

CHARLES UNIVERSITY

Faculty of Physical Education and Sport
Department of Physiotherapy

**A physiotherapeutic approach to
Rheumatoid Arthritis**

Bachelor thesis

Supervisor:

Mgr. Miroslava Jalovcová

Author:

Christopher Nordlís

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Declaration

I declare that this Bachelor Thesis is based on my own individual work during my two weeks of clinical practice at the Revmatologický Ústav in Albertov, Prague between the 4th and 15th of February 2008. All information used is presented in the reference list at the end.

A handwritten signature in blue ink, reading "Christopher Nordl", is written over a horizontal dashed line.

Christopher Nordl s

Acknowledgement

I would like to use this opportunity to thank my supervisor, Mrg. Jalovcová, for her time and advise during the process of writing my Bachelor Thesis. Moreover, I would like to thank my patient, for her willingness, cooperation and patience with me, during the two weeks we had together. I would also like to thank my supervisor at Albertov, Petra Čermáková for good guidance and help during the practice. Last, but certainly not least, I would like to thank all of the professors that I have had during my three-years period at the Charles University for excellent teaching, guidance and advice on my way to become a physiotherapist.

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1. PREFACE

I was assigned a patient with the primarily diagnosis *rheumatoid arthritis* and secondary diagnosis *ischemic brain stroke* at my clinical work placement at Revmatologicky Ustav, Albertov, Praha. During my two weeks of practice, from 04.02.08 to 15.02.08, I had all together nine therapy sessions with the patient.

The main objectives of this thesis are, first a general description of rheumatoid arthritis and stroke, followed by a specific description, including anamnesis, physical examinations, treatment and the efficacy of the treatment for the patient.

2. GENERAL PART

2.1 Rheumatoid arthritis

2.1.1 Biology and physiology of a normal joint

The joint is a specialized structure that provides both stability and movement. During activity, the joint cartilage may be exposed to shearing forces and compression forces equivalent to several times the body weight. The joint is well adapted to resisting these kinds of impacts. A joint consists of several important parts, with different roles.

Striated musculoskeletal tissues provide the driving force for musculoskeletal activity. Chemical energy from the nutrition is converted into the mechanical energy required for work. Individual striated fibres are bundled in perimysial tissue that transmits the force of the muscle contraction through tendons to attachments on the bone. The work of an agonist muscle is closely coordinated with an opposing antagonist muscle. Synergistic muscle groups' work together to produce movements that none of them are able to produce alone.

Bone works as a central lever. Each effective movement comes about as muscles act on bones to move the limbs, head or torso. The bones are characterized by deposition of hydroxyapatite crystals in a well-organized collagen matrix. In newly formed bone tissue, the matrix is loose. In full maturation, however, the bone is dense and better adapted to load bearing, especially under compensatory forces.

Cartilage works as an interposed cushion between bone articulations. It is primarily composed of water. Normal hyaline cartilage is firm and resilient. Normal articular cartilage lacks blood vessels and nerves.

Synovium covers all intra-articular surfaces other than the articulating areas of the cartilage. The synovial lining is sometimes classified in terms of its sub-adjacent connective tissue. Thus, areas of areolar, fibrous and adipose synovium respectively overlie regions of loose, dense and fatty connective tissue. The function is

maintenance of an intact non-adherent tissue surface, lubrication of cartilage, control of synovial fluid volume and composition, nutrition of chondrocytes within joints.

Ligaments and tendons are dense, tensile connective tissue. Ligaments are strong bundles of collagen fibres that prevent inappropriate movements. Tendons on the other hand, serve as active drivers of joint motion, while ligaments are passive resistants.

Tendons sheaths and bursae connect muscle bodies to distant insertion sites. Points prone to friction such are areas between ligaments, bony prominences, and overlying skin, are often protected by lubricating bursae.

Joints require blood supply to ensure the health of the hyaline articular cartilage, which lacks blood vessels of its own. Transport across the synovial intima, joint fluid and cartilage matrix depends on diffusion. Feeder vessels from the limbs enter and leave the joint capsule at positions protected from mechanical pressure during movement. Motion is the principal function of the joints, however, the motion itself affects the health of the joint. If a mature joint is immobilized, cartilage thins and loses its normal physiological macromolecular matrix, together with the mechanical properties. The volume of joint space diminishes, as does the range of motion. Application and release of weight-bearing forces are thought to play a role in the joint lubrication and in the diffusion of substances and waists out of the cartilage. Other important reasons for movement include: maintenance of muscle strength, coordination of muscles, prevention of bone loss, maintenance of desired weight and preservation of a full range of motion in the joints. When there is inflammation, there might be restricted movement, which will allow fibrosis and continuously shortening of ligaments and capsule. This in return will restrict the range of motion.

Whereas cartilage has none, and synovium has limited innervations, the capsule, intra-articular fat pads, ligaments, periosteum, muscles and adjacent bones are abundantly innervated. The presence of a normally functioning proprioceptive mechanism and sensorimotor reflexes prevents potentially destructive forces of gravity and movement

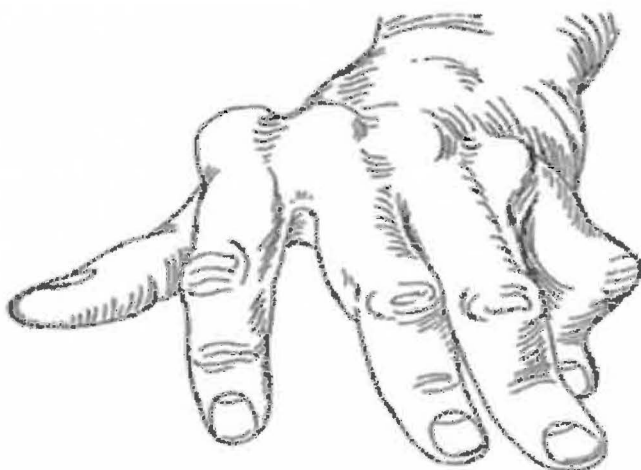
2.1.2 History of Rheumatoid arthritis

The first detailed description of the clinical picture of rheumatoid arthritis is attributed to medical doctor Landré-Beauvais in August 1800, under the name “goutte athénique primitive”. He concluded that the disease was characterized by swollen periarticular tissue, disorganized cartilage, bone decay or fusion. He concluded that the disease was affecting preferentially women, especially those of the lower classes. He described it as spasmodic, characterized by an immediately painful polyarticular involvement, but less violent and long lasting than in gout. Before his death in 1840, he established the clinical picture of rheumatoid arthritis and distinguished it from other illnesses, particularly gout.

2.1.3 Classification and epidemiology

Rheumatoid arthritis is an autoimmune condition that involves inflammation of the joints, in combination with pain. The cause of RA is not entirely understood. Rheumatoid arthritis begins with an altered immune response, in which certain white blood cells attack parts of the synovium, causing the inflammation. It is not yet known what causes the immune system to do this.

The swelling can deform the bones and tendons in the joints. Some people lose their ability to grip properly or turn objects with their wrists. Eventually, some patients can no longer work properly, or perform activities for daily living.



