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# A comparative study of pain perception between elastomeric and kesling separators – A prospective split mouth in vivo study.

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**Abstract**

Background : To compare the pain perception between elastomeric and Kesling separators. Materials and Methods: 60 patients in the age range of 15 to 25 years were selected and were evaluated after 5 days of separator placement for pain and discomfort perception respectively. Two types of separators namely elastomeric and Kesling separators were used, the separators were placed in maxillary and mandibular arches on mesial contacts and distal contacts of first molars.

The discomfort level was recorded on a Visual Analogue scale and questionnaire consisting 13 questions were asked before the removal of separators on 5th day.

Results: kesling separators were more comfortable and causing considerably less pain than that with elastomeric separators. Conclusion: Both types of the separators are equivalent for discomfort perception associated with them.

**Keywords:** Elastomeric Separators, Discomfort perception, Kesling separators.

**Introduction**

Separators are used in dental practice to create a space usually between molars prior to placement of orthodontic bands and crown restoration. Pain and discomfort due to separator placement is the most common chief complaint of the patients and one of the reasons for avoiding orthodontic treatment. For treatment with a fixed orthodontic appliance, interproximal separation in between molars and premolars is necessary to create enough space for the bands that anchor the appliance. The ideal separator should give rapid and good separation without causing the patient discomfort or pain, thereby making the fitting of the band to the tooth. During the past 10 years, springs, brass wire and elastomeric have most often been used. If an orthodontic band measuring 0.15 mm thickness is placed around a tooth having an average periodontal ligament (PDL) space of 0.25 mm without proper separation, there is a risk of contacting the alveolar bone, producing hyalinization areas in the PDL and evoking pain response of resident mechanoreceptors. In a study by Hoffman, the separation effect of four types of separators was examined, but the patient's subjective experiences were not investigated. Perception of discomfort in patients undergoing orthodontic treatment, including 7 days of separation by elastomeric separators, was evaluated by Ngan et al Davidovitch et al stated that elastomeric separators can achieve adequate separation in 8 to 12 hours depending on the tightness of contact point.

However, in their study, they placed separators mesial to the first molars in the mandibular arch only. It has been reported that the contact point distal to first molar is tighter than the mesial.

Two types of separators which are commonly used today are elastomeric and spring separators. Elastomeric are easily available and spring separators can be easily fabricated in the clinic. The present study was undertaken to evaluate perception of pain with elastomeric and kesling separators in maxillary and mandibular arches and also focusing on the patient's perception of pain and discomfort. So the purpose of this study is to evaluate the pain perception between the two different types of separators i.e. elastomeric separators and kesling separators.

**Aim of the study and objectives**

The aim of the study is to evaluate and compare the intensity of pain in orthodontic patients after insertion of two different types of separators (i.e. elastomeric and kesling) .

To evaluate the pain perception of elastomeric separators.

To evaluate the pain perception of kesling separators.

To compare the pain perception between elastomeric and keslingseparators. A split mouth in vivo study.

**Materials and Method**

**Source of data:** A sample of sixty patients who came to the Department of Orthodontics, K.D. Dental College and Hospital, Mathura seeking orthodontic treatment (both male and female) ranging in age group 15 to 25 years with no previous history of orthodontic treatment were selected for the present study.

**Inclusion criteria:** Subjects in the age group of 15-25 years with a full complement of teeth. Established

contacts between the first and second permanent molars and between first permanent molar and 2nd pre-molar. Patient consent to the study.

**Exclusion Criteria:** Previous history of orthodontic treatment. Caries or restorations on the proximal surfaces of 1st and 2nd permanent molars and 2nd premolars. Previous history of extractions. Evidence of periodontal or gingival problem.

**Materials used.**

Elastomeric separators

Separator placing plier

Stainless Steel wire – 0.018" AJ WILCOCK

Light wire plier

Wire cutter

Weingart plier and Mouth mirror

**Method**

A sample of 60 patients from K.D. Dental College Mathura were selected. All volunteers were informed about their participation in the study and all gave their informed consent to be included in the study. Oral prophylaxis of all the patients was done prior to the placement of separators. For each individual 2 different separators were placed in right and left upper and lower quadrants between 1st and 2nd permanent molars and between 1st permanent molars and 2nd premolars. In 1st and 4th quadrant elastomeric separators, and in 2nd and 3rd quadrant kesling separators (Figure 3 and 4).

**Method of placing separators**

**Elastomeric separator:** the elastomeric ring is placed over the beaks of the separator placing plier and stretched, then one side is snapped through the contact and the plier is slipped out so the separator now surrounds the contact point. (Figure 1)

**Kesling separator:** the spring is grasped using a plier next to the helix, at the base of its shorter leg. The bent-over end of the longer leg is placed in the lingual embrasure between the two teeth to be separated and the spring is pulled open so that the shorter leg can slip beneath the contact, with the helix on the vestibule side.(Figure 2).

Oral prophylaxis of all the patients was done prior to the placement of separators. The elastomeric separators (EL) and kesling separators (KP) were placed, at the mesial contact (MC) and distal contact (DC) of the first permanent molars in the maxillary arch (Mx) and mandibular arch (Md).Elastomeric and kesling separators were placed on the right or left side in each patient to avoid bias. Elastomeric separators were placed with a separator placing plier and the kesling separators with the weingart plier. Patients were informed that separators may cause discomfort in the days following placement. They were instructed to take over-the-counter pain medication (400 mg Ibuprofen) as needed. All the separators were removed on the follow up appointments. All patients were asked to record their discomfort level at 5th day on the follow-up appointment ranging from no discomfort to extreme discomfort according to the ten points visual Analogous scale (VAS) . Also a questionnaire consisting of 13 questions was given to the patients before the removal on 5th day. The patients were given written and oral instructions, with an explanation on how to fill the questions. The questionnaires consisted of 13 questions describing pain and discomfort. 8 questions used a visual analogue scale (VAS), with scores ranging from 0 (no pain) through 5 (Moderate pain) to 10 (Worst possible pain). Rest 5 questions had Yes/No as choices and patients were supposed to choose either.

**Removal of separators**

On the 5th day all the separators were removed and interdental scalingwas done.

Kesling separators were removed by light wire plier carefully.

Elastomeric separators were removed with curved probe.

Figure 1:Placement of kesling separator

Figure 2: Placement of elastomeric separator

Figure 3: Occlusal view of maxillary arch showing elastomeric and kesling separator in 1st and 2nd quadrant right and left side respectively

Figure 4: Occlusal view of mandibular arch showing elastomeric and kesling separator in 3rd and 4th quadrant right and left side respectively

**Result and discussion**

The present study aimed to evaluate and compare the intensity of pain in orthodontic patients after insertion of two different types separators (i.e. elastomeric and kesling) .

**Pain Perception:** As the result obtained did not differ between the genders, the data for male and female were pooled and analysed together.

The pain perception of both separators were compared individually for five days.

Independent t-test and Chi square test was done to illustrate the number of samples used and pain perception of two different types of orthodontic separators on both right and left maxillary and mandibular arches.

It showed that there was a statically significant difference in the pain perception of both separators.

It was found that:

Among the total subjects maximum subjects 33(55%) were from 16-20 years of age, 18(30%) subjects were from 21-25 years of age and only 9(15%) subjects were from 11-15 years of age.

Among the total subjects maximum subjects were 33(55%) were females and 27(45%) were males . (Chart no. 1 & 2)

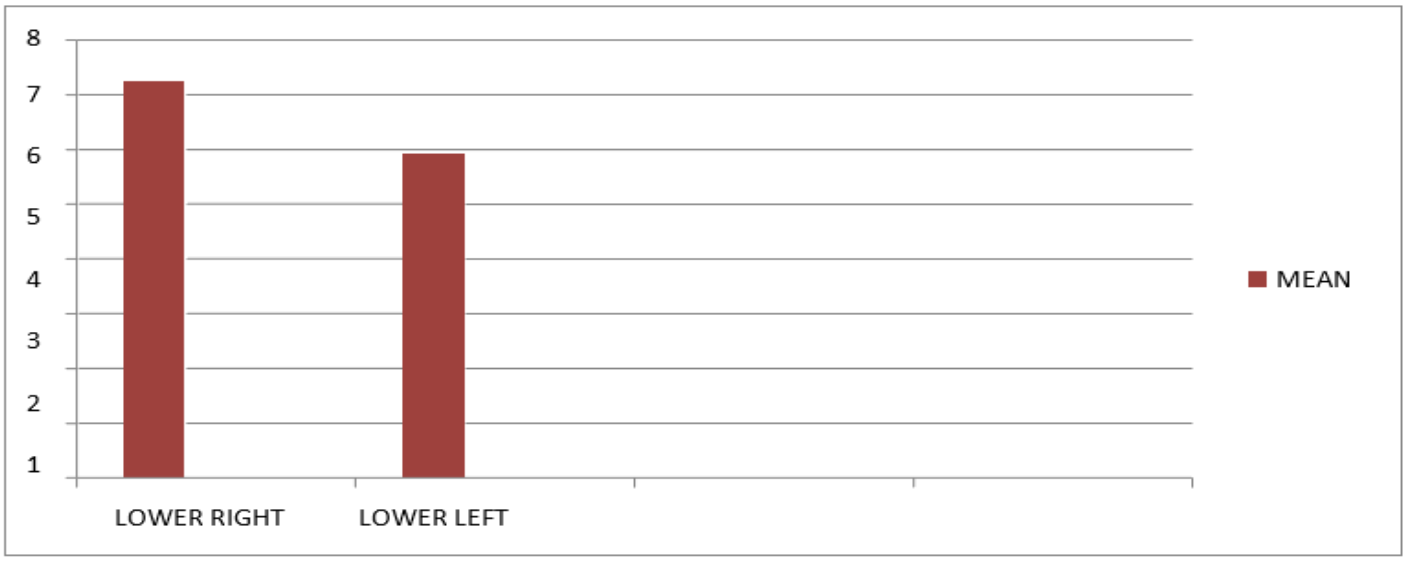
Mean of VAS score was 7.23 in lower right and 5.92 in lower left. It was clear that pain was more in lower right side in compare to lower left. Results were found to be statistically significant on comparing pain of lower right and lower left. (Table no.1, Graph no.1)

