

1. avoiding activities that overload the joint, as evidenced by their causing pain;
2. improving the strength and conditioning of muscles that bridge the joint, so as to optimize their function; and
3. unloading the joint, either by redistributing load within the joint with a brace or a splint or by unloading the joint during weight bearing with a cane or a crutch.

The simplest effective treatment for many patients is to avoid activities that precipitate pain. For example, for the middle-aged patient whose long-distance running brings on symptoms of knee OA, a less demanding form of weight-bearing activity may alleviate all symptoms. For an older person whose daily constitutional up and down hills bring on knee pain, routing the constitutional away from hills might eliminate symptoms.

Each pound of weight increases the loading across the knee three- to sixfold. Weight loss may have a commensurate multiplier effect, unloading both knees and hips and probably relieving pain in those joints.

In hand joints affected by OA, splinting, by limiting motion, often minimizes pain for patients with involvement especially in the base of the thumb. Weight-bearing joints such as knees and hips can be unloaded by using a cane in the hand opposite to the affected joint for partial weight bearing. A physical therapist can help teach the patient how to use the cane optimally, including ensuring that its height is optimal for unloading. Crutches or walkers can serve a similar beneficial function.

Exercise Osteoarthritic pain in knees or hips during weight bearing results in lack of activity and poor mobility, and because OA is so common, the inactivity that results represents a public health concern, increasing the risk of cardiovascular disease and obesity. Aerobic capacity is poor in most elders with symptomatic knee OA, worse than others of the same age.

Weakness in muscles that bridge osteoarthritic joints is multifactorial in etiology. First, there is a decline in strength with age. Second, with limited mobility comes disuse muscle atrophy. Third, patients with painful knee or hip OA alter their gait so as to lessen loading across the affected joint, and this further diminishes muscle use. Fourth, “arthrogenous inhibition” may occur, whereby contraction of muscles bridging the joint is inhibited by a nerve afferent feedback loop emanating in a swollen and stretched joint capsule; this prevents maximal attainment of voluntary maximal strength. Because adequate muscle strength and conditioning are critical to joint protection, weakness in a muscle that bridges a diseased joint makes the joint more susceptible to further damage and pain. The degree of weakness correlates strongly with the severity of joint pain and the degree of physical limitation. One of the cardinal elements of the treatment of OA is to improve the functioning of muscles surrounding the joint.

For knee and hip OA, trials have shown that exercise lessens pain and improves physical function. Most effective exercise regimens consist of aerobic and/or resistance training, the latter of which focuses on strengthening muscles across the joint. Exercises are likely to be effective, especially if they train muscles for the activities a person performs daily. Activities that increase pain in the joint should be avoided, and the exercise regimen needs to be individualized to optimize effectiveness. Range-of-motion exercises, which do not strengthen muscles, and isometric exercises that strengthen muscles, but not through range of motion, are unlikely to be effective by themselves. Low-impact exercises, including water aerobics and water resistance training, are often better tolerated by patients than exercises involving impact loading, such as running or treadmill exercises. A patient should be referred to an exercise class or to a therapist who can create an individualized regimen, and then an individualized home-based regimen can be crafted. In addition to conventional exercise regimens, tai chi may be effective for knee OA. However, there is no strong evidence that patients with hand OA benefit from therapeutic exercise.

Adherence over the long term is the major challenge to an exercise prescription. In trials involving patients with knee OA, who are engaged in exercise treatment, from a third to over half of patients stopped exercising by 6 months. Less than 50% continued regular exercise at 1 year. The strongest predictor of a patient’s continued exercise is a previous personal history of successful exercise. Physicians should reinforce the exercise prescription at each clinic visit, help the patient recognize barriers to ongoing exercise, and identify convenient times for exercise to be done routinely. The combination of exercise with calorie restriction and weight loss is especially effective in lessening pain.

Correction of Malalignment Malalignment in the frontal plane (varus-valgus) markedly increases the stress across the joint, which can lead to progression of disease and to pain and disability (Fig. 394-5). Correcting malalignment, either surgically or with bracing, may relieve pain in persons whose knees are malaligned. Malalignment develops over years as a consequence of gradual anatomic alterations of the joint and bone, and correcting it is often very challenging. One way is with a fitted brace, which takes an often varus osteoarthritic knee and straightens it by putting valgus stress across the knee. Unfortunately, many patients are unwilling to wear a realigning knee brace; in addition, in patients with obese legs, braces may slip with usage and lose their realigning effect. They are indicated for willing patients who can learn to put them on correctly and on whom they do not slip.

Other ways of correcting malalignment across the knee include the use of orthotics in footwear. Unfortunately, although they may have modest effects on knee alignment, trials have heretofore not demonstrated efficacy of a lateral wedge orthotic versus placebo wedges.

Pain from the patellofemoral compartment of the knee can be caused by tilting of the patella or patellar malalignment with the patella riding laterally or medially in the femoral trochlear groove. Using a brace to realign the patella, or tape to pull the patella back into the trochlear sulcus or reduce its tilt, has been shown, when compared to placebo taping in clinical trials, to lessen patellofemoral pain. However, patients may find it difficult to apply tape, and skin irritation from the tape is common. Commercial patellar braces may be a solution, but there is insufficient evidence on their efficacy to recommend them.

Although their effect on malalignment is questionable, neoprene sleeves pulled to cover the knee lessen pain and are easy to use and popular among patients. The explanation for their therapeutic effect on pain is unclear.

In patients with knee OA, acupuncture produces modest pain relief compared to placebo needles and may be an adjunctive treatment.

PHARMACOTHERAPY

Although nonpharmacologic approaches to therapy constitute its mainstay, pharmacotherapy serves an important adjunctive role in OA treatment. Available drugs are administered using oral, topical, and intraarticular routes.

Acetaminophen, Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), and Cyclooxygenase-2 (COX-2) Inhibitors Acetaminophen (paracetamol) is the initial analgesic of choice for patients with OA in knees, hips, or hands. For some patients, it is adequate to control symptoms, in which case more toxic drugs such as NSAIDs can be avoided. Doses up to 1 g three times daily can be used ([Table 394-1](#)).

NSAIDs are the most popular drugs to treat osteoarthritic pain. They can be administered either topically or orally. In clinical trials, oral NSAIDs produce ~30% greater improvement in pain than high-dose acetaminophen. Occasional patients treated with NSAIDs experience dramatic pain relief, whereas others experience little improvement. Initially, NSAIDs should be administered topically or taken orally on an “as needed” basis because side effects are less frequent with low intermittent doses. If occasional medication use is insufficiently effective, then daily treatment may be indicated, with