

Original Research Article

Rapid appraisal of procedural pain among patients undergoing orthodontic treatment from a tertiary care dental centre

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Abstract: Various investigations have been performed to understand the nature of pain and discomfort, psychological effects associated with orthodontic treatment. This kind of study has not been conducted in western Uttar Pradesh till date. The aim is to analyze and ascertain the severity of pain that the patients experiences during different stages of orthodontic treatment and their behavioral changes during treatment and also the change in their dietary habits. This cross sectional study was executed by the Department of Orthodontics, KD Dental College from December 2014 to May 2015. Any patient who underwent any procedure (orthodontic treatment) was planned to include in this study. The following inclusion criteria were used: Absence of deciduous teeth; willingness to undergo orthodontic treatment; no previous orthodontic treatment; good general health; disease-free oral mucosa and periodontal tissue. The Visual Analogue Scale (VAS) was used to assess the pain during various stages of orthodontic treatment. Data of 242 patients was included in the analysis. 47.9% of patients felt pain while undergoing Separator Placement. 39.7% and 34.3% of subjects perceived pain while initial wire and retraction respectively. Mean pain score measured on Visual Analogue Scale was found to be highest in case of Separator Placement (8.04) followed by 7.25 in retraction and 4.53 in initial wire. Majority (54.28%) of them felt occasional dull type of pain followed by 40% subjects who felt continuous throbbing pain. Only 3 patients reported having acute throbbing type of pain. 31.8% perceived changes in the behaviour and 72.7% of patients perceived changes in their food habits. Pain was frequently reported by study subjects during and after orthodontic treatment, mainly after Separator Placement and initial arch wire insertion. A healthy dietary change was noted in patients as a response to fixed appliance.

Keywords: Pain, Orthodontic treatment, Visual Analog Scale, Patient's compliance

INTRODUCTION

Patients undergoing orthodontic treatment routinely experience discomfort during various stages of orthodontic treatment and pain referred because of the dental supporting tissue (periodontal ligament) [1] due to force applied to the teeth [2] and due to the surrounding soft tissues due to attrition caused by brackets and wires [3, 4]. This is significant to both patients and dentists as studies have reported this reaction to be a major deterrent to orthodontic treatment and an important reason for discontinuing treatment.

Discomfort is expressed as unpleasant tactile sensations, feeling of constraint in the oral cavity, stretching of the soft tissues, pressure on the mucosa, displacement of the tongue, soreness of teeth and pain.

Most of orthodontic patients report pain, reaching 95% when only fixed appliances are used [5]. Due to subjectivity and influence from emotional, cognitive and cultural factors [6] pain reports may vary between groups with different characteristics.

Various investigations have been performed to understand the nature of pain and discomfort associated with orthodontic treatment, and also the psychological effects during treatment. This kind of study has not been conducted in western Uttar Pradesh till date therefore the present study was planned to conduct with an objective to analyze and ascertain the severity of pain that the patients experiences during different stages of orthodontic treatment and their behavioral changes during treatment and also the change in their dietary

habits. The findings of this study may be utilized to relieve the pain of our patients and bring a comfort zone and make the treatment less painful to them.

MATERIALS AND METHODS

The present study was a prospective, dental hospital based cross sectional study. The study was planned and executed by the Department of Orthodontics, KD Dental College a tertiary care dental hospital in Mathura city from December 2014 to May 2015. The patients seeking care at Department of Orthodontics of this dental hospital during 1st January 2015 to 31st December 2015 formed the study population. Any patient who underwent any procedure (orthodontic treatment) was planned to include in this study. The following inclusion criteria were used: Absence of deciduous teeth; willingness to undergo orthodontic treatment; no previous orthodontic treatment; good general health; disease-free oral mucosa and periodontal tissue. Orthodontic procedures were given due attention with respect to objectives of the study, Separator Placement, Anchorage Preparation, Initial Wire and Retraction.

KD Dental College is a tertiary care dental teaching hospital equipped with ultra-modern multi super specialty facilities and referral unit of western Uttar Pradesh. This dental hospital receives major chunk of its patients not only from western region of Uttar Pradesh but also from other regions of Uttar Pradesh as well as from neighboring states especially Haryana and Rajasthan. Hospital caters mainly to rural and semi-urban patients, with a significant number of them being below the poverty line (BPL) income group patients. Thus this tertiary care hospital provided us a perfect base to study such an objective.

