

Case report

CURATIVE MANAGEMENT OF ALVEOLAR OSTEITIS AFTER TOOTH EXTRACTION 46 IN PATIENTS WITH SMOKING HABITS

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ABSTRACT

Background : Alveolar osteitis is the most common complication after tooth extraction. Many factors can cause alveolar osteitis, one of which is smoking. The carbon monoxide content in cigarettes will cause a decrease in oxygen in the blood, thus slowing wound healing. Management of alveolar osteitis can be done radically or non-radically. Radical management is done by creating a new wound followed by adequate NaCl irrigation, while non-radical management can be done by applying iodoform gauze and changing the gauze every day for 6 days. **Case Report** : A 26-year-old man came to the clinic complaining of severe pain in the gums after a tooth extraction 5 days ago. The patient admitted to having a habit of smoking 1 pack per day and smoking after the extraction. Intraoral examination showed a grayish area in the socket that had not closed in the area of tooth 46 with pain on palpation and halitosis. On subjective examination, the pain scale using a numeric rating scale showed a scale of 8. **Case Management** : Asepsis and infiltration anesthesia were performed on the buccal and lingual areas of tooth socket 46. Curettage was performed on the post-extraction socket that had alveolar osteitis. The severe pain complained of gradually subsided after 1 week showing a scale of 1 with a numeric rating scale after curettage and NaCl irrigation. **Conclusion** : Smoking after extraction is one of the etiological factors of alveolar osteitis. Curative treatment with curettage shows good results in alveolar osteitis. Providing communication, information, and education to patients is very important to reduce the risk of alveolar osteitis..

Keywords: Alveolar Osteitis, Extraction, Curretage, Smoking, Pain, Wound Healing

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INTRODUCTION

Alveolar osteitis is one of the most common complications following tooth extraction. Acute inflammation resulting from delayed healing due to the dislodged blood clot is the cause of alveolar osteitis¹. Alveolar osteitis can be characterized by severe, disturbing pain that is not easily relieved by analgesics, the presence of food residue in the socket, halitosis, and mild inflammation in the gingival area around the socket². The average occurrence of alveolar osteitis is on the 3rd to 5th day after extraction. The prevalence of alveolar osteitis worldwide is 0.5 to 68.4%. The incidence of alveolar osteitis in Indonesia reaches 0.5 to 5% when compared to other post-extraction complications³.

There are many factors that can influence the occurrence of alveolar osteitis, namely the patient's systemic condition, poor oral hygiene, the level of difficulty during extraction, and smoking⁴. The bad habit of smoking is one of the factors that can cause alveolar osteitis. Research conducted by Younis and Hantash stated that the incidence rate of alveolar osteitis is higher in smokers with a prevalence of 12% compared to non-smokers. Komatulaini also reported that patients with a smoking habit have a

4x greater risk of developing alveolar osteitis compared to patients without an alveolar osteitis habit⁵.

Cigarettes contain many chemicals that can be harmful to the body, especially in the post-extraction socket area. These chemicals include nicotine, tar, and carbon monoxide. Nicotine can decrease blood flow, thus reducing wound healing⁶. Nicotine also increases blood viscosity by decreasing fibrinolytic activity and increasing platelet adhesion. Furthermore, nicotine can weaken the ability of macrophages to ingest pathogens in the post-extraction socket⁷.

Carbon monoxide can also cause oxygen deprivation, or hypoxia, in the post-extraction socket area. This occurs because carbon monoxide binds to red blood cells 200 times more than oxygen, reducing the oxygen carried by red blood cells in the post-extraction socket area. Decreased blood oxygen levels in the wound area can inhibit the healing process in the post-extraction socket area. Hydrogen cyanide is known to be a chemical found in cigarettes that can disrupt cellular oxygen metabolism and harm tissue. Cigarette smoke can also cause a burning sensation, leading to vasoconstriction of blood vessels and reducing polymorphonuclear fibrils

(PMNs) activity in the post-extraction socket area⁸.

