

A Comparison of Pain Perception among Adolescent and Orthodontist related to Elastomeric Separator

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Abstract

Aims: Pain perception has shown to vary from person to person with respect to age, gender, culture and psychological factor. The present study aims to assess the patient's perception of pain among adolescents and the orthodontist after the placement of elastomeric separators.

Methods: The study recruited 71 patients seeking orthodontic treatment. Each patient was provided with informed consent and a self-administrated questionnaire to collect relevant data in a clinical setup by one investigator. The questionnaire reviewed each perception regarding the pain elicited after placement of elastomeric separators, the need for the analgesics that reflected tolerance towards pain and orthodontist perception regarding the prescription of analgesics. To analyze the data, descriptive statistics and Chi-square was employed using SPSS 20.

Results: In the study, 59.3% of patients reported pain after placement of the separators; however, the degree of pain was bearable for 46.3% of patients compared to patients taking analgesics (38%). Nevertheless, chi-square was performed to evaluate a correlation between pain perception after separator placement, the orthodontist prescription (27.8%) and the need for analgesics (32.4%) ($p=0.001$).

Conclusion: The study provides a baseline for understanding pain tolerance in patients of Saudi Arabia and highlights the importance to follow the pain management protocol.

Keywords: Saudi Arabia, pain perception, elastomeric separators, orthodontics

Introduction

In orthodontic treatment, placement of the separator is essential to create space between the two adjacent teeth that permits ease in placement of orthodontic bands in the molar region to support the orthodontic movements (Manandhar, Rajbhandari, Pradhan, Bajracharya, & Maharjan, 2019). The space required for the fixed orthodontic band is 0.25 mm that equals the amount of separation; however, the elastomeric have shown to create double space i.e 0.41 compared to metal springs (0.32) (Al-Balbeesi et al, 2016). It was observed that after the placement of separators the peak intensity of pain was immediately within the first three mins (11-18%), which subsided gradually to 29 -57% in 24 hrs (Sandhu & Leckie, 2016). Currently, the dentists are using elastomeric rings as a separator, which appears as a nontraumatic approach for space creation, easy to retrieve and cleanse the molar area.

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However, during the placement of the elastomeric ring sufficient pressure can be induced due to the tight interdental contact especially in adults.

Pain is a perception of an individual depending upon the tolerance level. Research has shown 90% of the orthodontic patients reported pain during the initial stage of treatment and around almost 30% of these patients considered premature cessation of the treatment (Aldrees, 2015; Sharma, Barthunia, Pandit, & Singh, 2017). Hence, the placement of an orthodontic separator is a well known painful step for the patients. The periodontal pain arising is mainly due to the pressure, inflammation, ischemia and edema under exerted force. The authors reported that the pain can be classified into two types; immediate or delayed response (Sandhu & Leckie, 2016; Long et al, 2016). The immediate response usually arises due to the compression of periodontal ligament (PDL) whereas a delayed response is due to hyperalgesia of PDL, which occurs due to the production of prostaglandins. The changes in blood flow alter the levels of substance P and prostaglandins, which affects the pain perception in each patient. This has shown to be correlated with various factors which include culture, age, gender and emotional status associated with past experience (Becker & Neronov, 2012). Nevertheless, pain perception measurement is a difficult task.

Orthodontist reported the application of different types of separators in a clinical setup that includes latex elastics, brass wires, spring-type steel, and elastomeric separators (Sandhu & Leckie, 2016; Sharma et al, 2017). Comparative studies revealed that the elastomers have shown to exert the highest level of pressure for space creation but the pain reported was minimum (Manandhar et al, 2019; Mohammadi & Mahmoodi, 2015). According to Asiry et al (2014), patients reported that the pain usually starts within 4hr of insertion of the elastomeric rings. However, few studies reported no significant difference in pain perception among the patient with types of separators employed (Al-Balbeesi et al, 2016; Sandhu & Sandhu, 2015; Ashley et al, 2016). Regardless, studies have reported a beneficial effect of the analgesics to control the pain during the treatment indicating a specific relation of pain tolerance with respect to age and gender, especially in adolescents and females respectively (Sharma et al, 2017; Mohammadi & Mahmoodi, 2015; Patel et al, 2011). Nevertheless, limited evidence demonstrates the influence of the demographic location on the level of pain tolerance among the patients. Therefore, the study aimed to evaluate the pain perception among adolescents and dentists after the elastomeric separator placement in Saudi patients.

