

Bacteremia after piezocision

Zehra Ileri,^a Mehmet Akin,^a Emire Aybuke Erdur,^b Hatice Turk Dagi,^c and Duygu Findik^d

Konya, Turkey

Introduction: The aim of this study was to investigate the presence of transient bacteremia after a piezocision procedure. **Methods:** The sample consisted of 30 subjects (24 women, 6 men; mean age, 19.6 ± 0.7 years; range, 18.1-22.4 years) with the American Society of Anesthesiologists' physical status I. All patients had Class I skeletal and dental relationships and had fixed orthodontic treatment with the Damon system. The piezocision surgery was performed 1 week after the placement of the orthodontic appliances in all patients. Two 20-mL venous blood samples were collected before and 30 to 60 seconds after the first microincision using an aseptic technique. The samples were inoculated into BACTEC Plus aerobic and anaerobic blood culture bottles and were assessed in the BACTEC blood culture analyzer (Becton Dickinson Diagnostic Instrument Systems, Sparks, Md). The results were analyzed statistically using the McNemar test, with $P < 0.05$ indicating statistical significance. **Results:** No significant difference between the preoperative and postoperative samples was determined with respect to transient bacteremia ($P = 0.250$). No bacteremia was detected in the pretreatment samples, although *Gemella sanguinis*, *Streptococcus pluranimalium*, and *Streptococcus mitis/oralis* were detected in 3 postoperative blood samples. **Conclusions:** The piezocision procedure might be related to transitory bacteremia. Hence, orthodontists should consider the possibility of bacterial endocarditis in at-risk patients when piezocision is part of the treatment plan. (Am J Orthod Dentofacial Orthop 2014;146:430-6)

Bacterial translocation of oral microbial flora into the bloodstream can occur during dental operative procedures and routine daily activities, such as toothbrushing, flossing, and food chewing.¹⁻⁷ The relevant dental procedures are extractions, periodontal operations,¹ removal of a bonded expansion appliance,⁶ orthodontic stripping, mini-implant insertion, banding, debanding, and debonding.⁸⁻¹¹ Generally, microorganisms are eliminated within a few minutes by the reticuloendothelial system.¹ However, bacteremia can be dangerous for patients with abnormal heart valves or other cardiac abnormalities that predispose them to infective endocarditis.^{1,12}

In 2007, the American Heart Association issued a statement to update the recommendations for the prevention of infective endocarditis, stipulating that in patients with underlying cardiac conditions, prophylaxis

is recommended for all dental procedures that involve manipulation of gingival tissues, the periapical regions of teeth, or perforations of the oral mucosa.¹³ According to this, which reflects analyses of relevant literature about bacteremia, infective endocarditis prophylaxis for dental procedures should be recommended only for patients with underlying cardiac conditions.¹³ However, the studies regarding dental procedure-related bacteremia and infective endocarditis in the literature have been insufficient, as is the case for the piezocision procedure.

Increasing numbers of adults have been seeking orthodontic treatment,¹⁴ and a short treatment time has been a recurring request.^{15,16} To meet their expectations, a number of surgical techniques, including alveolar corticotomies, a combined interradiolar corticotomy and supra-apical osteotomy technique,^{17,18} periodontal ligament distraction,¹⁹ alveolar surgeries to undermine interseptal bone,²⁰ the corticotomy-facilitated technique,²¹ dentoalveolar distraction,²² micro-osteoperforations,²³ and piezopuncture,²⁴ have been developed to accelerate orthodontic tooth movement.

Corticision was introduced as a minimally invasive alternative to accelerate tooth movement. In this technique, a cortical incision is made by malleting a reinforced scalpel to separate the interproximal cortices transmucosally.^{25,26} To mitigate the patients' fear and discomfort from repeated malleting, Dibart et al^{15,27} suggested "piezocision," a process that uses an ultrasonic tool to

From Selcuk University, Konya, Turkey.

^aAssistant professor, Department of Orthodontics, Faculty of Dentistry.

^bResearch assistant, Department of Orthodontics, Faculty of Dentistry.

^cAssistant professor, Department of Medical Microbiology, Medical Faculty.

^dProfessor, Department of Medical Microbiology, Medical Faculty.

All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest, and none were reported.

Address correspondence to: Emire Aybuke Erdur, Selcuk University, Faculty of Dentistry, Department of Orthodontics, Konya, Turkey 42075; e-mail, dtaybuke@gmail.com.

Submitted, October 2013; revised and accepted, June 2014.

0889-5406/\$36.00

Copyright © 2014 by the American Association of Orthodontists.

