

Rheumatology: 9. Physical and occupational therapy in the management of arthritis

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The case

Mr. P is a 53-year-old man who, when younger, was actively involved in a number of sports including football, skiing and tennis. At the age of 22 years, he had a meniscectomy for a torn medial meniscus of the left knee. This knee became painful 5 years ago, especially at the end of the day. Over the past year, the episodes of pain have increased to the point where he has curtailed all recreational activity and is finding it increasingly difficult to walk long distances. Due to his pain and the resultant inactivity, he has gained 20 kg. Weight-bearing radiographs of his knee show moderate loss of joint space involving the medial joint compartment.

Physical therapy, which is also known as physiotherapy, and occupational therapy are integral components of the management of many forms of arthritis (Table 1). Physical and occupational therapists will establish a therapeutic home program and educate patients about the disease and its management.

Although this article focuses on the prescription of these services in the management of osteoarthritis, physical therapy will also benefit patients with chronic inflammatory conditions, such as ankylosing spondylitis, and patients with connective tissue disease may also require these disciplines if their disease affects the musculoskeletal system. Patients with rheumatoid arthritis, psoriatic arthritis, systemic lupus erythematosus or other chronic polyarthritic rheumatic diseases will follow a similar process and may be best referred to therapists familiar with these specific problems who have the time and resources to devote to patient education. In all of the chronic arthritides, treatment will ideally be multidisciplinary and education will be a major component. Limited problems such as tendinitis or bursitis are usually well managed in the community without specific referral.

Role and function of the physical therapist

The physical therapist will assess the musculoskeletal status of the patient by taking a history and examining ranges of motion, muscle strength, joint status (e.g., stability, alignment), posture and gait. Physical therapists who have additional training in rheumatic diseases will also evaluate the acuteness of the disease. This is necessary in inflammatory diseases, such as ankylosing spondylitis and rheumatoid arthritis, because it relates directly to the extent of physical activity that the patient can tolerate. Exercise can exacerbate the acuteness of disease if it is not delivered at a level consistent with the condition of a particular joint. An appropriate level of exercise may be followed by a short period (up to 2 hours) of moderate discomfort; however, significant exacerbation of the condition for a longer duration may occur if the assessment of the disease stage was inadequate or the patient has been overzealous or is exercising incorrectly. Physical therapists trained in the evaluation of rheumatic diseases can be located in some provinces through the Arthritis Society. A single toll-free number (800 321-1433) allows people to contact their local Arthritis Society office for referrals to community care providers.

Physical therapy consists of exercises to improve muscle strength, joint mobility and cardiovascular function. Heat, cold, electrical treatments or hydrotherapy may also be used to achieve temporary relief of pain and reduction of muscle spasm, but

Review

Synthèse

Mr. Clark is in private practice.

This article has been peer reviewed.

CMAJ 2000;163(8):999-1005

This series has been reviewed and endorsed by the Canadian Rheumatology Association.

The Arthritis Society salutes CMAJ for its extensive series of articles on arthritis. The Society believes that this kind of information is crucial to educating physicians about this devastating disease.

Series editor: *Dr. John M. Esdaile, Professor and Head, Division of Rheumatology, University of British Columbia, and Scientific Director, Arthritis Research Centre of Canada, Vancouver, BC.*

these techniques are used to prepare the patient with arthritis for exercise and should not be viewed as the treatment. The emphasis should be on exercise and education, with the goal of enabling the patient to continue an independent home program after discharge.

Gait training may be required to change poor habits, identify muscle weakness and imbalance and increase strength and walking range. For example, following total hip arthroplasty, patients often have a "Trendelenburg gait" with a lateral shift toward the operated leg in stance phase. This may be because of shortness of the leg, weak hip abductors or habit. An assessment of the strength of the hip and knee musculature, measurement of leg length and observation of gait will allow the therapist to identify which problems need to be corrected and how to do so.

A physical therapist uses posture training and counselling to help patients reduce stress on joints or soft tissue during regular movement, work and recreational activities. For example, a dentist with ankylosing spondylitis who spends a large part of his or her day stooped over the chair is increasing the likelihood of fixed postural deformities. It may be possible to encourage this patient to work from a sitting position, so that the spine is maintained in a more erect position for most of the workday. A person with osteoarthritis of the hip may not want to use a cane held in the opposite hand unless the therapist spends time demonstrating leverage and how forces on the hip joint can be unloaded when a cane is used properly.