Although rheumatoid arthritis is a chronic condition, the outcome may differ from patient to patient. There can be periods of severe inflammation (flare-ups), followed by remission for a long period. A few people may experience one flare-up followed by remission. However, it is generally a progressive illness.

Rheumatoid arthritis has an annual incidence of about 0,2 per 1000 in males and 0,4 per 1000 in females. A prevalence of 0,5-1% has been reported in the population worldwide. The disease has a heritability of 60%.

Human leukocyte antigen molecules (HLA-DR4) have an important role in the genetic risk. Hormonal and reproductive factors contribute to the excess of females suffering from rheumatoid arthritis. Obesity, smoking, coffee consumption, stress and prior blood transfusion have also been identified as potential risks.

Stages:

During the early disease, there are only few clinical evidences of joint damage, signs of cartilage loss, or bone erosion. Spontaneous remission may occur, especially if the onset of poly-arthritis has been quite sudden. When there is a progressive disease, there is an unrelenting chronic disease activity, despite treatment. In addition to poly-arthritis, there is often an increased ESR, positive rheumatoid factors tests and early radiographic evidence of joint erosion. When the disease has progressed into a late stage, there is a definite joint damage with all its attendant complications.

Rheumatoid arthritis affects twice as many women as men. It may begin at any age. However, the peak onset is in the fourth and fifth decade of life. After that, the number increases. It also appears to be more frequent in the winter months.

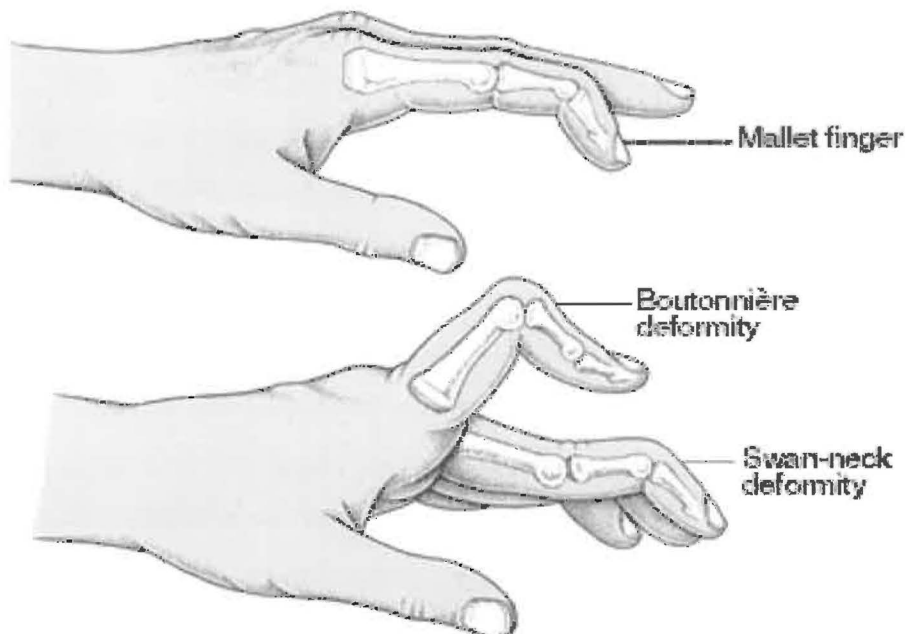
American Rheumatism Association (ARA) criteria for Rheumatoid Arthritis 1987	
Morning stiffness	In and around joints. Lasting at least one hour before maximal improvement
Arthritis in three or more joint areas*	Soft tissue swelling, or fluid present simultaneously at least 6 weeks
Arthritis of hand joints	Swelling of wrist, MCP or PIP joints for at least six weeks.
Symmetric arthritis	Simultaneous involvement of the same joint areas bilaterally for at least 6 weeks
Rheumatoid nodules	Subcutaneous nodules over bony prominences
Rheumatoid factor (positive blood test)	Detected by a method positive in fewer than 5% of normal controls
Radiographic changes	Bony decalcification of the involved joints (posteroanterior hand and wrist radiographs)
* Possible areas: right or left PIP, MCP, wrist, elbow, knee, ankle or MTP. <i>At least four criteria must be fulfilled for classification</i>	

2.1.4 Differential consideration

The most common presenting symptoms include symmetric joint pain and swelling of the small peripheral joints, often associated with difficulties of making a fist. Morning stiffness is also a sign of RA. Internal organs may be affected by rheumatoid arthritis as well. The most common organs include the skin, eyes, heart, lungs, gastrointestinal tract and kidneys. Moreover, inflammation of the blood vessels (*vasculitis*) may occur. This inflammation can be life threatening, causing skin ulcerations and infections, bleeding ulcers, hemorrhage and nerve problems.

2.1.5 Individual joints and rheumatoid arthritis

Hasting's classification of rheumatoid hand deformities – hand		
Joint involvement	MCP joints	Synovitis Passively correctable ulnar drift, Flexed volar subluxation, ulnar drift
	PIP joints	Synovitis Boutonnière deformity Swan-neck deformity Flail IP joint
	Thumb	Flail IP joint Boutonnière deformity Duckbill thumb (CMC) dislocation
	Wrist	Synovitis Carpal supination-subluxation Radiocarpal dislocation
Tendon involvement	Flexor tendon disease	Loss of active flexion, triggering Tendon rupture Median nerve involvement
	Extensor tendon disease	Synovitis – dorsal mass Extensor tendon rupture, dislocation



The elbow	Loss of extension, affects ADL, bulge between olecranon and head of radius, limited supination, pronation, synovitis
- Subcutaneous nodules	Affects 30%, cyst, local infection
- olecranon bursa	Bursitis, synovitis
The shoulder	Erosion of humeral heads, glenoid fossa Rapture of bursa Inflammation of rotator cuff synovium Acromioclavicular joint disease
The temporomandibular joint	Tenderness, swelling, “gump jaw”
The cervical spine	Atlanto-axial subluxation Neck stiffness
The thoracic and lumbar spine	Uncommon, apophyseal synovitis, compression fractures
The sacroiliac joint	Erosion, osteopenia, ank. spondylitis
The hip	Abnormal gait, groin discomfort,
- iliopsoas bursa	Synovitis, effusion, Femoral vein compression
- Trochanter and ischial bursae	Bursitis
The knee	Effusion, inflammation
- popliteal cyst	From the gastrocnemius bursa to the medial ankle region.
- Later disease	Laxity of the collateral and cruciate ligaments, inflammation,
The ankle	Persistent synovitis, stress fracture
The foot	Synovitis, subtalar dislocation, valgus and flatfoot deformation,

2.1.6 The physician's examination of a patient with Rheumatoid Arthritis

- Aspiration and injection of joints and soft tissue:

Synovial fluid analysis and synovial biopsy: the study of fluid or tissue is one way to distinguish rheumatoid arthritis from other diseases, such as crystal-induced arthritis.

- Imaging:

Plain film examination, conventional tomography, computed tomography (trauma, infections, bone neoplasm, articular diseases, miscellaneous regions and disorders), magnetic resonance imaging, general radiographic features (symmetry, osteoporosis, soft tissue changes, joint space narrowing, bony erosions, bony crystals, deformities and instabilities.)

- Arthroscopy and synovectomy:

Conventional open surgical techniques are sometimes used to address intra-articular pathology. It allows direct access to joint structures.

