

ON THE TREATMENT OF PERTROCHANTERIC FEMUR FRACTURES WITH ACTIVE MOVEMENT THERAPY

By

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Methods, some of them already abandoned, employed so far in the treatment of femoral fractures of the trochanter region have included: mere bed rest, splintage, plaster of Paris without reduction or after reduction, skin traction, skin traction and splint, skeletal traction from the condyles of the femur or from the tibial tuberosity, traction and subsequent fixation by plaster, traction in Thomas's splint, Russel traction with its modifications and the so-called "Well leg traction" etc. In the last few years, with the general realisation of the advantages of early mobilisation, operative treatment of these fractures has also been resorted to in an increasing degree. Use is made e.g. of Smith-Petersen's nail, Nyström's nails, Neufeld and Jewett's nails, Küntscher's nail, screws, various nail-screw combinations, Thornton's McLaughlin's, Moe's, Austin Moore's plates, metal wire, Parham band, bone transplants etc. (Aronsson, Böhler, Chandler, Geckeler, Matti, Moore & Moore, Siler & Caldwell, Speed, Watson-Jones).

It is an acknowledged fact that the problem involved in the treatment of these fractures is not the effecting of consolidation—a false joint never in fact comes out, nor avascular necrosis. The first task in the treatment of patients, usually old people, is the saving of life and health. Avoidance of pain is important in the treatment of these elderly patients. The only complications to be expected from the fracture are the development of coxa vara or rotation deformity.

Most authors writing on this subject in the last few years have favoured operative treatment rather than conservative (Aronsson, Bickel & Jackson, Boyd & Griffin, Cleveland & Bosworth & Thompson, van Demark & van Demark, Evans, Hafner, Lamphier, Le Vay, Moore, Ryan & Gosslee). The prevailing trend is operative treatment as early

as possible for all patients whose general condition permits the operational strain. The patient may be mobilised as early as the day following the operation. Operative repair is advocated on the following grounds: (1) a better anatomical result is achieved; (2) a better functional result is ensured; (3) early ambulation diminishes the risk and promotes the economic use of sick beds; (4) the nursing of operated cases is easier; (5) bed sores occur more rarely; (6) according to statistics the mortality rate for operated cases is smaller than with conservatively treated patients (according to various publications it is 3–20 % for the former, 10–43 % conservatively treated patients) (Aronsson, Bickel, Boyd-Griffin, Cleveland & Bosworth & Thompson, van Demark & van Demark, Evans, Hafner, Murray & Frew, Ryan & Gosslee).

An examination of these arguments occasions the following comments: (1) The significance of the anatomical result declines when we remember that with the shortening of the limb and coxa vara the use of the lower limb does not deteriorate markedly, especially with old persons. (2) The conservative methods employed hitherto have doubtless given poorer functional results than those achieved operatively. Stiffening of the knee joint especially and equinus deformity of the foot in addition to a stiffened hip have been warning complications. And that is not all: the joints of even a healthy lower limb stiffen when using so-called “well leg traction” or even without it, if exercising is neglected. However, the stiffening of even a damaged joint can be avoided in conservative treatment also, as will be apparent later on. (3) Early ambulation is naturally a great victory if we remember the dangers of protracted confinement to bed, more numerous and fatal for the aged. Enlightened conservative treatment has the advantages of early ambulation. (4) At least in Finland, a hospital with the prerequisites for successful operative repair also has a nursing staff capable of applying good conservative therapy. (5) Bed sores do not occur in conservative treatment except in patients whose general condition is so bad that the operative prognosis is poor. (6) In most series the mortality is higher in the conservatively-treated than in the actively-treated group. Perhaps conservative nursing methods are not in themselves as advanced and thoroughly planned as operative methods. On the other hand old patients easily develop various operation complications, emboli, thromboses, haematomas, wound infections, pneumonias, fluid balance disturbances and psychoses. Early mobilisation is incapable of preventing all of these, on the contrary it may even promote the development of some complications. Furthermore, it may cause e.g. the shifting, breaking etc. of a nail. Such complications

might be expected fairly frequently though they are mentioned very rarely in statistics (Taylor & Neufeld & Nickel).

