Pain prevention and management during orthodontic treatment as perceived by patients

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Aim: *The experience of pain is considered to be a major issue during active orthodontic treatment with fixed appliances. The objective of this study was to indirectly and retrospectively evaluate patients' perceptions of orthodontists' awareness to their pain during active orthodontic treatment.* ***Methods:*** *A structured questionnaire was distributed to 100 patients undergoing active orthodontic treatment with fixed appliances. The patients were treated by at least 35 orthodontists. The questionnaire accessed information regarding instructions the patients received from their orthodontist concerning pain management during and following treatment.* ***Results:*** *Most of the patients (83%) reported that their orthodontist informed them about expected pain during the orthodontic treatment. Fifty-nine percent informed their orthodontist of pain during the treatment (64% girls and 33% boys). Only 21% of the patients were recommended to take analgesic to relief the pain and only 7% patients received a prescription for an analgesic to relief their pain.* ***Conclusion:*** *Orthodontists should consider prescribing analgesics more frequently.* ORTHODONTICS (CHIC) 2012;13:xxx–xxx.

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During active orthodontic treatment, 70% to 95% of patients have been found to report pain, with some seeming to have a higher tendency to suffer acute and prolonged pain than others.[1,2] The magnitude of pain depends on several objective and subjective factors such as sex, individual pain thresholds, the magnitude of force applied, emotional state and stress, cultural factors, previous pain experiences,[3–9] and age. Adolescents undergoing orthodontic treatment generally report higher levels of pain than do preadolescents and adults.[3,8]

The sensation of dental pain during orthodontic treatment results from stretch and compression forces acting on the periodontal ligament and alveolar bone.[1] These forces set off changes in the blood flow to the periodontal apparatus, which induce the release of tissue mediators and increase the inflammatory reaction.[1] The levels of various mediators, such as substance P, histamine, enkephalin, dopamine, serotonin, glycine, glutamate gamma-amino butyric acid, PGEs, leukotriens, and cytokines, as well as neuropeptides, which elicit a painful response, were found to be correlated with a hyperalgesia response in the periodontium and dental pulp.[10–18]

Bergius et al distinguished between two types of pain during active orthodontic treatment: constant pain and chewing-related pain.[2] On the first day after activation of orthodontic forces, about 82% of patients reported pain dur-

ing chewing/biting and 24% constant pain.[2] The proportion of patients suffering constant pain decreased gradually with time, reaching zero on the seventh day. However, 30% of patients still reported pain during chewing/biting.[2]

Another source of pain during orthodontic treatment is trauma to the oral mucosa by orthodontic appliances, especially during the first months of treatment. Kvam et al reported that 75.8% of patients undergoing active orthodontic treatment with fixed appliances had small wounds and 2.5% had ulcers caused by the appliances.[19]

Pain can be reduced or prevented by informing patients about expected pain during chewing, especially during the first days after activating the orthodontic forces, and by advising them to avoid chewing and biting hard food. Since some of them have higher tendencies for pain, it is also advisable to inquire about former painful experiences and to recommend that patients with tendencies for pain take analgesics before undergoing orthodontic procedures.[1,20–23] Among the most effective analgesic agents for orthodontic treatment are ibuprofen, naproxen sodium, aspirin, and acetaminophen, although no consensus exists regarding the optimal agent. In addition, to prevent wounding of the oral mucosa, patients may be advised to use wax to cover the sharp edges of appliances.

Pain during orthodontic treatment has been determined a key deterrent to orthodontic therapy and a major reason for discontinuing treatment.[5,9] Nonetheless, orthodontists tend to underestimate the degree to which orthodontic treatment causes pain.[3,14] Therefore, the aim of the present study was to evaluate the awareness and the attitude of orthodontists regarding pain prevention during orthodontic treatment, according to patient reports.

METHODS

Questionnaire

A structured questionnaire was designed to assess the attitudes and actions of orthodontists regarding pain prevention during active orthodontic treatment. The questionnaire accessed demographic characteristics of patients (age and sex) and information regarding instructions patients received from their orthodontists concerning pain management during and following orthodontic treatment.

