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Faculty of Physical Education and Sport

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FACULTY OF PHYSICAL EDUCATION AND SPORT  
Physiotherapy Department

**Case Study of Treatment of a Patient after Rheumatoid  
Arthritis**

Bachelor Thesis

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## **Abstracts**

**Title:** Case Study of Treatment of a Patient after Rheumatoid Arthritis.

**Goals:** The goal of this thesis is to discuss the clinical finding and rehabilitation of a patient with a Rheumatoid Arthritis and to take a glance on the overview classification of the disease, the physiological and pathological part, also to implant the theories of the treatment and care of such patients.

**Methods:** Methods used in this study are all based on the literature given by the Faculty of Physical Education and Sport.

**Results:** After a 10 sessions of therapy and rehabilitation, the patient was able to increase the ROM of the affected upper and lower extremities joints with decreasing the pain of them and correcting the gait while walking.

**Keywords:** Rheumatoid Arthritis, Upper extremities, Lower extremities, Range of movement, Physical therapy.

## **Declaration**

I would like to declare that this thesis work is all written by me, special thanks for Doc.PaedDr.Dagmar Pavlu.CSc for all the advices and the support she provides me to write this work, the patient was fully aware and informed about the examination and therapy and fully agreed to participate in these sessions thanks to her.

I also would like to declare that the method of examination and therapy and physical therapy were used according to the teaching of FTVS and under the supervision of the supervisors of Revmatologicky Ustav who helped and me and guided me when it is needed.

In Prague, 04.April.2019

Abdulelah Almuhsin

Signature: \_\_\_\_\_

## **Acknowledgment**

It's a pleasure for me to study at FTVS where I gain my knowledge and practical skills, special thanks for my teachers and supervisors for showing me respect, care and dedication to make a better self of me.

I also would love to thanks my senior loyal friends who stand beside me and provided me with all necessary information and materials that helped to achieve my goals.

## **Dedication**

I dedicate this work to my lovely family to show me love and support, I precisely thank my father for all the hard work and support he provided and keeps providing me from the very beginning of my study until the present time, the thanks again dedicated to my lovely mum for her wishes and support .

I also would love to thanks my lovely wife for all the support and love she provides in my entire journey, her existence is a gift that I will never forgot.

Special thanks for the 2 beautiful women : miss Daniela Volkova and miss Jitka Krebsova, whom they believed in me and showed me care, love and attention in my first days in Czech Republic and provided me with information I needed to have successful future and career without any hesitations, a lovely time was spent in Podebrady.

And for last but not for least I would love to specially thanks miss R.C. for her collaboration and kindness in participation to be model for writing this thesis and to be tolerant in all the task she asked to do and information to provide

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## **1 Introduction**

The goal of this thesis case study is to provide the examination and treatment of a patient after diagnosis of rheumatoid arthritis. This thesis divided into 2 parts, theoretical part in which includes: the etiology, the physiology, the pathology, the anatomy, and the therapy of the disease.

The practice was taking place in Revamotologicky Ustav for 10 working days, working for 8 hours a day in the in-patient department.

The second part includes: the examination and treatment of the patient according to the knowledge given and learned by the patient from FTVS and the practice in specialized hospitals.

## **2 General Part**

### **2.1 Rheumatoid arthritis definition**

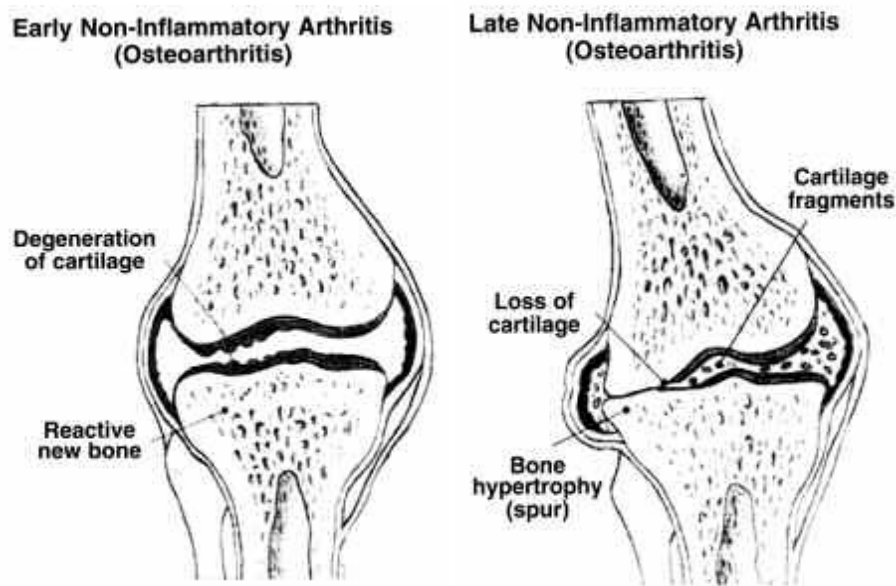
Rheumatoid arthritis (RA) is an inflammatory disease that affects the joint it happens genetically or by the cause of environment. The cause for RA (rheumatoid arthritis) is a chronic inflammatory disease in which its belong to autoimmune disease where the self defense system of the body attack its own healthy body parts , its characterized by inflammation of the synovial joint leading to further to the surrounding cartilage and bone , its accompanied with pain and stiffness of the joint following a rest , the disease is not curable yet its treatable , yet it's sometimes it's hard to diagnose the disease because of some patients doesn't show the exact symptoms we looking for , so a before starting the treatment we need to make sure about the right diagnosis.(1)(2)(7)

#### **2.1.1Types of Arthritis.**

Arthritis mostly divided into: inflammatory and non-inflammatory. The most common example of non-inflammatory arthritis is a type known to be Osteoarthritis (a degenerative disease of the joint), this happen when the cartilage of the joint is start to

damage leading to less shock absorbing and cause pain during movement , which also could lead to bone spurs to be appeared and fluid may accumulate in the affected joint . (8)(9)

The factor that triggers the OA here also is age, obesity and previous injuries, where OA main problem is the limitation and decrease of ROM due to pain. OA mostly happen in knees, hips, spine, and hands (8) (9)



**Figure 2.1.1: A, Early no inflammatory arthritis (osteoarthritis). B, Late no inflammatory arthritis (osteoarthritis) (16).**

### **2.1.2. Pre-Rheumatoid Arthritis and risk factors**

The earliest symptoms and changes in the body are known to be the pre-RA symptoms and factors ,these factors could vary form one patient to another , meaning one

patient could show only one factor , other could show more than one factor , therefore the symptoms as well , symptoms could vary from one patient to another one .these division includes : genetic risk factors, environmental risk factors, systemic autoimmunity.(3)(4)(7)(18)

### **2.1.3 Understanding of the underlying of the inflammation**

The inflammation of the body is very important for the body in order to protect its self by treating the injury, but if the inflammation is happening without an injury and it last for long time, this inflammation can destroy the site where it's happening. Some types of arthritis are caused by inflammation accompanied with typical symptoms of RA including redness, heat, swelling, pain, stiffness, and having difficulty to move the area where it's inflamed. (13) (19).

#### **2.1.3.1 Inflammation of rheumatoid arthritis**

RA is considered to be an inflammatory disease in which it's chronic disease which last for long time and it's treatable yet it's not curable , and usually pain is accompanied by the inflammation therefor it's important to control the inflammation in order to decrease the pain , along a specific diet and appropriate exercises.(9)(19)



**Figure 2.1.2 Mid-rheumatoid arthritis with dramatic synovitis. This patient is exhibiting a straightening of the ulnar border, marked thickening of the synovial tissues at the dorsum of the wrist, mild flexion deformities of the proximal interphalangeal joints and what is likely the beginning of subluxation of the metacarpophalangeal joints where the bases of proximal phalanges move palmar to the metacarpal heads.(4)**





**Figure 2.1.3 : Late rheumatoid arthritis with deformities. (4) These deformities truly represent significant functional disability especially regarding fine manipulation of the fingers so necessary for usual activities of daily living.**

### **2.1.4 Genetic Factors**

There are more than 100 genetic factors has been indicated , and the allele frequency is moderate minor , thus the genetic factor is quite common in population, there for carrying a minor and single risk factor like this allele factor doesn't increased the risk of RA.(4) (12)

### **2.1.5 Environmental risk factor**

This factor is very common, and the most common part of it is smoking since it is reported to increase the risk of the RA. Air pollution is as well considered to increase the risk factor of RA. Infections as well linked to RA indirectly since it shown for RA patient

to show more antibodies to infections. Coffee has positive and negative effect on a RA patient. Alcohol was reported to less taken by patient not really visible if Alcohol is protective for patient or not. (4)

### **2.1.6. Systemic autoimmunity associated with rheumatoid arthritis**

This phase is done by examining the blood serum taken from the patient, usually the rheumatoid factor (RF) is detectable in the early RA stages, indication an early and further symptoms of this disease, along with that patient with RA show degeneration of bone before RA occurs. (4) (5) (9)

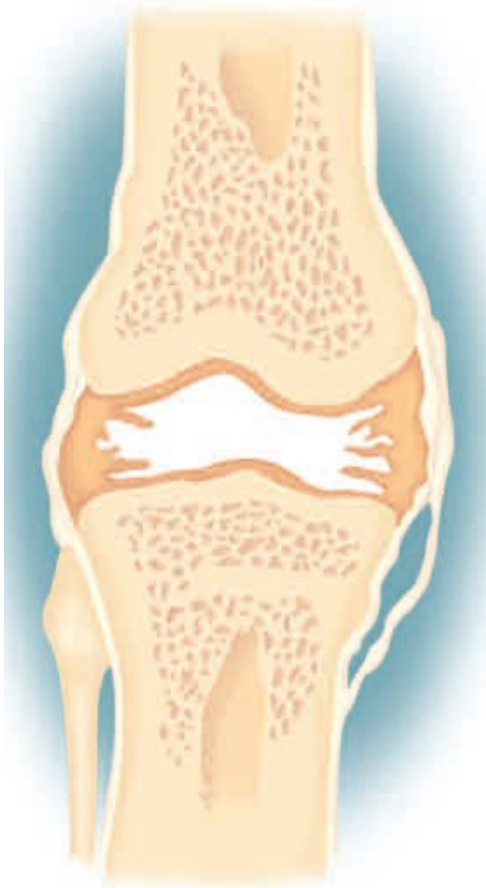
### **2.1.7 Etiology and pathogenesis**

Studies show that RA is caused by many factors in combinations of gene and environmental factors, where the genetic factor is strongly caused by the risk factor HLA-DRB1 molecule (where the problem is happening on sequence of 5 amino acids of this molecule). While in for the environmental factor is strongly caused by smoking cigarette. (1)(3)(17)

The cause of the disease or the trigger of it is not always to be smoking or genetics factors; yet, the cause can extend to be such: physical injury, psychological shock, trauma or a social event incident, studies shows that such event has the same frequencies such gene-smoking factors, and can lead to RA equally. (1)(4)(18)

### **2.1.8 Pathophysiology of joint inflammation in rheumatoid arthritis.**

For better understanding the RA disease , it's better to understand the underlying cause of the disease in the joint , the problem starts in the synovial membrane in which after its inflamed it release cytokines in which this cause harm and destruction and damage to the joints parts , including the cartilage and bone , leading to deformity to the joint. Being said that we need also to take a look on immunity system where the synovial membrane is packed and condensed with macrophages, T cells and B cells. T cells play an important role in sustaining the inflammation of RA, with a predominance of T-helper. The problem happens when the synovial membrane cell and articular chondrocytes release the tissue damaging enzymes metalloproteinases, which are responsible for the progressive destruction of cartilage and subchondral bone. (1)(3)(4)



A



B

**Figure 2.1.4 Inflammation of RA.**

**A- Early inflammatory arthritis.**

**B-Late inflammatory arthritis. (4).**

## 2.1.9 Diagnosis and classification

It's possible to diagnose the RA disease if the symptoms show an inflammation in one joint which is not connected to another disease. Another possibility is when the radiography show finding of the disease. Also it's possible to diagnose this disease if the patient scores 6 points according this option in the chart below (1) (5) (9)

One swollen joint not it's not explained by another disease	
Radiology examination to confirm the disease in the joint	
involvement of 2–10 large joints (and no small joints)	1 point
involvement of 1–3 small joints	2 points
involvement of 4–10 small joints	3 points
involvement of >10 joints (including at least one small joint)	5 points
low positive rheumatoid factor and/or anti-citrullinated peptide antibodies	2 points
high positive rheumatoid factor and/or anti-citrullinated peptide antibodies	3 points
elevated C-reactive protein (CRP) or erythrocyte sedimentation rate (ESR)	1 point
duration >6 weeks	1 point

Diagnosis of RA, patient need to get at least 6 points from any criteria in order to be diagnose with a positive RA (1) (5) (9)



