

## 어묵꼬치에 찔려 발생한 안면부 피하기종: 증례보고

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### - Abstract -

### A Facial Subcutaneous Emphysema after Using a Fish Cake Skewer: Case Report

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Cervicofacial subcutaneous emphysema is a rare complication mainly resulting from dental procedures. The majority of cases are self-limiting and benign in clinical nature. However, although entry sites may be quite small and superficial, it can result in potential respiratory difficulties, such as pneumothorax and pneumomediastinum. We present the first case in which facial subcutaneous emphysema developed in a 6-year-old boy following use of a fish cake skewer while eating. [ J Trauma Inj 2015; 28: 206-210 ]

**Key Words:** Subcutaneous emphysema, Trauma

## I. Introduction

Cervicofacial subcutaneous emphysema (CSE) is mainly associated with maxillofacial trauma, infection, tracheostomy, general anesthesia and radical neck dissection surgery.(1) This clinical condition also has been reported as a rare complication of dental procedures in recent years.(2) CSE occurs when air enters into the fascial planes of connective tissue in the head and neck and becomes trapped in

the subcutaneous layer of these areas. Once air enters the deep soft tissue under high pressure, it will follow the path of least resistance, spreading to more distant spaces, with potential extension into the thorax, pericardium and mediastinum.(3) While most cases are self-limiting and follow benign clinical courses, life-threatening complications such as pneumothorax, mediastinitis and air embolism may occur if the emphysema is extended.(3) If clinicians are unaware of this condition, they may consider

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this entity as an allergic reaction, hematoma, cellulitis or angioedema.

Here, we report the first case of facial subcutaneous emphysema occurring in a 6-year-old boy following incidental trauma from a fish cake skewer during a meal. This case highlights the risk that relatively low pressure in the oral cavity can cause CSE through a tiny oral wound.

## II. Case

A 6-year-old boy visited the outpatient clinic department of our hospital with a history of right cheek swelling, right periorbital swelling and pain. He did not have any preexisting disease and was in good health. Twelve hours earlier, he had eaten some fish cakes using a wooden skewer at a street market (Fig. 1). While eating, he felt pain in the



Fig. 1. Photographs of fish cakes and skewers at a street market.

right upper premolar area within his oral cavity, and after 2 hours, he visited the emergency department (ED) of another hospital with his parents. At the ED, he was already complaining of right cheek swelling, right periorbital swelling and pain. However, the clinician at the ED ignored the history of eating fish cakes and the pain while eating using a skewer according to his parents. Also, the clinician did not examine the wound within the oral cavity or order any radiologic work up, and explained his condition as periorbital cellulitis. The clinician prescribed an analgesic and antibiotic for him.

After that time, the patient complained of a further increase in cheek swelling, and he visited our outpatient clinic department. His general condition was fine, with a pulse of 95 beats/min, blood pressure of 100/60 mmHg, respiratory rate of 24 breaths/min, body temperature of 97.7° F (36.5° C), and oxygen saturation of 99% from room air. When we examined him, there was fullness and swelling on the right side of the cheek, but no erythema. We noted crepitation on the right side of the cheek upon palpation, suggesting profound subcutaneous emphysema. The crepitation extended to the buccal areas of the jaw, but not to the superior submental areas of the jaw or along the neck or superior aspect of the sternum. The patient did not complain of any tenderness upon palpation of these areas. Furthermore right periorbital swelling, redness and pain suggested periorbital cellulitis. When we

