Charles University

Faculty of Physical Education and Sports

Department of Physiotherapy

Rehabilitation of Hip Replacement

Bachelor Thesis

April 2009, Prague

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April 2009, Prague

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DECLARATION

I declare that my Bachelor thesis is based entirely on my own individual work, and on my practice at Revmatologický ústav, Physiotherapy department in Prague from 02.02.09 to 14.02.09.

All material in this thesis is composed of several books, journals and information found on the internet. Also material handed out in lectures during the 3 year bachelor studies, all of which is listed in the literature list.

Prague, April 2009 ....

ACKNOWLEDGEMENT

I would like to take this opportunity to thank my family for all the support I have gotten throughout my years of studies here in Czech Republic. I would also like to thank everyone of my wonderful classmates during these years for making the study in a foreign country easier. I would also like to thank all my good friends in Norway.

Furthermore i would like to thank all the teachers that i have met during my studies here at FTVS, i would like to thank them for all the valueable knowledge and experieces they have shared with me an my co-students. I will use all this knowledge to the best of my abilities to treat patients with disorders of various kinds. A human never stops learning new things, and the time spent in FTVS, Charles University has been a great plateu for me to build more future knowledge upon.

And last but not least, I would like to thank my supervisor through the process of creating this thesis, Mgr. Miroslava Jalovcová which have been great help. I would also like to thank my advisor at Revmatologický ústav, Dita Němcová for all the help during the practice.

Anders Halvorsen
Prague, April 2009

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1. ABSTRACT

Title: Hip Replacement

Thesis aim: In my Bachelor thesis I discuss the diagnostics and rehabilitation after total hip replacement. There is a general part consists of the anatomical, functional and biomechanical properties properties of the hip joint. There is also a chapter about osteoarthritis. Toward the end of the general part I have written about how diabetes can influence the rehabilitation. And the rituals that should be performed before operating

The special part is the presentation

Clinical findings: The patient is a retired teacher with total endoprothesis of left hip. The patient is also diagnosed with diabetes mellitus type 2.

Methods: The therapy during the two weeks consisted of 1 session every day. Which typically consisted of strengthening of weak muscles, relaxation techniques, walking with crutches and soft tissue techniques for the scar surroundings.

Result: The after effects of the two weeks of therapy were positive, improvement was seen and the patient seemed satisfied with the progression that was made. Increase in range of motion .

Key words: Hip replacement, Physiotherapy, Rehabilitation, Anatomy of hip joint, coxarthritis

-1-

3. PREFACE

The goal of this bachelor thesis is to portray how as a therapist went forward while rehabilitating a person with total hip replacement. Together with this present any advancements or decreases in performans from the start of the therapeutic period to the end of the therpeutic period

Revmatologický ústav is a facility located in Prague dealing especially with rheumatic disorders. The facility contains fifty two acute beds and "patients are admitted to the in-patient department based on the referral of health-care specialists, out-patient specialists or other professional departments of hospitals" and "patients from the entire Czech Republic are hospitalized in the i n-patient department of the institute." This institute deals with diagnosis and treatment of highly active and severe rheumatic diseases such as systemic lupus erythematosus, dermatomyositis, polymyositis, systemic sclerosis, vasculitis. At this hostpital there are several units inkl rehabilitation unit And therfore there are specialists in different fields working at this facility such as orthopedists, physiotherapists, and specialists in the field of balneology, physiology and medical rehabilitation.

4. GENERAL PART

4.1 ANATOMY OF PELVIS AND FEMUR

To understand how the procedure looks like, its important to know the anatomy and muscular structures that composes the pelvis.

The major coxal bones are fused together by three bones, the pubic bone, ischium and ilium. The structure is symmetrical on both sides and are connected by the sacrum (a fusion of five originally separate sacral vertebrae) and the pubic symphysis.

The iliac and sacral bone create a posterior joint called the sacroiliac joint. The ilium bones cranial part creates an arch called the iliac crest that has two notches, one frontally called the anterior superior iliac spine, and one dorsally called the posterior superior iliac spine. The acetabulum is situated bilaterally on the pelvis, the head of femur is placed within the acetabulum, forming the hip joint. (5)

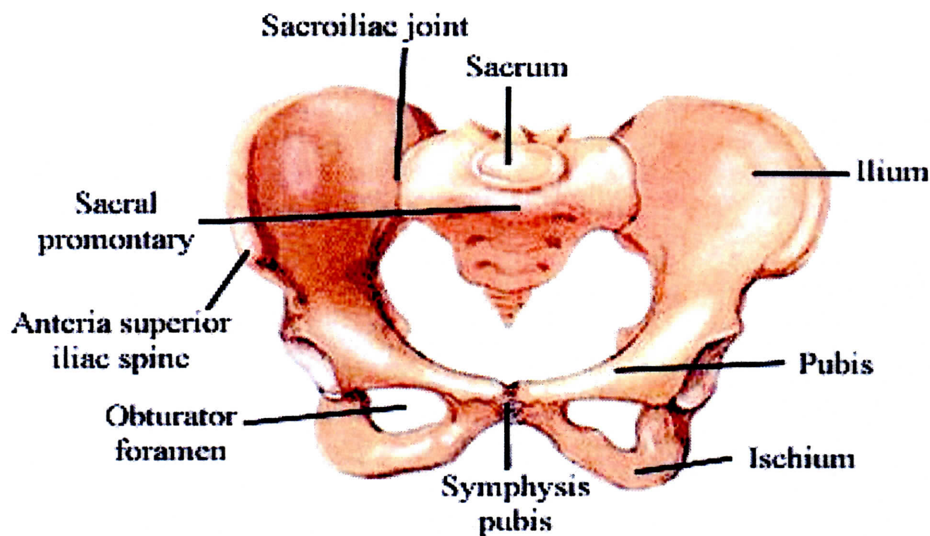

Image 1. The Pelvis(18)

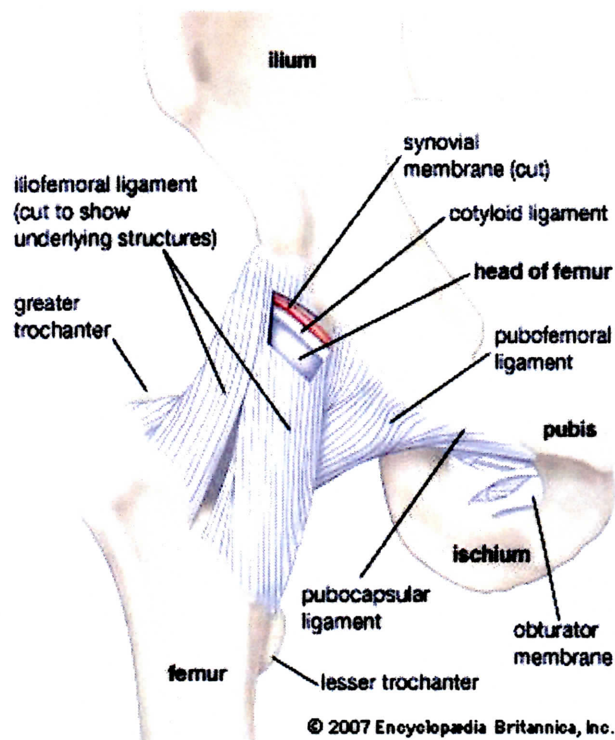

Image 2: The hip joint[19]

The hip joint is a synovial joint, this means that the joint is surrounded of a outer fibrous membrane. In the hip joint the synovial membrane is protected by outer laying ligaments (pubofemoral ligament and iliofemoral ligament) inside of the synovial membrane there is synovial fluid designed to moisturise the articular plates coating the two bone structures, this process helps the surfaces slide across each other without much friction, which would ultimately lead to erosion of the bones surface.[5]

The name femur derives from the Latin femoris which means "the thigh's bone". The femur is the longest and heaviest bone in the body, it transfers body weight from the femur to the tibia when a person is standing. Its length is approximately one fourth of the person's height. The femur consists of the shaft (body) and two ends, superior and inferior part. The superior part of the femur consists of a head, neck and two trochanters (greater and lesser).

