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Soft Tissue Injuries Management in Emergency Department: A Review

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Review Article

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ABSTRACT

Soft tissue injuries (STI) is the damage of muscles, ligaments and tendons and they are one of the most common injuries that also being presented to the different emergency department but often approached differently. Accident and emergency (A&E) services frequently see acute soft tissues injuries. To achieve the best potential results for patients with soft tissue injuries, the quality of emergency department (ED) care offered is crucial. The unstable situations of injured people are caused by these critical aspects, which include polytrauma in many cases, a lack of precise recovery periods, the use of definite tissue flaps, and the type of circulation. Soft tissue injuries are also sometimes complicated with another injury.

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1. INTRODUCTION

Soft tissue injuries (STI) is the damage of muscles, ligaments and tendons and they are one of the most common injurie that also being presented to the different emergency department but often approached differently. Accident and emergency (A&E) services frequently see acute soft tissues injuries. The knee is the most commonly injured joint. In high-risk sports like soccer, the most usually damaged joint is the knee. As well as rugby. The most common cause of permanent impairment following a sports injury is acute knee damage [1].

Unfortunately according to a study that have looked into; there are different strategies that being followed for soft tissues management In the emergency department (ED), it looks like there is no standard approach for early soft tissue wound management [2] in a study that made onto the English departments Only 40% of departments had a wound treatment policy [3] Dressing simplification, more defined referral criteria, and the implementation of standardized protocols with structured education programs are all areas that could be addressed [2]. Patients may have preconceived notions about how different members of the interdisciplinary team should treat them, which may be influenced by prior experiences or knowledge. Patients are often managed by a single interdisciplinary team member (ENP, doctor, or ESP), and they will receive varying degrees of information depending on their experience, personality, time constraints, and communication style [4,5].

To achieve the best potential results for patient's soft tissue injuries, the quality of emergency department ED care offered is crucial [6]. The unstable situations of injured people are caused by these critical aspects, which include polytrauma in many cases, a lack of precise recovery periods, the use of definite tissue flaps, and the type of circulation. Soft tissue injuries are also sometimes complicated with another injury. One of the most common difficulties in emergency orthopedic surgery is treating patients with open tibia fractures compounded by soft tissue abnormalities. After such traumas, there is a significant rate of amputations, deep wound infection, and non-union [7,8].

A systematic approach between orthopedic and plastic surgeons can also effectively manage open fractures of the lower leg with severe soft-tissue injury. The basic concepts of this forceful, systematic technique are appropriate debridement and delayed primary intention soft-tissue recovery [9].

2. MOST COMMON INJURIES

A soft tissue injury (STI) is the damage of muscles, ligaments and tendons throughout the body. Common soft tissue injuries usually occur from a sprain, strain, a one off blow resulting in a contusion or overuse of a particular part of the body. Wound, knee injuries, musculoskeletal injuries rapid and any injury to the body that occurs as a result of a sudden trauma, such as a fall, twist, or blow. Sprains, strains, and contusions are examples of this type of injury [10]. The knee is the most commonly injured joint, especially when it comes to high risk sports like football, basketball, rugby. Etc. and also due to driving accidents using motorcycles or bikes [11].

3. EPIDEMIOLOGY AND ETIOLOGY

Injury patterns differ significantly depending on the patient demographic. Children and the elderly are the most vulnerable to slips, stumbles, and falls, which frequently result in isolated soft tissue injuries such as laceration and contusions. The most common causes of injury in those aged 15 to 50 are violence and motor vehicle accidents. A primary trauma survey and a secondary examination for concomitant injuries and specific characteristics that guide management are required for evaluating and managing a trauma patient. Emergent airway stabilization is rarely necessary in the absence of craniofacial fractures. [2]

Early management isolated soft tissue wounds should be healed as soon as possible; early soft tissue repair, especially in the presence of major concurrent injuries, has been linked to better postoperative cosmetic outcomes. Delays in therapy might cause soft tissue swelling, which obscures landmarks and complicates primary closure [12].

4. MANAGEMENT AND TREATMENT

4.1 Wound

The goal for management should be to eliminate the risk of infection and create an infection-free

environment for wound healing. The treatment of choice is wound cleansing followed by primary closure, with prophylactic antibiotics helping to reduce the risk of infection. Cleaning, analgesia, dressing selection, suturing, referral patterns, medical photography, and antibiotic use are all part of the treatment plan. All departments were responsible for wound washing. Analgesia is commonly used. Suturing was done on a case-by-case basis by all departments. When it came to dressing options, there was a lot of variety. The complexity of the injury and cosmetically sensitive areas were the most common causes for referral to expert units. In one-third of the units polled, radiology were taken on a regular basis. [2,13].

