

Management of Multiple Soft Tissue Injuries in Oromaxillofacial Trauma: Case Report

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Abstract: ***Background:** Soft tissue injuries is one of the most common reasons why patient visit emergency department. Management of emergency soft tissue injuries caused of trauma requires quick and appropriate action to prevent complications. The purpose of this case report is to describe and discuss prompt and appropriate emergency management of patient who have multiple soft tissue injuries caused of oromaxillofacial trauma. **Case Report:** A 21-year-old male patient was referred to emergency department caused of bleeding from mouth due to fell down while sitting on the edge of bridge that suddenly collapsed in Karawang area with mechanism his face hit the stone edge of bridge first. In clinical examination there was necrotic tissue at lip avulsion region, lacerated wound at nasolabial region, gingiva of teeth 31, 32, 41, vestibule of teeth 33-34, and lacerated wound at tongue region. Treatment was wound debridement, necrotomy debridement, irrigation, and suturing at lacerated wound extra oral and intra oral. **Conclusion:** Multiple soft tissue injuries due to trauma at oromaxillofacial area need immediate treatment to prevent infection and maintain aesthetics. Wounds in this case occur good healing without significant complications.*

Keywords: Lacerated wound, soft tissue, trauma

1. Introduction

Soft tissue injuries is one of the most common reasons why patient visit emergency department. Over the last two decades there has been an increase in the number of patient who came to the emergency department, even though in the United States the case of patient visits has decreased, which is about 7 million (5.2%) of the total patient who came to the emergency department, which is alleged to have increased security and safety equipment on vehicles and places of work.^{1,2} It is also supported by a study conducted Jang et al in Park (2015) mentioned that soft tissue trauma in the form of a laceration is the most reason why patient came to the emergency department of 71% of the total of all visits to the emergency department. A study conducted at the university education hospital in Busan, South Korea involving 1742 patient known to be the most common cause of oromaxillofacial trauma is due to the falling slip (43.9%), followed by a collision (19.7%), traffic accident (15.2%), and the least amount of accidents in exercise (5.1%). The most frequent parts of the injury are the lips (41.3%), the chin (14.9%), the forehead (12.6%), the eyebrow (10.9%), the oral mucosa (6.83%), the gingiva (6.31%), etc.³

The cause of maxillofacial trauma differs from one country to another, especially between developed countries and developing countries. Recent studies have said that in developed countries cases of violence began to be the most frequent cause of maxillofacial trauma. While in developing countries traffic accidents are still the main cause of maxillofacial trauma. It is influenced by socio-economic differences, geographical location, and culture. A study conducted in Pekanbaru hospital involving 414 total patient gained that the main cause of maxillofacial trauma was the

result of a traffic accident (81.4%), falling (7.73%), no information (4.59%), work accident (3.86%), persecution (2.8%), and sports injuries (0.24%). The trauma distribution of oromaxillofacial can be about both hard and soft tissues. Trauma to soft tissues can occur both single and multiple. Multiple trauma cases are the most common in both hard and soft tissues, and it is reported that multiple hard network trauma is as much as (32.3%) and multiple soft tissue trauma (37.68%).⁵

The area of the mouth is 1% of the entire body, although trauma to this area is reported to be as much as 5-33% of all injuries that have been experienced by all age ranges. It was reported that out of all patient suffering from maxillofacial trauma, 70% had injuries to soft tissues.⁴ Hard tissue injuries have been extensively researched, although the cause of most patient comes to the emergency department, the case of injury to the soft tissues is still lacking in attention.³ Soft tissue injuries are rarely life-threatening, but injuries to soft tissues can serve as an indicator of assessing the trauma force. Another thing that very important to note is that the injuries caused by oromaxillofacial soft tissue injury involve the face structure, where the face plays an important role for expression, aesthetic appearance, as well as the identity of a person.⁵

Speed and accuracy in the handling of soft tissue injuries oromaxillofacial will greatly affect the aesthetic outcome and facial function. The challenge of oromaxillofacial trauma management is to restore the aspect of the function as well as aesthetic to approach the previous condition. Delayed treatment of soft tissue injuries oromaxillofacial can aggravate the wound that occurs, as can cause infections, swelling, primary closure becomes difficult to

occur, and the formation of scar tissue that can become scarring.⁵

Historically, almost all of the lacerations were treated in the same way. Local and general anesthesia is followed by clearing the wound from foreign matter, dirt, and necrotic tissue and infected with saline solution. Wounds are explored and formed in such a way as to prepare for suturing. Suturing are done with the appropriate technique of need on the wound, on stitching of muscles used suturing threads that can be absorbed by the body, while the skin is stitched with nylon yarn. Patient are advised to return 3-14 days to release suturing. Contaminated wounds should be noted whether it is necessary to provide prophylactic antibiotics and anti-tetanus injections.¹

The purpose of this case report is to display and discuss the treatment of immediate and precise obesity in patient with multiple soft tissue injuries in oromaxillofacial trauma to the upper lip, nasolabial, and tongue with general anesthesia.