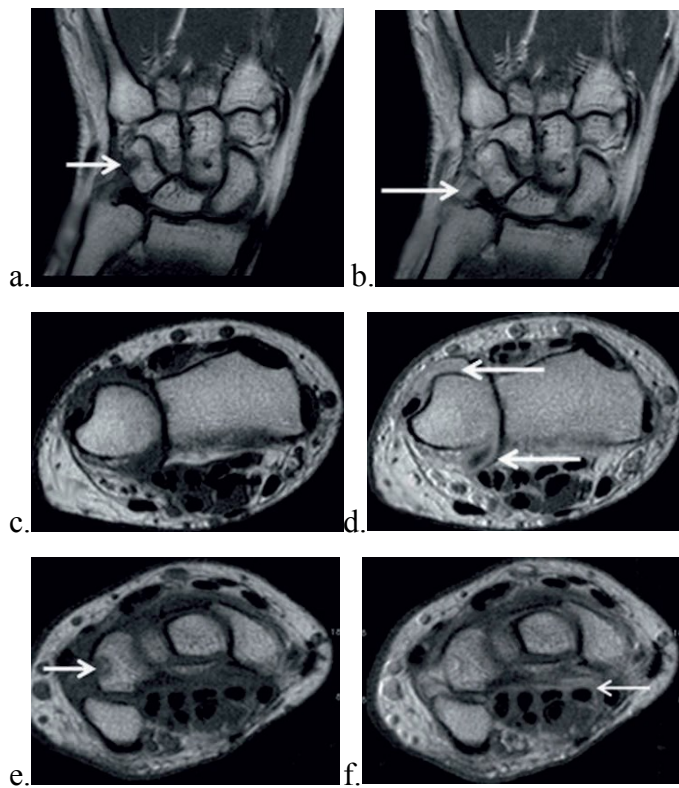
**Figure 2.1.5 : Patient with early RA symptoms (4)**

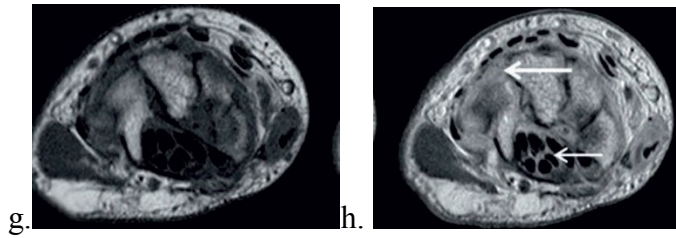
### **2.1.9.1 Ultrasound Imaging of RA (prognosis of disease)**

Many studies show that the important for the MRI images of RA to study and analyze the progression of the disease in the joint, here by we must focus on the fact that synovial inflammation starts in the wrist of the patient and small joint of the hand. (4)(7)

At this stage it's important to follow up with the patient and provide the adequate treatment and care accompanied with appropriate therapy exercise and drug therapy to prevent further destruction or deformity to joint .(4)(6)(19)

Methotrexate shows a very positive and good result with patient of RA since it's working as an immunity suppressant to help reduce inflammation and decrease the symptoms of the disease. This chemotherapy agent is not only limited to treat the RA patient, but it can be used to treat another autoimmune disease, ectopic pregnancy, cancer and another diseases. (4)(20).





**Figure 2.1.6 : Magnetic resonance imaging (MRI) of the wrist of a patient with clinically active early rheumatoid arthritis (<6 months' duration). T1-weighted MRI in the coronal (a, b) and axial planes (c–h), before (left column) and after (right column) intravenous contrast injection. (c, d): Axial section through the distal radius and ulna. (e, f): Section through the proximal row of carpal bones. (g, h): An even more distal section through the hook of the hamate. Erosion is seen in the triquetrum (short thick arrows) in two planes. Marked synovitis is seen both in proximal and distal parts of the wrist joint (long arrows). Furthermore, flexor tenosynovitis is seen (thin short arrows). (4)(6)**



**Figure 2.1.7 : A progressive variations in rheumatoid arthritis (RA) from radiologic findings to Terminal (RA) radiologic findings. (5)**



### **2.1.10 Therapy and treatment for rheumatoid arthritis**

Therapy and treatment for RA could be vary from different choices starting from joint play methods , physical therapy exercises, diet, psychological and mind control and coping with the disease, modern science has advances the ability to care about patient of RA to have less stiffness and pain and more relieve, energy and better all over body status.(12)(17)

- I have choose to discuss Joint play, stretching and physical exercises, that doesn't mean that the therapy should be limited to only these field , RA patient can benefit from ergotherapy, hydrotherapy, mechanotherapy, DNS, sensomotoric exercises and more .

#### **2.1.10.1 Joint play**

Joint play is a branch of physical therapy that works with examination and treatment of the painful and restricted joint, the technique described according to professor Lewit where the joint is subjected to examination to determine if it is blocked or restricted, and to perform the mobilization for these joints. Mostly all the joint of the body can be treated by these methods, including the upper and lower extremities, pelvis joint and whole spine segment and more , the point of these methods is to mobilize the joint in order to return it the physiological state and to reduce the pain accompanied by this blockage. These methods are used in chapter 3 for treating the patient. (2)(10)(15)

### **2.1.10.2 Physical therapy exercises**

Exercising the muscles help to maintain the fitness of the for body and help the joint to be mobilized and function in order to reduce the stiffness, RA patients should on a regular basis, though it is very important to know how to do them specially when we put in consideration that stiffness and pain in the joint can affect the quality of the exercises, but motivations to achieve this exercises is very essential and need to be knowledge by the patient. (21)

#### **Benefit of the exercises**

- Increase your strength and flexibility
- Decrease stiffness
- Have less pain
- Become more active and less tired
- Strengthen your heart and increase circulation
- Find it easier to control your weight
- Increase nutrition to all parts of your body
- Feel good.

#### **Warm up**

It's very important to warm up before doing any exercise in order to reduce stiffness, increase circulation and relax the muscle, and in order to do this we can use shower, hot pack or warm up exercises. For extremely swollen and or swollen joint, we can use ice pack. Some patient could use ice back then heat up the swollen joint before the exercise session. (12) (19)

## **Stretching**

Or so called ROM exercises, the point of these exercises is to increase the range of movement, the stretching should include all the part of the body include upper and lower extremities also trunk and head could be included. The pattern of stretching should be slow, rhythmic, and gentle. Any of jerky movement must be avoided since it could hurt the joint and the patient; the stretching could be done manually or by help of physiotherapist. During the stretching exercises if pain is happening, patient should change the exercise or limit the length of time they use to perform such exercise.(2)(12)

## **Upper extremities exercises**

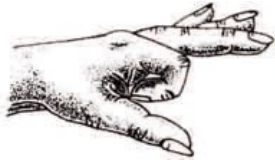
The following figures and informations are taken from Newman, E., & Matzko, C. (2007). Rheumatoid Arthritis FAQs book (12)

### **1) Hand**

For treatment of hand, use the thenar of hand to get of the chair or the treatment table, avoid putting pressure of the swollen or affected joint of fingers. (12)



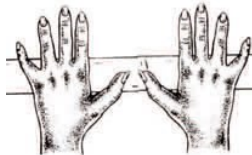
**Figure 2.1.8 Finger exercise 1**



**Figure 2.1.9 Finger exercise 2**



**Figure 2.1.10 Finger exercise 3**



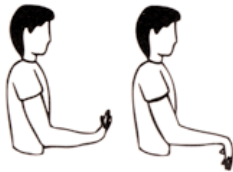
**Figure 2.1.11 Finger exercise 4**

- Gently touch the tip of the thumb to the tip of each finger forming an “O” with your fingers.
- Bring two fingers together. Repeat with each of the other fingers of both hands.

- With both palms facing each other, shape exercise putty into a log. Roll back and forth from the thumb to palm to tips of fingers. Fold log and repeat.
- Lightly touch each fingertip to the palm of hand then release.

## 2) Wrist

After exercising the fingers it's very important to move one and exercise the wrist joint and surrounding muscles.



**Figure 2.1.12 Wrist exercise**

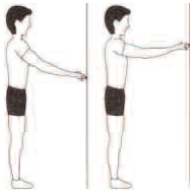
- With palm facing down, bend your wrist up as far as possible. Then slowly bend wrist down. Work both sides equally.

### 3) Elbow



**Figure 2.1.13 Elbow exercise 1**

- With your arm straight at your side, bend elbow and touch your shoulder. Return to starting position. Work both sides equally



**Figure 2.1.14 Elbow exercise 2**



**Figure 2.1.15 Elbow exercise 3**

- Stand facing wall. Walk fingers up wall keeping elbows as straight as possible. Reach as far as possible. Return to starting position. Work both sides equally.

- Hold towel behind you with one hand up over shoulder and other hand at hip,
- Pull towel back and forth slowly as if drying your back.

#### **4) Shoulder**



**Figure 2.1.16 shoulder exercise 1**

- While sitting or standing, shrug shoulders, hold for a count of five, and then relax. Do both shoulders at the same time. Keep arms relaxed at sides

- While sitting or standing and with arms relaxed at your sides, make circular motions with the tips of your shoulders—first in one direction and then in the other.



**Figure 2.1.17 shoulder exercise 2**

### **2.10.2.3. Trunk and neck exercises**

The following figures and informations are taken from Newman, E., & Matzko, C. (2007). Rheumatoid Arthritis FAQs book (12)

The following exercises should be done with care especially for the neck area since it's a very sensitive area.

#### **1) Neck**





### **Figure 2.1.18 Neck exercise 1**

- Rotation. Turn your head to the right as if you are looking over your shoulder. Keep chin level. Do not tilt your head. Repeat to opposite side. Hold 5 to 10 seconds.

### **2) Trunk**



**Figure 2.1.19 Trunk exercise 1**

- While seated, gently bend forward at the waist reaching toward the floor. Return to upright position and then pull shoulders back.



**Figure 2.1.20 trunk Exercise 2**

- While seated, gently lean to one side bending at the waist. Return to starting position and then lean to opposite side.



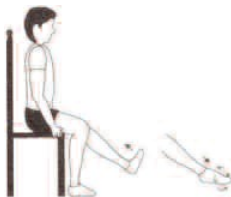
**Figure 2.1.21 Trunk Exercise 3**

- While seated, gently rotate your trunk to the right. Return to starting position and then rotate slowly toward the left.

## Lower extremities exercises

The following figures and informations are taken from Newman, E., & Matzko, C. (2007). Rheumatoid Arthritis FAQs book (12)

### 1) Ankle



**Figure 2.1 22 Ankle exercise**

- Slowly pull foot up at ankle and then push down at ankle. Make large, slow circles with feet in each direction. Make sure movement is at ankle. Use big toe as pointer. Repeat with each foot.

## 2) Knee



**Figure 2.1.23 Knee exercise**

- Sitting on a chair with foot flat on floor, slowly raise foot off floor and straighten knee. Hold for 2 seconds and return to starting position. Repeat both sides.

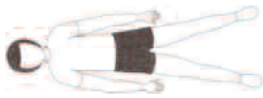
## 3) Hip



**Figure 2.1.24 Hip exercise 1**

- Lying on the floor, keep right leg flat and pull left leg up, bending at the knee and hip. Return to the starting position. Repeat with right leg keeping left leg flat.

- Lying on the floor, pull legs apart keeping knees straight. Return to starting position.



**Figure 2.1.25 Hip exercise 2**

### **3 Special part.**

#### **3.1 Methodology**

My bachelor thesis took place in RU – Revamotolgicky Ustav in Prague in the period from Monday the 4<sup>th</sup> of February 2019 until Friday the 15<sup>th</sup> of February 2019.

My work in RA was supervised by Marketa Mikulasova. The number of sessions with the patients was 10sessions.

Therapy sessions were applied in three different rooms. The individual therapy room, the RA gym room and the laser therapy room. For examinations we used goniometer, measurements tape, neurological hammers and plum line. For therapies, we used soft tissue techniques, joint play mobilization, stretching technique, strengthening technique, relaxation technique, sensomotoric exercises and general exercises.

The work has been approved by the Ethics Committee of the Faculty of Physical Education and Sport of Charles University.

#### **3.2 Anamnesis.**

Name	R.C
Gender	F
Year of birth	1975
Height	154 cm
Weight	54 kg

### **Table 3.2.1 Anamnesis**

- **Chief complaint**

Rheumatoid Arthritis since 10 years old.

- **Medical history**

43 years old patient with rheumatoid arthritis was accepted to the revmatologicky ustav on 04/02/2019 for therapeutic follow up, the patient was diagnosed with rheumatoid arthritis in 1985 when the patient was 10 years old. The patient had total hip replacement to the right side in 1994 and was re-operated in 2005 in the same side; also the patient had total hip replacement to the left side of hip in 1997 and re-operated in 2016.

Patient also has history to visit psychiatry for depression. And due to her big size of breast she went for surgery to reduce the size of the breast in 2012 because it was hurting her back, in the same time patient had cesarean birth for her only child in 1999 and after that she had a removal of the womb in 2009 and she has only one ovary so she is not able to have children anymore.

The patient went for colonoscopy and gastroscopy in 2017 without clinical findings, the small joint of extremities are getting worsen with time also the patient complained about the pain in the left side of knee 2 years ago and last until the present time, the patient also complains of low back pain and dizziness since last 2 weeks, also pain in left ankle is chronic during walking. In charismas time 2018 she had shooting pain in the both shoulder and her arms stabilities were affected.

The patient lives in flat in the first floor of the building with her family.

- **Medications:**

Methotrexate - Vignatol – Acidum Folicum.

- **Allergies:**

Allergy for dust

- **Abuses:**

Drinks alcohol occasionally, smokes 20 cigarettes a day

- **Occupation anamnesis**

House wife

- **Operative anamnesis**

The patient had total hip replacement to the right side in 1994 and was re-operated in 2005 in the same side; also the patient had total hip replacement to the left side of hip in 1997 and re-operated in 2016, surgery for the breast size-reducing in 2012, cesarean birth in 1999, and removal on womb in .

- **Family Anamnesis**

The mother is healthy. And the sister of the patient is healthy too. The father had three heart attacks, then he had heart surgery, he also had a tumor in his leg in 2017 and operated in 2018 and the surgery went well

- **Hobbies**

Patient loves to swim in free time 2-3 times a week; also she loves to do yoga in her free time

- **Accommodation anamnesis:**

Patient lives in flat in the first floor with her family.

