

Reasons why the results of hip joint screening in the UK are unsatisfactory

Outlined by Godward Sara. Ucarol Detateux Surgery for congenital dislocation of the hip in the UK as a measure of outcome of screening., Lancet 1998, 351, 9110

Summary.

Key issue: In 1969, the UK introduced screening of newborns to identify instabilities of the hip, and because the instability was obviously equated with hip luxation. In 1986, the Standing Medical Advisory Committee advised recommended screening three times in the first six weeks of a baby's life. Within 24 hours after birth, at discharge from the hospital, and at six weeks. Additionally it was advised to perform a clinical exam for classic signs of luxation and abnormal gate when the baby starts walking. In 1994, a national committee determined that this routine evaluation was still being practiced.

The introduction of Godward and Dezateux work clearly states: *“Early detection of hip instability in infants allows the initial treatment to be non-surgical, a splint appliance is worn that keeps the hips abducted to encourage a stable and concentric reduction of the femoral head within the acetabulum.”*(emphasis added)

In 1998, Godward and Dezateux published a study questioning the effectiveness of this procedure since the outcome was never established.. The question was; Were surgeries performed because a congenital hip luxation existed or because of a mistake during the screening process even if after the diagnosis no treatment followed? A national control system was implemented and hospital documents of 20% of in hospital births in the UK (Scotland, Northern and Wessex region) were evaluated to collect data on all children under 5 years of age per 1000 live births, who received at least one surgical procedure to correct a congenital hip luxation from April 1993 to April 1994. The result was that the frequency of initial surgical procedure for congenital hip luxation in the UK was 0.78 per 1000 live births. A congenital hip luxation was not detected in 222 (70%) out of 316 children registered with the national control system. In 112 (35%) of the children the diagnosis was the result of parental efforts. 67 (21%) of the children had not had any surgical treatment before. The further break down showed that the frequency of surgical interventions because of congenital hip luxation in the UK was identical with the numbers before screening was implemented.

The definition of surgical procedure included smaller procedures like exams under anesthesia, an arthrogram and the application of a cast but also more complicated procedures such as a pelvis or femoral osteotomy. The study resulted in the conclusion that a fundamental evaluation of generally used or alternative screening methods , including universal primary ultrasound pictures, was necessary. Basically, a complete evaluation of the common or alternative screening methods is necessary.

Method and Discussion: Evaluation of problems which are inherit in the screening procedure. Making sense of problems posed by the screening process.

The first problem is instability. . The reason for screening is earliest possible diagnosis and treatment of hip luxation with an abduction splint. During this process the goal is to look for an instability of the joint in order to treat any discovered instability of the joints. This instability is therefore interpreted as “hip luxation.” The ultrasound exams are used to investigate the anatomical structure of the hip socket and to evaluate if a joint has a luxation or if a future luxation is possible. However, these are two different diagnoses which are not necessarily interconnected with each other. One needs to question further if the search for an instability is a plausible way to detect a hip luxation or a potential luxation. The instability sign is connected to the name Ortolani. The pediatrician M. Ortolani ascertained in 1937 that it is possible to set the hip joint of children of around 3 months of age, with a single motion to a

definite clicking feeling. The hip was therefore dislocated conversely, the hip joint could also be dislocated the same way. The conclusion is that the hip was unstable.

After this discovery, Barlow attempted to dislocate baby's hips to see if any kind of instability of the hip was present. After several more publications on this there were critical comments. In 1989 Moore explicitly reported on this. Now the phenomena of late diagnosis cases was discovered.

It happened in some regions that children, who at their well child check up were classified as normal were later found to have a luxation. It was first thought to be a mistake of those administering the examination. The number of conspicuous cases was in part dependent on the person administering the examination. The more experience he had, the more cases and also late diagnosis cases he had. Furthermore, the number of cases of hip luxations increased world-wide wherever screening was practiced. Discussions started if the loosening was triggered through the examination by overstretching the joint capsule. Moore came to the conclusion that a screening for hip problems could be a blessing. However, it could get out of control if the examination is too forceful, too often or with too much pressure.

The second problem is the treatment and common forms of orthoses. The aim to get the legs into a spread position to receive a stable concentrated direction for the femur ball in the socket dates back to the treatment of A. Lorenz, who, after setting of the hip, fixated the position in the so called "frog-position" with a cast. This was a bitter necessity in order to support the unstable Reposition against a later Reluxation (Lorenz S.-176).