As most forms of arthritis are chronic, the patient will usually be instructed in a program of exercise that can be carried out at home. In addition to learning the exercises, the patient should also understand the rationale behind them and be given guidelines for progression. Long-term adherence to a regimen, particularly one as time-consuming as an exercise program, will only occur if the patient understands the reasons for doing the exercises and believes that they will be useful.

Table 1: Reasons for referring patients for physical and occupational therapy

Physical therapy	Musculoskeletal assessment
	Pain management
	Exercise program to improve ranges of motion, muscle strength and, possibly, aerobic conditioning
	Education about the disease and its management
	Home program
Occupational therapy	Gait analysis and re-education
	Functional assessment
	Instruction in joint protection
	Aids and assistive devices
	Splinting
Education about modifying daily activities	
Modification of workplace	

Role and function of the occupational therapist

The occupational therapist's role is to improve patients' ability to perform daily tasks, help them adapt to disruptions in lifestyle and prevent loss of function. Principles of energy conservation and joint protection, as well as techniques for stress management, are taught to minimize fatigue, reduce stress on joints, reduce pain and increase performance in the activities of daily life.

Patients are trained in alternative methods and the use of adaptive equipment for performing daily self-care, work, school, leisure and recreational tasks. Emphasis is placed on evaluating the patient within the context of his or her home, work or school setting so that appropriate, acceptable interventions will enhance the patient's capabilities. Environmental modifications may be necessary to promote independent functioning. For example, a grab rail fixed to the wall or bathtub can facilitate entry and exit from the tub. The toilet is often the lowest seat in the house and may be difficult for patients with hip or knee problems to use; a raised toilet seat may mean the difference between independence and institutional care for some patients. Ergonomic positioning of desks, chairs and computer monitors may be important for patients in sedentary jobs (Fig. 1).^{1,2} An occupational therapist may also help the patient adjust to new or changed roles in the family or community.

Symptom management for patients with osteoarthritis

Osteoarthritis is perhaps the most common rheumatology problem that the family physician sees, and physical and occupational therapy play an important role in relieving the symptoms associated with this disease.

Education

- The therapist will explain the use of heat or ice and which to use first. Ice has been shown to have more lasting benefit, but heat is often preferred by the patient. This therapy is used before exercise; its purpose is pain relief.
- Although exercise can improve mobility, strength and endurance, overdoing it can aggravate symptoms (pain and inflammation). The therapist will emphasize the need to begin an exercise program slowly and to limit first the weight used and then the number of repetitions if the patient experiences pain.
- Education will also include emphasizing the benefits of a *regular* exercise program.
- Education is important to reduce stressful activity, such as stair climbing and the inappropriate use of an exercise bicycle (i.e., with the resistance set too high), and to ex-

- plain the benefits of using a cane and controlling weight.
- For the obese patient, losing weight is essential for a satisfactory long-term outcome.

Pain relief

Physical therapy

- If the joint is warm and swollen, ice may be used, otherwise the choice of heat or ice depends on patient preference. Mild to moderate heat is applied for 15 minutes, ice for 10–15 minutes.
- Electrical treatments, such as interferential therapy and ultrasound, are of limited value because they cannot be continued in the long term by the patient independently and can be seen as a passive alternative to exercise.

Occupational therapy

- Splinting can provide rest and support and may be useful in pain relief (see section on splinting).
- Assistive devices will help relieve joint pain (see section on joint protection).

Exercise program

Physical therapy

- Daily walking, outside or inside on a treadmill, for 20–30 minutes a day is encouraged. If joint pain is acute, this activity will have to be started slowly.
- Range-of-motion exercises should be carried out daily, using a slow motion, with the joint as close to full range as possible without resistance or weight. These exercises should be repeated up to 5 times in each direction.
- Isometric exercise should be used to increase strength. Some motion is acceptable when the joint is loaded: for example, resting the leg above the knee on a shallow block and moving the joint through 10°–15° (Fig. 2).
- An exercise bicycle may aggravate the patient's condition. If it is used at all, the tension should be reduced to minimum resistance. It may be useful for osteoarthritis in the hip but may be harmful in the presence of patellofemoral joint disease. It is also to be avoided in the presence of synovitis.

- Aquatic exercise is invariably safe and acceptable, and the availability of community programs for people with arthritis is increasing. Warm water is more beneficial than cold. The breaststroke kick is best avoided by those with arthritis affecting the knee joint and after hip arthroplasty.