- **Social anamnesis**

Patient is married for 20 years and has one son, she is outgoing and loves to go out and meet new people and, she loves to walk 30 minutes in the morning 4 times a week, she meets her family once per week.

- **Status praesens**

Age	43 old
Weight	53 kg
Height	154 cm
BMI	22.3
Blood pressure	124/85 mmHg



Temperature	37° C
Respiratory rate	15 breaths/min
Cardiac rate	58 beat/min
Crutches	None

**Table 3.2.2 status prasens**

**A) objective**

Patient came to the revmatologicky ustav with her diagnosis of rheumatoid arthritis, she felt pain her distal extremities joint of hand and feet, along pain in the shoulder joint in both side, patient also complained about a pain in and stiffness in the left knee, also she feels pain in the low back sometimes, and pain in the left foot when she walks.

**B) Subjective**

Patient gait is quite narrow, she has analgesic gait due to pain in left foot, she has limited abduction in the both side of shoulder and more sever in the left side, her elbow extension is limited and remain in slight flexion position , there is limited abduction and flexion of both hips due to total hip replacement in both side , her left knee is stiff and its paining her , the joint of the fingers are affected and remains in flexion in the MCP joint

and extension in the proximal phalangeal joint and for the toes joint are in pronation position and pressed toes like phenomena .

### **Excerpt from patient's health care file**

X-ray for chest, hips, left knee and distal joint for upper and lower extremities, endoscopy and colonoscopy images.

### **Prior rehabilitation**

Patient for rehabilitations after total hip replacement for both hips and theirs reoperations including physical therapy, stress management, psychiatry consultations, massage therapy and spa therapy. The therapy was very helpful for the patient in order to control the pain and have over all better body status.

### **RHB indications**

Pain and restriction in shoulder joint , shoulder muscles pain , restrictions in left elbow joint, pain and restriction in the distal joint of upper and lower extremities , low back pain.

### **Differential balance**

Tightness or shortness in the neck or shoulder or trigger point muscles could include upper trapezius , levator scapulae , sternocleidomastoid , scalene , weakness of fixator of scapulae , pathology in the shoulder joint , tightness in the low back muscles , blockage in

the spine segments , blockage in the sacroiliac joint , weakness of the upper extremities muscles , pathology of the elbow joint , pathology on the distal joints in the upper extremities including wrist and hands joints , weakness or tightness in the lower extremities muscles, pathology in the knees joint and the distal joints of the lower extremities including the ankles and the feet joints .

### 3.3 Initial kinesiological examination.

#### 3.3.1 Postural examination

**Table 3.3.1 Posterior postural examination**

Posterior view:	
Ideal line goes in the middle of knees, pelvis, spine and skull.	
Base of support	No flat foot in both sides.
Shape and contour of heels and Achilles tendon	Inward insertion of Achilles tendon of the right foot and outward insertion of the Achilles tendon of the left foot.
Contour of calf muscles	Right calf positioned outward with bigger mas volume than the left calf.
Popliteal line	Right popliteal line is lower
Contour of thigh muscles	symmetrical size of muscles
Sub-gluteal line	Right gluteal line is higher
Gluteal muscles	Symmetrical in both sides
Symmetry of thoracobrachial	Right side is bigger

triangles	
Position of pelvis	Left side lateral tilt.
Paravertebral muscles	Left side is prominence
Curvature of spine	C-shaped scoliosis in the thoracolumbar part of spine at level Th <sub>12</sub> -L <sub>2</sub> part.
Position of scapula	Right side is higher and more prominence
Position of shoulder girdle	Symmetrical height for both sides.
Position of upper limb	Symmetrical height for both sides.

Lateral view (Right + Left)	
Plump line test is slightly anterior to lateral malleolus and knee joint, posterior to hip joint, body of the lumbar vertebrae , in the middle for shoulder Body of the most cervical vertebrae external auditory meatus, and slightly posterior of the coronal suture .	
Shape and position of ankle joint	R: natural position
	L: natural position
shape and contour of shin	:posterior to the plump line
	L:natural position
Position of knee joint	R:posterior to the knee joint
	L:natural position
Contour of thigh muscles	Both Symmetrical from lateral side.
Position of pelvis	Lateral tilt left side
Position and curvature of Spine	Less kyphosis in sacral spine Hyper-lordosis in lumbar spin Ideal kyphosis in thoracic spine Ideal lordosis in cervical spine
Shape of the abdominal muscles	Upper abdominal muscles are more prominent.

Position of shoulder griddle	Ideal position in both sides.
Position of head	Ideal position.

**Table 3.3.2 Lateral postural examination**

Anterior view	
Base of support	Eversion of the left foot and inversion of the right foot.
Position of feet, arches	R : inversion of the right foot L :slight eversion of foot
Position and shape of toes	Hallux valgus of both big toes, and grade 3 -moderately impaired stability -claw toes with pronation according to Vele's test.
Weight distribution on feet	Weight distribution to lateral arch.
Shape and position of knee joint (patella)	Right knee is higher.
Configuration of m. tibialis anterior	Identical in both sides.
shape of thigh muscles	symmetrical size of muscles
Position of pelvis	Lateral tilt in left side.
Symmetry of muscle tone abdominal muscles	Upper abdominal muscles are more prominent
Symmetry of thoracobrachial triangles	Right side is bigger.
Position and symmetry of chest	Symmetrical shape and height.

Position of sternum	Ideal position.
Position of collarbones and supraclavicular holes	Symmetrical shape and height for both sides.
Position of shoulder girdle	Same Position for both sides.
Position of upper limbs	Upper limbs are symmetrical in shape and position.
Position of head	Ideal position in the midline.

**Table 3.3.3 Anterior postural examination**

### 3.3.2 Palpation of pelvis

- Pelvis is laterally tilted and anteriorly
- ASIS: right side is higher
- PSIS: right side is higher
- Iliac crest: right side is higher

### 3.3.3 Gait Examination

Gait Examination	
Width of the base of support	20 cm
Position of the feet (angle)	10 degree outward position for both sides
Walking rhythm (periodic, non-Periodic)	Periodic type of walking
Walking speed	Ideal – symmetrical

Stride length (short steps/long steps)	Long steps
Movement of the foot (heel strike, flat foot, loading response, heel-off, toe-off)	Heel strike , lateral margin , toes load , pronation of toes , heel off , toes off for both side , ideal – symmetrical
Axial position of the lower limb (flatfoot, knock knee, coxa valga/vara...)	Ideal with no pathology
Movement and position of the knee and hip (extension)	Ideal-symmetrical
Position and movements of the pelvis (compensatory anteversion, rotation, lateral tilt max. 4 cm)	Slight anterior tilt of pelvis during walking
Movement of center of gravity (COG – max. 4,5 cm))	Stable
Position and movements of the trunk (latero-flexion, rotation, max. Th7)	Rotation of the trunk to the level of Th7 , Ideal symmetrical
Activity of abdomen muscles	Upper abdominals are active
Position of spine (positon of Th/L and L/S, lateroflexion,	Lumbar hyperlordosis of spine



lordotization)	
Activity of back muscles	Active –symmetrical
Position of shoulders (upper part of the trunk)	Right shoulder is higher
position and movements of the head	Ideal
Movements of the upper extremity (synchronicity, synkinesia, max 45°)	Visible – symmetrical
Stability of walking	Stable – symmetrical

**Table 3.3.4 Gait examination**

### 3.3.4 Dynamic spine examination

- **Backward:** fluent movement, no pain, no restriction.
- **Sideway:** 23cm lateroflexion in right side, 23 cm lateroflexion in left side without pain in both sides.
- **Forward:** patient is able to touch the floor, no pain and fluent movement.

### 3.3.5 Assessment of stereotype of breathing

- **Standing:** able to breathe from upper and lower thoracic and abdominal parts (normal).
- **Sitting:** able to breathe from upper and lower thoracic and abdominal parts (normal).
- **Lying position:** able to breathe from upper and lower thoracic and abdominal parts (normal).

### **3.3.6 Chest expansion**

- 4 cm during inhalation.

### **3.3.7 Two-scales standing**

- 28 KG to the left side. 25 KG to the right side

### **3.3.8 Specific testing**

- Romberg Test (I-III): Negative for both sides.
- Single-leg stance test: Patient was able to do it for both sides.
- Trendelenburg sign: negative for both sides.
- Vele test: positive, grade 3 (claw toes) with pronation of the toes hallux valgus of both big toes for both sides.

### 3.3.9 Anthropometric measurement

Height	154 cm
--------	--------

UPPER EXTREMITIES	Right (cm)	Left (cm)
Length of upper limbs	65 cm	65 cm
Length of homers	30 cm	30 cm
Length of forearm	20 cm	20 cm
Length of hands	15 cm	15 cm
Circumference of upper limb	26 cm	24 cm
Circumference of forearm	20 cm	22 cm
Circumference of head	50 cm	
Circumference of thorax	80 cm	
Circumference of waist	68 cm	

**Table 3.3.5 Anthropometric measurement upper extremities**

LOWER EXTREMITIES	Right (cm)	Left (cm)
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Anatomical length	77 cm	75 cm
Functional length	80 cm	80 cm
Length of thigh	41 cm	40 cm
Length of middle leg	36 cm	35 cm
Length of foot	23 cm	23 cm
Circumference of thigh	46 cm	45 cm
Circumference of knee	33 cm	33 cm
Circumference of calf	31 cm	31 cm
Circumference of ankle	25 cm	25 cm
Circumference of foot	22 cm	22 cm

**Table 3.3.6 Anthropometric measurement for lower extremities**

Biacromal	50 cm
Bicristal	34 cm
Bispinal	31 cm
Bitrochanterical	33 cm

**Table 3.3.7 Anthropometric measurement form side to side**

### 3.3.10 Spinal distances

Shober's distance	5 cm normal
Stibor's distance	9 cm normal
Čepojev's distance	3 cm normal
Otta's distance	Inclination 2.5 cm, reclinacion 2 cm sum is 4.5 normal
Thomayer 's distance	Patient fingers touches the floor (0 cm ) normal
Flesch de Forestier	3 cm normal
Latero-flexion	23 cm for both sides normal result

**Table 3.3.8 Spinal distances**

### 3.3.11 Muscle length test (according to Janda or Kendal).

Test of the muscles	According to Janda	According to Kendal
Test for length of ankle plantar flexors m. gastrocnemius and m. plantaris:		R: 90° dorsiflexion (normal) L90° dorsiflexion (normal)
Test for length of ankle plantar flexors		R: 90° dorsiflexion (normal) L90° dorsiflexion

m. soleus, m. popliteus:		(normal)
Test for length of hip flexor muscles		R: posterior thigh touches the table, knee flexes 80°, L: : posterior thigh touches the table, knee flexes 80° fascia latae
Test for length of hip adductor muscles	R: Grade 0 - ABD 40° L: Grade 0 - ABD 40°	
Test for length of hamstring muscles		90° both sides (no shortens)
Test for length of paravertebral muscles	Grade 0 - distance head-knee 10 cm normal	
Forward-bending test for length of posterior muscles		Patient is able to touch the floor with his fingers (normal)
Test for length of m. quadratus lumborum	R: Grade 0 - more than 5 cm. L: Grade 0 - more than 5 cm.	
Test for length of m. piriformis	R: IR and ADD are limited (grade 1) L: Grade 0 - soft barrier	
Test for length of m. pectoralis major		R: arm drops to table level L: arm drops to

Lower (sternal) part		table level
Test for length of m. pectoralis major The upper (clavicular) part		R: arm drops to table level L: arm drops to table level
Test for length of m. pectoralis minor		R: shoulder lie on table L: shoulder lie on table
Test for length of m. teres major, m. latissimus dorsi, mm. rhomboid major and minor		R: arm drops to table level L: arm drops to table level
Test for length of medial shoulder rotators		R: arm drops to table level L: arm drops to table level
Test for length of lateral shoulder rotators		R: forearm within 20°angle with table L: forearm within 20°angle with table
Test for length of cranial part of m. trapezius	R: Grade 1 – slight resistance in case of depression of the shoulder L: Grade 1 – slight resistance in case of depression of the shoulder	
Test for length of m.	R: Grade 1 –	

levator scapulae	slight resistance in case of depression of the shoulder L: Grade 1 – slight resistance in case of depression of the shoulder	
Test for length of m. SCM	R: Norm – soft barrier L: Norm – soft barrier	
Test for length of mm. scalene	R: Norm – soft barrier L: Norm – soft barrier	

**Table 3.3.9 Muscles length test**

### 3.3.12 Muscles strength test

Add pollicis	R: grade 4 L: grade 4
Abd pollicis brevis	R: grade 5 L: grade 5
Opponens pollicis	R: grade 5 L: grade 5
Flexor pollicis longus	R: grade 5 L: grade 5



Flexor pollicis brevis	R: grade 4 L: grade 4
Extensor pollicis longus	R: grade 5 L: grade 5
Extensor pollicis brevis	R: grade 5 L: grade 5
Abductor polucis longus	R: grade 4 L: grade 4
Abductor digiti minimi	R: grade 5 L: grade 5
Opponens digiti minimi	R: grade 5 L: grade 5
Flexor digiti minimi	R: grade 5 L: grade 5
Dorsal interossei	R: grade 5 L: grade 5
Palmar interossei	R: grade 5 L: grade 5
Lumbricales	R: grade 5 L: grade 5
Palmaris longus	R: grade 4 L: grade 4
Extensor indicis Extensor digiti minimi Extensor digitorum	R: grade 5 L: grade 5
Flexor digitorum superficialis	R: grade 5 L: grade 5
Flexor digitorum profundus	R: grade 5 L: grade 5
Flexor carpi radialis	R: grade 5

