

# Treatment of congenital shoulder luxation associated with swimmer syndrome in a puppy



The authors describe a case of congenital shoulder luxation associated with swimmer syndrome in a 2-month-old english setter female puppy. Both swimmer syndrome and congenital shoulder luxation are rare growth disorders. In this particular case both disorders were present at the same time. The case was initially approached with the application of a soft bandage and then surgically, with the application of a temporary external fixator and a trans-articular pin. The early diagnosis and treatment allowed the complete resolution in less than 3 months.

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**Key words** - Swimmer syndrome, shoulder luxation, congenital, puppy, external fixation.

## INTRODUCTION

The shoulder joint is supported by the joint capsule, the glenohumeral ligaments and the surrounding tendons (supraspinatus, infraspinatus, teres minor and subscapularis). When these structures are not competent or are torn, then shoulder joint dislocation - or loss of the relationship between the humerus and the scapula - occurs.

Congenital shoulder luxation is a rare condition and is often bilateral<sup>1</sup>; in the dog, when present, the glenoid cavity is deformed or hypoplastic and chronic pain and lameness are present. Medial congenital luxations are typical of small and toy breed dogs like the toy poodle, shetland sheepdog, chihuahua, pomeranian and pinschers, and the lameness begins when the ani-

mal is still young. Early diagnosis and treatment should be attempted in order to restore joint function<sup>2</sup>. In this case report we describe a two-month-old dog affected by swimmer syndrome and medial shoulder luxation treated successfully by closed reduction and a trans-articular external fixator.

The swimming puppy syndrome is a rare growth anomaly to be found essentially in some brachycephalic dog breeds and in cats<sup>3</sup>. The english bulldog, the basset hound and the scottish terrier are particularly prone to this syndrome<sup>4</sup>. Even though undocumented theories have been formulated, the causes are actually unknown. The possibilities that have been taken into consideration include: functional alteration of the neuromuscular synapses; improper or late formation of the myelinic sheath and of peripheral nerves<sup>5</sup>; slow muscle development<sup>6</sup>; hereditary, environment-related or nutritional causes or lack of space in the uterine horns<sup>3</sup>. Whatever the causes, the symptoms of the

