

Telescopic Dental Needles versus Conventional Dental Needles: Comparison of Pain and Anxiety in Adult Dental Patients of Kerman University of Medical Sciences—A Randomized Clinical Trial

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Abstract

Introduction: Pain felt during dental injections is dependent on dental anxiety. Patients feel increased pain if anxiety in the treatment environment is high, and therefore it is important to reduce anxiety during treatment to reduce pain. The purpose of this study was to compare pain and anxiety levels experienced during injections using a newly invented telescopic-coated dental needle that covers the conventional needle and also has the capability of applying topical anesthesia through its unique design with the conventional dental injection needle. **Methods:** Dental injection anxiety questionnaires were completed by 60 adult patients who were randomly assigned to either the telescopic (a newly invented telescopic-coated dental needle that covers the needles) or the conventional group. Patients also completed visual analog scales to rate their pain perception during injection, their overall experience, and their future anticipated anxiety. Wilcoxon, Mann-Whitney, and Student *t* tests were used for statistical analysis. Statistical significance was defined as $P < .05$. **Results:** A total of 25 men and 35 women with an age range of 19–55 years (mean age of 38.7 ± 2.31 years) participated in this study. Pain levels reported during the injection using the telescopic-coated needle (4.13 ± 1.37) were significantly lower than those using the conventional needle (5.63 ± 1.57), with statistically significant differences between the 2 groups ($P < .05$). Patients experienced significantly lower overall postinjection anxiety ($P < .05$) and had more positive overall experience ratings with the telescopic-coated needles. **Conclusions:** A new telescopic-coated dental needle was superior to a conventional injection system in pain perception and in reducing postinjection dental anxiety. (*J Endod* 2017; ■:1–6)

Key Words

Anxiety, dental injection, pain

Local anesthesia and pain control are important elements of dentistry. According to the American Dental Association, dental anxiety is the most important factor preventing subjects from visiting their dentists (1). This anxiety can be a significant impediment to dental care because it frequently causes many patients to delay or even avoid treatment (2–4). Incidents of discomfort or pain associated with local anesthesia may result in far greater and protracted problems than loss of time, efficiency, or confidence associated with 1 appointment. A study reported that 20%–23% of the population is highly anxious or even phobic about dental treatment (1). When interviewed, most individuals recount an episode or preconception of painful dental treatment associated with the injection or identify a needle or syringe as the predominant fear-provoking stimulus (5).

In addition, some studies showed that palatal, intraligamental, and periodontal ligament injections and nerve blocks are painful and hurtful. Asokan et al (6) showed that pain caused by needle penetration might be controlled by using thinner needles despite differences in pain perception, and fine needles are more comfortable when administering dental local anesthesia. However, several studies have demonstrated no difference in pain perception based on needle gauge (1, 7–14).

Many dentists have developed their skills; therefore, they deliver virtually painless injections, even in difficult anatomic locations and in areas with varying tissue resistance (15–17). However, a totally painless injection is impossible to achieve in every circumstance. A variety of measures and devices have been suggested or used in order to ensure the success or comfort of the needle injection or even to provide an alternative to it (18–20). Sometimes the severity of the patient's anxiety obligates the

Significance

Our goal was to build a simple, easy to use, and affordable device to solve the problems in the field of pain and anxiety during dental injections. Therefore, in this study, we compared the telescopic-coated dental needles with the conventional dental needles regarding pre- and postinjection dental anxiety, pain perception, procedure tolerance, and anxiety about future injections.

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CONSORT Randomized Clinical Trial

dentist to use sedative-hypnotic and relaxing drugs such as nitrous oxide, barbiturates, and tranquilizers (21, 22) or even render the dental treatment under general anesthesia although these treatments are not totally acceptable psychologically for all patients and are not cost-efficient.

Our goal was to build a simple, easy to use, and affordable device to solve the problems in the field of pain and anxiety during dental injections. Therefore, in this study, we compared telescopic-coated dental needles with conventional dental needles in relation to pre- and postinjection dental anxiety, pain perception, procedure tolerance, and anxiety about future injections.

Materials and Methods

The subjects in this randomized clinical trial consisted of 60 healthy adult patients (men and women) attending the Department of Restorative Dentistry, Faculty of Dentistry, Kerman University of Medical Sciences, Kerman, Iran. A random number table was used for block randomization. The inclusion criterion was a need for restoration of posterior maxillary teeth under local anesthesia. Maxillary teeth were selected for supraperiosteal injections in all the subjects to minimize the chance of error because the administration of local anesthesia is different between the maxilla and the mandible. Patients were in good health and had not taken any medications that would alter their pain perception for the last 48 hours. Subjects who were allergic to lidocaine, had a history of significant medical problems, were pregnant, were unable to give informed consent, and were on central nervous system depressants were excluded from the study.