The superior femur is "bent" (L-shaped) so that the long axis of the head and neck projects superomedially at an angle to that of the obliquely oriented shaft. This angle of inclination allows greater mobility of the femur at the hip joint because it places the head and neck more perpendicular to the acetabulum in the neutral position. [4]

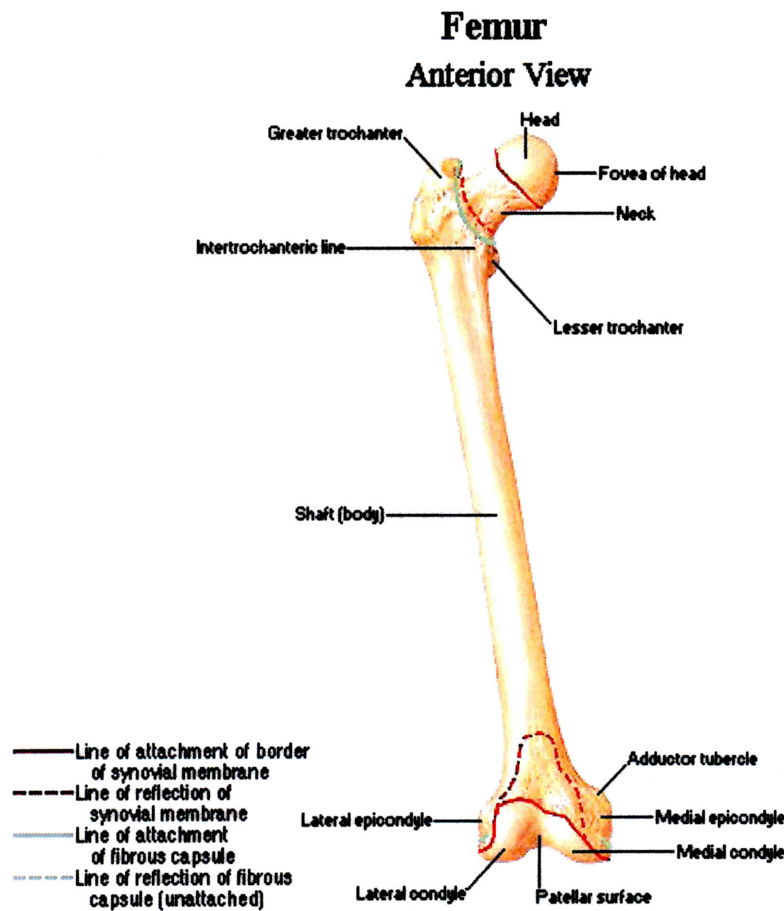

Image 3. The femur(1)

Inferior to the head, neck and trochanters of femur lies the shaft which is smoothly rounded off, except for fleshy parts that provide orgin to extension muscles of the knee. And on the posteriorly situated linea aspera that provide attachment for the adductors. [4]

4.1.1 MUSCLES OF PELVIS AND LOWER LIMB

Table 1. adductors and rotators of thigh[4]

Lower limb muscle	Orgin	Insertion	Nerve	Function
Piriformis	Anterior surface of sacrum: sacrotuberous ligament	Superior border of greater trochanter of femur	Branches of anterior rami of S1, S2	Laterally rotates extended thigh and abduct flexed thigh; steady femoral head in acetabulum
Obturator internus	Pelvic surface of obturator membrane and surrounding bones	Medial surface of greater trochanter (trochanteric fossa) of femur	Nerve to obturator internus (L5,S1)	
Superior and inferior gemelli	Superior: ischial spine Inferior: ischial tuberosity		Superior gemellus: Nerve to obturator internus (L5,S1) Inferior: nerve to quadratus femoris (L5,S1)	
Tensor facia latae	Ilium posterior to posterior gluteal line: dorsal surface of sacrum and coccyx: sacrotuberous ligament	Mos fibers end in iliotibial tract, which inserts into lateral condyle of tibia some fibers insert into gluteal tuberosity	Superior gluteal nerve (L5,S1)	Abducts and medially rotate thigh: keep pelvis level when ipsilateral limb weight bearing and advance opposite(unsupported) side during swing phase Gluteus medius: may laterally rotate
Gluteus medius	External surface of ilium between anterior and posterior gluteal line	Lateral surface of greater trochanter of femur		
Gluteus minimus	External surface of ilium between anterior and inferior gluteal line	Anterior surface of greater trochanter of femur		
Gluteus maximus	Ilium posterior to posterior gluteal line dorsal	Most fibers end in iliotibial tract, which inserts into	Inferior gluteal nerve (L5,S1,S2)	Extends hip, assists in lateral rotation.

	surface of sacrum and coccyx: sacrotuberous ligament	lateral condyle of tibia, some fibers insert on gluteal tuberosity		

Table 2. flexors of hip joint[4]

Lower limb muscle	Orgin	Insertion	Nerve	Function
Pectineus	Superior ramus of pubis	Pectineal line of femur, just inferior to lesser trochanter	Femoral nerve (L2,L3)	Adducts and flexes thigh: assists with medial rotation of thigh
Sartorius	Anterior superior iliac spine and superior part of noch inferior to it	Superior part of medial surface of tibia		Flexes, abducts and laterally rotates thigh at hip joint: flexes leg at knne joint
Iliopsoas, psoas major	Sides of T12-L5 vertebrae and discs between them: transverse processes of all lumbar vertebrae	Lesser trochanter of femur	Anterior rami of lumbar nerves (L1,L2,L3)	Act conjointly in flexing thigh at hip joint and in stabilizing this joint
Iliacus	Iliac crest, iliac fossa, ala of sacrum and anterior sacroiliag ligaments	Tendon of psoas major, lesser trochanter and femur distal to it	Femoral nerve (L2,L3)	
Psoas minor	Sides of T12-L1 vertebrae and discs between them, transverse oricesses if all lumbar vertebrae.	Pectineal line, iliopectineal eminence via iliopectineal arch	Anterior rami of limbar nerves (L1,L2)	

Table 3. Adductors of the thigh [4]

Lower limb muscle	Orgin	Insertion	Nerve	Function
Adductor longus	Body of pubis inferior to pubic crest	Middle third of linea aspera of femur	Obturator nerve, branche of anterior division (L2,L3,L4)	Adducts thigh
Adductor brevis	Body and inferior ramus of pubis	Pectineal line and proximal part of linea aspara of femur		Adducts thigh and some extent flexes it
Adductor magnus	Adductor part: inferior ramus of pubis, ramus of ischium: hamstrings part: ischial tuberosity	Adductor part: gluteal tuberosity, linea aspara, medial supracondylar line, hamstings part: adductor tubercle of femur	Adductor part: obturator nerve (L2,L3L4) branches of posterior division. Hamstrings part: tibial part of sciatic nerve (L4)	Adducts thigh: Adductor part: adducts thigh Hamstrings part extends thigh
Gracilis	Body andinferior ramus of pubis	Superior medial surface of tibia	Obturator nerve (L2,L3)	Adducts thigh: flexes leg: helps rotate it medially
Obturator externus	Margins of obturator foramen and obturator membrane			Laterally rotates thigh: steadies head of femur in acetabulum

Table 4. Extensors of the hip, flexors of the knee [4]

Lower limb muscle	Orgin	Insertion	Nerve	Function
Semitendin-osus	Ischial tuberosity	Medial surface of superior part of tibia	Tibial division of sciatic nerve part of tibia (L5,S1,S2)	Extend thigh: flex leg and rotate it medially when knee is flexed: when thigh and knee are flexed these muscles can extend trunk
Semimembra nosus		Posterior part of medial condyle of tibia: reflected attachment forms oblique popliteal ligament (to lateral femoral condyle)		
Biceps femoris	Long head: ischial tuberosity Short head: linea aspera and lateral supracondylar line of femur	Lateral side of head of fibula: tendon is split at this site by fibular collateral ligament of knee	Long head: tibial division of sciatic nerve (L5,S1,S2) Short head: Common fibular division of sciatic nerve (L5,S1,S2)	Flexes the leg and rotates it laterally when knee is flexed: extendeds thigh

Table 5. Extensors of knee[4]