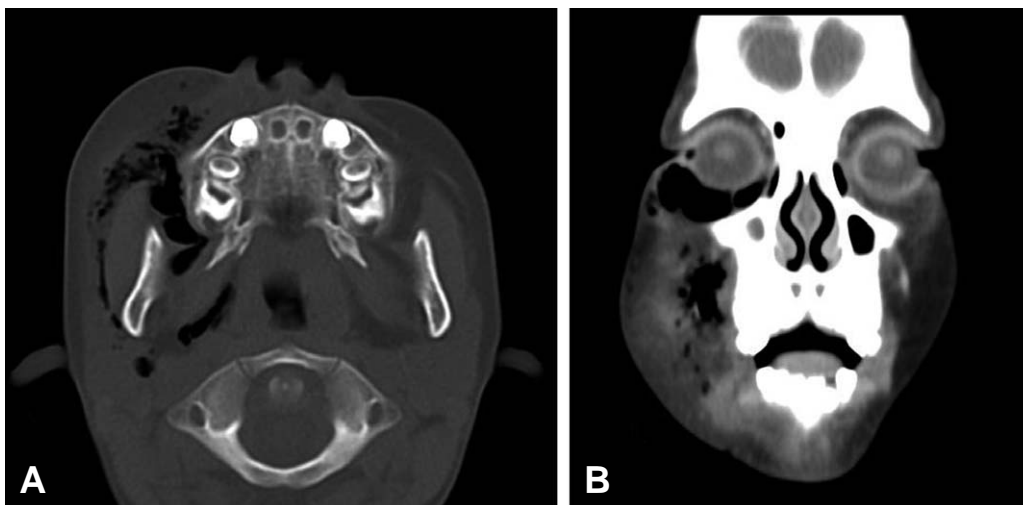


Fig. 2. CT showing multifocal air density and resulting diffuse soft tissue swelling of the intratemporal fossa, premandibular, premaxillary, buccal, intraorbital and preorbital area (A, B).

checked the oral cavity, there was small wound around the right upper premolar area. The patient denied self-mutilation behavior and had no history of intentionally inserting sharp objects (such as needles or fish bones) into the oral cavity previously. So we supposed the wound had been pricked by a skewer. The sound of his lungs was clear during auscultation, and all other findings of the physical examination were unremarkable. Furthermore, there were no abnormal results for laboratory tests such as complete blood cell count and C-reactive protein analysis. His chest radiograph showed no definite abnormality such as subcutaneous emphysema or pneumomediastinum. However, we also made the mistake of not performing a simple facial radiograph. Instead, contrast enhanced computerized tomography (CT) of the orbit and face was immediately performed to determine the extent of the emphysema and rule out other coexisting diseases, such as abscess. In CT scans, multifocal air density and resulting diffuse soft tissue swelling of the intratemporal fossa, premandibular, premaxillary, buccal, intraorbital and preorbital areas were observed (Fig. 2). However, there was no definite inflammatory change, mass or hemorrhage detected by CT. On CT scans, air was not observed in the submandibular or carotid area and did not extend into the superior mediastinum.

He was hospitalized to prevent the expansion of the emphysema and subsequent pyogenic mediastinitis or necrotizing fasciitis. After admission, he was managed conservatively with an intravenous broad spectrum antibiotic to prevent secondary infection from oral bacteria following the trauma. His face was wrapped in a compressive dressing to prevent the expansion of the emphysema for the first three days. The right periorbital and cheek swelling subsided in the next four days, and crepitation also subsided in the next five days. The patient was discharged from the hospital in good condition on the sixth day of hospitalization. A physical examination was performed 7 days after discharge, revealing complete resolution of the clinical symptoms, including the penetrating wound, and a follow-up CT scan was not performed.

### III. Discussion

CSE is defined as the abnormal presence of air in the subcutaneous tissues of the head and neck.(1,2) This condition is mainly associated with maxillofacial trauma, tonsillectomy, punch biopsy, endotracheal intubation, tracheostomy, general anesthesia and radical neck dissection surgery.(1,3) More rarely, it can occur as a complication of coughing, habitual performance of the Valsalva maneuver, sneezing, nose-blowing and cheek-biting.(4,5) This clinical condition is also a well-documented complication of dental procedures in elderly people.(2,6,7) The first reported case of subcutaneous emphysema associated with a dental procedure occurred in 1900.(2,3) Since then, it has been reported as a complication caused by high-speed air-turbine dental drills,(2,6) during tooth restoration,(8,9) extraction,(8,10) scaling(2,3) and endodontic procedures.(2,6,11,12) CSE develops following a disruption of the intraoral barrier, which allows air under high pressure to spread into soft tissue subcutaneously. The fascial planes of the head and neck consist of loose connective tissue containing potential spaces between muscle layers and other structures. Once air enters the deep soft tissue through the disrupted mucosa under high pressure, it can spread easily to more distant spaces and expand to considerable volumes.(2,6) For example, the roots of the mandibular molars and the visceral space of neck directly communicate with each other via the sublingual and submandibular spaces.(7) In addition, the visceral space of the neck communicates directly with the mediastinum inferiorly.(13) Thus, air entering any of these spaces can migrate downwards into the mediastinum, producing a pneumomediastinum. In the same way, air can ascend within the mediastinum up to the root of the neck, producing CSE.(13) It is well known that 70 to 90% of spontaneous pneumomediastinum patients experience subsequent CSE, but conversely, pneumomediastinum following CSE is very rare, though it has been reported in relation to dental procedures, head and neck surgery, and facial trauma.(12,14) The spread of air into the retropharyngeal spaces can result in potential respiratory difficulties such as pneumothorax and pneu-

