

## DORSAL DISPLACEMENT OF THE SCAPULA IN A CAT – CASE REPORT

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### **Abstract**

*Scapular luxation is an uncommon cause of forelimb lameness in cats. Dorsal dislocation of the scapula occurs by trauma, having a result a tearing of the muscular support for the scapula, the serratus ventralis, trapezius, and rhomboideus muscles. In this case report is presented the surgical management of dorsal scapula luxation in one adult cat. Dorso-caudal scapula approach (dissection of the infraspinatus muscle) was performed and a small portion of teres major muscle was elevated. Caudal scapular border was attached of the 5th rib with a cerclage wire and the torn edges of the trapezius and rhomboideus muscles were sutured. Postoperative pneumothorax was diagnosed and treated with thoracentesis and aspiration. Clinical outcome was considered good with resolution of lameness and normal scapular motion. Open reduction and internal fixation (scapulo-costal cerclage) represent one treatment option in dorsal scapular luxation in cats.*

**Key words:** cat, dorsal luxation, internal fixation, scapula.

### **INTRODUCTION**

Scapular luxation with dorsal dislocation in cats is a rare orthopaedic condition caused by trauma with tearing of muscles (serratus ventralis, trapezius, and rhomboideus muscles) that binds the scapula to the thoracic wall (Parker, 2003; Woss et al., 2009; Perry et al., 2012). Scapular luxation occurs more often in cats than in dogs, animals of any age and sex being affected (Schulz, 2013). Scapular luxation with dorsal luxation in cats also known as dorsal subluxation of the scapula usually occurs after jumps, falls or bites (Cagatay et al., 2018). The disease is clinically diagnosed (dorsal movement of the scapula during locomotion) and confirmed radiologically (Ozsoy & Guzel, 2013) or by computer tomography (Kano et al., 2013).

In the scientific literature, scapular luxation with dorsal dislocation in cats has been described in several books (Parker, 2003; Bordelon et al., 2005; Scott & Mc Laughlin, 2006; Woss et al., 2009; Drobats et al., 2011; Schulz, 2013), but information on the results of different surgical methods of treatment are relatively limited to only three cases for open reduction and internal fixation by scapulo-ribs

cerclage (Cagatay et al., 2018; Ozsoy & Guzel, 2013; Perry et al., 2012) and to six cases treated only by suturing the serratus and rhomboideus muscles to the infraspinatus and supraspinatus muscles (Ozer et al., 2017).

In the present study we present the surgical treatment by open reduction and internal fixation (scapulo-ribs cerclage) in a cat with dorsal scapular luxation.

### **MATERIALS AND METHODS**

A 1-year old European domestic short hair intact male cat was presented in the Surgery Clinic of the Faculty of Veterinary Medicine from Timisoara with approximately 10 days history of thoracic limb lameness. Physical examination of the patient revealed a normothermic animal (38.6°C), heart rate of 117 bpm, respiratory rate of 23 bpm and which in resting position highlighted exaggerated left suprascapular cartilage (Figure 1) and in gait exhibited lameness. During the support phase of the affected limb there was a marked tendency of dorsal displacement of the left suprascapular cartilage, accompanied by an obvious detachment of the scapula from the thoracic wall.

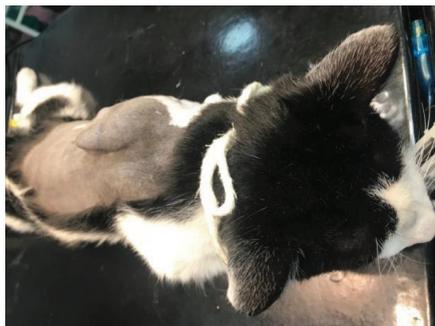


Figure 1. Appearance of the cat with dorsal scapular luxation

Clinical examination of affected limb did not reveal any swellings, ecchymosis or wounds, and no abnormal pain sensitivity. Adduction of the left leg induced lateral displacement of the scapula.

The cat did not show signs of respiratory failure and preoperative complete blood count (hemoleucogram) and blood chemistry (GOT, GPT, urea, creatinine, glucose, and total proteins) were normal. Tests for feline leukemia virus (FeLV) and feline immunodeficiency virus (FIV) were negative. The radiographic images (dorso-ventral and right-lateral – view) have revealed a dorsal left scapular luxation with no evidence of fracture of the scapula or lung atelectasis, emphysema or pneumothorax (Figure 2).