	L: grade 5
Flexor carpi ulnaris	R: grade 5 L: grade 5
Extensor carpi radialis longus	R: grade 5 L: grade 5
Extensor carpi radialis brevis	R: grade 5 L: grade 5
Extensor carpi ulnaris	R: grade 5 L: grade 5
Pronators teres and quadratus	R: grade 5 L: grade 5
Pronator quadratus	R: grade 5 L: grade 5
Supinator and biceps	R: grade 5 L: grade 5
Brachioradialis	R: grade 5 L: grade 5
Coracobrachialis	R: grade 5 L: grade 5
Biceps brachii and brachialis	R: grade 5 L: grade 5
Triceps brachii and anconeus	R: grade 5 L: grade 5
Supraspinatus	R: grade 5 L: grade 5
Deltoid	R: grade 5 L: grade 5
Anterior deltoid	R: grade 5 L: grade 5
Posterior deltoid	R: grade 5 L: grade 5

Teres major	R: grade 5 L: grade 5
Pectoralis major upper	R: grade 5 L: grade 5
Pectoralis major lower	R: grade 5 L: grade 5
Pectoralis minor	R: grade 5 L: grade 5
Latissimus dorsi	R: grade 4 L: grade 4
Shoulder medial rotator	R: grade 5 L: grade 5
Infraspinatus	R: grade 5 L: grade 5
Teres minor	R: grade 5 L: grade 5
Rhomboidei Levator scapulae	R: grade 5 L: grade 5
Trapezius	R: grade 5 L: grade 5
Lower trapezius	R: grade 5 L: grade 5
Upper trapezius	R: grade 5 L: grade 5
Serratus anterior	R: grade 5 L: grade 5
Abductor hallucis	R: grade 5 L: grade 5
Adductor hallucis	R: grade 5 L: grade 5

Lumbricales	R: grade 5 L: grade 5
Plantar interossei	R: grade 5 L: grade 5
Dorsal interossei	R: grade 5 L: grade 5
Flexor digitorum brevis	R: grade 5 L: grade 5
Flexor digitorum longus Quadratus plantae	R: grade 5 L: grade 5
Flexor hallucis brevis	R: grade 5 L: grade 5
Flexor hallucis longus	R: grade 5 L: grade 5
Extensor digitorum longus a brevis	R: grade 5 L: grade 5
Peroneus tertius	R: grade 5 L: grade 5
Extensor hallucis longus a brevis	R: grade 5 L: grade 5
Tibialis anterior	R: grade 5 L: grade 5
Tibialis posterior	R: grade 5 L: grade 5
Peroneus longus a brevis	R: grade 5 L: grade 5
Ankle plantar flexor	R: grade 5 L: grade 5
Soleus	R: grade 5 L: grade 5

Triceps surae	R: grade 5 L: grade 5
Popliteus	R: grade 5 L: grade 5
Biceps femoris	R: grade 5 L: grade 5
Semitendinosus Semimembranosus	R: grade 5 L: grade 5
Medial rotators	R: grade 5 L: grade 5
Quadratus femoris, obturator internus and externus, gemellus superior and inferior, piriformis	R: grade 5 L: grade 5
Gluteus medius	R: grade 5 L: grade 5
Gluteus minimus	R: grade 5 L: grade 5
Hip adductors	R: grade 5 L: grade 5
Hip flexors	R: grade 5 L: grade 5
Quadriceps femoris	R: grade 5 L: grade 5
Tensor fasciae latae	R: grade 4 L: grade 4
Sartorius	R: grade 5 L: grade 4
Iliopsoas	R: grade 4 L: grade 4
Gluteus maximus	R: grade 5

	L: grade 5
Extension trunk	Normal patient is able to complete the movement and hold position
Quadratus lumborum	Muscle appears to be strong
Lateral trunk flexors	R: grade 8 L: grade 8
Rectus abdominis, external oblique, internal oblique	Grade: 10
Upper abdominal muscles	Grade: 10
Lower abdominal	Grade: 8
Anterior neck flexors	Grade 5
Posterolateral neck extensors	Grade 5

**Table 3.3.10 Muscles strength test**

### 3.3.13 Goniometry

AROM Upper Extremities	RIGHT	LEFT
Shoulder joint	S: 30-0-160 F: 160-0-0 R: 90-0-60 T: 25-0-110	S: 30-0-160 F: 160-0-0 R: 90-0-60 T: 25-0-110
Elbow joint	S: 10-0-140	S: 30-0-140

	R: 80-0-80	R: 80-0-80
Wrist joint	S: 45-0-70 F: 25-0-35	S: 45-0-70 F: 25-0-35
Fingers (MCP)	S: 45-0-90 F: 20-0-25	S: 45-0-90 F: 20-0-25
Fingers (IP1)	S: 5-0-90	S:5-0-90
Fingers (IP2)	S: 5-0-90	S: 5-0-90
Thumb (CMC)	S: 10-0-30 F: 50-0-45	S: 10-0-30 F: 50-0-45
Thumb (MCP)	S: 5-0-55	S:5-0-55
Thumb (IP)	S: 5-0-80	S: 5-0-80

**Table 3.3.11 Active range of movement for upper extremities**

AROM Lower Extremities	RIGHT	LEFT
Hip joint	S: 30-0-120 F: 40-0-10 R: 50-0-35	S: 30-0-120 F: 40-0-10 R: 50-0-35
Knee joint	S: 0-0-120	S:0-0-90
Ankle joint	S: 20-0-30 R: 15-0-30	S: 20-0-30 R: 15-0-30
Toes (MTP)	S: 35-0-35	S: 35-0-35
IP 1	S: 0-0-80	S: 0-0-80
IP 2	S: 0-0-30	S: 0-0-30
Hallucis (IP)	S: 0-0-90	S: 0-0-90
Halluces	F: 20-0-10	F: 20-0-10

**Table 3.3.12 Active range of movement for lower extremities**

AROM Cervical spine	S: 60-0-45
Lateroflexion Cervical spine	R:50 L:45
Rotation Cervical spine	R:55 L:50
Thoracic and lumbar spine Lateroflexion	35 for both
Thoracic and lumbar spine Rotation	40 for both

**Table 3.3.13 Active range of movement of cervical spine**

PROM Upper Extremities	RIGHT	LEFT
Shoulder joint	S: 45-0-170 F: 170-0-0 R: 90-0-75 T: 35-0-120	S: 45-0-170 F: 170-0-0 R: 90-0-75 T: 35-0-110
Elbow joint	S: 5-0-145 R: 30-0-40	S: 40-0-145 R: 30-0-40
Wrist joint	S: 80-0-85 F: 30-0-45	S: 80-0-85 F: 30-0-40



Fingers (MCP)	S: 40-0-90 F: 35-0-35	S: 35-0-90 F: 30-0-35
Fingers (IP1)	S: 5-0-95	S:5-0-95
Fingers (IP2)	S: 10-0-90	S: 10-0-90
Thumb (CMC)	S: 10-0-40 F: 65-0-50	S: 10-0-40 F: 60-0-45
Thumb (MCP)	S: 10-0-65	S: 10-0-60
Thumb (IP)	S: 5-0-90	S: 5-0-90

**Table 3.3.14 Passive range of movement for upper extremities**

PROM Lower Extremities	RIGHT	LEFT
Hip joint:	S: 15-0-85 F: 50-0-10 R: 55-0-40	S: 15-0-85 F: 50-0-10 R: 55-0-35
Knee joint:	S: 0-0-130	S:0-0-95
Ankle joint:	S: 25-0-35 R: 15-0-35	S: 30-0-40 R: 15-0-30
Toes (MTP):	S: 45-0-40	S: 45-0-40
Hallucis (IP)	S: 5-0-90	S: 5-0-90
Halluces	F: 25-0-10	F: 25-0-10

**Table 3.3.15 passive range of lower extremities**

PROM Cervical spine	S: 60-0-45
Lateroflexion Cervical spine	R:65 L:65
Rotation Cervical spine	R:60 L:60
Thoracic and lumbar spine LateroFlexion	55 for both
Thoracic and lumbar spine Rotation	55 for both

**Table 3.3.16 Passive range of movement of cervical spine**

### **3.3.14 Neurological examination**

#### **Deep tendon reflex**

- The upper extremity reflexes examination:
  - The biceps brachii reflex (C5-C6) : movement exists in both sides.
  - The triceps reflex (C7) : movement exists in both sides.

- The radial part of the wrist and the tendon of the palm (C8): movement exists in both sides.
- The lower extremity reflexes examination:
  - The knee reflex (L2- L4) : movement exists in both sides.
  - The Achilles tendon or medioplantar reflex (L5-S2) : movement exists in both sides.

### **Exteroceptive Sensation**

- Tactile sensation: physiological for both sides of upper and lower extremities.
- Pain sensation: physiological for both sides of upper and lower extremities.
- Thermic sensation: physiological for both sides of upper and lower extremities.

### **Deep Sensation**

- Fork examination
  - Both metatarsal joint : patient were able to feel he sensations : 7 for both sides
  - Both Malleoli : patient were able to feel he sensations : 7 for left 7 for right side
  - Both knee caps : patient were able to feel he sensations : 7 for left 7 for right side
  - Both olecranon : patient were able to feel he sensations : 6.5 for both sides .
  - Both shoulder joints : patient were able to feel he sensations : 8 for both sides
  - Forhead : patient were able to feel he sensations : 7.5 .

- Position sense

with closed eyes : the therapist does dorsiflexion and plantar flexion of big toe of the right foot and ask the patient to do the same : patient were able to do it and repeated to do the same result for the left foot .examination were tested on bigger part and different joint of the body with different movements , the result were identicals and correct .

- Movement sense

the therapist does plantar flexion and ask the patient were to start and where to end , the patient were able to identify the movement in big toes , small toes , ankle joints and other joints of the body , result were identicals and correct .

- Stereognosis

patient asked to grasp a ( pen , block, cartoon ,, e.g..) and asked to identify the object and test the feelings , patient was able to feel and identify the objects .

- Graphesthesia

with closed eyes , patient were asked to lay down on supine and the examiner was drawing letters and numbers on both the feet and palms , patient was able to identify all the drawings but with one single mistake of the number 6 drawn on the right feet .

Cerebellum examination

- hand to nose : sitting with closed eyes , patient were asked to stretch his arms and slowly touch his nose with his index , each arm separately .
- heel to shin : supine with closed eyes , patient were asked to elevate each leg and touch the shin of the opposite leg .

Result : patient were able to perform the both tests , correctly and coordinationaly with balanced movement pattern .

## Pathological reflexes

### Upper extremities pathology signs

- Jaster sign :negative for both sides.
- Tromner's sign : negative for both sides.
- Hoffman sign : negative for both sides.
- Mingazzini:negative for both sides.
- Dufour:negative for both sides.
- Barre:negative for both sides.
- Retardation: negative for both sides.

### Lower extremities pathology signs

- Babinski sign : negative
- Chaddock's sign :negative
- Oppenheim sign :negative
- Rossomilo's sign :negative

### **3.3.15 Soft tissue technique examination**

#### Skin examination

- upper extremities : no visible restrictions were indicated .
- lower extremities : no visible restrictions were indicated .
- back area : lower back were restricted , rest were not restricted .
- neck area: no visible restriction were indicated .
- pectoral region : no visible restrictions were indicated .
- Abdominal : no visible restrictions were indicated .

#### Deep fascia examination

- upper extremities : slight restriction to the both arms .
- lower extremities : no visible restrictions were indicated .
- back area:
  - caudocranial direction : no visible restriction

- craniocaudal direction : restriction to the lower back
- neck area: was restricted to the right side .
- scalp : no visible restriction to the both sides .
- pectoral region : slight restriction of the left pectoral region , right were normal end feelings
- abdominal : restriction on the lower left part .
- side bending : no restriction for both sides .

### **3.3.16 Joint play**

The examination of the joint of the upper extremities shows that carpal joint and the carpo-metacarpal joint are mobile for both hands ,the proximal and distal joint of the fingers are stiff in the dorsal direction for both hands, the wrist joints are stiff in dorsal and palmar side for both wrists , the elbow joints are both stiff in medial and lateral direction for both elbows , the shoulder joints are mobile in all directions for the both shoulders.

While in the examination for the lower extremities shows the tarsal and tarso-metatarsal joints are mobile in the dorsal, plantar and sides ways directions for both feet , the metatarsi-phalangeal joints are mobile in all directions too , the proximal and distal phalanges of the toes are stiff in the dorsal directions for both feet. The ankle joints are stiff in dorsal and plantar directions for both sides, the both knees are mobile in side's ways directions, and the hip joints are mobile in all directions for both hips.

The sacro-iliac joint is block in the right side, there is no blockage in the lumbar, thoracic and cervical spine in all direction. It is very important to note that sometimes the

patient in some joints for example the shoulder joint even if there is no blockage or restriction and this is due to the nature of the disease of RA since there is a gradually deformity in the joint with time in which could lead to pain, accompanied by morning stiffness, patient felt pain in many joints and they were mobile.

### **3.3.17 Examination's conclusion**

For postural examination in the posterior side the patient's Achilles tendon were inserted inward resulting in pronation of the right foot, inserted outward resulting in supination of the left foot. The right calf was positioned outward with bigger volume than the left side. The popliteal line was higher in the right side of the leg due to variety of the length of the lower extremities due to the total hip replacement which has been done and re-operated to the both hips in the past. A symmetrical size of thighs. The sub-gluteal line is higher in the right side with symmetry in the gluteal muscles. The position of the pelvis was tilted to the left side and there is a prominent side of the paravertebral muscles. And there is a C-shaped scoliosis at the level of Th<sub>12</sub>-L<sub>2</sub>. The right scapula appears higher and more prominence than the left one. Symmetry of the shoulder girdle and the upper limb. And the position of the head is ideal and in the center of the plum line.