- Laboratory evaluation of inflammation:

It is difficult to find a precise definition of inflammation, however, physicians have been able to exploit the acute-phase response to obtain objective markers that reflect the extent or degree of the inflammation.

2.1.7 Conservative therapy provided by the physician: pharmacology

- Non-steroidal anti-rheumatic drugs

This group of drugs reduce the symptoms of inflammation, however, they do not eliminate the underlying cause of the inflammation. The effects on pain, swelling, heat, erythema and loss of function begins to manifest after a few weeks. These drugs are usually referred to as non-steroidal anti-inflammatory drugs (NSAIDs), and they include aspirin, non-acetylated salicylates, phenylbutazone and ibuprofen.

There may be adverse effects, affecting the gastrointestinal system (irritation, ulcers, nausea, vomiting), hepatic effects (liver toxicity, hyper-bilirubinemia), renal effects (reduced renal blood flow, proteinuria, renal toxicity), cutaneous effects, hypersensitivity reactions and effects on the central nervous system.

- Sulfasalazine

Sulfasalazine affects various inflammatory mediators, example reduction of circulating, activated lymphocytes, and fall in IgM and rheumatoid factor titers. Adverse effects may occur, especially in the gastroenteric system (nausea and upper abdominal discomfort. Haematological, skin, pulmonary and reproductive problems may also occur.

- Antimalarial drugs

The primary actions of these drugs are inhibition of enzyme activity, stabilization of lysosomal membranes, inhibition of connective tissue encapsulation and decreasing histamine production. In rheumatoid arthritis, these drugs act very slowly, and the improvement usually occurs after several months.

Adverse effects include: gastrointestinal problems (cramps, diarrhoea, nausea, vomiting and weight loss), skin and hair problems (rashes, dry skin), neuromuscular



problems (weakness, vestibular dysfunction, headache, insomnia, involuntary movements, irritability), ocular problems (diplopia, loss of corneal reflex, retinopathy) and miscellaneous problems (birth defects, renal problems, blood dyscrasias, electrocardiographic changes). Death may occur from overdose, due to problems with peripheral circulation or collapse.

- Glucocorticoids

Glucocorticoids suppresses inflammation induced by a great variety of immunologic, mechanical, chemical and infectious stimuli, though multiple interacting mechanisms. Adverse effects, after prolonged exposure to high doses include: immunologic (increased susceptibility to infection), musculoskeletal (osteoporosis, muscle waste), gastrointestinal (peptic ulceration), cardiovascular (hypertension)), dermatologic (acne, skin fragility), psychological (altered mood) and metabolic (glucose intolerance).

Reconstructive surgery for rheumatic disease may be indicated to relieve disabilities, such as progressive pain, loss of function, and cartilage destruction. In selected situations, surgery may even be indicated to prevent these consequences. The surgeon should be a part of a team, composed of rheumatologists, nurses, therapists, social workers and the patient. The involvement of the patient is important for his or her understanding of the treatment, the necessity of prolonged physical therapy and the ultimate realistic goal of the procedures. Participation of both the patient and physiotherapist in a post-operative exercise program is important for improvement of muscle strength, increase or preserve the range of motion and in education of the patient in proper protection of operated and non-operated joints. The most common operations occur in the following joints:

- The hand and wrist joints
- The elbow and shoulder
- Cervical spine
- Hip joint and knee
- The ankle and foot

Complications of reconstructive surgery include

- Infections and improper wound healing
- Neuro-apraxia
- Muscle insufficiency
- Fractures,
- Instability
- Displacing

Rehabilitation after reconstructive surgery include

- Avoidance of inflammation
- Education of the patient
- Rest
- Early motion in combination with exercises, with passive, active assistive and active movements.
- Splints

2.1.8 The examination provided by the physiotherapist

- Aspection, palpation and range of motion are important examinations, to find and to compare areas with restriction.
- Joint inflammation: tenderness, swelling and local heat. A joint is active if it is tender when pressure is applied, or painful if the joint is moved passively.
- Tenderness: elicited by direct palpation over a joint. Firmer pressure on the tissues between or remote areas should not be tender. This testing is especially useful in determining early and progressive disease activity in the wrist, finger and toes. Pain during movement in the late stage may be caused from bare bone rubbing against each other, due to loss of articular cartilage, and is not a reliable indication of the presence of inflammation. For this reason, the hips should not be included from the routine of simple joint count.
- Stress pain: produced when a joint at the limit of its range of motion is nudged a little further. It is especially useful symptom in the shoulder (external-internal rotation), wrist, MCP and the joints in the ankle region. The pressure on the joints should be about 20% less than required to reach the threshold of pain. If any doubt, record the joint as inactive.
- Synovial effusion: hydraulic effect of an increase in fluid tension produced by pressure in one direction is transmitted equally in all three planes. If you use two fingers, press one downward, and the other will feel an upward lift. When joints can be surrounded, it is possible to use four fingers.
- Joint damage and destruction: observations include reduced range of motion, collateral instability, malalignment, subluxation or loss of articular cartilage. After these examinations and evaluations have been accomplished, the diagnosis can finally be confirmed and the patient can be categorized as having early, progressive or late disease.

2.1.9 Therapy provided by a physiotherapist: non-conservative methods

- Rest:

Active inflammatory joint disease may be reduced with prolonged systemic rest (bed rest), however, complete bed rest has no place in the long term management of rheumatic disease, due to the negative effects of the musculoskeletal, cardiovascular and nervous systems. A programme of rest for a limited period each day or rest of particular joints is preferable.

- Exercise:

Inflammatory muscles, joints and connective tissue diseases may result in loss of joint range of motion, muscle strength and bone density. An accumulation of fluid within a joint also inhibits movement. Widespread muscle or poly-inflammation may also cause fatigue and reduced endurance, and therefore exercise can be used as therapy to increase the range of motion, endurance and strength, coordination and stability. For example an exercise program for the hand may help maintaining the grip and pincer strength. Examples of exercise include

1. Range of motion, or stretching
2. Strengthening (resistive): isometric, isotonic and isokinetic.
3. Aerobic (endurance).

In addition, exercises are divided into active or passive (movement of a joint without muscle contraction). Inflamed joints should be exercised daily. Isometric exercises are performed without a change in joint range or muscle length. These exercises are particularly recommended in rheumatoid arthritis, because they are easy to perform, can be performed in bed. In addition, they do not require any special equipment.

Swimming, bicycling and other non-weight-bearing condition exercises are especially suitable for rheumatoid arthritis. On the other hand, exercises, such as tennis is best avoided, due to the sudden stresses and strains placed on the ligaments and joints from rapid acceleration and deceleration movements that occur during these activities. It is important not to use the exercises in the morning, because of the problems with stiffness and pain in the points.

- Physical modalities

This treatment may be able to help lessen the inflammation and pain, clinical trials proving their lack effectiveness are lacking. They should be goal-orientated and time limited. Methods of superficial heating include; *hot packs, pads, hydrocollator packs, paraffin wax, hot water bottles, infrared lamps, heated pools and whirlpools*. Cold applications raise the pain threshold, thus producing local analgesia, and decrease spasticity and muscle spasms by direct action on the muscle spindle. Methods of superficial cooling include: *ice massage, ice pack, fluorotherapy, and running water*.

