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The rehabilitation treatment of the bearing joints arthroses from the lower limbs

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ABSTRACT. The arthrosic disease, the most common chronic osteoarticular disorder, represents a health and social problem in all countries, on account of both clinical and radiological discrepancy and of increased social and economic costs. The main joints of the lower limb: hip, knee and ankle are the bearing joints; they support the upright body position, as high mechanical pressure is exerted on them. The goal of the osteoarthritis treatment consists in pain elimination, mobility improvement, stability increase in the affected joints and disease progression prevention. Rehabilitation must be adapted to the evolution stage of the disorder; it comprises several methods: patient education, kinetotherapy, hydrokinetotherapy, massage therapy, electrotherapy, thermotherapy, balneotherapy and occupational therapy. In order for the rehabilitation treatment to be successful, patients' involvement in the therapeutic process is mandatory; thus, hygienic-dietary lifestyle and a recommended physical therapy program should be respected throughout entire life.
KEYWORDS: osteoarthritis treatment, rehabilitation, physical therapy program

CONTENT

Arthroses, also known as degenerative rheumatism, osteoarthritis or degenerative joint disease, are characterized, from a morpho-pathological perspective, by regressive and degenerative lesions of the articular hyaline cartilage, with the involvement of the subchondral bone, the synovial membrane and of the soft tissues (Block J. A., Shakoor N., 2009).

There are several, probably interwoven, (Marcu Fl., Lazăr L., 2012) theories which explain the osteoarthritis pathogenesis:

-the synovial theory: the quantitative or qualitative deficit of synovial fluid (the main nutritional source of the cartilage);

-the mechanical theory: a pressure excess on a normal histochemical articular cartilage;

-the chemo-enzymatic theory: condrocyte enzymatic activity disturbance (excess of the proteolytic enzymes accompanied by proteoglycan degradation or a deficiency of the enzymes needed for the synthesis of glycosaminoglycans);

-the vascular theory: ischemia or the venous stasis of subchondral bone (traumas, fractures, dislocations) disturbs the articular cartilage nutrition.

Osteoarthritis risk factors are classified as follows:

-general: heredity, age, nutrition, hormonal status and bone density, bone and cartilage metabolism;

-local, biomechanical: obesity, selective joint bearing, traumas and joint deformity, professional strain, sports, muscle weakening, non-physiological footwear.

Clinical symptoms in osteoarthritis are as follows: mechanical pain, stiffness of inactivity, mobility limitation and sensation of instability. With the disease's progress, rheumatic pains occur sooner, following physical exertion of lighter intensity and shorter duration and are exacerbated by changes caused by atmospheric pressure, as they are weather sensitive. In their algo-functional decompensated forms, pains become permanent. Other possible signs in this stage of the disease are: muscle atrophy, joint swelling, the occurrence of fluid in joints affected by osteoarthritis, crackles and misalignment caused by the weakening of the capsular ligament apparatus. In advanced stages of osteoarthritis, even the ability to remain independent throughout one's professional or social activities may be affected, the consequence being the depression occurrence to the algo-functional decompensated forms of the patients with arthroses (Halar E., Bell K., 1998)

One of the features of osteoarthritis is the impossibility of establishing a correlation between the X ray image and the patients' symptoms. There are many circumstances where, although radiological signs of joint destruction are massive, the clinical symptoms are minimal or conversely, less significant radiological changes determine important clinical manifestations (Boloşiu H., Fichera C.R., 2003).

High socioeconomic costs caused by this pathology are supported by:
- high frequency of this affection, the most common rheumatologic pathology;
- increased prevalence of the disease in relation to age;
- professional absenteeism in algo-functional decompensation;
- early retirement, secondary to the impact on independence, in professional activities;
- disability, secondary to a reduced quality of life and frequent arthroplasties.

By assessing the local risk factors one may notice that the lower limb joints - hip, knee and ankle - are very exposed to the emergence of arthrosic process. This explains why the location of osteoarthritic process in these bearing joints, correlated with strenuous work or prolonged standing, with activities implying repeated micro traumatisms, with overweight and improper footwear usage is common.

Quantifying the quality of life regarding the health status, when diagnosed with osteoarthritis, plays an important role in describing the measurement of disease severity and therapy response. To this purpose one may use the HAQ (Health Assessment Questionnaire) with its two versions: full HAQ and short HAQ, as well as the visual analogue pain scale (VAS).

The WOMAC (Western Ontario and McMaster Universities) index, functional evaluation tool used for gonarthrosis and coxarthrosis, consists of 24 questions assessing pain, stiffness and physical function (Yeung T.S., Wessel J., Stratford P., Macdermid J.,2009). The Lequesne functional index is also used in the functional assessment, in gonarthrosis and coxarthrosis. It describes the pain the patient felt in certain circumstances, the walking perimeter and daily life difficulties.

Among the functional scales used to evaluate patients with arthrosis at the ankle and foot, we would like to mention the MFS (Maryland Foot Score) and the FFI (Foot Function Index). The FFI questionnaire comprises 23 questions assessing the functional impact of foot pathology in terms of pain, disability and activity limitation. The Maryland Foot Score, also used to monitor the treatment effectiveness, provides information on pain, walking distance, stability, support, limping, footwear, stairs, walking surface, gait aspect and mobility.

