

PROCEEDINGS OF THE NORTHERN ORTHOPEDIC  
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EDITED BY  
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The meeting was opened by the chairman, surgeon in chief  
*Henning Waldenström*, M. D., Stockholm.

A. HELLSTADIUS, STOCKHOLM:

ON REDISLOCATIONS IN CASES OF REDUCED  
CONGENITAL DISLOCATIONS OF THE HIP

Manipulative reduction of congenital dislocation of the hip in the majority of cases yields excellent results. It is mainly to *Lorenz* that the invaluable credit belongs to have shown that not only can congenital dislocation of the hip be reduced without open operation but also that by subsequent fixation treatment it is possible to get the head to remain in its place in the acetabulum. Yet from time to time redislocations occur even after the most expert manipulative treatment.

The failures observed after manipulative reductions are mostly due to redislocation of the femoral head. The fact that the head remains in the socket is not always, however, identical with a good functional result and a redislocation does not always lead to a bad articular function of the joint. An articular head well retained in the acetabulum may sometimes on account of deformative processes above all in the articular head, or because of persistent muscular contractions, give rise to considerable functional deficiencies. On the other hand a good func-

tional result may sometimes be obtained in cases where the head is in a position of a not too well-marked forward dislocation and retained there in a secondarily formed acetabulum. Such cases, however, are exceptional and the result after treatment is generally subject to the head remaining in the acetabulum.

Still to-day *Lorenz's* original therapeutic plan is often used in the treatment of dislocations. In many places the original method of fixation has become more or less modified, as is the case at the Orthopaedic Centre in Stockholm where a modification of *Lorenz's* original method as suggested by Prof. *Haglund* is in use. Before enquiring more closely into the redislocations that have occurred at the Orthopaedic Hospital in Stockholm it would seem appropriate briefly to describe the treatment practised there for congenital dislocations.

The dislocated femoral head is reduced over the posterior rim of the acetabulum after which the limb is fixed in plaster with the thigh usually in a position of 90° flexion, 90° abduction and in addition to this preferably with some inward rotation. After 2 weeks a fresh plaster is applied with increase of the inward rotation generally to about 90°; this can then be carried out without risk of redislocation; flexion and abduction, however, as before. By the inward rotation a better centring is obtained of the head in the acetabulum than with the position originally suggested by *Lorenz*. After about 4 months the period of gradual lowering of the limb is commenced; the limb being then lowered in different plasters to walking position in two or several stages (about 40° abduction for one-sided cases and 30° for bilateral dislocations) yet retaining powerful inward rotation. The whole of this period of fixation until the limb is brought down to walking position generally takes about 5 months. The plasters extend from the nipple to just above the malleoli. The one-sided cases are then made to walk in their plaster. This is usually cut already after a few days into an anterior and a posterior portion, of which the latter is retained and used as a plaster box in which the child has to lie. The child is taken up from the plaster box for walking exercises (no special massage or movements are given) and is then put back into the box where still

for a fairly long time it has to remain at night-time and while no walking exercises are undertaken. The therapeutic programme thus sketched is only meant to give a rough outline of the treatment. Naturally this has to vary from case to case all according to individual circumstances, such as the age of the child, development of the acetabulum, degree of rigidity of the hip-joint etc.

The redislocations dealt with in this investigation are only those arisen after completion of the period of fixation, when thus the child has been allowed to get up and been walking about without plaster supports. The redislocations occurring during the period of plaster fixation are generally due to incomplete reduction, breakage of the plaster, carelessness on taking the child out of the plaster for roentgen examination or replastering, and so on; in these cases, therefore, conditions differ from those occurring at a subsequent time. The present enquiry only includes such cases of dislocation that have been reexamined after having been walking about on their legs without any plaster supports for at least 6 months. It is true that redislocations may occasionally arise even subsequent to such interval of time but this would seem to happen relatively rarely. The first few months in which the children are going about freely on their legs is that period of test during which we shall generally know whether the previous fixation treatment has been sufficient or not for establishing definite retention of the head in the acetabulum. Subsequently, with time, the acetabulum will gradually develop more and more and the less will be the risk for redislocation.

The line drawn between an articular head retained in the acetabulum and subluxation as also between subluxation and dislocation proper is arbitrary, and sometimes when it is a matter of assessing the result of treatment of a dislocation there has been some difficulty in deciding whether the one or the other condition has been present. A head placed slightly high up in the socket has been considered a satisfactory retention while more definite subluxations may have been referred to as luxations.