Alveolar osteitis can be prevented by maintaining good oral health and hygiene after tooth extraction. Some examples of behaviors that can prevent alveolar osteitis include eating a nutritious diet, getting 7-8 hours of sleep per day, not smoking, and brushing your teeth twice a day, in the morning after breakfast and at night before bed⁹.

A tooth socket wound that doesn't close allows the entry of pathogenic microorganisms, which can cause alveolar osteitis. A post-extraction socket infected with bacteria can cause oral discomfort. Wounds from tooth extractions are often painful and interfere with eating¹⁰. The presence of infection in the post-extraction socket can increase the occurrence of alveolar osteitis¹¹.

Pain management in alveolar osteitis can be performed using radical and non-radical methods. Radical alveolar osteitis treatment involves curettage and saline irrigation of the post-extraction area to remove remaining root fragments and granulation tissue remaining in the socket. Meanwhile, non-radical alveolar osteitis treatment involves inserting iodoform gauze strips into the socket and changing them daily

for 6 days¹⁴.

CASE REPORT

A 26-year-old male patient presented to the Soelastri Dental and Oral Hospital clinic complaining of severe pain after a tooth extraction five days ago. The extraction had no complications. The patient admitted to smoking four hours after the remaining root was extracted. He has been smoking since he was 17 years old, consuming one pack per day.

The patient's medical history after the extraction included the antibiotic amoxicillin 500 mg three times daily and the analgesic mefenamic acid 500 mg three times daily to prevent pain after the anesthetic wore off. However, the patient reported continued pain despite taking the prescribed medication regularly and completing the course. The patient reported the pain began on the third day and peaked on the fifth day, with a pain intensity rating of 8 on a scale of 1–10, characterized by throbbing and persistent pain that radiated to the head and neck.

Extra-oral examination did not reveal any abnormalities, intra-oral examination found an unclosed socket in the post-extraction socket area of the remaining root of tooth 46 and the surrounding soft tissue showed signs of

inflammation and swelling, with the gingiva discoloration becoming slightly gray. Palpation tests were performed to check the condition of the soft tissue in the area around the post-extraction socket and found pain during palpation.



Figure 1. Clinical appearance of the grayish socket of tooth 46 after 5 days post extraction

Based on the results of the objective examination that has been carried out on the patient, a diagnosis of alveolar osteitis was obtained in the area of tooth 46. The treatment plan that will be carried out is the management of alveolar osteitis by performing curettage and administering medication, then a check-up will be carried out a week later.

CASE MANAGEMENT

Informed consent was obtained for the treatment plan regarding alveolar

osteitis, including the diagnosis, etiology, risk factors, precautions to avoid, and treatment. After the patient completed the consent form, asepsis was performed, followed by buccal and lingual infiltration anesthesia in the post-extraction socket area using 1 cc of lidocaine HCl in each area. Irrigation was performed using saline NaCl until the socket was clean of debris, followed by curettage using a surgical curettage to remove all granulation tissue and fresh blood. Stopping the bleeding is done by instructing the patient to bite on cotton for 30 minutes. The patient was given the same prescription as before: amoxicillin 500 mg three times daily and mefenamic acid 500 mg three times daily. The patient was advised to continue taking the medication regularly and finish it and to avoid factors that could cause recurrence of alveolar osteitis, such as smoking, after the procedure. The patient was scheduled for a follow-up one week after the procedure.

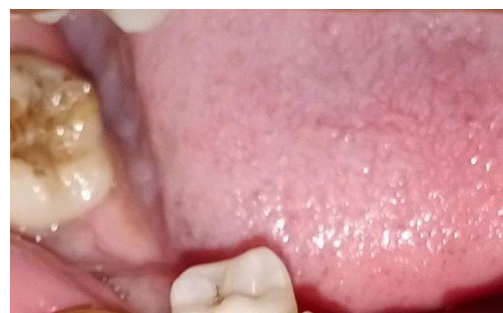


Figure 2. Clinical appearance of tooth 46 after 1 week post procedure

At a follow-up visit one week after the procedure, the patient reported gradually decreasing pain. An intraoral examination revealed a mucosa-colored socket that had closed, with no signs of inflammation or swelling in the surrounding tissue. The patient was advised to maintain good oral hygiene, reduce smoking, and consult a dentist immediately if any other symptoms develop.

