

SUBTROCHANTERIC VALGUS-EXTENSION OSTEOTOMY FOR NEGLECTED CONGENITAL DISLOCATION OF THE HIP IN YOUNG ADULTS

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Thirty-five patients with unilateral or bilateral neglected congenital dislocation of the hip (CDH) were treated with subtrochanteric valgus-extension osteotomy between 1975 and 1992. There were 29 females and 6 males in the group. A total of 50 osteotomies was performed. The mean age of the patients was 22 years; the mean follow-up was 7 years. Before operation, the main complaints were pain and gait abnormalities. Leg-length discrepancy was another problem, especially for unilateral cases. The main indication for the operation was pain. This pelvic support osteotomy was performed to correct the instability of the hip and as a result of this to relieve pain. Patients were retrospectively evaluated based upon Harris Hip Score and self-evaluation. The mean Harris Hip Score was 49 before operation and improved to 72 after the operation. Alleviation of the pain was the most significant functional outcome of the treatment. It was also noted that limping could be improved if an adequate rehabilitation program was followed.

We conclude that in neglected CDH cases with pain, limping and lumbar hyperlordosis in the young adult, a subtrochanteric valgus-extension osteotomy can give satisfactory results.

Keywords : congenital hip dislocation, valgus-extension osteotomy.

Mots-clés : luxation congénitale de hanche, ostéotomie de valgus-extension.

is frequently seen in developing countries. These patients, who are often young adults, are difficult cases for the orthopaedic surgeon. The operation reduces pain and instability and improves the function of the hip not merely by providing anatomical support but also and more importantly by improving the biomechanics of the hip joint. Pelvic support osteotomies are one of the treatment alternatives for these patients in the young adult period. Pelvic support osteotomy is a term used to designate osteotomy of the proximal femur performed to correct instability of the hip joint. This procedure is often called a subtrochanteric osteotomy or is given the names of surgeons who have devised different types of osteotomy. Lorenz (7) devised a bifurcation subtrochanteric osteotomy and attempted to position the resulting prong in the original socket. Von Baeyer (16) also produced a subtrochanteric angulation but wanted the socket of the hip joint to rest on the lesser trochanter. The low subtrochanteric osteotomy, in which the apex of the osteotomy is usually at the level of the ischial tuberosity, is known as a Schanz osteotomy (1, 3, 14).

Pelvic support osteotomies correct the line of weight bearing in two projections, anteroposterior and lateral. This osteotomy increases the tension of the abductor muscles, which helps correct Tren-

INTRODUCTION

Untreated congenital dislocation of the hip is rarely seen in the adult in developed countries but

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delenburg gait, and as well as the lumbar hyperlordosis, but the most important result of this osteotomy is pain reduction. In these patients the instability with a positive Trendelenburg sign causes painful limping. Overload of the secondary socket, excess strain of the muscular and fibrous tissues and overload of the lumbar spine, which are the main causes of the pain, can be corrected to some extent by subtrochanteric osteotomy (8).

Valgus-extension osteotomy should be performed for unreduced congenital dislocation of the hip after the age of 12 years. In the younger age group, this osteotomy is not suitable because of frequent loss of correction.

As a result, instability is corrected by altering the line of weight bearing and by improving the function of the gluteal muscles.

In this study we evaluated the late results of the valgus-extension osteotomy and tried to determine its effectiveness.

MATERIALS AND METHODS

We retrospectively evaluated 35 patients who underwent subtrochanteric valgus-extension osteotomy between 1975 and 1992, with the diagnosis of high congenital dislocation of the hip. The main complaints that caused the patients to come to the hospital were pain and gait abnormalities. In addition to that, 11 patients complained of chronic back pain. The main indication for valgus-extension osteotomy was pain. Lumbar hyperlordosis and limping were not accepted as surgical indications if there was no pain.

Valgus-extension osteotomies were performed on 50 hips in 35 patients, 29 female, and six male. The mean age was 22 years (range : 13-27 years), the mean follow-up was 7 years (range : 5-11 years), and the mean leg-length discrepancy was 6.5 cm (range : 4-8 cm.) for the unilateral cases.

Radiological analysis revealed that 11 hips had a neo-acetabulum in the unilaterally dislocated group, and 12 hips in the bilaterally dislocated group. Twenty-seven hips had high-riding femoral heads. The anatomical locations of the false acetabulum were graded in according to Eftekar (2). There are four stages of hip dislocation from dysplasia to complete dislocation...Stage-A indicates a dysplastic acetabulum, stage-B intermediate dislocation, stage-C high dislocation and stage-D an old unreduced dislocation. The location of the femoral head

was stage-C for 14 hips and stage-D for 13 hips in patients who did not have a neo-acetabulum. Twelve femoral heads were stage-B, and 11 stage-C in patients with a neo-acetabulum.