- Electrotherapy

Transcutaneous electrical nerve stimulation (TENS) is an intermittent low-voltage current. It is non-invasive and few side effects, but should not be used in patients with pacemakers. The mechanisms of action remain unknown, but the most common concept embraces the gate theory of pain by Melzack and Wall. Presumably, the current produced by the device closes the gate and prevents transmission of pain impulses.

- Orthotics

Orthotic devices generally include braces, splints, corsets, collars and shoe modifications. These applications help to maintain optimal function of an altering biomechanics. Orthoses decrease forces passing through painful weight-bearing joints, stabilize sub-luxing joints, improve motion patterns and maximize the functional positioning. Unless the underlying inflammation is treated, orthotic devices cannot prevent deformity. Orthosis may also allow a highly inflamed joint to fuse in the best functional position. The most common types of plastics used today are thermoplastic and thermoset.

In acute stages:

- Patient education
- Rest – local and general
- Cold applications
- Splints
- Range of motion exercises

In chronic stages:

- Passive movements
- Active assistive movements
- Active movements
- Muscle energy technique
- Walking and standing re-education

2.2 Cerebrovascular accident

2.2.1 Ischemic stroke

Cerebrovascular accident is characterized by sudden loss of blood circulation to an area of the brain, resulting in a corresponding loss of neurological function, termed as a stroke. A stroke is a nonspecific term encompassing a heterogeneous group of pathological causes, including thrombosis, embolism, and hemorrhage. Strokes can be classified as either hemorrhagic or ischemic. Acute ischemic stroke refers to strokes caused by thrombosis or embolism and accounts for 85% of all cases.

There are four types of ischemic stroke

- Large vessel disease:

Causes regional infarction. The main mechanism behind this type of stroke is embolism and thrombosis in named cerebral arteries.

- Small vessel disease

This form causes micro-infarcts known as lacunar infarcts. These are caused by arteriolosclerosis predisposed by hypertension and diabetes mellitus. The main sites for this type of infarction are the pons and the basal ganglia of the brain.

- Venous infarction

This type of infarction causes hemorrhagic necrosis. Due to thrombosis in a main cerebral venous sinus, it is associated with abnormal predisposition to thrombosis, such as in dehydration.

- Global ischemia

Global ischemia causes widespread neural necrosis, and it may even lead to laminar cortical necrosis. It is seen when there is a reduction in cerebral blood flow, for example in conditions caused by cardio-respiratory arrest, or when the blood flow is reduced, but not completely absent, as in severe hypotension. Infarction occurs at arterial boundary zones.

2.2.2 Central paresis

Clinical symptoms usually manifests themselves in

- Decreased muscle power, with hyper-tone in term of spasticity
- Increased deep tendon reflexes
- Irritative pyramidal signs
- Paretic reflexes

Types

- Hemiparesis: affecting one side of the body
- Paraparesis: affecting the lower extremities
- Quadraparesis: affecting all the limbs
- Triparesis: affecting the two of one specific limb, and one of the other (example two legs and one arm, or two arms and one leg)
- Mono-paresis: affects one extremity

Capsular hemiplegia usually affects the upper extremities to a greater degree than the lower extremities. It manifests itself in WernicMann's position of the patient, with:

- Flexion in the elbow joint,
- Wrist in ulnar duction,
- Fingers are held a in fist
- Adduction of the thumb
- Knee extension of the lower extremity
- Plantar flexion in ankle joint, in combination with inversion

Cerebrovascular accident of the left hemisphere of the brain, is usually manifested in

- Paresis, or loss of power (strength) in the right side of the body
- Loss of feeling and awareness to the right side
- Problems with performing purposeful movement in general
- Loss of vision on the right eye
- Difficulties in speaking and communication, usually in combination with problems of understanding what other people are saying.
- Inability to read and/or to write
- Loss of memory and confusion between left and right with early and quick frustration
- Slowness, clumsiness and poor motivation
- Difficulties in structuring and planning behaviour
- Problems when dealing with numbers
- Urge to repeat and perform certain movements

Cerebrovascular accident of the right hemisphere of the brain, is usually manifested in

- Paresis or loss of power (strength) in the left side of the body
- Loss of feeling, awareness and vision connected with left side of the body
- Excessive talking with slurred and monotonous speech, often with sarcasm
- Swallowing and eating problems
- Difficulties with recognition of faces and relate things to each other in space
- Difficulties in interpretation of sounds
- Depression, denying problems and mood swings
- Short attention span, memory problems and lack of interest

2.2.3 Therapy

- Positioning
- Passive movement
- Relaxation
- Education of voluntary movement using facilitation techniques
- Standing and walking education
- Education of activities of daily living

3. SPECIAL PARTS

3.1 Personal information from the physician

65 years old patient with sero-positive test results from the laboratory. She was diagnosed with rheumatoid arthritis in October 1996, and she has been on drug therapy from the time she got the diagnosis. Medical doctor Pavelka discovered the rheumatoid arthritis, and was prescribing corticotherapy for the patient until 2000. Moreover, she has been taking drugs for arterial hypertension as well. In October 2006, she suffered from ischemic brain stroke of left hemisphere of the brain, causing central paresis of both extremities of right side of the body.

- Blood pressure: 115/70
- Pulse: 100/min
- Height: 163 cm
- Weight: 64 kilograms

Subjective: pain and stiffness in most of her joints, especially in the left shoulder, and in the wrists and finger joints.

Objective: good orientation, good cooperation, she has periods with elevated temperature, she has eupnoea, no cyanosis, she walks with one crutch (Wernickman type of walking), circumduction during walking.

- Head: no headache, no pain where the cranial nerves enter, physiological innervation of the facial nerve, the eyeballs in normal position, no nyastagmus and the tongue is in a good position.
- Neck: good filling of the veins, good pulse, and no enlargement of the thyroid glands.
- Chest and abdomen: palpation is not painful, there is no excessive resistance, and the liver is not enlarged.
- Lower extremities: good pulse to the peripheral parts, the inguinal area is free from any blockage, no particular pain, negative Homan and no thrombosis.

3.2 ANAMNESIS

3.2.1 Main complaint

- She is currently at the revmatologicky ústav, due to problems with flare-up of rheumatoid arthritis. She has been experiencing frequent oedema, especially around the small joints in her fingers.
- In 2000, the patient stopped with the physical therapy for the rheumatoid arthritis, and continued with the medicaments from the medical doctor.
- Recently, she has been experiencing more frequent pain.
- Her rheumatoid arthritis started over ten years ago, and that is when she began with medications, however, the present problems started around two years ago, and they have gradually been increasing.
- The pain is more intense during the morning until noon. She takes pills twice each day to ease the pain (first in the morning and then around noon). After the medications, the pain eases a little. She is suffering from morning stiffness.