For the both right and left lateral sides of the plumb line test we can find that the shape of the ankle joint is in the natural position. The shape counter of the shin appear posterior to the line in the left side. The position of the right knee is posterior to the line.



Symmetry of the thighs muscles in both sides. For the pelvis there is lateral shift the left side, and there less kyphosis in the sacral spine, hyper-lordosis in the lumbar spine and ideal kyphosis in the thoracic spine. The upper abdominal are more prominent. An ideal position of both shoulder girdles. And an ideal position of the head.

For the anterior view there is eversion of the left foot and inversion of the right foot. We can also see a hallux valgus of both big toes with a grade-3 moderate impaired stability (claw toes with pronation according to Vele's test). The weight is more disturbed to the lateral arch. The right knee is higher. Identical configuration of both tibialis anterior muscles. Symmetry of both thighs muscles. Pelvis is tilted to the right side. The upper abdominals is more prominent. Right thorac-o-brachial is higher. Chest shape is symmetrical. The position if the sternum is ideal. symmetrical shape of the collarbone and supraclavicular holes. The position of the shoulder is symmetrical in both sides. The upper limb is symmetrical and both sides. And the potion of head is ideal in the midline. The palpation of the pelvis shows that its laterally and anteriorly tilted, where the ASIS and PSIS and the iliac crest are higher in the right side in comparison with the left side .

The gait observation shows a painful gait to the left leg with short width of gait, despite the fact that the upper abdominals are more dominant, with a lumbar hyper-lordosis and the right shoulder is higher .The dynamic examinations shows identical and physiological results without pain or limitations .The patient has a normal way of breathing from upper, lower and abdominal during standing sitting and side lining, the chest expanding were 4 cm inhalation and 2 cm in exhalation. The weight of the body was more likely to be disturbed to the left side of the body by 3 kg to the left side. Romberg test was negative, single leg stance were negative in both sides, Trendelenburg sign were negative for both sides as well, for Vele's test it was positive with grade 3 (claw toes).

The anthropometric measurements shows mostly identical values with a slight bigger value to the right side of the body .spinal distances were normal .the muscles length test were mostly normal expect for the upper trapezius and levator scapulae were both were

shorted to the both sides with grade 1. for the muscle strength test results were mostly vary between 4 and 5 grades in which its very good results and muscles are strong and able to perform the task against gravity, no weakness was indicated with respect that there is some limitations in ROM of some joint and that's not due the weakness or strength of the muscles yet but due the fact that some joints are deformed. For the goniometry the results were mostly good with some limitations in the elbow joint in the sides, pronation and supinations of the arms, the dorsiflexion and plamer flexion of the wrist, pain and limitation in flexion of the left knee, pain in the ankles with no limitations. The deep tendon reflex was normal in the upper and lower extremities. The exteroceptive sensation was normal and physiological in all sections including superficial and deep sensation. In the soft tissue technique the caudal part of the back were restricted while the rest of the tissues around the body were physiological ,the cerebellum examination shows negative results in hand to nose and heel to shin exams , the pathological signs of paresis of the upper and lower extremities were both negative in results . Regarding this examination output, the patient with the help of the physiotherapist should work on fixing the positive and pathological issues in the patient body.

### **3.4 Short term therapy plan**

- Mobilization of the joint with blockage including the shoulder joint, ankle joint and intertarsal joint.
- Stretching of the elbow joint, fingers of hands, toes of feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and manually.
- Decrease pain in the affected joint.

### **3.5 Long term therapeutic plan**

- Correcting the gait and posture.
- Stabilization of the trunk.
- Increase the ROM of the affected joint.
- Decrease drug use

### **3.6 Therapy progress**

1/ Day 1:4.02.2019

**Session lasted for 30 minutes**

## **Objective**

Patient complained about pain in the in the shoulder joint for both side , pain in the wrist joint in both side , left knee pain and ankle pain during walking , pain usually happen during the morning and ease up during the day .

## **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, painful gait appear in the left side of the lower extremities with narrow gait with pronation and hallux valgus of the both big toes.

## **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles

- Relax tight muscles

## **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching of the both biceps , forearm flexors , and fingers flexors for both hands
- Active and passive exercises for the affected joints
- Strength exercises for weak muscles
- PIR technique to relax tight muscles

## **Description of today's therapeutic unit**

- Abduction and external rotation exercise of shoulder using thera-band up to 20 times of repetition for each exercise
- Flexion of the shoulder joint and returning to the starting position using a thera-band up to 20 times for each hand.
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times for each hand.
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the biceps, forearm flexors, and fingers flexors for both hands manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Supination and pronation of the elbow using a small sponge ball up to 30 times for each direction.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.

- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- PIR for the hamstrings in supine position repeated 3 times.
- Stretching of the big and small toes in extension and dorsal direction.
- Sensomotoric exercises over balanced ball, with both open and close eyes, for 1 minute, repeated 3 times.
- Mobilization for the SIJ in the left side

### **Result of therapeutic unit**

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, the patient still has limited pronation and supination in the forearms, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the biceps, forearm and finger flexors for both arms.
- Dynamic breathing exercise.
- Stretching of the hamstrings using the thera-band at home or sleeping room.

2/ Day 2:5.02.2019

**Session lasted for 1 hour**

### **Objective**

Patient complained pain in the lower back and pain while walking in both legs, same pain extend to the left knee, the shoulder pain has felt better, and the patient felt good using the self-elbow extension exercise at home.

### **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, painful gait appear in the left side of the lower extremities with narrow gait with pronation and hallux valgus of the both big toes, dynamic spine examination is with no pain in the both side bending, flexion and extension.

### **The goal of therapeutic plan**

- Mobilizing the blocked joints.

- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint by exercising actively and passively.
- Strengthen weak muscles
- Relax tight muscles

### **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching the shortened muscles.
- Active and passive exercises for the affected joints
- Strength exercises for weak muscles
- PIR technique to relax tight muscles

### **Description of today's therapeutic unit**

- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and plantar flexion of the ankle joint 20 times on both sides
- Stretching of the big and small toes in extension and dorsal direction.
- Traction of talocrural joints of both ankles.
- SIJ mobilization to the right side.



- Senseromotoric and proprioception exercises over a balance ball 1 min for each session with open and closed eyes 3 sessions for each.

## **Result of therapeutic unit**

Patient were able to perform all the exercises given to achieve, the SIJ were free in the left side also the talocural joint, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

## **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the elbow joint.
- Dynamic breathing exercise.

3/ Day 3:6.02.2019

**Session lasted for 30 minutes**

**Objective**

Patient complained about pain in the shoulder and neck , low back pain are still persistence , also pain in the knee and ankle were still exist , the patient doesn't feel pain in the ankle during walking , patient also start to feel pain in the wrist again .

## **Subjective**

The gait of the patient looks better with increase in the stance distance, the shoulder position looks symmetrical and elbows still in slight flexion position in both sides, the fingers were in flexion position and the toes were pronated still.

## **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

## **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching the shorted muscles.
- Active and passive exercises for the affected joints
- Strength exercises for weak muscles
- PIR technique to relax tight muscles

## **Description of today's therapeutic unit**

- PIR for the upper trapezius and elevators scapulae for both sides
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times
- Mobilization of the shoulder joint of both shoulders to the ventral direction.
- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in terms of flexion of the both knee joints over a small therapeutic ball 15 times.
- Active dorsal and plantar flexion of the ankle joint 20 times on both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- Stretching of the big and small toes in extension and dorsal direction.
- Sensorimotoric and proprioception exercises over a balance ball 1 min for each session with open and closed eyes 3 sessions for each.

## **Result of therapeutic unit**

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the talocrural joint were free too in both sides, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, stretching of the

fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy**

- Active flexion and abduction of the shoulder joint .
- Active stretching of the elbow joint.
- Dynamic breathing exercise.
- Active dorsiflexion and planter flexion of the ankle joints 20 times

4/ Day 4:7.02.2019

**Session lasted for 30 minutes**

### **Objective**

The patient came complaining about the shoulder joint pain again and wrist joint, knee and ankle were painful as well, low back were painful too.

### **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side , the fingers of the hand are in flexion and limited in extension in

both sides , pronation and hallux valgus of the both big toes , gait were better with no pain and bigger stance distance .

### **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

### **Therapy proposal:**

- Mobilization for blocked joints by mobilization.
- Stretching the shorted muscles.
- Active and passive exercises for the affected joints
- Strength exercises for weak muscles
- PIR technique to relax tight muscles

### **Description of today's therapeutic unit**

- Abduction and external rotation exercise of shoulder using thera-band up to 20 times of repetition for each exercise
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.

- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chop art's joint in dorsal direction for both feet.
- Stretching of the big and small toes in extension and dorsal direction.

### Result of therapeutic unit:

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the elbow joint.
- Dynamic breathing exercise.

## **Session lasted for 30 minutes**

### **Objective**

Patient complained about pain in the in the neck and shoulder and wrist joint, pain in the ankle and low back pain.

### **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, right shoulder triangle is bigger, pronation and hallux valgus of the both big toes.

### **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

### **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching the shorted muscles.
- Active and passive exercises for the affected joints
- Strength exercises for weak muscles
- PIR technique to relax tight muscles

### **Description of today's therapeutic unit**

- Abduction and external rotation exercise of shoulder using thera-band up to 20 times of repetition for each exercise
- Flexion of the shoulder joint and returning to the starting position using a thera-band up to 20 times for each hand.
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- Stretching of the big and small toes in extension and dorsal direction.

### **Result of therapeutic unit:**



Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the biceps muscles.
- Dynamic breathing exercise.
- Stretching of hamstrings

6/ Day 6:11.02.2019

**Session lasted for 30 minutes**

### **Objective**

Patient complained about pain in lower back, pain in the shoulders, wrists, the knees and ankles felt well, the patient doesn't feel pain during walking.

### **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, right shoulder triangle is bigger, pronation and hallux valgus of the both big toes .there is no visible analectic gait and the width of the gait is bigger than the last session.

### **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of biceps muscles in both sides.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

### **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching the shorted muscles.
- Active and passive exercises for the affected joints
- Strength exercises for weak muscles
- PIR technique to relax tight muscles

### **Description of today's therapeutic unit**

- Abduction and external rotation exercise of shoulder using thera-band up to 20 times of repetition for each exercise

- Flexion of the shoulder joint and returning to the starting position using a thera-band up to 20 times for each hand.
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times for each hand.
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Supination and pronation of the elbow using a small sponge ball up to 30 times for each direction.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- PIR for the hamstrings in supine position repeated 3 times.
- Stretching of the big and small toes in extension and dorsal direction.
- Sensomotoric exercises over balanced ball, with both open and close eyes, for 1 minute, repeated 3 times.

### **Result of therapeutic unit:**

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, the patient still has limited pronation and supination in the forearms, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

## **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the elbow joint.
- Dynamic breathing exercise.
- Stretching of the hamstrings using the thera-band at home or sleeping room.

7/ Day 7:12.02.2019

**Session lasted for 30 minutes**

## **Objective**

Patient complained about pain in lower back, pain in the shoulders, wrists, the knees and ankles felt painful again, the patient doesn't feel pain during walking.

## **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, right shoulder triangle is bigger, pronation and hallux valgus of the both big toes .there is no visible analectic gait and the width of the gait is bigger than the last session.

### **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

### **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching of biceps, hand flexors, fingers flexors for both sides.
- Active and passive exercises for the affected joints.
- Strength exercises for weak muscles.
- PIR technique to relax tight muscles.

Description of today's therapeutic unit

- Abduction and external rotation exercise of shoulder using thera-band up to 20 times of repetition for each exercise
- Flexion of the shoulder joint and returning to the starting position using a thera-band up to 20 times for each hand.
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times for each hand.
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Supination and pronation of the elbow using a small sponge ball up to 30 times for each direction.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- PIR for the hamstrings in supine position repeated 3 times.
- Stretching of the big and small toes in extension and dorsal direction.
- Sensomotoric exercises over balanced ball, with both open and close eyes, for 1 minute, repeated 3 times.
- Mobilization for the SIJ in the left side

## **Result of therapeutic unit**

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, the patient still has limited pronation and supination in the forearms, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the elbow joint.
- Dynamic breathing exercise.
- Stretching of the hamstrings using the thera-band at home or sleeping room.

8/ Day 8:13.02.2019

**Session lasted for 30 minutes**

### **Objective**

Patient complained about pain in lower back, pain in the shoulders, wrists, the knees and ankles felt well, the patient doesn't feel pain during walking.

## **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, right shoulder triangle is bigger, pronation and hallux valgus of the both big toes .there is no visible analectic gait and the width of the gait is bigger than the last session.

## **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

## **Therapy proposal:**

- Mobilization for blocked joints by mobilization.
- Stretching of biceps, hand flexors, fingers flexors for both sides.
- Active and passive exercises for the affected joints.
- Strength exercises for weak muscles.
- PIR technique to relax tight muscles.

## **Description of today's therapeutic unit**



- Abduction and external rotation exercise of shoulder using thera-band up to 20 times of repetition for each exercise
- Flexion of the shoulder joint and returning to the starting position using a thera-band up to 20 times for each hand.
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times for each hand.
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Supination and pronation of the elbow using a small sponge ball up to 30 times for each direction.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- PIR for the hamstrings in supine position repeated 3 times.
- Stretching of the big and small toes in extension and dorsal direction.
- Sensomotoric exercises over balanced ball, with both open and close eyes, for 1 minute, repeated 3 times.
- Mobilization for the SIJ in the left side

## **Result of therapeutic unit**

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, the patient still has limited pronation and supination in the forearms, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy:**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the elbow joint.
- Dynamic breathing exercise.
- Stretching of the hamstrings using the thera-band at home or sleeping room.