All the patients who had a neo-acetabulum had osteoarthritis. Osteoarthritis of the hips was graded according to the Kellgren and Lawrence system (5). Grade-0 indicates a normal joint space, grade-1 narrowing of the joint space, grade-2 sclerosis and slight formation of osteophytes, grade-3 formation of secondary cysts and substantial formation of osteophytes and grade-4 virtually no joint space. Twelve hips had grade-2, 9 hips grade-3 and 2 hips grade-4 osteoarthritis.

All the hips without a neo-acetabulum were grossly unstable. These patients had more than 25° mobility in abduction. Patients with a neo-acetabulum had restricted mobility in abduction : only 11 hips had more than 25° of abduction.

The operations were performed on a radiolucent operating table, in the supine position and using a lateral approach to the femur. The osteotomies were done at the level of the ischial tuberosity and were fixed with custom-made plates and screws (figs. 1, 2). The osteotomy level was checked intraoperatively by radiography. The valgus angulation was determined preoperatively according to Milch (10, 11). The extent of angulation was determined based on the inclination of the pelvic wall. The adducted proximal fragment must be oriented parallel to the pelvic wall inclination, defined as a straight line between the superior iliac spine and the ischial tuberosity. If the valgus angulation is not sufficient, the tension of the pelvitrochanteric muscles is not sufficiently restored, causing persistence of the

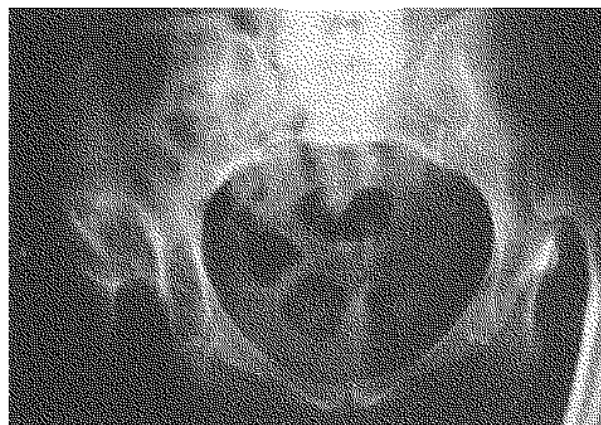


Fig. 1. — A 21-year-old female patient with bilateral dislocation. A-P x ray before the operation

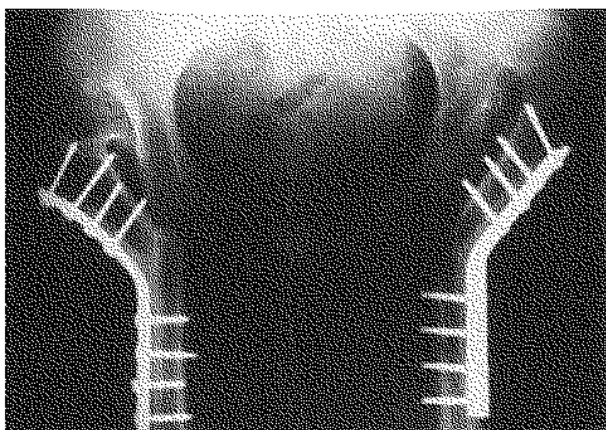


Fig. 2. — A-P xray of the same patient after the operation.

Trendelenburg gait. In contrast, if the angulation is excessive, the proximal femur may contact the pelvis, causing osseous impingement that restricts adduction. The valgus angle in our cases was between 20° and 35° depending on the pelvic wall inclination. Extension angulation was added to valgus angulation to relieve the flexion contracture and to bring the line of weight bearing anteriorly. The mean flexion contracture noted on preoperative physical examination was 25° (range : 10° - 35°).

Patients were mobilized with crutches on the first postoperative day and abduction exercises were started in the first week following the operation. Weight bearing was not permitted until radiological union of the osteotomy. Union was obtained in three months (range : 2-4.5 months) in all patients, but two implant failures occurred and were treated with refixation and autogenous bone grafting, and complete union was obtained. Two superficial wound infections occurred and were treated with antibiotics.

Patients were evaluated according to the Harris Hip Score (4) ; in addition, they were questioned on their subjective complaints at the latest follow-up, and according to their subjective complaints patients were divided into three groups :

good : no or minimal pain, no analgesic requirements, no functional restriction ;

fair : pain minimally affecting daily life, use of simple analgesics or NSAID irregularly, minimal functional restriction but no need for support ;

poor : pain affecting daily life, need for simple analgesics or NSAID regularly, functional restriction and need for supportive devices.