3.2.2 Personal

- Arterial hypertension: corrected by medications
- 1972: plastic surgery of the cervix, antibiotics for a urinary tract infection
- 1975: fracture of right wrist
- 1986: operation to correct a bilateral varix of her knees
- 1996: Operation of an aneurism in the posterior part of cerebrum in August
- 1996: Discovery of the rheumatoid arthritis
- 2006: Ischemic stroke on left side of the brain in October

3.2.3 Family

- Mother: suffered from osteoporosis. She died at the age of 82
- Father: suffered from leukaemia. He died at the age of 72
- Grandmother: suffered from rheumatoid arthritis

3.2.4 Social

- She lives alone in the ground floor of a house in Prague. Her daughters come over to visit her and help her out on a daily basis. No stairs where she lives.
- There are doorway frames, which work as minor obstacles, however, they do not cause her any big problems.
- She does basic hygiene by her self: microwave, washing herself, brushing her hair, visiting the toilet.
- Out-door walks and baths, hair washing, shopping, excessive housework and gardening, she needs help, usually from her daughters.

3.2.5 Work

- Retired chemist. During the last ten years, she worked as an assistant. Before that, she also worked at several offices.

3.2.6 Allergies

- She does not suffer from any allergies

3.2.7 Pharmaceuticals

- Vasocardin 50 1-0-1,
- Asentra 50 1-0-0,
- Rhefluin " -0-0,
- Tritace 10 " -0-0,
- Anopyrin 100 0-1-0,
- Ortanol 20 1-0-0,
- Medrol 16 " -0-0,
- Uraplex 50 1-0-1,
- Tramal 50 1-1-1,
- Dolmina 50 1-0-1,
- Baclofen 10 1-0-2,
- Coaxil 1-1-1,
- Chlorprotixen 15 1-0-1

3.2.8 Gynaecological

- She had menstruation between the age of 13 and 50.
- She has two successful child deliveries and no abortions.

3.2.9 Abuses

- She is an ex-smoker. She stopped after the brain stroke in 2006. Before that, she smoked approximately ten cigarettes each day.
- She does not drink alcohol, however, she usually drinks three cups of coffee each day

3.3. NEUROLOGICAL CLINICAL EXAMINATIONS

Initial kinesiological examination

3.3.1. Ventral/frontal

Symmetry	Left	Right
Flat transversal sole arch	Normal	Normal
Flat longitudinal sole arch	Flat	Normal
Calf – tibial side	Slightly convex	Slightly concave
Calf – fibular side	Slightly convex	Neutral (slightly concave)
Patella position	Neutral	Internally rotated
Thigh	Increased tone, int. rot.	Decreased tone, int. rot
Ant. Superior iliac spine	On the same plane	
Abdominal muscle tone	Decreased muscle tone of the rectus abdominis	
Shoulder position	Elevated, adduction	Depressed, adduction
Arms/elbows	Semi-flexed	Flexed, ulnar duction
Face symmetry	Good symmetry of the face	
Toes	Hammer toes on both sides	

3.3.2 Dorsal/back

Symmetry	Left	Right
Heel shape and position	Points medially	Points medially
Achilles tendon	Arches laterally	Located centrally
Calf medial side	Neutral	Neutral
Calf lateral side	Slightly convex	Neutral
Popliteal lines	Slight elevation	Slight depression
Thigh	Increased muscle tone	Decreased muscle tone
Sub-gluteal lines	Symmetrical, higher tone.	Decreased muscle tone
Post. Superior iliac spine	Symmetrical on both sides – same transverse plane	
Ilium crest	Symmetrical on both sides	
Scapulae	Elevation	Internal rot. of lower angle
Shoulder position	Elevated, adduction	Depressed, adduction

3.3.3 Lateral/side

Symmetry	Left	Right
Position of the head	Forward and without rotation to the sides	
Cervical spine	Kyphosis	
C-TH crossing	Kyphosis	
Thoracic spine	Increased flexion (long kyphosis)	
Th-L crossing	Increasing lordosis	
Lumbar spine	Lordosis of the whole lumbar spine	
Pelvis	Neutral	Neutral
Knee joints	Extension	Slight flexion
Sole	External rotation	External rotation
Shoulder	Elevated	Depressed
Elbow joints	Semi-flexion	Flexion
Fingers and thumb	Abduction and semiflexion	Adduction and flexion

3.3.4 Gait examination

Hips/pelvis/ thigh

- During walking there is little movement of the pelvis or hip
- Internal rotation of both hips (more on the right side)
- Reduced extension of the hip joint

Knees

- Left knee in extension and right knee in semi-flexion

Ankle/foot/toes

- Ankle and feet are in external rotation
- Bilateral hallux valgus

Arms

- No synkinesis
- Flexion in all joints of the right hand

Shoulder

- Right shoulder is elevated

Trunk

- The thorax rotates to the left side

Back

- Higher muscle tone of left paravertebral muscles

Head

- Head flexes and slightly rotates to the left

Overall

- Weight on to the left side
- Wernick-Mann type of walking
- Uses support
- Circumduction of both legs during walking

3.3.5 superficial sensation

Superficial sensation	Left	Right
Temperature	She felt the different between a cold object and warm object equally on both left and right side. <ul style="list-style-type: none"> - Medial and lateral side of forearm and arm - On palm and wrist - Medial and lateral side of thigh - On knees and on ankles 	
Pain and sensation: pin, brush and fingertip	Method	Method
Fingers	Touched – felt it	Nothing – described it
Lateral forearm	Brush – felt it	Brush – described it right
Lateral arm	Needle – felt it	Nothing – described it
Medial forearm	Brush – described as pin	Pin – described it right
Medial arm	Nothing – described it	Fingertip – described it
Medial thigh	Touch – felt it	Weak touch: felt it
Lateral thigh	Brush – felt it	Needle – felt it
Lateral ankles	Finger – felt it	Brush – same as finger
Medial ankles	Finger continued – she said that she felt that I stopped at both places at the same time (when is stopped on the right side earlier)	Finger – stopped earlier

Conclusion:

While there are no problems with the sensation of temperature, she does have some minor problems with pain sensation on the both sides of the body.

3.3.6 deep sensation

	Left	Right
Vibration sense		
Radial Styloid process	Good	Good
Olecranon	Good	Good
Medial malleolus	Good	Slightly reduced
Lateral malleolus	Good	Slightly reduced
Joint position		
Bending right knee	Passively	Explained it correctly
Bending right elbow	Passively	Repeated the movement
Abduction of right hip	Passively	Repeated the movement
Abduction of thumb	Passively	Repeated the movement
Supination	Passively	Repeated the movement
Two-point sensation	In cm	
On palms	Felt two points up to 0,5	Felt two points up to 1 cm
Dorsum of the hand	Felt two points up to 0,5	Felt two points up to 1 cm
Ankle	Felt two points up to 0,75	Felt two points up to 2 cm

Conclusion:

There is a physiological deep sensation on the entire left part of her body, while there is reduced vibration and two-point sensation on the right side. The joint position on the right side is physiological.

3.3.7 Deep tendon reflexes

Reflex	Main spinal nerve root	Result	
Biceps	C5	Left: 1	Right: 3
Brachioradialis	C6	Left: 1	Right: 3
Triceps	C7	Left: 1	Right: 2
Flexors of the hand	C8	Left: 1	Right: 4
Patellar	L2-L4	Left: 2	Right: 3
Achilles tendon	L5-S1	Left: 2	Right: 2

Conclusion:

The left side has hypo-to normal reflexes, while the right side has increased reflexes, probably caused by spastic muscles.