In the United Kingdom, there is a great deal of diversity in the initial management, referral, and assessment of facial wounds. More effort is needed to develop standards for the best possible patient care, ideally in collaboration with the receiving surgical specialties [14].

Dog bite wounds on the face should be closed as soon as possible after formal and thorough debridement. And the main closure would reduce the time it took for dog bite wounds to heal while also reducing the rate and duration of infection. When comparing immediate primary closure to wounds left open, there is no evidence of an increase in infection incidence or pace. Primary wound closure, on the other hand, can facilitate primary healing. Antibiotics were not indicated as a preventative measure. Secondary reconditioning should be performed on any significant facial organ or tissue injuries [15].

4.2 Bruising Injuries

Accidental or no accidental injury to the skin is the most prevalent type of cutaneous injury in children, and bruising is the most common form of cutaneous injury. Because skin bruising can be caused by a variety of factors other than direct trauma, the physician should be aware of the many types of bruising and be able to distinguish between accidental and abusive injuries [16].

Bleeding into the dermis or subcutaneous tissue is what a bruise is. The skin's vascular supply is divided into two layers. The deepest layers of the dermis contain a deep plexus of veins. The vessels in the dermal papillae and surrounding the epidermal appendages are connected to a more superficial layer of vessels in the dermal papillae (hair follicles, sweat glands, apocrine glands, sebaceous glands) [16].

Muscle contusion is the second biggest cause of morbidity from sports-related injuries, trailing only strain. The severity of the injury is determined by the location of impact, the activation level of the muscles involved, the patient's age, and the presence of weariness. Traditional clinical judgement has been used to make the diagnosis; however, emerging techniques such as ultrasonography, magnetic resonance imaging, and spectroscopy are becoming more significant in diagnosing and characterizing the level of harm [17].

Prior to the arrival of the patient, the trauma assessment process begins. Gathering the care team, equipment, and preliminary information is part of this process. The mechanism of injury, patient vital signs, evident injuries, current interventions, and the patient's age and sex, if available, should all be provided by emergency medical services (EMS). When a blow breaks blood vessels at your skin's surface, a little amount of blood leaks into the tissues beneath your skin, causing a bruise. The trapped blood may result in a bruise that appears black and blue at first, then changes colour as it heals. With a few simple techniques, you can speed up the healing of bruises. RICE stands for rest, ice, compression, and elevation [18].

If at all possible, put the bruised region to rest. Using an ice pack wrapped in a towel, ice the bruise. Allow 10 to 20 minutes for it to set. As needed, repeat many times a day for a day or two. If the damaged region is swollen, use an elastic bandage to compress it [18].

4.3 Musculoskeletal Injuries

Bones, muscles, tendons, ligaments, and soft tissues make up the musculoskeletal system. They cooperate to sustain your body's weight and assist you in moving. Pain, stiffness, and other issues with movement and function can be caused by injuries, disease, and ageing [19].

Simple analgesics, rest, and ice were indicated for the first therapy of acute wrist and hand injuries. Many articles discussed fracture reductions. However there was no convincing evidence that one reduction or analgesic strategy was preferable to another, implying that decisions should be made according on the patient, injury, staff, and resources available.

Immobilization was also frequently advised, particularly after fractures, reductions, and certain soft tissue injuries.
Fractures with extensive soft tissue damage, as well as neurovascular injury and joint involvement, describe complex foot and ankle trauma. These injuries are common in polytraumatized patients, and they are a predictor of a poor clinical outcome. Fractures with extensive soft tissue damage, neurovascular lesions, and joint involvement, with a high risk of sequelae, are referred to as "complex trauma of the foot and ankle." Mutilating injuries to the lower extremities, mangled extremity injuries, and high-energy lower extremity trauma are all terms used to describe these injuries. The goal of complex foot and ankle trauma treatment is to recover lower limb function while avoiding infections, complications, revision surgery, and hospital readmission [18].

The most common therapy for acute traumatic soft tissue injuries is RICE (rest, ice, compression, and elevation). However such a technique is not being used effectively by many health care providers. In a study All Danish emergency rooms were given a questionnaire about their protocols for acute care of ankle sprains and muscle contusions. RICE was used in a minority of injuries, with ice (21 percent), compression (32 percent), and elevation (58 percent) being used in a comparable way across injury types. RICE treatment in its entirety was rarely used (3 percent). That study concluded that the acute treatment of ankle sprains and muscle contusions in Danish emergency rooms does not follow international literature consensus, and that rehabilitation training should be improved [10,11].