Mean of VAS score was 6.92 in upper right and 5.70 in upper left. It was clear that pain was more in upper right side in compare to upper left. Results were found to be statistically significant on comparing pain of upper right and upper left. (Table no.1, Graph no.2)

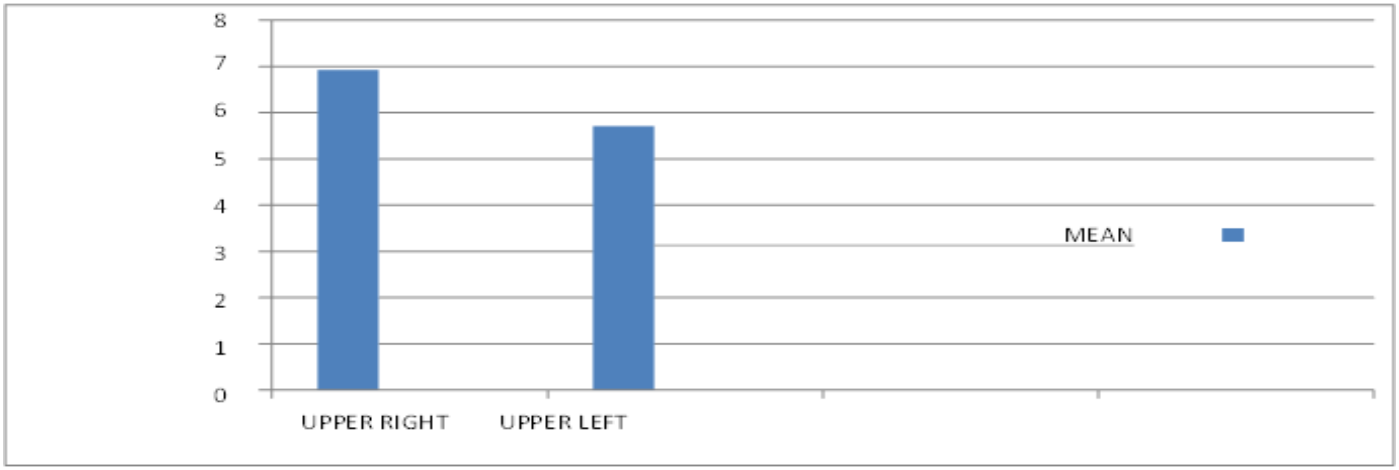
**Comparison of pain perception between elastomericand kesling on vas**

| SIDE | Mean | Std. Deviation | MEAN DIFF. | pvalue |
|---|---|---|---|---|
| LOWER LEFT | 5.92 | 1.522 | | |
| UPPER RIGHT | 6.92 | 1.441 | 1.217 | <0.001** |
| UPPER LEFT | 5.70 | 1.239 | | |
| LOWER RIGHT | 7.23 | 1.522 | 1.317 | <0.001** |

Table 1




Graph 1




Graph 2

On 5th day a questionnaire consisting of 5 questions was given to thepatients before the removal of separators.

The questions were:

Q1. Has it hurt so much that you have changed your diet to softfood?

Q2. Has it hurt so much that your leisure activities were influenced?

Q3. Has it hurt so much that your schoolwork was influenced?

Q4. Has it hurt so much that you have been awake on the night?

Q5. Has it hurt so much that you had to take pain killers?

**Conclusion**

Now a days two types of separators are commonly used, elastomeric and kesling separators. The ideal separator should give rapid and good separation without causing the patient discomfort or pain, thereby making the fitting of the band to the tooth. The present study was carried out to evaluate pain perception by using two types of orthodontic separators namely elastomeric and kesling separators, focusing on patient's perception of pain and discomfort. Materials and the separators tested were elastomeric and kesling separators (0.018-inch AJ Wilcock wire) on sixty subjects, who are scheduled for treatment with fixed orthodontic appliance were divided in to two groups. In selected subjects, kesling (0.018-inch SS wire) were placed.

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