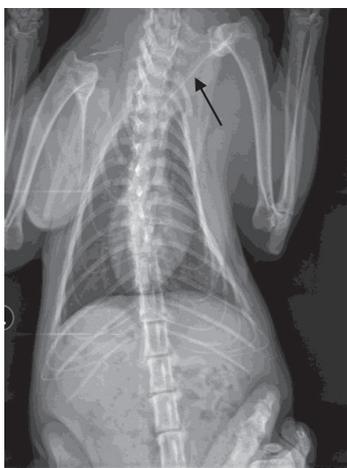


Figure 2. Radiographic image showing left scapulothoracic luxation with dorsal displacement (black arrow) and left scapula and left thoracic ribs with no signs of fracture

The surgical procedure was performed under general anaesthesia, which consisted of premedication with xylazine (1 mg/kg b.w., i.v.) and ketamine (5 mg/kg b.w., i.v.) followed by induction with propofol (3 mg/kg b.w., i.v.). General anaesthesia was maintained with isoflurane vaporized in oxygen using intermittent positive pressure ventilation. Postoperative analgesia was provided with one dose of butorphanol (0.4 mg/kg b.w., s.c.) administered 15 minutes before recovery. Ampicillin (20 mg/kg b.w., i.v.) was administered at induction and at the end of surgery.

The surgical site was aseptically prepared. The patient was placed in right lateral recumbency. Incision of the skin and subcutaneous tissue on dorso-caudal edge of the scapula and identification of the tears in the trapezius and rhomboideus muscles were the first surgical steps (Figure 3).



Figure 3. Identification of trapezius, rhomboideus and serratus ventralis muscles tearing

Dissection between the infraspinatus and teres major muscles allows highlighting of the caudal scapular edge and tears of the serratus ventralis muscle (Figure 3). On 5th left rib, the periosteum was elevated on a portion of about 0.5 cm and a loop of stainless steel wire (0.8 mm in diameter) was passed around the rib with caution to not enter the thorax (Figure 4).



Figure 4. The stainless steel wire passed around the 5th rib

Through the scapula, beneath a 1 cm elevated portion of the teres major muscle insertion, two holes were drilled (Figure 5) through which the ends of the wire were passed and anchored to the 5th rib, and the wire was twisted on the lateral surface of the scapula.



Figure 5. The holes drilled through the caudal edge of scapula

The teres major muscle was reattached to the scapula using the two holes drilled in its cranio-dorsal edge (Figure 6).

The trapezius and rhomboideus muscles were reattached to the scapular spine by interrupted sutures, using 2.0 metric polyglactin 910 (PGA, Biosintex) (Figure 7).



Figure 6. Reattachment through suture of the teres major muscle (a) at the cranio-dorsal edge of the scapula (b)



Figure 7. Suturing the tears in the trapezius and rhomboideus muscles

The subcutaneous fascia was closed in a simple continuous pattern, using 1.5 metric polyglactin 910 (PGA, Biosintex) thread. The skin was closed with simple interrupted sutures using 2.0 metric polypropylene (Prolene, Ethicon).

Postoperative, a radiograph was performed to check the metallic wire placement and the possibility of iatrogenic pneumothorax appearance (Figure 8). The operated limb was immobilized for the next 8 days using a Velpeau sling.



Figure 8. Immediate postoperative dorso-ventral radiography

## RESULTS AND DISCUSSIONS

In the postoperative radiography (Figure 8) a pneumothorax was diagnosed probably produced intraoperatively by iatrogenic causes. This complication probably occurred when the metallic wire was passed around the Vth rib. Postoperative pneumothorax was treated with thoracentesis and aspiration two times a day for 4 days. There was no subcutaneous emphysema. Prophylaxis of possible septic complications was made using Ampicillin (20 mg/kg b.w., i.v.) every 12 h for 5 days postoperative.

The Velpeau sling was changed daily, for the next 8 days, to inspect and perform antisepsis of the surgical wound and to check the patient's locomotion. The cat resumed its locomotion in the next postoperative day, placing the operated limb in light contact with the ground and has continued to do so for the first three days after surgery. One week later, a slight lameness during walking was observed (1-2 level), without scapular dislocation.

Skin sutures were removed at 8<sup>th</sup> postoperative day. Two weeks postoperative, the cat presented a normal gait without signs of lameness. No other postoperative complications were observed.

At three months postoperative, the animal had a normal behaviour and locomotion, the owner

did not tell about possible (Ozer et al., 2017) pain episodes or lameness as a reaction to the implanted metal wire.

Various methods are available for the treatment of dorsal scapular luxation.

In cats with displacement of the scapula after recent trauma, closed reduction and immobilization for 2-3 weeks using a Velpeau sling is sufficient (Bordelon et al., 2005).

Due to the fact that displacement of the scapula occurs secondary to traumatic disruption of the serratus ventralis muscle, and the serratus ventralis muscle is the primary supporting muscle of the scapula to the thorax (Pick, 2012; Parker, 2003), the scientific literature also presents two techniques of open reduction of scapular luxation in cats.

One technique is to fix the ruptured muscles and re-attach them to the scapula - the ruptured section of the serratus ventralis muscle was pulled across the lateral surface of the scapula and sutured to the supraspinatus and infraspinatus muscles using horizontal mattress sutures, and the rhomboideus muscle was pulled over the scapular cartilage and sutured to the infraspinatus muscle using horizontal mattress sutures (Ozer et al., 2017). This procedure has been reported to fail to achieve sufficient stabilization for the extremity to bear weight (Johnson & Hulse, 2002).