The patients were informed that 2 special anesthetic injection devices were being studied:

1. A conventional syringe with a standard needle
2. A conventional syringe with a recently designed telescopic-coated needle (patent number 85929)

No effort was made to control previous dental experience, but the presence of previous experience was noted for each patient. No patients had previously received any type of injection from the investigator. Dental injection anxiety surveys similar to those used by Krochak and Friedman (4) were used to quantify patients' anxiety levels before and after the administration of anesthesia (Table 1). After completing

TABLE 1. Dental Injection Anxiety Questionnaire

Dental injection anxiety questionnaire
Please respond to 6 of the following questions based on 4 statements that best represent your feeling.
Questions: How do you feel when
1 you make a dental appointment and believe you may need an injection?
2 you arrive at the office and the receptionist confirms you need an injection?
3 sit in the dental chair and see the injection syringe?
4 the dentist is preparing to administer the local anesthetic injection?
5 the dentist carefully administers the local anesthetic injection?
6 numbness is inadequate and the dentist prepares another injection?
Statement options:
• Not anxious, completely calm
• Mildly anxious, hardly bothered
• Somewhat anxious, in control
• Very anxious, continuous negative thoughts
• Extremely anxious, near panic

Reprinted with permission from Krochak and Friedman (4).

a preinjection anxiety survey, 1 experienced dentist (female) applied either the conventional or the telescopic-coated needle technique on a patient who had been randomly assigned in the clinical practice.

The result was 2 groups of 30 patients each. Both injections were given in essentially the same manner and in the same environment in relation to light and temperature. Once the target area of injection was reached, aspiration was performed by the usual thumb back pressure. After negative blood aspiration was confirmed, positive pressure was applied to the plunger, which was slowly increased while the administrator carefully monitored the patient for signs of any adverse sensation. In the case of the telescopic-coated needles, an anesthetic cartridge was placed in the syringe. The telescopic cover tubing was connected to the conventional syringe to cover the needle (Fig. 1A and B). A sterile cotton pellet impregnated with a topical anesthetic gel, 20% benzocaine topical anesthetic gel (Topex; Sultan, New York, NY), was attached to the head of the telescopic cover (Fig. 1A). With the telescopic-coated dental needles, injection was initiated by contact of a sterile cotton pellet to the soft tissue of the injection site for 60 seconds. Then, the injection continued for about 90 to 120 seconds. In the conventional group, topical anesthetic gel was applied before needle

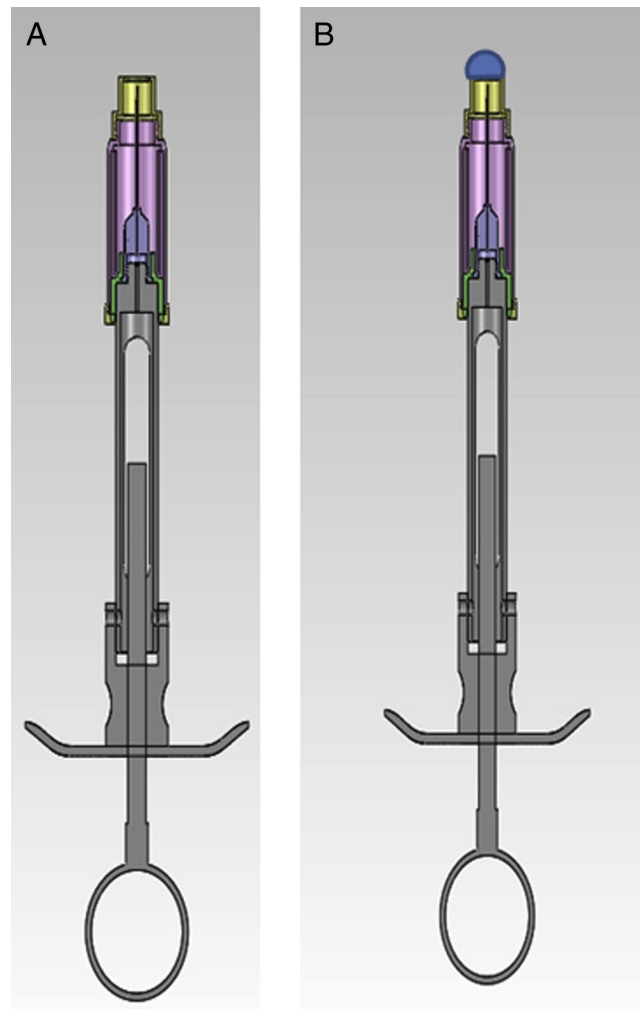


Figure 1. (A) The newly invented telescopic-coated dental needles. (B) The newly invented telescopic-coated dental needles with topical anesthetic gel in place.

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