



KENNY Lam

IMPROVING THE LONG-TERM PICTURE AFTER A KNEE INJURY

Sports fans know how devastating a ruptured anterior cruciate ligament (ACL) can be to an athlete's career—and also how wonderful it is when that athlete finally returns to the field, typically after about a year of rehabilitation following surgery.

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What is generally lost in the story, however, are the lingering effects of such an injury three, five, or ten years down the road. In fact, until recently, this was not an area substantially explored by orthopedic surgeons, athletic trainers, or physical therapists. But with the work of people like Kenneth Lam, the long-term problems of knee surgery could be identified—and possibly solved.

On top of being a teaching fellow within the Athletic Training Program at Boston University (BU) Sargent College of Health and Rehabilitation Sciences and a certified athletic trainer at the Massachusetts Institute of Technology, Lam is also a doctoral candidate in the rehabilitation sciences program, where he is studying the long-term impact of ACL reconstructive surgery (ACL-RS) on both the flexibility and stability of coordination patterns during walking. ACL-RS studies indicate a surgical success rate of over 90

percent; however, Lam says, studies also report that individuals who have undergone ACL-RS are up to 10 times more likely to develop osteoarthritis after surgery. Not content with merely successful surgery, Lam wishes to improve the quality of life for post-operative patients by easing the chronic conditions that sometimes follow, and he is studying the reasons behind them. His interest is in the relative stability of coordination patterns; he hypothesizes that ACL patients will have a less stable pattern when compared with healthy control subjects.

Research of this kind could have a profound impact on knowledge of chronic injuries as well as on the larger field of physical therapy and rehabilitation practices. “Let’s say we find that these ACL patients are more unstable,” says Lam, who also received a bachelor’s degree in athletic training from Sargent and a master’s degree in human movement from the School of Education at BU. “Then, we could start thinking about: What are we doing during rehabilitation that is falling short? Or it could be: What are we doing wrong in surgery? What is causing this?”

Since very little research has been done on ACL-RS patients beyond the first year after surgery, Lam is hoping to uncover the missing information by studying subjects who are between one and five years removed from their operation. Using treadmills, he explains, “We systematically manipulate our subjects’ walking velocity from an extremely low walking speed to a running mode by increasing the velocity every sixty seconds. Once they top out at 3 meters per second, we systematically bring them back down to the original, low walking speed. Through this method, we hope to find coordination characteristics that may differ between our ACL subjects and healthy individuals.”

Studying flexibility and stability of coordination patterns has been used before for an athletic population, says Lam, but researchers have looked at only one pattern, the subject’s preferred walking mode. His study, he says,

looks at a broad range of gait patterns—slow walk, normal walk, jogging, and running. He also uses “step frequency manipulation,” alternating among three different walking speeds in order to study how subjects change their gait patterns. This research will indicate any patterns of movement that exist differently in post-ACL-RS patients versus control subjects who have never undergone the operation. “The benefit of this research is to see possible links to long-term, degenerative changes in the knee. And then the next step would be: What can we do to prevent this from happening?”

This is a learning experience that Lam—as a research teaching fellow in Sargent’s fairly new ScD program in rehabilitation sciences—has had the opportunity to design himself, based on his lifelong interests. “When I was younger, I wanted to be a doctor. One day I was watching football on TV with my dad, and a player went down with an injury, and all these people—athletic trainers, team doctors—ran out onto the field. And I thought, ‘Sports and medicine—sounds pretty cool!’” Later, in high school, Lam played roller hockey, followed by ice hockey. “That’s what brought me to BU,” he says with a grin. “I was fortunate, because it’s also one of the top programs in the country for athletic training.”

Lam’s research could change lives, with the results opening up areas of further study and perhaps leading to new surgical and rehabilitation techniques. The outcome could be longer careers for athletes and a better long-term quality of life for anyone who has ever suffered the agonizing pain of a torn ACL.

Opposite page: Kenny Lam, a student in the doctoral program in rehabilitation sciences.

Right: Lam and his mentor, Robert Wagenaar, PhD, professor of physical therapy and athletic training.

Lam tests a subject on the treadmill for his research.

