Osteoarthritis, Application of Physical Therapy Proceduers

Dijana Avdić[1*], Džemal Pecar[2],
Emela Mujić-Skikić[3], Ehlimana Pecar[2]

1. Orthopaedic and Trauma Clinic, Clinical Centre University of Sarajevo, Bolnička 25, 71000 Sarajevo, Bosnia and Herzegovina
2. Polyclinic "Praxis", Center for Physical Medicine and Rehabilitation, Ćumurija 3, 71000 Sarajevo, Bosnia and Herzegovina
3. Physical Medicine and Rehabilitation Department, Rashid Hospital, Dubai, UAE

* Corresponding author

Abstract

Osteoarthritis (OA) is a group of overlapping disorders, which may have different aetiology but similar biological, morphologic and clinical outcome. In osteoarthritis, process will not encompass the joint cartilage only, but the entire joint, including sub-hondral bone, ligaments, capsule, and sinovial membrane and surrounding muscles. Osteoarthritis is a multi-factor disorder of sinovial joints, which occurs as result of mechanical and biological factors, which destabilise normal hondrocyte function, partitioning of cartilage, extra-cellular matrix and sub-hondral bone. The earliest changes, which are restricted to the joint cartilage surface only, do not cause any subjective feeling. The pain in arthrosis occurs (or re-occurs) a bit later, Diagnosis will be determined based on clinical exam as well as signs and symptoms present. Symptomatic and functional treatment of osteoarthritis as one of rheumatic disorders must be taken throughout years, sometimes throughout a lifetime. It encompasses application of many medications and physical therapy procedures.

KEY WORDS: osteoarthritis, functional treatment, physical therapy procedures

Introduction

Osteoarthritis, sometimes referred to as degenerative arthritis, degenerative joints disorder or simply arthrosis, has a great medical, social and economical significance due to its frequency, lowering quality of life, handicap as well as direct and indirect costs. This is the most frequent disorder ever, which is at the same time most frequent cause for functional damage to the loco-motor system (1). As opposed to inflammatory rheumatic disorders, degenerative joints disorder is not the disorder of the entire organism, rather a local disorder of one or more joints. General conditions shall not be disturbed by this disorder, though it is possible to have another disorder, which is not related to arthrosis, but can disturb general health condition of the patient. Osteoarthritis (OA) is a group of overlapping disorders, which may have different aetiology but similar biological, morphologic and clinical outcome (2). It is most frequent in elderly persons, however it may occur before a person reaches 45th year in age. In elderly population, more women suffer from this disorder. Osteoarthritis attacks fists, feet, spine, knee and hip joints. It is very common in persons, who worked in heavy physical activities, repetitive activities (manual and physical workers, workers in agriculture etc). Professional and sport injuries can be additional causes to osteoarthritis, while one of the risks is being overweight (1, 2).

Definition and Epidemiology

In osteoarthritis, process will not encompass the joint cartilage only, but the entire joint, including sub-hondral bone, ligaments, capsule, and sinovial membrane and surrounding muscles. At the end of the process, the cartilage degenerates along with fibrillations, fissures, ulcerations and full lose of joint area. Although the epidemiologic data are not consistent due to different methods of collection as well as different interpretation, it has been estimated that approximately 14% of adult population suffer from the symptomatic disorder. These data may vary depending on osteoarthritis location, gender, age, race and geography. The same stays for radiological population researches with the prevalence of osteoarthritis from 10 to 20% in the age of 40 and 74% above the age of 65 (3).

Aetiology

This disorder happens to be multi-factorial. Due to its very complex etymology problems, and due to better understanding and aimed therapies, arthroses are most usually classified as primary, where the occurrence is not clear, and secondary, which occur primarily based on bio-mechanical disorders. Genders, age, trauma, being overweight, hormonal and metabolic factor, children and genetics have great influence onto occurrence of primary arthrosis. The cause to secondary osteoarthritis is connected to a know factor, such as breaking the joint parts or nearby joints, where it is likely that degeneration of cartilage or bone structure will occur during life. Another classification would be by causes, which can be treated or those, which cannot, meaning genetics (gender, race, inherited collagen gene disorder type II, as well as other inherited bone and joint disorders), non-genetic (age, being overweight, lack of estrogens, developmental and gained bone and joints disorders, operations) as well as environmental (vocation, conditions of work, trauma, professional or recreational sports activities) (4).