**Congenital shoulder luxation is a rare disease and often bilateral. It usually occurs in small and toy breed dogs.**

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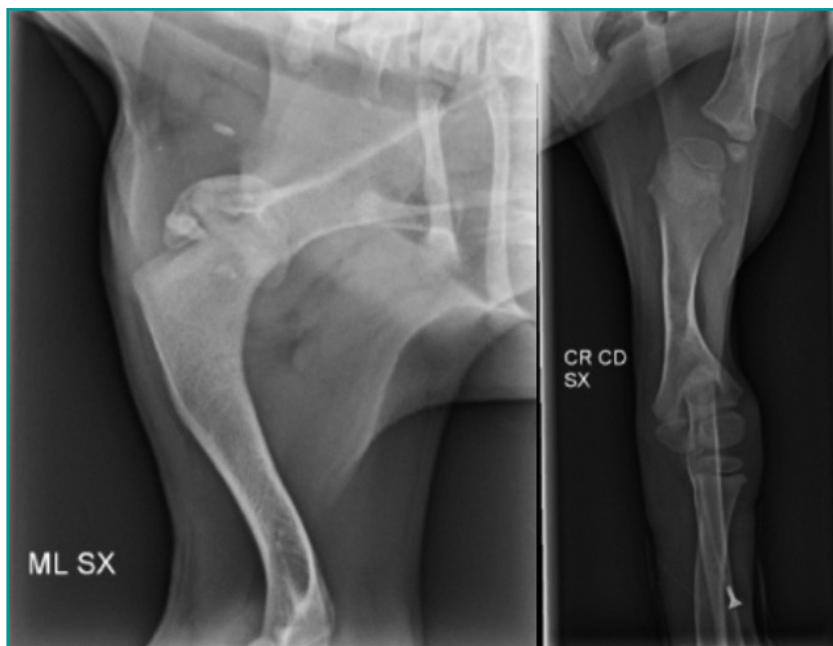
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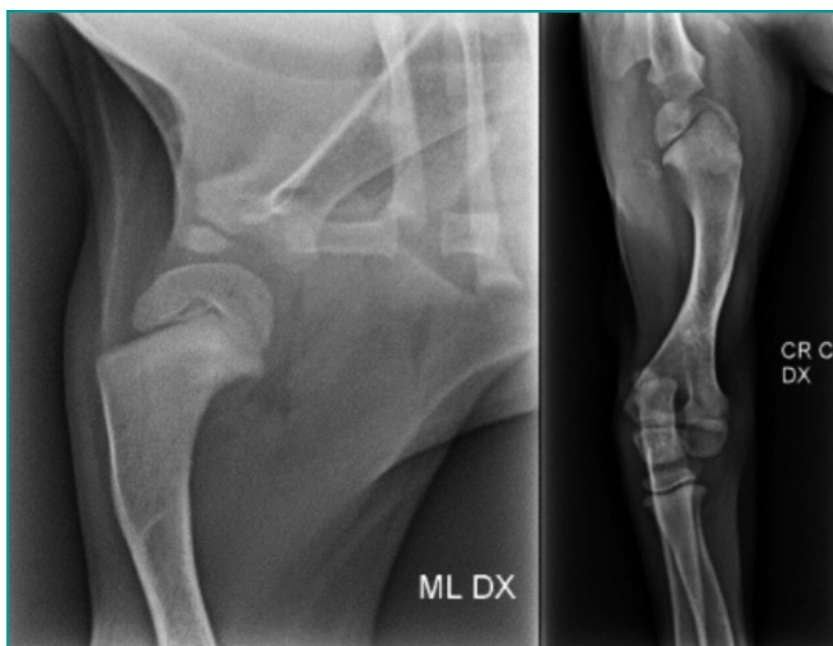
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**Figure 1** - Preoperative mediolateral and craniocaudal radiographs of the left shoulder. Note the shoulder luxation.



**Figure 2** - Preoperative mediolateral and craniocaudal radiographs of the right shoulder. The joint is normal.

syndrome can be detected as early as the second week of life and are quite evident by the 5th and 6th weeks. Affected animals initially appear weak and incapable of standing or moving; despite the locomotor dysfunction, the puppies continue to grow and to feed normally. To move, animals with the syndrome typically move their legs as if to swim. Generally, neurological tests do not show the presence of any neurological deficit.

functions were normal. The orthopaedic examination showed that the patient had a marked clear difficulty in walking, with the chest resting heavily on the floor, partial loading of the front right limb and severe abduction of the front left limb. Palpation of the limb involved revealed an alteration of the anatomical landmarks of the shoulder joint; in particular, the greater tubercle of the humerus appeared medially and proximally dislocated in respect to the

Pneumonia and constipation can easily develop because of thoracic and pelvic compression. Other associated problems are

**Swimming puppy syndrome is a growth anomaly, especially in brachycephalic dog breeds that can cause locomotor dysfunction, pneumonia and constipation because of thoracic and pelvic compression.**

bedsores and abrasions caused by urine exposure. Bandaging and passive physiotherapy have been suggested as treatments by various authors<sup>3</sup>. According to Hosgood and Hoskins<sup>6</sup>, the prognosis is very good if therapy begins before the puppy is three or four weeks old. According to Lorenz<sup>4</sup>, in puppies with swimmers syndrome and with *pectus excavatum* the prognosis is fatal and euthanasia is suggested.

### CASE REPORT

A 2-month-old english setter female puppy with swimmers syndrome was referred to us by a colleague.

