Dynamic Chiropractic

ORTHOTICS & ORTHOPEADICS

Orthotics and DJD Prevention

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As the baby boomer generation ages, there will be more cases of degenerative joint disease (DJD). Today, more than 35 million Americans are 65 or older, and more than half of them have evidence of DJD in at least one joint. Among people age 45 or younger, DJD is more common among men than women. However, among people older than age 54, DJD is more common among women; women generally have more joints involved and more frequently experience stiffness and swelling.

Causes of DJD

DJD, also known as osteoarthritis, results from physical changes in the joints and surrounding tissues, leading to pain, tenderness, swelling and decreased function. The joints most often affected are the hip and knee. In addition to advancing age, risk factors for DJD include joint trauma, obesity and repetitive joint use.

DJD limits the ability of the bones to move against each other. Cartilage between the bones allows them to slide on each other, providing stable movement at the joints. If the smooth cartilage between the bones becomes rough from wear and tear, it causes friction to occur, which can lead to joint pain. After the cartilage has been frayed and worn completely off the bone ends, another process can lead to the formation of osteophytes.

Diagnosis

Usually, DJD is diagnosed by a combination of history, examination and X-ray evidence of a narrowing in the joint space, and/or the growth of these osteophytes. The degeneration of the cartilage itself is not visible on an X-ray; as cartilage is rubbed away, however, the space between the bones narrows and is visible.

Symptoms include morning joint stiffness upon arising or after periods of resting and/or sitting. Pain that increases with the use of the affected joint(s), progressive reduction of joint motion, and redness and swelling in surrounding tissues also may be present.

DJD of the Knee

The knee, often referred to as the most complicated joint in the body, must bear a majority of the body's weight while supporting movements necessary for locomotion. This, in turn, can result in degeneration due to osteophytic changes of the joint margins, the tibial spine and the posterior surface of the patella. Subchondral bony necrosis, the production of joint mice (loose bodies of'cartilage or bone chips in the joint space), and joint narrowing are often noted in patients presenting with DJD.

Excessive pronation causes internal tibial fixation (ITF) and stretches the anterior cruciate ligament (ACL), placing abnormal biomechanical forces on a normal joint. ITF stretches the ACL beyond its physiological limits, creating stress. The tibial rotation increases compressive forces on the medial meniscus and causes effusion of the knee joint. Inhibition of the quadriceps occurs, causing abnormal patellar tracking, and biomechanical coordination deteriorates, thus creating

increased inflammation. All of these conditions may cause DJD of the knee later in life.

DJD of the Hip

The hip is a very stable joint due to its deep-socketed bony anatomy; it is injured much less often than other joints. However, the hip forms a vital link in the lower kinetic chain, transferring forces from the legs to the trunk during gait. Following years of improper biomechanics and dysfunction, DJD of the hip occurs often.

Excessive pronation produces medial rotational stress on the legs and hip joints, and can cause excessive joint movement during gait. Overuse injuries can occur in the hip joints as a result of excessive pronation which can go unnoticed for years. Another cause of DJD in the hip is leg-length inequality. A functional short leg created by the combination of arch collapse and medial rotation of the ankle and leg can result in a pelvic tilt to the shorter side. A study by Friberg hypothesized that the greater pressure on the articulation of the longer leg produces chondral damage and ensuing unilateral arthrosis.[1] Repetitive impact loading on the hip joint also can cause DJD. This compounded repetitive shock wave travels through the body and places unnecessary strain on the hip joints, possibly resulting in degenerative changes.

Prevention

While genetics may be a factor in DJD, it doesn't necessarily mean that everyone will develop DJD later in life. Three methods are key in preventing DJD in the baby boomer generation: chiropractic adjustments, exercise/stretching, and the use of supportive, custom-made orthotics.

Chiropractic adjustments. Adjustments aimed at relieving restricted motion in either the knee or hip can be beneficial in the prevention of DJD. Chiropractic adjustments also can help maintain the body's proper alignment.

Exercise. Exercise is important in remaining arthritis-free, or in preventing DJD from progressing. Years ago, this was not generally recommended, as doctors feared activity would cause damage and inflammation of the joints. However, safe exercise and stretching effectively spreads synovial fluid around joints, which helps ensure that cartilage receives essential nourishment.

Strengthening the muscles and joints around the knee and hip also can lower the incidence of trauma to the joints. Patients should be instructed to perform a series of strengthening exercises that provide and coordinate the contraction of muscles involved in flexion, extension and rotation.

Orthotic support. Flexible, custom-made orthotics are essential in preventing DJD. Such orthotics can correct pedal imbalances, such as improper arch support, which can cause excessive pronation and tibial torsion, thus helping prevent overuse injuries and knee-joint degeneration. Decreasing the extent and speed of pronation with a "pronation wedge" also reduces the medial rotation forces transmitted into the hip joints and pelvis.

Viscoelastic materials in orthotics are effective in reducing repetitive shock waves to the joints. Published research demonstrates that custom-made orthotics improve structural alignment of the foot, thereby creating a more symmetrical foundation throughout the entire kinetic chain.[2]

References

1. Friberg O. Clinical symptoms and biomechanics of lumbar spine and hip joint in leg length inequality. *Spine* 1983;8:643-651.
2. Kuhn DR, et al. Radiographic evaluation of weight-bearing orthotics and their effect on

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