A patient with a severe foot and ankle injury should be evaluated in the emergency room for all local and systemic characteristics, as well as the treatment algorithm:

- **Early complete care is essential** when both the patient's systemic and local conditions are appropriate to support the duration of the operations and surgical aggression, this style of care should be used in chosen instances with simple fractures, clean wounds, and a team educated in the definitive procedures.

  The following are some soft tissue management options:

  - Primary closure
  - Closing device with vacuum assistance
  - Fixation in conjunction with a microsurgical or local flap
  - Amputation

- **Staged treatment**

  - Initial treatment
  - Definitive treatment

5. PART I: PREVENT THE PROGRESSION OF ISCHEMIA AND NECROSIS

Screening for severe trauma and, if necessary, resuscitation according to the principles of Advanced Trauma Life Support, both during prehospital and in-hospital care, should be the initial steps.

The injury to the foot and ankle is examined and treated if there are no other life-threatening injuries that require immediate attention or if the patient has reacted well to systemic stabilization techniques. The doctor should check vascular status (palpable pulses, capillary refill, temperature, and color), neurological impairment (sensitivity, deficient), soft tissue injuries (closed or open), and bone and joint disorders in the second step of diagnosis. For determining early treatment, standard radiographs are sufficient (e.g., external fixation). Compartment syndrome (CS) should be diagnosed or ruled out at this point in the treatment [18,20,21]

6. PART II: PREVENT INFECTION

In pre-hospital care, open fractures should be covered as soon as possible with sterile dressings. In open fractures, less than 20% of infections are caused by microorganisms present at the time of the trauma, while more than 90% of infections are acquired in the hospital. To enhance communication and patient records, 48 photographs must be taken. The use of antibiotics should be started as soon as possible. The most common choice is a first-generation cephalosporin. Gentamicin is utilized when there is a lot of contamination or if there are type III open fractures. Tetanus prophylaxis should be considered, and definitive antibiotic therapy or a combination of antibiotics should be determined based on the results of cultures and sensitivity testing. After initial irrigation and debridement, a fresh surgical technique should be used within 24 to 48 hours, depending on the original

contamination and the biological reaction of the remaining tissues. Early soft tissue covering, on the other hand, has resulted in decreased infection rates following complex foot and ankle damage [18,21,22].

7. PART III: DECIDE BETWEEN AMPUTATION AND RECONSTRUCTION

Depending on the severity of the injury, the combined rate of primary and secondary amputation is roughly 15% to 30%. In the case of severe limb injuries or life-threatening injuries, such as in multi-trauma patients with significant comorbidities, primary amputation should be undertaken. Because sensitivity returns in half of the cases, the initial absence of plantar sensation is not a valid predictor. Psychological and social aspects have been shown to be more relevant in predicting result than scoring systems. Amputation decisions should not be made only on the basis of scoring systems. Everyone must remember that determining reconstruction or amputation is a difficult task [18]

8. AMPUTATION

The primary goal is to survive, with the secondary goal of providing the best possible quality of life.

The principles of amputation are as follows:

- Dentification as well as nerve and vascular treatment.
- Stable myodesis ensures complete soft tissue covering.
- Maintain the muscle and tendon equilibrium.
- When possible, keep the limb as long as possible.
- Throughout the therapy period, a multidisciplinary team approach is used [18]

Other injuries may require more immediate attention if operative intervention is required, however early intervention is desirable. Bony and soft tissue injuries should ideally be repaired in a single procedure, as further surgeries rarely enhance functional outcomes. When it comes to high-velocity or explosion injuries, Due to the necessity for several debridements, this is generally not practicable; nonetheless, early soft tissue repair should be tried to avoid substantial soft tissue contracture and give coverage for osseous reconstruction [12,22].

To reduce infection rates and fibrosis, and hence improve the functional result, complex foot injuries require early and persistent soft tissue covering. In two of the 28 patients, definitive wound closure with tissue transfer was accomplished as an emergency operation within 24 hours, as an urgent revision within 72 hours in nine of the 28 patients, and as an early revision within 120 hours in 15 of the 28 patients [22].

In patients with extensive soft tissue avulsions of the head and face caused by trauma, satisfactory functional and aesthetic outcomes can be achieved with appropriate debridement of the wound surface, correct and meticulous stitching, and the deployment of local skin flaps [23] .

9. CONCLUSION

To achieve the best possible results for patients with soft tissue injuries, the quality of ED care offered is crucial. The emergency department (ED) is critical in providing quick and effective clinical care to patients. It is the healthcare entry point in charge of accepting, sorting, assessing, stabilizing, and managing patients with varying degrees of urgency and complexity who arrive at its door.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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