Cane use

Physical therapy

- A cane may be used for extended outdoor activity but not necessarily for routine activity.
- The cane is held in the hand opposite the affected hip or knee.
- The top of the cane should be level with the proximal wrist crease when the patient is standing erect (Fig. 3). (A good rubber cane tip should be in place for safety.)
- For bilateral joint problems, 2 canes may be used. Crutches or a walker provide greater support and allow partial weight bearing. Severe problems of this nature probably require surgery.

Occupational therapy

- The therapist should ensure that the cane tip is in good

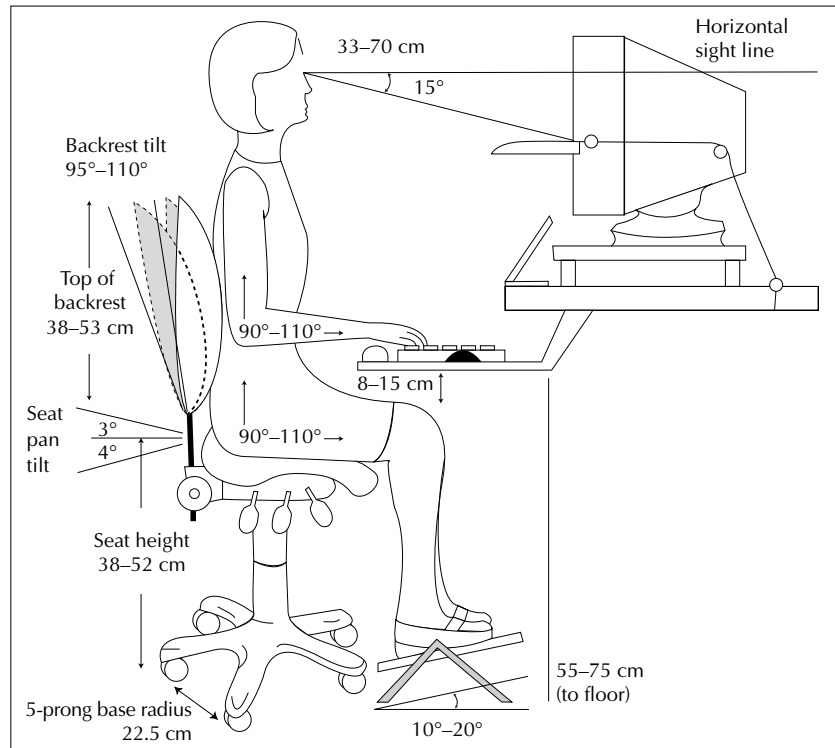


Fig. 1: Recommended dimensions and adjustment ranges for workstation chair, footstool, monitor, keyboard and work surfaces. Adapted with permission from Workers' Compensation Board of British Columbia¹ and Sibbald and Doyle.²

repair for safety reasons, particularly in winter. A spike tip is available for patients walking in icy conditions.

- A simple wooden cane provides the same support as an adjustable metal cane and can be obtained from a pharmacy or medical supplier at minimal cost.

Weight control

Physical therapy

- Weight Watchers may be a useful resource because the program is supervised and provides a weekly incentive.
- Patients need to be informed of the relation between symptoms in their weight-bearing joints and their weight. This understanding will increase their motivation to lose weight. (The Framingham Study³ has demonstrated that obesity is a causative factor in osteoarthritis of the knee in women.)
- Patients may be encouraged to participate in an aquatic program. In water, buoyancy relieves stress on the weight-bearing joints and is well tolerated. The ability to swim is unnecessary.