RESULTS

Sixty-five percent of the patients operated unilaterally, and 60% of those operated bilaterally were subjectively satisfied with the result of the operation. Five unilaterally operated, and three bilaterally operated who had complaints only on one side had pain and limping, but they stated that their complaints were not as severe as before the operation. Four patients however were completely dissatisfied with the operation. Two of them were operated bilaterally, and the other two unilaterally. The osteotomy level was higher than planned preoperatively on one side, in one of these two patients who had bilateral dislocations (fig. 3). In the other patient the valgus angulation was not sufficient on one side. These patients complained of persisting pain and limping without any significant difference compared with the preoperative status. The technical success of the contralateral hips was not found sufficient to make them satisfied. The other two patients had unilateral dislocations. In one of these patients, the level of the osteotomy was too high and the valgus angulation was insufficient ; he complained of pain after the operation. In the other patient, medialization of the distal fragment was insufficient, and she complained of a feeling of instability of the hip and persisting pain.

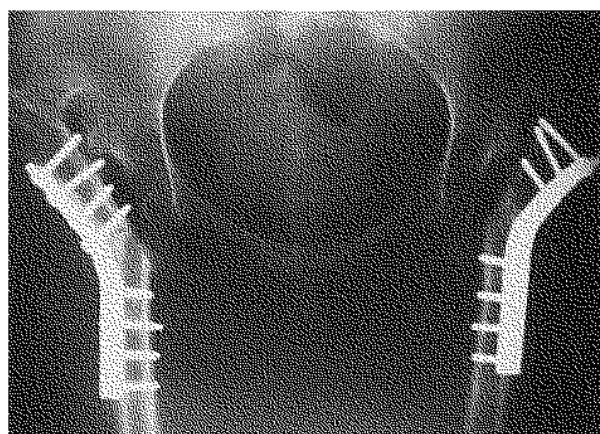


Fig. 3. — A 23-year-old female patient with bilateral dislocation. The osteotomy level is higher than planned, and the patient is dissatisfied with the operation.

The mean Harris Hip Score improved from 48 (39-61) to 71 (55-80) for unilateral cases and from 44 (36-58) to 68 (55-75) for bilateral cases after the osteotomies. The mean Harris Hip Score improved from 47.6 (range 36-60) to 70.8 (range 55-80) in patients without a neo-acetabulum. The hip score improved from 44.3 (range 39-54) to 69.3 (range, 55-75) in patients with a neo-acetabulum.

The functional capacity of the patients increased, i.e., they became capable of walking long distances, climbing stairs normally with the banister, and sitting in any chair without support. The range of motion of the hip increased, and because of the extension angulation, the fixed flexion contracture also decreased. The mean flexion contracture decreased from 25° (range: 10°-35°) to 8° (range: 0°-20°) after the operation. All the patients without a neo-acetabulum and 17 patients with a neo-acetabulum had more than 25° abduction.

Two patients (both with unilateral dislocations) complained of knee pain after the osteotomy, but all responded to simple analgesics and none of them needed a reconstructive procedure.

DISCUSSION

Treatment of neglected congenital dislocation of the hip in young adults is extremely difficult. There is no universally accepted treatment method, and the literature is limited and mostly consists of reports published many years ago.

The major complaint of these patients that causes them to come to the hospital is pain. The pain results from overload of the secondary socket when present, excessive strain of the muscles and fibrous tissues and overload of the lumbar spine (8). In addition, posterior shift of the femoral head increases the anterior tilt of the pelvis, which is compensated by hyperlordosis of the lumbar spine. These deformities result in chronic low back pain (12). Limping is another complaint of the patients, together with pain. All these problems are closely related with instability of the hip, and the patient with an unreduced congenital dislocation of the hip has obvious instability. Instability of the hip is corrected in two planes by valgus-extension

osteotomy of the femur. In the coronal plane, the line of weight bearing is corrected by an osteotomy angled in such a way that the proximal fragment is in the position of maximum adduction and the distal fragment is in the line of weight bearing and under the acetabulum. In the sagittal plane the distal fragment is angled so that the angle formed with the proximal fragment corrects the flexion deformity and the line of weight bearing is displaced forward so that it falls under the acetabulum. By correction of the line of weight bearing, the hip becomes more stable and at the same time the femur proximal to the osteotomy acts as a lever for the use of the pelvifemoral muscles. Deformity, that is, adduction, flexion and rotation, is corrected. The distance between the attachments of the muscles to the pelvis and femur is increased, thereby increasing their efficiency. The point at which the osteotomy apex is placed should be under the acetabulum. This places the line of weight bearing at the normal position. For that reason, correction of the instability of the hip by pelvic support osteotomy may be a solution to that problem. Our study supported the above-mentioned biomechanical data, in that a significant number of the patients responded well to this approach.