The clinical material under review is made up of dislocations successfully reduced at the Orthopaedic Clinic in Stockholm during the last years (1924—1931) who have returned for after-examination. Some of the patients treated have not returned for after-examination, partly owing to their residing in more distant parts of the country. These cases probably include relatively many who were cured by the treatment and therefore found an after-examination unnecessary while such cases where redislocations occurred have returned comparatively more frequently. It would seem therefore that the therapeutic results are really somewhat better than may appear from the following summarised account.

The review comprises 114 children with congenital dislocation, of whom 94 females and 20 males. There were 38 cases of bilateral lesions and 76 cases of one-sided lesions; there were thus a total of 152 cases of dislocations.

*Out of all the 152 dislocations there were 27 recurrences, i.e. 17.7 %.* In some cases one tried by way of experiment for a certain period of time to shorten considerably the period of fixation but since this resulted in a very high rate of redislocations it was rapidly given up. If these latter cases, to which I will return later, are deducted the rate of redislocations for the rest of the material will amount to 15 %.

The experience generally made is that the therapeutic results of bilateral dislocations are more frequently worse than those of the unilateral cases. Among my 76 cases of *unilateral dislocations* there were 12 redislocations, i.e. 15.8 %. There were 38 children with bilateral dislocations and of these 11 recurred (uni- or bilateral), i.e. 28.4 % of the cases. In 4 of these redislocation had taken place on both sides, in the rest on one side only. Among these 38 children with *bilateral dislocations* there is thus a total of 76 dislocations and of these there were 15 recurrences (8 bilateral and 7 unilateral), i.e. 19.7 % which is only 4 % more than in the unilateral cases. There is thus no great difference in the rate of redislocations between the bilateral and unilateral cases in the material under review. This is partly explained by the fact that those cases for which a shortened period

of fixation was tentatively tried and for which the rate of redislocation was particularly great all belonged to the unilateral group whereby the number of redislocations among the unilateral cases became relatively great as compared with the bilateral cases: Moreover, the relatively bad reputation of bilateral dislocations has often caused these to be treated with greater care than the unilateral cases and preferably with a somewhat longer period of fixation. These factors probably help to explain why the rate of redislocation among the bilateral cases is not more definitely in excess of that of the unilateral cases.

Regarding the age at which a dislocation is reduced and its bearing upon the rate of redislocation no definite relation of that nature can be ascertained from my cases, the rate of redislocation being fairly much alike for the different ages.

Because of the muscular contracture resulting from the fixation and sometimes inveterately persisting in elderly children one has in these cases tried to shorten as much as possible especially that part of the time when the limb is kept in plaster in a position of strong flexion and abduction. In a less number of old cases of unilateral dislocations we tried a much shorter period of fixation, considerably shorter than that generally practised. The total period of fixation here was less than 2½ months and the first part of the fixation period before commencing bringing down the limb was less than 1½ months. Out of these 6 cases no less than 5 redislocated. This *shortened period of fixation* which was only tentatively tried in a small number of cases *thus yielded a very disheartening result* and has helped to increase the rate of redislocation for the whole material by more than 2 %.

For retention of the head in its place in the acetabulum the development of this ought to be of some importance. Our estimation of the development of the acetabulum in a given case is generally rather uncertain and incomplete. Through skiagrams, however, we obtain certain clues for estimating the depth of the acetabulum as also through the »feel« of reduction experienced at the actual operation and by the degree of the so-called primary retention.

Although the *skiagram* affords us an approximate view of the osseous part of the acetabulum it leaves us entirely in the dark as to the development of its cartilagenous rim. Among the redislocations in my material there are a few cases with an acetabulum more poorly developed than usual but in the majority of cases it is not worse than in congenital dislocations in general. Among those bilateral cases where only one of the hips was reduced it was only in one case that one found, on comparing the two sockets, an acetabulum definitely worse developed on the redislocated side, in that the primary socket without any visible boundary passed over into a secondary acetabular formation, but in the rest of the cases no definite difference between the two acetabuli could be demonstrated on the radiogram. On the other hand a great many exceedingly poorly developed sockets may be found where the head has not redislocated but remained in situ in the socket. Generally speaking, therefore, a more or less developed acetabulum on the radiogram would not seem to yield any clues for estimating the tendency to redislocation. Yet a certain amount of care should be exercised in cases where the upper acetabular rim is quite definitely poorly developed as for example when the primary socket through a smooth groove apparently passes directly over, without any dividing line, into a secondary acetabular formation.