In 1949 Murray and Frew described a method of conservative treatment which, among the methods found by the writer in the literature, approximates most closely to a method to be described later. They generally employed an adhesive strapping tension and but rarely made use of skeletal traction. For a part of their patients they used at first Braun's, Thomas's or Hodgen's splint. Later they abandoned all splints. The limb was placed on a pillow, a 12-18 pound traction was applied and, immediately above the proximal side of the knee, a sling bandage to correct external rotation, i.e. an "internal rotation bandage". In order to produce counter extension the foot of the bed was elevated. To begin with, the injured limb was kept immobilised for as long as 8 weeks. Later, they began to shorten the immobilisation time until, in the end, it was only 1-2 weeks. Attention is aroused by the fact that, with the exception of mobilisation, no arrangements whatsoever were made, according to the text and pictures, to prevent equinus deformity of the foot. "Drop foot" consequently occurred as a complication in 9 % of the cases; true, in 5 of them it is attributed to a reason not associated with the treatment or the principal illness. Moreover, all the cases are reported to have recovered. The traction was diminished step by step once ossification was established and it could be abolished altogether in the 9-12th week. After 12 weeks the patients were able to move with crutches. The results were excellent or good both anatomically and functionally in over 60 % and poor in only 7-9 %. Deaths accounted for 10 % (7 from pneumonia, 2 from pulmonary embolism and 1 from cerebral haemorrhage). Poor results were achieved on patients who were spastic paralytics and almost complete invalids prior to the trauma. These statistical data are even better than the statistics of several operatively treated cases.

In 1952 G. Perkins reported at St. Thomas Hospital in London, at the Joint Meeting of the Orthopaedic Associations of the English-speaking World, on fractures treated by him with a new mobilisation method, e.g. tibial condyle and collum humeri fractures. Having seen Perkins' cases Prof. Kallio wanted to apply the same principle in the treatment of the fractures of the trochanter region of the femur. This was done in the following manner: immediately upon admission to hospital and after treatment for potential shock a Kirschner wire is bored through the femoral condyles (true, traction is applied at first from the tibial tuberosity) and a 4-7 kg traction is applied from it longitudinally along the thigh. The movements of the knee thus remain completely free and the traction has no detrimental effect on the

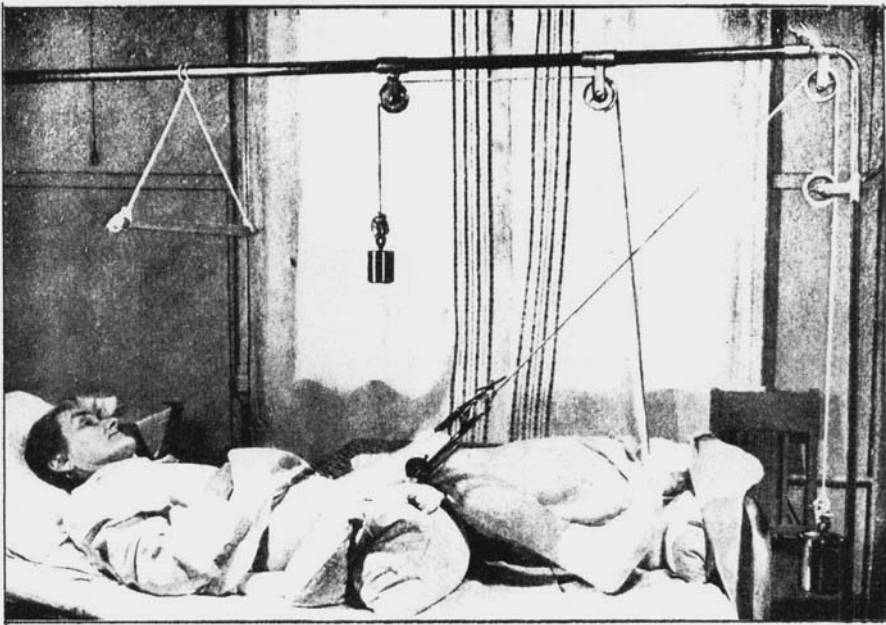


Fig. 1.

