

# Perception of discomfort and amount of separation from two types of orthodontic separators: A Prospective Study

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## ABSTRACT

**Background:** To compare the amount of separation of tooth contact and perception of discomfort associated using elastomeric and Kansal separators. **Materials and Methods:** 30 patients (15 males, 15 females) in the age range of 18 to 25 years were selected and were evaluated after 7 days of separator placement for separation and discomfort perception respectively. Two types of separators namely elastomeric and Kansal separators were used, the separators were placed in maxillary and mandibular arches on mesial contacts and distal contacts of first premolars. The separation was measured at each contact point with the help of the leaf gauge and discomfort level was recorded on a Visual Analogue scale. **Results:** Both types of separators achieved adequate separation after 7 days of separator placement. There was no gender wise difference in the amount of separation and discomfort perception with either of the separators. **Conclusion:** Both types of the separators are equivalent for separation effect and discomfort perception associated with them.

**KEYWORDS:** Elastomeric Separators, Discomfort perception, Kansal separator

## INTRODUCTION

Fixed orthodontic mechanotherapy requires separation of the molars prior to banding to gain space, reduce the pain and discomfort during banding, prevent injury to both hard and soft tissues and ensure that a band fits the tooth. Different types of separators like elastomeric modules, plastic separators, twisted brass wire, Kesling spring and nickel titanium alloy are available and they vary in the amount of pain they cause during separation, the effectiveness in separating teeth and maintenance of the separation gained.<sup>1</sup>

The ideal separators should give rapid and adequate separation without causing the patient discomfort or pain. They should also be easy to clean and remain in place till the bands are placed.<sup>2</sup> Separators are usually placed for a few days to a week. Due to the occlusal interferences, they inevitably cause discomfort that can last the whole week.<sup>3</sup> Types of separators which are commonly used today are elastomeric modules, spring separators, plastic separators, twisted brass springs, Kesling spring and nickel titanium alloy springs. Elastomeric is easily available, and spring separators can be easily fabricated in the clinic. Currently, elastomeric modules are 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. Many times, the patient reports with missing elastic separators. In most cases, the separators need to be

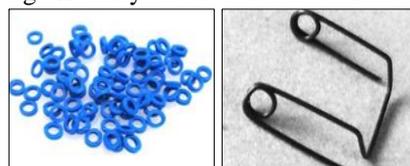
placed again leading to an extra visit to the orthodontic office for band placement.<sup>4</sup>

As the placement of elastomeric separator is routinely done in orthodontic practice, its iatrogenic potential should not be overlooked. Therefore, the aim of the present study is to compare discomfort and amount of separation achieved using two types of orthodontic separators i.e., elastomeric separators and kansal separators.

## MATERIALS AND METHODS

30 patients (15 females and 15 males) with mean age group of 21.44 ± 2.43 years seeking orthodontic treatment with no previous history of orthodontic treatment were selected.

Two types of separators used were Elastomeric separators, Fig. 1a and Kansal separators, Fig. 1b, Kansal separators were made with 0.016" AJ Wilcock<sup>1</sup> wire using a bird beak plier to form the mesial spring assembly, distal spring assembly and self-secured connecting bar.<sup>1</sup>



a) Elastomeric Separators b) Kansal Separators

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The elastomeric separators were placed using separator placing plier (Fig. 2). ContacEZ Gauge (AO) was used to measure the amount of separation achieved.(Fig. 3)



Figure 2



Figure 3

The separators were placed at the mesial contact and distal contact of the first permanent molar in the maxillary and mandibular arch. One type of separator was selected for each side i.e., elastomeric separators were placed on the right side, and kansal separators were placed on the left side (Fig. 4).



Figure 4: Elastomeric separators on right side and kansal separators on left

The total sample was divided into upper elastomeric, lower elastomeric, upper kansal and lower kansal group and was evaluated for the amount of separation and perception of pain and discomfort. All patients were reviewed on the 7<sup>th</sup> day, the separators were removed using an explorer, and the interdental sulcus was thoroughly examined. The amount of separation was measured using ContacEZ leaf gauge (AO) as shown in Fig. 5.



Figure 5: measurement using leaf gauge

Each subject rated their pain/discomfort on left and right side separately on Discomfort Index card with Visual Analogue Scale (Fig.6). The discomfort index card consisted of 10 separate visual analogue scales (VAS), taken to represent the limits of the pain experience ranging from No pain to worst pain in all 4 groups. The data collected were subjected to statistical analysis with independent sample test using SPSS software.

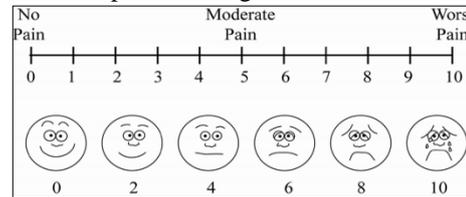


Figure 6: Visual Analogue Scale

## RESULTS

No statistical differences were found in the separation amount achieved and perception of pain with either of the separators in males and females. (Table 1 and Table 2).