Lower limb muscle	Orgin	Insertion	Nerve	Function
Rectus femoris	Anterior inferior iliac spine and ilium superior to acetabulum	Via common tendinous (Quadriceps tendon) and independent attachments to base of patella: indirectly via patellar ligament to tibial tuberosity: medial and lateral vasti also attach to tibia and patella via aponeuroses (medial and lateral patellar retinacula)	Femoral nerve (L2,L3,L4)	Extend leg at knee joint: rectus femoris also steadies hip joint and helps iliopsoas flex thigh
Vastus lateralis	Greater trochanter and lateral lip of linea aspera of femur			
Vastus medialis	Intertrochanteric line and medial lip of linea aspera of femur			
Vastus intermedius	Anterior and lateral surfaces of shaft of femur			

4.2 BIOMECHANICS

The hip "coxo-femoral" joint is a ball-and-socket joint on the proximal proximal part of the lower limb, which allows the hip joint to have three degree's of freedom. The transverse axis allowing movement in the sagittal plane, flexion and extension. The anteroposterior axis enables movements in the sagital plane, meaning abduction and adduction of the femur, and the last degree of freedom being the horizontal axis that controls and allows internal and external rotation.[3]

Range of movement in to flexion of the hip joint varies according to the following conditions, whether the movement is active or passive influences the total range of movement as well as the position of the knee joint. With the knee joint extended the hip joint should reach 90 degrees of flexion, with knee joint flexed it can reach one hundred and twenty degrees or even more. Passive flexion of the hip joint reaches over 120 degrees, but the total range of movement depends on the position of the knee, because the range is remarkably smaller with the knee in extended position compared to flexed position. The latter type will exceed 140 degrees of flexion, creating a position where the ventral part of the thigh almost touches the thorax of the patient.[3]

Range of movement in to extension is considerably smaller than in flexion . Limited by the iliofemoral ligament. And the same case as mentioned above, active movement give lesser range of movement than a passive one. The range of movement is also influenced by the position of the knee in extension as well, but has the opposite effect. The range of movement is decreased when the leg is in flexion. The reason for this is that the same muscle that work in co activation with the muscles of the gluteal region (**se table 1**) also functions as a flexor of the knee. Causing a loss in efficiency during the process of extending the hip joint. Passive movement of the hip joint may reach 10 degrees.[3]

Abduction is the movement that guides the lower limb away from the central axis of the body. It is technically possible to move only one hip, but the practice of this shows that during abduction of one hip will eventually when abduction reaches maximum angle and passes this limit, the displacement of the second hip will start. The maximum of a persons abduction is usually restricted by the restriction when the femoral neck hits the acetabular rim, adductor muscles and the ilio- and pubofemoral ligament. But there are exceptions, in ballerinas and gymnasts especially, their exercise regime is designed to improve mobility and decrease the fixation form the iliofemoral ligament. (3)

Adduction in the movement where lower limbs are moved medially toward the central axis of the body. The maximum range of adduction is thirty degrees, but for this to be carried out the contra lateral leg needs to be flexed for the other leg to reach maximal range without being obstructed. Adduction is mostly used together with combination of another movement, such as adduction with flexion or extension (crossing legs in front, or behind the person). (3)

4.2.1 Loading of the hip joint

The hip is the major weight bearing joint in the body. When a person has his bodyweight evenly distributed in standing position the hip joint is carrying one fourth of the entire bodyweight. But due to muscles stretching over hip joint, it created extra load to the hip joint. And combining these two factors adds up to about full body weight during the swing phase of walking, and while in the support phase it is estimated to be three to four hundred percent bodyweight at normal walking. The impact forces translate cranially through the patients sole through the skeleton. So a cane or crutch will help the person to evenly distribute load between the legs through the entire walking cycle. And while standing still the crutches reduces the tension that the powerful adductors provide. (1)

4.3 OSTEOARTHRITIS

Osteoarthritis is a type of arthritis that causes cartilage from joints to break down and disappear. Osteoarthritis quite often affect the big weight bearing joints (hip and knee). Primary OA is most commonly related to ageing, as a person gets older the water content in the cartilage and eventually starts flaking away.

When this reaches an advanced stage, the cartilage is completely disintegrated and the two bony surfaces rub against each other, after long time usage of the joint without any cartilage to protect it the joint will start to ache and get restricted range of movement. OA is not a systemic disease which means that it does not affect other structures than the affected joint. Classical symptoms of OA is a sense of friction within the joint, pain and also a creaking sound when the patient moves the joint.

There is no specific treatment to slow down or repair cartilage degeneration, the only thing that can be done as conservative treatment is to cease activities that causes excessive load to the joint, weight management through diet and exercising can be a deciding factor when it comes to living comfortably with OA.

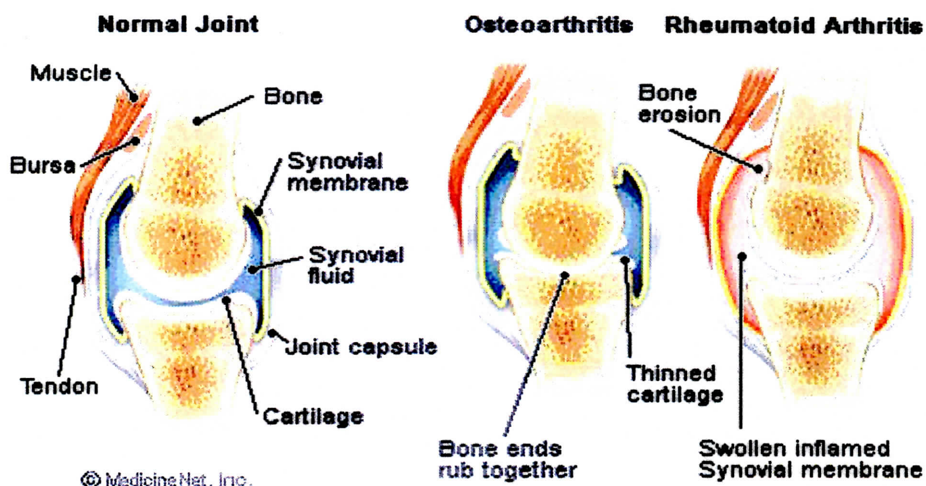

Image 4. A normal joint compared to arthritic joint[21]

4.3.1 Stages of osteoarthritis

The earliest stage of osteoarthritis starts before the patient notices any symptoms. Osteoarthritis starts with gradually removal of the smooth cartilage that lubricates the two bones. A combination of age and overuse accelerate the degeneration of this cartilage. Once this surface is completely broken down, and friction between the bone start to occur, the symptoms appear.

The moderate stage is the next step in the disease. A person suffering from osteoarthritis notices pain and stiffness in joints which gradually increase throughout the day. But the pain disappears during rest. When the cartilage is disintegrated the friction between the bones will start a process of osteophyts production, limiting the range of motion possible in the joint.

The late stage, during this stage of development all the joints structures are affected. Healthy lubricating fluid is lost and the joint affected by osteoarthritis may fill with inflammatory fluids that stretch the joint capsule, causing swelling, more pain, and stiffness. At this point strong pain medications are needed, and ultimately may end in hip surgery.

4.3.2 Endoprothesis types

Hip replacement is a common orthopaedic procedure where the damaged joint is being removed and replaced with an artificial implant. The materials used in the implant may differ according to different factors such as age of the patient and different activity level.

Metal to plastic implant is a variation where both the ball and the socket is replaced. The prosthesis is made of metal while the cup is coated with polyethylene.

When securing the implant into the bone there are two different methods used, one is called "press-fit" and the other one is cemented. The press-fit prosthesis grows together with the bone because of its design, while the cemented one glues itself to the bone.

There are positives and negatives with both procedures, the press-fit takes longer time to establish than the cemented version, while the cemented version has shorter life span than the press fit. The cemented implant is often used for older patients, since they are less likely to wear it out. [10]

4.4 DIABETES MELLITUS TYPE-2

The patient has diabetes mellitus type 2, which is a chronic disease which require long term medical attention. The second type of diabetes typically develop in people that are older than 40 years old, but because of a recent epidemic of child obesity and inactivity it is now being diagnosed in people of younger age. About 90 percent of all people who develop diabetes type 2 are obese. DM 2 is characterized by peripheral insuline resistance with insulin-secretory defects that varies in severity, for diabetes mellitus to develop, both defects must exist. All overweight individuals have insulin resistance, but only those with an inability to increase beta-cell production of insulin develop diabetes.

A person with long time exposure of hyperglycemia may develop nerve damage or so called neuropathy. There is also risk of disorders in small or big blood vessels. For a patient after total hip replacement these conditions might be a high risk factor. Neuropathy and vascular diseases may decrease the sensation to the peripheral extrimeties. Peripheral neuropathy usually cause loss of feeling in fingers or toes first and then spreads towards the center of the body. The prevention of falling is of great importance for a patient with a surgically replaces hip. [9]

4.5 PREOPERATIVE ACTIVITIES

The postoperative period is difficult for patients, but preoperative preparations readies the patient physically and gives the patient advantages during the postoperative rehabilitation.

During this preoperative period the patient will exercise muscle strength and movements through the maximal range of motion. Minimizing the unpleasant symptoms with pain releaving techniques. Teaching the patient to walk with crutches before the patient is operated. This enables the patient to be experienced at walking without loading the operated extremity. Patient should be introduced to the contraindicated movements and their risks before going into surgery.
Rehabilitation

4.6 POST OPERATIVE CARE

During the post operative care period the patient prepares the foundation for life with a new hip joint. Its important to pay close attention to the patients future needs in everyday life. Its important to start the rehabilitation and learning process already from day 1.[14]

On the first day after the operation the patient should start to exercise with his legs to increase circulation to prevent blood clotting. TEP exercises are designed to help the patient improve circulation, as well as to strengthen muscles. The patient is encouraged to do these exercises every two hours if the patient is awake. Also the patient should practice verticalisation from supine or prone, to sitting and standing.[14]

Day two should consist of the same exercises as the prior day, and in addition to that the patient will initiate gait training by help of assistive device, such as walker or french crutches. From 3rd to 5th day its important to start working on the patients muscle strength and range of motion, this is done according to the patients tolerance, and practising how to do activities of daily living such as grooming without with the least

complications as possible. From this date modalities such as heat and cold is used for pain and oedema reduction.

From day 5 to the 4th week the patient should exercise in different positions such as in sitting, side-lying or in standing. Stretching the muscles and increasing flexibility and further practice ADL. (14)

Its crucial to set some goals for the patient within the rehabilitation period, the patient should be able to function in everyday life. During the post operative stages the patient should become enough flexible in hip and knee to be able to ascend and descend stairs. Which requires close to 90 degrees of flexion in the hip joint, and 30 degrees or above in the knee joint. But before returning to a normal life there are things that needs to be taken care of.

In order to exercise properly the patient should reduce his pain via analgesic drugs with lasting effect over the whole day. Secondly the oedema around the scar should be treated, the oedema that appears after the surgery can delay the progress if not treated, the oedema that surrounds the operated area will provide pain and pressure to the patient during exercise. Treating the scar and swelling with soft tissue techniques will speed up the healing process of the scar, and decrease the painful pressure that is limiting the patient in doing e.g flexion of the hip joint. If the scar is not treated with proper care it may become active and affect other places on the body.

The ability to go from horizontal to vertical position is important to exercise from early on, so that the patient quickly can become more independent, with the help of a pillow and correct weight distribution the patient can go from supine to sitting position without any help. The feeling of independence should be worked on as soon as possible to increase the patients feeling of progression and make them motivated to be independent again. Working on making ADL easier and prevention of falling are also huge steps on the road to recovery.

Lastly the patient should improve range of motion, strength of the extremity, to be capable of performing activities such as house cleaning or walking in stairs.

After the therapy with physiotherapist is done, the patient should maintain their muscle strength and flexibility.

Sports is advised, the patient should start practising sports that does not apply much force or pressure through the long axis of the leg. Cycling, swimming and nordic walking are activities that are perfect for a person working with maintaining. Using big parts of range of motion using strength of muscles with minimal force through the extremity are the perfect exercises for a hip replacement patient.

5. METHODOLOGY

All the examinations were done during the time period between the 2nd and 13th of February 2009 at Revmatologický Ùstav in Albertov, Prague. The therapy was provided daily from 10-11 a.m, the therapy was performed in a exercise hall on a physiotherapy bed or in the patients own room on a hospital bed.

The methods used to for diagnostics and treatment are based on literature either recommended or taught by the teachers at FTVS. Data obtained in the special part are subjective and based of my personal judgement. Diagnostic methods used

- Aspection
- Postural examination
- Palpation
- Gait examination
- Transfer and ADL examination
- ROM examination
- Antropomotoric measurements
- Manual Muscle testing by Kendall

Diagnostic tools used during the examinations includes, neurologic hammer w. spike, measuring tape and goniometer.

Aids used in therapy sessions, Overball

6. SPECIAL PART

6.1 ANAMNESIS

Examined person: J.D

Gender: Male

Date of birth: 1943

Diagnosis: M16.1 – Coxarthrosis Sinistra

Present state

The patients main problems are his inability to load the operated extremity, decreased range of motion of the hip joint and oedema around the operated area. He first noticed the onset of the disease five years ago. He started noticing painful pressure and friction within the joint, which developed into restrictions in his range of motion. He did not experience any pain during night time, and neither while keeping completely still. Movement of the lower extremity provoked pain.

The patient is lucid and do not have any vision or hearing difficulties. The patient is higher educated and is also bilingual (Czech and English). He comprehends the instructions given to him, with some exceptions. He is cooperative but seems to be indifferent to exercise.

Table 6. Physical parameters

Height	179 CM
Weight	92 Kg
BMI	28.7
Pain scale	6
Heart Rate	60
Blood pressure	150/90
Breathing frequency	15 per minute

(Pain scale from 0-10)

Family anamnesis

The patients father and brother both have a history of hip joint problems of same character. Apart from that there are no significant hereditary diseases in his family.

Personal anamnesis

Childhood disorders

The patient did not suffer from any serious childhood disorders.

Chronic disorders

The patient has diabetes mellitus 2nd type. (non-insulin dependant)

Surgical history

Both his eyes were operated in 1984.

Operated left hip on 19.1.2009

Past injury

The patient has not suffered from any serious injuries in the past.

Medications

Lipirex (Fenofibrate) : (Dosis 0-0-1)

A lipid regulating agent used to reduce elevated LDL-C, Total-C and Triglyceride and increase HDL in the patient. The medicament should be taken with meals for increased effectiveness.(11)

Xatral (Alfuzosin): (Dosis 1-0-0)

Belongs to Alpha-Blockers group which is used to treat symptoms of BPH (Benign prostatic hyperplasia) or enlarged prostate. "Alfuzosin helps to relax the muscles in the prostate and the opening of the bladder. This helps to improve urine flow and decrease symptoms of BPH. Alfuzosin does not slow or stop the progression of enlarged prostate." The medicament should be ingested after a meal.[(15)]

Siofon (Metformin): (Dosis 1-0-1)

This medicament belongs to diabetic medicine.

„Siofor works by lowering the amount of glucose(sugar) produced by the liver cells and the amount of sugar adsorbed into the bowel. Metformin also increases the sensitivity of insulin receptors helping insulin be more efficient in lowering high blood sugar levels.

Indications: Metformine is used to treat type 2 diabetes called non insulin-dependent diabetes or adult-onset diabetes(especially in people with obesity)" [(13)]

Clexane (Enoxaparin):

Belongs to a group called low molecular weight heparin. It is used to stop blood clots forming within the blood vessels.

Preventing these types of blood clots (thromboembolic disorders), particularly following general surgery or surgery on the bones (orthopaedic surgery), or in people bedridden due to illness. [(7)]

Allergies

The patient does not have any allergies.

Abuse

Non-Smoking patient, but drinks alcohol occasionally.

Psychosocial anamnesis

Patient lives with his wife in Prague, in a flat that is situated on the 3rd floor, and the building has an elevator. He has two daughters who both also live in Prague.
His occupation is teacher at a university.

Diet

The patients diet is specifically designed to balance out the diabetes

Sports

He has been quite active in terms of sport since his youth, and has been playing football and tennis during this time until he quit doing tennis 5 years ago, and football a few years prior to this. He used to practice tennis with his friends twice per week, and he quit because his friends started playing golf instead.

Previous rehabilitation

He has never had any previous rehabilitation or functional aids to help him in his everyday life.

6.2 Statement from the patient's medical documentation

Statement from the patient's medical documentation

The documentation from medical doctor dates to 19. January, 2009. Patient feel pain in both his hip joints, the left hip is noticeably worse than the right one. He carries findings that indicate arthritis of both hips. Previous conservative treatment has failed to improve his condition. The patient needs to replace his hip through surgery.

Post operative stage, documentation is dated to 29.January, 2009

The patient has no complaints regarding the operation. He is currently using ABT type Axetin. He uses Clexane against thromboembolic disorders but he should exchange this with Warfarin after a period of six days. The patient is able to walk same day as operation. Stitches should be extirpated 10 days after the operation. He does not have any fever or oedema.

Operation went without complications and the patient is satisfied with that. He is currently getting infusion and transfusion. And the Homans test is negative. His rehabilitation should involve walking with crutches. He has been instructed by physiotherapist. Medical doctor should perform a new examination withing the next 6 weeks.

6.3 Initial kinesiologic examination

Aspection

The color of the extremities were the were symmetrical

The patient's whole right leg is externally rotated.

He has good mobility in bed, and changes from supine to sitting position independently.

The skin around the patients plaster is red/orange.

Palpation

Symmetrical tonus on both lower extremities

Temperature of the patients extremities is symmetrical, as well as the skin around the bandage.

Rigid oedema around the scar.

Sensation is symmetrical for both lower extremities, but the sensation on the skin around the plaster is decreased in comparison with surrounding skin.

Neurologic examination

Graph astasia – Test is Negative

Movement sensation – Test is Negative

Pain sensation – Patient have symmetrical sensation.

Posture examination

(This posture examination in standing will not be valid, since the patient cant load the operated extremity, and is standing with crutches)

Anterior view

Patient is rotated to the left side

Elevation of shoulders

Thoracolumbar triangle cant be evaluated because of crutches

Right iliac crest is 1 cm higher than the left.

Right anterior superior iliac spine is higher than the left.

Both knees are externally rotated, the right leg is more rotated

The feet are in eversion

Claw toes

Longitudinal and transverse arch on both feet are decreased

Posterior view

Right iliac crest is 1 cm higher than the left.

Patients right leg is more externally rotated than the left one

The patients upper trunk is shifted to the left to compensate for the higher pelvis position on the right side.

Popliteal line is higher on the right leg.

He stands with his feet close together (narrow base)

Sub gluteal line is about 1 cm higher on the right side.

Lateral view

Forward head position

Anterior tilt of pelvis on both sides

Forward bending of upper trunk.

Both knees are in semiflexion

Increased lumbar lordosis

Walking examination

(The patient is prohibited to full weight on his left lower extremity, so this gait examination is done with crutches and without full weight on one lower extremity)

During walking with crutches patient

- Bends at the waist to put crutches in front of himself, while maintaining weight on non operated extremity.
- Patient is not able to fully extend knees, he walks with flexion of knee.
- He swings the leg in front of him and while keeping the weight on his axilla and non operated extremity.
- Right iliac crest elevated when he is shifting the operated leg forward.
- The rhythm of the walking is constant and steady
- He has constant ante flexion of pelvis during walking and turning.
- His tempo is steady, normal tempo.

Table 7. Anthropometric measurements[17]

Measurement type:	Position:	Left:	Right:
Anatomical length	From trochanter major to medial malleolus	91 Cm	89 Cm
Functional length	From spina illiaca anterior superior to medial malleolus of the ankle	95 Cm	94 Cm
Length of thigh	Trochanter major to the knee joint	47 Cm	45 Cm
Length of calf	Knee joint to the head of malleolus	44 Cm	44 Cm

Table 8. Circumference of lower extremities [17]

Measurement type:	Position:	Left:	Right:
Thigh	10 centimetres above patella.	46 Cm	45.5 Cm
	15 centimetres above patella.	48.5 Cm	46 Cm
Knee Joint	Around knee.	39 Cm	40 Cm
Calf	Around thickest part of calf	33.5 Cm	37.5 Cm
Ankle	Around the ankle	27.5 Cm	27.5 Cm

Table 9. Muscle strength testing [2]

Muscle	Left	Right
Quadriceps femoris	5	5
Hamstring group	4-	4
Abductor muscles	3-	3
Gluteus maximus	1	1

Table 10. Joint play [16]

	Right leg.		Left leg	
Joint	Dorsal	Plantar/ Ventral	Dorsal	Plantar/ Ventral
Metatarsal heads	Normal	Normal	Normal	Normal
Lisfranc joint	Normal	Normal	Normal	Normal
Cuboideum	Normal	Normal	Normal	Normal
Naviculare	Normal	Normal	Normal	Normal
Calcaneus	Normal	Normal	Normal	Normal
Talocrural joint	Normal	Normal	Normal	Normal
Tibiofibular joint	Normal	Normal	Normal	Normal
Head of fibula	Restricted	Restricted	Restricted	Restricted
Examination of	Cranial	Caudal	Cranial	Caudal
Patella	Normal	Normal	Normal	Normal

Table 11. Range of motion measurements [2]

	Left		Right	
Hip Joint	Passive	Active	Passive	Active
Flexion	70°		70°	70°
Extension	5°	0°	0°	0°
Abduction	30°	25°	45°	30°
Adduction	Contraindicated		10°	5°
External rot.			20°	20°
Internal rot.			5°	0°
Knee joint	Passive	Active	Passive	Active
Flexion	115°	80°	115°	90°
Extension	0°	-20°	0°	-10°
Ankle Joint	Passive	Active	Passive	Active
Dorsal fl.	10°	5°	10°	0°
Plantar fl.	30°	25°	45°	35°
Inversion	35°	30°	0°	-10°
Eversion	20°	20°	20°	20°

Result of initial kinesiologic examination

Rigid oedema is present around the operated area. No pathologic neurological signs were found.

The patients whole right leg is externally rotated without possibility to put in zero position. Range of motion of the right leg is the same during passive and active movement. The range of motion of both legs are decreased compared to normal, in the direction of flexion and extension. The knee extensors are strong, while the abductors and hip extensors are weak. He walks with a constant anterior tilt of pelvis, not extending the hip while walking. And he is not allowed to load the operated leg.

6.4 Short-term and long-term rehabilitation plan

Short term rehabilitation plan

In the short term rehabilitation plan I want to focus on decreasing pain and swelling in the area around of the operation. When the patient spends most of the day in bed, its important to prevent thromboembolic disorders, its important to teach the patient how to perform these, and explain why they are important. The patient should be taught how to do scar treatment by himself. This is important to prevent active scar.

During the rehabilitation process it is crucial to improve the range of motion in the operated joint, as well as improve strength of the lower extremity. The possibility to move while keeping a stable position is important in everyday life.

The patient should also within short time learn how to transfer from supine to sitting and standing position. Before the patient leaves the hospital he should receive education on how to perform exercises that will improve or maintain the patients current situation.

Long term rehabilitation plan

The long term rehabilitation plan will consist of exercises that help maintain the range of motion and strength of the patient. Some patients forget to maintain their progression after the operation, something that may lead to re-lapse. Educating the patient on how to perform certain activities of daily living after hip replacement is given, also education about prevention of falling, such as installing rails in the patients home and use of cane.

6.5 Day-to-Day Therapy

2nd February, 2009

Subjective feeling

The patient feels a strong sensation of fatigue and pain during our first session. Patient did not get much sleep during the night because of pain sensation in the operated area. When asked to use the pain scale from 1-10 the patient rates his pain to six

Goal of therapy unit

The goal of the initial day of therapy was to aquire information about the patiens current state. And further plan what future therapy should look like.

Procedure

The initial day of the practice period started with taking the anamnesis and doing the initial kinesiologic examinations which included observation, aspection, palpation, muscle testing, anthropometric measurements, neurological examination of feet, range of motion measurements of the lower extremities, joint play of lower extremties. Walking examination.

The following therapy consisted of exercises against thromboembolitic disorders, which means performing exercises that are preventing blood clot release and transport into the patients lungs. Pumping movements of the ankles and toes as well as circular movements are performed. Active abduction in supine position is performed, the only resistance applied is the friction of the bedsheets beneath the patient.