2. Case Report

A 21-year-old male patient came with bleeding from the mouth. The incident is about \pm 48 hours before the hospital admission, when the patient was sitting on the edge of the bridge, suddenly a large river current came and made the

bridge collapsed then the patient fell down with mechanism face hit the edge of the bridge made of stone first. Then the patient was brought to general hospital in Karawang area and was performed wound cleansing then the patient was referred to general hospital in Kopo area but nothing was performed there. Then the patient was referred to Hasan Sadikin Emergency department for further treatment.

Preliminary inspections include airway to see whether there is breath, neurological status and patient awareness, and carried out examinations on the chest, abdomen, upper and lower extremities. No circumstances were found that could threaten the patient's life. Examination of vital signs shows the patient's blood pressure level 110/80 mmHg, heart rate of 86 times/minute, body temperature 36.7°C, respiratory rate 24x/min. Subsequent inspections are inspections on areas with injuries, including location, size and shape of the wound.

Extraoral examination was asymmetric face an edema and hematoma on the upper lip and lower lip and on the left eye. In addition to the extra oral examination, there are also lacerated wound on nasolabial with 2x1x0, 5 cm in size, irregular edge and muscle base, avulsion the upper lip with 2x1x0, 5 cm in size, irregular edge and muscle base, as well as multiple abrasion in the facial area (Fig. 1).



Figure 1: Profile picture and extra oral, lacerated wound on nasolabial

Intraoral examination finding was lacerated wound at gingiva of tooth 32-41 region with 2x1x0, 5 cm in size, irregular edge and bone base, and lacerated wound on the vestibulum of teeth 33-44 region with 6x2x1 cm in size, irregular edge and bone base, and a lacerated wound on the tongue dorsal with 6x3x2 cm with in size, irregular edge and muscle base. Laboratory test results showed an increase in the number of leukocytes ($14.570/\text{mm}^3$).



Figure 2: Clinical photographs, lacerated wound at gingiva, vestibulum, and tongue

Before the operative action, the patient was given treatment using empirical antibiotics (Ceftriaxone injection 1 gram for prophylaxis intravenously), then intubation was performed and administered local anesthesia. Wound cleansing on the tongue by removing the tissue that was necrotic and infected with a scalpel and surgical knife No. 15 (Fig. 3). After all the necrotic tissue on the tongue was discarded, further irrigation with carried out using saline solution (NaCl 0.9%). The suturing is done by horizontal mattress technique using absorbable (Vycril 4.0). Wounds on the Vestibulum and gingiva are carried out wound cleansing procedures, disposal of necrotic tissue and irrigation with saline solution (NaCl 0.9%). The suturing on the vestibulum and gingiva was done with a simple interrupted technique using not absorbed (Silk 4.0) (Fig. 4). Extra oral wounds on the upper lip and nasolabial area are also carried out wound cleansing, necrotic tissue and the infected was discarded, marking of the design of the incision with the blue methylene, then stitched with the nordof technique using not absorbed (nylon 6.0).



Figure 3: Clinical photos, necrotomy debridement



Figure 4: Clinical photos, reconstruction and suturing

At the time of hospitalization, patient was given Ceftriaxone (2x1 gr), Ketorolac (2x30 mg), Omeprazole (2x40 mg), and Dexamethasone (3x5 mg). The diet in patient was calculated according to body weight and nutritional needs, given a high-calorie liquid diet high in protein via NGT. Patient are instructed to maintain the hygiene of the oral cavity, the application of hyaluronic acid gel in the region of lacerated wound in intra oral and application Chloramphenicol zalf on the area of lacerated wound that is in extra oral.

