

# Hip Dislocation in Spina Bifida: When is Surgery Required and What Type of Surgery Should be Performed?

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## **SUMMARY**

Children with spina bifida develop a wide variety of congenital and acquired hip joint deformities. Among these are contractures, subluxation or dislocation. This paper will review both the overall orthopedic care of a spina bifida patient with hip problems and provide a focused review of surgery management of hip deformities. Special emphasis is placed on the indications and contraindications to surgery based on a literature review and the author's personal experience.

**Key words:** hip joint, neurogenic dislocation, operative treatment

Hip dislocation or subluxation is quite common in patients with spina bifida. Nearly half of the children with spina bifida show some degree of hip instability during the first 10 years of life. The main cause of this pathology is muscle imbalance between the hip flexors/extensors and the hip abductors/adductors. Several studies in the past have espoused different views regarding the correlation between hip dislocation/subluxation and the decrease or loss of walking ability. A quite popular procedure in the past was the iliopsoas transfer as described by Sharrard and is still being used by several spina bifida centers. On the other hand, previous studies failed to demonstrate a relationship between the hip status and ambulatory ability [1]. These authors concluded that these patients would not benefit from surgical relocation of the hip. However, other studies have supported the surgical relocation of the hip, particularly in unilateral cases. It is important to mention the Sherk and Amos study in which they review 36 spina bifida patients with an average follow-up of 7 years who underwent an iliopsoas transfer with an open reduction and capsular plication [2]. They found that 47% maintained reduction of the hip. However, 17.6% of those patients demonstrated loss of hip motion and difficulty with sitting. In all patients, the transferred muscle did not function as a strong abductor. In their series, 11% experienced a worsening of the neurological deficit. They also reported a high rate of pathological fractures post-op which is related to disuse osteoporosis. Their conclusion was that factors such as the functional level, lower extremity alignment and the presence of scoliosis and pelvic obliquity were more important in determining function than maintenance of hip reduction.

Feiwell et al., in 1978, reviewed 76 patients comparing the functional results in those who had undergone surgical treatment to reduce the hip to those who had not [3]. They found that the presence of a concentric reduction did not lead to improved hip range of motion or ability to walk, nor did it provide a decrease in pain or need for bracing. As mentioned before, the complication rate following these surgical procedures was high. In Feiwell's series, 29% showed a loss of motion and 17% with pathological fractures [3]. Multiple authors have shown that the most important factor in determining the walking ability is the level of neurological involvement, i.e. the functional level and not the status of the hip.

In 2003, Gabrieli et al showed quite clearly in a study utilizing gait analysis in low lumbar myelomeningocele patients with unilateral hip dislocation that the unilateral dislocation alone, without any significant degree of hip flexion or adduction con-

tracture, leads to a quite symmetrical gait pattern [4]. When the hip contracture, flexion or adduction, is significant, there is some degree of gait asymmetry. What is interesting is that they found that the walking velocity for either group was essentially the same. The authors clearly concluded, as has also been shown in previous studies such as Feiwell, Sherk et al., that reduction of the dislocated hip in the low lumbar level spina bifida patient is unnecessary [5,6]. If we are to improve their gait symmetry, treatment of contractures with procedures such as a hip flexor release or adductor myotomy and, in more severe cases, a valgus osteotomy of the proximal femur is the procedure of choice.

Duffy et al. in 1996 examined gait patterns in 28 children with myelomeningocele using 3-dimensional gait analysis to determine if ambulation was improved by tendon transfers [7]. All of the patients who had undergone a posterolateral iliopsoas tendon transfer had concentrically reduced hips at the time of the study. They found that there was no significant difference in range of pelvic obliquity in those patients who had an iliopsoas transfer as compared to those who did not. They also reported a worse pelvic rotation and significantly worse range of hip abduction-adduction in those who had undergone a psoas transfer. The authors concluded that gait was not improved by the posterolateral iliopsoas transfer.

Swaroop and Dias reported their literature review concerning hip surgery in spina bifida. In conclusion, they stated that the available literature supports the level of neurological deficit (functional motor level) as the most important predictor of ambulatory ability [8]. Many authors agree that, "extensive surgery to reduce hip dislocation is not indicated in the myelomeningocele population". "Treatment goals should include a level pelvis and a free motion of the hips rather than a radiographic reduction of the hip."

Most of the studies in the past have always been concerned with the anatomic reduction of the hip. There was no clear documentation if these children undergoing surgery were walking with support and without support. Clearly, for the sacral level patient who can walk without support, hip dislocation can lead to a major gait asymmetry and here, maybe the surgical relocation of the hip would be indicated since the gluteus lurch is quite significant to a loss of fulcrum. On the other hand, there have been no past publications documenting that this surgical treatment is valuable. In order to maintain the hip reduced after the open reduction and osteotomies at the pelvis and femur, there is a need to have some degree of muscle balance. The gluteus medius should have at least a strength of 2 to 2+. If present, then surgical treat-

ment is indicated. If the gluteus strength is quite abnormal, then a re-dislocation will very likely occur.

Another important factor to consider regarding the iliopsoas transfer is that during normal gait we have power generation muscles which are quite important. The gastrosoleus complex, the gluteus medius and maximus and the hip flexors including the iliopsoas, which is a quite powerful hip flexor. A spina bifida child, low lumbar level, has a weak gluteus, no gastrosoleus and a powerful iliopsoas. So, the forward motion is especially related with the iliopsoas function. As the iliopsoas transfer is perform-

ed, there is a loss of flexor power and this can lead to an excessive pelvic movement in order to provide adequate step length. As well demonstrated by Duffy, the gait kinematic is worse after the transfer [7].

In conclusion, as stated by Swaroop and Dias, "Although surgical treatment may allow reduction of the dislocated hip, this result must be weighed in terms of the potential for complications and functional decline [8]. One must also consider the potential need for subsequent procedures to maintain reduction, risk for pathological fracture(s) and the effect of prolonged treatment on the patient and family.

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