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The rehabilitation management after hip arthroplasty: a case report

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Abstract

Aim: In this paper we describe the physical therapy management of a 64-year-old female following a bilateral hip arthroplasty. **Method:** The patient featured in this study, after the surgical intervention had undergone specific recovery treatment consisting of: posture techniques, static (isometric contractions) and dynamic kinetic techniques (passive motion, passive-actives, actives, actives with resistance), massage, respiratory gymnastics and reeducation of walking. **Results:** At the end of the rehabilitation program, hip muscular strength and joint range of motion were improved significantly. The Harris hip score was significantly improved, in comparison to the preoperative one. **Conclusion:** This case illustrates the importance of the rehabilitation management after bilateral hip replacement.

Key words: kinetic therapy, hip prosthetics, rehabilitation techniques

Rezumat

Scop: În această lucrare se prezintă managementul tratamentului de recuperare în cazul unei femei în vârstă de 64 de ani care a suferit o artroplastie de șold bilaterală. **Metode:** După intervenția chirurgicală, pacienta a urmat un tratament de recuperare specific constând în: tehnici de posturare, tehnici statice (contractii izometrice) și dinamice (mişcări pasive, pasivo-active, active, active cu rezistență), masaj, gimnastică respiratorie și reeducarea mersului. **Rezultate:** La finalul programului de reabilitare, forța mușchilor de la nivelul șoldului și amplitudinea de mișcare s-au îmbunătățit semnificativ. Scorul Harris s-a îmbunătățit semnificativ comparativ cu cel preoperator. **Concluzie:** Acest caz ilustrează importanța managementului terapiei de reabilitare după artroplastia bilaterală de șold.

Cuvinte cheie: kinetoterapie, proteze de șold, tehnici de reabilitare

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Introduction

As a spheroidal joint, the hip possesses three degrees of freedom of motion. It has a great importance for body balance in static (when standing) and dynamic position (walking and running).

The joint surfaces are represented by the femoral head (2/3 sphere) and the acetabulum of the pelvis (form of a hemisphere). Because of the incongruency of these two surfaces, at the edge of the glenoid cavity it has developed a labrum similar to that which exists at the shoulder.

From a biomechanical point of view, it is classified as a movable joint and it enables leg movements in several directions: flexion (lifting), extension (straightening), adduction (moving the leg towards the body), lateral and medial rotation [1,2].

The first total hip replacement was performed in advanced osteoarthritis as the sole indication, and was made in the 1960s; the indication was conditioned by the patient's age, over 65 years. With time, arthroplasties had broadened, encompassing several disorders, and age limits hardly exists anymore.

Initially, the hip osteoarthritis treatment include conservative therapies (bed rest, weight loss, use of a cane or crutches, reduction in hip joint stress, physiotherapy, analgesic and anti-inflammatory drugs). Only when these prove their ineffectiveness arthroplasty will be considered as a last resort.

The American Academy of Orthopaedic Surgeons published in March 2014 an article that mentions the prevalence of hip arthroplasty within the United States. Thus 0.8% of the American population has a hip prosthetic and 1.5% a knee one, the prevalence in the population over 50 years is of 2.5% [3].

The most common cause of hip arthroplasty are represented by hip osteoarthritis. On the other hand, the arthrosis can be: primitive (most common) or secondary (congenital, coxa plana, slipped epiphyses, Paget's disease, posttraumatic sequelae, hemophilia, hereditary diseases, etc.). Another indications of arthroplasties are represented by nonspecific and specific arthritis (rheumatoid arthritis, ankylosing spondylitis), avascular necrosis, femur or acetabulum tumors, the failures of nonunions, and osteotomies.

Pain is the main reason patient seeks orthopedic, rheumatology and medical rehabilitation services.

When it comes to the osteoarthritis pain, it is located around the femoral hip joint or may expand to the iliac crest, the buttocks and knees. Usually it has a mechanical nature, being exacerbated by walking, climbing and descending the stairs. Relief from this pain may occur during the night time and at rest. There may be joint morning stiffness for up to 30 minutes.

Limitation of the hip joint mobility, accompanied by static balance disorders and walking impairments can reduce activities of daily living (ADLs).

Mobility is gradually affected in the following order: internal rotation, extension and abduction.

In the case of advanced osteoarthritis (stage IV Kellgren) apparent leg shortening caused by tilting up the pelvis can be observed. Also, lumbar scoliosis and difficulty in walking are present.

The pelvic radiograph may reveal: joint space narrowing, osteosclerosis of the upper pole and lower pole osteophytosis.

If the conservative treatment and the complex physical therapy fail, the next measure is to resort to surgery.

Case report

A 64 year-old female patient was admitted to the Orthopaedic Clinic I, accusing mechanical pain in her left hip, marked limitation of mobility and functional impotence when it came to mobilization, walking, transfers.

Her medical history was significant for cardiovascular disease, hypertension, obesity and hypercholesterolaemia.

The patient states the onset of symptoms about 20 years ago. Initially, she presented right mechanical hip pains with irradiation on the buttocks and right thigh. The morning stiffness lasted around 15 minutes, gradually becoming bilateral with age and growing in intensity with increasing weight. She was diagnosed with bilateral primary coxarthrosis in 2002.

During the course of the disease she had undergone several physical treatments, both in the hips and lumbar spine. Because the right hip osteoarthritis was more advanced, total hip replacement surgery was decided (in november 2013) (Figure 1).



