The Incidence and Severity of Postoperative Pain After Root Canal Treatment Performed in One Visit or Multiple Visits

Tek veya Çok Seansta Uygulanan Kök Kanal Tedavisi Sonrasında Postoperatif Ağrının Sıklığı ve Şiddeti

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ABSTRACT Objective: The purpose of this study was to evaluate the incidence and severity of postoperative pain occurring at the 6th, 12th, 24th, 48th and 72nd hours after root canal treatment performed in one visit or multiple visits. **Material and Methods:** This study involved 110 patients referred for root canal treatment. Treatments were provided by two postgraduate students in the Department of Endodontics. All canals were prepared with routine chemomechanical preparation. A rubber dam was used throughout the endodontic procedures. The incidence of postoperative pain following one visit and multiple visit treatments was recorded and expressed as percentages. Data were statistically analyzed using the Pearson chi-square test. **Results:** Fifty-five patients had root canal treatment performed in one visit and other 55 patients had treatment completed in multiple visits. Any postoperative pain decreased progressively from the 6th to the 72nd hour in both groups. There was no statistically significant difference between the groups at the 6th, 12th, 24th, 48th and 72nd hours. Also, there was no significant difference between the one visit and the multiple visit groups regarding the incidence of flare-ups. The overall incidence of flare-ups was 4.5%. **Conclusion:** Under the limitations of this study, there was no difference in the occurrence of postoperative pain following root canal therapy, whether the treatment was completed in a single visit or over multiple visits.

Key Words: Pain, postoperative; endodontics

ÖZET Amaç: Bu çalışmanın amacı, tek seans veya çok seansta uygulanan kök kanal tedavisini takiben 6., 12., 24., 48. ve 72. saatte meydana gelen postoperatif ağrının sıklığını ve şiddetini değerlendirmek idi. **Gereç ve Yöntemler:** Çalışma, kök kanal tedavisi için başvuran 110 hastayı içermektedir. Tedaviler Endodonti bölümündeki 2 doktora öğrencisi tarafından yürütüldü. Bütün kanallar rutin kimyasal-mekanik preparasyon ile hazırlandı. Endodontik işlemler boyunca rubberdam kullanıldı. Tek ve çok seansta kök kanal tedavisini takiben oluşan ağrı sıklığı kaydedildi ve yüzdeleri hesaplandı. Veriler Pearson ki-kare testi kullanılarak analiz edildi. **Bulgular:** Elli beş hastanın kök kanal tedavisi tek seansta ve diğer 55 hastanın da çok seansta sonlandırıldı. Bütün gruplarda altıncı saatten yetmiş ikinci saate doğru gittikçe dereceli olarak postoperatif ağrı azaldı. Altıncı, 12., 24., 48. ve 72. saatler arasında istatistiksel olarak anlamlı bir fark mevcut değildi. Aynı zamanda "flare-up" sıklığı bakımından da tek ve çok seans arasında fark gözlemlenmedi. "Flare up" sıklığı toplamda %4.5 idi. **Sonuç:** Bu çalışma sınırları dâhilinde, tek seansta veya çok seansta tamamlanan kök kanal tedavilerini takiben meydana gelen postoperatif ağrıda fark bulunamamıştır.

Anahtar Kelimeler: Ağrı, postoperatif; endodonti

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Postoperative pain is an experience that neither dentists nor patients want to occur following endodontic treatment. It may affect the quality of life of the patient and undermine the patient's confidence in their dentist.[1]

It has been reported in various studies that after nonsurgical root canal treatment, pain can occur from 2% to 88% of cases.[2] Speculatively, the causes of postoperative pain may be gender, race, over instrumentation, escape of intracanal medication and continuing preoperative pain.[3-9]

The attempt to complete root canal treatment in one visit has been documented since the end of the nineteenth century.[10] Many researchers have compared postoperative pain that occurred after a one-visit root canal treatment with the pain that occurred after a multiple-visit root canal treatment.[11-13] The majority of the research has shown either no significant difference in postoperative pain, or less pain following one visit treatment.[14-18]

The purpose of this study was to evaluate the incidence and severity of postoperative pain occurring at the 6th, 12th, 24th, 48th and 72nd hours after root canal treatment performed in either one visit or multiple visits.

