Post-operative Management of Hips

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GENERAL TREATMENT

1. Wherever possible, it is of prime importance to treat patients pre-operatively. Teach the specific exercises for the hip, as well as general maintenance exercises. Make sure the patient knows exactly how and why the exercises are to be done.

2. Especially in patients in the older age group (and the greater majority fall in this group) or that suffer from chronic chest complaints, teach localised and deep breathing exercises and make sure that coughing is efficient. Deep breathing exercises will also aid venous return, which is of importance immediately after the operation.

3. Explain to the patient the importance of regular and purposeful exercise in the early post-operative stage, as time and recovery lost during this stage can never be made up at a later stage.

4. Teach proper relaxation and rest after exercises as the muscles will tire and overtire easily in the early stages and this can give rise to several of the complications.

5. Emphasise the importance of doing the exercises at regular intervals during the day in order to maintain and even increase mobility and to build up strength and endurance in the muscles.

Muscle function and strength recover quickly, but endurance slower. Thus progressive, purposeful exercises done regularly within reasonable limits of pain and comfort will give the best results. The recovery of other soft tissues involved in the operation, e.g. skin, bloodvessels, fascia, etc., will parallel the recovery of muscle in order to comply with the progressively increased physiological demands made by increased function and activity.

Delay in recovery may be due to:

1. Sitting, standing or lying too long in one position.
2. An inconsistent and irregular rehabilitation programme.
3. Overactivity with resultant excessive fatigue, e.g. to compensate for earlier negligence.
4. Wrong use of crutches, especially "swing-through" gait instead of "walking" to simulate normal gait.
5. Abuse of the operated hip by weightbearing too soon, i.e. pain and limping on weightbearing are indications that the hip must still be protected by the use of crutches.
6. Limitation of movement due to pain which can in turn be due to:
   (*a*) congestion and oedema.
   (*b*) haematoma.
   (*c*) infection.
   (*d*) ossification.

OPERATIONS OF THE HIP

The following are the most common hip operations performed in most orthopaedic units. The Smith-Petersen cup arthroplasty and the subsequent physiotherapy treatment will be described in detail, whilst variations from this in the other operations will be mentioned, both in technique and physiotherapy treatment.

A. ARTHOPLASTY

1. Smith-Petersen Cup:

In this operation a metal cup is interposed between the acetabulum and femoral head after resection of bony and soft tissue overgrowth and tight and contracted muscles have been cut and/or re-attached, in order to re-establish smooth movement of the hip.

(*a*) **Incision:**

The anterior approach is used. The skin incision starts 2½ in. above the anterior superior iliac spine, along the iliac crest to the antero-lateral aspect of the thigh, 2 in. below the level of the pubis to an interval between sartorius and tensor fasciae latae. It is extended posteriorly and distally to the iliotibial band when a trochanteric transplant is necessary.

(*b*) **Muscles Cut:**

1. Origin of sartorius.
2. The iliotibial band when it is very tight.
3. If no greater trochanteric transplant is necessary, gluteus minimus is cut at its insertion and retracted.
4. If there is a marked flexion contracture, iliopsoas is cut from its insertion for later re-attachment. This is done once the capsule has been cut.
5. In the case of an abduction contracture, an osteotomy of the greater trochanter is done in line with the superior surface of the femoral neck.
6. The short external rotators are cut from their insertion into the trochanteric fossa if there is difficulty with the dislocation of the hip.

(*c*) **Dislocation of the Hip:**

1. Usually a circumferential incision of the capsule is done, although it is sometimes necessary, and even customary these days, to do a complete capsulotomy. It has been found on post-operative follow-up that remnants of the capsule tend to ossify and limit movement, thus it is believed that the more radical the capsulotomy, the better the result.
2. The anterior portion of the acetabulum is osteotomised or an osteotomy done along the old joint line in the case of bony ankylosis.
3. The hip is gently dislocated by means of adducation, external rotation and extension.
4. The femoral head is reshaped with a reamer to healthy bleeding bone. The acetabulum is then reamed to the desired shape, i.e. until full range passive hip movements are possible with the reamer still in place.