9/ Day 9:14.02.2019

Session lasted for 30 minutes

### **Objective**

Patient complained about pain in lower back, pain in the shoulders, wrists, the knees and ankles felt well, the patient doesn't feel pain during walking.

## **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, right shoulder triangle is bigger, pronation and hallux valgus of the both big toes .there is no visible analectic gait and the width of the gait is bigger than the last session.

## **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

## **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching of biceps, hand flexors, fingers flexors for both sides.
- Active and passive exercises for the affected joints.
- Strength exercises for weak muscles.
- PIR technique to relax tight muscles.

## **Description of today's therapeutic unit**

- Abduction and external rotation exercise of shoulder using there-band up to 20 times of repetition for each exercise.
- Flexion of the shoulder joint and returning to the starting position using a thera-band up to 20 times for each hand.
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times for each hand.
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the both elbow joints manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Supination and pronation of the elbow using a small sponge ball up to 30 times for each direction.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- PIR for the hamstrings in supine position repeated 3 times.
- Stretching of the big and small toes in extension and dorsal direction.
- Sensomotoric exercises over balanced ball, with both open and close eyes, for 1 minute, repeated 3 times.
- Mobilization for the SIJ in the left side

## **Result of therapeutic unit**

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, the patient still has limited pronation and supination in the forearms, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the elbow joint.
- Dynamic breathing exercise.
- Stretching of the hamstrings using the thera-band at home or sleeping room.

10/ Day 10:15.02.2019

**Session lasted for 30 minutes**

### **Objective**

Patient complained about pain in lower back, pain in the shoulders, wrists, the knees and ankles felt well, the patient doesn't feel pain during walking.

### **Subjective**

The patient's forearms are slightly flexed in the left side up to 40 degree and up to 10 degree in the right side, the fingers of the hand are in flexion and limited in extension in both sides, right shoulder triangle is bigger, pronation and hallux valgus of the both big toes .there is no visible analectic gait and the width of the gait is bigger than the last session.

### **The goal of therapeutic plan**

- Mobilizing the blocked joints.
- Stretching of the muscles of arm, wrist, finger of hand and feet.
- Restore the ROM of the affected joint, including the shoulder, elbow wrist, knee and ankle joint buy exercising actively and passively.
- Strength weak muscles
- Relax tight muscles

### **Therapy proposal**

- Mobilization for blocked joints by mobilization.
- Stretching of biceps, hand flexors, fingers flexors for both sides.
- Active and passive exercises for the affected joints.
- Strength exercises for weak muscles.
- PIR technique to relax tight muscles.

### **Description of today's therapeutic unit**

- Abduction and external rotation exercise of shoulder using thera-band up to 20 times of repetition for each exercise

- Flexion of the shoulder joint and returning to the starting position using a thera-band up to 20 times for each hand.
- Flexion of the shoulder joint and returning to the starting position using a stick up to 20 times for each hand.
- Mobilization of the shoulder joint of both shoulder to the ventral direction.
- Stretching of the biceps, forearm flexors, and fingers flexors for both hands manually up to 10 times each.
- Flexion and extension of the elbow joint repetitively up to 20 times.
- Supination and pronation of the elbow using a small sponge ball up to 30 times for each direction.
- Flexion and extension of wrist joint actively with stick 20 times for both hands.
- Passive stretching of the fingers of hands in dorsal side.
- Isotonic contraction in term of flexion of the both knee joints over small therapeutic ball 15 times.
- Active dorsal and planter flexion of the ankle joint 20 times got both sides
- Mobilization of Chopart's joint in dorsal direction for both feet.
- PIR for the hamstrings in supine position repeated 3 times.
- Stretching of the big and small toes in extension and dorsal direction.
- Sensomotoric exercises over balanced ball, with both open and close eyes, for 1 minute, repeated 3 times.
- Mobilization for the SIJ in the left side

## **Result of therapeutic unit**

Patient were able to perform all the exercises given to achieve, the mobilization of the shoulder joint and Chopart's joint were free after mobilization, the elbow stretching were performed but the outcome remains the same with no increasing the ROM due to deformity in the joint of elbows, the patient still has limited pronation and supination in the forearms, stretching of the fingers and toes were performed and has a good result on the patient and the ROM were increased slightly.

### **Self-therapy**

- Active flexion and abduction of the shoulder joint.
- Active stretching of the biceps, forearm and finger flexors for both arms.
- Dynamic breathing exercise.
- Stretching of the hamstrings using the thera-band at home or sleeping room.

## **3.7 Final kinesiological examination**

### **3.7.1 Postural examination**

<b>Posterior postural test</b>	
Ideal line goes in the middle of knees, pelvis, spine and skull.	
Base of support	No flat foot in both sides.



Shape and contour of heels and Achilles tendon	Inward insertion of Achilles tendon of the right foot and outward insertion of the Achillis tendon of the left foot.
Contour of calf muscles	Right calf positioned outward with bigger mas volume than the left calf.
Popliteal line	Right popliteal line is lower
Contour of thigh muscles	symmetrical size of muscles
Sub-gluteal line	Right gluteal line is higher
Gluteal muscles	Symmetrical in both sides
Symmetry of thoracobrachial triangles	Right side is bigger
Position of pelvis	Left side lateral tilt.
Paravertebral muscles	Left side is prominence
Curvature of spine	C-shaped scoliosis in the thoracolumbar part of spine at level Th <sub>12</sub> -L <sub>2</sub> part.
Position of scapula	Right side is higher and more prominence
Position of shoulder griddle	Symmetrical height for both sides.
Position of upper limb	Symmetrical height for both sides.
Position of head	Ideal position of head.

**Table 3.7.1 Posterior postural examination**

**Table 3.7.2 Lateral postural examination**

### Lateral postural test

Plump line test is slightly anterior to lateral malleolus and knee joint, posterior to hip joint, body of the lumbar vertebrae , in the middle for shoulder , body of the most cervical vertebrae external auditory meatus, and slightly posterior of the coronal suture .

Shape and position of ankle joint	R: natural position
	L: natural position
shape and contour of shin	R:posterior to the plump line
	L:natural position
Position of knee joint	R:posterior to the knee joint
	L:natural position
Contour of thigh muscles	Both Symmetrical from lateral side.
Position of pelvis	Lateral tilt left side
Position and curvature of spine	Less kyphosis in sacral spine Hyper-lordosis in lumbar spin Ideal kyphosis in thoracic spine Ideal lordosis in cervical spine
Shape of the abdominal muscles	Upper abdominal muscles are more prominent.
Position of shoulder griddle	Ideal position in both sides.
Position of head	Ideal position.

### Anterior postural test

Base of support	Eversion of the left foot and inversion of the right foot.
Position of feet, arches	R : inversion of the right foot L :slight eversion of foot

Position and shape of toes	Hallux valgus of both big toes, and grade 3 -moderately impaired stability - claw toes with pronation according to Vele's test.
Weight distribution on feet	No weight distribution to lateral arch.
Shape and position of knee joint (patella)	Right knee is higher.
Configuration of m. tibialis anterior	Identical in both sides.
shape of thigh muscles	symmetrical size of muscles
Position of pelvis	Lateral tilt in left side.
Symmetry of muscle tone abdominal muscles	Upper abdominal muscles are more prominent
Symmetry of thoracobrachial triangles	Right side is bigger.
Position and symmetry of chest	Symmetrical shape and height.
Position of sternum	Ideal position.
Position of collarbones and supraclavicular holes	Symmetrical shape and height for both sides.
Position of shoulder girdle	Same Position for both sides.
Position of upper limbs	Upper limbs are symmetrical in shape and position.
Position of head	Ideal position in the midline.

**Table 3.7.3 Anterior postural examination**

### 3.7.2 Palpation of pelvis

- Pelvis is laterally tilted and anteriorly
- ASIS: right side is higher
- PSIS: right side is higher
- Iliac crest: right side is higher

### 3.7.3 Gait examination

<b>Gait examination</b>	
width of the base of support	22 cm
position of the feet (angle)	10 degree outward position for both sides
walking rhythm (periodic, non-periodic)	Periodic type of walking
walking speed	Ideal – symmetrical
stride length (short steps/long steps)	Long steps
movement of the foot (heel strike, flat foot, loading response, heel-off, toe-off)	Heel strike , lateral margin , toes load , pronation of toes , heel off , toes off for both side , ideal – symmetrical
Axial position of the lower limb (flatfoot, knock knee, coxa)	Ideal with no pathology

valga/vara...)	
movement and position of the knee and hip (extension)	Ideal-symmetrical
position and movements of the pelvis (compensatory anteversion, rotation, lateral tilt max. 4 cm)	Slight anterior tilt of pelvis during walking
movement of center of gravity (COG – max. 4,5 cm))	Stable
position and movements of the trunk (latero-flexion, rotation, max. Th7)	Rotation of the trunk to the level of Th7 , Ideal symmetrical
activity of abdomen muscles	Upper abdominals are active
position of spine (position of Th/L and L/S, lateroflexion, lordotization)	Lumbar hyperlordosis of spine
activity of back muscles	Active –symmetrical
position of shoulders (upper part of the trunk)	Right shoulder is higher
position and movements of the head	Ideal

movements of the upper extremity (synchronicity, synkinesia, max 45°)	Visible – symmetrical
stability of walking	Stable – symmetrical

**Table 3.7.4 Gait examination**

### **3.7.4 Dynamic spine examination**

Backward: fluent movement, no pain, no restriction.

Sideway: 23cm lateroflexion in right side, 23 cm lateroflexion in left side without pain in both sides.

Forward: patient is able to touch the floor, no pain and fluent movement.

### **3.7.5 Assessment of stereotype of breathing**

- Standing: able to breathe from upper and lower thoracic and abdominal parts (normal).
- Sitting: able to breathe from upper and lower thoracic and abdominal parts (normal).
- Lying position: able to breathe from upper and lower thoracic and abdominal parts (normal).
- Chest expansion: 4.5 cm during inhalation.

### **3.7.6 Two-scales standing**

- 23 KG to the left side. 20 KG to the right side

### 3.7.7 Specific testing

Romberg Test (I-III): Negative for both sides

Single-leg stance test: Patient was able to do it for both sides.

Trendelenburg sign: negative for both sides

Veale test: positive, grade 3 (claw toes) with pronation of the toes hallux valgus of both big toes

### 3.7.8 Anthropometric measurement

Height	154 cm
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UPPER EXTREMITIES	RIGHT (cm)	LEFT (cm)
Length of upper limbs	65 cm	65 cm
Length of humerus	30 cm	30 cm
Length of forearm	20 cm	20 cm
Length of hands	15 cm	15 cm
Circumference of upper limb	26 cm	24 cm

Circumference of forearm	20 cm	22 cm
Circumference of head	50 cm	
Circumference of thorax	80 cm	
Circumference of waist	68 cm	

**Table 3.7.5 Anthropometric measurements of upper extremities**

LOWER EXTREMITIES	RIGHT (cm)	LEFT(cm)
Anatomical length	77 cm	75 cm
Functional length	80 cm	80 cm
Length of thigh	41 cm	40 cm
Length of middle leg	36 cm	35 cm
Length of foot	23 cm	23 cm
Circumference of thigh	46 cm	45 cm
Circumference of knee	33 cm	33 cm
Circumference of calf	32 cm	32 cm
Circumference of ankle	25 cm	25 cm
Circumference of foot	22 cm	22 cm

**Table 3.7.6 Anthropometric measurements of lower extremities**



Biacromial	50 cm
Bicristal	34 cm
Bispinal	31 cm
Bitrochanterical	33 cm

### 3.7.7 Anthropometric measurements from side to side

### 3.7.8 Spinal distances

Shober's distance	5 cm normal
Stibor's distance	9 cm normal
Čepojev's distance	3 cm normal
Otta's distance	Inclination 2.5 cm, reinclination 2 cm sum is 4.5 normal
Thomayer 's distance	Patient fingers touches the floor (0 cm ) normal
Flesch de Forestier	3 cm normal
Latero-flexion	23 cm for both sides normal result

**Table 3.7.8 Spinal distances**

### 3.7.9 Muscle length test

Test of the muscles	Janda	Kendall
Test for length of ankle plantar flexors M. gastrocnemius and m.		R: 90° dorsiflexion (normal) L: 90° dorsiflexion (normal)
Test for length of ankle plantar flexors: M. soleus, m. popliteus		R: 90° dorsiflexion (normal) L: 90° dorsiflexion (normal)
Test for length of hip flexor muscles:		R: posterior thigh touches the table, knee flexes 80°, L: posterior thigh touches the table, knee flexes 80° fascia latae
Test for length of hip adductor muscles	R: Grade 0 - ABD 40° L: Grade 0 - ABD 40°	
Test for length of hamstring muscles		90° both sides (no shortens)
Test for length of paravertebral muscles	Grade 0 - distance head-knee 10 cm normal	
Forward-bending test for length of posterior muscles		Patient is able to touch the floor with his fingers (normal)
Test for length of m. quadratus lumborum	R: Grade 0 - more than 5 cm.	