Another method is to restore the scapula to its normal anatomical position and attach it to the ribs (Cagatay et al., 2018; Schulz, 2011; Ozsoy & Guzel, 2013; Perry et al., 2012; Woss et al., 2009) combined with reconstruction of the serratus ventralis muscle re-attached in the holes drilled in the cranio-dorsal edge of the scapula (Piermattei et al., 2006; DeCamp et al., 2016). This technique has the possibility of causing intercostal muscle ruptures, subcutaneous emphysema and breathing difficulties due to the cerclage wire passed around the rib (Ozer et al., 2017).

In our case, we preferred to restore the scapula to its normal anatomical position and attach it to the ribs, re-attach the serratus ventralis muscle in the holes drilled in the cranio-dorsal edge of the scapula and re-attach the rhomboideus and trapezius muscles to the scapular spine, which provides a good functional outcome.

There are several limitations to this report. The absence of a larger number of cases did not allow us to verify the fact that the surgical technique applied by us is superior to other conservative or surgical methods described by the scientific literature.

## CONCLUSIONS

Open reduction and internal fixation (scapular-rib cerclage) represents a treatment option in dorsal scapular luxations in cats.

Clinical outcome was considered good with resolution of lameness and normal scapular motion.

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## REFERENCES

Bordelon, J. T., Reaugh, H. F., Rochat, M. C. (2005). Traumatic luxations of the appendicular skeleton. *Veterinary Clinics: Small Animal Practice*, 35(5), 1169-1194.

Çağatay, S., Sağlam, M., Pilli, M. (2018). Dorsal scapular luxation and its surgical treatment in a cat. *Vet Hekim Der Derg.*, 89(1), 92-96.

DeCamp, C. E., Johnston, S. A., DeJardin, L. M., Schaefer, S. L (2016) The shoulder joint. In: C. E. DeCamp, S. A. Johnston, L. M. DeJardin, S. L. Schaefer (Eds), *Brinker, Piermattei, and Flo's*

*Handbook of Small Animal Orthopedics and Fracture Repair*. Fifth edn., (pp. 260-297). Missouri: Elsevier.

Drobatz K. J., Beal W. M., Syring S. R. (2011). *Manual of Trauma Management in the Dog and Cat*. Oxford, John Wiley & Sons.

Johnson, A. L., Hulse, D. A. (2002). Diseases of joints. In: T. W. Fossum (Ed): *Small Animal Surgery*. 2nd edn., (pp. 1023-1150). China: Mosby.

Kano, W. T., Rahal, S. C., Mesquita, L. R., Faria L. G. (2013). Gait analysis in a cat with scapular luxation and contralateral fore limb amputation. *Can. Vet. J.*, 54, 990-991.

Özer, K., Karabağlı, M., Ömer, H., Demir, M. E. (2017). Surgical treatment of dorsal scapular luxation in cats: 6 cases (2010-2016). *Kafkas Univ Vet Fak Derg.*, 23, 503-506.

Özsoy, S., & Güzel, Ö. (2013). Dorsal luksasyon of the scapula in a cat. *Turk. J. Vet. Anim. Sci.*, 37, 618-620.

Parker, R. B. (2003). Scapula. In: D. Slatter (Ed.), *Textbook of small animal surgery*. 3rd ed. (pp 1896–1897). Philadelphia: Saunders Elsevier.

Peck J. (2012). Scapula. In: K. M. Tobias, S. A. Johnson (Ed.). *Veterinary Surgery: Small Animal*. Volume 1. (pp. 690-691). St. Louis, Missouri: Saunders.

Perry, K. L., Lam, R., Rutherford, L., Arthurs, G. I. (2012). A case of scapular avulsion with concomitant scapular fracture in a cat. *Journal of feline medicine and surgery*, 14(12), 946-951.

Piermattei, D. L., Flo, G. L., DeCamp, CE. (2006). The shoulder joint. In: W.O. Brinker, D. L. Piermattei, G. L. Flo (Eds.), *Handbook of small animal orthopedics and fracture repair*. 4<sup>th</sup> ed. (pp 262-296). St. Louis: Saunders Elsevier.

Schulz, K. S. (2013). Diseases of joints. Scapular luxation. In: T. W. Fossum (Ed.), *Small animal surgery* 4<sup>th</sup> ed, (pp. 1246). St Louis: Elsevier.

Scott, H., Mv Laughlin, R. (2006) *Feline Orthopedics* (pp. 111). Boca Raton: Taylor and Francis Group.

Voss, K., Langley-Hobbs, S. J., Montavon, P. M. (2009). Scapula. In: P. M. Montavon, K. Voss, S. Langley Hobbs (Ed.), *Feline orthopaedic surgery and musculoskeletal disease*. (pp. 329–336). Philadelphia: Saunders Elsevier.