The owner reported that 8 puppies were born from the same litter; four of them were healthy and 4 were affected by the same disease. When the puppies were 30-days old the referring veterinarian stabilized the chest of the 4 puppies using soft bandaging and also suggested passive physiotherapy to increase the muscle tone and to make the puppies walk on rough surfaces. In about three weeks three puppies out of the four resumed their normal physical activity.

The puppy referred to us underwent a physical examination in order to assess the state of the sensorium, the state of nutrition and hydration, body temperature, visible mucous membranes, pulse and respiration as well as the lymph node status; major organ

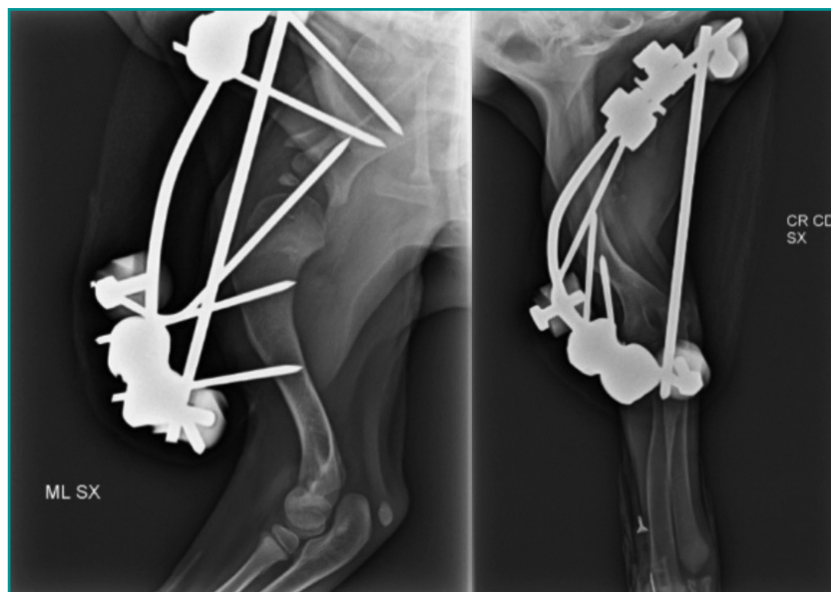
acromion of the scapula. The contralateral shoulder joint was normal. The diagnosis required complete blood tests and a radi-

**On palpation, during the orthopedic exam, an alteration of the anatomical landmarks of the shoulder joint was observed; in particular, the great tubercle of humerus appeared medially and proximally dislocated in respect to the acromion of the scapula. It was confirmed by radiographic study.**

ographic study under general anaesthesia of the scapular-humeral joint. The blood count with differential leucocyte count and biochemical profile was normal. The dog was pre-medicated with methadone (0.2 mg/kg IM) and dexmedetomidine (0.05 mg/kg IM), induced with propofol (1 mg/kg IV), intubated and maintained under anaesthesia with isoflurane and oxygen. Medio-lateral and caudo-cranial radiographic views of both shoulder joints showed a medial dislocation of the left humeral head (Fig. 1 and 2). The other skeletal structures were normal. Closed reduction was possible but the loss of relationship between the glenoid and humeral head immediately recurred.

With the owner's agreement a surgical procedure was performed consisting of closed reduction of the shoulder luxation and temporary stabilization with a trans-articular pin and a trans-articular external fixator. The luxation was reduced during surgery and, while maintaining a shoulder angle of approximately 110°, stabilized by means of a 2 mm trans-articular Kirschner wire inserted starting from the transition point between the proximal and middle third of the humeral shaft. After fluoroscopic evaluation confirming a correct shoulder reduction and pin placement a Type I external fixator was applied: two positive-thread 2 mm pins were inserted in the humeral shaft and two positive-thread 2 mm pins were inserted in the spine of the scapula. The trans-articular pin and the four pins were connected to a 3 mm bar by means of Meynard clamps.