MATERIAL AND METHODS

This study involved the treatment of 110 teeth of patients referred for root canal treatment to the Endodontics Clinic, Atatürk University, Erzurum, Turkey. Treatment was provided by two postgraduate students in the Department of Endodontics. Details of the study were revealed to the patients. Patients were excluded if they were: younger than 18 years old, pregnant, using antibiotics or corticosteroids at the time of treatment, had a complicating systemic disease. Upon approval by the Institutional Review Board of Atatürk University, a consent form was signed by all patients before treatment. The sensibility of the pulp was determined by an electric pulp-testing device (Digitest pulp vitality tester, USA). Fifty-six teeth responded positively while 64 teeth did not. Nine teeth had periapical radiolucencies. According to the patient symptoms before treatment, 74 patients had symptomatic teeth (mild or moderate pain) and 36 had asymptomatic teeth (no pain) before the treatment. Thirty-six of symptomatic teeth and 19 of asymptomatic teeth were treated in one visit; the remaining patients (38 symptomatic and 17 asymptomatic teeth) were treated in multiple visits.

All canals were prepared with routine chemomechanical preparation. A rubber dam was used throughout the endodontic procedures. Cleaning and shaping were considered as minimally adequate when an ISO file size 25 with a 0.04 taper came to within 0.5-1.0 mm of the established working length. One milliliter of 15% EDTA solution (Rehber Kimya, Istanbul, Turkey) was placed in the canal for 1 minute. This was flushed with 3 mL of 5.25% NaOCl as final irrigant and the canal(s) dried with sterile paper points. The teeth in Group 1 were obturated at the initial appointment with laterally condensed gutta-percha and Sealapex (Kerr, Italy). The root canals in Group 2 had an interappointment dressing of calcium hydroxide (Calcicur, Voco, Germany) placed. They were sealed with a sterile dry cotton pellet and a minimum of 3 to 4 mm of Cavit temporary restorative (ESPE Dental AG, Seefeld, Germany).

Although no systemic medicament was prescribed, the patients were instructed to take mild analgesics (paracetamol) if they experienced pain. Patients in Group 2 were seen for the second appointment 1 week later. Teeth in this group were isolated with a rubber dam and the temporary filling material removed. The canals were irrigated as were the canals in the other treatment group and dried with sterile paper points. All teeth were obturated similarily with laterally condensed gutta-percha and Sealapex.

Following the completion of treatment, each patient was given a form to describe his/her pain level. This was rated as follows: 1) no pain, 2) mild pain: recognizable pain that required no analgesics, 3) moderate pain: discomforting but bearable pain (analgesics, if used, were effective in relieving the pain), 4) severe pain: difficult to bear (analgesics were effective in relieving pain).

The incidence of postoperative discomfort was recorded by one author and expressed as percentages. Data were statistically analyzed using the Pearson chi-square test.

RESULTS

In the present study, 55 patients had root canal treatment performed in one visit and 55 had treat-

ment completed in multiple visits. The age of patients ranged from 18 to 56 years with a mean age of 36 years. In the one visit group, 38 patients were females and 17 were males. The multiple visits group comprised 32 females and 22 males. The difference between the number of female and male patients in one or multiple visits groups was not statistically significant (p=0.234).

Twelve incisors, 28 premolars, and 15 molars were treated in one visit. Fourteen incisors, 20 premolars and 21 molars were treated in multiple visits. The differences between the tooth types were not statistically significant (p=0.288). Additionally, there was not a statistical difference between tooth type and postoperative moderate/severe pain (p=0.595). Thirteen of the patients needed analgesics for relieving pain that occurred following treatment. Eight of these patients were in multiple visits group, 5 of them were in one visit group. There was no statistically significant difference between the numbers of the patients required analgesics in one and multiple visits groups (p=0.376).

Five of the nine teeth which have radiolucent area at the apex were treated in one visit and four teeth were treated in multiple visits. Patients, who have teeth with radiolucent area, reported no pain at any time interval. Also there was no significant difference between the groups.

As seen in Figure 1, postoperative pain decreased progressively from the 6th hour to the 72nd hour in both groups. There was no statistically significant difference between the groups at all time intervals.