The degree of the so-called *primary retention* obtainable after reduction is generally accorded some value for estimating the risk of redislocation. If from Lorenz' primary position the limb can be brought down fairly well without redislocation occurring, the primary retention being thus good, this is considered a favourable prognostic sign. If it be found, on the other hand, that the limb on the slightest deviation from the position of reduction would tend again to redislocate, it will naturally be particularly prone to do so during the very period of fixation, but it may also to some extent be an expression of anatomical and physiological conditions which may favour also a later redislocation. The degree of primary retention is partly determined by the development of the acetabulum, and above all then by its upper and posterior rim over which the redis-

location often takes place, and partly by the tension of the pelvifemoral and pelvircural muscles. A well adjusted muscular tension between the different muscular groups forces the head into the socket and thus tends to fix it by virtue of this tension but too great a tension of either muscle group may lead to redislocation. A reduction of Lorenz's primary position in the form of diminished flexion and abduction elicits in the stretched pelvircural and pelvifemoral muscles a component movement which tends to displace the head upwards and backwards whereby redislocation may arise, this the more readily the more poorly developed the acetabular rim is. In the case of particularly bad primary retention a so-called »accentuated primary position« with increased flexion and abduction renders the position of the head more secure in the acetabulum. Even working the head well forwards towards the groin through hyperextension and outward rotation, whereby better shortening and shrinkage of the posterior capsular parts are obtained, does no harm in the first plaster since this overcorrection can readily be altered in the second plaster. A poor primary retention may occasionally be caused by other factors than those related above. So does interposition of the capsule arisen during reduction of the dislocation naturally result in an exceedingly bad primary retention if reduction has on the whole been at all possible.

In my collection of 27 redislocations data were at hand in 23 cases as regards the primary retention. In 7 cases this was bad or very bad, in 12 cases good and in 4 cases exceedingly good. It will be seen therefore that the retention was bad in a small number of cases only. In those cases where no redislocation had occurred one found it fairly often stated that a bad primary retention had been present, and among the bilateral dislocations where redislocation had occurred on one side only it is stated in a couple of cases that a better primary retention had been present on the redislocated side than on the other. *The degree of primary retention is therefore of rather uncertain prognostic value when it is a question of redislocation arisen after completion of the period of fixation.*

*Antetorsion of the collum of the femur is often increased in*

congenital dislocations and several authors maintain that such increased antetorsion is in some cases the cause of redislocation. It would seem, however, that more pronounced antetorsion of the collum is of fairly rare occurrence. *Frölich* (Revue d'orthopédie, Tome 8, 1921) on a material of 1,000 cases of congenital dislocations of the hip found a more pronounced antetorsion of the collum in 1 % of the cases. In well-marked cases corrective osteotomies of the middle or the upper part of the femur have been made to prevent redislocations through the position of antetorsion of the collum. It is naturally very difficult to estimate the angles of antetorsion on a radiogram unless this be taken for that very purpose. For the cases under review I am unable therefore to give any particulars of such angles. Yet on comparing the two sides in unilateral dislocations I have found nothing to indicate any decided difference regarding the antetorsion of the collum on the two sides.

Redislocation during the period of fixation is generally an expression of an exceedingly poor retention and in these cases such period has naturally been relatively prolonged. Among the 27 cases of redislocation arisen after conclusion of the fixation treatment the period of fixation had already in 2 cases been complicated by redislocations which necessitated renewed reductions. Among the remaining 125 reduced dislocations there was also 2 cases of redislocation during the period of fixation but after renewed reduction there the head remained in situ in the socket.

In two cases a *rigidity of more unusual degree* was encountered which caused some difficulty in bringing down the limb. At least in one case the rigidity was very pronounced with abduction and outward rotation which necessitated many corrections in plaster before the limb could be properly brought down. A few months later the head had redislocated despite the well-marked contraction of soft parts obtained. In this case the rim of the acetabulum was extremely poorly developed as revealed by roentgen which showed the primary socket passing directly over into a secondary acetabular formation. It will be clear, therefore, that a well-marked rigidity with abduction of the

hip-joint obtained by the fixation does not always protect against redislocation. This may be possibly so explained that the rigidity occurring—which in older children sets in relatively more rapidly—is due to the increased tendency to shortening and shrinkage being mainly localised to the muscular soft parts while the shrinking tendency of capsular and ligamentous tissues are not affected in the same degree by rising age. Assuming this it would not need a particularly long period of fixation in older children to produce considerable muscular contracture, at the same time as the shrinkage of the upper and posterior capsular parts—of particular importance for retention of the head in the socket—would still be unsatisfactory and unable to prevent redislocation of the head. In certain cases, however, an inveterate muscular contracture arisen through the fixation may conceivably directly favour a redislocation. If after the period of fixation the contracture of the abductors abates but the shortening of the flexors persists then we get a pure flexor contracture. The hip flexors force the head against the upper and posterior parts of the acetabulum and may thereby help to produce redislocation. Subspinal tenotomy may become necessary where physical treatment is unable to overcome the flexor contracture.