It was reported that conservative treatment in cases of bilateral dislocations is more suitable, but our study confirmed that valgus-extension osteotomy was useful for these patients (6), by reducing pain and limping and therefore improving quality of life. However, we agree with Schiltewolf *et al.* (15), who advise conservative treatment for older patients, with either unilateral or bilateral dislocation, for whom total hip replacement becomes an operative alternative within the next few years.

Schiltewolf *et al.* recently reported successful results with subtrochanteric angulation osteotomy (15). The results of their study were similar to ours, but their study group mainly consisted of unilaterally dislocated hips and the osteotomy level was higher than in our group. The results of that study showed that progression of patients with a neo-acetabulum or a high riding femoral head was similar.

The clinical improvement in patients with a neo-acetabulum results from removing the femoral

head away from the neo-acetabulum and correcting the instability. On the contrary, in patients with a high riding femoral head the clinical improvement is basically due to correction of the instability.

Adding extension to the valgus angulation is debatable. It has been reported that extension osteotomy should be guided by secondary lumbar pain (15). However, we believe that extension should be added to valgus osteotomy in every case, because this helps to relieve the flexion contracture by correcting the pelvic tilt and the line of weight bearing.

Genu valgum deformity due to a distal osteotomy and extreme medialization of the distal fragment has been reported (15). In the present study, secondary genu valgum was not noted. However, we admit that knee problems in these patients may occur. If such a deformity develops after the osteotomy, a supracondylar correction osteotomy should be advised (1).

Reconstruction of the hip joint with total hip arthroplasty is another acceptable method for these patients, but the indications for total hip arthroplasty in that young age group are controversial. Total hip arthroplasty can be performed after valgus extension osteotomy. It will then likely require corrective osteotomy and shortening of the femur (9, 12, 13). We prefer a corrective osteotomy at the level of the old osteotomy site and shortening of the femur just distal to that point (generally 4-6 cm shortening is necessary), and we use cementless fixation. We use a DCP-plate for the rotational stability of the osteotomy site if necessary. However, making a new osteotomy and, shortening the femur is a technically demanding procedure, and the morbidity of the operation may be higher than that of a standard primary total hip arthroplasty.

This study showed that 65% of patients with unilateral dislocations and 60% of patients with bilateral dislocations were satisfied with the procedure. Patients with a neo-acetabulum also responded well to this procedure. However the end result of the procedure was directly related to the technical performance. This means that the osteotomy level should be correct, the valgus angle should be determined exactly preoperatively, and medialization of the distal fragment should not be excessive. In

addition, rehabilitation after the operation also affects the result in terms of continuation of limping.

For patients over 12 years old, who have an unreduced congenital dislocation of the hip and have pain, limping and lumbar hyperlordosis, we consider subtrochanteric valgus-extension osteotomy as an interesting treatment alternative: it corrects instability of the hip and as a result of that reduces pain.