Figure 1. Left hip osteoarthritis (preoperative radiograph)

Postoperatively, the evolution has been favorable, with the disappearance of symptoms, but the functional incapacity within the left femur persists. 18 months after the right hip arthroplasty the patient presents an increased pain in her left hip. Complex medical and physical treatment was recommended. Because of the unfavorable response to these therapies, left hip replacement surgery was required.

Upon admission in our service, the patient was afebrile, with normal physiological curves, with slightly pallor of skin and mucosae. Her blood pressure was 140/70 mmHg and her heart rate was 74 beats/min.

The patient had very well represented body fat, especially on the belly and thighs. Her BMI (body mass index) was 39.5kg/m² with bilateral quadriceps muscle hypotonia and decreased muscle strength (thigh and calf muscles strength was 3). We noted a vicious attitude of the trunk, dextroconvex scoliosis of the lumbar spine, reduced lumbar lordosis, plantar arch collapsed and hallux valgus on both sides. The hand-ground distance was 45 cm. Low left ROMs for flexion (65°), extension (0°), abduction (15°) and adduction (30°) were assessed. Moreover, right ROMs for flexion (110°), extension (15°), abduction (30°) and adduction (15°) were noted.

Standing was possible, but walking was cradled, analgesic, with the need of a cane.

The functional assessment has found that the patient is partly dependent, managing with difficulty the ADLs (getting dressed or undressed, hygiene). Transfers are difficult, so are climbing and descending the stairs. Communication is normal and household works are slightly limited.

Preoperative radiograph of the pelvis confirmed the existence of a right femoral hip arthroplasty with an uncemented bipolar prosthesis and hemispherical acetabular fixation with a screw. There were no decelerated osteomas or demineralization. Also, advanced left hip osteoarthritis was confirmed (Figure 2).

Based upon the clinical presentation, the laboratory and the imaging findings she was diagnosed with advanced left coxarthrosis.



Figure 2. Right hip arthroplasty
Left hip osteoarthritis

Thus, on november 2015 surgical intervention was performed. It consisted of a total left hip arthroplasty, uncemented, using a lateral approach (Figure 3).



Figure 3. Left hip arthroplasty (postoperative radiograph)

Postoperatively, the evolution has been favorable, the patient being relised. Recommendations to maintain the anticoagulant therapy up to 29 days and continue physical therapy program at home and to lose weight were made.

In order to achieve maximum therapeutic results, tailored to the particularities of this case, the recovery treatment began with a *preoperative stage* aimed to [4]:

- teach basic exercises that will be executed later on,
- muscle strengthening, focusing on the quadriceps, buttocks and abduction,
- school back pain exercises,
- breathing exercises that stimulate peripheral circulation.

The *postoperative stage* targets the following objectives [4,5]:

- decreasing pain and inflammation,
- increasing muscle strength and muscle resistance,
- maintaining postoperative mobility, stability and movement coordination,
- combating edema,
- avoiding and preventing thrombosis, pulmonary embolism, pneumonia, bedsores and other post traumas,
- including elements of occupational therapy and continuing weight loss.

Within the first 24 hours, the operated leg was positioned slightly in abduction, external rotation being avoided. Also the unaffected leg was mobilized. With respect to the affected hip, isometric contractions of the buttocks and quadriceps muscles were performed.

Moreover, muscle relaxant massage using circular maneuvers in order to facilitate venous circulation was performed. The massage also consisted in circular and longitudinal movements done with the purpose of lymphatic drainage of the lower limbs (the operated hip was avoided).

Kinethotherapy consisted of passive and passive-active ROM hip exercises, as well as suspension exercises insisting on flexion, extension and slight abduction. The patient continued quadriceps strengthening exercises with light resistance and passive-active ROM homolateral knee exercises [5,6].

Taking into account the favorable response to the kinethotherapy and considering the status of the patient, her verticalization was decided 48 hours post-surgery (initially without the support of the operated limb). Active exercises with slight resistance, in particular flexion, extension and abduction were performed. Of note is that, in the first three weeks flexion, adduction and external rotation were avoided.

Before discharge, the patient was able to achieve 90° of flexion, 5° of extension, 10° of adduction and 15° of abduction. Thigh and calf muscles strength increased to 4 on the MRC scale and she was able to walk with two crutches supporting her.

The Harris hip questionnaire score [2] was 60 before the intervention and after the recovery treatment increased to 78.

Lastly, the patient received an personalized program to do at home. Therefore, the program initiated in the hospital will be continued progressively to increase muscle strength and endurance.

It is worth mentioning that the joint mobilisation should be avoided to the maximum angles (up to 30-40° abduction), external rotation and adduction (legs crossed over the other). Flexing, posterior adduction, internal rotation, as well as extension, adduction and external rotation in the forward position could deploy the prosthesis.

Overall, the recovery program should be followed 2-4 months postoperatively. Occupational therapy targets the use and facilitates walking, devices for footwear, getting dressed, lifting objects from the ground. Correct posture is recommended for the supine position with the use of aids (pillows). For the rest of the her life, the patient, will have to continue the program of maintaining muscle strength with fallowing rules of "orthopedic hip hygiene".

Conclusion

The particularity of this case lies in the rapid progressive bilateral form, which has not responded favorably to the conservative treatment and therefore within two years the second prosthesis was required. , the obesity of the patient was a risk factor that aggravated the development of bilateral osteoarthritis.

At the end of the rehabilitation program, hip muscular strength and joint range of motion were improved significantly, which means an increased life quality in this patient.

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