JOHN BROLIN, GOTHENBURG:

A REVIEW OF OLD CONGENITAL DISLOCATIONS OF THE HIP TREATED BY SUBTROCHANTERIC OSTEOTOMY AT THE GOTHENBURG ORTHOPAEDIC HOSPITAL

A similar subject was published in 1928 when *Camitz* reviewed cases subjected to Lorenz' bifurcation operation for congenital dislocation of the hip at the Gothenburg Orthopaedic Hospital. Since that time a great number of patients with congenital dislocation of the hip have been subjected to operation. These patients as also those operated upon earlier have been subjected to a careful after-examination which enables us to form a more unbiassed opinion of the therapeutic results. Moreover can thereby the different operative methods be mutually compared and the indications for operation be more readily clarified.

I shall not enter more in detail into the subject itself, as this will be done by Dr. Camitz on a future occasion. I will only submit here a few data regarding the material and the results attained. The history and the copious literature arisen around this operation will be omitted. On the other hand, I intend trying to clarify the theoretical basis of this operation as it seems to me that in this respect appertinent literature has not been entirely successful. This is largely due to the dispute arisen between the different schools which are anxious to uphold what their respective originators, *Lorenz* and von *Baeyer,* have suggested as being the causes of the improvement obtained in the condition, without wishing to admit the views of the opposing school. Since then *Schanz*'s low osteotomy has still further added to the confusion.

The principle of Lorenz's operation is as follows: With the limb in a position of greatest possible adduction osteotomy is carried out level with the acetabulum. The proximal fragment is retained in adduction while the limb is abducted 30°—40° and hyperextended 15°—20°. The osteotomy angle is thus brought into the acetabulum. In such a manner Lorenz aims at getting a support for the femur in the acetabulum, considering this the most important part of the operation. Von Baeyer, on the other hand, who has performed the same operation considers the tension arisen in the abductors through the operation to be the most important factor. Schanz's method is based on Trendelenburg's test which, as is well known, signifies a descent of the healthy side until the lower edge of the pelvis abuts on the femur, only after which the sound limb can be brought forward. Schanz is now wishing by his operation to eliminate the first useless phase of this performance, i. e. the descent of the pelvis. He does an osteotomy lower down on the femur so that the proximal fragment comes to lie close to the pelvis while the distal part is to run parallel with the longitudinal axis.

A study of the different methods of operation has caused me to put forward a working hypothesis which would go to explain, theoretically, and in a satisfactory manner, the operative results obtained. In so doing I have had special regard to three points:

1. The line of stress through the femur should be displaced medially and forwards, i. e. the osteotomy angle is to be brought inwards and forwards.

2. The trochanter major should be displaced as much as possible downwards.

3. The osteotomy angle should receive the greatest possible support in the acetabulum.

Lorenz's method correctly performed and undertaken under presumingly correct anatomical conditions fulfils these three qualifications. Schanz's method only fulfils the two first conditions completely, the third incompletely. The advantages of the forward displacement of the stress line of the femur as

stated in point 1 are readily explained. In the dislocated hip the line of stress of the femur is situated behind the line of gravity of the body and this is compensated by a lumbar lordosis. By the forward displacement therefore the line of stress of the femur is brought to the same frontal plane as the line of gravity or somewhat in front of it whereby the body weight will tend to straighten the lordosis. By medial displacement of the line of stress of the femur the axis of rotation of the pelvis in the frontal plane becomes diminished and for its fixation less strength is required by the abductor muscles of the limb which at the same time serve to fix the pelvis.

In point 2 it was stated that the trochanter major should be displaced downwards and rotated backwards. This displacement obviously causes the abductor- as well as the extensor muscles to become stretched whereby the functional value of these muscles becomes enhanced.

