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## Carapace fracture management in Indian star tortoise

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### Abstract

Carapace fracture in Indian star tortoise was commonly encountered followed by accident/ falling down from a height. Two cases were presented with fracture carapace; one of that had accidental injury, whereas second had falling down history. X-ray examination was carried out to rule out further abnormalities, but both cases had no any internal abnormalities detected. Carapace fracture management was carried out under isoflurane inhalant gaseous anaesthesia, where induction of anaesthesia in both cases were achieved by putting them in gaseous chamber till anaesthetized. Fracture reduction was carried out by placing orthopaedic screws up to the depth of carapace and applied tension band wiring on orthopaedic screws. Epoxy adhesive solution was applied on external fracture ridge after reduction of fractured carapace to avoid environmental contamination. Antibiotic and anti-inflammatory drugs were offered orally for 7 days. Tension band wiring and orthopaedic screws were removed after 35 days.

**Keywords:** Carapace fracture, tension band wiring

### Introduction

Star tortoise (*Geochelone elegans*) is common in India; where accidental injuries to carapace are also routinely encountered. Management of carapace fracture is challenging due to minimum external support for immobilization and having potential high risk in injectable anaesthesia.

The chelonian shell composed of at least 67 bony plates of dermal origin and covered by epidermal keratin scutes<sup>[1]</sup>. The shell divided into the upper carapace and lower plastron, where unique configuration separates the chelonian anatomy from other reptiles, with the shell providing support and protection. Carapace fractures were the most common orthopaedic involvement in these animals due to predator attack, human conflicts, accidental or faulty handling<sup>[2]</sup>.

Following standard orthopedic principles, the ideal shell repair should produce perfect apposition and stability, while allowing for visual assessment of healing. In the past, shell repair using epoxy and fiberglass cloth was popular. More recent methods for shell repair include various methods of wiring, bridging, or bracing fractures<sup>[3]</sup>.

### Case History

Star tortoises (n=2) were presented with the history of accidental injury before 2 days on one, whereas fall down from a height in another. Both animals were dull, lethargic & anorectic (fig.1)



**Fig 1:** Fracture of carapace

## Diagnosis

Physical examination revealed fracture on dorsal & lateral region of carapace with partial exposure of coelomic cavity. After clinical examinations x-ray examination was carried out to rule out internal damaged. X-ray examination revealed no any internal organs abnormality.

## Surgical Management

Anaesthesia induction was carried out by using isoflurane gas anaesthesia chamber for both cases (Fig.2), star tortoises were placed inside chamber till stage of anaesthesia. Open fracture site of both cases was prepared aseptically by application of 7.5% povidone iodine, followed by normal saline washing and application of spirit at site. Orthopaedic 3.2mm screws were fixed up to the depth of carapace with the help of electric drill machine and 2.7mm drill bite to make holes in side carapace to insert orthopaedic screws (Fig.3). Tension band wiring (Fig.4) was applied in between orthopaedic screws to reduce and withhold carapace fracture. Epoxy adhesive solution was applied on external fracture ridge after reduction of fractured carapace (Fig. 5) to avoid environmental contamination. Syrup. *Amoxicillin sulbactam* was offered orally @ 5mg/kg BID along with syrup. Meloxicam @ 0.5mg/kg antibiotic and anti-inflammatory drugs were offered orally for 7 days. Tension band wiring and orthopaedic screws were removed after 35 days in both the Indian star tortoise without any complication.



Fig 2: Anesthetic chamber with isoflurane



Fig 3: Drilling for screw fixation



Fig 4: Tension band wiring



Fig 5: Epoxy adhesive application



Fig 6: Recovery of carapace fracture

## Conclusion

Indian star tortoise had frequent carapace fractures followed by injury, whereas only fractured carapace needs to reduce fracture gaps. Tension band wiring on orthopaedic screws fixed in carapace provides better fracture reduction with better withholding capacity as compared to other techniques of carapace fracture repair. Healing of carapace required 30-40 days (Fig.6).

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