<http://dx.doi.org/10.1016/j.ajodo.2014.06.009>

produce the incisions. This is a minimally invasive procedure that combines microincisions with selective tunneling, which allows for hard-tissue or soft-tissue grafting and piezoelectric incisions.^{15,27}

Although the piezocision procedure is less invasive because it involves microincisions through the periosteum and cortical alveolar incisions with a piezosurgery knife, it is likely to cause bacteremia. To our knowledge, no authors have investigated the relationship between odontogenic bacteremia and piezocision. Therefore, the purpose of this study was to evaluate the prevalence of bacteremia associated with piezocision in a sample of orthodontic patients. The hypothesis of our study was that piezocision influences the production of bacteremia.

MATERIAL AND METHODS

Before this study, a power analysis was performed to estimate the sample size. From the literature, the prevalence of bacteremia in preoperative samples (with similar techniques) was determined to be between 0% and 6.6% after dento-gingival manipulation.^{6,9,28-31} Our assumption of a 10% prevalence of bacteremia before the manipulation was taken by averaging the findings of other studies.^{6,9,28-31} It was assumed that an increase in the prevalence of bacteremia from an initial prevalence of 10% or less before the piezocision to 35% would have clinical importance.³⁰ At an alpha level of 5% and a power of 80%, 24 patients would be enough to allow us to detect at least a 25% difference in the prevalence of bacteremia before and after the piezocision.³² We decided to collect 30 patients after considering the possibility of potential losses from patient dropouts and sample contamination.

We received approval from the local research ethics committee of Selcuk University in Konya, Turkey, to collect blood samples for this prospective cohort study. All patients gave written, informed consent before participation. Thirty subjects (24 women, 6 men; average age, 19.6 ± 0.7 years) with the American Society of Anesthesiologists' physical status I and mild to moderate crowding who were scheduled to have nonextraction treatment were enrolled in this study. The study was conducted at the clinic of the Department of Orthodontics, Faculty of Dentistry of Selcuk University, over a 6-month period.

The irregularity index was used to assess incisor crowding.³³ The average irregularity index value of the subjects was 3.7 ± 0.35 , with a range of 1.4 to 4.7. Before fixed orthodontic treatment, all patients had visited the periodontology clinic and received instructions for maintaining general oral hygiene and cleaning their fixed orthodontic appliances. One operator (E.A.E.), who bonded

the brackets and treated the patients, evaluated their oral hygiene and gave scores for each patient as follows. If the patient had more than 5 areas with bleeding after brushing, the oral hygiene was assessed as poor (hygiene score 3); if there was a little bleeding, it was moderate (hygiene score 2); and if there were no areas with bleeding, the oral hygiene was assessed as good (hygiene score 1). According to this scoring, the patients who had oral hygiene scores of 1 were included in this study. Exclusion criteria were predetermined according to the study of Erverdi et al²⁸ and are listed in Table 1. Instructions were given to avoid food consumption and tooth brushing for 2 hours before the scheduled sampling session.

The piezocision surgery was performed 1 week after placement of the orthodontic appliance in all patients. After local infiltrative anesthesia (2 cc of epinephrine [Ultracain DS Forte Ampul; Sanofi Aventis Pharma, Istanbul, Turkey]), vertical microincisions were made between each tooth through the periosteum and the middle third of the root on the buccal aspects of the maxilla and the mandible using a number 15 blade. After stretching the vertical incisions with a periodontal probe and performing corticotomies safely, a piezosurgery knife (BS1 insert, piezotome; Satelec Acteon, Mericnac Cedex, France) was used to create the cortical alveolar incisions interproximally to a depth of approximately 3 mm. The incision areas that were not tunneled did not require suturing. The whole procedure was performed by an experienced specialist (M.A.). Gingival bleeding occurred in all patients, but this soft-tissue bleeding stopped normally by the end of the piezocision process (Fig).

To determine the incidence of bacteremia under basal conditions, a peripheral venous blood sample (20 mL) was drawn from each patient. The first blood sample was taken before the administration of anesthesia and the first incision. The second blood sample was taken within 30 to 60 seconds after the first piezosurgery knife insertion.³⁴ The cannula used for all patients was inserted into the antecubital fossa to facilitate blood sampling after disinfecting the area with alcohol and povidone iodine. The cannula was left in place and closed between the 2 samplings. Equal parts of each sample were injected into aerobic and anaerobic bacteriologic media bottles: BD BACTEC Plus Aerobic/F Medium (product number 442192; Becton Dickinson Diagnostic Instrument Systems, Sparks, Md) and BD BACTEC Plus Anaerobic/F Medium (product number 442193; Becton Dickinson Diagnostic Instrument Systems). They were immediately processed in the microbiologic laboratory.

The blood culture bottles were monitored in the BACTEC 9120 fully automated blood culture instrument

Download English Version:

<https://daneshyari.com/en/article/3116304>

Download Persian Version:

<https://daneshyari.com/article/3116304>

[Daneshyari.com](https://daneshyari.com)