It is important to note that Lorenz only treated already dislocated hips of older children who could already walk, often considerably older than one year. He is said to have preferred a joint middle position because of the broader contact of the joint parts. That did not agree with the redeeming reposition. For a prophylaxes he suggested the "the dissolving or increase of the natural flexing of a newborn." (Lorenz page 241). He anticipated certain problems with the spread position. The spreading positing is not used as a treatment for the hip. It is also not a position in which the newborn hip joints need to be brought in order to keep them from dislocating. For these reasons Lorenz did not suggest spreading to treat a prophylaxe.

If through the testing the instability is loosened, special precaution is required not to dislocate the hip. For this reason the testing can be dangerous. Most hip joints of newborns are usually not dislocated at birth. They luxate with the stretching after birth of the maxed out tilting when the socket is not stable enough, which was the result of experience and of course ultrasound exams.

That the hip joint does not dislocate after birth is not a mechanical problem by passive straddling. The follow up exams of the treatment according to Lorenz were poor. Georg Hohmann 1951 reported on this. There were three reasons responsible for that. A changed femoral head axis, femoral head necrosis, and an increasingly negative outcome. Upon examining the unfavorable results, the cause was overstretching of the legs. Fettweis found that the deviation of the femoral neck axis through a varus and antetorsion are responsible for the bad outcome but can be prevented if over spreading is avoided. Pauwels found the following rule: functional adaption of the bone through growths in lengths. Salter and el. realized in animal experiments that avascular necrosis of the femoral head has to be the result of overspreading and he tailored his therapy accordingly.

Later Fettweis was able to pinpoint the connection of the late deterioration as a result of the changed center of rotation of the hip.

With the over spreading of the hip joints, the adductors are overstretched and the abductors, mainly the gluteal muscles, are loosened. The overly stretched muscles slacken and the loosened muscles shrink some. This will slowly lead to decentralizing of the hip and in some cases to a reluxation.

A centralizing of the femoral head in the acetabulum happens through active muscle tension in the position in which children are carried on the mother's body the way it is seen in cultures where hip

luxations are extremely rare. Bueschelberger did detailed research on this. The hip joint of a newborn is in an ideal way prepared for being carried on his mother's body. In a flexion of 110 degree and an abduction of 40 degree, which is about the degree of the leg position when carried on mother's hip, the femoral head axis is vertical to all acetabulum levels. This means the socket is always pressed evenly and the condition for the bone structure according to Pauwels, namely the hydrostatic pressure, is most favorable. The important impact of the gluteal muscles was detailed by Fettweis in 1991.

A good spreading does not happen passively but actively through the muscles. The above mentioned possible damages are not only referred to when the children came to treatment but also with infants according to their age and stage of development.

Considering these points, the advised orthoses are not recommendable to promote a definite healing. There is the Von Rosen Splint. Put on dorsally, keeps the legs spread apart. Von Rosen himself in 1976 advised the ideal position for this splint to be a 70 degree spread apart and a 90 degree flexion. Also the orthoses from Barlow was put on dorsally and brought the legs into an analog position like the Von-Rosen splint.

The Craig splint, as pictured by Gordon Petrie, is basically the spread harness according to Becker in the German speaking regions. Due to several possible damages this harness has been abandoned. The legs were basically spread in a right angle. Today, the preferred early treatment is the Pavlick Harness, which is a harness made of straps, hooks, and loop buckles. Pavlik developed this method while the treatment according to Lorenz was practiced. He tried to limit the high number of avascular necrosis of the femoral head, which was common in the Lorenz position. The transition to the spreading was to be done slowly. This harness allowed for all possible positions of the legs except overstretching. Children are to restore the proper position of the hip spontaneously through kicking of the legs. The accompanying pictures illustrate this, especially the Lorenz position accomplished through the straps. After the reposition, some of the hips had to be held in place by a cast, a splint, or other device. This method was mainly used in the first year of life. The number of femoral head necrosis diminished. In the examination of Toenis of femoral head necrosis he found with the Pavlik Harness, relocation and fixation, to be 7%. The danger with this harness is the adduction; this combined with flexion can lead to luxation.

If in a newborn, or respectively infant, the legs are mainly brought into a spreading position, the upper epiphyseal of the femoral neck can be stimulated for a change in the axis position which can lead to a disruption of the abductor muscles which would show in the hip joint with the passage of time later down the road. Some damage might correct itself. The severity is also directly connected with the duration of the treatment. These orthoses contradict the biomechanical conditions that are necessary for an optimal development of the hip joint. It is safe to say that the less favorable outcome of the screenings comprise not only a problem of the loosening but also a problem of the therapy.

Conclusion:

The exam for the instability of the hip joint is not an appropriate method to record with certainty any hip luxation. The common treatment methods after the diagnosis with the recommended orthoses are in direct contrast of the biomechanical laws and can lead to further damage.

The reason for the unfavorable results of the hip screenings are to be found in the screening method along with the subsequent treatment.

Sources:

