



Thoughts and Suggestions on Subcutaneous Emphysema in the Process of Dental Preparation: A Case Report

Yuan Xin Ming^{1,*}, Florenly¹, Liu Chao²

¹Clinical Dentistry, Specialization of Dental Medicine, Faculty of Medicine, Dentistry, and Health Science, University Prima Indonesia, Medan, Indonesia

²Clinical Medicine, Specialization of Surgery, Faculty of Medicine, Dentistry, and Health Science, University Prima Indonesia, Medan, Indonesia

Email address:

yuanxinming2023@163.com (Yuan Xin Ming), liuchao1838044@163.com (Liu Chao)

*Corresponding author

To cite this article:

Yuan Xin Ming, Florenly, Liu Chao. Thoughts and Suggestions on Subcutaneous Emphysema in the Process of Dental Preparation: A Case Report. *International Journal of Clinical Oral and Maxillofacial Surgery*. Vol. 9, No. 2, 2023, pp. 9-12. doi: 10.11648/j.ijcoms.20230902.11

Received: March 16, 2023; **Accepted:** April 2, 2023; **Published:** November 9, 2023

Abstract: *Background:* Hypodermal emphysema is caused by air or other gases penetrating into subcutaneous or submucosal tissue. The swelling caused by subcutaneous emphysema is relatively limited. The gas can usually be absorbed by itself and has a better prognosis. *Research methods:* Through deep learning about the clinical manifestations, diagnosis and treatment of oral emphysema. At the same time, we summarize our experience, learn lessons, and reduce the incidence of subcutaneous emphysema. This study is from a 43-year-old female patient who suffered jaw facial emphysema during the preparation of the root canal of the lower left anterior molar. Through this study, let's explore lessons learned and lessons together. *Objective:* Through the study of the manifestations, mechanism and treatment of subcutaneous emphysema of the face. Through this study, we can learn that dentists operate gently during treatment to avoid subcutaneous emphysema, hematoma, hematoma and other complications during treatment. When stomatologists develop subcutaneous emphysema, hematoma, hematoma and other complications during treatment operations, actively deal with, comfort patients, and follow up regularly. *Results:* In this study, we studied the complications of subcutaneous emphysema in a 43-year-old woman during dental preparation. The formation mechanism of subcutaneous emphysema in patients is caused by the use of surgical instruments by our doctors during the treatment. The maxillofacial manifestations are local emphysema. We actively deal with it symptomatically and recover well in prognosis.

Keywords: Teeth, Dental, Dental Preparation, Subcutaneous Emphysema, Hematoma, Complications, Stomatology, Surgical Treatment

1. Introduction

Hypodermal emphysema; However, if it is not handled properly, serious complications such as dyspnea and infection will occur, and even life-threatening [1]. The earliest report of subcutaneous emphysema after stomatological treatment can be traced back to 1900. It is more common after the third molar extraction of the mandibular impact, and it is relatively rare to appear in the process of dental preparation treatment [2]. The author received a patient who had subcutaneous emphysema during the preparation process of the lower left anterior molar. We can learn a lot from this thinking, and we can also learn a lot from this study. For stomatologists, it is very common to

operate dental extraction, root canal therapy and other therapeutic operations, but intraoperative complications cannot be avoided. We can have complications such as maxillofacial emphysema, hematoma, hematoma, infection, bleeding and other complications during the operation. So we need to fully explain it to the patient before the operation; and the operation is gentle during the operation. We need to explain to the patient what may occur during the operation. When there is emphysema, hematoma, hematoma, infection, bleeding, etc. on the jaw face, how do our doctor deal with it and follow up later. In this way, we will explain the necessity of surgery before the operation, intraoperative complications, how do our doctor deal with complications, and follow up later. Finally, the operation is performed after the patient obtains consent and signs informed

consent. For every stomatologist, you must fully understand the importance of periodontal attachment for tissue closure under the oral mask. The operation is gentle, and keep in mind violence. When intraoperative complications cannot be avoided, blood vessels, nerves and bone injuries are treated in time to reduce sequelae.

2. Case Presentation

2.1. Case Data

The patient, female, 59 years old, came to our hospital on October 23, 2020. The pain in the lower left posterior tooth required treatment. Due to periodontal problems, the 27th degree of loosening. Our doctor removed 27 under local anesthesia on the same day. Because the CBCT examination found that 34 had exposed the marrow due to the wedge defect and had clinical symptoms, as shown in Figure 1. Finally, the patient made an appointment to treat 34 on November 6, 2020. The root canal treatment ended on November 17, 2020, and the root was intact, denying the history of systemic diseases and drug allergies. On November 24, 2020, the patient came to our hospital to repair the crown of 34.

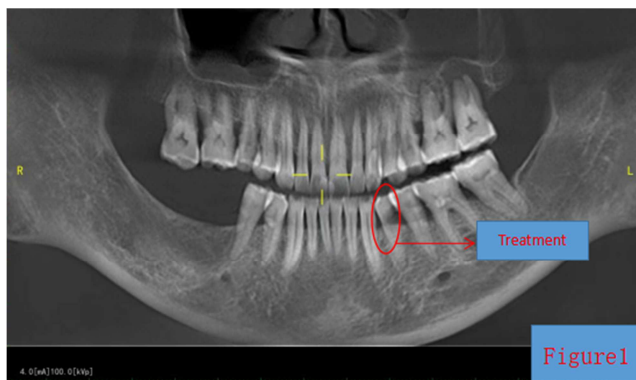


Figure 1. The patient has an operation pointer.

2.2. Clinical Examination

The lower left anterior molar crown is intact, and a large number of resin fillings can be seen; the visit is negative, there is no cold and hot irritation pain and tapping pain, the teeth are not loose, the adhesion of the gingival contraction, and there is redness and swelling in the gums. Imaging examination: X-rays show that the filling material can be seen in the root canal of 34 teeth, the filling density is poor, and the core image of the pile can be seen in the upper part of the root canal.

2.3. Surgical Treatment Process

Remove the temporary seal and fiber pile preparation bonding after disinfection, towel laying, and local anesthesia are satisfied. The electric knife repairs the gums at the wedge-shaped defect. The dental gas motor is used for dental preparation. At the end of the dental preparation, the surgeon found that the patient's left cheek is red. Heat, swelling and other manifestations. The patient has no symptoms. The

treatment doctor immediately stopped the operation. The examination found that the patient's left cheek was swollen, the swelling was palpated with twisted pronunciation, the tenderness was obvious, and the left mandibular mucosa was swollen. The patient had no dyspnea, no dizziness, palpitations and other symptoms.

2.4. Postoperative Diagnosis

subcutaneous emphysema in the lower left cheek, as shown in Figure 2.

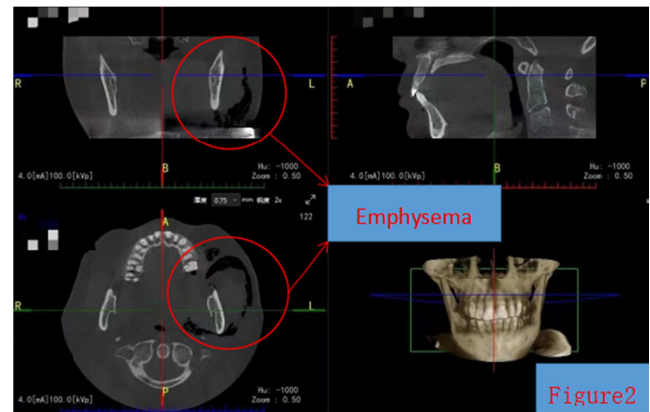


Figure 2. The formation of emphysema.

2.5. Treatment

Preparation for temporary crown repair, gum margin periodontal dressing closed, preventive use of antibiotics, metronidazole take 0.2 g each time, 3 times a day; amoxicillin is taken orally 0.5 g each time, 3 times a day, the dosage is one week.

2.6. Patient Follow-up and Re-examination

The patient's follow-up the next day, the examination found that the swelling did not progress, the periodontal dressing covered the gum edge, and continued to take oral anti-inflammatory drugs. After 7 days, the patient re-examined again, the swelling of the cheek disappeared, and the left face of the palpation The gums of the affected teeth are not red and swollen, and the wound heals well. Remove the temporary restoration, digitally scan the model, and repair the all-ceramic crown. There is no abnormality left, and the recovery is good, as shown in Figure 3.

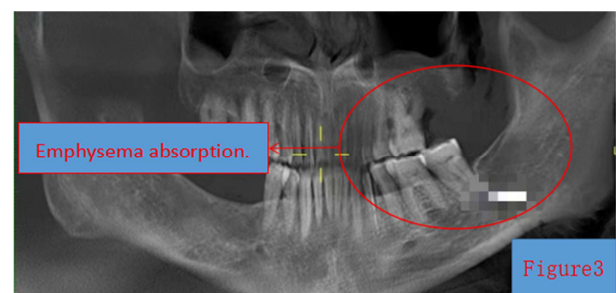


Figure 3. The patient followed up several re-examination X-pieces after treatment.

The schematic diagram of the mechanism of the formation of subcutaneous emphysema, hematoma and emphysema in the maxillofacial face of this study, as shown in Figure 4.

The mechanism of subcutaneous emphysema in our study.

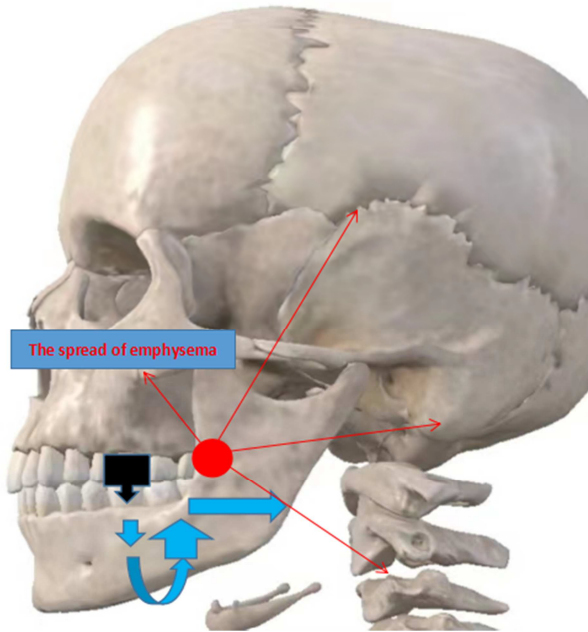


Figure 4. Schematic diagram of the mechanism of the formation of subcutaneous emphysema, hematoma and emphysema in the patient's maxillofacial.

3. Discussion

Hematoma, emphysema and hematoma are caused by various external forces. There are rupture of blood vessels, gas enters the tissue, and finally forms cavity holes and tumors full of blood, blood and gas. When we operate treatment, we need differential diagnosis when this hematoma, emphysema and hematoma occurs. First of all, cellulitis refers to extensive, diffuse and purulent inflammation of skin and subcutaneous tissue caused by *Staphylococcus aureus*, hemolytic streptococcus or rot bacteria [3]. Then there is an allergic reaction, which refers to the tissue damage or dysfunction of an immune organism when it is once again stimulated by the same antigen. The reaction is characterized by rapid attack, strong response and rapid subside; vascular neurosema is a limited non-concave edema that occurs in loose tissue. Finally, the characteristic of subcutaneous emphysema is twisted pronunciation when palpating the swelling site. Imaging can further confirm and determine the scope of subcutaneous emphysema [4]. Once subcutaneous emphysema occurs, it must be diagnosed quickly. Do not blindly squeeze the swollen area to minimize the possibility of gas diffusion into the surrounding space [5]. Because the air entering from the mouth may carry bacteria that cause cellulitis, patients diagnosed with subcutaneous emphysema should be treated with antibiotics. In addition, infections in potential parts of