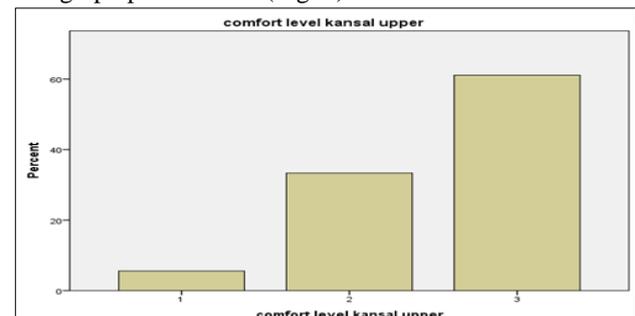
	Age	Upper Elastomeric	Lower Elastomeric	Upper Kansal	Lower Kansal
Mean	21.44	.3111	.3083	.2194	.2139
Std. Deviation	2.431	.06077	.06243	.03888	.03760
Minimum	18	.25	.25	.10	.
Maximum	25	.40	.40	.25	.25

Upper Elastomeric vs. Kansal	t-test for Equality of Means	
	p	Mean Difference
	0.000	0.092

Lower Elastomeric vs. Kansal	t-test for Equality of Means	
	p	Mean Difference
	0.000	0.094

Table-2 Mean difference and p value of the difference in amount of separation between elastomeric separators and Kansal separator in upper and lower arch using Independent Samples Test

- The mean separating effect was 0.21mm for the Kansal and 0.31 mm for the elastomeric separators.
- There was no gender wise difference in the amount of separation and discomfort perception with either of the separators.
- Among daily activities, eating was most affected during the separation period.
- Both types of separators caused pain of mild to moderate intensity, with the springs considered less painful than the elastomers, but the difference found was statistically non-significant as depicted in Bar graph presentation (Fig. 7).



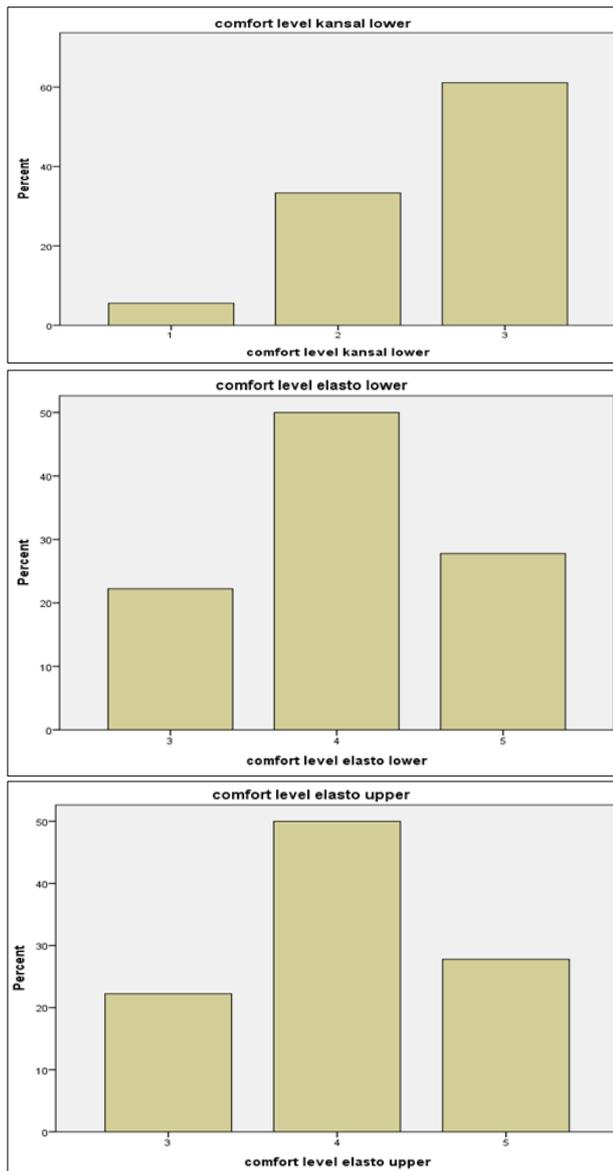


Figure 7: Bar graph showing level of discomfort in Elastomeric vs Kansal separators

- Kansal separators had a higher discomfort level when compared to elastic separators.

## DISCUSSION

Insufficient separation causes pain and discomfort to the patient during banding procedures apart from causing improper seating of bands. Many studies have evaluated the pain response of patients undergoing orthodontic treatment following separator placement.<sup>5</sup> Ngan, and coworkers<sup>6</sup> reported that pain and discomfort started at 4 hours and increased over the next 24 hours after the insertion of separators. Bondemark and coworkers<sup>7</sup> reported that the worst pain with separators was experienced on day 2, which subsided almost completely by day 5. In the present study, the difference in separation effect between spring and elastomeric separators was negligible which was statistically non-significant, and the two separators were considered clinically equivalent. The

space necessary for fitting bands for a fixed appliance is approximately 0.25 mm (0.01 inch); i.e., the amount of separation, 0.21 and 0.31 mm for springs and elastomeric separators, respectively, was near to twice the molar band thickness.<sup>8</sup>

The visual analogue scale (VAS) was used to assess pain and discomfort intensity, since it is one of the most commonly used pain assessment tools and is easy to score. The VAS is also a valid and reliable method of measuring discrete pain, being able to discriminate between small changes in pain intensity. VAS is helpful to discriminate between pain/discomfort in the anterior and posterior teeth.<sup>9</sup> Hence, in the present study the patients had no problem in discriminating between pain/discomfort in the right and the left quadrants when two different separators were placed on each side. Mild to moderate pain was associated with both types of orthodontic separators. Another important predictor of pain is gender.<sup>10</sup> In the current study, there was no significant difference reported between males and females pain/discomfort experience. Although some studies have shown that females experience more pain/discomfort than males, the literature rarely shows correlation in perception of pain/discomfort between males and females during the course of treatment.<sup>11,12,13</sup>

## CONCLUSION

The difference in separation effect between kansal and elastomeric separators was small, albeit statistically non-significant. The amount of separation between the two types of separators was considered clinically equivalent. Both types of separators caused pain of mild to moderate intensity, the kansal separators were less painful and less comfortable than the elastomeric separators, but the difference found was statistically non-significant. Therefore, amount of separation using elastomeric separators and kansal separators is clinically equivalent and the discomfort level is lower with elastomeric separators compared to kansal separators.

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