REVIEW ARTICLE

Physical Management of Patient with Osteoarthritis of Knee

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Abstract:

Osteoarthritis (OA), is by far the most common form of arthritis. It shows a strong association with ageing and is a major cause of pain and disability in the elderly. Pathologically, it may be defined as a condition of synovial joints characterized by focal loss of articular hyaline cartilage with proliferation of new bone and remodelling of joint contour. Inflammation is not a prominent feature, OA preferentially targets the weight bearing joint mainly knee & hip. There is no single cause of OA; it results from a disparity between the stress applied to the articular cartilage and the ability of the cartilage to withstand that stress. The initial or early OA treatment aimed at relieve of pain, restoration of joint movement and rest of the joint with the support of analgesic and NSAIDS. Shortwave diathermy (SWD) and ultrasound therapy is also helpful in relieving pain and joint stiffness. For long term management full explanation of the nature of OA and advice and instruction on appropriate exercise program is essential. Reduction of any adverse mechanical factors – these includes weight loss if obese, shock –absorbing footwear, use of walking stick or walker.

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Introduction:

Osteoarthritis of the knee is one of the common disability among our population specially elderly people both in male and female. It is one of the major causes of disability specially in lower extremity .[1] The condition is more common in women and is associated with overweight.[2] The role of physical activity both in working and leisure time is one of the risk factor in the development of knee osteoarthritis.[3] Osteoarthritis is characterized clinically by pain, remodelling of joint contour and limitation of motion. Diagnosis of osteoarthritis is based on X- ray evidence of joint: Narrowing of joint space with subchondral sclerosis, marginal Osteophyte and sharp intercondylar imminence.[4] Treatment of osteoarthritis typically consists of some combination of rest, exercise Program, medications and full explanation of the nature of OA (with or without support literature).[5] For those with severe arthritis of knees, total knee arthroplasty provides a possible eventual solution.[6] It is well known that no specific treatment is appropriate for degenerative arthritis, but physical management along with medication is important for treating this disease.[7]

Management of Knee Osteoarthritis

There is no-one specific treatment program for patients with osteoarthritis. The treatment must be individualized to the needs of the given patient.[8] It is also important to properly educate the patient as to the nature and prognosis of the disease as well as to the goals of treatment. Optimal management of osteoarthritis combines the use of analgesic and anti-inflammatory medications, physiotherapy and other rehabilitation measures. There is a comprehensive approach by a multidisciplinary team of physician (specially physiatrist), orthopaedic surgeon, physiotherapist & occupational therapist, social workers and nurses.[9]

Successful management depends on careful assessment and a total patient approach. Factors to be considered include –

- Pain severity
- Functional disability and requirements (Handicap)
- Patient's expectation
- Anxiety and / or depression
- Articular versus periarticular pain
- Synovitis
- Instability
- Local and general condition of muscles.

Treatment of Osteoarthritis

A. Basic approach:

- Education and reassurance of patient
- Physical therapy
- Psychosocial support

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B. Drug treatment:
- Paracetamol and oral NSAIDS
- Intra- articular injection of corticosteroid and hyaluronan for temporary benefit of moderate to severe pain.

C. Surgery where indicted
- Removal of loose bodies
- Correction of mal-alignment i.e. osteotomy
- Joint replacement

Physical Therapy

Physical therapy holds a prominent position in the treatment of osteoarthritis. It involves principally the use of heat or cold and an appropriate exercise program. It is generally useful to precede each exercise session with applications of moderate heat for 20 to 30 minutes to relieve pain and diminish stiffness.[10]

A variety of heat modalities may be use, e.g. hydrocollator packs, electric pads, ultrasound, infrared bakers, diathermy (SWD& MWD) and paraffin baths. For deep-seated joint specially in knee joint short wave diathermy may be particularly effective. It helps the synthesis of glucosamine in the knee joint.[11]

Use of heat and cold

Application of various heating modalities in the treatment of osteoarthritis has lost much of its former popularity. In present day practice, cold rather than heat is often prescribed for relief of pain and muscle relaxation.[12] An ice pack application to a painful and swollen knee for 15 minutes as a temporary anesthetic effect and facilitates the performance of exercise. It can be repeated two or three times daily. However, most elderly patient with osteoarthritis prefer the warm to the cold. At home the easiest method is to use a warm in the morning and at bedtime.[13] A hot pack improvised with moist towel or a commercially available hydrocollator applied round joint and along the length of the affected muscle can be used for 30 minutes prior to exercises. The pain is often relieved by the intermittent use of heating pad. The use of radiant superficial heat is soothing and pain relieving for periarticular muscles and tendons. It relieves some of the muscles spasm or contructure, but it has no lasting benefit.

Penetrating deep heat supplied by diathermy or ultrasound can be given to the knees in the supine position. With diathermy (SWD or MWD), a treatment session should last for 20-30minutes, with ultrasound, the treatment last for 10 minutes.[14] An average prescription for deep heat application in osteoarthritis of knee calls for three session a week for three to four weeks . Most of the data on the benefit of deep heat in osteoarthritis are based on the subjective response of the patient.

The influence of shortwave diathermy and Ultrasound on osteoarthritis of knee.

Physical therapy plays a crucial role in a comprehensive care of patients with rheumatic disease and its use is fairly widespread.

In various type of study to compare the analgesic effect of different types of physical therapy (e. g – SWD, Ultrasound) in patient with osteoarthritis of a weight – bearing joint (hip or knee) and to compare the analgesic effect of combined physical and drug therapy with that of physical therapy alone.

The analgesic effect of various type of physical therapy appeared as early as after the 5th treatment, but there was no statistical different either between the types of therapy.[15]

According to the visual analog scale the pain intensity had decreased in all groups after the 10th treatment. By these combined effect of physical and drug therapy appeared better than that of physical therapy alone. The difference was statistically significant of a 5% significant level (F=3.9). No statistically significant difference was found between the different types of physical therapy.

Exercise Therapy

Rest and joint protection are supplemented by exercise. The objective is to maintain the joint range of motion and to avoid muscle weakness and joint instability.[9] Exercises are done twice daily for 10 minutes on getting up and on retiring. The exercise need to be limited in number and easy to remember and perform.

The first basic exercise are the isometric setting of gluti and quadriceps muscles. Each setting of muscle contraction is done to the count of five, and each stage of contraction is done 10 times. The patient is made aware of the tightening of his buttocks and of his thigh muscles as he exercise.

The second exercise is straight leg raising, perform 10 times on the involve side alternately on each side. The patient contracts the Quadriceps as done in the isometric exercise. These with the knee in full extension, he slowly raises the leg to 45 degree and then slowly brings it down, maintaining the knee fully extended. These isotonic exercise strengthening the Quadriceps because it pulls up the extended leg against gravity.

If the patients satisfactorily perform two exercise in the follow up visit, he is given additional exercise – these are

progressive muscles strengthening exercise, Pool under water exercises and the use of a stationary bicycle exercise program.

Quantitative Progressive Exercise Program

The QPE program composed of isometric, isotonic, isotonic with resistance, endurance and speed contractions prescribed in a progressive sequence.[16] Muscle strength and endurance increase significantly for both quadriceps and hamstrings after rehabilitation. There were marked decrease in walking time and the difficulty and pain experienced during functional activity.

Description of the QPE program

Week		Exercise
1	-	Initial testing
2,34.5	-	Maximal isometric contractions (3 times for 3sec. at all knee and hip angle for hamstring and quadriceps.)- Slow isotonic range of motion contraction (3 times with no resistance at each hip angle) for hamstrings and quadriceps.- Isometric contraction with resistance (5 times for 5 sec)- Isotonic contraction with resistance (5 times at each hip angle).
6	-	1 month testing.
7,8,9,10	-	Isometric contraction continue (5times for 9 sec)- Isotonic contraction continue (5 times).- Endurance exercise : holding a specific resistance for 90 secs or until fatigue.
11	-	2 months testing.
12,13,14,15	-	Isometric, isotonic and endurance progression continued. Contraction velocity exercises knee extension and flexion at maximal speed with isotonic resistance.
16	-	Final testing

Occupational Therapy

Individualized management and continuity of care of osteoarthritis starts with an assessment of the patient's pain and mobility, health status, environment and goals. The assessment must also consider activity of daily living for self care and maintenance of life style at home and in the community.

The pain pattern should guide the treatment. As the pain is brought on by weight bearing – weight bearing does not have to be stopped, but it needs to be reduced. A compromise and a consensus must be negotiated between the patient and the physician as to the need for behavioural changes, a new balance of rest and activity should be acceptable to the patient.

Patient's physical activity as tolerated by the weight bearing joints. An individual with knee osteoarthritis needs to be told that prolonged standing can do harm, and that long walks are not necessarily good exercise.[8] Overloading of the joints is to be avoided during shopping or travelling. Weight- reduction in over-weight patients is a desirable goal which may not always be achieved.

It is often necessary to modify a patient's immediate environment and habits. His bed needs to be firm and he should not place a pillow under his knees at night to relieve pain. This could lead to weakness of the quadriceps muscles. The patient should be encouraged to assume a prone position for half an hour daily. Chairs need to be 12 cm higher than usual and to have arm rests to facilitate getting up and sitting down. A raised toilet seat reduces the strain on weight – bearing joints.

When pain in the hip or knee is on weight – bearing only, it can be relieved by the proper use of walking aids. In unilateral knee or hip disease a cane should be used in the contralateral hand, the height of the cane should places the handle at the level of the greater trochanter, the use of a cane gives pain relief and may retard progression of joint disease. For bilateral hip or knee arthritis or when one knee or one hip are involved on opposite sites, pain relief and joint protection are enhanced by the use of a walker.

Instruction for daily living activity

To minimize stress on knees, the following suggestions may be of benefit:

- Do not walk or jog as an exercise, swimming is an excellent alternative.
- Avoid stairs whenever possible.
- Sits, rather than stand. Use a high stool when working at a counter.
- Use higher chairs, rather than low sofas
- Avoid kneeling or squatting.
- Before arising from a chair, sit at the edge of the seat, with legs under the body. Use the armrests to push up from the seat.

The patient with painful osteoarthritis of knee may benefit from a cane (used in the contralateral hand) or, if symptoms are bilateral, crutches or a walker.[10]

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