subcutaneous emphysema develop faster than ordinary infections, and the preventive use of antibiotics can reduce the risk of secondary infections and serious complications. In order to prevent more air from flowing, oral activity, such as bulging or playing musical instruments, should be reduced. Most subcutaneous emphysema usually subsides spontaneously within 3 to 5 d and fully recovers within 7 to 10 d. For patients with emphysema spreading to the neck and chest, causing dysphagia, dyspnea and chest pain, they should stay in bed and take oxygen. Reduce the partial pressure of nitrogen in the blood by inhaling oxygen to promote air absorption. If necessary, please consult the corresponding department to avoid delaying the disease. It is important to fully understand the etiology, clinical manifestations, diagnosis and treatment measures related to subcutaneous emphysema to prevent its occurrence and development. Subcutaneous emphysema in stomatology is relatively rare. Occasionally after tooth extraction, it is also reported that V-type hole repair, sandblasting after tooth cleaning, mandibular fracture, and after dental laser treatment [6]. Analyzing the causes of subcutaneous emphysema in this case, the author believes that it is caused by many factors. During the preparation of the middle teeth, the order of the trimming gingival margin is improper, and the lack of understanding of periodontal attachment is insufficient. It is reported that subcutaneous emphysema is caused by the destruction of the integrity of the mucosa in the mouth, coupled with the increase of local pressure in the mouth, causing the gas to enter the deep fascia here. The most common is caused by high-speed turbine tooth extraction [7]. Subcutaneous emphysema after tooth extraction is often manifested as facial and neck swelling immediately or within a few days after surgery, and there is a typical twist pronunciation for palpation. It usually involves the gap between connective tissue in the face and neck. If it is further enlarged, it enters the mediastinum through the anterior cervical muscle space, and enters the soft tissue around the eyelids up through the cheek space [8]. Mediastinal emphysema is characterized by dyspnea, hoarse voice, chest pain or back pain. The gas is bacterial and can cause secondary infection in the closed cavity of the body, leading to necrotizing fasciitis and mediastinal inflammation. Under the premise of opening the wound, the gas should be squeezed from bottom up. After the operation, the wound should be tightly stitched to facilitate the continuous discharge of the gas and the exudate to reduce tissue swelling. Early local cold compresses for emphysema to prevent diffusion, apply a hot compress after 48 hours to promote absorption, and apply antibiotics to prevent infection. Limited emphysema can be absorbed by itself without special treatment. It is also reported in the literature that the use of an air gun to dry the root canal is also one of the common causes of subcutaneous emphysema [9]. When subcutaneous emphysema occurs, the patient will feel pain and swelling discomfort. The swelling part can touch the twist pronunciation, and some patients will also have temporary neurosensory abnormalities [10-14]. Usually, the swelling is relatively limited, but if it is not handled properly, the gas can

spread along the space between loose connective tissue to the neck, mediastinum and other parts, causing serious complications such as dyspnea, pneumothorax, infection, [15] etc. In clinical examination, subcutaneous emphysema needs to be differentiated with hematoma, cellulitis, allergic reaction, vascular neuroedema, etc [16-18]. Fully understand the mechanism and principle of subcutaneous emphysema, the tissue characteristics of periodontal mucosal tissue, standardize the clinical operation process, and avoid the occurrence of subcutaneous emphysema. Close the air inlet in time when subcutaneous emphysema occurs to avoid the aggravation of the emphysema. In future treatment, the operation should be standardized to avoid accidents.

4. Conclusion

Our stomatologists must be proficient in common surgical treatments. Before any operation, we need to fully communicate with patients and their families about the need for surgical treatment. We need to explain the possible complications during the operation. We can have complications such as maxillofacial emphysema, hematoma, infection, bleeding and other complications during the operation. When there are emphysema, hematoma, hematoma, infection, bleeding, etc. on the jaw face, how does our doctor deal with it and follow up later? Finally, the operation is performed after the patient obtains consent and signs informed consent.

Author's Statement

This study is approved by the author, and its case data is used for academic research. The research data is provided by Yuan xin ming.

Yuan xin ming: Write a paper.

Florenly (MD, PHD) and Chao Liu: Statistics, review essays and paper drawing.

Conflicts of Interest

All authors have no conflicts of interest.

