

## Surgical management of a compound tibiotarsus fracture in a rose-ringed parakeet (*Psittacula krameri*) - A case report

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### Abstract

A 2-year-old Rose-Ringed Parakeet was presented with a history of physical trauma. On physical examination, it was revealed a compound fracture of the right tibia. The fracture was reduced and stabilized by the application of intra medullary 18 G sutureless stainless steel surgical needle, in a retrograde manner. Modified Robert Jones along with a splint was applied as protective bandage. Post-operatively the antibiotic and analgesic were advised. The bird was assessed for recovery by physical and radiographic evaluation after 2 months of surgery. The X-rays showed good callus accumulation and healing of the fractured part, and the bird regained its normal gait. Hence, it is concluded that the use of a stainless-steel needle corresponding to the required size is an effective and successful immobilization process in the tibiotarsus fracture repair of a parakeet.

**Keywords:** Indian Rose-Ringed Parakeet, Surgical stainless-steel straight needle, Tibiotarsus fracture, Trauma

### Highlights

- Compound fracture of the right tibiotarsus bone
- Xylazine-ketamine combination was used as anaesthetic protocol.
- 18 G surgical stainless-steel needle was used for fracture immobilization.
- Complete healing of the fractured bone following 2 months of surgery

Among household exotic birds, Indian Rose-Ringed Parakeets also, known as ring-neck parrots are reared as the most common pets (Pruett-Jones, 2021). Though the majority of them are kept in captivities like cages, sometimes owners keep them like free-ranging birds inside the house. In such cases, birds meet most injuries and traumas. The major trauma and injury-related concerns in these pet birds include beak trauma, fracture or avulsions of the tibiotarsus bone, radio-ulnar fractures, or wing trauma and lacerations. In birds, the tibiotarsus is a large type of bone, positioned in between the femur and tarsometatarsus. The proximal tarsus fuses with the tibia, appearing as tibiotarsus (Zehnder et al., 2014). Fracture of this part due to trauma is a common problem, as reported in this case. Among the tibiotarsus fractures, most of them lead to compound situations, due to the comparatively higher mineral content in avian bones, and distal one third of the bone comprises less soft tissue protection causing the fractured parts directly penetrate skin leads to compound fractures. Moreover, due to the thin cortices of the bones, they do not support implants as well and the large medullary canals are tough to fill without

adding excessive weight to the affected limb (Houston, 1993). In the present report, surgical management of a trauma-led tibiotarsus compound fracture has been described along with supportive care.

A 2-year-old, Indian Rose-ringed parakeet weighing 200 g, was reported in the ward with a history of physical trauma 6-8 hours before presenting in the clinic. The triage was decided by cleaning the wound and stabilizing the bird for the moment. An emergency dose of dexamethasone @ 1 mg kg<sup>-1</sup> was administered intramuscularly to relieve the shock and stimulate the body functions of the bird (Gröger & Grimm, 1989). Clinical examination revealed a compound fracture of the right tibiotarsus bone and surrounding soft tissue injury (Fig. 1). The site was temporarily dressed with local antibiotic gentamicin applied on the wound and covered with sterile gauze for further diagnostic evaluations. X-ray evaluation revealed a complete distal one-third diaphyseal fracture of the right tibiotarsus, with protruded proximal part out of the skin, and moderate surrounding soft tissue damage (Fig. 2). Emergency surgical planning was carried out for internal fixation of the fracture followed by

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repairing of the surrounding adnexa.

The bird was anaesthetized by intramuscular administration of xylazine and ketamine mixed in a single syringe @40 mg kg<sup>-1</sup>, and @3 mg kg<sup>-1</sup> respectively (Vesal & Eskandari, 2006). The limb was properly clipped and prepared aseptically following anaesthesia. The bird was placed on left lateral recumbency and supplementary oxygen and thermal pad were provided. An intramuscular injection of antibiotic and analgesic, viz. enrofloxacin @15 mg kg<sup>-1</sup> and meloxicam @1 mg kg<sup>-1</sup> was administered before repair (Flammer et al., 1991; Beaufrère et al., 2019). Following debridement of the wound, the fracture parts were reduced and an 18 G sterile stainless-steel needle was introduced in a retrograde fashion (Fig. 3). Diluted adrenaline (1:9) was used topically to check capillary bleeding (Ring et al., 2014). The wound was closed routinely with 2-0 nylon, thereby immobilization the limb with a modified Robert Jones bandage along with a splint. The bird was kept under observation with oxygen supplementation and heat padding and showed uneventful recovery. The bird was advised on oral antibiotic viz. enrofloxacin @15 mg kg<sup>-1</sup> body weight for 7 days long with analgesic meloxicam @1 mg kg<sup>-1</sup> for 3 days. Routine dressing was advised on alternative days up to 5 occasions. The sutures were removed after 10 days of surgery. The needle was removed 2 months post-surgery without any complication. The bird was undergone mild sedation by induction of isoflurane by a musk and withdrew following the needle removal.