(*d*) **Closure:**

1. The wound is debrided, washed with physiologic saline and bone and soft tissue fragments removed by means of suction. The metal cup is carefully placed in position and the femoral head relocated.
2. Incorrect muscle pull is improved as follows:
   (i) Iliopsoas is transplanted forward into the distal part of the hip joint capsule. Thus the pull will be directly across the hip with a resultant increase in stability and correction of external rotation deformity.
   (ii) If the femoral neck is shortened, the greater trochanter and the abductors attached to it are transplanted more distally on the lateral aspect of the femur. It is wired with the hip in abduction as screws tend to pull out.
3. Tension on the wound is avoided by means of bony resection of the acetabular rim, where necessary.

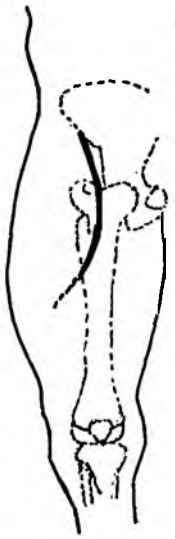
(*e*) **Traction:**

1. 5 to 7 lbs. are enough to overcome muscle spasm and it is put on while the patient is still anaesthetised.
2. The hip is kept in slight flexion, moderate abduction, neutral or slight internal rotation and the knee is slightly flexed.
3. The patient is treated in traction for 3 to 4 weeks.

The following are some of the other hip operations, variations in the approach to the joint and thus muscles cut and the subsequent post-operative rehabilitating.

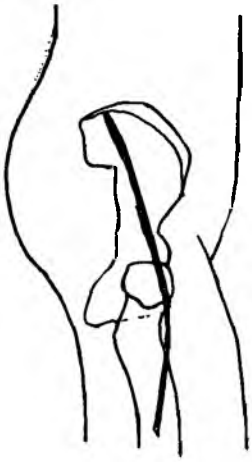
1. Moore's and Thompson's Prostheses:

These consist of the removal of the femoral head which is then replaced by a prosthesis which is driven into the shaft of the femur. The postero-lateral approach, usually the Gibson modification, is used.

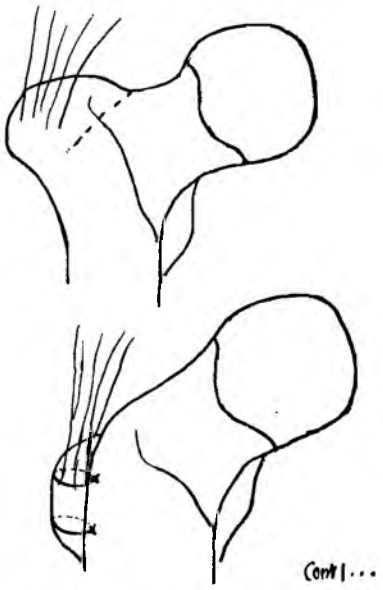


ANTERIOR APPROACH

LATERAL APPROACH



POSTERO-LATERAL APPROACH



TROCHANTERIC TRANSPLANT

(*a*) **Incision:**
Patient is in the lateral position. Proximally the incision starts 2½ in. to 3 in. anterior to the posterior superior iliac spine and just distal to the iliac crest, over the anterior border of gluteus maximus and then distally to the anterior edge of the greater trochanter and along the line of the femur for 6 in. to 7 in.

(*b*) **Muscles Cut:**
1. The iliotibial band is incised in line with its fibres, from the distal end of the incision and proximally to the greater trochanter. The thigh is abducted and the incision extended proximally along the sulcus at the anterior border of gluteus maximus.
2. Gluteus medius and—minimus are nicked or even divided at their insertion, but enough tendon left for suture at the closure.

(*c*) **Dislocation:**
The capsule is incised superiorly along the axis of the femoral neck, along the joint line anteriorly and along the anterior intertrochanteric line anteriorly and along the anterior intertrochanteric line laterally. The hip is dislocated by flexion of the hip and knee, abduction and external rotation of the hip.

(*d*) **Closure:**
The muscles are re-attached by means of interrupted sutures. Sometimes the greater trochanter with all its attached muscles is osteotomised and then re-attached by means of two wire loops.

(*e*) **Physiotherapy:**
These patients are not treated in traction and are usually allowed partial weightbearing after 10 to 14 days. Mobilisation of the hip in side lying is started after 4 to 5 days and in prone after 7 to 8 days. One would avoid internal rotation or adduction of the hip in association with flexion for 3 to 6 weeks, depending on the extent of the muscles cut and the speed of recovery. Once more the criteria of this as well as the indications for full weightbearing ambulation, are full range and controlled painless movements of the hip.