References

- [1] Clinical report of Kang Xuedong's root filling with subcutaneous emphysema. *Journal of Inner Mongolia Medicine*, 2020, 38 (7): 609.
- [2] Zhang Lu, Wang Min, Zhou Tian. Nail preparation for 1 case of subcutaneous emphysema [J]. *Journal of Endodontics*, 2004, 14 (4): 238. DOI: 10.3969/j.issn.1005-2593.2021.04.019.
- [3] Feng Lin. A case of subcutaneous emphysema after wedge-shaped defect filling [C]. *Compilation of papers of the Third National Clinical Technology Seminar on Endodontics*. 2022.
- [4] Su Xianshuang, Sun Zhaohong. 1 case of upper lip emphysema after root canal preparation [J]. *Journal of Endodontics*, 2002, 12 (5): 283. DOI: 10.3969/j.issn.1005-2593.2021.05.024.
- [5] Hu Weiping, Zhang Guoliang. 1 case of facial subcutaneous emphysema caused by anterior root control [J]. *Journal of Harbin Medical University*, 2020 (03): 245.
- [6] Fleagle J. Subcutaneous emphysema following dental care of a patient with ventriculoperitoneal shunt: Case repo Rt. *Spec Care Dentist*. 2020; 40: 488-492. <https://doi.org/10.1111/scd.12490>.
- [7] Tan Kaixuan, Li Fan, Zhang Lijuan, Li Shanshan, Lu Jie, Zhang Ying, Yang Fang. 1 case of subcutaneous emphysema with root canal retreatment [J]. *International Journal of Oral Medicine*, 2020, 47 (5): 563-566. DOI: 10.7518/gjkq.2020099.
- [8] Zhao Jihong, Editor-in-Chief. New Technology of Modern Alveolar Surgery [J]. *Journal of Practical Oral Medicine*, 2016, 32 (3): 353-353. DOI: 10.3969/j.issn.1001-3733.2022.03.017.
- [9] Wang Xiaofang, Hu Weiping. 1 case of facial subcutaneous emphysema caused by anterior root control [J]. *Chinese clinician*, 2022 (07): 64.
- [10] Du Juan. A case of subcutaneous emphysema was misdiagnosed as vascular neuroedema [J]. *Journal of Clinical Dermatology*, 2019, 40 (10): 594.
- [11] Sun Dong, Zhou Yekun. 1 case of subcutaneous emphysema in the elderly with root canal treatment [J]. *Chinese Journal of Geriatric Oral Medicine*, 2020 (04): 43.
- [12] Zhang Liyan. 1 case of maxillary palatal process fracture with subcutaneous emphysema of the face and neck [J]. *Journal of Forensic Medicine*, 2021, 27 (04): 319.
- [13] Zhao Yuanqing, Zhou Min, Zhao Tianyou. 1 case of eye and subcutaneous emphysema caused by pinching nose and air blowing of the pharyngeal tube [J]. *Journal of the School of Basic Medicine of Shandong University*, 2023 (06): 335.
- [14] Shi Yingying, Zhao Jianshe. Bronchial foreign bodies cause mediastinal and subcutaneous emphysema of the neck [J]. *Chinese Journal of Clinical Medical Imaging*, 2022 (S1): 92.
- [15] White osmanthus plum. 1 case of facial subcutaneous emphysema caused by air gun blowing [J]. *Journal of Dental Pulp Periodontal Diseases*, 2020 (02): 7.
- [16] Fan Yongfeng. 1 case of hydrogen peroxide flushing root canal with subcutaneous emphysema [J]. *Journal of Shanxi Medical College*, 2023 (03): 395.
- [17] Hu Zuoliang. A case of eye and subcutaneous emphysema of the eye and subcutaneous emphyllation of the pharyngeal tube [J]. *Journal of Clinical Otolaryngology*, 2020 (02): 74.
- [18] Zheng Shaobo. Facial subcutaneous emphysema during the treatment of periodontal disease [J]. *Foreign medical reference materials. Brostomatology fascicle*, 2020 (03): 128.