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Original Article

Friction Burns

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ABSTRACT

A friction burn occurs when the skin is scraped off by contact with some hard object, such as the road, the floor, etc., or by prolonged contact with a smooth surface. It is usually confused with burns but it is both an abrasion and a heat burn.
A friction burn can occur in any part of the body but these usually affect bony prominences, such as the hands, forearms, elbows, knees, heels, head, or chin. It can per se be a cause of death.
This case series highlights the characteristics of friction burns and their medico-legal significance.

Key Words: *Friction burn, road traffic accident, abrasion, heat burn*

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INTRODUCTION

Friction burns, "road rash or brush burns" [1, 2 & 3] is a type of abrasion [4, 1 & 5] occurring when the skin is rubbed against some hard object, such as the road, the floor, etc. or by prolonged contact with a smooth surface of a moving object.

Friction burn injuries are most commonly seen in road traffic accidents, mainly in motorcycle or bicycle riders, other modes are sports injuries, the use of an exercise treadmill at home, fast-moving belts in factories, tourniquets applied over the thigh without proper padding which cause friction burns [1, 6].

When the victim is overrun by a motor vehicle the superficial injuries are typically severe with associated underlying soft tissue or bone injuries. If a victim is dragged by the vehicle for a substantial distance, relatively characteristic "friction/grinding" injuries are produced, involving the skin, soft tissue, and sometimes bone.

Extensive grinding injuries related to the victim being struck and dragged under the vehicle are less common because drivers usually stop before driving great distances. This report presents two examples of friction injuries and addresses the difficulties faced with mechanisms of death and timing of death.

Case 1:

A 52-year-old male was stuck in the vehicle. The vehicle traveled 3 km along the roadway before the body was dislodged from underneath the vehicle. The victim was found dead at the crime scene.

The autopsy was performed at Rajiv Gandhi Govt General Hospital. It disclosed multiple severe injuries with mud, dust, and gravel, including classic dragging/grinding injuries of the arms and hands (Images 1 and 2), legs and foot (Image3), back and scapula (Image 4), buttock (Image 5) and head (Image 6), there was a grinding injury that extended through the entire skull, dura, with exposure of the brain. Internal injuries found to be subdural hemorrhage, subarachnoid hemorrhage, brain contusions, skull fractures, laceration around right shoulder and neck, extensive rib fractures/chest wall injuries, pelvic fractures, long bones fractures (humerus, radius, ulna, and femur). On cut section organs found pale

The cause of death was multiple injuries. The manner of death was an accident (RTA).

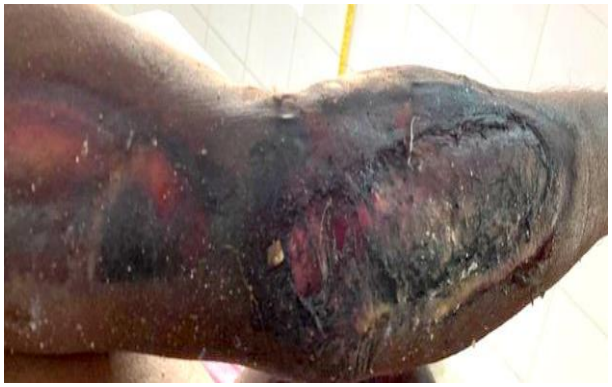

Image 1: A friction burn- right upper extremity.

Image 2: Friction burn involving the dorsal surface of the left hand

Image: 3A

Image: 3B

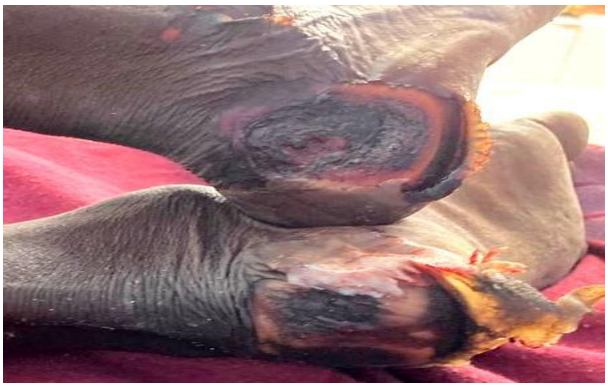

Image 3C

Image 3: Three separate dragging injuries on the back of the right lower extremity with target-like appearance, grinding injuries of femur - extremely smooth, flat grinding injuries partially avulsed skin on the heel remaining attached to the distal-most end of the wound, indicating that the direction of applied force was from proximal to distal.