Illustration of the method.

ligaments of the knee. A toe traction of $\frac{1}{2}$ –1 kg is applied at the same time; this prevents equinus deformity but allows ankle movements. Pillows are placed under the thigh so that the hip is flexed about 45° and is fixed in moderate abduction the extent of which is regulated according to the X-ray pictures taken later on. From the very beginning the patient is encouraged to perform sustained flexion and extension movements of the knee and to make ankle movements, but without moving the hip. He is allowed to move the healthy lower limb and both upper limbs as much as possible and immediately the pain permits it he may sit up in bed. By means of his hands and the healthy lower limb the patient soon learns to raise himself from his bed and thus facilitate nursing. Considerable attention is paid to all mobilisation and to increasing the patient's activity. It is easy to observe what a stimulating influence such activity has on old patients. The pillows under the thigh are removed after 3–4 weeks and the already previously used gentle flexion-extension movements of the hip are intensified still more. No rotation bandage in the manner of Murray-Frew is needed. After some 6–8 weeks, when the fractured point feels firm and there is no tenderness, and X-ray examination shows that the ossification is beginning to look firm, the tractions are removed and the patient is

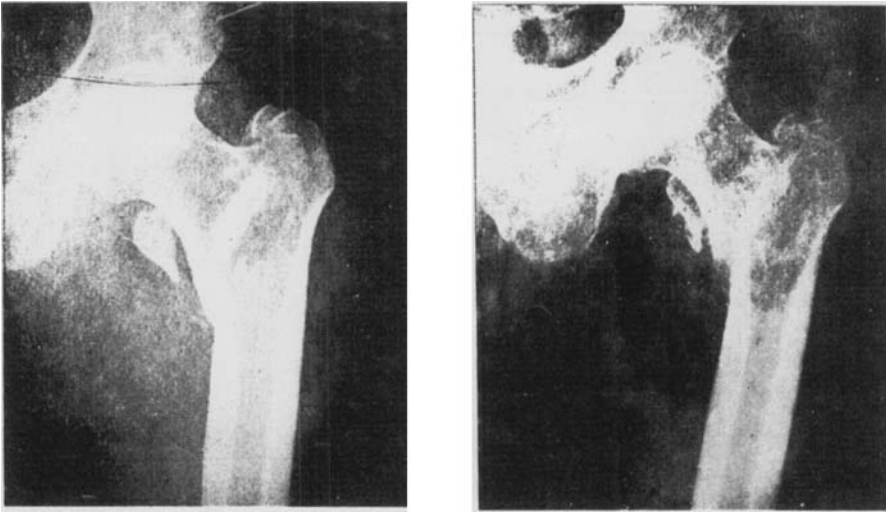


Fig. 2.
Case 1.

On the admission to the hospital.

4 weeks later.

taught to move on crutches. All limb movements are practised continuously. Weight-bearing by the limb is not allowed before the 12th week.

The following cases are described as examples of patients thus treated:

(1) Former small farmer, 83, who 3½ years ago had been at the Surgical Hospital for treatment for prostate hypertrophy. He could not be operated on because of his poor general condition and feeble kidney function. His poor condition enabled him to move only with the aid of 2 sticks. Fell 3 days before admission to hospital, since when he had been unable to be on his feet.

Examination showed the patient to be in poor general condition, suffering from hypertrophy of prostate, urine retention, cardiac insufficiency with oedemas of the lower limbs and the small of the back, and pulmonary stasis. There was a petrochanteric fracture of the left thigh with the trochanter minor a loose fragment.

Fracture therapy of the type described was commenced directly together with other measures to combat the diseases.

He had to be transferred to another hospital 5 weeks after initiation of the treatment. The mobility of the knee and the ankle was practically the same as at the beginning of treatment, the extension of the thigh was complete, flexion 180-110°. The patient's great age and poor general

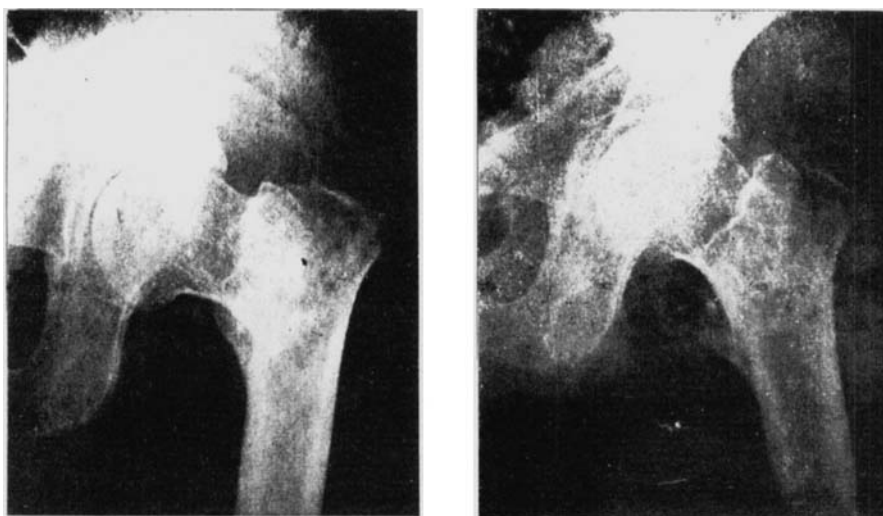


Fig. 3.
Case 2.

On the admission to the hospital.

4½ weeks later.

status notwithstanding, treatment progressed without complications. Follow-up data have not been obtained (Fig. 2).

(2) Former cab-driver, 86. During the last few years capable of moving only on two sticks on account of his infirmity. Fell on the ice 4 days before admission to hospital, and since then incapable of standing on his feet.

Poor general condition, cardiac insufficiency, oedemas in the lower limbs, enlarged liver, stasis rales were heard in the lungs. In addition, large inguinal hernia and hypochromic anaemia. SR 108. A pertrochanteric anterior femoral fracture existed on the left.

Treatment as above. By means of sustained vigilant nursing this old man in a pitiable condition was successfully treated in hospital and without complications for 6 weeks after which he was taken home by his relations. Upon discharge no abnormal movement or tenderness was felt around the fracture. Ankle movements were good, knee extension complete, flexion 180–120°. Hip movement 180–115°. Follow-up data have not been obtained (Fig. 3).

(3) Motor car mechanic, 43, who had fallen on the day of admission from a 4 metre high log load onto the ice on his left thigh. Unable to get to his feet.

The patient was in good condition. A pertrochanteric femur fracture was established in his left lower limb.

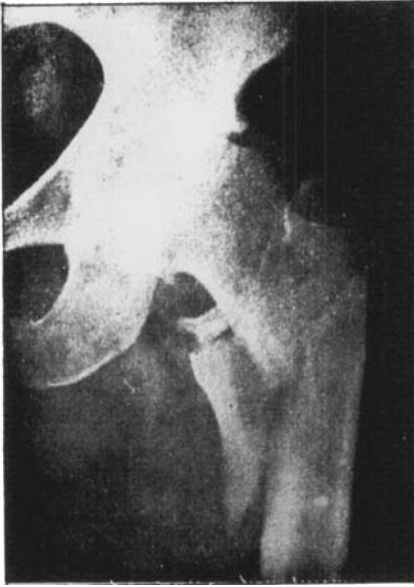


Fig. 4.
Case 3.

On the admission to the hospital.

12½ weeks later.

Treatment as in the previous cases.

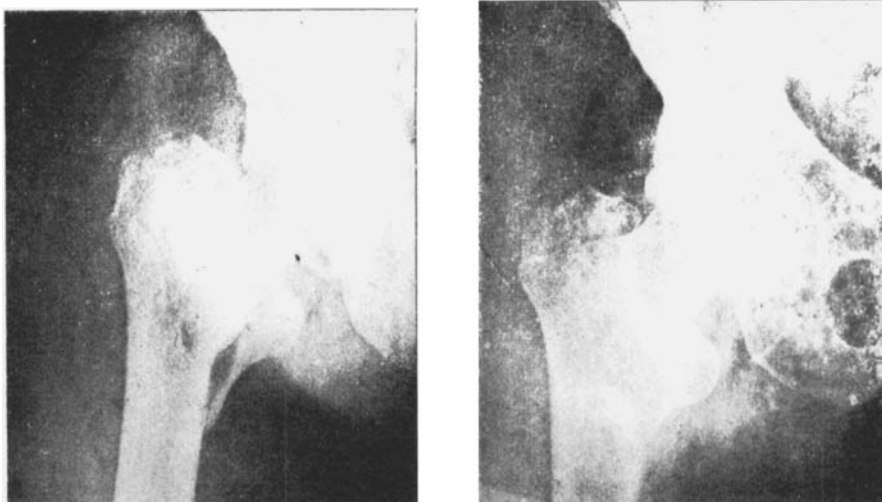
After 3 weeks full extension was established in the knee, flexion was 180–100°, ankle mobility complete. After 8 weeks the knee mobility was 180–90°, thigh extension complete, flexion 180–120°, no tenderness was felt in the thigh; the fractured point appeared firm. The tractions were removed and the patient was mobilised on crutches. He was discharged a week later and used crutches for another month.