Result of therapy

The initial kinesiologic examination and anamnesis taking took most of the time that were intended for therapy. Patient has no complaints during the exercising. The patient should perform this exercise at least once every hour. Patient should also exercise abduction of the legs in supine position following the conditional exercise.

3rd February

Subjective feeling

On the 2nd day of therapy the patient feels less pain, and is more lucid. He has had significantly more sleep than the night prior to this one. And pain is decreased. On the pain scale the patient rates his pain to two.

Goal of therapy

To decrease the pain during movement of the hip, increase the patients arm strength and range of motion in hip joint to prepair him for walking. TEP

Procedure

The therapy starts with pumping movements of the ankles and toes. The patient then does active abduction of his legs to the sides of the bed without any resistance, friction from the bed provides small resistance for the patient. Active flexion of knee and hip with plantar contact to the mattress.

A soft half empty Overball is used under the heel of the patient so the patient can press his heel down to the ball to activate the quadriceps and relax the hamstrings.

The patients leg is brought into maximal available flexion of the hip joint below 90 degrees, this is combined with deep breathing, position is held in 10 seconds until pain relief in the given position, this procedure is repeated 3 times.

The half empty Overball is then introduced under the patients knee and he pushes it down to the bed, holding the pressure for 5 seconds followed by relaxation 5 seconds, this is repeated about 10 times. Post Isometric Relaxation (PIR) for the iliopsoas and quadriceps.

Result of therapy

The results of this therapy is positive. While laying in supine position his leg is more straight than before the therapy started. The range of motion in the hip joint is not yet increased, but during the therapy the pain in maximal ROM is decreased. The patients autotherapy is expanded to walking at least once every day, and deep breathing exercises combined with the previously explained autotherapy.

4th February

Subjective feeling

The patient has gotten an infection in the wound after the operation. He also received a fever. Patients mood is good and he has slept through most the night. Don't seem to be bothered by this. He receive ATB though IV application. Patient rates his daily pain to three.

Goal of therapy

Practice breathing wave. TEP. Increase range of motion in the hip joint through flexion of the hip. Stretching of the hip flexors and knee extensors, to improve position toward zero position. The intensity of the therapy was is decreased

Procedure

Intensity of therapy is decreased because of the infection. Practising the breathing wave together with the prevention against thromboembolitic disorders. Passive flexion of hip joint combined with breahting wave. Stretching iliopsoas and quadriceps. And patient is instructed to do self therapy once every two hours and walking atleast once during the day.

Result of therapy

Decreased intensity is required because of the fever/infection, therefore results were minimal. Because of the antibiotics we reach 80° of flexion without pain.

5th February

Subjective feeling

J.D still has fever and infection of the wound. He has slept throughout the night and he feels totally rested and his mood is good. When asked if he feels any pain in his body according to the scale, he says two.

Goal of therapy

TEP. Improve muscle strength of the abductors and increase range of motion in abduction. Improve strength of biceps and triceps in context of walking with crutches. Patient also needs practice in walking with crutches. Decubitus prevention and walking with emphasis on hip extension. PIR for hip flexors and knee extensors. The intensity of the therapy was is decreased

Procedure

Firstly we do circular motions of the ankles to improve circulation to the feet, toes and ankles. Then active flexion of the knee with the foot sliding on the bedsheets as resistance, followed up by active abduction in supine position sliding the legs laterally.

The ball is introduced under the patients triceps brachii so the patient will press the ball down in the bed,also the ball is put on his biceps brachii and he is told to flex his forearm towards the ball, the goal of this is to strengthen the upper extremities for the use of walking with crutches. After this the patient is put to vertical (standing) position on the floor and walk to the toilet.

Post Isometric Relaxation (PIR) for the iliopsoas and quadriceps.

Result of therapy

Since he got the infection he has been in supine position over longer periods of time. His upper limb strength is strong because of tennis background. Stretching of the flexors of the hip and extensors of the knee successful. Patients leg is more horizontal while lying in supine position than before therapy

6th February

Subjective feeling

On 6th of February the patient has no complaints, or any other kind of emotional expression. He slept through most of the night without waking up, he is rested and the mood is indifferent. He measures the pain to a zero. Which is the first time since the start of the therapy.

Goal of therapy

The main goal of today's therapy is firstly TEP, then strengthening of muscles, verticalisation, practice walking in stairs.

Procedure

Pumping movements of the ankles and toes. Followed by circular movements of ankle joints clockwise and counter clockwise.

Changing position of the patient into sitting position. The patient is leaning back with support to prevent over 90° of flexion in the hip joint. Leg is pushed below the bed and he is instructed to press against the pressure applied into extension of the knee through the whole range of motion, following this the resistance is put to the heel of patient, and the patient flexes toward the bed.

Then its time for walking with French crutches, emphasis on extension of the hip, and elevation of the knee during walking.

Walking downstairs and upstairs while being supervised by therapist. The patient is brought to a therapy bench for exercises in supine position.
Post isometric relaxation of hip flexors and knee extensors, with leg hanging out from the edge of the bench.
Patient then do strengthening exercises for the upper extremity. Patient then does assisted active flexion of hip and knee into maximum flexion below 90° in hip joint.

Following this, the patient gets a Overball placed between his knees to do adduction to the ball. Patient then lies on his right side with a thick pillow placed between his leg to prevent any adduction past the middle axis and do repeated contractions of the operated legs abductors to create a contraction into abduction, patient does not elevate the leg

Result of therapy

The therapy of the day was aimed toward strengthening of muscles and improvement of the patients range of motion in the hip joint. He can exercise longer without feeling fatigue. Improved conditioning. The pain during maximal flexion and stretching is decreased and the ROM (range of motion) is increasing.

9th February

Subjective feeling

Unmotivated to exercise, even though he had plenty of rest and sleep from the day before. He is pain free.

Goal of therapy

Strengthening the abductors and adductors of the hip. Strengthening gluteus. TEP. Increasing range of motion in flexion.

Procedure

The warm up exercises consists of active movements while in supine position on a bed. Active abduction of the hip joint without resistance, and then with resistance, this combined with deep breathing chain to the lower and upper trunk. Overball is placed under each of his knees, he presses his knees to the bed and while being instructed activating his gluteal muscles as well as his quadriceps.

A ball that is filled completely with air is placed between the patients knees, he presses the ball together. Exercising the adductors without crossing the central axis of the body.

Patient then does assisted active flexion of hip and knee into maximum flexion. patient then inspirates and presses toward the fixation, followed by expiration and relaxation, procedure repeated 3 times.
Two small exercise balls are placed under the patients heels, patient is instructed to contract his quadriceps muscles and straighten his legs, because the patient has extension deficit on both knees.

Result of therapy

Patient is able to reach eighty five degrees of flexion in hip joint without trace of pain. Any other progress in muscle strength needs to be examined in final kinesiological evaluation.

10th February

Subjective feeling

The patients mood for the tenth of February might be described as irritated, his fever has been increased. Regarding his daily form, he's rested, and he rates his present pain state to zero. He is not motivated to exercise.

Goal of therapy

Because of the patients increase in fever. The goal was set to strengthen gluteal and knee extensor muscles. Relaxation of muscles via PIR, TEP. Stretch flexors of the knee.

Procedure

Therapy for this session was shortened from the standard time of one hour, to thirty minutes. It started by dynamic work of lower limb by means of anti thromboembolic disorders exercise, abduction of lower limb without resistance.

PIR of the patients adductor muscles. And pressure of Overball placed under the patients heels down to the bed.

Result of therapy

Because of the drastically shortened therapy period, no improvement or declination of present state.

11th February

Subjective feeling

Patients mood is significantly better than previous day. He slept throughout the whole night, he is rested, positive and motivated for exercise. He no longer has a fever and the infection has subsided.

Goal of therapy

Since the infection has healed I focus the therapy on decreasing oedema in the region of operation, deep breathing exercises, TEP, decreasing pressure during movement. Improve conditioning and strength of the muscles of the hip and knee. Walking.

Procedure

Starting off the therapy with conditional exercises combined with deep breathing. Soft tissue techniques applied around the area of the scar where oedema is present. Abduction of the leg in during supine position. Thromboembolitic preventative exercising.