After 2 days of hospitalization, the patient's general condition began to improve. Given the education maintenance of hygiene of oral cavity, diet, use of good and correct drugs, and given wound maintenance education to achieve optimal wound healing to patient. Patient perform outpatient care and are instructed to come on the fifth day to

release extra-oral suturing. When patient come to control and remove suturing, the wound after extra oral suturing in the nasolabial area is well covered and there are no signs of infection. Intra oral examination is seen wound after suturing in upper lip area and good gingiva, but the wound on the vestibulum is still wet and there is a buildup of plaque and necrotic tissue. Conducted education and installation of periodontal pack on gum and vestibulum area of lower jaw. Wounds after suturing on the dorsal and ventral portions of the tongue look good and there are no visible signs of infection. The patient is instructed to stick the tongue and remove the tongue and look no disturbance to the tongue (Fig. 5). The patient is instructed to return again on the 14th day to remove intra oral suturing on the tongue, gingiva, and vestibulum.



Figure 5: Clinical photos, day 5, wounds appear dry and no sign of infection



Figure 6: Clinical photos, day 14, wound appears dry and no sign of infection or function abnormalities

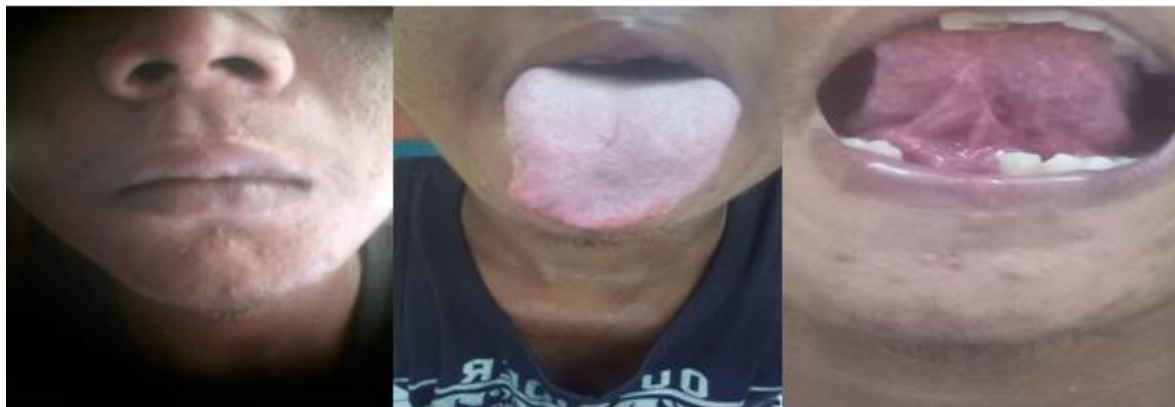


Figure 7: Clinical photos, day 90, dry wound and no sign of infection or function disorder

3. Discussion

Soft tissue Trauma can be classified into several types of abrasions, contusion, wound bites, burns with several variations in severity, and avulsion wounds. Wounds can also be classified into 2 types i.e. acute wounds and chronic wounds. Acute lesions are caused by surgical procedures, trauma, pathological, or ischemia. In a healthy state, wound

healing occurs in three different phases but is overlapping each other i.e. inflammation/inflammation phases, proliferation, and of (table 1). When there is a disorder in the wound healing process or a delay, chronic wounds become formed. Delays usually affect the inflammatory stage that can lead to excessive deposition of collagen and scar tissue.^{8,9}

Table 1: Soft tissue wound healing phase⁸

Phase	Function
I. Inflammatory	Vascular response Cell infiltration PMN Macrophages Choroidal neovascularization Tissue synthesis granulation
II. Proliferation	Cell proliferation Macrophages Fibroblast Collagen synthesis Endothelial cell proliferation Formation of mature granulation tissues
III. Maturation	Remodelling Collagen Increased wound strength Decreased vascularity Macrophages Fibroblasts Scar Tissue formation

There are several factors that can inhibit the wound healing process. Local factors include the occurrence of foreign

matter, venous insufficiency, pressure or trauma, ischemia or hypoxia, radiation, saliva contamination, scars, and

hematoma. Systemic factors include smoking habit, diabetes mellitus disease, corticosteroid use, malnutrition, chemotherapy, vitamin deficiency, and chronic diseases. The patient's age also affects wound healing. In elderly patient, collagen on the skin is less and causes the tissue to be more easily injured and the wound healing process becomes slower.⁸

