Team Effort

ORTHOPAEDIC SURGEON WORKS WITH RESEARCHERS ACROSS THE COUNTRY TO PREDICT RISK FACTORS FOR A DEBILITATING DISEASE STRIKING ONE IN 10 CANADIANS

Drs. Gadi Khan, Paul Marks and Om Sharma. Background: Dr. Chris Robinson

Dr. Paul Marks thinks that when it comes to understanding diseases, two — or in his case, eight — heads are better than one. An orthopaedic surgeon and associate scientist in the Holland musculoskeletal research program at Sunnybrook Research Institute, Marks is a researcher, along with seven others, in the Prospective Study of Patients with Knee Injuries (ProKnee), which seeks to identify risk factors that predict the progression of osteoarthritis after knee injury. For Marks, tackling osteoarthritis — a disease afflicting three million Canadians — requires collaboration: "If we are going to make progress in understanding these complex problems [then] we need a team of people who are like-minded but have their own area of expertise that they can bring to bear on the problem in a more sophisticated way." The multi-institutional ProKnee study, the first of its kind in Canada, does just that, amassing experts in radiology, orthopaedics, statistics, biomechanics and biomedical engineering.

Osteoarthritis, the most common form of arthritis, is caused by the breakdown of cartilage, the dense elastic tissue that covers and protects the ends of the bones. Marks discovered early in his career that the disease was complex, with various factors that were poorly understood. Even patients whose biomechanics were repaired through surgery began to develop the disease. This suggested the presence of biologic factors beneath the cartilage that, according to Marks, "might set the stage for someone developing arthritis."

The varied expertise of the investigators in the ProKnee study addresses the need to use a multifaceted approach in examining the progression of osteoarthritis. They have recruited 121 patients (all of whom came from Marks's practice), between the ages of 18 and 40 years, who have had an anterior cruciate ligament (ACL) injury, a tear in the ligament that is responsible for stabilizing the knee joint. All of the participants had surgery within three months of the injury. They will be monitored for five years to determine whether the knee is healing, or if bone and cartilage are deteriorating. Using mathematical models and diagnostic tests, Marks and his colleagues hope to determine which participants will develop osteoarthritis and why — what he calls "the ACL risk equation." The equation has as its constant ACL injury, and variables such as individual habits and disturbances in the joint, which prevent tissues from fully healing and cause further damage to the knee. They are also targeting new therapeutic strategies, including the use of drugs to stop bone softening and replacing cartilage using cells from other parts of the body.

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Regardless of whether his patient is an elite athlete (he is also the medical director for the Toronto Raptors — a role he has had since the team's inception), or someone who simply wants to maintain an active lifestyle, Marks strives to treat injuries early to prevent them from becoming more serious. "There is a 'golden interval of time' where we have the opportunity to restore biologic integrity and try to get back to normal physiology. That's why our focus is at the beginning — right after the injuries have occurred," he says.

Although time is of the essence for the treatment of injuries, Marks and his colleagues will have to wait and see if they can come up with the risk equation. The ProKnee team will follow patients for five years, but Marks suspects that because major problems likely won't surface until much later, it could be 10 or 15 years before the answers are uncovered.

Only time will tell. AK

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