodontic Treatment

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ABSTRACT

Background: Band placement following improper separation may lead to hyalinization of periodontal ligament and evokes pain response of mechanoreceptors. The present study was conducted to assess separation effect of different types of separators in orthodontic treatment.

Materials & Methods: The present study was conducted on 60 orthodontics patients selected for fixed orthodontics of both genders. Three types of separators such as elastomeric separators, Dumbell and Kesling separators were placed at different teeth region. All the patients were recalled daily for 5 days and time taken to achieve required separation and amount of separation was noted.

Results: The mean separation achieved with elastomeric separators was 0.24 mm, with dumbbell was 0.32 mm and with Kesling was 0.21 mm. The difference was significant ($P < 0.05$). The mean days required to achieve separation with elastomeric separators was 3.21 days, with dumbbell was 2.24 days and with Kesling was 04.28 days. The difference was significant ($P < 0.05$).

Conclusion: Authors found that maximum separation was achieved with dumbbell separators and less time was also taken by dumbbell separators than others.

Keywords: Dumbell, Kesling, Separators.

INTRODUCTION

Placement of orthodontic bands requires separation between adjacent teeth, due to the presence of tight interproximal contacts. Band placement following improper separation may lead to hyalinization of periodontal ligament and evokes pain response of mechanoreceptors. The average thickness of orthodontic band is 0.16 mm, which requires a separation of 0.25mm.¹ In contemporary Orthodontics, various methods for separation like brass wire, elastic ring separator, Kesling separator, C separator, dumbbell shaped separator, NiTi spring separator, Kansal separator, etc. have been used. The major drawback of commonly available

separators is that they get dislodged from their position once the space is created, and may be ingested or get wedged between adjacent teeth, causing acute localized periodontitis. Separators should be easy to place with little or no discomfort, easily cleaned, radio-opaque and not be lost or dislodged.²

The average thickness of orthodontic band is 0.16 mm, which requires a separation of 0.25mm. There are various types of separators like Kesling separator, C separator, brass wire, elastic ring separator, dumbbell shaped separator, NiTi spring

Received: Nov. 3, 2019; Accepted: Dec. 18, 2019

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separator, Kansal separator, etc. Separators should be easy to place, easy to clean, radio-opaque and should not be lost or dislodged.³ Elastomeric and spring separators are the separators which are commonly used today. Elastomeric are easily available and spring separators can be easily fabricated in the clinic. Kansal and dumbbell separators are also used but not as commonly as the elastic and kesling separators because of more discomfort produced by dumbbell separator and less efficacy of kansal separator as given in the literature.⁴ The present study was conducted to assess separation effect of different types of separators in orthodontic treatment.

MATERIALS & METHODS

The present study was conducted in the department of Orthodontics. It comprised of 60 orthodontics patients selected for fixed orthodontics of both genders. The study was approved from institutional ethical committee. All were informed regarding the study and written consent was taken.

Data such as name, age, gender etc. was recorded. Three types of separators such as elastomeric separators, Dumbell and Kesling separators were placed at different teeth region.

All the patients were recalled daily for 5 days and time taken to achieve required separation was noted. After a gap of 5 days after separator placement, amount of separation achieved was also recorded. Results thus obtained were subjected to statistics. P value less than 0.05 was considered significant.

RESULTS

Table I: Amount of separation in different types of separators

Separator type	Mean (mm)	P value
Elastomeric	0.24	0.02
Dumbell	0.32	
Kesling	0.21	

Table I, graph I shows that mean separation achieved with elastomeric separators was 0.24 mm, with dumbbell was 0.32 mm and with Kesling was 0.21 mm. The difference was significant ($P < 0.05$).

Graph I: Amount of separation in different types of separators.