5½ months after the accident the extension of the thigh was free, flexion was 180–90°, rotations, abduction and adduction were free. The movements of the knee and ankle were complete. A shortening of about 1 cm in the spina-malleoli and spina-patella measurements existed as compared with the other limb. The patient is very satisfied with the result (Fig. 4).

(4) Married woman, 63, healthy. Fell on her right thigh. Incapable of getting to her feet.

The patient was found to be in a good condition and alert. There was a petrochanteric femur fracture in the right lower limb.

After 5½ weeks' treatment the movements of the ankle and knee were free, thigh movement was 180–120°. The tractions were discarded and the patient was able to travel by air to Rome from where she

*Fig. 5.*

Case 4.

On the admission to the hospital.

6 weeks later.

wrote a year later expressing her satisfaction with the result and mentioning that the thigh was painless and very mobile. (Fig. 5).

(5) Married woman, 64; she suffered for 15 years from serious bronchial asthma requiring constant medication. During the last two months she felt such severe giddiness and weakness that she could get up only for essential purposes. On the day of admission she had fallen backwards on a staircase on account of vertigo, bumping her seat and hip, and had been unable to rise to her feet again.

The patient was thin, pale, in very poor condition; she suffered from severe shortness of breath and presented typical symptoms of a difficult asthma. The pulse was rapid, weak and superficial. SR 40, Hgb 35 %, Er 2.75, Ind. 0.64, blood proteins 5.4 %.

The fracture therapy described was commenced immediately. On account of the patient's poor condition decubitus developed in a few days near the sacrum at the site of the contusion; it healed easily as the general condition improved (blood transfusions etc.). When the tractions were removed after 8 weeks the fracture was firm and not tender, the mobility of the ankle complete, that of the knee 180-100° and of the hip 180-90°. The patient was now allowed up on crutches. After about 4 months from the trauma the hip movement was 180-80°, rotation in both directions about 10°, abduction and adduction about 30°, there was a shortening of some 2 cm in the spina malleoli me-



Fig. 6.
On the admission to the hospital.

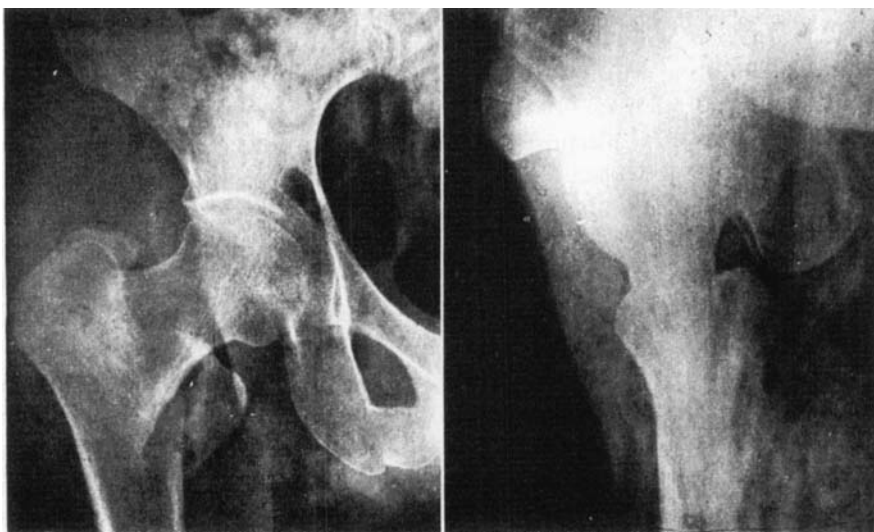


Fig. 6.
17 weeks later.



Fig. 7.
Case 6.

On the admission to the hospital.

9 weeks later.

asurement. The patient walks with a stick, still limping, but is satisfied. The hip does not feel tender (Fig. 6).

(6) Married woman, 71. Fell on her right side, since when unable to put any weight on her right lower limb. She was admitted to hospital 2 days later. Diagnosis: An old woman in comparatively good condition with a pertrochanteric fracture of the right femur. Treatment was commenced immediately by drilling a Kirschner wire through the femoral condyles and applying the tractions in the manner described. At the time of writing the patient, who was first tired and passive for some time, has recovered strength considerably and moves her undamaged limb satisfactorily in the traction appliance. For the reposition of the fracture see the following pictures (Fig. 7).

