

## BRIEF RESEARCH

## Dilemma of Antemortem and Post-mortem Fracture: A Brief Research

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### Abstract:

The major duties of a medicolegal system in handling deaths falling under its jurisdiction are to determine the cause and manner of death, identify the deceased if unknown, determining the time of death and injury, collecting evidence from the body that can be used to prove or disprove an individual's guilt or innocence and to confirm or deny the account of how the death occurred, documenting injuries. However, the most important query that is to be solved during autopsy is to designate an injury as either post-mortem or antemortem. Five cases are discussed here to differentiate antemortem and post-mortem injury. There are various permutations and combinations that makes it difficult to designate an injury antemortem. Even when an injury is antemortem, one couldn't find the properties of it due to the dynamic process of sustaining an injury. Infiltration of blood in the fractured ends of bones is a process that needs time to appear and depends on the severity of injuries sustained over the body. If the process of sustaining the injuries is sudden and there is rupture of greater blood vessels, one cannot find any infiltration of blood in the bony trabeculae on autopsy.

**Keywords:** Autopsy; Antemortem; Post-mortem; Injuries; Fracture; Railway incidents.

### Introduction:

Blood itself is an extremely important entity in the medicolegal practice, which alone or along with other trace evidences can play a clinching role to unfold different criminal problems. It is the task of the police to collect such evidence from the scene and of the autopsy surgeon to collect such evidence from the victim's body/clothing, etc., which may help the police in locating matching materials from the suspect(s) in order to provide objective evidence of their presence at the scene.<sup>1</sup> One of the important aspects of the visit to the scene of crime is searching for and interpretation of bloodstains. Relatively minor blood smearing may also provide significant evidence, such as a smear on the door handle. Heel prints or shoe prints on bloodstained area of the body, help in the identification of the assailant. The distribution and amount of blood at the scene of the crime may give valuable information about the manner of death, whether it was suicidal or homicidal, and whether the victim struggled or moved about after his injuries.<sup>2</sup> As per the Locard's principle of exchange, it could be certain by foreign blood stain over the dead body found in suspicious circumstances for example dried blood found over the lips and nostrils in cases of smothering when the struggling victim bites overt the hand of assailant. The substantiality of extravasation of blood in the soft tissues or bony structures to differentiates between antemortem and post mortem injury is already proven in literature. Many times, in cases of either decomposed dead bodies or the body with extensive disintegration brought from the railway track and multiple

runover the body after a road side accident confusing the investigating authorities as well as the autopsy surgeons in ascertaining the cause of death as its difficult to differentiate between antemortem and post-mortem nature of injuries. However, meticulous and thorough examination with sceptical eye examination of these types of injuries on the basis of infiltration and extravasation of blood could make it possible to designate the antemortem and post-mortem nature of injury. In this case series the author will discuss about the dynamic role of blood infiltration in the fractured ends of bones via different autopsy cases of railway track incidents.

### Case 1:

A body of middle-aged male individual was received in the mortuary for autopsy after a railway accident to decide the cause and manner of death. On examination, the body was found into two pieces transected at the mid i.e. at pelvis. As per the history and police inquest papers, the body was of a male beggar who jumped in front of a running train with an intent of suicide. The incident was reported by the pilot of train by which this incident occurred. On autopsy, both the lower limbs were found detached from the torso and were inside a black coloured trouser which was found torn from its waistline (Figure 1 and 2). The frilled ends of the trouser showed some blackish greasy material suggestive of the grease from the railway engine. A crush injury was present over the distal end of upper half of the body with crushed intestinal loops and urinary bladder with a stump of proximal part of left femur bone of size 12 cm. On examination of the fractured end of left femur bone using a hand lens, there was no infiltration of blood into the bone marrow and cortex of fractured ends of bone. After such a disintegrating injury to the body by the train, there was extensive pooling of the blood from the body and no blood was remained in the body to infiltrate the fractured ends of bones. Multiple reddish abrasions were present over the posterior

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Figure. 1

Figure. 2



Figure. 3



Figure. 4

aspect of the body which were antemortem in nature. Cumulatively, the injuries sustained over the bodies were antemortem in nature as the whole event was dictated by the eye witnesses.

**Case 2:**

The author received a mutilated dead body with a history of railway track accident a day before. As per history, the patient was a diagnosed case of major depressive disorder and was on anti-depressive treatment. On examination, the dead body of a male individual wrapped in a white sheet of cloth. It had crush injury over the abdomen and both lower limbs were found amputated below the level of knee joint (Figure 3 and 4). The fractured ends of bones showed no infiltration of blood in their bony trabeculae. The case was reported by the train pilot and the deceased came and jumped in front of train with a clear suicidal intent.

**Case 3:**

Received dead body of a male individual after an alleged incident of railway track injury. After the incident the deceased was taken to our facility and was declared dead. On examination, the left upper limb was found traumatically amputated from the left shoulder joint. The left lower limb was found traumatically amputated from the mid of thigh with a crush injury (Figure 5). The right lower limb was found traumatically amputated below the knee leaving behind a stump of upper one third of right leg and crush injury. The fractured ends of bones showed no infiltration of blood in their bony trabeculae.

**Case 4:**

We received a dead body of male individual after an accidental railway track injury. The deceased has crush injuries over both arms with both humerus bones fractured in multiple pieces (Figure 6 and 7). The body was autopsied and the fractured ends of long bones showed infiltration of blood in their bony trabeculae.

