



Pain Perception to Orthodontic Tooth Movement during Menstrual Cycle: A Clinical Study

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Abstract

Pain during orthodontic treatment is inevitable side effect. Therefore, it is the responsibility of the orthodontist to alleviate this pain as possible. Menstrual cycle is often a painful event to female. Female is the most of orthodontic patient. Hence, study the pain perception of female to orthodontic treatment during menstrual cycle is essential. Aim: the aim of the present study is to assess, if there is change in pain perception to orthodontic tooth movement during menstrual cycle. Seventeen healthy female with regular menstrual cycle intended to receive orthodontic treatment with fixed appliances were participated in the study. Elastomeric separators were placed mesial and distal to maxillary and mandibular first molars during the menstrual and postmenstrual period respectively. Visual analog scale (VAS) was used to assess pain perception at 4 hours, 24 hours, 2nd, 3rd, 4th and 5th days after the separators were placed. Data of VAS scores were statistically analyzed. There were statistically significant increase in the pain perception level after the insertion of separators during menstrual cycle period and decrease during postmenstrual period. During menstrual cycle, female experienced higher pain perception to orthodontic tooth movement. Hence, it is better to postpone orthodontic visits for female patients to postmenstrual period.

Introduction:

Orthodontic pain is an inflammatory pain and considered one of the major adverse effects that associated with the orthodontic treatment. It may affect patient compliance and treatment result⁽¹⁻⁴⁾. Pain may accompanied all orthodontic procedures like application of orthopedic force, placement of separator, arch wire, activations and bracket debonding⁽⁵⁾. The majority of patients seeking orthodontic

treatment are from females^(6,7). Differences in pain perception among gender were widely studied in both experimental and epidemiological research^(8,9). Menstrual cycle is often considered as one of the more painful events in female life. It characterized by physiological and psychological changes due to multiple hormonal variation during this period⁽¹⁰⁾. From the past, there were a

considerable attention in the literature about the severe somatic, psychological and behavioral changes accompanied menstrual cycle ^(11,12). The relation between menstrual cycle and Orthodontic treatment is studied in term of its effect on the speed of tooth movement ⁽¹³⁻¹⁶⁾. After searching abundant of literature, only two studies were found considering the impact of menstrual cycle on the pain perception during orthodontic procedures ^(17,18). Therefore, the present study aimed to assess changes in pain perception to orthodontic tooth movement after placement of elastic separators during menstrual and postmenstrual periods.

Materials and Methods:

Ethical approval was granted by the scientific committee of research and development of the college of dentistry ALMustansiriyha University. Seventeen female aged 17-21 years requiring treatment with fixed orthodontic appliances with banded first molars were engaged in the present study. The inclusion criteria were healthy female with regular menstrual cycle, full maxillary permanent dentition with no caries or filling. The objectives of the study were discussed with the patients, and a written informed consent was obtained. Elastomeric separator (Ortho Technology) were placed mesial and distal to bilateral maxillary first molars during the day one to five of menstrual period. The separators on the bilateral mandibular first molars were placed in the next visit during day twelve to fifteen of post menstrual period. In both occasions after placement of separators, the pain perception was assessed using 10 cm visual analog scale (VAS) a marked horizontal line (Figure1) from 0 cm (no pain) to 10 cm (very severe unimaginable pain). Patients were prohibited from using any analgesic during the observation periods. A formulated questionnaire were given to the patients for marking their level of pain on a 10 cm VAS at 4 hours, 24 hours, 2nd, 3rd, 4th and 5th days after the separators were placed during both menstrual and post menstrual appointments. This was

explained to each patient before the study. SPSS Version 21 was used for statistical data analysis. Descriptive statistics such as the mean and standard deviation of the VAS scores were calculated. Paired sample T test and ANOVA were used to analyze the data. Fig. (1) show a marked 10 cm visual analog scale (VAS).

Results:

The statistical analysis of the data in the present study was done by using the paired simple T test and ANOVA test. The descriptive statistics of VAS pain scores at 4 hours, 24 hours, 2nd, 3rd, 4th and 5th days after separators placement during the menstrual and postmenstrual period are shown in Table (1). The peak of mean pain scores were recorded at 24 hours during both menstrual and postmenstrual periods and were significantly higher than the rest studied times. Fig (2), as demonstrated in Table(1) and Fig(2), the mean pain scores during postmenstrual period at 4 hours, 24 hours, 2nd, 3rd, 4th and 5th days were 1.35 ± 0.49 , 2.65 ± 0.61 , 1.82 ± 0.39 , 1.29 ± 0.47 , 0.82 ± 0.39 and 0.47 ± 0.51 respectively. The mean pain scores during the menstrual period were significantly higher than postmenstrual period at all studied times 1.765 ± 0.44 , 3.24 ± 0.44 , 2.12 ± 0.06 , 1.53 ± 0.51 , 1.12 ± 0.33 and 0.94 ± 0.24 respectively.