The most important factor in the wound inhibition process is the presence or absence of infection. If the wound is not properly cleaned, contaminated wounds can be infected. Increased bacterial count leads to increased inflammatory response. Bacteria produce a product in the form of endotoxin and metalloprotease which can destroy the ultrasonic matrix of tissues that are undergoing healing so that the lysis occurs. Bacteria also inhibit wound healing by competing with cells or tissues that are experiencing healing to get nutrients and oxygen. Therefore, infected wounds have to be done with adequate debridement, necrotic tissue disposal, and irrigation. The infected soft tissue wound has the characteristic of erythema, edema, temperature rise around the wound, tissues become more soft, there are leukocytosis, and sometimes in patient with fever.⁸

Wound Management

Wound management starts from optimizing the environment and factors that support wound healing. The wound should be well prepared for healing and preventing possible complications after wound management such as infections, the formation of scarring, contracture, maceration of tissues, and dehiscent. Wounds should be cleaned and closed as soon as possible. Adherence to surgical principles and adherence to standards-appropriate wound handling is important in influencing the success rate of wound handling. Wounds must be cleaned without injury or new injuries, injuries should not be exposed to chemicals. The wound must be closed layer by layer using the appropriate suturing tools and materials. All dead Space should be eliminated and a vital structure must be closed with a well-vascularized tissue. Comorbidities in patient should also be handled well.⁸

Wound cleansing includes the disposal of entire necrotic tissues, foreign bodies, and biofilms. This can be done using sharp surgical instruments. Irrigation in the wound is intended to reduce the accumulation of bacteria, rinsing wounds from foreign bodies and debris. Irrigation can be done using saline solution (Ringer's lactate or NaCl 0.9%). Toxic substances such as alcohol, hydrogen peroxide, benzalkonium chloride, and some soaps containing hexachlorophene or povidone iodine are not recommended, this is because these ingredients can damage the structure of cells.⁸

Overall, the procedure performed in patient has been in accordance with the theory of, administering prophylactic antibiotics for contaminated wounds, tissue cleaning by removing the entire necrotic tissue and the infected using a sharp surgical instrument that is a surgical knife No. 15, the use of irrigation is recommended that is a solution of NaCl 0.9%, suturing using a thread that can be absorbed by the body in the tongue and muscle area using the Yarn Vicryl 4.0 and use the yarn that does Silk 4.0 and in extra oral and lip is using a thread nylon 6.0.

Anti-Tetanus is administered to patient who suffer from contaminated wounds (table 2). 8 in patient with wounds found in extra oral and intraoral is a type of contaminated and infected wounds. It looks a lot of tissue that has been necrotic and infected mainly on the wound area on the tongue and in the nasolabial. Signs of infection are evident in the wound, so that the introduction of anti-tetanus, although the wound has been occurring more than 24 hours. The results of Anamnesa to the patient are informed that the patient does not know the history of immunizations when small or recent history get anti-tetanus serum.

Table 2: Characteristic wound prone to tetanus

Clinical picture	Tetanus prone	No tetanus-prone
Injury time	> 6 hours	< 6 hours
Configuration	Irregular	Linear
Depth	> 1 cm	< 1 cm
Injury mechanisms	Explosions, collisions, burns, studded	Sharps (e.g. knives)
Necrotic tissue	Have	No
Contamination (dirt, ground, saliva)	Have	No
Denervasi or tissue ischemia (or both)	Have	No

In addition to the provision of anti-tetanus, prophylactic antibiotics are also recommended for contaminated wounds and infection can be prevented. Wounds larger than 2 cm are one indication of prophylactic antibiotics. A study conducted by Katsetos (2016) on patient who were traumatized and received treatment in the emergency Department, there was a difference in patient given prophylactic antibiotics with which it was not administered. Patient who are not given both local and systemic antibiotics have an amount of 22% infection.⁶ The patient are given prophylactic antibiotic that is Ceftriaxone inj 1 gr through intravenously considering that this type of antibiotic tends to rarely have resistance in patient.

Soft tissue Trauma especially in the Oromaxillofacial area has several complications, such as infections, the formation of scarring, dehiscent, and the occurrence of functional disorders. In patient there are several factors that can inhibit the healing of patient wounds is an active and less optimal smoker in the maintenance of oral hygiene, but there are no complications in patient. The wounds in the face and inside the mouth include the gingiva, vestibulum and tongue look cured well and there was no disturbance of speech, neurological, and functions.

4. Conclusion

Treatment of maxillofacial trauma injuries to the soft tissues is done by observing the signs and symptoms of emergency, including a severe bleeding, and airway obstruction. Treatment of lacerated wound can be done by general anesthesia then performed muscle suturing and mucosal suturing. The success of wound healing can be seen from the presence or absence of infections, decreased functions, and dehiscent.

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