For the osteotomy angle, as stated in point 3, to obtain the greatest possible support on the pelvis, preferably in the acetabulum, constitutes the most important factor in the operation. It is a condition for obtaining full advantage of the two first points. The distal fragment is thereby meant to overtake as much as possible of the body weight while the proximal fragment is to be relieved of this task and only serve as a »point d'appui« for the trochanteric muscles. This condition is best fulfilled by Lorenz's method. By Schanz's method the proximal fragment comes to overtake no small part of the body weight. By this working hypothesis I have tried to explain the improvement obtained at the Gothenburg Orthopaedic Hospital in dislocations treated by subtrochanteric osteotomy.

The shortest time elapsed between the operation and the after-examination was eighteen months. The oldest cases were operated on in 1924. The clinical material comprises 62 operations on 43 patients of whom there were 19 with bilateral dislocations and 24 with either unilateral dislocation only or cases that were operated on on the one side only. Of the bilateral there were 17 females and 2 males, of those subjected to unilateral

operation only there were 21 females and 3 males. The age incidence at the time of operation has varied between 7 and 34 years.

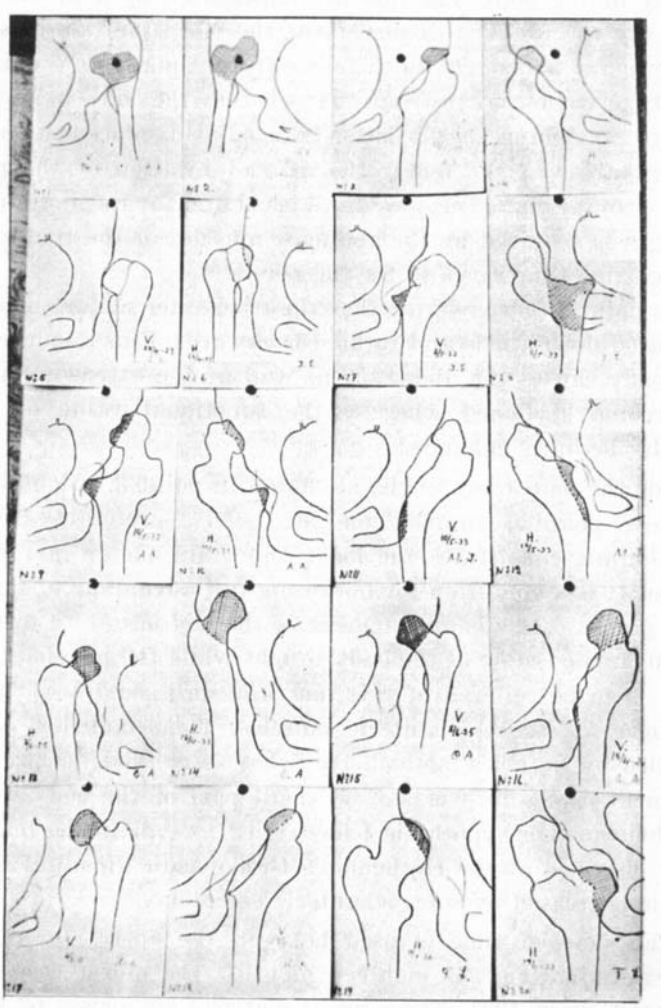

Fig. 1—20.

Operation has been undertaken in such cases where the patient complained of pains or rapidly on-coming fatigue. In a few other cases the patient required operation on account of an ugly

gait or wellmarked lordosis. Operation has not been undertaken in cases where a useful secondary socket had been established. A necessary condition is a free and satisfactory mobility of the femoral head.

For the sake of clearness in surveying these patients I have from practical-functional viewpoint classified them into 3 groups, in so doing following on the whole a scheme suggested by Prof. *Hass* of Vienna. Thus the cases have been divided into those with good, satisfactory and unsatisfactory results.

1. By a good result we mean that the patient is free from pains, that he can keep up walking for about 1 hour, without any limping typical of dislocation, negative Trendelenburg, with sufficient mobility and with no or slight lordosis.

