

Management of Lacerated Wounds Due to Trauma Saws Machine (Chainsaw): Case Report

Endang Sjamsudin¹, Harmas Yazid Yusuf², Eka Marwansyah³, Cahyono Yudianto⁴, Fauzan Akmal⁵, Rachendra Pratama⁶, Bambang Hudiworo KD⁷

^{1, 2, 3} Lecturer, Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Padjadjaran, Hasan Sadikin Hospital, Bandung, Indonesia

^{4, 5, 6, 7} Resident, Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Padjadjaran, Hasan Sadikin Hospital, Bandung, Indonesia

Abstract: Injury due to work accidents caused by a chainsaw rarely occurs on the face. The wound can be irregular and disrupt facial aesthetics. In this case report, a 60-year-old male patient came to the ER of Hasan Sadikin Hospital Bandung with complaints of bleeding from the mouth and face due to being hit by a chainsaw while working. Irregular soft tissue open sores in the left zygoma region, lacerations in the zygoma, bilateral commissural lip, lower lip penetrating the oral vestibule cavity. Treatments include wound debridement, reconstruction, and wound closure. Facial reconstruction of the face must be considered in rearranging anatomical landmarks, muscle, and sensory functions. In this patient, simple reconstruction was performed with tissue dissection and rotation. The results show improvement, and there is no infection.

Keywords: Lacerated Wounds, debridement, reconstruction, Chainsaw

1. Introduction

Soft tissue injuries in the maxillofacial area are still frequently found in hospital emergency departments. Different types of injuries occur depending on the etiology and mechanism of the injury. Factors causing these injuries include road traffic accidents, interpersonal violence/homicide injuries, household accidents, falls, gunfire, bomb explosions, industrial accidents, and work-related injuries, sports-related injuries, animal bitten injuries, earthquakes earth, and iatrogenic injury.^[1]

Oromaxillofacial trauma is associated with injury to the face or jaw caused by physical strength, foreign bodies, or burns, including injury to one of the bones, skin, and soft tissue structures on the face. Every part of the face may be affected by trauma, such as in the oral cavity area. Trauma in the oral cavity can cause teeth to shake or break, soft tissue damage such as edema, contusions, abrasion, laceration, and avulsions.^[2,3]

Facial soft tissue injury is the most challenging problem for surgeons to face. Problems caused by facial injuries related to patients' life and social problems can be temporary or permanent. A patient who arrives in the emergency room with severe soft-tissue facial trauma requires a surgeon with sufficient skills in managing this injury. Trauma can cause complex facial injuries with tissue loss. The motor vehicle accidents were the leading cause of this injury, bite injuries and sharp object injuries were the next most common cause of facial injuries.^[1]

The most defects can be reconstructed immediately in order to obtain better anatomical shape and function with early rehabilitation. Generally, there are various options to correct defects that arise. These defects can be treated with secondary healing, primary closure, placement of skin grafts,

mobilization of local or regional flaps, and free flaps. Local flaps often produce useful functional and aesthetic features. The great advantage of local flaps is that the tissue is very similar to lost skin of the same color and texture. This flap can be rotated, forward, transposed, or interpolated to a network defect area.^[4]

Various forms of facial injuries due to accidents at work can be found. Building tools used while working without using adequate safety can risk occupational accidents. One of the building tools is a saw. Saws are tools that are commonly used at home and are also specific to many jobs. Injuries associated with chainsaws can be very severe. However, currently, there is little published research on facial injuries related to the use of chainsaws. In general, safety information about using the right saw is available in the instructions for using this tool.^[5] This case report describes work accidents involving the face due to the use of chainsaw, including wound care and reconstruction

2. Case Report

Male patients aged 60 years came to the emergency room Hasan Sadikin Hospital Bandung with complaints of bleeding from the mouth. Approximately 6 hours before entering the hospital, the patient repaired the door of the house with a chainsaw. Suddenly the patient loses balance and falls with the mechanism of the mouth hitting the chainsaw first. The patient did not experience a history of fainting and did not experience nausea and vomiting. There is a laceration wound in the commissure region Sinistra size 3x0,5x0,5 cm with irregular edges, muscle base. Lacerations of right zygoma area of size 2x0,5x0,5 cm irregular edge, the base of muscle. Lacerations in the vestibule region of the teeth 32-42 size 2x1x0.5 cm, irregular edges, muscle base, and lacerations in the lower lip area measuring 7x2x0.5 cm irregular edges of the muscle base (figure 1).



Figure 1: The facial profile, visible lacerated wound in left zygoma, bilateral oral commissure, lower lip penetrating the vestibule

On the radiographic picture, there is no fracture on the facial bone (Figure 2). The diagnosis of this patient is lacerations of the zygoma, the oral commissure on both sides, lower lip penetrating the vestibule of the tooth region 32-42 (Figure 2). Emergency treatment is done by the wound debridement, suturing the wound from the oral commissure on both sides, the lower lip and the vestibule (Figure 3).