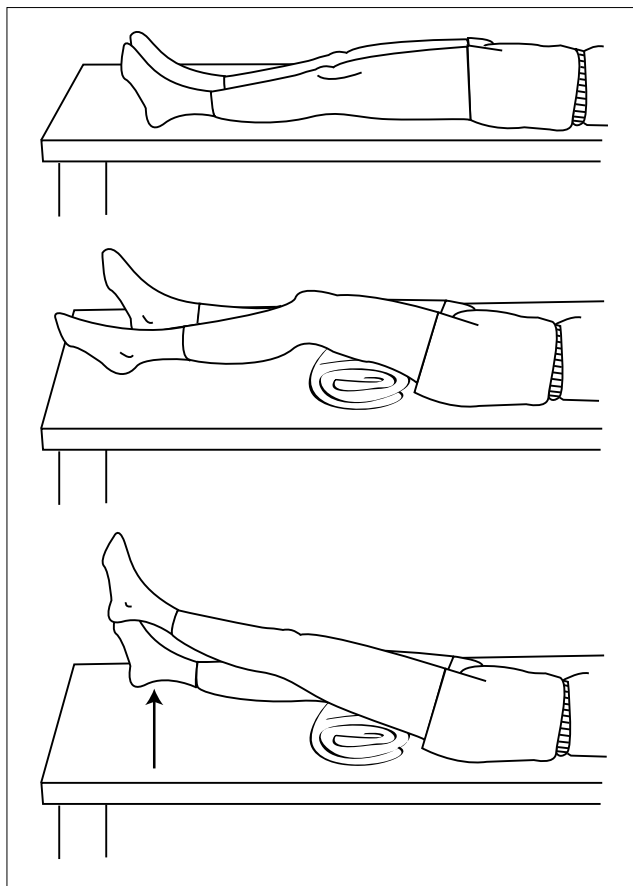


Fig. 2: Quadriceps exercise to strengthen muscles acting on the knee joint. The leg above the knee is rested on a shallow block, and the joint is moved 10°–15°.

Joint protection

Occupational therapy

- Many assistive devices for reducing stress on joints are commercially available (Fig. 4). Devices to assist in the kitchen, including electric can openers, jar openers and extended tap turners, can reduce stress on the first carpometacarpal (CMC) joint by reducing the gripping force required.
- Raised toilet seats (Fig. 5), grab rails for the bathtub or a bath bench reduce stress on lower limb joints and help patients maintain their independence.
- A seat cushion (Fig. 6) or bed blocks can elevate a piece of furniture, making getting up and down possible for those with of arthritis of the hip or knee.
- A running shoe with a wide, supportive heel and a good, cushioned sole may reduce jarring forces through weight-bearing joints.

Splinting

Occupational therapy

- Some commercial splints are useful and usually economical; however, custom-made splints can be fitted and may be more effective. A splint for the first CMC joint allows pinching and gripping with less pain (Fig. 4). A wrist splint will reduce pain during gripping. A leather splint should be used for heavy work; plastic splints allow work in water.
- Knee bracing should be deferred until after a good



Fig. 3: The correct height for a cane, with the top of the cane level with the proximal wrist crease (dashed line).

trial of the following standard conservative measures: analgesics or nonsteroidal anti-inflammatory drugs, a quadriceps-strengthening program, the use of a cane and possible shoe wedging if valgus (knock-knee) or varus (bowleg) are pronounced. Weight loss is essential if a patient is overweight. Knee bracing is useful where lateral instability is pronounced.

- A medial wedge (for knock-knee) or a lateral wedge (for bowleg) applied to the outside of the shoe or, less frequently, to an insole in the shoe can be effective in moving the knee alignment into greater or lesser valgus or varus. Minor changes in alignment can produce significant changes in symptoms.
- A wedge can only be used in a sturdy shoe that is laced and fixed firmly to the foot with a good supportive heel. In a soft, unsupportive shoe, the wedge will not affect the movement of the foot.

Physical and occupational therapy for an inflammatory form of arthritis

The principles outlined here also apply to inflammatory forms of arthritis but require closer patient adherence to instruction because the potential for loss of mobility, flexion contractures and deformity are even greater in chronic inflammatory polyarthritis.

Exercise should become part of the daily routine, but the patient should focus on the joints in which the inflammation and pain are most severe. Each active joint should be taken through its full range of motion daily. Isometric exercise may maintain muscle strength without exacerbating the condition of the joint. Exercise should stop short of increasing inflammation in the joint (as observed by an

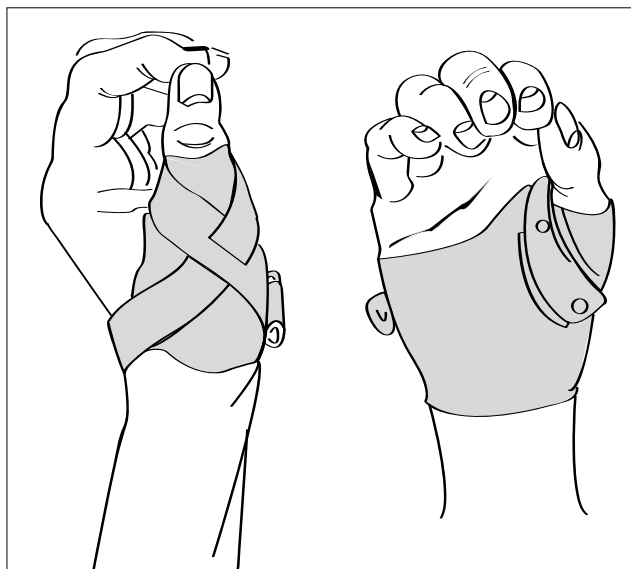


Fig. 4: Thumb splints restrict movement, decrease pain and allow use of the hand.