Following surgery, the post-operative radiograph showed proper alignment of the bones with the desired reduction (Fig. 4). The bird showed recovery without any complications. The 1 and, 2-month post-operative X-rays showed proper healing and callus formation (Fig. 5 and 6).

The fracture of the tibio-tarsus bone is one of the most common orthopedic incidences that requires immediate intervention. A similar case was reported by clinicians, repaired with an orthopedic wire of 18 G. Callus in the fractured site, mainly progressed from the surface of the periosteum, and the periosteal blood circulation is important from the surrounding soft

tissues, therefore requiring proper immobilization (Wan et al., 1994). Generally, birds show a faster recovery process than other animals, and the bones sufficiently heal after 3-4 weeks of care in most the cases. In many cases, studies showed the use of external fixator devices set up especially for birds to achieve immobilization. However, providing internal fixing along with external fixation techniques showed better outcomes for fracture management (Azmanis et al., 2014). Several studies have been found with the use of k-wires, orthopedic plates, intramedullary stainless-steel pins, and use of external fixation either alone or incorporation with internal fixations, and the outcome showed promising results in healing of the fractures and gaining flight and normal ability of the birds undergone trauma and surgery (Yamazoe et al., 1994; Suryawanshi et al., 2021), but, considering the availability, and low-cost, stainless steel straight needle yielded promising result as an alternative to K-wire or other internal fixation devices in birds.

Summarizing the contents and procedures, it can be concluded that the use of sterile stainless-steel needle for intramedullary pinning corresponding to the size is a successful technique and a promising alternative to other internal fixation devices in repairing tibio-tarsus fracture of parakeets.

**Conflict of interest:** Authors have no conflict of interest in this study.

**Author's contribution:** DP: Surgical management, data compiling, draft writing; PR, CBR, DKS: Surgical management; DG, SR: Overlooking, data analysis and revision of the draft; PM: Surgical management, data analysis, overlooking and revision of the draft.

**Data availability statement:** The data mentioned in the article will be available with the corresponding author.

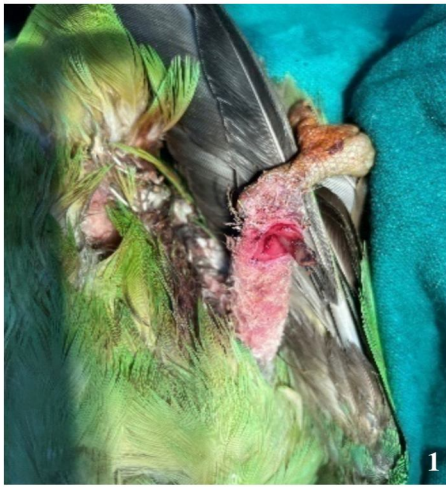
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## REFERENCES

- Azmanis, P. N., Wernick, M. B., & Hatt, J. M. (2014). Avian luxations: occurrence, diagnosis and treatment. *The Veterinary Quarterly*, 34(1), 11–21. <https://doi.org/10.1080/01652176.2014.905731>
- Beaufrère, H., Lanièsse, D., Kabakchiev, C., Axelson, R., & Zur Linden, A. (2019). Multiple fractures and luxations of palatofacial bones in a hawk-headed parrot (*Deroptyus accipitrinus*). *Journal of the American Veterinary Medical Association*, 254(2), 251–256. <https://doi.org/10.2460/javma.254.2.251>
- Flammer, K., Aucoin, D. P., & Whitt, D. A. (1991). Intramuscular and oral disposition of enrofloxacin in African grey parrots following single and multiple doses. *Journal of Veterinary Pharmacology and Therapeutics*, 14(4), 359–366. <https://doi.org/10.1111/j.1365-2885.1991.tb00849.x>

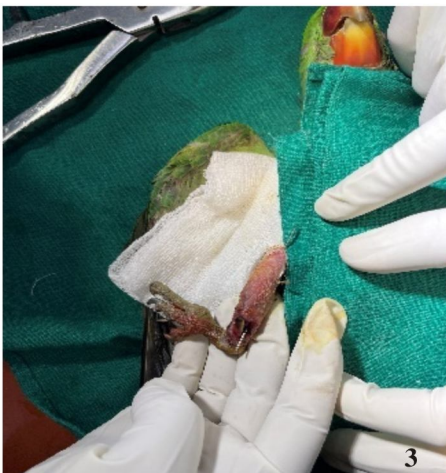
Repair of compound tibiotarsus fracture in an Indian red necked parakeet