2. **Total Replacement Prosthesis:**

This is also known as the *McKee-Farror prosthesis* and consists of the replacement of the femoral head with a prosthesis, as well as a prosthetic cup fitted to the acetabulum by means of cement. For this the lateral approach or so-called U-incision is used.

(*a*) **Incision:**
It starts at the anterior superior iliac spine, goes distally to the greater trochanter, then curves posteriorly across the femur. From there it curves posteriorly and proximally to end halfway between the greater trochanter and the posterior superior iliac spine.

(*b*) **Muscles Cut:**
1. An osteotomy of the greater trochanter is done and it is reflected up with piriformis, gemelli and gluteal muscles still attached.
2. Gluteus maximus is separated along the posterior limb of the skin incision and reflected.
3. Sometimes vastus lateralis is cut at its origin from the greater trochanter and along the linea aspera.

(*c*) **Dislocation:**
The capsule is cut longitudinally along the superior surface of the femoral neck both anteriorly and posteriorly. The hip is dislocated by means of flexion of hip and knee, adduction and internal rotation of the hip.

(*d*) **Closure:**
The greater trochanter is re-attached by means of two wire loops.

(*e*) **Physiotherapy:**
The general outline of rehabilitation is the same as for the Moore's prosthesis. These patients can usually do partial weightbearing after two weeks and full weightbearing after five weeks. It is advisable to avoid any flexion strain on the hip for the first few weeks in these cases.

B. COMPRESSION OSTEOTOMY:

Once more the approach is usually lateral as described above. Thus vastus lateralis is cut partially, iliopsoas where there is a flexion contracture and gluteus medius rarely, usually in cases with a difficult approach. A wedge osteotomy is usually done between the level of the two trochanters and a compression plate inserted.

These patients do partial weightbearing after ten days and weightbearing to nearly full with the aid of a walking stick after about six weeks.

C. PSEUDO-ARTHROSIS:

This is the Girdlestone operation or variations of it. This consists mainly of excision of the femoral head at the neck and a valgus osteotomy below the greater trochanter. This gives rise to a more direct line of weightbearing and a relatively painfree pseudo-arthrosis.

Once more the approach is lateral as above. Usually iliopsoas is detached from the lesser trochanter and re-attached to the greater trochanter. These patients are treated in traction for 4 to 5 weeks.

Physiotherapy:
Whilst in traction, it would be along the same lines as for the cup arthroplasty. In the first three weeks after the operation one would avoid rotation and extension in extremes of range because of the transplantation of iliopsoas. Emphasise mobility, especially of abduction and internal rotation. Resisted exercises on the affected hip are usually started after 4 to 6 weeks, depending on the age and condition of the patient. Full weightbearing is not allowed for at least six months.

REHABILITATION PROGRAMME

The following is a suggested programme of exercise and rehabilitation for **Cup Arthroplasty** which can be modified to suit other hip operations. It has been found that manually controlled exercises are the safest and give the best results in the early post-operative stages. This way the physiotherapist can gauge and control passive range of movement as well as the amount of assistance necessary, or resistance that can be tolerated, in the case of isotonic contractions. One would start with isolated movements especially of the hip, i.e. pure flexion, extension etc. and progress to P.N.F. patterns after a week to ten days, on the affected side. P.N.F. can be given to the uninvolved leg and arms. Sling suspension is useful to build up endurance and maintain mobility once the patient has enough muscle power to control the hip joint.

Pre-operative training for 2 to 3 days if possible.
1. Breathing exercises and coughing.
2. Foot exercises for "pumping" action.
3. Static quadriceps contractions.
4. Teach full range hip movements, as well as static contractions of muscles expected to be cut.
5. General trunk and arm exercises.

Post-operative:

Day 1:
Patients are nursed flat for 24 hours, but encouraged to change position often.
1. Breathing exercises and coughing.
2. Foot movements, mainly to aid circulation.
3. Static quadriceps contractions.