3.3.8 Pathological reflexes: spastic

Upper extremities		Left	Right
Flexion, opposition of thumb	<i>Juster</i>	Negative	Slight reaction
Flexion, opposition of middle finger	<i>Trömner</i>	Negative	Slight reaction
Flexion, opposition of middle finger	<i>Hoffman</i>	Negative	Slight reaction
Lower extremities		Left	Right
With extension of the big toe	<i>Babinski</i>	Negative	Positive
With flexion of the big toe	<i>Mendel-Bechterev</i>	Negative	Slight reaction

Conclusion:

The patient has spastic muscles in the upper and lower limbs on the right side.

3.3.9 Anthropometric examination

Lower extremities			
Unit	Description	Left in cm	Right in cm
Anatomical length	Trochanter major to lateral malleolus	79	77
Functional length	SIAS. to medial malleolus	88	88
Thigh	Trochanter major to head of fibula	48	47
Middle leg	Knee joint to medial malleolus	41	39
Foot	Heel to longest toe	25	24
Thigh circumference	15 cm above the knee cap	52	50
Knee circumference	Around the knee and the knee cap	39	37
Calf Circumference	Highest volume	33	31
Ankle Circumference	Around medial and lateral malleolus	22	22
Foot circumference	Metatarsal heads	21	22

Conclusion:

Shortness of right side, probably caused by contracted muscles over a longer period

Upper extremities			
Unit	Description	Left in cm	Right in cm
Whole extremity	Acromion to tip of the third finger	72	70 – spasticity and semiflexion
Humerus	Acromion to the lateral epicondyle	30	30
Forearm	from the olecranon to the processus styloideus ulnae	24	25
Hand	Between the styloid process ulna and radius to the tip of third finger	20	20
Circumference upper arm	At the place with the highest volume	28	29
Circumference forearm	At the place with the highest volume	22	23

Conclusion:

With the exception of the whole extremity, the two sides are relatively symmetrical. Note: the circumference of the right side is greater, probably caused by the constant contraction of the flexors of the arms.

Others		
Head	Height of glabella	56
Thorax	Middle sternum, xiphoid	4 cm between insp+exp
Waist	Umbilicus	92
Hips	Around the trochanters	102

3.3.10 Dynamic tests: spine distances

Test	Purpose	Normal range	Patient
Thomayer's test	Flexibility of spine	0 cm	15 cm positive
Shober's test	Test Lumbar spine	4-6 cm	5 cm
Stibor's test	TH- and L spine	7-10 cm	6 cm (1 cm neg.)
Latero-flexion	Whole spine	20-25 cm	12 cm and 12 cm
Otto's distance	TH in F and E	Sum: 4,5 cm	5 cm
Flesh de forestier	Cervical flexibility	Occipital and wall	8 cm
Cepoj's distance	Cervical flexibility	3-4 cm	3,5 cm

Conclusion: Hypomobility of the spine as a whole, although certain parts have physiological range

3.3.11 Goniometry – joint measurement (passively)

		Motion	Normal		
60	Left Shoulder	Extension	45	Right shoulder	50
150		Flexion	180		40
210		Range	225		90
80		Abd	180		30
20		Add	0		10
100		Range	180		40
125		H. Abd	90		45
30		H. Add	30		30
155		Range	120		75
60		Lat. Rot	90		40
85		Med. Rot	70		65
145		Range	160		105

Conclusion: there is misbalance between both sides. In general, there is reduced range of motion on both sides, except horizontal abduction and horizontal adduction of shoulder on left side. The right shoulder has the most restriction, probably due to the RA, and because the patient does not use this joint properly.

	Left elbow	Motion	Normal	Right elbow	
0		Extension	0		10
130		Flexion	145		135
130		Range	145		145

Conclusion: Although there is flexion on both sides, it is not as severe as in the shoulder joint. On the right side, it was not possible to fully extend the elbow.

	Left forearm	Motion	Normal	Right forearm	
90		Supination	90		85
90		Pronation	90		60
180		Range	180		145

Conclusion: supination and pronation on the left side was normal. On the other hand, there were some restrictions of both movements on the right side, mainly concerning pronation.

	Left wrist	Motion	Normal	Right wrist	
20		Extension	70		5
30		Flexion	80		30
50		Range	150		35
25		Ulnar dev.	45		10
10		Radial dev.	20		10
35		Range	65		20

Conclusion: both wrists show severe reduction of motion range

Joint	Thumb	Normal	Left	Right
CMC	Flexion	15	P: 15 A: 15	P: 15 A: 15
	Extension	20	P: 20 A: 20	P: 20 A: 20
	Abduction	60	P: 60 A: 55	P: 60 A: 50
	Adduction / Opposition	Pad of thumb to Pad of the 5th digit	P: Good A: Good	P: -3 cm A: Good
MCP	Flexion	50	P: 50 A: 50	P: 45 A: 55
	Extension	0	P: 0 A: 0	P: 5 A: 0
IP	Flexion	80	P: 80 A: 80	P: 85 A: 80
	Extension	0	P: 0 A: 0	P: 5 A: 0

Conclusion: all the joints of her thumbs show a relative good ROM.

Joint:	2 nd – 5 th Digits	Normal	Left	Right
MCP Meta Carpal Phalangeal	Flexion	90	2 90/90	2 95/90
			3 90/90	3 95/90
			4 90/90	4 90/85
			5 90/90	5 90/85
	Extension	0	2 0/0	2 0/0
			3 0/0	3 0/0
			4 0/0	4 0/0
			5 0/0	5 0/0
	Abduction	20	2 20/20	2 0/0
			3 20/20	3 0/0
			4 20/20	4 0/0
			5 20/20	5 0/0
PIP Proximal Inter Phalangeal	Flexion	100	2 100/100	2 110/100
			3 100/100	3 105/105
			4 100/100	4 105/100
			5 100/95	5 100/95
	Extension	0	2 0/0	2 10/0
			3 0/0	3 5/0
			4 0/0	4 5/0
			5 0/0	5 5/0
DIP Distal Inter phalangeal	Flexion	70	2 70/70	2 75/70
			3 70/70	3 70/70
			4 70/70	4 70/70
			5 70/70	5 70/65
	Extension	0	2 0/0	2 10/0
			3 0/0	3 5/0
			4 0/0	4 5/0
			5 0/0	5 5/0

Conclusion: there are restrictions, probably caused by a combination of rheumatoid arthritis and the stroke. The most affected movements and joints are flexion of her MCP, flexion and extension of the PIP, and extension of the DIP. The restrictions are more severe on her right hand.

		Motion	Normal		
20	Left hip	Extension	10	Right hip	30
115		Flexion	125		100
135		Range	135		130
40		Abduction	45		45
40		Adduction	10		40
80		Range	55		95
40		Lat. Rot.	45		10
40		Med. Rot.	45		10
80		Range	90		20

Conclusion: as for flexion and extension, the ROM is physiological, the adduction of both legs are excessive, and right lat. and med. rot. of the are restricted.