REFERENCES

1. Bell B. T. Pelvic support osteotomy. *Surg. Clin. N. Am.*, 1953, 33, 1719-1730.
2. Eftekar N. S. Total Hip Arthroplasty. Mosby, New York USA, 1993, 925-967.
3. Haas J. A subtrochanteric osteotomy for pelvic support. *J. Bone Joint Surg.*, 1943, 25, 281-291.
4. Harris W. H. Traumatic arthritis of the hip after dislocation and acetabular fracture: Treatment by mold arthroplasty. *J. Bone Joint Surg.*, 1969, 51-A, 737-755.
5. Kellgren J. H., Lawrence J. S. Radiological assessment of osteoarthritis. *Ann. Rheumatol. Dis.*, 1957, 16, 494-502.
6. Kuesswetter W., Wolf G., Stuhler T. An evaluation of primary resection of the head of the femur with or without subtrochanteric angulation osteotomy. *Int. Orthop.*, 1983, 46, 11-34.
7. Lorenz A. Einleitungsvortrag über das irreponiblen angeborenen Hüftluxation und der Schenkelhalspseudarthrose mittels Gabelung (Bifurkation des oberen Femurendes). *Wien. Klin. Wochenschr.*, 1919, 41, 997-998.
8. Mc Hale K. A, Baggs M., Nason S. S. Treatment of the chronically dislocated hip in adolescents with cerebral palsy with femoral head resection and subtrochanteric valgus osteotomy. *J. Pediatr. Orthop.*, 1990, 10, 504-509.
9. Mendes D. G. Total hip arthroplasty in congenital dislocated hips. *Clin. Orthop.*, 1981, 161, 163-179.
10. Milch H. The resection - angulation operation for hip joint disabilities. *J. Bone Joint Surg.*, 1955, 37-A, 699-717.
11. Milch H. The postosteotomy angle. *J. Bone Joint Surg.*, 1944, 25, 394-400.
12. Paavilainen T., Hoikka V., Paavolainen P. Cementless total hip arthroplasty for congenitally dislocated or dysplastic hips. *Clin. Orthop.*, 1993, 297, 71-81.
13. Paavilainen T., Hoikka V., Solonen K. A. Cementless total replacement for severely dysplastic or dislocated hips. *J. Bone Joint Surg.*, 1990, 72-B, 205-211.
14. Schanz A. Zur Behandlung der veralteten angeborenen Hüftverrenkung. *Munch. Med. Wschr.*, 1922, 69, 930-931.
15. Schiltenswolf M., Carstens C., Bernd L., Lukoschek M. Late results after subtrochanteric angulation osteotomy in

young patients. J. Pediatr. Orhop. Part-B, 1996, 5, 259-267.

16. Von Baeyer H. Zur Geschichte der Gabelung des oberen Femurendes bei irreponiblen angeborenen Hüftverrenkungen. Zbl. Chir., 1927, 54, 1566-1575.

SAMENVATTING

M. C. AKSOY, Y. MUSDAL. Subtrochantere valgiserende extensie osteotomie voor miskende congenitale luxatie van de heup bij jonge volwassenen.

Tussen 1975 en 1992 werden 35 patiënten met unilaterale of bilaterale verwaarloosde congenitale heupluxatie (CHD) behandeld met een valgus-extensie osteotomie : 29 vrouwen en 6 mannen met een gemiddelde leeftijd van 22 jaar. Er werden 50 operaties uitgevoerd en de gemiddelde follow-up was 7 jaar. Preoperatief was er vnl pijn en gangproblemen. Bij de unilaterale was beenlengteverschil een probleem, maar pijn was de voornaamste indicatie tot ingreep. Deze bekkenondersteunende osteotomie werd uitgevoerd om de instabiliteit van de heup te corrigeren en alsdus de pijn te bestrijden. De Harris heup score en een zelfevaluatie werden gebruikt om deze patiënten te evalueren. De Harris score evolueerde van 49 preoperatief tot 72 postoperatief, met vnl een gunstige invloed op de pijn. Het manken kon met een doorgedreven revalidatie worden verbeterd. Bij de jong volwassenen is een subtrochantere osteotomie een goede oplossing voor verwaarloosde CHD met pijn, manken en lumbale hyperlordose.

RÉSUMÉ

M. C. AKSOY, Y. MUSDAL. L'ostéotomie sous-trochanterienne de valgisation-extension dans la luxation congénitale négligée de la hanche chez l'adulte jeune.

Entre 1975 et 1992, les auteurs ont traité 35 patients qui présentaient une luxation congénitale négligée de la hanche, uni- ou bilatérale, par ostéotomie sous-trochanterienne de valgisation – extension. Au total, 50 ostéotomies ont été réalisées chez 29 femmes et 6 hommes dont l'âge moyen était de 22 ans. Ils ont été suivis en moyenne pendant sept ans. En préopératoire, les plaintes principales étaient la douleur et la perturbation de la marche. L'inégalité de longueur des membres inférieurs était un autre problème, en particulier dans les cas unilatéraux. L'indication principale de l'opération a été la douleur. L'ostéotomie a été réalisée pour corriger l'instabilité de la hanche et pour réduire ainsi la douleur. Les patients ont été revus rétrospectivement sur base du Harris Hip Score et leur évaluation subjective a été demandée. Le score de Harris moyen est passé de 49 en préopératoire à 72 après l'opération. La réduction de la douleur a été le résultat le plus significatif du traitement. On a aussi remarqué que la boiterie pouvait être améliorée au prix d'un programme de rééducation adéquat. Les auteurs concluent que l'ostéotomie sous-trochanterienne de valgisation-extension peut donner des résultats intéressants dans les luxations congénitales négligées de la hanche chez l'adulte jeune, avec douleur, boiterie et hyperlordose lombaire.