Image 4: Extensive dragging grinding injuries of scapula

Image 5: Extensive grinding injuries of buttocks

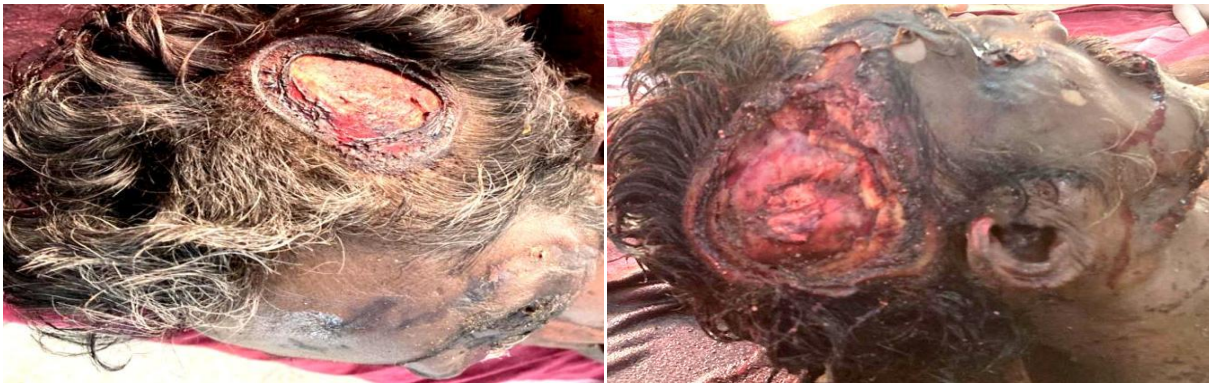

Image 6: scalp defect, target-like appearance of the underlying skull, with full-thickness dragging injuries, with tear of the dura, visualization of the brain.

Case 2:

A 23-year-old female was thrown out of her vehicle and struck under another vehicle. The victim was dragged for about 1 km on the road and was found dead.

The autopsy was done at RGGGH (MMC). It disclosed multiple severe injuries with mud, dust, and gravel, including classic dragging/grinding injuries of the arms, hands, leg, and back of the body. Internal injuries found to be subdural hemorrhage, subarachnoid hemorrhage, skull fractures, right-sided rib fractures, right lung, laceration, and hemopneumothorax, comminuted fractures of the right lower leg(tibia and fibula) with extensive tissue damage. All the organs were pale on the cut section.

The deceased died of multiple injuries. The manner of death was an accident (RTA).

Image 7: Dragging injury of the right lower extremity, the target-like appearance of the wound. Piled-up, loose skin/soft tissue tags.

DISCUSSION

Although friction burn injuries are not common, several cases available in forensic journals. Train-related dragging deaths also occur; the distance of dragging in these cases was much longer than typical distances in cases involving automobiles [7].

Friction burn/ dragging injuries have characteristic patterns, that can help to determine when it has occurred. Classic patterns produced tend to be target-like in appearance, with deeper injuries centrally, tapering to more superficial injuries peripherally [8, 9]. The more severe injuries are frequently associated with bone trauma having a very smooth, flat surface. The directionality of dragging may be able to be found out based on piled up, loose soft tissue/skin tags or partially-avulsed soft tissue at one end of the wound margin, which indicates that the force was directed from the opposite end of the wound toward the end having the tags of tissue [8, 9]. This is shown in Images 3C and 7.

It is difficult to find out whether the victim was dead on impact [10] or if death was the result of the dragging/grinding injuries sustained from contact with the vehicle and ground. Unfortunately, this is not able to be made through the forensic autopsy alone. Eyewitness accounts and corroborative evidence need to be considered.

CONCLUSION

The classic friction/grinding/dragging injuries have a target-like appearance, with associated bone-grinding trauma. Sometimes questions may arise regarding the timing of death or the manner of death occurring in relation to dragging

death. Along with police investigation, corroborative evidenceand autopsy findings can provide valuable information and render justice.

Social Forensic Message:

Wearing protective clothing, a helmet, and shoes while riding a motorcycle.

Preventing road accidents by following traffic rules and regulations.

REFERENCES

1. K. Tamilmani (2022). Forensic Medicine & Toxicology 1st ed. Tamilnadu (India): Forensic Publication. p. 141 – 144
2. Spitz WU. Spitz and Fisher's medico legal investigation of death: guidelines for the application of pathology to crime investigation.4th ed. Springfield (IL): Charles C. Thomas; c (2006). Chapter XVII, Road traffic victim; p. 903-65.
3. Wolf DA. (2005). Forensic pathology: principles and practice. Burlington, (MA): Elsevier Academic Press; c. Chapter 11, Motor vehicle collisions; p. 259-88.
4. The Essentials of Forensic Medicine and Toxicology by Dr K.S. Narayan Reddy (34th Ed)
5. Textbooks of Forensic Medicine and Toxicology by Anil Aggrawal (2 Ed)
6. Forensic pathology by Pekka Saukko Bernard Knight (4 Ed)
7. Gaur JR, Sharma A, Thakur GC, et al. (1994). Homicide or accidental death? Med Sci Law. 34(3):270-3. PMID: 7968408.
8. Samuel P. Prahlow, Joseph A. (2016). Prahlow Fatal Dragging Deaths with Soft Tissue and Bone Grinding Injuries Acad Forensic Pathol. 6(4): 709-719
9. K. Tamilmani, (2021). Principles and Basics of Autopsy 1st ed, Tamilnadu (India): mahi publication. p. 27-39
10. Zaba C, Lewandowski A, Kolowski J, Tezyk A (2011). Pieszy ciagnietyprzez samochod ciezarowy [Pedestrian dragged under a truck]. Arch Med Sadowej Kryminol. 61(2):176-80. Polish. PMID: 22390132.