



IN SITU FIXATION OF SLIPPED CAPITAL FEMORAL EPIPHYSIS WITH CANCELLOUS SCREW

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ABSTRACT

Background: In-situ pinning has a definite role in the management of slipped capital femoral epiphysis (SCFE). We describe in-situ screw fixation with cancellous screw on a regular radiolucent operating table which avoids certain complications innate with the existing techniques. **Materials:** Ten consecutive hips which underwent either in-situ fixation for SCFE (10 hips) or prophylactic fixation of the contralateral hip (4 hips) by the modified technique were analysed. **Results:** For 10 subjects who had unilateral surgery without any signs or suggestions of contralateral involvement, movement in the operated hip was compared to that in the normal hip. A mean reduction of 5° (SD = 11) in internal rotation and a mean increase of 9° (SD = 9) in external rotation was found for the operated hip. 1 case of chondrolysis. **Conclusion:** Our study shows the fact that percutaneous screw fixation of slipped capital femoral epiphysis is gold standard method for better functional outcome in mild and moderate scfe. Long-term follow-up has shown good-to-excellent outcomes after in situ screw fixation of stable slips.

KEYWORDS :

INTRODUCTION

Slipped capital femoral epiphysis (SCFE) is a disease of unknown etiology, but mechanical, biological and hereditary factors are likely to play a role. The rationale for treatment of SCFE is to restore hip function, prevent further slip, and to reduce the risk of subsequent degenerative changes. Several surgical techniques have been recommended such as cannulated screws, hook-pins specially constructed screws, and most recently surgical hip dislocation with subcapital correction osteotomy. However, currently there is no evidence to support the superiority of one particular technique over another.

In-situ screw fixation is one of the preferred techniques for the treatment of SCFE. It is a time-tested method and has a definite role in the management of SCFE. The criteria for successful insitu screw fixation are that the screw should be placed in the center of the epiphysis, preferably perpendicular to the physis without penetrating the joint we present clinical and radiographic results of a novel, simple technique for in situ fixation of the femoral head with partially threaded cancellous screw to enable further growth of the femoral neck.

MATERIALS AND METHODS

Clinical and radiological data of all children with SCFE, operated between 2019 and 2021. The AP and frog-leg lateral radiographs of 10 consecutive hips which underwent either in-situ fixation for the slip (10hips) or prophylactic screw fixation of the contralateral hip (3 hips) were taken for this study. Of 10 hips in in-situ pinning group, 3 were acute slips, 6 were acute on chronic, and 4 were chronic slips. We analyzed the six weeks post-operative radiographs of 10 hips for the accuracy of placement of screws by this technique.

Surgical Procedure

Anteroposterior (AP) and frog-leg lateral views are analyzed for the severity of slip. The starting point and trajectory of the screw in the AP and frog-leg lateral views are determined based on the severity of slip. The patient was positioned supine on the radiolucent table. The image intensifier is placed on the opposite side in a static position to get an AP image of the hip joint.

The preferred entry point is 0.5 to 1 cm below the trochanteric

apophysis on the AP projection. The entry on the lateral projection will be decided according to the severity of the slip. Make the entry with 4.5 mm solid drill bit in the desired trajectory in the AP plane under image intensifier. Once the desired trajectory is obtained in both the views, drive the drill bit further inside just short of the physis. The correct length 6.5 mm cannulated cancellous screw is advanced over the guidewire.

Postoperatively, the child was mobilized with crutches and partially weight-bearing for 4-6 weeks; thereafter, there were no restrictions. Three of the children had prophylactic pinning of the contralateral hip.

Outcome

Clinical and radiographic findings after physcal closure were used to assess long-term outcome.

The radiographic examination at the final follow-up included 2 supine views (1 anteroposterior (AP) and 1 frog-leg view). Radiographic outcomes were

1. slip progression of more than 10° as assessed by Southwick's lateral epiphyseal-shaft angle,
2. signs of avascular necrosis
3. leg length discrepancy (measured from the superior margins of the greater trochanter to the superior margins of the femoral head)
4. longitudinal growth of the femoral neck and
5. whether there was evidence of a chondrolysis.

Clinical long-term outcomes were based on clinical assessment of bilateral hip motions for subjects operated unilaterally and without signs of an asymptomatic slip at follow-up.

RESULTS

Types of slip	Pinning Involved side	Pinning Contralateral side	
Acute	3	3	
Acute on chronic	6		
Chronic	4		
TYPES OF SLIP	MALE	FEMALE	TOTAL
Acute	2	1	3

Acute on chronic	4	2	6
Chronic	3	1	4

For 10 subjects who had unilateral surgery without any signs or suggestions of contralateral involvement, movement in the operated hip was compared to that in the normal hip. A mean reduction of 5° (SD = 11) in internal rotation and a mean increase of 9° (SD = 9) in external rotation was found for the operated hip. These were not statistically significant, however. The mean difference in ATD between the operated hip and the contralateral hip for subjects operated unilaterally was 7.3 (0–17) mm. chondrolysis occur in 1 patient. After 1 year follow up no patient had developed SCFE on opposite side.

DISCUSSION

This study indicates that in situ pinning of slipped capital femoral epiphysis with partly threaded cancellous screw is a feasible and safe technique with few peroperative and postoperative complications, and with good clinical and radiographic long-term outcome. None of the operated hips had a slip progression of more than 10°.

Slip progression after stabilization with a single screw has been reported by several authors (Carney et al. 1991, Aronson and Carlson 1992, Denton 1993). The idea that double screw fixation is more likely to provide torsional stability in non-reduced slips than a single screw has been verified in artificially created slips in bovine femurs (Segal et al. 2006). Others have used multiple Kirchner wires to fixate the femoral head. In a study of 29 patients, a repeat trans fixation was judged to be necessary in 7 of the cases as the wires lost contact with the femoral head during growth (Seller et al. 2006). Carney et al. (2003) found that 20% suffered a slip progression of 10° or more when operated with a single cannulated screw.

Avascular necrosis (AVN) of the femoral head is a severe surgical complication. Carey et al. (1987) reviewed 60 patients operated with threaded pin fixation. At follow-up of between 4 and 13 years, 8 patients had findings consistent with AVN. Carney et al. (1991) reported on 155 operated hips with a mean follow-up of 41 years. AVN was diagnosed in 12% of the subjects, and was more frequent in those with severe slips. They also found a positive association between AVN and penetration of a pin into the joint. No case of AVN found in our study.

In our study Bilateral involvement was seen in 40 percent of the subjects. Hägglund et al. found that 61% had bilateral slips at skeletal maturity, 40% of which remained undiagnosed until the long-term follow-up. In another study involving 224 children, Loder et al. (1993) reported that 37% had bilateral slips. In a retrospective study of 100 patients.

In our study 1 case of chondrolysis occur for which screw revision done.

CONCLUSION

Our article reiterates the fact that percutaneous screw fixation of slipped capital femoral epiphysis is gold standard method for better functional outcome in mild and moderate scfe. Long-term follow-up has shown good-to-excellent outcomes after in situ screw fixation of stable slips.

Case Illustration

Case 1 Unilateral Fixation



Case 2 Unilateral Slip Bilateral Fixation



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