Discussion:

Pain accompanied orthodontic procedures is one of the annoying issue that bother both patients and orthodontists, therefore it is crucial for orthodontists to relieve this pain as possible ⁽¹⁹⁾. Females are more attentive about their appearance and teeth alignment than males ^(20,21) therefore, seeking orthodontics treatment more than male. Female life have many painful events one of them is the menstrual cycle which cause changes in psychology, physiology and pain perception ^(12,22). Therefore, the present study concern with evaluation of pain perception to one of painful orthodontic procedure that is separator placement during the menstrual

cycle. In the present study visual analogue scale (VAS) was used to evaluate pain perception because it considered an easy, reliable and commonly used tool assessing clinical pain (23,24). The result of the present study revealed that during both menstrual and postmenstrual periods, pain scores of VAS was significantly decreased over time with the peak VAS scores shown at 24 hours after separators placemen. This inconsistent with the results of Fujiyama et al.; Al-Balbeesi et al., and Thimmaiah et al., (25-27) . On the other hand, this result disagree with Furquim et al., (28) who founded no differences in pain perception in all observation periods. In the present study the significant increase in the pain perception at the 24 hours after separation insertion could be explained by the periodontal vasodilatation that related to the acute inflammatory response to the mechanical stress according to finding of Watanabe et al., and Diravidamani et al., (29,30).

In the present study, the visual analogue scores that calculated after separator placement during the menstrual cycle were significantly higher than those scores during postmenstrual periods at all observation times. This finding is in agreement with the results of Ileri et al., and Long et al., (17,18). The possible cause of the present result is the low estrogen level during the menstrual period which increase pain sensitivity according to Vincent and Tracey; Paller et al., and Allen et al., (12,31,32).

Conclusions

During menstrual period, female patients perceive more pain than at postmenstrual period. Therefore, it is preferable to schedule orthodontic follow-up appointment during the postmenstrual period were estrogen hormone level is high.

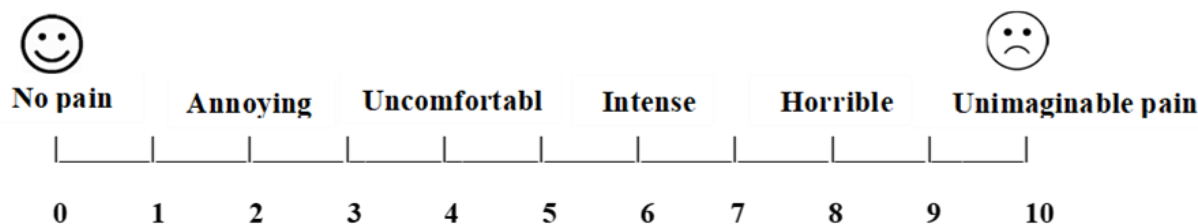


Fig. (1): A marked 10 cm visual analog scale (VAS).

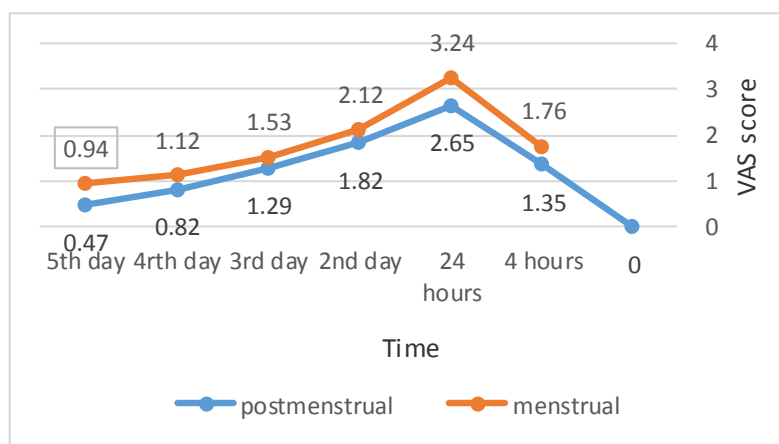


Fig. (2): Comparison of pain scores in menstrual and postmenstrual period during all the observation times.

Table (1): The descriptive statistics of the VAS scores during the menstrual and postmenstrual periods.

Time	menstrual		postmenstrual	
	Mean pain scores	SD	Mean pain scores	SD
4 hours	1.76	0.44	1.35	0.49
24 hours	3.24	0.44	2.65	0.61
2 nd day	2.12	0.60	1.82	0.39
3 rd day	1.53	0.51	1.29	0.47
4 th day	1.12	0.33	0.82	0.39
5 th day	0.94	0.24	0.47	0.51

n= 17, SD-standard deviation

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