Study population

The study population included 100 patients with fixed orthodontic appliances during active orthodontic treatment. Patients with physical or mental disabilities were excluded from the study as were patients in the final phase of orthodontic treatment. The study was approved by the ethics committee of Tel Aviv University, Tel Aviv, Israel.

Statistical analysis

Descriptive analysis was performed on patient responses to the questionnaire. The chi-square test and Fisher exact test were used to evaluate relationships between two variables. The level of significance was set at 5%.

RESULTS

Study population

The mean patient age was 16.3 ± 0.5 years [au: edit ok?] (30% were boys and 70% girls). The response rate for filling in the questionnaire was 100%. How-

ever, response rates for particular questions ranged from 90% to 100%. More girls reported pain than boys did (64% vs 33%, $P = .03$).

The name of the treating orthodontist was provided by only some of the participants; accordingly, at least 35 orthodontists were evaluated.

Awareness of orthodontists to their patients' sensation of pain

Most of the patients (83%) reported that they were informed about the possibility of pain during treatment, and 62% received information about the possible etiology of pain (chewing or wounds in the oral mucosa). Almost all the participants (95%) reported that they received at least some instruction regarding recommended foods to consume during the treatment period (soft food and/or avoiding chewing gum). No statistical relationship was found between informing patients about possible pain from treatment and recommendations to take analgesics before treatment (Table 1).

Awareness of orthodontists to differences in individual tendencies to suffer from pain

Less than half (47%) of the patients reported that their orthodontist asked them about their past experience with postoperative dental pain, and even fewer (14%) were asked about their past experiences when taking analgesics. A positive relationship was found between orthodontists who inquired about past experience with postoperative dental pain and those who informed patients that pain may be evoked after orthodontic treatment ($P = .025$) and prescribed an analgesic agent ($P = .037$) (see Table 1).

Orthodontic instruction and management of pain

Most patients (95%) were not initially advised to take analgesics if pain would evoke after the treatment. However, when 59% of the patients told their orthodontist that they suffered from pain after the orthodontic treatment, only 21% were recommended to take analgesics in response to their compliant. Seven percent received a prescription. Of those, only 20% received instruction on how to use the analgesic agents. Sixty-two percent were to told to use wax to alleviate mucosal pain (see Table 1).

Severity of pain after orthodontic treatment

Of the 28 patients who used analgesics during the treatment, 18 (64%) reported that the analgesic did not relieve their pain. Four patients took analgesics for 3 days or more.

Analgesics were prescribed twice as much (11%) to patients who complained about pain as to those who did not complain about pain (5%) (see Table 1).

DISCUSSION

Pain is an important concern in dentistry in general and in orthodontics in particular.[24,25] Pain during orthodontic treatment is a prevalent, yet preventable, condition that has an impact on patients' fear, quality of life, treatment compliance, and even cessation of treatment.[5,9,26] Nevertheless, pain management and prevention are sometimes overlooked.[1,14] To deal effectively with patients' pain, orthodontists should relate to pain duration and intensity.[1,14,27] Informing the patient during the diagnostic phase about potential pain and its timing, characterization, and causes can decrease patient anxiety and suffering once pain occurs.[28,29]

Table 1 Patient responses to the questionnaire

Question	Responses				Response rate (%)
	A	B	C	D	
Did your orthodontists inform you about possible pain that may occur during the orthodontic treatment? A. Yes B. No	83	17			99
Did your orthodontist inform you as to the types of pain that may occur? A. Pain during chewing B. Pain resulting from mucosal wounds C. A and B D. Did not mention	24	11	27	38	93
Did your orthodontist inform you about the time when the pain may occur? A. Yes B. No	53	48			98
Did your orthodontist recommend foods to eat during orthodontic treatment? A. Recommended soft food B. Prohibited chewing gum C. A and B D. No recommendations	16	22	57	5	93
Did your orthodontist ask you about your past experience in postoperative dental pain? A. Yes B. No	47	53			96
Did your orthodontist ask you about your past experience in using analgesics? A. Yes B. No	14	86			90
Did your orthodontist recommend taking analgesics if pain would occur after treatment? A. Yes B. No	5	95			93
Did you inform your dentist about pain that you suffered after the treatment? A. Yes B. No	59	41			92
When you told your orthodontist that you suffered from pain, what did he do? (more than one answer possible) A. Recommended I take an analgesic B. Recommended the use of wax C. Recommended performing mouthrinse D. Nothing	21	62	14	23	97
If your orthodontist recommended an analgesic, did he instruct you how to use it? A. Yes B. No	20	80			35*
Did your orthodontist give you a prescription for analgesics? A. Yes B. No	7	93			98
Did the analgesics relieve your orthodontic pain? A. Yes B. No	36	64			28*
How many days did you take analgesics to relieve your pain? A. 1 B. 2 C. 3 D. More than 3	44	11	33	11	9*