2. With a satisfactory result is meant that the patient has insufficient staying power, with pains after exertion, but no limping typical of dislocation; condition improved. Trendelenburg faintly positive, mild to moderate lordosis.

3. The result is unsatisfactory when the patient suffers pains, has slight mobility, perhaps ankylosis, Trendelenburg positive, marked lordosis or no improvement as compared with the condition prior to the operation.

According to Hass' table the result is good in 8 of those cases of our list treated bilaterally, satisfactory in 6 and unsatisfactory in 5 cases. All the 8 patients in group 1 fulfill the conditions set up in my 3 points as far as one has been able to ascertain by roentgenological and clinical examinations. (Figures 1—8 show radiograms before operation and now).

Among the 6 patients with satisfactory results (group 2) two get tired after having walked for a couple of kilometres, their gait is slightly waddling, Trendelenburg's sign is positive on both sides and one of them has got a mild lordosis. In one of these patients (fig. 9—10) the proximal fragment is seen to be insufficiently adducted. The tension in the abductors has therefore been insufficient to enable these muscles to resume their function; hence the waddling gait and no active abduction. The distal fragment, on the other hand, is well displaced medially

and well supported by the roof of the acetabulum which explains the increased greater stability and the obvious improvement.

The other case shows an apparently very good result (fig. 11—12). This patient was operated on by Schanz's method. The osteotomy angle has no secure bearing wherefore it slides up and down on walking; duck's gait.

To this group belong 2 further cases who also show a slightly waddling gait. The result is good on the one side, on the other there is a positive Trendelenburg's sign. They are able to walk, however, for an hour without getting tired. In both cases it is a question of the right side. The radiograms make it evident that the proximal fragment is insufficiently adducted and that the osteotomy angle lacks secure bearing. In one of the cases the medial displacement is too small.

In the fifth case belonging to this group the osteotomy angle has become straightened so that at present there is only a slight medial displacement of the distal fragment, and also quite a small adduction of the proximal fragment. The result is good on the left side (fig. 13—16). The last case in group 2 was operated on by Schanz's method and shows a good result clinically as well as roentgenologically but the patient having since then contracted a severe polyarthritis it is impossible for the present to give any final judgment as to the result.

Regarding the third group, those with unsatisfactory results, one side succeeded well in 4 patients but on the other ankylosis ensued in a good position. From practical point of view all the patients are satisfied, free from pains and consider themselves much better than before the operation.

In the last case belonging to this group the osteotomy angle has entirely straightened out on the one side, the resulting coudition being thus the same as prior to the operation. On the other side the result is good.

Among patients operated on on one side only the result was good in 19 cases, satisfactory in 4 and unsatisfactory in 1 case. Out of the 19 patients 3 have a waddling gait and slight lordosis. The radiograms also show on the non-operated side a position of subluxation (fig. 17—28 b).

In passing on to the cases with satisfactory results we find in one of these (fig. 29—30) that the operation has partly been a failure. The region of the trochanter major has not been dragged down but instead we find a certain amount of resposition of the caput femoris. The medial displacement of the

Fig 21—40.

peripheral fragment is not sufficient. The non-operated side is subluxated. Gait is normal and there is no lordosis, Trendelenburg is slightly positive. The patient gets tired after having walked for 3—4 kilometres. In 2 other cases Trendelenburg is faintly positive. Roentgen shows the osteotomy angle to be too small. In one of them the angle is almost entirely obliterated

(fig. 31—33). In the other case (fig. 34—35) the medial displacement is seen to be too small, the fragments overlap one another causing the shortening of the limb to be unnecessarily great. The fourth patient is complaining of periodical pains in the thigh. The operation was successful but the acetabulum is poorly developed and does not give a secure bearing for the osteotomy angle (fig. 36—37).