momediastinum due to its anatomic location. Other complications following CSE include pneumopericardium, mediastinitis and life-threatening air embolism.(15) These complications can result in compromised respiratory and cardiac function. Fortunately, the emphysema did not extend further to the mediastinal and intrapleural spaces in our patient. It is easy to understand that high pressure in the oral cavity, such as that caused by high-speed air turbine drills for dental procedures, may induce emphysema through an oral mucosal laceration. However, it is surprising and wondered that although an intraoral lesion may be quite small, superficial and under relatively low intraoral pressure, significant amounts of air can enter the soft tissues and expand easily for some distance, as in our case. In fact, although everyone occasionally may experience self-inflicted bite of oral mucosa while eating, possibility of CSE after using skewer is not easily accepted. In this point, it might have been difficult to consider a diagnosis of CSE for our patient initially, from the perspective of the physician at the other hospital. In this point, Yamada et al(5) reported a case of a 60-year-old woman with facial emphysema due to a self-inflicted bite of the buccal mucosa during a meal, which demonstrated that relatively low intraoral pressure also can cause facial emphysema through an oral wound, as with our patient.

The clinical presentation of CSE usually involves a sudden onset and soft, local swelling of the affected site without redness. It has the sensation of fullness and local discomfort on the face and closure of the eyelid on the involved side.(10) It is always associated with crepitation upon palpation, which is almost pathognomonic, but may not be palpable until several hours after trauma. In over 90% of cases, the onset of swelling occurs during or within 1 hour of a dental procedure.(3,15) Although clinicians should consider the potential of serious complications such as pneumomediastinum and pneumothorax, the clinical presentation and course of CSE is usually benign. It is important to make a differential diagnosis of CSE, which could be mistaken for other diseases such as hematoma, cellulitis, allergic reaction, or angioedema. Computerized tomography (CT) can

clearly exclude these conditions and it was mistake not performing simple facial radiography in our case. And in consideration of radiation exposure of CT at growing children, we will consider and suggest a facial ultrasonography instead of CT in future another patients. We noted crepitation on the right side of the cheek upon palpation, suggesting profound subcutaneous emphysema in our patient. The crepitation extended to the buccal areas of the jaw, but not to the superior submental areas of the jaw, nor along the neck or the superior aspect of the sternum in our patient. Therefore we concluded he had facial emphysema not CSE. The patient did not complain of any tenderness upon palpation of these areas.

The treatment of CSE varies with the severity of the condition and the experience of the physician. In mild cases, treatment consists of observation and reassurance. Most cases will begin to resolve after 2~3 days of supportive treatment, with complete resolution after 7~10 days.(13,14) In our case, he was hospitalized to prevent the expansion of the emphysema and to observe the developing of pneumothorax and pneumomediastinum. In the facial emphysema, it maybe confused about need of facial bandaging at our patient in perspective of every doctor, our patient's face was wrapped in compressive dressing to expect preventing him from frequently touching his face, and preventing the expansion of the emphysema for the first three days. After admission the swelling of the right peri-orbital area and cheek subsided within four days, and the crepitation also subsided within five days of hospitalization. Prophylactic administration of antibiotics is recommended to prevent secondary infection by intraoral bacteria. Because the skewer used at the street market was not disposable, we worried about the possibility of bad sanitary conditions. Analgesics may be prescribed as necessary, but are rarely required, as discomfort is often minimal.

In this case, it is emphasized that clinicians should consider CSE when a patient complains of hemifacial swelling and mild tenderness after trauma by any sharp material (such as a fish cake skewer) and be aware that relatively low pressure in the oral cavity can cause facial emphysema through a tiny oral wound. Also, it is important to perform a careful

physical examination for crepitation upon palpation, which suggests subcutaneous emphysema. An immediate radiologic work-up should be considered for suddenly-increased cheek swelling to rule out other diseases. There have been several reports of death related to gradual expansion of emphysema leading to the development of mediastinitis, cardiac tamponade, and air embolism.<sup>(15)</sup> Thus, regardless of whether there are respiratory symptoms at the onset, careful observation of the clinical course is necessary in subcutaneous emphysema. Lastly, it is important to educate young children not to insert sharp materials into their oral cavities for any reason.

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