Day 2:
1. All the above. Traction weights can be removed during the exercise periods to enable the biggest range of movement possible.
2. Active rotation, within the limit of pain and avoiding extremes of range.
3. Abduction and adduction, first passively by the physiotherapist and then actively by the patient with assistance if necessary. Again this is within the limits of pain and adduction beyond the midline is avoided. In arthroplasty, especially, it is of prime importance to obtain as great a range as possible, first passively and then

allowing the patient to control it voluntarily, in the early post-operative stage. "Limit of pain" has to be judged carefully by the physiotherapist, i.e. there will be a certain amount of pain on movement immediately after the operation, so one has to obtain the greatest range possible without causing damage by excessive force and still take the patient's pain tolerance into consideration.

4. Contraction of gluteus maximus for hyperextension, i.e. static work where there is traction but in side lying in other cases.
5. Use of arms for lifting, moving around in bed, etc., and even start simple arm exercises. In the case of the stronger and more agile patient one can attach springs to the bed for resistive exercises for the arms and uninvolved leg.

Day 3:

1. All the above, increasing the range and the power, the latter by decreasing assistance or increasing resistance, as the case may be.
2. Add simple trunk exercises like attempted or active "sit-ups", side flexion and bridging with the affected leg in extension. Always avoid the combination of flexion, adduction and internal rotation as this is the most common cause of dislocation in unstable hips or where muscle power is not yet sufficient to control unnatural strains.
3. The patient can sit up in bed if there are no complications and even in a chair, with the doctor's permission, where there is no traction. Make sure the patient understands the importance of avoiding an adduction, internal rotation strain on the hip in the sitting position.
4. Resisted exercises to the uninvolved leg and the arms.

Day 5:

1. The above, once more increasing the active range and power.
2. Active hip and knee flexion with the traction temporarily relieved, is started. This can be assisted manually at first but aim at free full range movement controlled voluntarily by the patient as soon as possible.

Week 2-4: (simple arthroplasty)

Week 2-6: (reconstruction with trochanteric transplant)

The patient will be kept in traction for the above length of time, depending on the type of operation he had.

1. The above exercises are continued, aiming at the maximum range and steadily increasing power and endurance in all the muscles by increasing resistance and exercise time to suit the patient's tolerance. To encourage and measure progress, patients can be given charts to fill in exercises done, number of times per day, increase in range, etc. Exercises have to be done regularly and purposefully, but with adequate rest in between and relaxation after sessions.
2. The arms and unaffected leg must be exercised strongly by means of springs, manual resistance, etc.
3. Carefully graded resistance can be given to movements of the operated hip towards the end of the period of traction, provided the patient has painfree movement with sufficient muscle power and especially endurance.

After 4-6 weeks:

The patient is weaned from traction and the affected hip exercised in as full a range as possible in preparation for ambulation.

1. Gluteus maximus is of prime importance, thus hyperextension of the hip in prone lying is graduated to fully resisted work.
2. Hip adduction and abduction is graduated to side lying with increasing resistance.
3. Static quadriceps and iliopsoas contractions are graduated to full straight leg raising.
4. Increasing resistance is given to hip and knee flextion.
5. Trunk flexion from supine with hands behind head.
6. Trunk hyperextension, lifting head, shoulders and both feet in prone.

These are the most important exercises for ambulation as the patient needs good control of hip extension and abduction, as well as a stable knee and trunk for successful and functional ambulation.

Ambulation:

Once the patient can do all the above exercises with ease, as well as move from the bed to chair and back without any assistance, ambulation training is started. An ordinary walking gait is taught, using crutches with the affected leg to ensure partial weightbearing at first. Gradually increase to full weightbearing, then managing stairs. A limp or unrelieved pain in the hip are always signs of too early or too much weightbearing and such a hip should be supported by crutches until the surrounding musculature is sufficiently strengthened to ensure painless and smooth ambulation.

Discharge and Follow-up:

Once the patient has sufficient endurance and control of ambulation, he can be discharged with the following instructions. The patient will be seen by the surgeon at regular intervals and may sometimes come in for an additional period of physiotherapy treatment as an out-patient, as the merits of the case warrant.

1. Patients have to avoid sitting for periods longer than an hour at first. It is sufficient just to stand or stretch where long periods of sitting are unavoidable.
2. An exercise programme, compatible with home life is given, once more stressing the most important muscle groups and keeping it simple. Ideally the patient should have frequent, short sessions with adequate rest in between.
3. Stress that exercises should be done to the point of discomfort only and that overactivity should be avoided.

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