

## Traumatic toenail wound in a Thai elephant (*Elephas maximus indicus*)

Lynette Ong Huey<sup>1</sup>, Agik Suprayogi<sup>2</sup>, Aryani Sismin Satyaningtjas<sup>2</sup>, Damiana Rita Ekastuti<sup>2</sup>, Hera Maheshwari<sup>2</sup>, Isdoni Bustamam<sup>2</sup>, Koekoeh Santoso<sup>2</sup>, Pudji Achmadi<sup>2</sup>, Wasmen Manalu<sup>2</sup>, Sat-tabongkoch Maneewong<sup>3</sup>, Ronald Tarigan<sup>2,\*</sup>

<sup>1</sup> Veterinary Professional Education Program, School of Veterinary Medicine and Biomedical Sciences, IPB University

<sup>2</sup> Division of Physiology, School of Veterinary Medicine and Biomedical Sciences, IPB University

<sup>3</sup> Krabi Elephant Hospital, Krabi, Thailand

**ABSTRACT:** Elephant is Thailand’s national animal which represents three aspects: loyalty, longevity, and strength. Thai elephants are often used for deforestation and tourist activities, such as elephants, riding, and showering. This case report highlights a traumatic wound in the left foreleg nail of a showering Thai elephant. Nail wounds undergo infection and tissue necrosis. A bone fragment suspected to be part of the distal phalanges was found and confirmed by X-ray examination. However, a surgical approach is not recommended because of the high risk of sedation in elephants. Routine wound cleaning with antiseptics and topical antibiotics was performed on the traumatic wounds. The bone fragment was removed after necrosis of the surrounding tissues. The prognosis for this case was considered good based on the location and wound condition.

**Keywords:**

distal phalange, Thai elephant, traumatic wound

### INTRODUCTION

Wildlife conservation is crucial for maintaining ecological balance, which becomes more pressing as the global population grows and resources become scarcer (Stiles 2004). To combat habitat destruction and animal loss, conservation efforts are expanding. In Thailand, both governmental and non-governmental organisations, as well as individuals, have made significant progress in safeguarding the national symbol, the elephant (Bansiddhi *et al.* 2020).

Asian elephant has been the representative of national animal for loyalty, longevity, and strength in Thailand. They are often used for deforestation activities and tourist activities including elephant riding, elephant showering, or elephant show. Thus, it is very common to find cases of elephants with traumatic wounds (Ubaidillah *et al.* 2018). A variety of foot postures can be found in mammals due to the adaptation to the diverse environments. These foot postures include plantigrade, digitigrade, and unguligrade. Elephants are plantigrades which utilize the whole foot for walking purpose, similar to humans (Kubo *et al.* 2019). This case report highlights the traumatic wound on the left foreleg nail of a showering Thai elephant at Krabi Elephant Hospital.

### CASE

**Signalment and Case History:** A forty-five-year-old female Asian elephant (*Elephas maximus indicus*) was brought to the Krabi Elephant Hospital by the owner and mahout, with complaints of a traumatic wound on the left foreleg, third

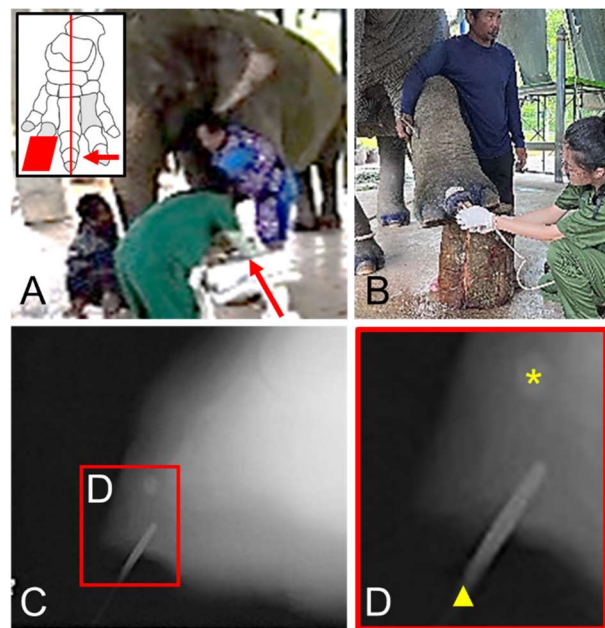


Figure 1. Radiography and treatment of the toenail of Thai elephant. (A) X-ray examination performed on an elephant using a mobile x-ray unit, (B) wound cleaning using combination of normal saline and antiseptics, (C) radiogram showed the presence of a small bone fragment (yellow star in red box) near the distal phalange of the left forelimb, and (D) (inset) with a hemostatic clamp inserted through the wound as a guidance (yellow triangle).