		Motion	Normal		
0	Left knee	Extension	0	Right knee	0
110		Flexion	140		110
110		Range	140		110

Conclusion: there is normal extension, but reduced flexion of the patient's knee joint

	Left ankle	Motion	Normal	Right ankle	
50		Plantar F	45		10
10		Dorsi F	20		5
60		Range	65		15

Conclusion: left ankle is almost physiological; both the right plantar and dorsal flexion is restricted

	Left foot	Motion	Normal	Right foot	
30		Inversion	40		10
20		Eversion	20		20
50		Range	60		30

Conclusion: there is slight restriction of inversion the left foot. On the right foot, the restriction is also reserved to the inversion of the foot, but to a higher degree.

3.3.12 Muscle strength tests

Upper extremities and shoulders	Left	Right
Biceps brachii	4+	Due to positive pathological spastic reflexes of her upper-extremities, manual muscle testing could not be provided, as she cannot control her muscle activity.
Brachobrachialis	4+	
Brachioradialis	4+	
Triceps brachii, anconeus	4	
Deltoid (whole muscle)	4	
Pectoralis major	4	
Pectoralis minor	4+	
Infraspinatus	3+	
Supraspinatus	3	
Latissimus dorsi	3+	
Upper trapezius	4+	
Middle trapezius	3	
Lower trapezius	3	
Serratus anterior	5-	
Rhomboids	3-	
Arm flexors	4	
Arm extensors	3+	
Abductor pollicis brevis	4	
Opponens pollicis	4	
Extensor pollicis longus	4-	
Abductor digiti minimi	4	

Lower extremities	Left	Right
Tibialis anterior	4	Due to positive pathological spastic reflexes of her lower extremities, manual muscle testing could not be provided, as she cannot control her muscle activity.
Tibialis posterior	4	
Peroneus longus	3+	
Plantar flexion ⁽¹⁾	Good	
Hamstrings (semitendinosus, semimembranosus)	4+	
Biceps femoris	4	
Quadriceps femoris	4+	
Hip flexors	4-	
Adductors	4+	
Lateral hip rotators ⁽²⁾	2+	
Abductors	3	
Gluteus maximus	4	
Tensor fasciae latae	4	

⁽¹⁾ Soleus, Gastrocnemius, Plantaris, Tibialis posterior, Peroneus longus, Peroneus brevis, Flexor hallucis longus, Flexor digitorum longus

⁽²⁾ Piriformis, Quadratus femoris, Obturator internus, Obturator externus, Gemellus superior, Gemellus inferior,

Conclusion: despite long-term rheumatoid arthritis, she has quite good muscle strength of her left side.

3.3.13 Signs of inflammation

- Redness was not found anywhere on the patient, during my examination
- Heat was present, however, during the examination, the patient had fever, which probably contributed to the increased skin-temperature
- Swelling was present in the small joints in her fingers. Although not so obvious, it was detected through palpation.
- Pain was present in all the finger joints and in the left shoulder joint, especially in the early morning.
- Loss of function was present in many joints. Especially when the patient was flexing her fingers.

3.4. SHORT AND LONG TERM REHABILITATION PLAN

3.4.1 Short-term rehabilitation

- Exercises for prevention of thrombo-embolic disorder
- Muscle stretching and relaxation for facilitation of antagonist and spastic muscles, to decrease the spasticity (passive, active assistant, soft ball).
- Improve balance and coordination of the limbs (rhythmic stabilization, PNF)
- Gait education
- Strengthening of individual muscles and muscle groups
- Increase range of motion in joints
- Self-care education

3.4.2 Long-term rehabilitation

- Improve muscle coordination and coordination in time and space
- Improve general condition
- Improve activities of daily living, and improve self-care abilities
- Activation of the patient

3.5 REHABILITATION

3.5.1 Session one: 04.02.08

Part I

- Anamnesis with the help of my supervisor, Dif. Petra Čermáková.
- After the request of the medical doctor, I did only simple condition training and breathing exercises in bed (supine position), because of the patients elevated body temperature, which reached 38,5° that day.

Part II: exercises (condition). The exercises were done with my assistance on the right side.

- Plantar and dorsal flexion and extension of the ankle → anti thrombosis
- Circular movements of the ankle → anti thrombosis
- Knee extension, followed by knee flexion → ROM and strengthening the quadriceps femoris
- Hip flexion → ROM
- Hip and knee flexion in combination with elevation of the pelvis → Pelvic floor exercises
- Abduction of the thigh → ROM and gluteus medius
- Adduction of the thigh → ROM and adductors
- Breathing exercises

3.5.2 Session two: 05.02.08

- The body temperature of the patient had been decreased to 37,5 °

Part I:

- Postural examination
- Gait examination

Part II:

- Passive movement of ankles, knees, hips, shoulders, elbows, wrists and fingers
- Active assistant movement of the ankles, knees, hips, shoulders, elbows, wrists, and fingers
- Exercises and breathing like the first day
- Walking around the room

3.5.3 Session three: 06.02.08

Part I:

- Dynamic tests and goniometer of the joints

Part II:

- The same exercises as the first and second day, with additional exercises
(in sitting: isometric knee flexion, extension, abduction and adduction, arms in horizontal abduction with rotation of the spine)
(in standing: plantar and dorsi flexion and extension of the ankles)
- Breathing exercises like the first day
- Walking around the room

3.5.4 Session four: 07.02.08

Part I:

- Anthropometric tests and muscle strength testing of lower extremities

Part II:

- Same exercises as the first, second and third day
- Strengthening exercises where also done in prone position for the hamstrings and gluteus maximus (hip extensors)
- Facilitation of finger, forearm and elbow extensors with a small soft ball. Moreover, I used passive and active movement of her MCP, PIP and DIP joints.
- Breathing exercises

3.5.5 Session five: 08.02.08

Part I:

- Muscle strength testing of upper extremities

Part II:

- Condition exercises, using balls and bands
- Walking in the room and out on the hallway
- Facilitation of finger, forearm and arm extensors with a ball
- Passive and active extension, flexion, abduction, adduction of fingers and thumbs. Ulnar and radial deviation of the wrist.

- PNF → First diagonal extension with elbow extension, to facilitate the triceps brachii and anconeus muscles.

3.5.6 Session six: 11.02.08

Part I:

- The first part of the neurological examination

Part II:

- Rhythmic stabilization training
- Walk at the same place and standing at the same place – change weight from left to right continuously
- PNF
- Passive movement and positioning (extension and abduction) of the right fingers, followed by active movement of the fingers
- Facilitation of arm extensors with a ball of fingers and palm

3.5.7 Session seven: 12.02.08

Part I:

- The last part of the neurological examination

Part II:

- Facilitation of arm extensors with a ball of fingers and palm
- Passive movement of fingers (right side), followed by active movement
- Isometric and isotonic muscle strength exercises of lower extremities
- Walking in the hall

3.5.8 Session eight: 14. 02.08

Part I:

- Facilitation of arm extensors with a ball of fingers and palm
- Passive movement of fingers (right side)
- Active movement (coordination with both hands)
- Isotonic exercises of extremities in supine, prone and sitting (with bands and balls)
- Rhythmic stabilization in standing position
- Walking in the room

- Breathing exercises

3.5.9 Session nine: 15. 02.08

Part one:

- The final kinesiological examination: posture and gait

Part two:

- Facilitation of arm extensors with a ball of fingers
- Passive movement of fingers (right side)
- Active movement (coordination with both hands)
- Isotonic exercises of extremities in supine, prone and sitting (with bands and balls)
- Active and passive movements of all the large joints: ankle, knee, hip, shoulder
- Rhythmic stabilization in standing position
- Walking in the hallway
- Working on exercises for changing positions: lying to sitting, sitting to standing, standing to sitting and sitting to lying.