The patient with the unsatisfactory result is complaining of pains in the groin and on the front aspect of the thigh. This is probably caused by the distal fragment being displaced too far forwards with consequent pressure on the neuro-vascular bundles lying in front (fig. 38—40; the lateral picture is indicative of this).

Shortening of the limb after operation is generally slight and in one-third of the cases there was elongation. This is probably explained by the proximal fragment after osteotomy being dragged downwards by the short transverse pelvo-femoral musculature.

In summary the above figures show that out of the 62 operations performed 43 led to good results, 13 to satisfactory and 6 to unsatisfactory results, that is to say that barely 10 % of them proved unsuccessful. Some patients consider themselves improved as compared with their state prior to the operation. The majority of patients belonging to group 3 were operated on before 1927 and the results then obtained were probably due to the operation not being performed with the same refined technique as has subsequently been elaborated.

SUMMARY:

The author explains in 3 points the aim of the operation:

1) The line of stress through the femur is to be displaced medially and forwards.

2) The great trochanter is to be displaced as far as possible downwards.

3) The osteotomy angle is to receive as much bearing as possible in the acetabulum.

The author shows that the results obtained at the Gothen-

burg Orthopaedic Hospital are good in 70 %, satisfactory in 20 % and unsatisfactory in 10 %.

DISCUSSION:

V. Bülow-Hansen, Oslo:

I wish to show some roentgenographs of congenital luxations of the hip joint treated by subtrochanteric osteotomy (Lorenz' bifurcation), together with the clinical notes concerning the results, as given in the case-journals. To state the matter briefly, these results are: absolute freedom from pain, the disappearance of Trendelenburg's symptom, and that the walk becomes good and strong, and does not tire unnecessarily. It means a great improvement for the patient, and I cannot but recommend this treatment most warmly.

Patrik Haglund, Stockholm:

Brolin spoke of three things which the osteotomies mentioned are intended to accomplish. They are all means to one single purpose, however,—that, namely, of getting the weight to bear on the abducted instead of, as before, on the adducted joint. As a matter of fact, the purpose with every treatment of chronically defective hip-joints with insufficient fixation—over-aged congenital luxations and other conditions—is to ensure that the weight is kept on the abducted joint. The defective hip on which the weight falls in adduction unavoidably becomes subject to increasing changes; the insuffiency gets more and more pronounced, and the result, for the individual thus affected is a steady worsening of the invalid state, in the form of pains, increasing lack of strength in the joint, and still further accentuation of the malformation. Only by ensuring the transference of the weight to the abducted position can this sad development of a severe affliction be prevented; very often it is even possible by this means considerably to lessen both the subjective distress and the degree of the invalidism. It is toward that end that all our efforts are directed; by what particular method the object is attained is, relatively, of minor importance. In my opinion,

osteotomy, in its various forms, is the best method, and the one which causes least suffering to the patient. But it seems to me that a little too much fuss has been made about the various procedures, not the least from the histologic point of view. Already when I studied under *Berg* and *Lennander,* certain cases of luxation, as well as a number of other cases, were treated by *von Bergmann*'s method of subtrochanteric osteotomy. That this method gradually went into disuse, as it seems, was probably because, in the long run, it did not prove so very effective; and that again was very likely because we did not at that time possess the whole modern technic of orthopedic surgery with regard to correction and fixation. Nowadays we see that subtrochanteric osteototomy has become an everyday procedure in orthopedic practice, and that it is used with the happiest results, with slightly varying technic and on many various indications. If we look at the healing of those innumerable osteotomies, we find the same pictures as after *Lorentz'* bifurcation or *Schanz'* osteotomy. If the osteotomy has been a high one, the result is bifurcation; if it has been done lower down, the healing thates the same shape as after *Schanz'* operation. All these procedures have for object the transference of the weight, so as to make it bear on the abducted instead of, as before, on the adducted joint. In cases where the lumbar region is mobile we get, as additional result, a considerable lengthening of a shortened extremity.