

# Physal dysplasia with slipped capital femoral epiphysis: Review of two clinical cases

Sara Aguilera Muñiz, June 2018

**Introduction** - Feline physal dysplasia syndrome is an infrequently seen condition in the clinic characterized by a late or non-fusion of growth cartilage beyond the expected age of closure. This implies a degeneration of the physis, losing its columnar chondrocytes structure that translates into mechanical weakness. This may be responsible of fractures along the growth plate, reported in the capital femoral physis and named Slipped Capital Femoral Epiphysis (SCFE)<sup>1,2,3</sup>. Most of the times it is a bilateral condition. If not, the contralateral hind limb most probably will be affected at a later date<sup>2,3</sup>. This pathology is most represented by overweight, castrated male cats<sup>1,2,3</sup>. This work's aim is the description of two cases of SCFE referred to the University Veterinary Hospital of Barcelona, and the characterization of this illness.



Fig 3. macroscopic appearance of feline femoral head and neck extracted from the surgery. Both structures remained separately



Fig 1. Ventrodorsal radiographic projection of the 20-month-old cat hip. There is a bilateral fracture with epiphyseal-metaphyseal separation. The displacement of the capital femoral epiphysis is evident on the left side. On the right femur there is no evident slippage.



Fig 2. Cross-sectional hip tomography. Bilateral physal fracture, with moderate epiphyseal-metaphyseal separation on the right side, and with dorsal displacement of the metaphysis while the epiphysis remains lodged in the acetabulum on the left side.

**Clinical cases** – The two patients were male cats, with 20 and 24 months of age, with similar 4/5 body condition, and neutered at unknown age. Both cats presented bilateral hind limbs lameness, acute hip pain and no previous history of trauma. There was evidence of bilateral fractures of the femoral heads through the femoral physis, with epiphyseal-metaphyseal separation, in the radiographic and tomographic studies of their hips. Bilateral femoral and neck excision was performed on both patients, and they recovered successfully with good limb function in few weeks postoperatively. Histopathological findings confirmed the pathology of physal dysplasia as the main cause of the spontaneous fractures of the femoral heads. It showed loss of columnar distribution of chondrocytes, as they were organized in clusters and surrounded of abundant extracellular matrix. Lesions were well delimited on the physal area, with no evidence of epiphyseal or metaphyseal changes as osteolysis or sclerosis.

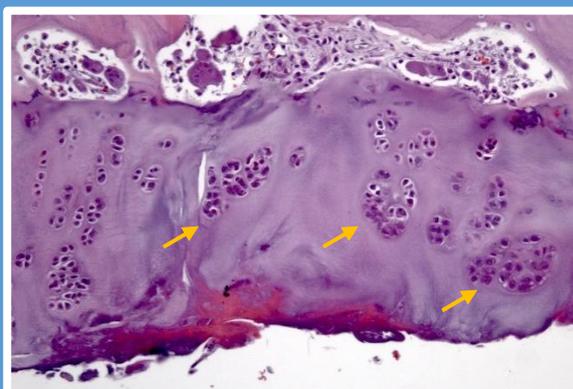


Fig 4. Histopathological section of epiphysal side of the fracture with physal cartilage (late or non-fusion). Loss of the columnar architecture of the chondrocytes is noticed, which are now arranged in clusters (arrows) surrounded by abundant extracellular matrix. The growth plate appears thicker than normal (H/E at x20)

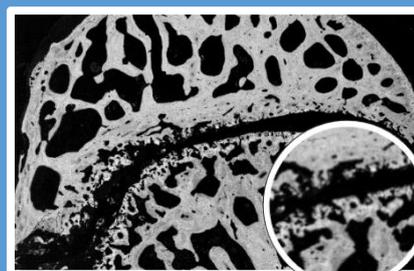


Fig 6. Backscattered scanning electron microscopy of a sagittal plane of the femoral head and neck. There is image of incomplete physal fusion, with diminished bone quality on both sides of the physis due to apparent abnormal endochondral ossification.

**Discussion and conclusions** – SCFE must be taken into consideration as a differential in neutered, overweight, adult cats, with non-traumatic hind limb lameness with radiographic images of non-fusion of the femoral head physis. Physal dysplasia is a multicentric disorder where many physis may be involved, although the capital femoral physis fracture and slippage will be the one giving clinical signs because of the direction and magnitude of the biomechanical forces involved in the coxofemoral joint<sup>2,3</sup>. It is known that prepuberal gonadectomy delays the closure of the growth plate<sup>4</sup>, and it is thought to be one of the multifactorial factors that could take part in the etiopathology of this disease. A change in castration age could serve as a preventive measure for feline patients.

#### References and Reading suggestions

1. Craig LE. 2001. Physal dysplasia with slipped capital femoral epiphysis in 13 cats. *Vet. Pathol.*
2. McNicholas WT, Wilkens BE, Blevins WE, Snyder PW, McCabe GP, Applewhite AA, Lavery PH, Breur GJ. 2002. Spontaneous femoral capital physal fractures in adult cats: 26 cases (1996-2001). *J. Am. Vet. Med. Assoc.* 221:1731-1736.
3. Newton AL, Craig LE. 2006. Multicentric Physal Dysplasia in Two Cats. *Br. Commun. Case Reports* 43:388-390.
4. Root M V., Johnston SD, Olson PN. 1997. The effect of prepuberal and postpuberal gonadectomy on radial physal closure in male and female domestic cats. *Vet. Radiol. Ultrasound* 38:42-47.