*Out of the total number of patients.

In the present study, most patients reported that their orthodontist did inform them of the possibility of pain after the initiation of the treatment. About half of them even received information regarding expectations of the timing of pain. The number of girls reporting pain during orthodontic treatment was almost twice that of boys. This supports previous studies that found girls to report more discomfort/pain and ulcerations than boys during fixed appliance treatment.[1,2,4,19,28,30]

In the present study, about half of the patients reported being interviewed about their tendency to suffer pain following dental treatment, yet only about 14% were asked about their experience taking analgesics following dental pain in the past. Thus, orthodontists treating most of the patients in this study missed the opportunity to evaluate pain intensity following past dental treatments, information that might predict future pain experience. Bergius et al[2] found a positive relationship between experiences of intensified prolonged pain after orthodontic treatment and dental operative procedures such as local anesthesia or drilling or general pain such as following immunization.

For patients with a high tendency to feel pain, prescriptions for analgesics before and several days after dental procedures such as extractions and root canal treatment have been recommended.[1,31–33] While 59% of participants in the current study told their orthodontist that they suffered pain during treatment, only 21% of them reported receiving recommendations to take analgesics; 9% reported taking analgesics to relief their pain for 1 day or more.

The fact that the number of patients who answered the question about the effectiveness of analgesics to relieve pain was higher than the number who reported receiving a prescription from their orthodontist suggests that some patients may have taken analgesics even though their orthodontist did not recommend it or inform them to take it. Nevertheless, twice the percentage of patients who complained about pain were prescribed analgesics as patients who did not complain about pain.

Similarly, Krukemeyer et al found that 60% of patients reported suffering from pain, despite a lower number of patients who took analgesics.[23] The low usage of analgesics reportedly resulted mainly from miscommunication between orthodontists and their patients, lack of patient awareness, and an underestimation by orthodontists of the intensity of pain that patients experience during treatment.[14,23] Orthodontists' oversight to analgesic prescriptions even in patients who complain of pain should be addressed.

Only 36% of those who took an analgesic reported that it alleviated their pain. The ineffectiveness of analgesic use in the current study may be due to prescriptions of low dosages. This highlights the importance of prescribing dosages of nonsteroidal anti-inflammatory drugs (NSAIDs) that have demonstrated effectiveness for the relief of pain.[25] Orthodontists may avoid prescribing NSAIDs since these medications reduce the development of the inflammatory reaction that is required for tooth movement. However, according to current knowledge, small quantities of NSAIDs taken during the first phase of orthodontic treatment do not detract from the movement process.[1] Notwithstanding, indications for analgesic prescriptions during orthodontic treatment need to be clarified. The lack of an acceptable protocol regarding analgesic prescription has been discussed in previous studies.[1,3]

Even though dental care providers have a positive attitude to pain relief in dentistry, most patients go through orthodontic treatment without the benefit of analgesia. There might be a discrepancy between orthodontists' attitudes regarding pain relief during orthodontic treatment and practice of the same, with many orthodontists having no genuine reasons for not offering pain relief to their patients during the treatment. Orthodontists need to align their practice to their attitudes and need to be helped to do this through training.

CONCLUSION

According to patient reports, while most patients were informed by their orthodontists about the possibility of pain during orthodontic treatment, only a small proportion were recommended or prescribed analgesics. This study shows low implementation of pain prevention through analgesics among orthodontists. A consensus protocol regarding type of analgesics, effective dosages, and timing of administration is needed to prevent and treat orthodontic pain. However, the pharmacologic actions as well as adverse effects should be considered before prescribing these medications in routine clinical practice.

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