Osteoarthritis treatment aims to relieve pain, improve the mobility, increase the ailing joints stability and prevent the disease progression. These objectives can be achieved by decreasing the articulation load; that is, hygienic-dietary treatment, by medication and rehabilitation treatment as well as through orthopedic surgical interventions.

The rehabilitation treatment includes the information and education of the patients, kinetotherapy, massage therapy, electrotherapy, thermotherapy, occupational therapy, joint protection by orthotics, footwear adjustment and assistive gait devices.

In case of coxarthrosis, gonarthrosis and tibial-tarsal arthroses one will recommend the observance of the "articular hygiene" rules regarding hip, knee and leg, as well as the avoidance of prolonged orthostatism and walking, along with the avoidance of difficult terrain. Maintaining a normal body weight and cycling practice are very important. The recommended hygienic rules are as follows:
-avoidance of vicious postures of affected joints: on one's knees, crossing one's legs, adopting unipodal stances or accompanied by partial leaning on soles;
-limiting the use of fixed positions for prolonged periods, especially in the office or car;
-orthopedic correction of a more than 1.3 cm at the lower limb inequality;
-ruling out the use of high heels for women and of the tight and stiff shoes;
-vocational retraining in what regards the jobs requiring load bearing joint positions;
-the proper performance during the 3 stages of gait phase (heel strike, medium position, heel rise).

A kinetotherapy program should be included in any kind of treatment of osteoarthritis, the program being based on the clinical, anatomic and functional stage of the disease. The objectives of kinetotherapy regarding osteoarthritis are to decrease pain, increase stability, improve mobility, regain muscle strength and improve the coordination and balance while walking.

To gain stability and joint mobility, kinetotherapy exercises will be adapted to the functional deficit as well as to the muscles that need separate training, in order to have adequate functional results. Concerning coxarthrosis, the purpose is to strengthen the gluteus maximus and gluteus medius muscles, the hamstrings and the quadriceps muscles. In what concerns gonarthrosis, the muscles that ″locks the knee″ during walking, the quadriceps and the hamstring muscles will be strengthened, while in the case of tibio-tarsal arthrosis, one will need to strengthen the sural triceps muscle, the anterior and posterior tibial muscles, the finger long common flexor, short plantar flexor, the hallux flexor, common finger extensor and the peroneal muscles.

Stability improvement will be achieved through analytical muscle strengthening exercises and with closed

kinetic chain exercises; ergonomic bicycle exercises are recommended provided the operating parameters are adapted to each patient: the bike seat - height and size, strain - optimal charging.

A good mio-arthrokinetic functionality of adjacent joints and of contralateral limb must be maintained. Another purpose will be regaining dynamic muscle control for walking (coordination and balance) at initial physiological stage and pathological level, but accompanied by the best possible compensation during the evolved stage. The proper use of the cane in the opposite hand of the affected hip will be recommended, while limping, in order to avoid using the cane, will not be accepted.

The kinetotherapy rehabilitation program includes:

-postures, used against joint stiffness;

-joint mobilizations which can be passive, passive-active and active;

Regarding coxarthrosis, the focus is on the extension, internal rotation and abduction movement; for gonarthrosis , initially, the complete extension regaining and internal rotation will be aimed at and subsequently, flexion increasing while in what regards tibial-tarsal arthrosis, plantar and dorsal flexion will improve, as well as inversion and eversion of the foot. Subsequently, balance exercises will be performed, initially with the eyes open and then with the eyes closed.

One session for 20 minutes of hydrokinetotherapy, in the pool, at 36-37° C, it causes a thermal effect (antialgic, relaxing, vasodilator, softening, tissue compliance increase) and a mechanical effect (contractures and body weight reduction, movement facilitation) (Sbenghe T., 1987).

Both classical massage, with sedation and tonification type of techniques, and also circulatory massage, in case of lower limb arterial or venous circulatory disorders, may be used.

Electrotherapy will be used for its antialgic effect, for decreasing joint stiffness and muscle contraction. Low frequency electrotherapy (Trabert, TENS, diadynamic currents), medium frequency currents, galvanic current (transversal, galvanic baths) and high frequency electrotherapy (shortwaves, diapulse, ultrasound) will be used. Laser therapy and phototherapy (infrared, ultraviolet) may be used as well.

Thermotherapy procedures, as local paraffin applications (42ºC for 20 minutes, and washing at 22°C), may be recommended with the exception of acute clinical forms accompanied by nocturnal pains. These procedures have antialgic and muscle relaxing effects in preparation of relevant joints for kinetotherapy exercises. The use of very low temperatures (cryotherapy) is indicated for local inflammatory reactions (warm knee, with light edema, patellar shock, spontaneously painful at rest, including during the night).

The presence of arterial or venous circulatory disorders justifies the indication of cryotherapy (cold water compresses and ice massage) or of alternating temperatures (alternate affusions).

Occupational therapy, as part of the recovery treatment, is performed in sitting position or decubitus position, being based on pedaling, gyroplanes or slides on planchette with wheels. The recommended sports to the patients with this type of arthrosis are cycling, swimming and horse riding.

Climatotherapy will comprise the use of a sedative climate either hills or underhills (Băile Felix, Călimăneşti, Ocna Sibiu) or a challenging climate (seaside), unless there are contraindications.

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