Dynamic Chiropractic

SOFT TISSUE / TRIGGER POINTS

Is "Wear and Tear" the Cause of Exercise-Related Osteoarthritis?

Warren Hammer, MS, DC, DABCO

Most of the time, we hear that osteoarthritis results from "wear and tear" due to repeated weight bearing and gradual thinning of the articular cartilage. Shrier[1] performed a literature review to determine how exercise was related to osteoarthritis. He chose to look at primary osteoarthritis (OA), i.e., arthritis not due to genetic disease, severe biomechanical abnormalities, postseptic arthritis, etc. He limited the study to the hip and knee. The question he pursued was whether exercise-related osteoarthritis was due to what is known as "wear and tear" or muscle dysfunction.

The argument for the muscle dysfunction theory of osteoarthritis is that properly contracting muscles are the main force absorbers for the joint; since regular exercise improves muscle function, exercise would not increase the incidence of or worsen OA.[1,2] Patients with mild and moderate OA have been relieved by strengthening and endurance exercises.[3] Muscle fatigue increases the impact forces crossing a joint.[4] Since muscles are responsible for stabilizing the joint during movement, it is possible that osteophytes and capsular thickening may be the body's attempt to increase joint stability to make up for the causative muscle dysfunction.

If the "wear and tear" theory is true, exercise should worsen the condition; the greater distance one runs should increase the wear; and cartilage damage should precede the bone sclerosis that appears above the damaged cartilage. The obesity theory also should agree with the wear and tear theory.

According to the literature, recreational running and soccer did not increase the risk of OA.[2,5] Regular running increased joint space width, but forced exhaustive running in dogs resulted in degeneration[6] due to marked depletion of proteoglycans from the superficial layer of the femoral condyles, which received the highest impact loads. There was increased osteoarthritis in elite athletes, but this could be related to increased risk of injury and playing with minor injuries, which would increase joint stress due to accompanying muscle weakness. Regarding the running of large distances and increased "wear and tear," subjects older than age 50 were not affected by the amount of mileage.[7] Shrier hypothesizes that when muscles are unable to contract adequately due to age, fatigue, disuse atrophy, decreased proprioception or strain, more force is transmitted to the bone, leading to sclerosis.[1]

The microtrabecular damage of the bone and eventual sclerosis could create stress on the articular cartilage, with eventual joint space narrowing. The muscle dysfunction theory predicts that sclerosis will appear before cartilage thinning. Early bone injury has been found to be an early sign in the progression of OA.[8]

With muscle dysfunction - for example, to the thigh or leg - the OA might not necessarily occur in the

joint adjacent to the injured muscle, since new impact forces may not be absorbed in joints distal to the injury. Knee injuries might be a cause of hip OA and vice versa, since the muscles of the thigh would be expected to absorb force across both joints.[1] The muscle dysfunction theory, rather than the wear and tear theory, could be related to the effect of obesity on OA, because increased weight requires muscles to absorb more force, and with a reduction in physical activity, the decreased strength and endurance would result in more stress to the joint.

It becomes apparent that if the muscle dysfunction theory is related to osteoarthritis, it is imperative to maintain proper muscle strength and proprioception - not only for major injuries, but especially after minor injuries, which may over time lead to decreased muscle absorption of joint stress and eventual osteoarthritis.

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