Fig. 5: A raised toilet seat, available commercially, decreases the required range of motion and force through the hip and knee joints.



Fig. 6: Using a riser to adjust seat height makes it easier for those with arthritis of the hip or knee to get up and down.

increase in pain and warmth or swelling in the joint). Any activity that increases inflammation in the joint should be avoided.

It is important to note that exercises for spondylitis are often the reverse of those recommended for mechanical back pain. Flexion exercise regimens are commonly used for mechanical back pain to improve abdominal strength and flatten the lumbar spine. In spondylitis, pain and inflammation promote a stooped posture with potential deformity in a position of flexion. Therefore, exercise is aimed at maintaining spinal extensor mobility and increasing the strength of the spinal extensor muscles. As spondylitis is less common than mechanical low-back pain (e.g., disc lesions, sprains), there is a danger of applying the standard mechanical treatment rationale to the inflammatory back problem.

Custom-fitted or store-bought splints may rest an active joint or provide support to a damaged joint, and patients are willing to wear these when they are well fitted.

Of paramount importance is the patient's understanding of the need to adhere to a regimen over a long period. Education, delivered when the patient is receptive, is effective; this is rarely at the time of diagnosis. Typically, denial and anger precede the optimum teaching moment.

Conclusion

Physical and occupational therapists expect to be provided with the primary diagnosis for the problem they are going to treat. They do not expect specific instructions or treatment recommendations but generally prefer to be allowed some discretion in developing a treatment plan based on their findings.

These therapists also expect the primary care physician or specialist to have achieved control of inflammation and pain through pharmacologic means where possible. A patient with ankylosing spondylitis, for example, is less likely to adhere to a daily exercise regimen if he or she has not achieved some degree of pain management with an appropriate anti-inflammatory medication.

The services of physical and occupational therapists will be enhanced if supporting information is forwarded to them at the time of referral. Copies of radiologic reports or radiographs, for example, can help them tailor treatment and education to the individual patient. As the primary care physician, the general practitioner should also determine what treatment is being carried out by the therapist and whether it is successful. Regular communication will facilitate the development of a rapport between physician and therapist and will improve treatment for the patient.

Treatment for Mr. P

Mr. P, who has moderate osteoarthritis of the knee, has every reason to expect significant improvement in his symptoms with a program of analgesic or anti-inflammatory medication combined with the therapy outlined in Table 1. He is using a heating pad at home for pain relief and has made good progress with daily quadriceps exercises. These exercises include static quadriceps contractions, but the main exercise involves extending the knee over a shallow block (in this case a rolled-up cushion)

with a 3-kg weight attached to his foot. He does 2 sets of 10 repetitions, holding each for 5 seconds. He is progressing by increasing the weight as his strength improves. He swims 3 times a week and participates in a program of deep-water jogging for weight loss. Over the last 6 weeks, he has lost 4.5 kg. He has stopped using an exercise bicycle, because the activity aggravated the condition of his kneecap and has opted for isometric exercise. His therapist has reinforced the rationale for the use of medication and has discussed the common side effects with him. His physician is supportive of these interventions, enhancing the likelihood of compliance with the treatment regimen and, thus, an excellent outcome.

Competing interests: None declared.

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Key points

- Physical therapists will carry out a full assessment of musculoskeletal status before designing a regimen for the individual patient.
- Physical therapy may include exercises to improve strength, mobility and endurance; gait and posture training to relieve strain on affected joints; and patient education to promote independent management and adherence to the regimen.
- Occupational therapists use interviews, observation and functional assessment to evaluate each patient and plan a treatment program.
- Occupational therapy may include alternative methods for performing everyday tasks and the use of adaptive equipment and environmental modifications, such as a grab rail on the bathroom wall.
- For the treatment of osteoarthritis, a physical therapy program includes the use of heat or cold for pain management, exercises to increase range of motion and strength, and education about joint protection, stress reduction through weight loss and the use of a cane and adapted furniture.
- For the treatment of osteoarthritis, an occupational therapy program may include splinting to relieve stress on a joint and will include education about modifying the activities of daily life to reduce joint load.
- Patients are instructed in home measures, such as balancing rest and activity and avoiding stair climbing (for lower limb problems).

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Related Web sites

- American College of Rheumatology: www.rheumatology.org
- Arthritis Canada: www.arthritis.ca

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