Regarding the *treatment of redislocation* we have used in the cases under review here renewed reduction and fixation in plaster along the same principles as at the first reduction. Lately we have also in a few cases carried out plastic operations of the acetabulum but it is too early yet to draw any conclusions as to the results obtained. The cases of redislocation taken for treatment anew represent a comparatively small number. Those children who have returned with their redislocations have sometimes grown relatively old for renewed reduction to be successful. One has generally refrained from reducing such dislocations where too great difficulties would be entailed. The trauma sustained at reductions violently carried out sometimes gives rise to considerable deformative changes of the articular head with consequent functional disturbances whereas cases in which the head is in a position of anterior subluxation or not too well-

marked dislocation often lead to a surprisingly good functional result. Among the *redislocations treated with renewed reduction and fixation in plaster* 5 cases were under observation for a sufficiently long time to enable the results to be estimated. *Four of these had again redislocated and only in one case had the head remained in situ in the acetabulum.* Since it was feared that too great a rigidity would ensue in the hip-joint a greatly reduced period of fixation was employed in 2 of the cases, the total period of fixation being in both cases 2½ months only. In both these cases with shortened period of fixation redislocation occurred.

The number of redislocations is of course far too small to allow any definite view as to the prognosis. Even if in some cases a definite retention of the head in the socket can be obtained by renewed reduction and fixation in plaster the outlook is very likely one of failure. A relatively short period of fixation would seem rather useless while a long one is probably necessary to afford any chance at all for the head to remain in situ in the acetabulum. A plastic operation of the acetabulum is worth considering particularly in older cases where muscular contractions, rapidly ensuing on account of the fixation, rule out a longer period of fixation wherefore the possibility of getting the head to remain in its place in the acetabulum through fixation treatment is very remote.

#### DISCUSSION:

V. Bülow-Hansen, Oslo:

I have followed the speaker, and have studied the statistics on relaxations handed us, with the greatest interest. It seems to me that the first fixation, for less than three months, is rather short, and I must say that I do not see any advantage in emplastration by stages, especially not as regards the youngest patients. It is on the development of the acetabulum more than anything else that depends the stability which prevents relaxation. The most important is a concentric position of the caput, and next to that the development of muscular tonus. It is on the latter, of course, that the maintainance of the position depends.

But with frequent, repeated emplastrations one does not arrive at developing the musculature, which is weak and atrophic to begin with. It is for those reasons that I, like several others, very early adopted *Lorenz'* after-treatment.

As soon as the bandage has been removed, the patient is handed over for massage treatment, and the position under extreme retraction—*le grand écart*—is controlled. If adduction contracture is observed, the adductors are tightened under narcosis, in order to prevent relaxation, whereupon the patient is put in plaster for two weeks. Of course there are relaxations that defy all attempts at treatment. If good pronation can be secured, the after-treatment is shortened; but on no condition unless the trochanter has passed the ischial tuberosity, because otherwise the caput will unavoidably slip out, and relaxation occur.

If, now, the proper stability cannot be secured, we always have in *Lorenz'* bifurcation an operation which gives excellent results even in the case of the oldest and never before treated luxations. It should never be used on children, however.

*Patrik Haglund, Stockholm:*

The great contrast which *Bülow-Hansen* seems to find between his own technic and the one employed in the Stockholm clinic is more apparent than real. It is true that certain details of our procedure are of our own devising, but how he has gotten the idea that we use some sort of »emplastration by stages« which disregards the usual periods for anything so important as the primary fixation, I don't understand at all. We use no such thing. Our modifications of *Lorenz'* method are, in fact, rather slight, and aim to a large extent at greater individualisation and less adherence to a fixed routine,—which, of course, in all dealing with changing natural phenomena, is the only way in which any progress can be made. The point to which we—like *Bülow-Hansen*—attach particular importance, is to get the inward rotation established right from the beginning, or at least as soon as possible; and then to see that it is maintained afterwards, all through the treatment. I have myself heard *Bülow-*

*Hansen* insist on that very point already thirty years ago, and on the whole I think we agree perfectly. The most ticklish time comes, of course, when the fixation is discarded and the child begins to walk without that support for the hip. To ensure the maintainance of a good inward rotation then *is* difficult; and I cannot imagine how it can be done, even, with the gymnastic, or choreographic, exercises performed by *Bilow-Hansen's* young luxation patients. To me, those exercises seem enormously risky, and liable to destroy many a good result already obtained.

