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## Functional treatment of congenital dislocation of the hip

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## SUMMARY AND CONCLUSION

### SUMMARY

A prerequisite for the development of congenital dislocation of the hip is ligamentous laxity of the hip-joint, which is demonstrable shortly after birth when the hip can be easily dislocated and reduced. This situation is described as dislocatable hip. Ligamentous laxity naturally tends to disappear, and 90% of all dislocatable hips in fact stabilize spontaneously. No dislocation develops unless an exogenous factor is involved. In infants born in breech presentation the hyperextension of the knees with the resulting increased tension in the hamstrings plays a role. During or shortly after birth, the deflexion of the hip-joint causes an increased tension in the relatively shortened iliopsoas muscle, as a result of which the hip can be dislocated in postero-superior direction. By the time the infant is two months old secondary changes (more specifically restricted abduction) become more pronounced. It may therefore be stated that contracture of the iliopsoas muscle is one of the causes, and restricted abduction a consequence of congenital dislocation of the hip. The degree of dislocation is determined by a balance between the degree of ligamentous laxity and the influence of exogenous factors. When the infant starts to stand and walk, its body weight also begins to function as a deforming exogenous factor.

When dislocatable hips are not treated immediately after birth, the frequency of congenital dislocation of the hip at the age of three months amounts to 1-2 per 1000 neonates. The male:female ratio is 1:4.

The secondary changes in the osseous structures of the hip-joint should always be studied three-dimensionally. Apart from conventional antero-posterior pelvic roentgenograms, CT-scans can enhance spatial insight. The secondary changes manifest themselves in an enlarged neck-shaft angle, increased femoral anteversion, an increased inclination of the acetabulum and possibly also in diminished acetabular anteversion. In view of the high radiation load involved, examination by CT-scan is not yet a routine procedure in congenital hip dislocation. Radiological examination is usually confined to an antero-posterior pelvic roentgenogram on which the acetabular angle, the neck-shaft angle and the CE-angle can be measured. These are all values projected in a frontal plane. To determine the real values the degree of acetabular and femoral torsion has to be known. With the aid of the CT-scan the torsion of the acetabulum and of the femoral neck as well as their summation - the instability index - can be measured without difficulty. By conventional techniques only femoral torsion can be determined. The most widely used procedure is the biplanar technique, but this entails the risk of a by no means inconsiderable measuring error.

Functional treatment of congenital dislocation of the hip comprises closed reduction which, slowly and in a controlled way, reverses the pathogenetic mechanism of the dislocation. The influence of the iliopsoas muscle is eliminated by flexing the hips  $90^\circ$  with the aid of skin traction in balanced suspension. Next, the adduction contracture is abolished by slow abduction. At  $90^\circ$  flexion and  $90^\circ$  abduction of the hip-joint reduction is achieved via the anteriorly directed vector of the resulting force of the adductors.

After reduction efforts are made to restore the anatomical architecture of the hip-joint by means of the inductive action of the well-centred femoral head in the acetabulum. On the basis of myogenetic conditions, the most stable position is the Lorenz position. However, in order to ensure an optimal inductive action of the femoral head on the acetabulum, the head must be optimally centred both in the frontal and in the transverse plane. This is ensured by  $45^\circ$  flexion,  $30^\circ$  abduction and  $20^\circ$  medial rotation of the hips or by  $90^\circ$  flexion,  $30^\circ$  abduction and neutral rotation (human position) for immobilization.

In patients up to three years old, reduction can be achieved by traction methods in some 90% of cases. After reduction of the femoral head the decision to perform a pelvic osteotomy to improve the covering of the femoral head should be postponed three years, because during this period considerable improvement of the acetabular angle can be expected to occur with growth. After reduction within the first year of life a normal acetabular angle develops in most cases without surgical intervention. After the first year of life this happens much less frequently. When a pelvic osteotomy is required, the Salter osteotomy is the operation of choice as long as there is adequate congruence between femoral head and acetabulum. It should be realized that the maximal correction of the acetabular angle to be achieved by this osteotomy does not exceed  $10-12^\circ$ .

Spontaneous correction occurs during growth in some 80% of patients with pathologically increased femoral anteversion. This is most pronounced during the first few years after reduction and is very limited after the age of eight years.

A serious complication which may occur in treatment of congenital hip dislocation is ischaemic necrosis of the femoral head. The deformity of the proximal end of the femur can be predicted from the degree of damage of the epiphyseal plate. This complication occurred in only one of the 68 functionally treated congenital hip dislocations.

Evaluating on the basis of strict criteria, the result of functional treatment of congenital dislocation of the hip can be described as good in 64 of the 68 hips and poor in four; two of these four poor results are capable of subsequent improvement.

## CONCLUSION

Functional treatment of congenital dislocation of the hip as described in this thesis is a simple, safe method. During the reduction phase the hips are flexed to eliminate the influence of the iliopsoas muscle; subsequent abduction of the hips should be effected very gradually to prevent ischaemic necrosis of the femoral head. The

pectineus-adductor muscles play an important role both in reduction and in the pathogenesis of ischaemic necrosis of the femoral head.

Up to the age of three years reduction is achieved by skin traction in balanced suspension in 90% of cases. On the basis of myogenetic conditions the Lorenz position is the most stable position for immobilization after reduction. This position entails no increased risk of necrosis after gradual abduction. A less extreme position can be chosen when the contractures are less marked and reduction is quick and easy. When no further risk of redislocation exists the femoral head should be optimally centred in the acetabulum in the frontal as well as in the transverse plane, preferably with the aid of a splint which allows mobility in the hip-joint within certain limits. After reduction of the femoral head at least three years should be allowed to pass before a decision is made concerning a pelvic osteotomy to improve the covering of the femoral head.