Method and Materials

The present study was conducted in Al Baha city, Kingdom of Saudi Arabia (KSA) between January – June 2019 after the ethical approval from the research center at the college of dentistry, King Saud University. This randomized cross-sectional study was performed in the orthodontic department on the patients seeking orthodontic treatment, both gender (male and female) with age ranging from 14 to 35 years. The randomly selected patients included were on specific inclusion criteria; normal occlusion, appropriate orthognathic profile, good gingival health and elastic separators (3M Unitek Inc., St. Paul, Minnesota, USA) placed between the mesial and distal to the upper and lower molars in both arches/all quadrants.

A total of 71 patients were recruited for the study; 35 males and 36 females. All the patients were distributed well designed closed-ended questionnaires and proper informed consent was taken before their participation. The focus of the questionnaire was to assess the pain perception after placement of the elastomeric separator, the need for analgesics to control the pain, the effect of analgesics on the pain and orthodontist perception. The questionnaire consisted of 6 questions (Table 1) with a standard design of the tick box to select the appropriate answer. All questions were answered as “yes” or “no”, which was collected within the clinical OPD at the same time. The self-assessed questionnaire was designed in the simple English language. The collected response was validated by the investigators and patients who left incomplete questionnaires were excluded from the study.

The collected data were subjected to statistical analysis using SPSS IBM version 20 (Chicago, USA) systems. The results were reviewed in terms of percentage for categorical variables and Chi-square was performed to evaluate a correlation between the need for analgesics, orthodontist prescription for analgesics and level of pain elicited due to the separator.

2.1 Ethical consideration

In accordance with the standards in the Helsinki declaration (1964), the study was conducted and followed the approved protocol. All patients were provided with the right to withdraw from the study at any point without any consequences.

Table 1: Questionnaire

Question	Answer by yes / no	
Did you feel pain after your dentist placed elastic separator?	<input type="checkbox"/>	<input type="checkbox"/>
Did your dentist prescribe analgesic drugs after placed elastic separator?	<input type="checkbox"/>	<input type="checkbox"/>
Did the analgesic drug reduce the level of pain?	<input type="checkbox"/>	<input type="checkbox"/>
Do you think you really need analgesic drugs?	<input type="checkbox"/>	<input type="checkbox"/>
Do you think the pain is comfortable without analgesic drug	<input type="checkbox"/>	<input type="checkbox"/>
Did you use the analgesic drug to reduce the pain during chewing for example?	<input type="checkbox"/>	<input type="checkbox"/>

Result

The response rate obtained from the recruited patients was optimum. The findings of the study were evaluated based on no gender discrimination as the study included an equal number of representatives with a mean age of 21. In the study, 59.3% of patients reported pain after placement of the separators; however, the degree of pain was bearable for 46.3% of patients as they did not feel the need for analgesics (Table 2). A total of 32.4 % of patients reported the need for analgesics to control the pain whereas 38% used the analgesics during eating to control the pain; however, the effect of the analgesics to subside the pain was only observed in 30.6 % of the patients. Evaluating the perception of orthodontists, it was observed that among these patients, only 27.8% were prescribed analgesics.

Overall, no significance was appreciated regarding the need for analgesics to control the pain during orthodontic treatment. Nevertheless, chi-square employed presented with a significant correlation between pain perception after separator placement and the need for analgesics ($p=0.001$) suggestive of pain tolerance among Saudi patients. Furthermore, a significant difference was observed between orthodontist analgesics prescription and the need for analgesics ($p=0.001$) indicating a difference in the perceptions.

Table 2: Response of the patient

Question	Answer by yes (%)	AVONA
Did you feel pain after your dentist placed elastic separator?	59.3 ^a	p < 0.01
Did your dentist prescribe analgesic drug after placed elastic separator?	27.8 ^a	
Did the analgesic drug reduce the level of pain ?	30.6 ^{ab}	
Do you think you really need analgesic drug?	32.4 ^b	
Do you think the pain is comfortable without analgesic drug	46.3 ^{ab}	
Did you use the analgesic drug to reduce the pain during chewing for example?	38 ^{ab}	

Dissimilar superscript alphabets indicate significance
 Similar superscript alphabets indicate no significance.

Discussion

The present study aimed to assess the pain perception after the elastomeric separator placement among the patients and orthodontists in Saudi patients. The study investigated the influence of demographics on the pain tolerance level and distinguished the pain perception between the patients and orthodontists. A major concern of the orthodontic patients is the fear of pain that varies widely with respect to age, gender, culture, past experience and psychological state relevant to the condition in which pain ensued. The age category evaluated comprised mainly of adolescents and young adults. The result of the study revealed that more than 50% patients experienced pain after the placement of the separators; however, due to difference in perception between the orthodontist and patient, the prescription of analgesics were often neglected. However, around 30% did not feel the need for the analgesics and the patient who took the analgesics often did not experience a significant reduction in pain.