Pato-Physiology OA

Osteoarthritis is a multi-factor disorder of sinovial joints, which occurs as result of mechanical and biological factors, which destabilise normal hondrocyte function, partitioning of cartilage, extra-cellular matrix and sub-hondral bone. Osteoarthritis we diagnose nowadays using standard methods is but a late diagnosis of changes, which occurred long ago, in a form of metabolic and biochemical occurrences. It is often impossible to draw a line between mechanical factors and factors of age, hormones, genes, cultural or other yet unknown causes, which may participate within the process of osteoarthritis start or its progress. Although osteoarthritis is most usually the consequence of mechanical or inflammatory / immunologic occurrence, the influence of genes cannot be neglected. As for genes, inherited osteo-arthropaties (connected to a gene disorder) may be classified into primary generalised osteoarthritis and metabolic joint disorders, including disorders in disposing calcium salts and hondro-dysplasia. Interaction of occurrences in sub-hondral bone and cartilage has been subject to many intensive researches during past years (5). Osteoporosis in its beginning, followed by osteo-sclerosis and thinning the sub-hondral bone may induce changes in the cartilage as well as participate in osteoarthritis progression. Higher or smaller degree of inflammation may be present within sinovial membrane of the patient suffering symptomatic osteoarthritis.

Clinical picture

The clinical picture depends on the localisation of changes and it is most peculiar for each joint area. Common symptoms would be pain and hardened joint movements,

while objective signs would be crackling during joint movements, followed by atrophy of belonging muscle structure. Pain in arthrosis, especially in joints with more burdens (hip, knee) has three significances: 1. It occurs in first movements after a longer period of resting and lets go after few steps are taken; since the pain is typical for beginning of a movement, it is called "the start" pain; rigidness following the pain in the morning becomes shorter in intervals and not so distinctive as in inflammatory rheumatic disorders (2). The pain occurs repeatedly (or grows in intensity) during long period of burdening (long distance walks) or higher burden lifting (carrying). 3. While walking on a steep area or stairs, the pain is harder while going down and is lowering while going up (muscles around joints are tense, they stabilise it and take over a part of the burden). The earliest changes, which are restricted to the joint cartilage surface only, do not cause any subjective feeling. The pain in arthrosis occurs (or re-occurs) a bit later, which can be caused by sub-hondral bone (which is more and more under pressure), from sinovial layer of the cartilage capsule / shell (in synovitis which follows), as well as by fibril joint capsule, ligament grips, sinews and muscles, which are exposed to stretching and overwork (6, 7).

Diagnosis

Diagnosis will be determined based on clinical exam as well as signs and symptoms present. Laboratory blood and urine analyses are within normal. Roentgen is used for confirmation of the diagnosis, while the test result depends on the stadium of the disorder. In the beginning stadium, roentgen result is correct, while later on there are visible changes to the joint, in the sense of narrowing of joint crack as well as occurrence of osteophites on joints. Most people over 60 years in age will show disorders in their roentgen, while one third of them have real symptoms.

Treatment

In treating osteoarthritis, symptomatic fast-action drugs will be used: pain killers and non-steroidal anti-rheumatics. When there is an increased joint pain, corticosteroids will be applied into the very joint, along with symptomatic slow-action glucosamines, hontroitin and hyaluron acid. This will remove pain and cramps in the surrounding muscles (8, 9, 10, 11). Therapeutic aims in treating osteoarthritis are: education of patients, decreasing symptoms, decreasing handicap, increase in quality of life and limiting disorder progress. As for non-pharmacologic treatments in curing osteoarthrosis, education is conducted, which is aimed to better understanding of the disorder, installation of positive attitude, joint protection, improvement of general performances and psycho-social support. In decreasing disorder symptoms, central part goes to the combination of medicine applications and physical therapy. Functional treatment in osteoarthrosis encompasses different procedures in physical therapy and exercise. Certain exercises and physical therapy can and should be applied in order to remove rigidness and provide strength to surrounding muscles. In most controlled studies, these proved as efficient in decreasing symptoms of osteoarthritis. Physical therapy takes the most important place in curing arthrosis. Many procedures are applied including direct physical-therapeutic intervention, education of patients and if necessary, members of their families. It also included coordination and communication with team members and filing. Most frequent physical-therapeutic intervention in persons with osteoarthritis includes therapy exercises, functional training, techniques of manual therapy, application of aids, adaptive, protective and supportive aids and equipment, electric therapy procedures and applications of physical ageneses and mechanical therapy procedures (12). Therapy procedures include activities for increase of strength, scope of movement, endurance, coordination, motorical control and motorical learning, motorical development and safety, development of posture and respiration, even in cases where activity capabilities are decreased. Aim is focused on the problems of conduct of a movement or a functional task, where therapy exercises are directed in order to relieve consequence of damage, functional handicap of disablement. Therapy exercise includes activities for improvement of body function and health status, meaning activities, which can decrease or stop handicap in patients, where handicap is a consequence of damage. Therapy exercise may prevent development of secondary complications which will further decrease the use of health services and hospitalisation. Therapy exercise is conducted with the use of active movement, passive movement of a movement with resistance. Exercises are conduced in water or dry. Water exercises are much easier to conduct and provide much more in effect. As for active exercises in osteoarthritis, static exercises should be applied more, in order to avoid side-effects (increase of pain, effusion). Such exercises should be repeated two or three times daily, with gradual enforcement. Dynamic exercises and exercises with movements should be avoided. Walks and exercise should be regular but not further than pain occurrence. Functional training in taking care about oneself and the household includes a group of information, with the aim of increase in neural, muscle, cardiovascular and pulmal capacities, as well as faster and more efficient inclusion or