DISCUSSION

The reported case is an example of alveolar osteitis in a patient due to smoking after a tooth extraction. Complications often arise without the patient being aware of it, but are only realized when the pain becomes unbearable. Alveolar osteitis can cause exposure of the alveolar bone due to the socket not yet closed, making it easily irritated by food debris or bacteria. Irritation in the socket that has not yet closed can cause severe pain, usually described as throbbing by the patient. This severe pain can radiate to the face and head, causing discomfort and disrupting daily activities. In addition to severe pain, the symptoms of alveolar osteitis experienced by the patient are characterized by halitosis. Bad breath or

halitosis is also another symptom of alveolar osteitis, this is caused by the accumulation of bacteria and necrotic tissue in the socket¹¹.

The pathogenesis of alveolar osteitis may begin with osteoblast necrosis. Osteoblast necrosis can trigger fibrinolytic activity, which can lyse the blood clot that would otherwise form after an extraction. The blood clot can dislodge because the osteoblasts undergo necrosis and lose their ability to metabolically integrate with the blood clot¹¹.

Alveolar osteitis is essentially an inflammatory condition resulting from the loss of a blood clot after tooth extraction. If not treated promptly, this condition can progress to osteomyelitis through several pathophysiological stages. When a blood clot fails to form or undergoes premature lysis, the alveolar bone becomes exposed and loses its natural protection against bacterial contamination. This exposure allows microorganisms from the oral cavity to enter and accumulate on the bone surface. Continued bacterial accumulation can lead to impaired blood circulation within the bone. In addition, local vasoconstriction and blood vessel thrombosis can increase the risk of ischemia, which reduces oxygen levels in the bone tissue¹⁴.

Due to reduced blood supply, bone tissue undergoes necrosis. Necrotic bone tissue becomes an ideal environment for bacterial growth. Bacterial infection can spread through the bony canal system and medullary space, thus developing osteomyelitis. Thus, the mechanism from alveolar osteitis to osteomyelitis involves bone exposure, bacterial colonization, ongoing inflammation, vascular disruption, bone necrosis, and the spread of infection to deeper bone tissue¹⁴.

Etiological factors must be considered to prevent alveolar osteitis. In this case, smoking is the primary etiology of alveolar osteitis. Cigarettes can disrupt blood flow for socket healing. The carbon monoxide in cigarettes can also reduce oxygen levels in the socket, slowing socket healing and causing recurrence of inflammation¹⁵. Hot cigarette smoke is also a factor in alveolar osteitis. Hydrogen cyanide is also known to disrupt cellular oxygen metabolism and can worsen the condition of the socket after extraction. Activities such as smoking can cause ischemia in the socket area after extraction. Lack of blood supply to the injured area results in a lack of immune cell distribution through the capillaries to begin absorbing necrotic osteoblasts. This ischemia can prevent the re-formation of a

blood clot. Necrotic bone cells are exposed and unprotected for several days, causing acute pain¹¹.

The management of alveolar osteitis in this case used a radical technique, considering the indications and considerations of severe and persistent pain, an open socket with debris, no visible granulation tissue formation after several days of observation, and the presence of high-risk factors such as heavy smoking. Radical techniques have advantages such as removing necrotic tissue and debris with curettage, stimulating new blood clot formation, thus accelerating the wound healing process, and reducing the risk of secondary infection¹⁶.

CONCLUSION

Dentists need to explain post-extraction communication, information, and education to patients to minimize complications. Alveolar osteitis is one of the post-extraction complications. The most common triggering factor for alveolar osteitis is smoking. Alveolar osteitis requires appropriate and prompt treatment before the infection spreads and increases pain. Curative management in this case is considered effective in treating smoking-induced alveolar osteitis

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