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toenail. The elephant is a showering elephant which is used for tourist attraction. The toenail wound has not seemed to be recovering due to long underwater exposure. **Clinical Examination:** Body weight of 3,780 kg and body condition score is 4.5, based on the observation from the temporal muscles, scapula, ribs, hips, and the backbones. The capillary refill time can be done on the oral mucosa or the rectal mucosa and the results are <3 seconds. Several areas of tissues around the wound have undergone necrosis including the epidermis and dermis. No lameness was observed from the elephant. There was a firm object palpated from the wound, suspected to be a bone fragment. **Ancillary Test:** An x-ray examination was performed by using a mobile X-ray unit (Figure 1A and B). Latero-medial view was taken from the left side of the elephant, with the left forelimb elevated on a log. The results of the X-ray examination showed the presence of a small bone fragment found near to the distal phalange of the left forelimb (Figure 1C and D). **Diagnosis:** Traumatic wound has been infected and undergoes necrosis on the tissues surrounding, bone fragment was discovered, suspected to be trauma-induced distal phalange bone fracture. **Prognosis:** Fausta, judging from the location of necrosis and bone fragment that can be easily reached and removed. **Treatment:** The wound is cleaned routinely, once a day in the morning by using diluted chlorhexidine, diluted povidone iodine, and normal saline irrigation. After drying, the wound is inserted with a mixture of povidone iodine and penicillin powder on a clean gauze (Figure 1B). The gauze will be fitted and placed in the wound and will be removed and replaced on the next day.

## ■ RESULTS AND DISCUSSION

As a mechanical barrier, the skin protects an individual from the external environment containing mechanical, chemical, and microbial harms. Wound management is the key to successful traumatic wound healing. This physiological process helps maintain skin integrity after trauma (Labib & Winters 2022). Infection can inhibit normal wound healing. Due to prolonged infection, the toenail wound has been infected slightly deeper into the toe, as it loses the innate barrier function of the skin and dermal appendages. This may accelerate bacterial colonisation (Withycombe *et al.* 2017).

Standard wound management for chronic wounds consists of cleaning, dressing, and debridement in certain cases. The use of chlorhexidine and povidone-iodine, which have broad-spectrum bactericidal properties, helps to control local infections. This reduces the number of microorganisms in the wound area and promotes healing. However, these antiseptics can have detrimental effects on healing. Therefore, the concentration used was crucial. Penicillin is a  $\beta$ -lactam antibiotic with broad-spectrum bactericidal activity that is effective against various bacteria, including gram-positive cocci and rods, anaerobes, and gram-negative cocci. Penicillin works by inhibiting peptidoglycan cross-linking in the bacterial cell wall (Fisher & Mobashery 2020). Topical antibiotics

are more effective in reducing infections than plain antiseptic applications (Heal *et al.* 2016).

The bone fragment may be a distal phalangeal fracture residue from trauma (Figure 1C and D); however, a surgical approach is not recommended due to the risk of general anaesthesia. Instead, standing sedation with a combination of medetomidine and butorphanol is a better option as it is less risky for captive elephants (Luders *et al.* 2016). However, a deeper location of the wound requires elevation of the left forelimb for bone fragment removal, which may cause imbalance if standing sedation is performed. An alternative option is to remove the bone fragment after removing the surrounding necrotised tissues, which may take longer but is less invasive for the elephant. Removing the bone fragment improves elephant locomotion by resolving the irritation caused by the fragment.

## ■ CONCLUSION

The Asian elephant (*Elephas maximus indicus*) was successfully diagnosed with a bone fragment near the distal phalange of the left forelimb and was treated with daily antiseptic cleaning and topical antibiotics. Standing sedation is recommended for bone fragment removal due to potential complications, such as lateral recumbency or falling resulting from forelimb elevation. The plan was to remove the bone fragment once necrosis of the surrounding tissue occurred.

## ■ AUTHOR INFORMATION

### Author for Correspondence

\*RT: tariganronald@apps.ipb.ac.id

Divison of Physiology, School of Veterinary Medicine and Biomedical Sciences, IPB University, Jln Agathis IPB Dramaga Campus, Dramaga, Bogor, 16680, West Java of INDONESIA

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