Figure 2: On radiographic features there are no fractures on the facial bones



Figure 3: Debridement and closure of the wound with reconstruction and suturing

Emergency care includes debridement wound care, administration of Anti Tetanus Serum (ATS) and Tetanus Toxoid (TT) drugs, 1 gram ceftriaxone antibiotics, 30 mg ketorolac analgesics, and Ranitidine 50 mg. Wound cleansing is done using 0.9% NaCl mixed with gentamicin, with a ratio of 500 ml, 0.9% NaCl mixed with 2 ml (10 mg/ml) gentamicin. Furthermore, reconstructing the sores on the face and lips and suturing.



Figure 4: Clinical features ten days after treatment, the wound looks dry and there is no infection

3. Discussion

The pattern of soft tissue injury, in this case, is slightly different from what has been documented in previous journals. Cases of soft tissue injury due to chainsaws are still rare and publicized. The surface shape of a jagged chain saw makes the resulting wound has irregular characteristics. In addition to anatomical and functional considerations, aesthetic considerations pose a significant challenge in the management of wound-bearing injuries. Wounds are physical injuries that disrupt the reasonable continuity of anatomical structures, and the wound healing process consists of restoring continuity. Wound healing is usually a well-organized process divided into overlapping phases.^[5]

The primary survey is the first action taken in managing post-traumatic patients, namely airway safety, breathing, circulation, and exposure/environment. After the patient's condition is stable, a secondary survey is carried out, which includes a complete history taking to determine the sequence of events and a general examination to determine the systemic conditions experienced by the patient. Laboratory blood tests and radiological examinations, including supporting examinations that can be carried out to support the patient's systemic state.^[6] In these patients, the primary survey was carried out with results within normal limits. Secondary surveys show lacerations in zygomas, oral commissure, lower lip penetrating vestibules.

Tetanus Immunoglobulin (TIG) is given to patients who are at risk of tetanus. Injuries that are at risk of tetanus included wound more than 1 cm, dirty wounds, wounds exposed to the ground, saliva or feces, necrotic or infected wounds, puncture or amputation or injury, and extensive burns with a high degree.^[7] This patient is given TT and ATS because the wound is more than 1 cm. The wound with a dirty object that contaminated with bacteria that has a risk of tetanus.

Lip reconstruction, realignment of anatomical landmarks must be considered, and muscle and sensory function restored. Primary reconstruction can usually be done on lip laceration. Correct stitching and closure of layered and tension-free lip landmarks are essential for proper management of lip injuries. The first stitch should be done in vermillion, and the right lip alignment must be done. If the defect is up to 30%, it can be repaired primarily; however, larger defects require local folds for reconstruction taken from the opposite lip or cheek. The type of cover depends on the location and size of the defect. For defects in the upper lip, the primary closure can disrupt the normal anatomy of the columns and dimples. For wounds that cannot be closed primary, the best method to achieve good results is to use lip tissue that is available for repair. Although skin grafts can

play an essential role in management, a color mismatch may be a problem when grafting vermilion defects. This can be corrected by using Abbe flap to reconstruct the vermilion center without moving the commissure. Larger defects or involving other areas of the lips can be corrected using similar lip transfer procedures or various local flaps^[6]

Skin grafting and local flaps are also options for management proposed by Braun, et al. the best option to restore shape and function to the lips is to reconstruct the defect with available lip tissue. Traumatic amputations on the upper and lower lip, although not common, can occur due to animal bites on the face, attacks, or other traumatic accidents. Given that the lips are a particular facial structure, replacing the lips, if possible, is the best way to restore its shape and function. Small caliber of superior and inferior labial arteries and veins makes lip replantation difficult, and venous outflow is often a problem^[8] In the case of this patient in reconstructing the wound, only the dissection and rotation of local tissue prevents tension.

A key factor for the successful treatment of facial injuries is the use of appropriate surgical techniques. Prevention of complications, such as scars, infections, and long-term complications is critical. Injury analysis, including location, size, and depth of penetration as well as associated injuries, will help in the formulation of an appropriate surgical plan. An understanding of facial aesthetics and skin tension lines is essential, especially when facing complex and irregular lacerations. Wounds in the oral cavity and face can develop into severe infections.^[9] In this patient, debridement and washing of the wound are performed, then the closure of the wound to prevent infection.