Thus, the hypothesis can be accepted, as the results clearly point out a significant difference in pain perception of the orthodontist and patient. A multitude of explanations can be aligned with the findings of the study.

Studies have shown that adolescent is a common age to pursue the orthodontic treatment because of their bone condition and occlusal positions allied with the tolerability of their physical mien (Al-Balbeesi et al, 2016; Asiry et al, 2014). Authors have reported that the intensity of pain perceived during the early tooth movements varies with the patient's age; hence, creating difficulty for the orthodontist to refer to each concern precisely regarding the degree and duration of distress (Asiry et al, 2014; Beck et al, 2014). Emphasis has always been placed on early treatment due to the high degree of tolerance towards pain despite the fact sensitivity decrease with age. These orthodontic patients reported a moderate level of pain sensitivity threshold suggestive of increased pain tolerance in Saudi patients (Asiry et al, 2014). Currently, in the present study, the majority of patients reported pain after the placement of the elastomer, however, the Saudi patients demonstrated high tolerance level as half of these patients felt no need for the analgesics. Thus, comparatively to correlative studies, the present study findings indicated an increased pain threshold in Saudi people (Sandhu & Leckie, 2016; Asiry et al, 2014).

According to Mohammadi and Mahmoodi (2015), the periodontal pain elicited is due to inflammatory reaction and ischemia of tissue, which releases substance P and the level of prostaglandins in the periodontal ligament. It is suggestive that the fluctuation in the pain response is due to the nerve sprouting within the pulp that alters the intradental nerves functions and mitigates the pain sensitivity by multiplying the receptor sites (Patel et al, 2011; Sandhu et al, 2013). The pain induced achieves the peaks in 1 or 2 days of tooth movement, thus it is recommended to prescribe analgesics. Studies have shown that the level of pain perceived after placement of separator is related to the timing of the drug and past experience (Al-Balbeesi et al, 2016; Malagan et al, 2015). The authors reported that preoperative medication demonstrated more effective control of the pain than postoperative. A plausible explanation for the less number of patients benefiting from prescribed analgesics by the orthodontist in the present study. Literature states that the preoperative medication acts by increasing the blood levels of the drug that leads to a reduction of pain severity compared to immediate post-operative doses (Aldrees, 2015). Furthermore, the intensity of pain and tolerance also have demonstrated a positive correlation with the psychological factor. As reported, the psychological factor is governed by the emotional state and past experience (Malagan et al, 2015). Thus, many of the orthodontists are concerned regarding the constant state of fear in patients during the treatment as it increases the patient's sensitivity towards pain; however, these aspects remain unexplored in the present study.

The most preferred way to control pain is analgesics during orthodontics treatment; however, misuse of these drugs is considered as a potential concern. Studies have shown that 80% of the orthodontists have sufficient pharmacological knowledge of analgesics; however, only 13% recommend the use of the analgesics (Al-Balbeesi et al, 2016; Asiry et al, 2014). Every country sets certain rules and protocols to govern the clinical practice of practitioners. With time, the perception of the practitioner changes and they ignore the prescription of analgesics in the initial stage of orthodontic treatment (Asiry et al, 2014). The present study showed less number of analgesics prescription that is suggestive of neglect of proper protocol and pain management of orthodontic patients. Thus, it is necessary to regularly provoke the practitioners to abide by the protocol along with proper pain management training for the patient's guidance.

The clinical significance of the present study indicated better tolerance of elastomeric separators; however, the neglect of the pain management indicated the importance of the relevant education and training. Moreover, the findings of the study cannot be generalized as the present study is a cross-sectional study specified for a particular population in addition interpersonal variance is inevitable that acts as a barrier in terms of the contact point morphology, contact tightness and pain threshold which differs among the patients. Nevertheless, the study provides a basic understanding of the difference in the pain perception between the orthodontist and patient in Saudia Arabia that would act as guidance for future reference in further studies.

Conclusion

Pain is a subjective perception that varies among the individual thus a significant difference in the pain perception of the patient and orthodontist was appreciated in the study. However, the outcome indicated neglect of the pain management protocol among the orthodontist. In addition, the study provided a baseline for understanding pain tolerance in Saudi patients and highlights the importance to adopt proper pain management guidelines in order to reduce the fear of the patients.

5.1 Highlights/key findings:

A significant difference in pain perception between the orthodontist and patient.

Demographics have shown a positive impact on the level of pain tolerance indicated through the lesser need for analgesics despite the perceived pain.

Neglect of pain management protocol in orthodontic treatment.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article.

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