3.6 Final kinesiology examination

3.6.1 Ventral/frontal

Symmetry	Left	Right
Flat transversal sole arch	Normal	Normal
Flat longitudinal sole arch	Flat	Normal
Calf – tibial side	Slightly convex	Slightly concave
Calf – fibular side	Slightly convex	Neutral
Patella – rotation	Neutral	Internally rotated
Thigh	Increased tone, int. rot.	Decreased tone, int. rot
Ant. Superior iliac spine	It is in the same transverse plane on both sides	
Abdominal muscle tone	Slightly increased muscle tone since the first week	
Shoulder position	Elevated	Depressed
Arms/elbows	Semi-flexion	Slight flexion
Face symmetry	Good symmetry of her face	
Toes	Hammer toes on both sides	

3.6.2 Dorsal/back

Symmetry	Left	Right
Heel shape and position	Points medially	Points medially
Achilles tendon	Arches laterally	Located centrally
Calf medial side	Slightly convex	Neutral
Calf lateral side	Slightly convex	Neutral
Popliteal lines	Symmetrical, higher tone	Decreased muscle tone
Thigh	Neutral position	Internal rotation, atrophy
Sub-gluteal lines	Elevation	Atrophy of glut. maximus
Post. Superior iliac spine	In a good line in the same transverse plane	
Ilium crest	Symmetrical	

Scapulae	Internal rotation, elevated	Scapula lata, depressed
Shoulder position	Elevation, protrusion	Depression

3.6.3 Lateral/side

Symmetry	Left	Right
Position of the head	Forward and without rotation to the sides	Forward and without rotation to the sides
Cervical spine	Slight Kyphosis	
C-TH crossing	Kyphosis	
Thoracic spine	Increased flexion (long kyphosis)	
Th-L crossing	Increasing lordosis	
Lumbar spine	Lordosis of the whole lumbar spine	
Pelvis	Neutral	Neutral
Knee joints	Extension	Semi flexion
Sole	External rotation	External rotation
Shoulder	Elevated	Depressed
Elbow joints	Semi-flexion	Flexion
Fingers and thumb	Abduction and semiflexion	Adduction, semi-flexion

3.6.4 Gait

Hips/pelvis/thighs

- External rotation of right hip. The left hip is more neutral
- Little movement of the pelvis
- Slightly increased extension of the hip

Knees

- Extension of left knee, semi-flexion of right knee

Ankle/foot/toe

- External rotation in both ankles
- No dorsal flexion in the ankles when walking

Arms

- Slight synkinesis of left arm (when she walks without the crutch – assistance of right side)

Shoulder

- Slight semi flexion in all joints of the right hand
- Left shoulder is more elevated than in the start. It is approaching the right one, which is still slightly more elevated than the left.

Back

- Higher muscle tone of left paravertebral muscles

Trunk

- Thorax is in latero-flexion to the left side

Head

- Less rotation of the head to the left side

Overall:

- Circumduction of the right leg in the first part of the step
- Puts weight on her left foot
- The Wernickmann position is still present

3.7. THERAPY EFFECT EVALUATION, PROGNOSIS

Due to the nature of her diagnosis with one chronic disease and stroke two years ago, it is a very difficult task to work with a patient like mine, and to expect fast progression. However, during my two weeks with her, there was some improvement, found mainly in the joints. On my last session with the patient, there was some slight increased passive extension in the small joints of her fingers and increased extension of her left elbow joint.

The most important sign of positive therapy effect in the patient is reduced subjective feeling of pain, which diminished in her joints. There was also a clear improvement in the mood of the patient, in combination with her motivation and willingness to perform exercises in cooperation with me as a therapist and when she is alone. If she continues to perform some simple exercises on her own, she might gradually be able to perform certain desired activities easier on her own.

The therapy was aimed for helping her to perform activities of daily living, with the exercises we performed together, in combination with auto-therapy, pharmacology, her good attitude towards the therapy and some help in her home from ergo-therapists and family, there is a possibility for her to return to a relative normal every-day life.

4. CONCLUSION

According to the feedback from the patient, the subjective feeling of pain was reduced, she felt improvement in her condition, and her motivation increased a lot, during her stay at the hospital. Moreover, she returned home from the hospital a few weeks later, hence it is fair to conclude that the therapy was as successful as it could be, and that the prognosis for her looks fairly good.

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6. ABBREVIATIONS

ABD – Abduction

ADD – Adduction

ADL – Activities of daily living

ANK. SPONDYLYTIS – Ankylosing spondilitis

CMC – Carpo meta carpal joint

DIP – Distal interphalangeal joint

H. ABD – Horizontal abduction

H. ADD – Horizontal adduction

LAT. ROT – Lateral rotation

MCP – meta carpo phalangeal joint

MED. ROT – Medial rotation

ROM – Range of motion

RA – Rheumatoid arthritis

RADIAL DEV. – Radial deviation

ULNAR DEV. – Ulnar deviation



CHARLES UNIVERSITY PRAGUE
FACULTY OF PHYSICAL EDUCATION AND SPORTS

José Martího 31, 162 52 Prague 6 – Veleslavín

Phone. (02) 2017 1111

http://www.ftvs.cuni.cz/

- 3 -03- 2008

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**Application for
Opinion of UK FTVS Ethic Committee**
On the project of Bachelor Thesis including human participants

Title: *Rheumatoid arthritis... Casistic work*

Project form: Bachelor Thesis

Author: (crucial author) *Christopher Nordås*

Supervisor (in case of student project) *Mgr. Miroslava Jalovcová*

Project description
The case report of rehabilitation the patient with anamnesiselaborated with the vocational sight of physiotherapist
in *Revmatologický Ústav, Albertov* (Health care unit)
No one invasive procedure will be applied.
Proposal of Agreement (enclosed)

Prague *04.02.08*

Author's signature *Christopher Nordås*

**Statement
UK FTVS Ethic Committee**

Committee members: Ass. Prof. Staša Bartůňková, M.D., CSc.
Prof. Ing. Václav Bunc, CSc.
Prof. PhDr. Pavel Slepíčka, DrSc
Ass. Prof. Jan Heller, MD., CSc.

The project was authorized by Ethic Committee UK FTVS with reference number: *0064/2008*
Date: *5.3.2008*

Ethic Committee UK FTVS evaluated submitted project and found no discrepancy to valid principles, instructions and international guidelines for biomedical research, including human participants.

Author of project fulfilled necessary conditions for the agreement of Ethic Committee.



Soubinová
Signature of EC chairman

7 SUPPLEMENTS



Palms at before the first day of treatment



Dorsum aspect of hands before the first day of treatment



Dorsum of the hand after treatment



The feet before treatment



Posture before treatment



Posture after treatment



X-ray taken before the stroke



X-rays taken after the stroke



X-ray before the stroke



X-ray after the stroke