

Acutely infected teeth: to extract or not to extract?*

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Abstract: Not only laymen but also dentists generally believe that extraction of acutely infected teeth should be avoided until the infection subdues by using systemic antibiotics. The aim of this study was to compare perioperative complications in routine extractions of acutely infected teeth with extractions of asymptomatic teeth. This prospective study was performed with 82 patients. Severe pain on percussion of the relevant tooth was considered as basic criteria for acute infection. The acutely infected teeth were labeled as the study group (n = 35) and the asymptomatic teeth as the control group (n = 47). The extractions were done using standard procedures. The amount of anesthetic solution used and duration of extractions were recorded. Postoperative severe pain and exposed bone with no granulation tissue in the extraction socket were indications of alveolar osteitis (AO). The level of statistical significance was accepted as 0.05. Symptoms that could indicate systemic response, including fever, fatigue, and shivering were not found. There was no statistically significant difference between groups in terms of AO, amount of anesthetic solution used, and duration of extraction. The presence of an acute infection characterized by severe percussion pain is not a contraindication for tooth extraction. Infected teeth should be extracted as soon as possible and the procedure should not be postponed by giving antibiotics.

Keywords: Tooth Extraction; Anti-bacterial Agents.

Introduction

It is a common belief not only in the public eye but also among dentists that extraction of acutely infected teeth should be avoided. As a result, patients use antibiotics with or without prescription, which contributes to increased health care spending and the formation of antibiotic-resistant bacteria.¹ The main concerns for dentists in extracting infected teeth are anesthesia failure, dissemination of the infection to adjacent areas, hematogenous spread, and increased risk of alveolar osteitis (AO).²

AO was first described in 1896.³ It is an inflammatory process in the bone that develops between 2–4 days following tooth extraction. Symptoms and findings include moderate or severe pain, loss of the clot from the extraction socket, exposed alveolar bone, and reddish gingiva around the socket.³ AO incidence varies from 1 to 4% in routine



extractions and it is ten times more common in mandibular molar extractions than extractions in the maxilla.^{4,5}

For almost 100 years, researchers have suggested that infection should be suppressed by antibiotics and the tooth should be removed later, while others recommend the extraction should be done immediately.^{6,7,8,9} All of them advocate their practices as the valid way for avoiding local and systemic spread of the infection.

Our aim was to compare perioperative complications in extractions of acutely infected teeth and asymptomatic teeth.

Methodology

This was a prospective study carried out between February 2017 and June 2017. An ethical committee approval was obtained (document number 2017/01). The patients were selected among healthy volunteers, referred to our institution for extraction of one mandibular molar (n = 212). The informed consents were obtained. Exclusion criteria were smoking, oral contraceptive use, any conditions affecting the immune system, and usage of antibiotics in the previous two weeks. Patients were also excluded if in panoramic radiograph, the tooth had a lesion that could be tumoral or cystic.

After excluding 130 patients, 82, aged between 15 and 79 years (mean 40.52 ± 15.46) met the study criteria. Percussion sensitivity was accepted as the criterion for acute infection, defined as severe pain when a dental mirror was dropped on the tooth from about 1 cm.

Patients with acutely infected teeth were labelled as "study group" (n = 35) and the asymptomatic patients as "control group" (n = 47). The null hypothesis of the study was "there is no significant difference between the acutely infected and asymptomatic lower molar teeth in terms of the complications that may occur during and after tooth extraction".

Surgical method

All the extractions were performed by a single operator. We used 4% Articaine and 1:100,000 epinephrine HCL as anesthetic solution. Inferior

alveolar nerve (IAN) and buccal nerve (BN) blockages were performed using 1.5 mL and 0.5 mL of solution, respectively. If the anesthesia failed, the same procedure was repeated. The amount of anesthetic solution used for each patient was recorded.

Numbness on half of the lower lip and feeling no pain when probing the periodontal space of the target tooth was accepted as a successful IAN blockage. The BN blockage was performed and the extraction was completed with sterile equipment and gloves. No surgical drapes, mouthwash, or skin antiseptic was used. Unless there was a radiographically confirmed granulation tissue, we did not curette the extraction sockets. We also did not package any medications into the wounds or suture. A sterile damp gauze was placed tightly on the extraction area and the patients were asked to bite it for 20 minutes. Extraction durations were noted for each patient.

All patients were given postoperative instructions. In case of a complication, they were asked to return to our clinic and not to use antibiotics on their own.

Postoperative evaluation of systemic condition

All the patients were seen by us on the first and second post-extraction days for assessing the systemic signs of fever, fatigue, and shivering.