The questionnaires were handed out to the patients and requested to participate in the study. Each eligible subject was well explained about the purpose of the study by the investigator and an informed consent was obtained, prior to inclusion. The Visual Analogue Scale (VAS) was used to assess the pain during various

stages of orthodontic treatment. The patients was asked to rate the pain from 0 to 10, 0 being the no pain and 10 being highest degree of pain.

The study adhered to the tenets of the Declaration of Helsinki for research in humans. Permission of Institutional ethics committee (IEC) was sought before the commencement of the study. All the proforma were manually checked and edited for completeness and consistency and were then coded for computer entry. After compilation of collected data, analysis was done using Statistical Package for Social Sciences (SPSS), version 20 (IBM, Chicago, USA). The results were expressed using appropriate statistical methods. P value of <0.05 was considered to be statistically significant for any given measures.

RESULTS

A total of 260 patients returned the filled up questionnaires during the study period. 18 questionnaires were discarded as they were not completely filled thus data of 242 patients was included in the analysis. 47.9% of patients felt pain while undergoing Separator Placement. 39.7% and 34.3% of subjects perceived pain while initial wire and retraction respectively. (Table 1)

Mean pain score measured on Visual Analogue Scale was found to be highest in case of Separator Placement (8.04) followed by 7.25 in retraction and 4.53 in initial wire. (Table 2)

Out of total that experienced pain while orthodontic procedure, majority (54.28%) of them felt occasional dull type of pain followed by 40% subjects who felt continuous throbbing pain. Only 3 patients reported having acute throbbing type of pain. (Figure 1)

Seventy seven subjects (31.8%) perceived changes in the behaviour and 72.7% of patients perceived changes in their food habits who undergone orthodontic procedures. (Table 3)

Table 1: Distribution of pain during various orthodontic procedures as perceived by study subjects

Orthodontic Procedure	Pain		P value
	Yes	No	
Separator Placement	116 (47.9%)	126 (52.1%)	<0.001
Anchorage Preparation	0	242 (100%)	
Initial Wire	96 (39.7%)	146 (60.3%)	
Retraction	83 (34.3%)	159 (65.7%)	

Table 2: Quantification of procedural pain using Visual Analogue Scale

Orthodontic Procedure	Visual Analogue Scale	
	Mean	SD
Separator Placement	8.04	1.18
Initial Wire	4.53	1.20
Retraction	7.25	1.12

