

# Navigating Rubber Band Syndrome in Dogs: A Report of Three Cases

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The presence of strangulating foreign bodies within the limbs of dogs is a matter of considerable veterinary concern due to the potential for various complications, including constriction, compromised blood flow, and damage to musculoskeletal and neurovascular structures (John *et al.*, 2019). A specific manifestation of this issue is rubber band syndrome or circumferential strangulating foreign bodies, characterized by the presence of encircling external materials around distal limbs (Arora and Agarwal, 2004; Aggarwal *et al.*, 2010). Notably, this phenomenon is predominantly reported in India, where ceremonial or religious bands, often worn for both aesthetic and ritualistic purposes, are frequently tied around wrists and ankles. Unfortunately, these bands are inadvertently forgotten, resulting in adverse consequences (Baddula *et al.*, 2021). This article presents a series of three cases involving Rubber band syndrome challenging to diagnose due to a forgotten history. All cases underwent surgical management, involving debridement, and foreign body removal. Following surgery, all cases demonstrated uneventful healing, with the average time for sinus healing being three weeks.

## CASE HISTORY AND OBSERVATIONS

Three dogs, a Golden Retriever, Shih Tzu and Spitz, aged 2.5 years, 3 years and 4 years respectively, were presented to the Madras Veterinary College Orthopaedic Outpatient Unit, with the complaint of weight-bearing lameness persisting for over a month in one of the limbs with chronic encircling wound in metatarsal region with or without sinus tracts. All these dogs previously received treatment at different hospitals without a positive response to medications. Upon examination, distinctive features such as circumferential wound accompanied by sinus tracts, scar formation, and swelling at the site were observed. Previous wound management efforts involved local ointments and systemic antibiotic therapy. Despite some healing with skin epithelialization, the sinus tracts remained unresolved.

**Case I** was a 2.5-year-old male Golden Retriever dog exhibiting weight-bearing lameness in the left hind limb persisting for one month. The clinical evaluation revealed a chronic encircling wound in the metatarsal region with sinus tracts. Radiography revealed bone remodeling

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characterized by a radiolucent area and slight osteolysis (Fig. 1). Ultrasonography revealed linear, hyperechoic structures with variable distal acoustic shadowing and/or reverberation artifact, prompting suspicion of foreign body (Fig. 2).

**Case II** was a 3-year-old male Shih Tzu dog presented with weight-bearing lameness in the right forelimb persisting for 45 days, accompanied by a non-healing circumferential wound in the metacarpal region, indicating the suspicion for presence of a foreign body. Ultrasonography revealed hyperechoic structure deep in the subcutaneous tissue above the bone.

**Case III** was a 4-year-old female Spitz dog exhibiting chronic weight-bearing lameness in the right hind limb persisting for thirty-two days, accompanied by a encircling non-healing wound in the metatarsal region. Ultrasonography revealed presence of foreign body deep within the tissues.

All the cases were planned for exploration of the wound to trace the foreign body. Clinical parameters were found to be within the normal limits in all the cases during preoperative assessment. Fasting protocols were adhered to, with pre-emptive antibiotic administration.

## TREATMENT AND DISCUSSION

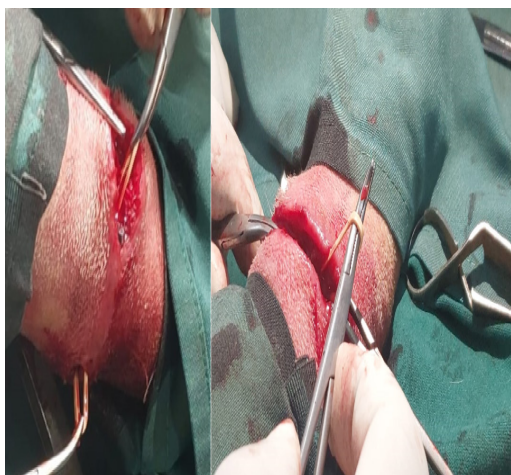
**In case 1:** Premedication was done with Inj. Butorphanol @ 0.2 mg/kg b wt. i/v and Diazepam @ 0.25 mg/kg b wt. i/v, anaesthesia was induced with Inj. Propofol @ 4 mg/kg b wt. i/v and maintained with 1.5% Isoflurane in 100% oxygen. Following aseptic site preparation, an incision was made along the sinus tract, revealing the presence of an encircling rubber band as the foreign body. The rubber