Postoperative radiographs (Fig. 3) showed that the left shoulder was reduced and fixed at an angle of 105° with a slightly incongruent joint space. The dog was able to walk already on the next day and was discharged with antibiotic (amoxicillin + clavulanic acid 20 mg/kg Bid) and anti-inflammatory (meloxicam 0.1 mg/kg Sid) therapy for 15 days; cage rest was recommended. Gentle physiotherapy with passive cranial movements of the



**Figure 3** - Postoperative mediolateral and craniocaudal radiographs of the left shoulder. Note the shoulder luxation reduction.

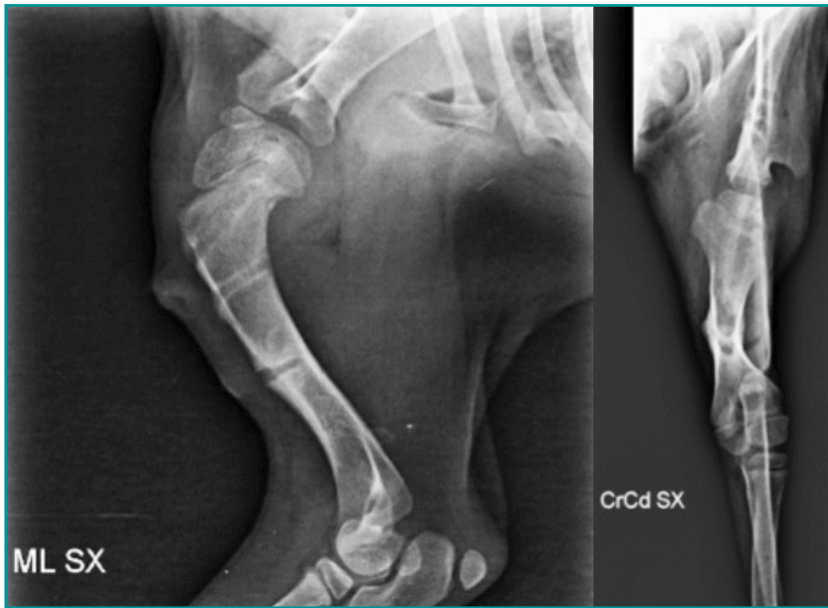
**The surgery consisted of application of a trans-articular Kirschner pin associated to a Type I external fixator to reduce and fix the shoulder joint with an angle of 105°.**

fixed left shoulder and extension and flexion of the left elbow joint, applied daily with increasing intensity, were performed one day after surgery and continued until frame removal.

At the clinical follow-up 2 weeks after surgery the patient was able to walk, using the right front limb properly. A second-degree lameness was still present on the left limb. Medio-lateral and caudo-cranial radiographs were executed under general anaesthesia. Reduction of the luxation and proper implant positioning were confirmed. The connecting bar and the trans-articular pin were removed; shoulder stability was confirmed by clinical evaluation and the remaining four pins were also removed (Fig. 4). No complications were present, except for the presence of minor draining tracts at the insertion points of the 2 pins in the humerus, a finding considered as a typical complication of external skeletal fixation.

At the clinical follow-up one month after surgery the patient showed a first-degree lameness with absence of pain at manipulation of the left shoulder and a normal relationship between the greater tubercle of the humerus and the acromion of the scapula. At the next follow-up three months after surgery the puppy was clinically normal and displayed no symptoms of joint instability, pain or lameness. The ROM was compara-





**Figure 4** - Mediolateral and craniocaudal radiographs of the left shoulder 15 days after surgery. Note the shoulder luxation reduction after pin and external fixator removal.



**Figure 5** - Mediolateral and caudocranial radiographs of the left shoulder 3 months after surgery. Note the persistence of the shoulder luxation reduction.

**The 50% of the cases of congenital shoulder luxation are poodles, thus suggesting a genetic-hereditary cause; the condition is often unilateral and medial.**

ble to that of the contralateral shoulder. The clinical evaluation was confirmed with the last radiographic study (Fig. 5).