In prone position patient alternating flexing his knee against resistance applied to the heel of the patient through the whole possible range of motion, and resistance was put to calf when patient extended the knee.

With flexed knee the patient contracts the gluteus maximus as if he would extend his hip during walking.

Stretching of quadratus femoris with the leg partially outside of the bed side, the thigh is partially elevated above the table and kept there together with kept inspiration, during expiration the leg is being lowered. And his calf is being passively brought into flexion.

Overball is placed between the knees of the patient to exercise his adductors, then he do active abduction first without, then with the resistance to the knee cap. After this post isometric relaxation is performed to the patients adductor muscles.

Walking in stairs with French crutches.

Result of therapy

Abduction was improved by 10 degrees since the start of the therapy, this might not be permanent. J.D has increasingly improved condition since the first therapy units. The patient has good control while walking in stairs, he shows no sign of instability while keeping a steady and fluent tempo during the ascending and descending in the stairs.

12th February

Subjective feeling

His mood is good, he's rested and he has no pain.

Goal of therapy

TEP, deep breathing exercise, strengthening the abductors of the hip. Stretching muscles on the posterior side of the thigh. Soft tissue techniques on the patients oedema. Lastly walking

Procedure

The therapy starts with pumping movements of the ankles and toes. Circular movements of the ankle joints. Patient is asked to breathe under my hand, firstly placed on the patients abdomen, then with fingers in the intercostal spaces and lastly below the clavicle of the patient.

Abduction of both lower extremities toward the edge of bed is performed by patient, after ten repetitions, the patient lies on the his healthy side with a pillow between his legs to prevent adduction of the leg. Contraction of the abductors of the leg in a way that the leg of the patient slightly moves from the surface, then relaxation, ten repetitions.

Supine positioned patient does flexion of the knee joint, bilaterally.
Patient then relaxes and I stretch the front of the hip via taking the extremity with flexed knee and fixating the pelvis for tilting, and stretch the flexors of the hip.

Walking with the patient through the corridor, with emphasis on hip extension and elevation of knee when taking steps.

Result of therapy

Final kinesiologic examination

13th February

Subjective feeling

The patients mood is good. On the pain scale he says zero. Slept all night without troubles. So he is rested.

Goal of therapy

The goal for the last day of therapy is to instruct the patient how to continue autotherapy by himself in his home. The goal for today is to improve conditioning and strengthen the muscles of lower extremities.

Procedure

The last day of rehabilitation is primary used for final kinesiologic examinations and final testing of muscles and range of motion. Circumferential and anthropometry measurements followed by gait examination of the patient.

Patient is then put to the table and laid down supine on the bench, performing soft tissue techniques around the plaster to soften up the tissue before inducing higher range of motion.

Patient then does assisted active flexion of hip and knee into maximum flexion below ninety degrees.

Result of therapy

The result of therapy can be found in the final kinesiologic examination.

6.6 Final kinesiologic examination

Aspection

The colour of the extremities were the were symmetrical, the colour of the area around the scar is red/pink compared to other surrounding skin.

The patient's whole right leg is externally rotated, while he is able to keep the left one in neutral position.

Palpation

Symmetrical tonus on both lower extremities

Temperature of the patients extremities is symmetrical for both extremities.

The rigidity around the scar of the patient has been reduced in surface area and in resistance.

Sensation around the scar is increased.

Neurologic examination

Graph astasia – Test is Negative

- The patient got 9 out of 10 correct.

Movement sensation – Test is Negative

Pain sensation – Pain sensation is symmetrical on both extremities.

Posture examination

Posture examination is not valid because of the patients inability to load operated leg

Anterior view

Thoracolumbar triangle cant be evaluated because of crutches

Right iliac crest is 1 cm higher than the left.

Right anterior superior iliac spine is higher than the left.

Both knees are externally rotated

The feet are in eversion

Claw toes

Posterior view

Right iliac crest is higher than the left one

The patients upper trunk is shifted to the left to compensate for the higher pelvis position on the right side.

Popliteal line is higher on the right leg.

He stands with his feet close together (narrow base)

Sub gluteal line is about 1 cm higher on the right side.

Lateral view

Forward head position

Anterior tilt of pelvis is decreased.

Both knees are fully extended.

Increased lumbar lordosis

Walking examination[17]

(The patient is prohibited to full weight on his left lower extremity, so this gait examination is done with crutches and without full weight on one lower extremity)

During walking with crutches patient:

- Bends at the waist to put crutches in front of himself, while maintaining weight on non operated extremity.
- Patient is not able to fully extend knees, he walks with flexion of knee.
- He swings the leg in front of him and while keeping the weight on his axilla and non operated extremity.
- Right iliac crest elevated when he is shifting the operated leg forward.
- The rhythm of the walking is constant and steady
- The ante flexion of pelvis during walk is still present, but it has been decreased.
- His tempo is steady, normal tempo.
- Elevation of shoulders due to french crutches has been decreased

Table 12. Anthropometric measurements II[17]

Measurement type:	Position:	Left:	Right:
Anatomical length	From trochanter major to medial malleolus	91 Cm	89 Cm
Functional length	From spina illiaca anterior superior to medial malleolus of the ankle	95 Cm	94 Cm
Length of thigh	Trochanter major to the knee joint	47 Cm	45 Cm
Length of calf	Knee joint to the head of malleolus	44 Cm	44 Cm

Table 13. Circumference of lower extremities II[17]

Measurement type:	Position:	Left:	Right:
Thigh	10 centimetres above patella.	46 Cm	45.5 Cm
	15 centimetres above patella.	48.5 Cm	46 Cm
Knee Joint	Around knee.	39 Cm	40 Cm
Calf	Around thickest part of calf	33.5 Cm	37.5 Cm
Ankle	Around the ankle	27.5 Cm	27.5 Cm

Table 14. Muscle strength testing II [2]

Muscle	Left	Right
Quadriceps femoris	5	5
Hamstring group	4+	4+
Abductor muscles	3+	3
Gluteus maximus	2-	2-

Table 15. Joint play II [16]

	Right leg.		Left leg	
Joint	Dorsal	Plantar/ Ventral	Dorsal	Plantar/ Ventral
Metatarsal heads	Normal	Normal	Normal	Normal
Lisfranc joint	Normal	Normal	Normal	Normal
Cuboideum	Normal	Normal	Normal	Normal
Naviculare	Normal	Normal	Normal	Normal
Calcaneus	Normal	Normal	Normal	Normal
Talocrural joint	Normal	Normal	Normal	Normal
Tibiofibular joint	Normal	Normal	Normal	Normal
Head of fibula	Restricted	Restricted	Restricted	Restricted
Mobility of:	Cranial	Caudal	Cranial	Caudal
Patella	Normal	Normal	Normal	Normal

Table 16. Range of motion measurements II[2]

	Left		Right	
Hip Joint	Passive	Active	Passive	Active
Flexion	90°		70°	70°
Extension	10°	5°	0°	0°
Abduction	35°	35°	45°	45°
Adduction	Contraindicated		10°	5°
External rot.			20°	20°
Internal rot.			5°	0°
Knee joint	Passive	Active	Passive	Active
Flexion	115°	90°	115°	105°
Extension	0°	0°	0°	-5
Ankle Joint	Passive	Active	Passive	Active
Dorsal fl.	10°	5°	10°	0°
Plantar fl.	30°	25°	45°	35°
Inversion	35°	30°	0°	-10°
Eversion	20°	20°	20°	20°

Result of final kinesiologic examination

According to feedback from the patient, subjective feeling of pain was reduced. As you can see on the daily pain scale in the daily therapy.

Table 17. Comparison

	After	Before
Range of motion		
Flexion	90°	70°
Extension	10°	5°
Muscle strength		
Quadriceps femoris	5	5
Hamstring group	4	4-
Abductor muscles	3	3-
Gluteus maximus	2-	1

These numbers are corresponding to the main goals I had for the therapy. The patient has improved his walking pattern over the course of the rehabilitation period.

The surface areal and rigidity of the oedema is decreased.

6.7 Therapy effect evaluation

After having worked with the patient over a ten day period, during this period of time I must say that I reach my primary goal of increasing the patients range of motion in his hip joint and secondary in the knee. Exercising with the patient every day for one hour seemed to be good for his conditioning. Although I suspect that he did not do his self therapy after exercising with me in the morning.