**Fig. 1.** Compound fracture of the right tibiotarsus and soft tissue injury



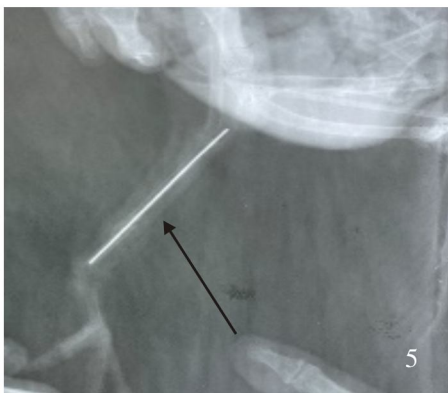
**Fig. 2.** Pre-operative Skiagram



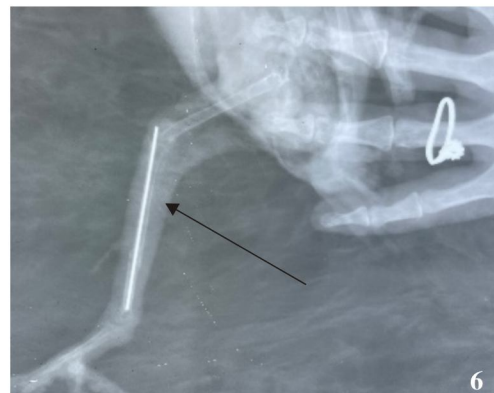
**Fig. 3.** Retrograde introduction of 18 G sterile surgical stainless-steel needle



**Fig. 4.** Post-operative Skiagram



**Fig. 5.** 1-month post-operative radiograph (Callus formation- black arrow)



**Fig. 6.** 2-month post-operative radiograph (Callus formation- black arrow)

- Gröger, U., & Grimm, F. (1989). Dexamethason- und Prednisoloneinsatz bei Tauben [Dexamethasone and prednisolone use in pigeons]. *Tierärztliche Praxis*, 17(2), 167–170.
- Houston, D. C. (1993). The incidence of healed fractures to wing bones of white-backed and Rüppell's griffon vultures *Gyps africanus* and *G. rueppellii* and other birds. *Ibis*, 135(4), 468–469. <https://doi.org/10.1111/j.1474-919X.1993.tb02122.x>
- Pruett-Jones, S. (Ed.). (2021). *Naturalized parrots of the world: Distribution, ecology, and impacts of the world's most colorful colonizers* (pp. 1-155). Princeton University Press. <https://doi.org/10.2307/j.ctv1g13jxb>
- Ring, J., Beyer, K., Biedermann, T., Bircher, A., Duda, D., Fischer, J., Friedrichs, F., Fuchs, T., Gieler, U., Jakob, T., Klimek, L., Lange, L., Merk, H. F., Niggemann, B., Pfaar, O., Przybilla, B., Rueff, F., Rietschel, E., Schnadt, . . . Brockow, K. (2014). Guideline for acute therapy and management of anaphylaxis: S2 guideline of the German Society for Allergology and clinical immunology (DGAKI), the association of German Allergologists (AeDA), the Society of pediatric allergy and environmental medicine (GpA), the German Academy of Allergology and environmental medicine (DAAU), the German professional association of pediatricians (BVKJ), the Austrian Society for Allergology and immunology (ÖGAI), the Swiss Society for allergy and immunology (SGAI), the German Society of Anaesthesiology and Intensive Care Medicine (DGAI), the German Society of Pharmacology (DGP), the German Society for Psychosomatic Medicine (DGPM), the German Working Group of Anaphylaxis Training and Education (AGATE) and the patient organization German Allergy and Asthma Association (DAAB). *Allergo Journal International*, 23(3), 96-112. <https://doi.org/10.1007/s40629-014-0009-1>
- Suryawanshi, R. V., Ubhare, G., Pande, G., & Ulemale, A. H. (2021). Surgical repair of a tibiotarsal fracture by intramedullary pinning in goose-a case report. *The Haryana Veterinarian*, 60(SI), 143-144.
- Vesal, N., & Eskandari, M. H. (2006). Sedative effects of midazolam and xylazine with or without ketamine and detomidine alone following intranasal administration in ring-necked parakeets. *Journal of the American Veterinary Medical Association*, 228(3), 383-388. <https://doi.org/10.2460/javma.228.3.383>
- Wan, P. Y., Adair, H. S., Patton, C. S., & Faulk, D. L. (1994). Comparison of bone healing using polydioxanone and stainless steel intramedullary pins in transverse, midhumeral osteotomies in pigeons (*Columba livia*). *Journal of Zoo and Wildlife Medicine*, 25(2), 264-269.
- Yamazoe, K., Hibino, C., Kudo, T., & Yanai, T. (1994). The reduction of humeral fracture in pigeons with intramedullary poly (methyl methacrylate) and neutralization plate fixation. *The Journal of Veterinary Medical Science*, 56(4), 739-745. <https://doi.org/10.1292/jvms.56.739>
- Zehnder, A. M., Hawkins, M. G., & Pascoe, P. J. (2014). Avian anatomy and physiology. In: G. West, D. Heard, & N. Caulkett (Eds.), *Zoo Animal and Wildlife Immobilization and Anesthesia*, (pp.389-398). New York: Wiley-Blackwell. <https://doi.org/10.1002/9781118792919.ch23>