

Special symposium issue: slipped capital femoral epiphysis (SCFE)

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Abstract

Up-date on the pathogenesis, epidemiology, pathology, histopathology, clinical findings, diagnosis & classification, imaging modalities and all treatment options in slipped capital femoral epiphysis. This symposium issue of JCO is based on lectures presented at the Pre-Course at the 35th Annual Congress of the European Paediatric Orthopaedic Society (EPOS) in 2016.

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“The Congress began with a SCFE explosion. We had a half day course devoted only to the diagnosis, histology, classification, and treatment of Slipped Epiphysis. The world’s leading minds on the topic presented their perspectives on the past, present, and future of SCFE. It was a very thought provoking session. The problem still hasn’t been completely solved, but I believe we are all bit closer after today”, the POSNA fellows reported on this event.

Slipped capital femoral epiphysis (SCFE) is still a hot topic in paediatric orthopaedics worldwide. It might become even more important with increasing obesity of children and adolescents: A report from Australia documented a correlation of increasing bodyweight with increasing incidence of SCFE. Also recent data show that the average age at diagnosis is decreasing and specifically for that area indigenous individuals were significantly more affected, another hint that genetic factors are involved in SCFE.

SCFE is one of the most common hip disorders in adolescents. This growth period – the critical period of

somatic but also of psychosocial maturation – shows some specific characteristics at and around the growth plates. Associations with risk factors, epidemiologic and aetio-pathogenetic findings for SCFE will be discussed. Histologic abnormalities may help to better understand this condition and the dynamics of slippage as well as mechanisms involved in the disease process, in healing and side effects like avascular necrosis and chondrolysis.¹

The typical clinical findings need to be addressed during full clinical exam of each patient presenting with hip and /or knee pain. Delayed diagnosis is mostly related to uncharacteristic and episodic symptoms. Clinical findings including Drehmann’s sign and femuro-acetabular impingement signs have to be assessed regularly. General practitioners and paediatricians as well as general orthopaedists need to be trained not to miss the diagnosis of SCFE, for a key role for the paediatric orthopaedic community.²

Imaging in SCFE is mandatory. Plain pelvis and a lateral (frog leg) view should be the standard. Once the diagnosis is established at least one of the clinical and one of the radiological classification and grading systems should be applied.

Recent achievements have been made with 3D reconstructions based on CT data, those based on MRI data are under current investigation. The value of PET-CT scans to show normal or impaired vascularity has to be established.

Extended imaging by MRI may be helpful for incipient SCFE cases but for routine diagnostics many colleagues agree that MRI should not (yet) be included in diagnostic protocols. For specific studies on hip joint and growth plate cartilage, vascularity and other parameter new MRI sequences (d-GEMRIC, T-2*, others) are promising techniques for research, which may be included in clinical protocols in the near future.³

Paediatric orthopaedic surgeons and the scientific community have established new surgical principles based on pathoanatomic findings of SCFE, vascular supply of the femoral head and meticulous surgical technique for open anatomic reduction and internal fixation. The modified Dunn procedure introduced by R. Ganz continues to gain more and more acceptance. Mid-term results from some centers are promising, while other centers report high numbers of avascular necrosis (AVN) with this procedure. The up-date papers on treatment modalities and outcome data presented here still show some controversies. Recent studies and data showing a rather poor correlation of severity of slippage with post-slip deformity

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and femoroacetabular impingement (FAI) findings have to be recognised.⁴ Mild slips may show significant post-slip deformity while even severe slips may remodel significantly showing no or only minor post-slip deformity with good clinical outcome. The significance of remodelling versus post-slip deformity and risk for FAI induced cartilage damage remains unclear.

Overall in SCFE there are valid arguments for both pinning in-situ as well as for anatomic reduction via surgical dislocation and other procedures.⁴⁻⁹ FAI may develop without or only with minor symptoms over a period of time. At the time FAI becomes clinically evident severe damage of the cartilage may already be present preventing joint preservation surgery. Remaining unanswered is whether recommending open extended surgery for all SCFE patients putting these patients at risk for deleterious AVN is warranted? At least minor slips (< 30°) may be treated by fixation in-situ with primary or secondary osteochondroplasty via open or arthroscopic procedure as necessary.^{8,10}

Obviously we have to establish a more detailed analysis of each case. Age, remaining time for remodelling, pre-existing deformities like retroversion of the femoral neck and/or acetabulum should be considered in decision making for the initial surgical treatment for each case. Also we need to have a follow-up protocol and fixed appointments for continued re-examination to rule out secondary problems as early as possible. For cartilage properties new MRI sequences have shown promising data for early detection of degradation at a time point when joint preservation is still promising. There continues to be a need for long-term outcome studies of the different and new surgical methods.

This symposium issue of *Journal of Children's Orthopaedics* provides current knowledge for diagnostics and treatment of SCFE. New approaches and concepts are presented based on recent achievements and the pros and cons of various surgical strategies will be discussed. Among the specialists there are still some controversies about treatment modalities but there is wide agreement that early diagnosis and treatment will allow for better results by less risky procedures. This is why the general practitioners, paediatricians and also general orthopaedists need to be trained and up-dated to allow for early diagnosis of SCFE. Over the last decades the delay of diagnosis has not been improved, hopefully by educating primary care physicians and general orthopaedic surgeons we will do better job at early detection and earlier safer treatments. This issue of *Journal of Children's Orthopaedics* intends to foster all of these activities. Also it is clearly shown that further research is urgently needed on aetiology,

pathogenesis and more detailed treatment algorithms as well as for risk factor analysis and salvage procedures for complications. Our hope is to normalise hip joint function and to preserve the hip joint long-term.

With many thanks to all authors for their great contributions; it is with great pleasure that we present this symposium issue to our paediatric orthopaedic colleagues and the orthopaedic community at-large.

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