	L: Grade 0 - more than 5 cm.	
Test for length of m. piriformis	R: Grade 0 - soft barrier L: Grade 0 - soft barrier	
Test for length of m. pectoralis major Lower (sternal) part		R: arm drops to table level L: arm drops to table level
Test for length of m. pectoralis major The upper (clavicular) part		R: arm drops to table level L: arm drops to table level
Test for length of m. pectoralis minor		R: shoulder lie on table L: shoulder lie on table
Test for length of m. teres major, m. latissimus dorsi, mm. rhomboid major and minor		R: arm drops to table level L: arm drops to table level
Test for length of medial shoulder rotators		R: arm drops to table level L: arm drops to table level
Test for length of lateral shoulder rotators		R: forearm within 20°angle with table L: forearm within 20°angle with table
Test for length of cranial part	R: Grade 0	

of m. trapezius	– soft feelings (normal) L: Grade 0 – soft feelings (normal)	
Test for length of m. levator scapulae	R: Grade 0 – soft feelings (normal) L: Grade 0 – soft feelings (normal)	
Test for length of m. SCM	R: Norm – soft barrier L: Norm – soft barrier	
Test for length of mm. scalene	R: Norm – soft barrier L: Norm – soft barrier	

**Table 3.7.9 Muscle length test**

### **3.7.10 Muscles strength test**

Add pollicis	R: grade 5 L: grade 5
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Abd. pollicis brevis	R: grade 5 L: grade 5
Opponens pollicis	R: grade 5 L: grade 5
Flexor pollicis longus	R: grade 5 L: grade 5
Flexor pollicis brevis	R: grade 4 L: grade 4
Extensor pollicis longus	R: grade 5 L: grade 5
Extensor pollicis brevis	R: grade 5 L: grade 5
Abductor polucis longus	R: grade 4 L: grade 4
Abductor digiti minimi	R: grade 5 L: grade 5
Opponens digiti minimi	R: grade 5 L: grade 5
Flexor digiti minimi	R: grade 5 L: grade 5
Dorsal interossei	R: grade 5 L: grade 5
Palmar interossei	R: grade 5 L: grade 5
Lumbricales	R: grade 5 L: grade 5
Palmaris longus	R: grade 4 L: grade 4
Extensor indicis Extensor digiti minimi	R: grade 5 L: grade 5

Extensor digitorum	
Flexor digitorum superficialis	R: grade 5 L: grade 5
Flexor digitorum profundus	R: grade 5 L: grade 5
Flexor carpi radialis	R: grade 5 L: grade 5
Flexor carpi ulnaris	R: grade 5 L: grade 5
Extensor carpi radialis longus	R: grade 5 L: grade 5
Extensor carpi radialis brevis	R: grade 5 L: grade 5
Extensor carpi ulnaris	R: grade 5 L: grade 5
Pronators teres and quadratus	R: grade 5 L: grade 5
Pronator quadratus	R: grade 5 L: grade 5
Supinator and biceps	R: grade 5 L: grade 5
Brachioradialis	R: grade 5 L: grade 5
Coracobrachialis	R: grade 5 L: grade 5
Biceps brachii a n d brachialis	R: grade 5 L: grade 5
Triceps brachii a n d anconeus	R: grade 5 L: grade 5
Supraspinatus	R: grade 5 L: grade 5

Deltoid	R: grade 5 L: grade 5
Anterior deltoid	R: grade 5 L: grade 5
Posterior deltoid	R: grade 5 L: grade 5
Teres major	R: grade 5 L: grade 5
Pectoralis major upper	R: grade 5 L: grade 5
Pectoralis major lower	R: grade 5 L: grade 5
Pectoralis minor	R: grade 5 L: grade 5
Latissimus dorsi	R: grade 4 L: grade 5
Shoulder medial rotator	R: grade 5 L: grade 5
Infraspinatus	R: grade 5 L: grade 5
Teres minor	R: grade 5 L: grade 5
Rhomboidei Levator scapulae	R: grade 5 L: grade 5
Trapezius	R: grade 5 L: grade 5
Lower trapezius	R: grade 5 L: grade 5
Upper trapezius	R: grade 5 L: grade 5

Serratus anterior	R: grade 5 L: grade 5
Abductor hallucis	R: grade 5 L: grade 5
Adductor hallucis	R: grade 5 L: grade 5
Lumbricales	R: grade 5 L: grade 5
Plantar interossei	R: grade 5 L: grade 5
Dorsal interossei	R: grade 5 L: grade 5
Flexor digitorum brevis	R: grade 5 L: grade 5
Flexor digitorum longus Quadratus plantae	R: grade 5 L: grade 5
Flexor hallucis brevis	R: grade 5 L: grade 5
Flexor hallucis longus	R: grade 5 L: grade 5
Extensor digitorum longus a brevis	R: grade 5 L: grade 5
Peroneus tertius	R: grade 5 L: grade 5
Extensor hallucis longus a brevis	R: grade 5 L: grade 5
Tibialis anterior	R: grade 5 L: grade 5
Tibialis posterior	R: grade 5 L: grade 5



Peroneus longus a brevis	R: grade 5 L: grade 5
Ankle plantar flexor	R: grade 5 L: grade 5
Soleus	R: grade 5 L: grade 5
M. Triceps surae	R: grade 5 L: grade 5
Popliteus	R: grade 5 L: grade 5
Biceps femoris	R: grade 5 L: grade 5
Semitendinosus Semimembranosus	R: grade 5 L: grade 5
Medial rotators	R: grade 5 L: grade 5
Quadratus femoris, obturator internus and externus, gemellus superior and inferior, piriformis	R: grade 5 L: grade 5
Gluteus medius	R: grade 5 L: grade 5
Gluteus minimus	R: grade 5 L: grade 5
Hip adductors	R: grade 5 L: grade 5
Hip flexors	R: grade 5 L: grade 5
Quadriceps femoris	R: grade 5 L: grade 5
Tensor fasciae latae	R: grade 4

	L: grade 4
Sartorius	R: grade 5 L: grade 4
Iliopsoas	R: grade 4 L: grade 4
Gluteus maximus	R: grade 5 L: grade 5
Extension trunk	Normal patient is able to complete the movement and hold position
Quadratus lumborum	Muscle appears to be strong
Lateral trunk flexors	R: grade 8 L: grade 8
Rectus abdominis, external oblique, internal oblique	Grade: 10
Upper abdominal muscles	Grade: 10
Lower abdominal	Grade: 8
Anterior neck flexors	Grade 5
Posterolateral neck extensors	Grade 5

**Table 3.7.10 Muscles strength test**

### 3.7.11 Goniometry

AROM Upper Extremities	RIGHT	LEFT
Shoulder joint:	S: 30-0-170 F: 170-0-0 R: 90-0-60 T: 25-0-110	S: 30-0-170 F: 170-0-0 R: 90-0-60 T: 25-0-110
Elbow joint:	S: 10-0-140 R: 35-0-45	S: 30-0-140 R: 35-0-45
Wrist joint:	S: 45-0-70 F: 25-0-35	S: 45-0-70 F: 25-0-35
Fingers (MCP):	S: 45-0-90 F: 20-0-25	S: 45-0-90 F: 20-0-25
Fingers (IP1):	S: 5-0-90	S: 5-0-90
Fingers (IP2):	S: 5-0-90	S: 5-0-90
Thumb (CMC):	S: 10-0-30 F: 50-0-45	S: 10-0-30 F: 50-0-45
Thumb (MCP):	S: 5-0-55	S: 5-0-55
Thumb (IP):	S: 5-0-80	S: 5-0-80

**Table 3.7.11 Active range of movement of upper extremities**

AROM Lower Extremities	RIGHT	LEFT
Hip joint:	S: 30-0-120 F: 40-0-10 R: 50-0-35	S: 30-0-120 F: 40-0-10 R: 50-0-35

Knee joint:	S: 0-0-120	S:0-0-90
Ankle joint:	S: 20-0-30 R: 15-0-30	S: 20-0-30 R: 15-0-30
Toes (MTP):	S: 35-0-35	S: 35-0-35
IP 1	S: 0-0-80	S: 0-0-80
IP 2	S: 0-0-30	S: 0-0-30
Halluces (IP)	S: 0-0-90	S: 0-0-90
Halluces	F: 20-0-10	F: 20-0-10

**Table 3.7.12 Active range of movement of lower extremities**

<b>AROM Cervical spine</b>	S: 60-0-45
Lateroflexion Cervical spine	R:50 L:45
Rotation Cervical spine	R:55 L:50
Thoracic and lumbar spine LateroFlexion	35 for both
Thoracic and lumbar spine Rotation	40 for both

**Table 3.7.13 Active range of movement of cervical spine**

PROM Upper Extremities	RIGHT	LEFT
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Shoulder joint:	S: 45-0-170 F: 170-0-0 R: 90-0-75 T: 35-0-120	S: 45-0-170 F: 170-0-0 R: 90-0-75 T: 35-0-110
Elbow joint:	S: 5-0-145 R: 50-0-55	S: 40-0-145 R: 50-0-55
Wrist joint:	S: 80-0-85 F: 30-0-45	S: 80-0-85 F: 30-0-40
Fingers (MCP):	S: 40-0-90 F: 35-0-35	S: 35-0-90 F: 30-0-35
Fingers (IP1):	S: 5-0-95	S: 5-0-95
Fingers (IP2):	S: 10-0-90	S: 10-0-90
Thumb (CMC):	S: 10-0-40 F: 65-0-50	S: 10-0-40 F: 60-0-45
Thumb (MCP):	S: 10-0-65	S: 10-0-60
Thumb (IP):	S: 5-0-90	S: 5-0-90

**Table 3.7.14 Passive range of movement of upper extremities**

PROM Lower Extremities	RIGHT	LEFT
Hip joint:	S: 15-0-85 F: 50-0-10 R: 55-0-40	S: 15-0-85 F: 50-0-10 R: 55-0-35
Knee joint:	S: 0-0-130	S: 0-0-95
Ankle joint:	S: 25-0-35 R: 15-0-35	S: 30-0-40 R: 15-0-30
Toes (MTP):	S: 45-0-40	S: 45-0-40
Halluces (IP)	S: 5-0-90	S: 5-0-90

Halluces	F: 25-0-10	F: 25-0-10
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**Table 3.7.15 Passive range of movement of lower extremities**

PROM Cervical spine	S: 60-0-45
Lateroflexion Cervical spine	R:65 L:65
Rotation Cervical spine	R:60 L:60
Thoracic and lumbar spine LateroFlexion	55 for both
Thoracic and lumbar spine Rotation	55 for both

**Table 3.7.16 Passive range of movement of cervical spine**

### 3.7.12 Neurological examination

- The upper extremity reflexes examination.
- The biceps brachii reflex (C5-C6): movement exists in both sides.
- The triceps reflex (C7): movement exists in both sides.
- The radial part of the wrist and the tendon of the palm (C8): movement exists in both sides.

- The lower extremity reflexes examination.
- The knee reflex (L2- L4) : movement exists in both sides.
- The Achilles tendon or medioplantar reflex (L5-S2) : movement exists in both sides.

## **Exteroceptive Sensation**

A. Tactile sensation: all result were physiological for both sides

B. Pain sensation: all result were physiological for both sides

C. Thermic sensation: all result were physiological for both sides

D. Deep Sensation:

A/Tuning fork examinations vibration sense on :

- Both metatarsal joint : patient were able to feel he sensations : 7 for both sides
- Both Malleouli : patient were able to feel he sensations : 7 for left 7 for right side Both  
knee caps : patient were able to feel he sensations : 7 for left 7for right side
- Both olecranon : patient were able to feel he sensations : 6.5 for both sides .
- Both shoulder joints : patient were able to feel he sensations : 8 for both sides
- Forhead : patient were able to feel he sensations : 7.5 .

B/postion sense :

With closed eyes : the therapist does dorsiflexion and plantar flexion of big toe of the right foot and ask the patient to do the same : patient were able to do it and repeated to do the same result for the left foot .examination were tested on bigger part and different joint of the body with different movements , the result were identicals and correct .

C/Movement sense :

The therapist does plantar flexion and ask the patient were to start and where to end , the patient were able to identify the movement in big toes , small toes , ankle joints and other joints of the body , result were identicals and correct .

D/Stereognosis:

The patient asked to grasp a ( pen , block, cartoon ,, e.g..) and asked to identify the object and test the feelings , patient was able to feel and identify the objects .

E/Graphesthesia :

With closed eyes , patient were asked to lay down on supine and the examiner was drawing letters and numbers on both the feet and palms , patient was able to identify all the drawings but with one single mistake of the number 6 drawn on the right foot .

## **Cerebellum examination**

1/ hand to nose : sitting with closed eyes , patient were asked to stretch his arms and slowly touch his nose with his index , each arm separately .

2/heel to shin : supine with closed eyes , patient were asked to elevate each leg and touch the shin of the opposite leg .



Result : patient were able to perform the both tests , correctly and coordinationaly with balanced movement pattern .

## **Pathological reflexes**

Upper extremities pathology signs:

- Jaster sign :negative for both sides
- Tromner's sign : for both sides
- Hoffman sign : negative for both sides
- Mingazzini:negative for both sides
- Dufour:negative for both sides
- Barre:negative for both sides
- Retardation: negative for both sides

Lower extremities pathology signs:

- Babinski sign : negative for both sides
- Chaddock's sign :negative for both sides
- Oppenheim sign :negative for both sides
- Rossomilo's sign :negative for both sides

### **3.7.13 Soft tissue technique examination**

Skin examination

- Upper extremities : no visible restrictions were indicated .
- Lower extremities : no visible restrictions were indicated .
- Back area : lower back were restricted , rest were not restricted .
- Neck area: no visible restriction were indicated .
- Pectoral region : no visible restrictions were indicated .
- Abdominal : no visible restrictions were indicated .