*H. Nilsonne*, Stockholm:

Judging from *Hellstadius'* after-examination and others of more extensive nature it is evident that one always has to reckon with a number of redislocations among one's collected cases of dislocation. Generally it is not a question of cases with defective reduction but of cases with a poor primary retention.

When a case returns with redislocation after reduction and after-treatment carried out in the usual manner it would rarely seem to be worth while again to perform a manipulative reduction. My impression is that in these cases the acetabulum lacks the possibility of retaining the head owing to a poor formation of the acetabular roof, a fact which is observed at a very early stage of the operation of these cases.

In recent years I have in a few cases performed plastic operations of the acetabular roof in cases of redislocation. In so doing I have followed *Spitzzy's* technique thereto encouraged by *Berntsen's* paper at the Orthopedic Congress in Copenhagen 1930. It is impossible as yet to pass any final judgment regarding the results of these cases but so far we have found this therapeutic method satisfactory.

*P. G. K. Bentzon*, Kopenhagen:

Dr. *Bentzon* admitted that he still employed a method which might perhaps be called »emplastration by stages«, inasmuch as he always, began by a primary application of plaster of Paris in full abduction and inward rotation, and then, from three to five months after, according to the age of the child and the

character of the luxation, exchanged this for another plaster bandage, to be worn for from three to five weeks, in a position more or less corresponding to Lorenz' bandage no. II, but with very strong accentuation of the inward rotation. It must be remembered that the leg is to be used, in the future, not in the position of abduction, but in the almost completely adducted position. The attention must not be concentrated too much on the purely osteo-articular conditions; the conditions of the capsule and musculature have to be considered as well; and the necessity of a period of habituation for these soft parts during fixation in a position midway between the primary one in the abduction bandage and the one in which the leg is to be used seems to me so evident that I have not found any reason to abandon it.

To counteract the risk of any »primary relaxation« I consider it as particularly important that the condition of the hip should be controlled very carefully during the time when the child first attempts to walk. During that period, I roentgenograph at least every two weeks, and if I find the slightest indication of incipient relaxation I immediately bandage again in a certain degree of abduction and with strong inward rotation. I believe that by so doing I have saved a number of cases from relaxation. In all cases, I use night bandaging, in the position indicated, for a long period,—six months or more.

*Patrik Haglund*, Stockholm:

As *Bentzon* rightly observed, the important thing is, of course, to teach the child to walk in such a way that there will be no risk of relaxation. This is done precisely by teaching it to walk with the hip-joint rotated inward. As the child in whose case there has been question only of unilateral reduction can keep up the inward rotation for a long time after the bandage has been removed, which for natural reasons is impossible for the child with bilateral reduction, the prospects for continued retention are considerably better in the former cases than in the latter. The difference between *Hellstadius'* figures—15 and 19 respectively—is suspiciously small. It has to be remembered

that his investigations deal with only one side of the question, and must not be taken as any exposition of the results of the treatment, which of course depend on a great many other circumstances. Under certain conditions, a hip-joint not fully retained may represent a better result than one whose retention is completely established. I need not go further into this, as it is something which is, of course, well known by all who have any experience with cases of this kind.

*S. Hybbinette, Stockholm:*

With reference to Dr. *Nilsonne's* observation, that in cases where the relaxation recurs one often distinctly feels that it is some intervening obstacle which prevents complete reposition, I wish to tell about two such cases from my own experience. Both were bilateral luxations, and had been treated *lege artis* by colleagues of mine, but as soon as the plaster had been removed the relaxation had recurred. They were very easy to reduce, but even in the reduced position I had the feeling of some thick, obstructing mass between the caput and the acetabulum, which prevented complete reposition. I then opened into the joint, and found that the caput had pushed the isthmus of the capsule along before it, into the acetabulum, and that this isthmus, in spite of long previous treatment, was not visibly atrophied, but was considerably thick and firm, and that in the middle of it there was a hole only about as large as the circumference of an ordinary note pencil. After I had severed the isthmus, the complete reposition was an easy matter; the outer wound was sutured, and the treatment completed in the same manner as after an ordinary bloodless operation. I have been able to follow up these two cases, one of them for twenty-one years, the other for sixteen, and they are both perfectly normally developed. In cases of relaxation where such an obstacle to complete reposition is felt to exist, I can therefore only recommend to proceed in the manner which I have here described.