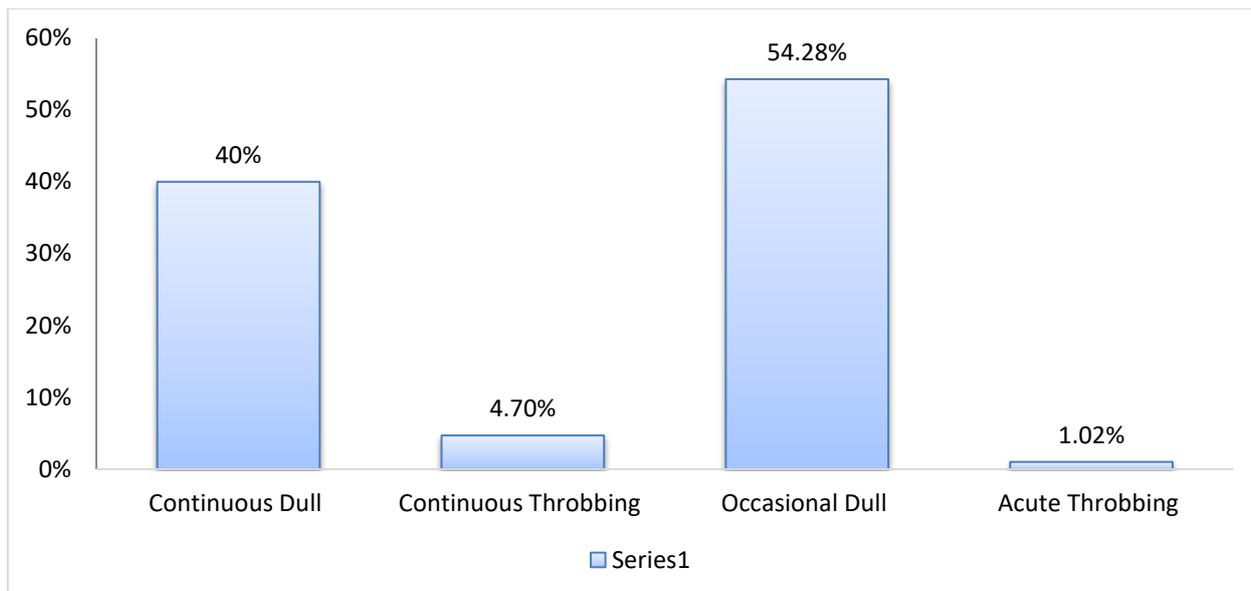


Fig- 1: Assessment of type of pain among study subjects

Table 3: Assessment of perceived changes in the behaviour and food habit of study subjects undergone orthodontic procedures

Perceived changes	Yes	No
	No. (%)	No. (%)
Changes in the behaviour	77 (31.8%)	165 (68.2%)
Changes in the food habit	176 (72.7%)	66 (27.3%)

DISCUSSION

Surveys of orthodontic patients have revealed that pain is among the most cited negative effect of orthodontic therapy[2] and even when compared with the pain of invasive procedures such as extractions, patients perceived orthodontic pain to be greater in both incidence and severity [7]. There exist differences among patients in the perceived pain dependent on factors such as individual pain threshold, the magnitude of the force applied, age, gender, cultural differences, previous pain experienced and present emotional state and stress [3, 4, 8]. Orthodontic pain is the result of compression of the periodontal ligament by the tooth resulting in an inflammatory response mediated by cytokines and prostaglandin. Thus, anti-inflammatory medication such as ibuprofen, have been suggested as the gold standard in decreasing post-operative orthodontic pain [4, 6].

Orthodontic treatment uses appliances to apply forces to the teeth, so that they can occupy more favorable esthetic and functional positions. Such devices injure the underlying oral mucosa, leading to discomfort and pain[6,7]. Forces applied to the teeth are transmitted to the supporting tissues (periodontal ligament and alveolar bone) which allow tooth mobility through inflammation, often associated with pain [8]. Using the same type of initial arch wire in all patients, regardless of their degree of tooth misalignment, resulted in the non-standardization of force application

to the teeth, which has not been proved to influence the intensity of reported pain [9, 10].

The VAS, particularly the graded and linear horizontal scale, has been shown to be the most reliable and accurate tool in the evaluation of subjective experiences such as pain [11]. The VAS is recommended for individuals over 5 years of age [12].

We observed that 47.9% of patients felt pain while undergoing Separator Placement. 39.7% and 34.3% of subjects perceived pain while initial wire and retraction respectively. Another study on perception of discomfort by patients undergoing orthodontic treatment (pain due to separator placement) observed that patients experienced pain from 4 to 24 hours after separator placement and it gradually reduced as time elapsed [13].

In this study it was revealed that majority (54.28) of subject felt occasional dull type of pain followed by 40% subjects who felt continuous throbbing pain. Only 3 patients reported having acute throbbing type of pain. Jones and Chan described a trend towards pain intensity reduction, occurring due to progressive adaptation of the patients to orthodontic appliances [7].

This investigation observed that 31.8% perceived changes in the behaviour and 72.7% of patients perceived changes in their food habits who

undergone orthodontic procedures. Another study by Sergl HG is also in concordance with our observations [14]. A similar finding was recorded by Brown *et al.*; in his study [8]. Dietary advice play important role in this regard. Orthodontists instruct their patients to avoid sticky food like chocolate and chips which stick to the appliance and worsen the oral hygiene and avoid consumption of hard food stuff in order to reduce chances of debonding of single brackets. These results are cohort with others. Another study reported that patients adopted a healthier diet as a response to fixed appliance treatment [15].

CONCLUSION

On the basis of empirical findings of this study, it can be concluded that pain was frequently reported by study subjects during and after orthodontic treatment, mainly after Separator Placement and initial arch wire insertion. Precautions should be taken during these procedures. A healthy dietary change was noted in patients as a response to fixed appliance. Dietary advice play important role in this regard. No significant change in the behavior of the patients was observed during the orthodontic treatment.

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