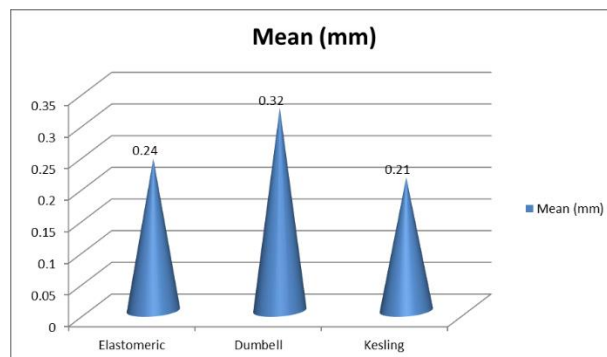
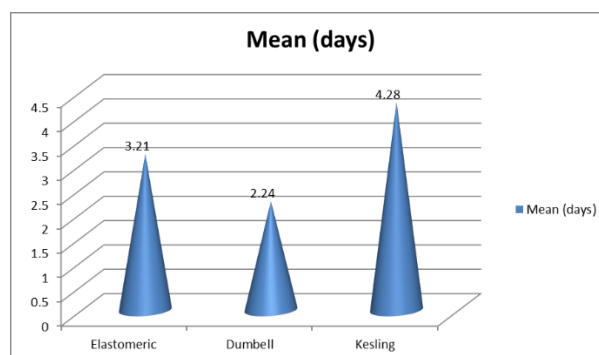


Table II Time taken for separation.

Separator type	Mean (days)	P value
Elastomeric	3.21	0.01
Dumbell	2.24	
Kesling	4.28	

Table II, graph II shows that mean days required to achieve separation with elastomeric separators was 3.21 days, with dumbbell was 2.24 days and with Kesling was 04.28 days. The difference was significant ($P < 0.05$).

Graph II: Time taken for separation.



DISCUSSION

The placement of separators causes pressure, tension, soreness and pain, which can be detrimental to the patient's attitude towards further orthodontic procedures. The separator-associated pain also interferes with functions like chewing or

dietary pattern, leading to discomfort and need for medication.⁵ A subjective method for pain assessment is the Visual Analogue Scale (VAS), which has been extensively used in various studies for assessment of pain intensity. On the other hand, an objective method for assessment of separator-associated pain is the use of questionnaires to evaluate patient's discomfort. Thus, an ideal separator in orthodontic speciality is the one that creates optimum separation with minimal pain and discomfort.⁶ The present study was conducted to assess separation effect of different types of separators in orthodontic treatment.

Fixed orthodontic therapy involves the placement of bands and brackets as a medium to apply the necessary forces. The procedure of banding the molars requires adequate separation, to facilitate band placement without any undesirable periodontal injury.⁷

In present study, mean separation achieved with elastomeric separators was 0.24 mm, with dumbbell was 0.32 mm and with Kesling was 0.21 mm. Cureton et al⁸ in their study included 50 patients (25 males and 25 females) for fixed orthodontic treatment. All four types of separators namely Elastomeric, Kesling, Kansal and Dumbbell separators were placed in each and every patient in all the four quadrants. Result of the study showed that dumbbell separator was most efficient in separating the teeth followed by elastomeric separator. Dumbbell separator was found to be the fastest followed by elastomeric separator in separating the teeth. Kesling and kansal separator almost took same time to achieve adequate separation.

We found that mean days required to achieve separation with elastomeric separators was 3.21 days, with dumbbell was 2.24 days and with Kesling was 04.28 days. Currently, two major types of separators, namely Elastomeric and spring separators, are in use. Elastomeric separators are most commonly used due to the easy availability and convenient use. However, studies have shown that elastomeric separators are frequently dislodged and cause greater amount of pain and discomfort. Another limitation of the conventional elastomeric separator is the difficulty for placement around tight contacts. For such cases, Kesling

separator has been advocated, which can be more easily placed.⁹

Although both Kesling and dumbel separators use the principle of spring action, the difference in separation achieved with both the spring separators may be attributed to the differences in their designs. The Kesling separator comprises of two free arms and a helix with two and half coils, which results in greater flexibility. On the other hand, the dumbelseparator has unified arms and a helix with one and a half coil. In addition to the design features, the working of Kesling separator is more advantageous as it works on the principle of closed coil spring, which has the advantage of showing reverse Bauschinger effect, wherein the activation is done in the same direction of the coil.¹⁰

CONCLUSION

Authors found that maximum separation was achieved with dumbbell separators and less time was also taken by dumbbell separators than others.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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