Satisfactory, even good results have thus been obtained in the cases described. At least half of these cases (1, 2, 3) were patients whose operation prognosis must have been regarded as poor. It is also very probable that fracture therapy consisting of mere immobilisation would have had slender chances of success. Operative treatment of the other cases would obviously have been equally justifiable. However, it may be asked in what respect operative treatment would have been more advantageous than conservative, even in these cases. Naturally no conclusions concerning the choice of treatment can be drawn on the basis of so few cases. Indeed, they have simply been published as

evidence of a new method worthy of attention in the treatment of fractures in the trochanter region. They have recalled at least to the present writer's mind the old saw: what can be competently treated conservatively must not be treated operatively. On the other hand, "probably no treatment is best for all patients", as Scott said in writing of fractures of the same region.

SUMMARY

A short survey is given of the therapeutical methods of femoral fractures of the trochanteric region. 6 cases of pertrochanteric femur fractures treated at the Orthopaedic Clinic of Helsinki University are described. So-called mobilising immobilisation was employed in their treatment: direct skeletal traction towards the thigh or from the femoral condyles, prevention of equinus deformity by means of gentle traction working upwards from the toes, both tractions applied mobilely over a grooved wheel. The magnitude of the traction on the femur and the degree of abduction are regulated by means of X-ray pictures. From the very outset of treatment the patient is allowed freely to move his knee and ankle, and within 3-4 weeks his hip. The activity of all the other limbs is simultaneously taken care of. After confinement to bed for about 6-8 weeks the patient is allowed up on crutches and the limb is allowed to bear weight freely after about 12 weeks. The results have been good and the patients have remained in good spirits. No complicating illnesses have occurred.

RESUME

Il est donné un compte-rendu sommaire de la thérapeutique des fractures fémorales dans la région trochantérienne. 6 cas de fracture pertrochantérienne du fémur, traités à la Clinique Orthopédique de l'Université d'Helsingfors sont décrits. L'immobilisation osseuse directe du côté du fémur ou à partir des condyles fémoraux, prévention de la déformité equinus au moyen d'une légère traction agissant en remontant à partir des orteils, ces deux tractions étant appliquées mobilement en passant par une roue cannelée. La longueur de la traction du fémur et le degré de l'abduction sont réglés d'après les radiographies. Dès le début du traitement, le malade doit être autorisé à mouvoir librement le genou et la cheville, et au bout de 3 à 4 semaines, la hanche. L'activité de tous les autres membres est surveillée simultanément. Après être resté alité pendant 6 à 8 semaines, le malade peut se lever en s'appuyant sur des béquilles, puis, au bout de 12 semaines environ, il

peut laisser reposer librement son poids sur la jambe. Les résultats ont été bons et les malades ont conservé un excellent moral. Il n'y a eu aucune complication.

ZUSAMMENFASSUNG

Eine kurze Übersicht der Behandlungsmethoden der Oberschenkelbrüche in der Trochanterregion wird gegeben. 6 Fälle von pertrochanteren Femurfrakturen, die in der orthopädischen Klinik der Universität in Helsinki behandelt wurden, werden beschrieben. Eine sogenannte bewegliche Fixierung wurde zu ihrer Behandlung angewendet: Direkter Zug am Knochen der condyli femoris in der Oberschenkelrichtung, Verhinderung von Spitzfussstellung mit Hilfe von leichtem Aufwärtzug an den Zehen, Beide Züge werden dadurch beweglich gemacht, dass sie über Räder, die mit einer Rinne versehen sind, geleitet werden. Die Stärke des Zuges am Femur und der Abduktionswinkel werden mit Hilfe von Röntgenbildern bestimmt. Vom Beginn der Behandlung bewegt der Patient Knie und Knöchelgelenk ausgiebig und nach 3-4 Wochen auch das Hüftgelenk. Der aktiven Bewegung aller anderen Gliedmassen wird ausserdem Aufmerksamkeit gewidmet. Nach 6-8 Wochen Aufenthalt im Bett steht der Patient mit Hilfe von Krücken auf und volle Belastung des Beines wird nach ungefähr 12 Wochen gestattet. Die Ergebnisse dieser Behandlung waren gut und die Patienten fühlten sich wohl. Keinerlei Komplikationen sind aufgetreten.

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