

Cars, Cretins, and Conspecifics: The many faces of trauma  
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Soft tissue and bony injuries have varied etiologies, most of which are natural or accidental. Some injuries, though, are the result of intentional abuse and may be legally actionable. Knowledge of trauma mechanics and patterns of injury helps the veterinary pathologist differentiate between accidental and non-accidental injuries. Opinions based on this knowledge may then assist law enforcement in the pursuit of cases of potential abuse, neglect, and cruelty, or wildlife take.

The manifestations of trauma reflect the capacity of different tissues to withstand the forces placed upon them. The most resilient tissue in the body, the skin, is constantly under tension and has the greatest capacity to stretch. Interspecific trauma may result in tooth punctures of the skin while the underlying, less resilient muscle is deeply torn by the teeth of the opponent. Similarly, contusions without breaks in the tissue may be seen in both the skin and muscle after an animal has been hit by a car, while the liver exhibits deep lacerations and hemorrhage from the blunt impact.

Conversely, bones of the spine and appendicular skeleton are constantly under compression and are much stronger in this vector than when exposed to distracting forces. The character of bone fractures is dictated by the force (speed and weight) applied to a bone during a trauma episode. High speed and/or high weight forces (e.g., bullet or highway HBC) are more likely to cause comminuted fractures than slow speed and/or light weight impacts (e.g., residential HBC). The character of the fracture can be used to speculate on the exogenous and endogenous forces that were at work on the bone at the time of the trauma.

Injuries sustained from accidental trauma and from non-accidental injury (NAI; e.g., abuse) may overlap. Comparison of several studies found that pelvic fractures are more often seen in motor vehicle accidents than in NAI. Rib fractures in animals that survive the impact of a vehicle are most often unilateral and occur in clusters (2-4 adjacent ribs). Rib fractures can be unilateral or bilateral in fatal HBCs. Limb fractures are more common in NAI cases than in dogs and cats that survive a vehicular impact. Scleral hemorrhage is also significantly associated with NAI.

Injuries sustained from fighting between animals may mimic other trauma, such as gunshot wounds or HBC. The relative sizes of the opponents inform the injuries seen. A larger dog, for example, will cause injury to the back and head of a small dog, whereas dogs of equal size target the forelimbs, hind limbs, and neck. In contrast, dogs specifically trained to fight each other will attack the front of the body almost exclusively.

Trauma is a heterogenous diagnosis that requires thorough investigation. The mechanical properties of bones and soft tissues cause these tissues to form lesions in predictable ways. Damage to bones, muscles, and internal organs is often more informative than what is visible on the skin surface. With the knowledge of these properties and lesion distribution commonly seen in different categories of trauma, the pathologist can make an informed opinion on veterinary forensic cases.

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