FRAME REDUCTION IN CONGENITAL DISLOCATION OF THE HIP

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In congenital dislocation of the hip three essentials for good results are early diagnosis, early and accurate reduction without violence, and correction of associated deformity in femur and acetabulum if this is necessary for the maintenance of stable reduction. While no one disputes the importance of the first point, there is no unanimity about methods of obtaining the second, and the emphasis placed on the third varies greatly in different orthopaedic centres.

FIG. 1

Having organised an effective clinic system in our area, and so done what we could to promote early diagnosis, we began in 1935 under the stimulus of Mr G. R. Girdlestone to reconsider methods of reduction. This reconsideration was stimulated by various contemporary developments, namely: a clinical review of the patients with congenital dislocations of the hip treated at this hospital (unpublished); Farrell and Howorth's (1935) re-emphasis of the importance of dysplastic changes in the femoral head; Lambrinudi's insistence on the importance of anteversion of the femoral neck; and seeming general dissatisfaction with the results of treatment by the methods of closed reduction and immobilisation then practised.

The frame—It was thought that the principle underlying the use of Putti's divaricator—a gradual reduction without the use of force—might be applied in children over twelve months old. The writings of Coonse and Stewart (1934) supported this view. No satisfactory apparatus for this purpose had been described, and the frame now known as the "Wingfield" frame was therefore designed (Fig. 1). The essential requirements to be met were: ease of continuous nursing, gradual abduction of both hips, and the application of traction to and across the

long axis of the limb. The frame is a modified Robert Jones abduction frame with hinges in the frame and saddle at the hip joints (Fig. 1). Fixed longitudinal traction is exerted by adhesive strapping extensions applied below the knee and fixed to the bows at the end of the frame, the pelvis being controlled by groin straps. The cross pull is applied by means of a wide band around the upper thigh; a cord to this is passed through a pulley on the opposite side of the frame and weights of up to two pounds are attached (Fig. 2).

METHOD OF REDUCTION

It was our practice in the early days simply to put the child on the frame, but since 1938, when we began doing arthrograms on all these patients, the following routine has evolved. After arthrography with about 7 cubic centimetres of diodone the child is put on the frame. The legs are gradually abducted, the rate depending on the age of the child (the average being 5 degrees per day); meanwhile a gentle longitudinal pull is maintained. When an angle of

FIG. 2

60 degrees of abduction has been reached the cross pull is applied and continued until reduction has been achieved, radiographs being taken at intervals of about seven days. If reduction seems satisfactory a second arthrogram is done, and the appropriate form of immobilisation applied. The abduction must be carried out slowly, and traction in either direction must not exceed two or three pounds. In all the uncomplicated dislocations in children up to five or six years of age it is possible by this means gradually to bring the head opposite the acetabulum. If there has been a failure of development of the hip, as in arthrogryposis multiplex congenita, the frame traction may have little or no influence on the position of the femoral head.

INCIDENCE OF SUCCESSFUL REDUCTION

Up to 1949, ninety-three patients were treated by this method, and in twenty the dislocation was bilateral. Eighty per cent were on the frame for less than two months. In ninety-eight hips satisfactory reduction was obtained; in fifteen it was necessary to resort to open reduction. Twenty-three other operations were done at a later stage, ten acetabulo-

plasties, twelve rotation osteotomies, and one combined acetabuloplasty and rotation osteotomy.

Of the ninety-seven hips of which a full series of radiographs is available, 8 per cent showed a moderate or severe degree of osteochondritis. In a comparable series of seventy-two hips treated by the Denucé method of reduction with immobilisation in abduction and medial rotation for similar periods, 26 per cent showed moderate or severe osteochondritis. We have now satisfied ourselves that gradual reduction does effectively reduce the incidence of osteochondritis. In those treated before the age of four, the incidence of moderate or severe changes has been reduced to less than 10 per cent. I doubt whether much further reduction will be possible. The incidence is of the same order as in untreated congenital dislocations of the hip.

OTHER FACTORS IN SUCCESSFUL TREATMENT

Since 1948 we have turned our attention to stability of the reduction, especially that obtained on the frame, and to the factors that might increase stability and allow the period of immobilisation to be decreased. The figures already given show that of the 113 hips studied fifteen required open reduction because no satisfactory reduction was obtained on the frame, and twenty-three required some secondary operation because the reduction was unstable. In other words, approximately 34 per cent could not be properly dealt with by this method alone, and in more than half of these the inherent instability was not recognised until too late. The worst results follow secondary subluxation or dislocation after the hip has been "reduced" and immobilised for many months, especially if the method of reduction has led to a severe degree of osteochondritis.

If the patients operated upon are excluded, stable reduction was produced as often as it is claimed for other methods of closed reduction. The clinical results will be assessed in detail later in relation to work now being carried out on the causes of failure of closed reduction.

We believe, then, that we can, using the frame, bring the head opposite the acetabulum, but that we cannot as yet recognise all those cases in which the reduction will not be stable, in spite of arthrograms and careful clinical estimation of the angle of anteversion. The radiographic appearances are often misleading, and those that look best do not always remain so.

SUMMARY AND CONCLUSIONS

The frame described has a place in the treatment of congenital dislocation of the hip especially if the diagnosis is not made until after the age of one year. Analysis of comparable series of hips reduced on the frame and by manipulation shows that dysplasia of the femoral head is decidedly commoner after the manipulative method.

REFERENCES

- COONSE, G. K., and STEWART, W. J. (1934): Further Observations on the Abduction-Traction Treatment of Congenital Dislocation of the Hip. *Journal of Bone and Joint Surgery*, **16**, 303.
FARRELL, B. P., and HOWORTH, M. B. (1935): Open Reduction in Congenital Dislocation of the Hip. *Journal of Bone and Joint Surgery*, **17**, 35.