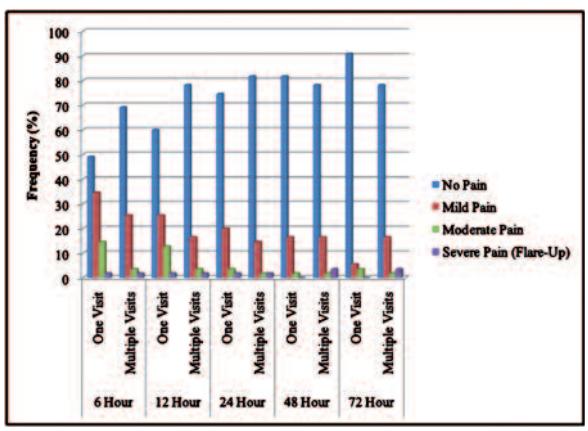

FIGURE 1: Pain levels reported by patients treated endodontically with in one or multiple visits.
(See for colored form http://dishekimligi.turkiyeklinikleri.com/)

The frequency of postoperative pain at all interval hours was 65.5% (36/55) for the one visit group and 49.1% (27/55) for the multiple visits group. No statistically significant difference was found between the groups (p=0.083). The majority of the patients studied in both groups reported no moderate/severe pain. The frequencies of moderate/severe pain were 21.8% for the one visit group and 14.5% for the multiple visit groups. There was no significant difference between groups (p=0.323). The total incidence of moderate/severe pain was 18.2%. One of the patients from the one visit group (1.8%) and four patients from the multiple visit groups (7.3%) experienced flare-ups that required an emergency visit. There was no significant difference between the one visit and the multiple visit groups regarding the incidence of flare-ups (p>0.05). The overall incidence of flare-ups was 4.5%.

DISCUSSION

It is well known that pain sensation is an extremely subjective and variable experience modulated by physical and psychological factors. The measurement and reporting of pain is extremely difficult. Many different scales and methods have been used for evaluating pain after endodontic procedures. Among them, the visual analog scale (VAS) is considered to be a valid and reliable ratio scale for the measurement of pain. However, to simplify pain rating, some authors have used a scale that rates the level of pain in only four categories.[13,14] This scale was used for convenience.

Advantages of the one visit root canal treatment are that there is no risk of bacterial leakage under the temporary restoration used between visits, reduction of working time and the dentists' familiarity with the root canal anatomy and its shape at the time of treatment. On the other hand, it also has some disadvantages, such as patient and dentist fatigue (depending upon the operation time), access difficulty to the root canal apex should there be a flare-up and the impossibility of the placement of root canal disinfectants (except for irrigants

used) during treatment.[19] In this study, the differences between the two groups were not statistically significant. This finding is in agreement with the findings of DiRenzo et al., Al-Negrish and Habahbeh, and Ince et al.[14,20,21] It was in disagreement with the findings of Glennon et al, and Albashaireh and Alnegrish, where a significant difference in the incidence of postoperative pain between one and multiple visits was reported.[2,17]

Mechanical preparation using Ni-Ti instruments generates less postoperative pain than stainless steel hand files.[22] However, the postoperative pain may be less when the root canal instrumentation was done with the modified crown-down technique with use of rotary instruments.[23] In agreement with the literature, in our study with Ni-Ti instruments and the crown-down technique the overall incidence of moderate/severe pain was 18.2%. This finding was similar to the data reported by O'Keefe who determined moderate/severe postoperative pain in 16.3% of the patients.[5]

Previously reported prevalence rates of flare-up (severe pain) in patients have ranged from 0.39% to 20%.[16,24,25] In the present study more flare-ups occurred in the multiple visit group (7.3%) than in the single visit group (1.8%). Similar to the results of our study, Eleazer and Eleazer. found the rate of flare-up (3%) in the one visit group to be less than that in the multiple visit groups.[26] This is in contrast to the findings of Oginni and Udoye, who reported fewer flare-ups for the multiple visit group (8.1%), and 18.3% for the one visit group.[27] The factors that may be contribute to the flare-ups are alteration of the local adaptation syndrome, changes in the periapical tissue pressure, microbial factors, effects of chemical mediators, changes in cyclic nucleotides, immunological phenomena, and various psychological factors. The reasons for such exacerbations are not always clear.[28] Study designs, preoperative conditions of the tooth, the treatment protocol, the definition of pain by the patients, pain measurement, and the analysis of pain data all affect the results. Thus, comparison of pain between different studies is difficult.[29]

Some studies have shown that teeth with no apical periodontitis are more susceptible to flare-ups.[6,30] In the present study patients who have teeth with periapical lesion reported no pain at all time intervals, regardless of the type of the treatment. This situation might be attributed to a presence of space for pressure release when periradicular bone resorption is presence.[31]

CONCLUSION

Under the limitations of this study, there was no difference in the incidence of postoperative pain whether treatment was completed in a single visit or over multiple visits.

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