In the tables displayed in the final kinesiologic examination you can observe a twenty degree increase in range of motion of the hip joint into flexion without the presents of pain. The patient gradually stopped feeling pain in the hip and started sleeping better at night. I think this improved the quality of therapy considerably. The infection the patient got during the therapy period was very unfortunate since these days became somewhat limited in intensity. The patients strength improved slightly, but I think he have sufficient muscle power to complete most activities independently.

6.8 Conclusion

After working with this patient over this ten day period, I have come to the conclusion that this patient has all the ability's that are needed for a full recovery. What I think is the biggest obstacle for the patient is lack of self discipline. If he focuses on making autotherapy a daily routine, and do his exercises correct, he will be able to reach full recovery. I wish him all the best in his future!

As for myself, I liked my practice period in Revmatologický ústav. I got to see a lot of different rheumatic diseases that I never have seen in past practices, it awoke my curiosity. I hope that I will have the chance to explore other fields of physiotherapy eventually, because this was a very nice experience for me. Having my own patient built my confidence in myself and I am looking forward to taking care of my own patients one day.

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Image2: The hip joint

Image 3. The femur

Image 4. A normal joint compared to arthritic joint

Image 5: Relaxed position of patients legs

Image 6: Anterior view of patient

ABBREVIATIONS

BMI - Body mass index

E.G - exempli gratia

ATB - Antibiotica

PIR - Post Isometric Relaxation

ROM - Range of Motion

IV - Intra venous

J.D - Initials of patient

Esp. - Especially

fl. - Flexion

Abd - Abduction

Add - Adduction

OA - Osteoarthritis

FTVS - Fakulta Telesne Vychovy a sportu

DM 2 - Diabetes mellitus type 2

A.M - ante meridiem

ADL - Activities of daily living

Pictures were taken on the 6th of february.

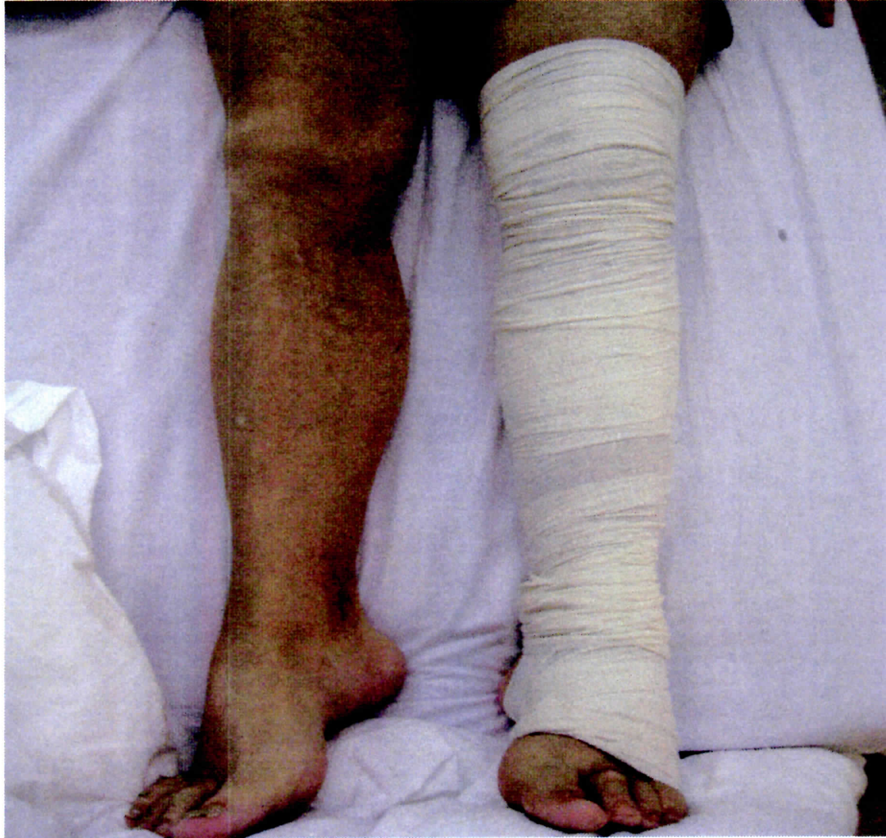

Image 5: Relaxed position of patients legs

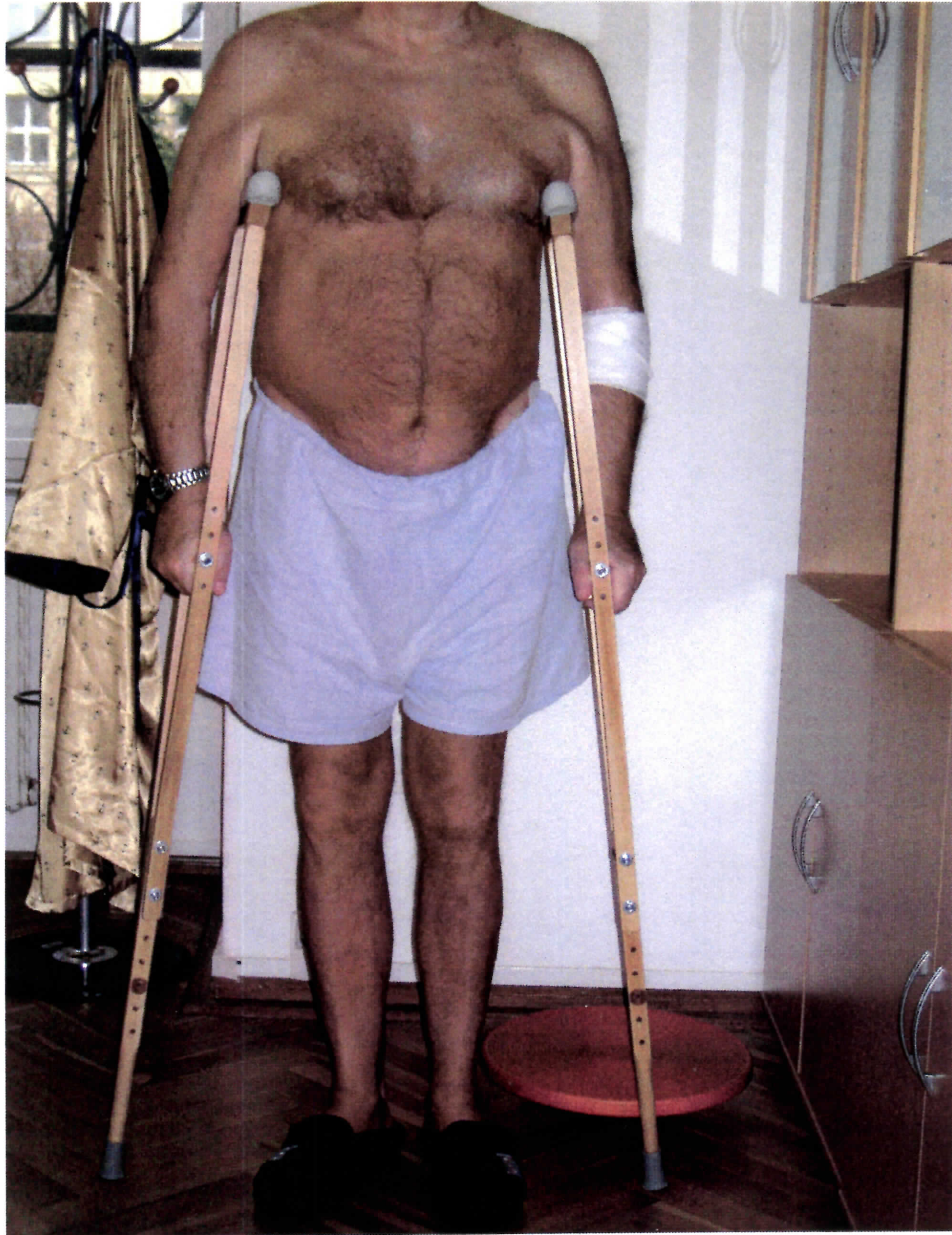

Image 6: Anterior view of patient