**Case 5:**

The dead body of a male individual after a railway track accident. The right lower limb was found amputated. The right femur bone



Figure. 5



Figure. 6



Figure. 7



Figure. 8



Figure. 9

**Interpretation and analysis:**

Case Number	Antemortem Injuries	Post-mortem Injuries	Major Blood Vessels Injury	Infiltration of blood
01	Yes	No	Yes	Absent
02	Yes	No	Yes	Absent
03	Yes	No	No	Absent
04	Yes	Yes	No	Present
05	Yes	Yes	No	Present

was found fractured through and through with infiltration of blood in their bony trabeculae (Figure 8 and 9).

**Discussion:**

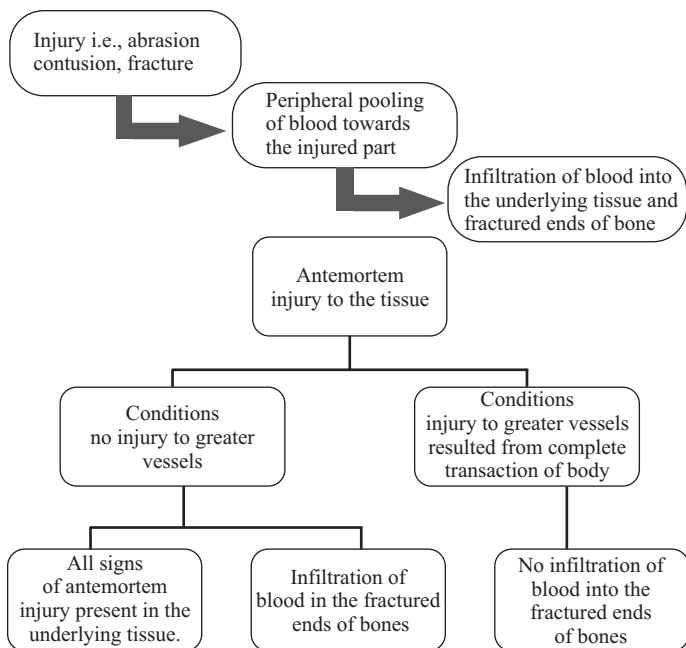
An abrasion or graze is a superficial injury involving (generally) outer layers of skin without penetration of full thickness of the epidermis. They are caused when there is contact between a rough surface and the skin, often involving a tangential 'shearing' force.<sup>3</sup> Antemortem abrasions have a reddish-brown appearance and heal without scarring. Abrasions produced after death are yellow and translucent with a parchment-like appearance.<sup>4</sup> A contusion is an extravasation or collection of blood due to rupture of blood vessels caused by application of mechanical force of blunt nature without loss of continuity of tissue.<sup>5</sup> Contusions may be present not only in skin, but also in internal organs, such as the lungs, heart, brain, and muscles. One of the most commonly heard statements in regard to contusions is that they indicate that the injury was incurred prior to death, because one cannot form a contusion after death. This is not absolutely correct. Contusions can be produced post-mortem if a severe blow is delivered to a body within a few hours of death. The blow can rupture capillaries, forcing blood into the soft tissue and producing a

post-mortem contusion identical in appearance to an antemortem contusion. Postmortem contusions rarely occur and are most commonly seen in skin and soft tissues overlying bone or bony prominences such as in the head. Microscopic examination of a contusion to determine whether it is antemortem or postmortem is usually of no help, because, in most cases, the antemortem injuries are incurred immediately prior to death and there is insufficient time for tissue reaction.<sup>4</sup> When the tissues get crushed or stretched beyond the limits of their elasticity thus tearing off leading to the formation of lacerated wound. The lacerated wound is caused by a blunt trauma. Thus, it may be caused in falls, in accidents and in blows to chest, abdomen, head etc. by blunt object.<sup>6</sup> A fracture is a break in the continuity of a bone. On the basis of quantum of force causing fracture, fracture is classified into high-velocity injury fractures sustained as a result of severe trauma force, as in traffic accidents where there is severe soft tissue injury (periosteal and muscle injury) with extensive devascularisation of fracture ends and low-velocity injury fractures sustained as a result of mild trauma force, as in a fall where there is little associated soft tissue injury and hence these fractures often heal predictably.<sup>7</sup>

The most frequent query that arise after a transportation related death is how the injuries over the body came about. Homicidal traffic deaths are rare, though the author (BK) has been involved in one incident where racial hatred led to the running-down of youths of one ethnic group – and another where a man repeatedly crashed the near-side of his own car in an effort to kill his passenger. Attempts at deliberate self-destruction by the use of a motor vehicle are said to be not uncommon, though this is difficult to prove in most cases. Once again, the evidence is more likely to be based on circumstantial rather than medical evidence—a matter for the investigating authorities rather than the pathologist.<sup>8</sup>

Among the transportation injuries, railway track related deaths

**Concept and theory:**



are the most difficult to classify as either antemortem and post-mortem because criminal act can easily camouflage behind the extensive disintegration of body by the heavy machinery. However, circumstantial evidences and detailed autopsy can clear the incertitude regarding the cause and manner of death.

**Conclusion and summary:**

Infiltration of blood in the fractured ends of bones is a process that needs time to appear and depends on the severity of injuries sustained over the body. If the process of sustaining the injuries is sudden and there is rupture of greater blood vessels, one cannot find any infiltration of blood in the bony trabeculae on autopsy as the blood drains out as soon as possible in a severed vessel. However, it is difficult to say with certainty in cases where the injuries sustained posthumously as long as perimortem period lasts. Therefore, it is the need of an hour that more research should be conducted in demarking an antemortem injury from the post-mortem one.

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**Ethical clearance:** In Indian legal system, consent of the relatives is not necessary for autopsy performed in medicolegal cases. As these are medicolegal autopsies, the particulars of the deceased are not revealed and kept confidential with the authors, so ethical clearance is not required in this present case series.

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