Postoperative evaluation of the extraction wound

If a patient presented severe pain, we recorded the onset time and characteristic of the pain. In intraoral examination, the absence of granulation tissue was used as a sign of healing and exposed alveolar bone was used as a sign of AO.

To compare the rates of AO, chi-squared test with Yates correction was employed. Shapiro-Wilk normality test was performed on the data for the amount of anesthetic solution used and the duration of extractions. Since the data did not have a normal distribution, nonparametric Mann Whitney U test was used. The level of statistical significance was 0.05 and SigmaPlot 11.0 (Systat Software, Inc., San Jose, Calif.) program was used for statistical analyses.

Results

No patient reported fever, fatigue, and shivering, which indicate systemic involvement. No statistically significant difference was found in amount of anesthetic solution used, duration of extractions, or AO incidence ($p>0.05$). The results of statistical evaluation are shown in Table.

Lymphadenopathy was present in all patients of the study group, because we extracted acutely infected teeth. For the patients of the study group that showed swelling and signs of cellulitis, the tooth was extracted when mouth opening was adequate.

Discussion

There is a tendency among dentists to prescribe antibiotics unnecessarily. Many dentists follow the anecdotal information of colleagues instead of guidelines and tend to give antibiotics when they are uncertain.^{10,11} Another factor is that patients are demanding antibiotics, even for a simple toothache. As a result, after the analgesics, antibiotics are the second most prescribed medications in dentistry.¹² Moreover, this practice is prevalent not only for tooth extractions. According to a study conducted by the American Endodontics Association, 33% of dentists routinely prescribe antibiotics before treatment in case of necrotic pulp or acute apical abscess, even though there is no swelling. This rate reaches 61-88% in cases with swelling.¹³

The first study about extraction of acutely infected teeth was published in 1937 and the authors recommended the control of the infection as the first step.⁶ After that, extraction could be done safely.⁶ They claimed immediate extraction could cause

central nervous system complications, cavernous sinus thrombosis, and brain abscesses.^{7,14} However, subsequent studies emphasized surgical intervention as the initial procedure. Immediate removal of the source of infection through tooth extraction or endodontic treatment has been advocated.^{9,15}

Another reason for dentists not to intervene in infected teeth is the fear of anesthesia failure. Some local changes may occur due to infection and inflammation.¹⁶ According to the common belief, the acidity increases in the inflamed area preventing local anesthesia but this is actually an unproven theory.¹⁷ Indeed, anesthesia success rates in acutely infected teeth are not low, reported as 65-69% for infiltration anesthesia and 58-76% for inferior alveolar nerve blockage.^{18,19}

Another concern of dentists is the risk of developing bacteremia and septicemia after the extraction of acutely infected teeth. However, a tooth with pulpitis is already a source of bacteremia. Despite the usage of antibiotics, the bacterial colonization will still occur unless pulp extirpation or extraction is performed. Thus, the delay will lead to the prolongation of the bacteremia period. However, dentists must be more careful in immunocompromised patients. A few more steps can be added to the procedure in such patients, including consulting a specialist or performing prophylaxis. In our study, there was no systemic complication indicative of septicemia or systemic involvement post-operatively.

The incidence of AO varies from 1 to 4%. It has been shown that no AO does not occur in sterile sockets and it can be argued bacterial colonization plays an important role in the etiology of AO.²⁰ Thus, AO might be expected more frequently in acutely infected teeth because of bacterial colonization. However, our results did not confirm this thought.

The etiology of AO is multifactorial. The main problem is the loss of the clot at the extraction site by mechanical or biological means. AO is more common after mandibular extractions probably because the mandible bone is denser and has less blood supply than the maxilla.^{4,5} In addition, the compactness of the bone may cause extractions to take longer, be more traumatic, and contribute to

Table. Parameters evaluated in the study, median values and p-values.

Parameter	Study group (median)	Control group (median)	p- value
Amount of anesthetic solution used	1.5 mL	1.5 mL	0.75
Duration of extraction	4 min	5 min	0.98
Alveolar osteitis	7	8	0.96

AO development. Because of that relatively higher risk of AO in the mandible, we confined the study with mandibular molars.

Conclusion

The presence of an acute infection characterized by severe pain on percussion is not a contraindication for tooth extraction. Infected teeth should be extracted as soon as possible and the procedure should not

be postponed by giving antibiotics for pain relief or infection controlling. Immediate extractions prevents the development of more serious infections and unnecessary use of antibiotics. Antibiotics should not be considered as an alternative for surgical or endodontic intervention.

All patients in this study were healthy and this can be considered a limitation. In future studies, the inclusion of systemically compromised patients might contribute to the scientific literature.

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