Wound debridement is the initial stage in the treatment of soft tissue injuries. Actions taken during this debridement process are cleaning all foreign objects that enter the wound, necrotic tissue, including the hematoma area. Debridement step is to irrigate the wound tissue with NaCl liquid then the wound tissue is gently rubbed using a sterile gauze that has been moistened with NaCl. The selection of NaCl is because it does not irritate, is safe for the body, keeps the wound tissue moist, this is important to do so that the wound tissue undergoes a proper healing process in a way that is cheap and readily available.^[9]

In the case of trauma in soft tissue, generally, the shape of the injured tissue forms torn and irregular tissue margins. These conditions require a good and neat wound debridement procedure, making it easier for the operator in the suturing process, which aims to achieve maximum wound closure.^[1]

The usual suture technique used is interrupted because this technique has the smallest failure effect on the wound edge attachment. Sutures must be carried out with due regard to the lines of tension and natural folds of the skin, and do not allow suturing to be carried out and cause a dead space (dehiscence) or provide excessive tension.^[10] After completing the suturing process, the wound is covered with a scarf and bandages. The patient Changes bandages once a day. The patient return to remove the sewing thread for

extraoral and intraoral six-day post-operative.

The process of inflammation and recovery requires several chemical compounds to protect the injured area from invading microorganisms to a structure for wound closure. Therefore, antiseptic agents and antibiotics are usually used. Sufratule is a sterile gauze with an antibiotic content of Framycetin sulfate BP 1%. This mass has an antibacterial effect and is suitable for dressing and used in various wound infections even though it does not facilitate the wound healing process.^[10]

In some cases, the use of chloramphenicol for medication for post-traumatic infections is reduced. Therefore it is advisable always to keep the wound area clean from pathogenic bacterial contamination. The use of antipyretics and antibiotics is done as prevention from further infections. Antibiotics are given back as additional therapy after surgery. The purpose of using antibiotics for infection prevention is by eliminating bacteria until the immune system in the body can neutralize pathogenic bacteria. The use of antibiotics and other drugs can be orally or IV.^[9]

Therefore the entire process and action must be permanent and adequate, starting from the selection of drugs and actions are taken. The use of antibiotics is intended to avoid infection in patients. The choice of antibiotic must be based on the level of bacterial contamination, the presence of factors that support the mechanical injury, and the presence of predisposing factors for infection. The bacteria that cause wound contamination are healthy flora on the skin such as Staphylococcus spp, Corynebacterium spp, Bacillus spp, Propionibacterium acnes. Staphylococcus aureus and Streptococcus pyogenes. Gram-negative bacteria are susceptible to antibiotics ampicillin, cefuroxime, cefoxitin, ceftriaxone, cefotaxime, ceftazidime, cefepime, ciprofloxacin, trimethoprim, sulfamethoxazole, gentamicin, amikacin, and co-amoxiclav. In this patient, antibiotics are given to prevent infections from commensal bacteria of the skin and pathogenic bacteria.^[9]

4. Conclusion

Injuries resulting from irregularly shaped chainsaws, so that requires skill in reconstructing. The main actions of wound management include irrigation, debridement, and reunification of the tissue separated by suturing, and with various reconstruction techniques. Wound care for these patients is done simply by dissection and rotation. The success of wound closure can be seen from the absence of infection or dehiscence.

References

- [1] Okoje VN, Alonge TO, Oluteye OA, Denloye OO. Changing pattern of pediatric maxillofacial injuries at the accident and emergency department of the university teaching hospital, ibadan—a four-year experience. Prehosp Disaster Med. 2010;25(1):68–71.

- [2] Engin D, Alper G, Erdal K, Cemil K, Fevzi Y, Evvah K, et al. Assessment of maxillofacial trauma in emergency department. *WJES*. 2014;9(13).
- [3] Raymond J, Fonseca. Oral and maxillofacial trauma. 4th, editor. Missouri: Saunders; 2013.
- [4] Ebrahimi A. Experience with esthetic reconstruction of complex facial soft tissue trauma: application of the pulsed dye laser. *Trauma mon*. 2014;19(3):e16220.
- [5] Hammig B, Jones C. Epidemiology of Chain Saw Related Injuries, United States: 2009 through 2013. *Hindawi*. 2015;2015(459694):1–4.
- [6] Girardeau RP. Assessing and managing facial trauma. *JEMS*. 2015;40(6).
- [7] Collins S, White J, Ramsay M, Amirthalingam G. The importance of tetanus risk assessment during wound management. *IDCases*. 2015;2:3–5.
- [8] Braun T, Maricevich R. Soft tissue management in facial trauma. *Seminars in plastic surgery*. 2017;31(2):73–9.
- [9] Sirijatuphat R, Siritongtavorn P, Sripojtham V, Thamlikitkul V. Bacterial contamination of fresh traumatic wounds at Trauma Center, Siriraj Hospital, Bangkok, Thailand. *Int J Antimicrob Agents*. 2017;42:S102–3.
- [10] Bhattacharya V. Management of soft tissue wounds of the face. *Indian J Plast Surg*. 2012;45(3):436–43