### DISCUSSION

The shoulder joint consists of two bone structures, the scapular glenoid and the humeral head, and of many ligaments and muscles. Shoulder luxations are therefore rare and are often caused by traumatic events. The causes of congenital shoulder luxation are still unknown. Our diagnosis was made based on the clinical

history, physical examination and radiographic study. No recent cases are reported in the literature: the latest case dates back to 1994<sup>2</sup>.

Congenital shoulder luxation is reported as occurring especially in toy or small breed dogs; 50% of the cases are in fact in poodles, thus suggesting a genetic-hereditary cause<sup>7</sup>; the condition is often unilateral and medial. In our case, instead, the patient was a medium-sized dog with unilateral medial luxation and with an associated swimming-puppy syndrome.

Furthermore, in the literature the mean age at which congenital luxation of the shoulder is diagnosed is reported as being between 4 and 6-10 months<sup>8</sup>, while in Read's case report<sup>2</sup> the puppy was 3 months old. In our case the diagnosis was made even earlier, when the dog was only 8 weeks old. Read suggests that the diagnosis must be made early, as a late diagnosis may impair the effectiveness of the surgical treatment with an increased risk of bone deformation.

**Early diagnosis and surgical treatment of the medial congenital luxation of the shoulder is very important to reach an excellent result.**

Some Authors have dealt with congenital luxation of the shoulder with a different approach: in the case of late diagnosis, at between 4 and 6 months of age, some Authors<sup>9</sup>

suggest an open reduction, releasing the tendon of the supraspinatus muscle, opening the joint capsule and finally placing a non-absorbable monofilament (nylon) to stabilize the joint between the neck of the scapula and the humeral head. In dogs with severe bone deformation or DJD other Authors have suggested arthrodesis or arthroplasty as a salvage procedure<sup>10</sup>.

According to the latest studies in the literature in the presence of an early diagnosis and in the absence of signs of bone deformation it is recommended to avoid an open technique and to use instead a modified closed approach, which is considered less invasive and safer. Read<sup>2</sup> states that in case of early diagnosis, with no bone deformation and with still healthy soft tissues, a temporary closed arthrodesis with the insertion of a single trans-articular pin can be performed. In Read's case-report after about ten days the trans-articular pin started to lose its original placement, without im-

pairing the clinical recovery; for this reason in our case we decided to add an external fixator with 4 pins for greater stability. The risk of fracturing the spine of the scapula during surgery was avoided. The pins did not migrate from their original placement and we only had a minor soft tissue complication, typical of external skeletal fixation. Finally, by removing all the implants in just 2 weeks the risk of ankylosis or of cartilage damage, due to immobilization, was avoided.

## CONCLUSION

Congenital luxation of the shoulder is an extremely rare disease, which occurs mainly in toy or small breed dogs, with the poodle being particularly prone.

Even though in the literature data on congenital luxation of the shoulder is scanty and in spite of the different surgical treatments that have been suggested, in

the Authors' experience an early treatment of the medial congenital luxation of the shoulder using a trans-articular pin and an external fixator gave excellent results after as short as 2 weeks from surgery; the device was removed at the first medical and x-ray check-up, which confirmed that the shoulder joint was perfectly stable. Furthermore, no complications were present during surgery and thanks to the owner's great collaboration the patient showed a clear improvement of the limp after only 3 weeks from surgery, with an almost complete use of the limb involved. At 12 weeks from surgery the dog was clinically healed and had fully recovered the use of its left forelimb.

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### KEY POINTS

- Congenital shoulder luxation is a rare disease, often unilateral and medial and usually in small and toy breed, especially in poodles (50% of cases).
- Swimming puppy syndrome can be associated but this condition is extremely rare.
- The premature diagnosis and surgery is essential to reach a good final result: the application of a trans - articular pin with an external fixator was considered a good choice with a good prognosis.
- Excellent results after as short as 2 weeks from surgery: the clinical exam and radiographic study confirmed that the shoulder was stable after the removal of the device.

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