### **Deep fascia examination:**

- Upper extremities : slight restriction to the both arms .
- Lower extremities : no visible restrictions were indicated .
- Back area:
  - Caudocranial direction : no visible restriction
  - Craniocaudal direction : restriction to the lower back
- Neck area: was restricted to the right side .
- Scalp : no visible restriction to the both sides .
- Pectoral region : slight restriction of the left pectoral region , right were normal end feelings
- Abdominal : restriction on the lower left part .
- Side bending : no restriction for both sides .

### **3.7.14 Joint play**

The examination of the joint of the upper extremities shows that carpal joint and the carpo-metacarpal joint are mobile for both hands ,the proximal and distal joint of the

fingers are slightly mobile , the wrist joints are mobile in dorsal and palmer side for both wrists , the elbow joints are both stiff in medial and lateral direction for both elbows , the shoulder joints are mobile in all directions for the both shoulders.

While in the examination for the lower extermities shows the tarsal and tarso-metatarsal joints are mobile in the dorsal, planter and sides ways directions for both feet , the metatrasso-phalangeal joints are mobile in all directions too , the proximal and distal phalanges of the toes are now more mobile in the dorsal directions for both feet. The ankle joints are stiff in dorsal and planter directions for both sides, the both knees are mobile in sides ways directions, the hip joints are mobile in all directions for both hips.

The sacro-iliac joint is mobile in the right side; there is no blockage in the lumbar, thoracic and cervical spine in all direction. It is very important to note that sometimes the patient in some joints for example the shoulder joint even if there is no blockage or restriction and this is due to the nature of the disease of RA since there is a gradually deformity in the joint with time in which could lead to pain, accompanied by morning stiffness, patient felt pain in many joints and they were mobile.

### **3.7.15 Examination's conclusion**

For postural examination in the posterior side the patient still have flat foot in both sides of the feet, the patient's Achilles tendon were inserted inward resulting in pronation of the right foot, inserted outward resulting in supination of the left foot. The right calf was positioned outward with bigger volume than the left side. The popliteal line was higher in the right side of the leg due to variety of the length of the lower extremities due to the total hip replacement which has been done and re-operated to the both hips in the past. A symmetrical size if thighs. The sub-gluteal line is higher in the right side with symmetry in

the gluteal muscles .the position of the pelvis was tilted to the left side and there is a prominent side of the paravertebral muscles. And there is a C-shaped scoliosis at the level of Th<sub>12</sub>-L<sub>2</sub>. The right scapula appears higher and more prominence than the left one. Symmetry of the shoulder girdle and the upper limb .And the position of the head is ideal and in the center of the plum line.

For the both right and left lateral sides of the plumb line test we can find that the shape of the ankle joint is in the natural position. The shape counter of the shin appear posterior to the line in the lefts side. The position of the right knee is posterior to the line. Symmetry of the thighs muscles in both sides. For the pelvis there is lateral shift the left side, and there less kyphosis in the sacral spine, hyper-lordosis in the lumbar spine and ideal kyphosis in the thoracic spine. The upper abdominal are more prominent. An ideal position of both shoulder girdles. And an ideal position of the head.

For the anterior view there is eversion of the left foot and inversion of the right foot. We can also see a hallux valgus of both big toes with a grade-3 moderate impaired stability (claw toes with pronation according to Vele's test).the weight is more disturbed to the lateral arch. The right knee is higher. Identical configuration of both tibialis anterior muscles. Symmetry of both thighs muscles. Pelvis is tilted to the right side. The upper abdominals is more prominent. Right thorac-o-brachial is higher. Chest shape is symmetrical. The position if the sternum is ideal. Symmetrical shape of the collarbone and supraclavicular holes. The position of the shoulder is symmetrical in both sides. The upper limb is symmetrical and both sides. And the potion of head is ideal in the midline. The palpation of the pelvis shows that it's laterally and anteriorly tilted, where the ASIS and PSIS and the iliac crest are higher in the right side in comparison with the left side.

The gait observation shows a bigger width of the gait with less pain during walking in comparison with the first initial examination , despite the fact that the upper abdominals are more dominant but also the lower and lateral abdominal muscles are visible to action during the gait ,with a lumbar hyper-lordosis and the right shoulder is higher still .The dynamic examinations shows identical and physiological results without pain or limitations .The patient has a normal way of breathing from upper , lower and abdominal during standing sitting and side lining, the chest expanding were 4,5 cm inhalation and 2 cm in exhalation . The weight of the body was more likely to be disturbed to the left side of the

body by 3 kg to the left side. Romberg test was negative, single leg stance were negative in both sides, Trendelenburg sign were negative for both sides as well, for Vele's test it was positive with grade 3 (claw toes) still.

The anthropometric measurements shows mostly identical values with a slight bigger value to the right side of the body .spinal distances were normal .the muscles length test were mostly normal expect for the upper trapezius and levator scapulae were both were shorted to the both sides with grade 1. for the muscle strength test results were mostly vary between 4 and 5 grades in which its very good results and muscles are strong and able to perform the task against gravity also the patient were able to increase the strength of some muscles, no weakness was indicated with respect that there is some limitations in ROM of some joint and that's not due the weakness or strength of the muscles yet but due the fact that some joints are deformed. For the goniometry the results were mostly good with some limitations in the elbow joint in the both sides but the patient were able to increase the ROM for extension and pronation and supinations of the elbow joint , pronation and supinations of the arms are now increased in range , the dorsiflexion and palmer flexion of the wrist were also increased in range and are less painful , the ROM of the fingers were slightly increased in extension due to stretching technique , pain and limitation in flexion of the left knee still present and patient is thinking about having a new operation for total knee replacement to the left side , less pain in the ankles with no limitations in dorsal and planter flexion . The deep tendon reflex was normal in the upper and lower extremities. The exteroceptive sensation was normal and physiological in all sections including superficial and deep sensation. In the soft tissue technique the caudal part of the back were restricted while the rest of the tissues around the body were physiological ,the cerebellum examination shows negative results in hand to nose and heel to shin exams , the pathological signs of paresis of the upper and lower extremities were both negative in results . Regarding this examination output, the patient with the help of the physiotherapist should work on fixing the positive and pathological issues in the patient body.

### **3.8 Effect of therapy**

The patient were able to perform all the exercises she asked to do , the therapy has a positive effect on the patient since its reduced the pain, and it's also has a psychological effect as the therapy going , yet the joint deformity shows no progress and the joint ROM are limited in term of increasing.

The patient was enjoying the therapy and has achieved the therapy at the training room and it their private room as self-therapy without any problem.

The patient was instructed to how to care of her body during the therapy session and before leaving the hospital.

## **4 Conclusion**

Working in the Revamatologicky Ustav was such a great experience, I was dealing with a nice and expert supervisors in which they tried their best to help and provide the necessary information to deal with the patients , it was also a great experience since I met different type of pathological cases in which increased my knowledge to how I suppose to examine them and treat them , the working environment was equipped with the therapy equipment we need to treat the patient , if the patient can't come to the training room then we have to go to their room and carry on with the treatment , I was working only with in-patient in which that allowed me to meet my patient on frequent bases .

For 10 days of working in this health center, I was practicing and demonstrating most of what I have learned from FTVS and by doing so, this session period was really helpful to practice my knowledge and to learn new techniques, and also to help to be more prepared to work in the future environments

, and I'm looking forward to have such lovely experience in the future.

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## 6 supplements

### 6.1 Ethics committee approval

CHARLES UNIVERSITY  
FACULTY OF PHYSICAL EDUCATION AND SPORT  
José Martího 31, 162 52 Prague 6-Vešelavín

#### Application for Approval by UK FTVS Ethics Committee

of a research project, thesis, dissertation or seminar work involving human subjects

**The title of a project:** Case Study of Physiotherapy Treatment of a Patient with the Diagnosis Rheumatoid Arthritis

**Project form:** Bachelor's Thesis

**Period of realization of the project:** February/2019

**Applicant:** Mr. Abdulalah Ahmed Almuahysin (UK FTVS + physical therapy)

**Main researcher:** Mr. Abdulalah Ahmed Almuahysin

**Workplace:** Rheumatology Ústav

**Supervisor:** Mgr. Marketa Mikulášová

**Project description:** a project of state examination and thesis writing accompanied by obligatory clinical work placement at selected hospital.

**Characteristics of participants in the research:** one patient aged between 30 and 80 with the Diagnosis Rheumatoid Arthritis.

**Ensuring safety within the research:** the project is safe and supervised by Supervisor Mgr. Marketa Mikulášová. Risks of therapy and methods will not be higher than the commonly anticipated risks for this type of therapy.

**Ethical aspects of the research:** The gained data will be processed and safely retained in an anonymised form and published in a bachelor thesis, possibly also in journals, monographs, and presented at conferences, possibly also used in further research at UK FTVS. After the anonymization the personal data will be deleted.

Anonymisation of persons on the photographs will be done by blurring their faces or parts of the body or characteristics that could lead to identification of the person. Non-anonymised photographs will be deleted after the end of the research.

I shall ensure to the maximum extent possible that the research data will not be misused.

**Informed Consent:** attached

It is the duty of all participants of the research team to protect life, health, dignity, integrity, the right to self-determination, privacy and protection of the personal data of all research subjects, and to undertake all possible precautions. Responsibility for the protection of all research subjects lies on the researcher(s) and not on the research subjects themselves, even if they gave their consent to participation in the research. All participants of the research team must take into consideration ethical, legal and regulative norms and standards of research involving human subjects applicable not only in the Czech Republic but also internationally.

I confirm that this project description corresponds to the plan of the project and, in case of any change, especially of the methods used in the project, I will inform the UK FTVS Ethics Committee, which may require a re-submission of the application form.

In Prague, 26/02/2019

Applicant's signature:

#### Approval of UK FTVS Ethics Committee

**The Committee: Chair:** doc. PhDr. Irena Parry Martinková, Ph.D.

**Members:** prof. PhDr. Pavel Slepíčka, DrSc.  
doc. MUDr. Jan Heller, CSc.  
PhDr. Pavel Hráský, Ph.D.  
Mgr. Eva Prokešová, Ph.D.  
MUDr. Simona Majorová

The research project was approved by UK FTVS Ethics Committee under the registration number: 068/2019

Date of approval: 27.2.2019

UK FTVS Ethics Committee reviewed the submitted research project and found no contradictions with valid principles, regulations and international guidelines for carrying out research involving human subjects.

The applicant has met the necessary requirements for receiving approval of UK FTVS Ethics Committee.

UNIVERZITA KARLOVA  
Fakulta tělesné výchovy a sportu  
José Martího 31, Praha 6

Stamp of UK FTVS

Signature of the Chair of  
UK FTVS Ethics Committee

## 6.2. Informed consent

### INFORMOVANÝ SOUHLAS

Vážená paní, vážený pane, v souladu se Všeobecnou deklarací lidských práv, zákonem č. 101/2000 Sb., o ochraně osobních údajů a o změně některých zákonů, ve znění pozdějších předpisů, Helsinskou deklarací, přijatou 18. Světovým zdravotnickým shromážděním v roce 1964 ve znění pozdějších změn (Fortaleza, Brazílie, 2013) a dalšími obecně závaznými právními předpisy Vás žádám o souhlas s prezentováním a uveřejněním výsledků vyšetření a průběhu terapie prováděné v rámci praxe na ....., kde Vás příslušně kvalifikovaná osoba seznámila s Vaším vyšetřením a následnou terapií. Výsledky Vašeho vyšetření a průběh Vaší terapie bude publikován v rámci bakalářské práce na UK FTVS, s názvem .....

Získané údaje, fotodokumentace, průběh a výsledky terapie budou uveřejněny v bakalářské práci v anonymizované podobě. Osobní data nebudou uvedena a budou uchována v anonymní podobě. V maximální možné míře zabezpečím, aby získaná data nebyla zneužita.

Jméno a příjmení řešitele .....

Podpis:.....

Jméno a příjmení osoby, která provedla poučení3.....

Podpis:.....

Prohlašuji a svým níže uvedeným vlastnoručním podpisem potvrzuji, že dobrovolně souhlasím s prezentováním a uveřejněním výsledků vyšetření a průběhu terapie ve výše uvedené bakalářské práci, a že mi osoba, která provedla poučení, osobně vše podrobně vysvětlila, a že jsem měl(a) možnost si řádně a v dostatečném čase zvážit všechny relevantní informace, zeptat se na vše podstatné a že jsem dostal(a) jasné a srozumitelné odpovědi na své dotazy. Byl(a) jsem poučen(a) o právu odmítnout prezentování a uveřejnění výsledků vyšetření a průběhu terapie v bakalářské práci nebo svůj souhlas

kdykoli odvolat bez represí, a to písemně zasláním Etické komisi UK FTVS, která bude následně informovat řešitele.

Místo, datum .....

Jméno a příjmení pacienta ..... Podpis pacienta:

.....

Jméno a příjmení zákonného zástupce .....

Vztah zákonného zástupce k pacientovi ..... Podpis:

.....

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## 6.5 Patients images



**6.5.1 Patient foot**



**6.5.2 Posture anterior view**



**6.5.3 Posture lateral view**



**6.5.4 Posture posterior view**

## 6.6 List of abbreviations

- ROM - Range of motion
- RHB -Rehabilitation
- ASIS - Anterior Superior Iliac Spine
- PSIS - Posterior Superior Iliac Spine
- ABD - Abduction
- ADD - Adduction
- EXT - Extension
- ER - External Rotation
- IR - Internal Rotation
- BMI - Body Mass Index
- RA - Rheumatoid Arthritis
- RU - Revamatologicky Ustav.