**Fig. 1:** Bone remodeling showing a radiolucent area and slight bone loss (osteolysis) observed in the radiographs



**Fig. 2:** Linear, hyperechoic structure with variable distal acoustic shadowing observed in ultrasonography



**Fig. 3 & 4:** Circumferential wound and exploration of sinus tracts, revealing the presence of a rubber band as the underlying foreign body

band was clamped, cut, and removed taking care that no part of rubber band is left *in situ* (Fig. 3). Sinus tracts were meticulously debrided, lavaged, and subsequently closed using 2-0 Polyamide suture in an interrupted pattern. Soft cotton padding was applied post-surgery, and by the second day, grade-1 lameness was noted, progressing to grade-0 lameness by the sixth day. The wounds exhibited healing within ten days, with suture removal on the 12<sup>th</sup> post-operative day.

**In case II**, dog was sedated using 0.5 mg/kg b wt. Xylazine i/m and Inj Diazepam 0.2 mg/kg b wt. i/v. Wound was explored, the foreign body was found to be rubber band which was then cut and removed, and the wound was lavaged before being treated as an open wound (Fig. 4). Remarkably, the wound exhibited healing within a span of 10 days.

**In case III**, dog was sedated using Inj. Propofol i/v to facilitate exploration of sinus tracts, revealing the presence of a rubber band as the underlying foreign body. The rubber band was cut and removed, and subsequent debridement of

sinus tracts was performed. The wound was treated as open wound. Complete healing of wound was observed within 18 days after removal of the foreign body.

Rubber band syndrome, also known as hair-thread tourniquet syndrome, ischemic hair syndrome, and acquired constriction ring (Meier *et al.*, 2019), has been associated with the tradition of wearing threads or elastic bands on distal limbs. These bands may go unnoticed, particularly in breeds with abundant fur such as Golden Retrievers, Shih Tzus, Spitz, and Siberian Huskies, making it challenging to detect a circumferentially applied rubber band. The tension exerted by the rubber band compresses the skin, gradually penetrating into the underlying soft tissue. Due to the skin's superior regenerative capacity, wounds inflicted by rubber bands can superficially heal with the bands embedded within them (Boonwittaya and Kaewmanee, 2019). This complicates diagnosis, and cases might be misdiagnosed as hypertrophic scars. Early detection through detailed history taking and thorough clinical examination is crucial to prevent misdiagnosis. As time passes, constriction induced by a

rubber band can lead to the necrosis of distal structures by impeding blood supply. However, in this study, only osteolysis was observed, and there were no recorded instances of necrosis affecting distal structures as all the cases were diagnosed earliest.

Radiographic features of rubber band syndrome include a soft tissue constriction sign, manifesting as precise, constricting indentations within the soft tissue at the foreign body's location. This sign serves as an indicator of strangulation and compression of soft tissues (John *et al.*, 2019). Focal osteolytic changes, bone remodeling, and periosteal reactions evident in radiographs are consistent with findings of Wagoner *et al.* (2022). While computed tomography has been reported as a diagnostic aid in the diagnosis of circumferential cervical rubber band foreign bodies (Stelmach *et al.*, 2014; Wagoner *et al.*, 2022), this study found ultrasonography to be effective in locating the foreign body, aligning with the findings of Orlinksky *et al.* (2000), who successfully detected radiolucent foreign bodies using ultrasonography.

Surgical removal of the embedded rubber band, coupled with antibiotic administration, analgesics, and rehabilitation, ensures speedy recovery. The comprehensive diagnostic and therapeutic approach outlined in this study underscores the importance of early detection and intervention in managing rubber band syndrome in dogs.

In brief, the presence of a linear, circumferential scar, as discussed in the cases, should raise suspicion for the possibility of the rubber band syndrome. To facilitate a definitive diagnosis, a thorough clinical examination, complemented by radiographic and ultrasonographic evaluations, is paramount. Early detection is crucial for effective intervention, and the diagnostic features, including soft tissue constriction signs and radiographic characteristics, should be carefully scrutinized. Timely recognition and appropriate treatment strategies are imperative to prevent

further complications and ensure optimal outcomes for dogs affected by Rubber Band Syndrome.

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