

August 30, 2015

Dear Editor,

Please find enclosed the edited manuscript in Word format (file name: 20187-review.doc).

Title: **Controversies in management of Slipped Capital Femoral Epiphysis**

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Name of Journal: *World Journal of Orthopedics*

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The manuscript has been improved according to the suggestions of reviewers:

1 Format has been updated

2 Revision has been made according to the suggestions of the reviewer

- (1) Dear Editor, here are the comments and reviews for the paper entitled "Controversies in management of Slipped Capital Femoral Epiphysis". The paper elucidate the current therapeutic approaches for Slipped Capital Femoral Epiphysis (SCFE). In literature, the surgical reduction of the slip is related to the concept of "stability". As pointed out by one researcher (T. Slongo) cited in this paper, differences between the clinical classification and the intraoperative findings are often present, suggesting that the clinical evaluation and the traditional classification systems of SCFE are not always reliable to estimate the real stability of the epiphysis. Please add a paragraph about this topic. Specific comments: References should be formatted according to journal's guidelines.

The exact cause for AVN developing in patients with SCFE remains unclear. Assuming that mechanical instability of the physis is one of the main causes for development of AVN, two clinical classifications have attempted to predict physeal instability by appreciation of the duration of symptoms [1, 2] or of the severity of symptoms regarding the ability to walk [3]. However, confirmation of their accuracy is difficult and indirect. In the classification based on the duration of symptoms, a SCFE was considered acute if the duration of symptoms was less than 3 weeks, as acute-on-chronic if symptoms were present for more than 3 weeks with a recent exacerbation, and as chronic if symptoms had been constantly present longer than 3 weeks. According to Loder classification, SCFE is considered as unstable if weight bearing on the affected limb is impossible with or without crutches. According to their system the recommended treatment for a stable or chronic slip is in situ fixation with pins or screws without regard for the slip angle. In contrast, the treatment strategies regarding timing of treatment and method of reduction vary in unstable or acute cases. But clinical estimation of physeal stability did not always correlate with intraoperative findings at open surgery. Ziebarth

and Ganz performed a systematic comparison of the clinical classification systems with the intraoperative observations. With classification as acute, acute-on-chronic, and chronic, the sensitivity for disrupted physes was 82% and the specificity was 44%. With the classification of Loder et al., the values were 39% and 76%, respectively. They concluded that current clinical classification systems are limited in accurately diagnosing the physeal stability in SCFE[4].

1. Aronsson DD, Loder RT. Treatment of the unstable (acute) slipped capital femoral epiphysis. *ClinOrthopRelat Res*. 1996; 322:99–110.
2. Fahey JJ, O'Brien ET. Acute slipped capital femoral epiphysis: review of the literature and report of ten cases. *J Bone Joint SurgAm*. 1965;47:1105–1127.
3. Loder RT, Richards BS, Shapiro PS, Reznick LR, Aronson DD. Acute slipped capital femoral epiphysis: the importance of physeal stability. *J Bone Joint Surg Am*. 1993;75:1134–1140.
4. Kai Ziebarth MD, Stephan Domayer MD, Theddy Slongo MD, Young-Jo Kim MD, PhD, Reinhold Ganz MD Clinical Stability of Slipped Capital Femoral Epiphysis does not Correlate with Intraoperative Stability. *ClinOrthopRelat Res* (2012) 470:2274–2279. [PMCID: PMC3392371, DOI 10.1007/s11999-012-2339-y]

(2) The authors provide an overview of SCFE for the readership. There is nothing new here but the authors provide a succinct review of the state of the art in SCFE. I would mention that no study supports the Dunn procedure over simple pinning of the hip. Between the groups in Boston and those in Phila, there is a vast difference in outcomes of the Dunn procedure. It is unclear if it prevents AVN in the setting of an unstable slip. It is currently not standard of care, and is technically difficult, and probably not a procedure that can or should be performed by any pediatric orthopedist. The second paragraph is a bit confusing. Are the authors referring to a healed slip? In the paragraph considering non-anatomic reconstructions (Southwick etc), they mention "good" outcomes. What are these outcomes? Are they short or long term? What is the risk (percent) of iatrogenic AVN in cervical osteotomies, what do the authors recommend? My feeling is the safer operation is Southwick in hands that are not experienced with intra articular osteotomies. What is the authors preference in terms of contralateral fixation, the authors only touch on this, but it is a huge debate, what factors are important to them?

Second paragraph is not about the healed SCFE specifically. It talks about the factors affecting the decision in the management of SCFE in general. The good outcome for Southwick osteotomy refers to both short and long term. For example a study by Cristiano Coppola describes the outcome in 22 Southwick osteotomies. Average follow up in this study is 22 years (range 16 to 28 years). Clinically, pain and hip deformity in flexion, adduction, and external rotation disappeared in all patients. The Trendelenberg sign also disappeared in all patients within six months of surgery. Radiographically, all patients showed full consolidation of the osteotomy within two months of surgery. There was no further epiphyseal slipping. There was no incidence of any infection or avascular necrosis. Only one patient developed chondrolysis,

which resolved fully in eight months. No limb length discrepancy was seen in 18 patients, while two patients had a mean of 0.8 cm shortening. Eight patients (36.4%) showed radiographic evidence for degenerative joint disease, but none were symptomatic.

In all series studying Dunn's operation, the risk of avascular necrosis is reported, at rates up to 17%. Even, open reduction and internal fixation of unstable SCFE by means of surgical dislocation does not decrease the rate of avascular necrosis as suggested by Cristina Alves (2012) and Lucas A. Anderson (2013). The authors recommend an in situ fixation followed by a later osteochondroplasty if felt necessary on a longer follow up. We prefer to avoid unnecessary fixation of the contralateral hip in all cases and suggest fixation of the opposite hip only if risk factors for contralateral slip is present. These are, young age at primary diagnosis, severe slip at primary diagnosis, presence of endocrine disorders like adiposogenital dystrophy, juvenile hypothyroidism and presence of nonspecific obesity. We also fix the contralateral normal hip if patient is on growth hormone therapy. Finally, in those cases where for social and/or geographical reasons the patient is not expected to comply with a protocol of continued regular clinical and radiological observation, prophylactic fixation is considered.

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4 References and typesetting were corrected

Thank you again for publishing our manuscript in the *World Journal of Orthopedics*.

Sincerely yours,  
The authors