return of the patient to the activity of self-care and care for the household. Sticks, crutches, walking aids or supporters may relieve stress and joint tensions. Application of such aids, ortoses, adaptive, protective and supportive ones, as well as other means, includes the need for using group therapy means, aids and equipment, all in order to: conduct a task or movement, support for unstable joint or diminished muscle function, protection of body parts from further damaging, adaptation with the environmental conditions in order to make daily activities easier, as well as instrumental activities of an every day living. Such means and equipment are frequently used in combination with therapy exercise, functional training and other interventions, which might be chosen in the context of patient's needs. The final aim is that the patient increases his function to a higher level and decrease the functional limitation. The usefulness of application of aims, ortoses, adaptive, protective and supportive aids is measured in terms of curing or prevention of damage, functional limitation of disability (13). Surgical procedures with aim of diminishing pain and regaining functions include techniques, which may preserve or restore cartilage, redistribute burden onto joint surfaces, stiff the joint or replace it with endoprosthetics. The results may be excellent, though complications must not be neglected. The type of surgical procedure will be chosen based on the type of osteoarthritis, its severity and the physical condition of the patient. Surgical procedures include: arthroscopic dressing of the joint in question, surgical correction of angular joint deformities, implantation of total endoprosthetics (so called "artificial joints"), joint anchilosis in order to prevent joint movement, which will further remove joint pain.

Education for patients

Education has the central place within curing and rehabilitation of osteoarhrosis. The patient must be familiar with the nature of the disorder, prognostics, cure and rehabilitation. It is important to know in what manner the joint should be protected for daily activities, hobbies, at home and during rehabilitation. In this manner, the patient becomes an equal member of the rehabilitation team. The contents of education relate to the patient, his / her family and other persons significant to the patient, who are included in the process of cure due to his / hers current status; plan of cure and procedures of physical therapy; necessary switching of roles within household, at working place and in wider social community. The aim of education is to ensure short term and long term positive consequences of the intervention, as well as primary and secondary prevention with disorders, which may result in disablement. The development of educational programme must be in accordance with aims, which are set for the plan of cure and treatment. It can include information o damage, functional limitation or disablement, prognostics, purpose and usefulness, self-helping procedures during activities in daily life, as well as physical therapy intervention risks. While planning education, age and gender of the patient must be taken into consideration, as well as cultural and racial background, gender role, sexual commitment and social-economic status. Persons with osteoarthritis, including their risk of permanent damage, functional disability or disablement, face a number of changes, which occur in functional, socio-economical and psychological status (13).

Conclusion

Symptomatic and functional treatment of osteoarthritis as one of rheumatic disorders must be taken throughout years, sometimes throughout a lifetime. It encompasses application of many medications and physical therapy procedures. Social problem encounters very often along with this disorder, as well as the fact that young and capable working population are subject to this disorder. It diminished the working ability of employees, endangers his capability to earn for living, which is a significant economic damage for an individual and for the community, since many patients fall out from the production process, while their treatment and rehabilitation require significant material resources. It is necessary to have continuous education for the doctors in order to diagnose rheumatic disorders in an early level, as well as for their up-to-date, rational and adequate therapy. It is ideally including cooperation of many medical and similar workers: nurses, physical therapists, psychologists, defectologists and others. Along with the doctor, physical therapists have a great role in therapy and medical rehabilitation of patients with rheumatic disorders. They must be sure and creative in individual programmes of kinesis-therapy. They must also have whole lot of patience and understanding towards their rheumatic patients, in order to provide them motive for cooperation and participation in their treatment and rehabilitation. Therapists should reinforce them not to give up within this process, which is very often long and painful. In order to fulfil this all, a therapist must be very familiar with rheumatic disorders and up-to-date possibilities of treatment and rehabilitation. Surgical procedures will be conducted with severe types of osteoarthrosis, most prevailingly hip and knee joint, where the pain and damage is very severe. The replacement of the natural joint with an artificial one is conducted to establish better relations between joint areas, to decrease pain to a lower level and to increase functionality. Amongst operational methods, it is suggested to conduct timely corrective osteothomies for static deformations, especially for lower extremities (legs) as prevention from arthrosis. When the arthrosis is advanced, there is the indication of applying a total joint endo-prosthetics. The endurance of endo-prosthetics is limited and it is usual to wait until patient is 60 in order to conduct operation, so that endo-prosthetics would not have to be changed on many occasions. Kinesis-therapy and educations of the patients, whether it is pre-operational phase (e.g. previous familiarisation for walking on crutches) or post – operational enablement for daily and even professional activities.

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