Fixation of a Radius and Ulna Fracture in an Asian Elephant Calf by Using Fibreglass Casts

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A two-year old male Asian elephant (*Elephas maximus*) calf at the Pinnawala Elephant Orphanage was observed to be limping, favouring his right front leg in the morning of 5th July 2017. The calf was kept untethered with his mother in a separate shed at night and he might have had a fall while attempting to climb on the iron bars of the shed. The limb was noticeably swollen (Fig. 1) from elbow to the carpal joint. Xylazine was administered intramuscularly (Table 1) using a blowpipe and, radiographs taken in the standing position. Sedation was reversed with yohimbine hydrochloride. Radiographs revealed a complete mid-shaft oblique fracture involving both radius and ulna (Fig. 2). Drugs administered consisted of 10 ml of dexamethasone intramuscularly, daily for five days, frusemide 1200 mg with potassium chloride 1800 mg twice a day for 14 days and 10 ml of long acting penicillin at four day intervals for 1 month.

Two days after the incident, the calf was sedated again (Table 1), restrained on lateral recumbency on grass bedding and the trunk connected to a mask supplying oxygen. After thorough scrubbing of the affected leg using povidone iodine and then isopropyl alcohol, a Robert Jones bandage was applied to stabilize the fracture allowing the swelling to be resorbed. Immobilization was obtained by including joints both proximal and distal to the fracture in the bandage (Fig. 3). The bandage included two internal layers of orthopedic cotton padding, two layers of gauze bandage as an intermediate layer and two outer layers of elastic adhesive bandage.

In order to better stabilize the fracture by neutralizing the possible forces of bending, rotation, shortening and distraction, it was decided to apply a fibreglass (3M Scotchcast™) cast. Therefore 7 days after the incident, the

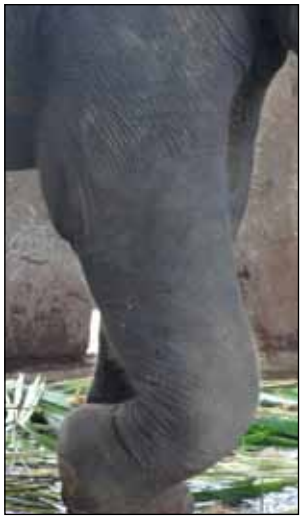
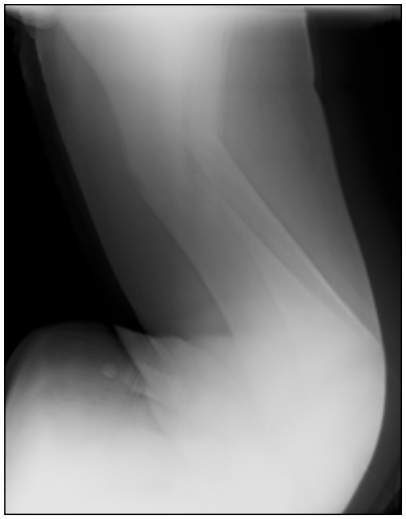

Fig. 1. Swollen leg. **Fig. 2.** Radiograph. **Fig. 3.** Robert Jones bandage. **Fig. 4.** First fibreglass cast

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Table 1. Drugs history of sedation. YH = yohimbine hydrochloride. RT = recovery time after antidote.

Sedation #	Initial xylazine IM [mg]	Sedation time [min]	Procedure time [min]	Additional xylazine IM	Subsequent xylazine IV	YH IV [ml]	RT [sec]
1	50	8	17	No	No	2.5	30
2	40	10	8	No	No	2.5	30
3	40	32	38	28 min later 30 mg	No	3	30
4	50	11	90	51 min later 20 mg 115 min later 10 mg	No	2	25
5	50	82	54	20 min later 30 mg 52 min later 30 mg 63 min later 40 mg	71 min later 10 mg 76 min later 20 mg	5	20

calf was sedated again and the Robert Jones bandage removed. Two layers of orthopaedic cotton padding, two layers of gauze bandage and an external layer of fibreglass bandage (3M™ Scotchcast™ Plus casting tape) was applied (Fig. 4). The Scotchcast hardened within 10 min and the entire casting process took 38 min.

Twenty days after the incident, as the swelling had gradually reduced, the scotch cast slid down on the leg. Therefore after sedating the calf again, while on lateral recumbency on grass bedding, a new fibreglass cast was applied to confirm to the measurements after the swelling reduced. After removing the first cast, four custom-made aluminium plates with appropriate curves and bends were placed over the fracture area so that the joints below the elbow in that leg could not be bent (Fig. 5). This procedure required an extended time and two additional doses of xylazine were given (Table 1). The site of fracture was aseptically prepared with povidone iodine and isopropyl alcohol and two layers of orthopaedic cotton padding, then gauze bandage and thereafter a single layer of fibreglass tape, were applied. Four aluminium splints, prepared based on specific measurements of the calf, were placed on the first fibreglass tape layer, and secured with a layer of adhesive plaster. Two layers of fibreglass tape were applied over the splints thereafter. The calf was left sedated for 20 min for hardening of the cast. This fibreglass cast was kept for 47 days.

During removal of the second fibreglass cast with aluminium plates, no complications were observed except for minor pressure wounds. Subsequently, 65 days after the incident, four new custom-made aluminium plates were placed on the new fibreglass cast layers after sedation (Fig. 6). Several additional doses of xylazine were given to obtain satisfactory sedation (Table 1). However the calf did not tolerate this cast and removed it on his own 2 weeks after its application. Repeated sedation required increasing volumes of xylazine as intramuscular or intravenous injections.

Currently, the calf is applying weight on the fractured leg with a mild limp (Fig. 7). To our knowledge this is the first successful use of fibreglass casts, on an elephant calf in Sri Lanka.

Fig. 5. Second fibreglass cast.

Fig. 6. Third fibreglass cast.

Fig. 7. Recovered calf.