

## THE STORY AND THE RATIONAL BEHIND THE ACCELERATED REHABILITATION CONCEPT



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### Background

Through the years, the "Accelerated Rehabilitation" program that I published in 1990 (2) has been wrongly portrayed. The conclusion of the study was: "Evidence indicates that... the accelerated rehabilitation program has been more effective than our initial program in reducing limitation of motion (particularly knee extension) and loss of strength while maintaining stability and preventing anterior knee pain." However, many concluded that accelerated rehabilitation meant returning to sports quickly after surgery. The rehabilitation program evolved and a history of the evolution will give a good understanding of the rationale for treatment.

The goal of Anterior Cruciate Ligament (ACL) surgery in the 1970's was to provide stability to knees with chronic ACL deficiency. Patients with acute injuries were usually treated with a trial of rehab and bracing. Most procedures were extra-articular and patients were placed in a 30° flexed cast for 6 weeks after surgery to try and make the knee stiff because the extra-articular procedure would loosen over time. When intra-articular grafts were added to augment the extra-articular procedures, the rehab was not altered. The added intra-articular surgery caused many more stiff knees and disabling arthrofibrosis.

As I began practice in 1982, I had a process in place for research and data collection that allowed me to identify major complications and patients who did extremely well after surgery. This allowed me to study factors related to both good and bad outcomes. The rate of arthrofibrosis that required scar resection surgery after ACL reconstruction was 20-25% in 1983-84, with higher rates with acute ACL reconstruction. I started to alter the approach to surgery and rehabilitation to reduce arthrofibrosis. The initial changes made included using a splint instead of a cast, using a Continuous Passive Motion (CPM) machine, stop doing extra-articular procedures, and stop repairing MCL injuries. These changes reduced the rate to 8-10% by 1986.

In 1986, we performed a study to determine compliance of rehabilitation. A survey was conducted. The answers determined that many patients were not wearing their splint at all times, were putting weight on their leg, and were not using crutches. Further analysis of results showed us that the non-compliant patients had better Range Of Motion (ROM), better leg control, and better strength but did not have different stability than compliant patients. These results led us to make major rehabilitation changes. Changes implemented included elimination of using a splint, weight bearing was allowed as tolerated, full extension exercises began the day of surgery, and strengthening exercises started at 2-3 weeks post-op. Subsequent analysis of results showed further improvement in ROM, less pain, decrease in rate of scar resection, but no difference in post-op stability. One problem we initially saw with the rehab changes was that some patients developed a large hemarthrosis with being encouraged to walk. We then started limiting the time out of bed for the first 5-7 days after surgery to bathroom privileges only and exercises were performed while in bed. We also began using a cold/compression device to be worn continually except during exercises. These changes continued to reduce our rate of scar resection to less than 1% since 1997.

The data of the 10-20 year results of ACL reconstruction in my practice has been published. The data showed that the most important factor related to higher subjective scores was obtaining full knee extension after surgery (1). When comparing patients who had normal ROM (International Knee Documentation Committee - IKDC - criteria) with patients who lacked normal ROM, the subjective scores were significantly higher and the rate of osteoarthritis was significantly lower for patients with normal ROM, even within like groups of patients with meniscus tears and/or chondral damage.

### **Conclusion**

The goal of accelerated rehabilitation is to give the patient the best chance of a normal knee in the long-term. Any loss of extension or flexion significantly affects the results. "Accelerated" means achieve full ROM as quickly as possible after surgery, and maintain full ROM throughout the process.

### **References**

1. Shelbourne KD, Gray T. Minimum 10-year results after anterior cruciate ligament reconstruction: how the loss of normal knee motion compounds other factors related to the development of osteoarthritis after surgery. *Am J Sports Med* 2009; 37(3): 471-480
2. Shelbourne KD, Nitz P. Accelerated rehabilitation after anterior cruciate ligament reconstruction. *Am J Sports Med* 1990; 18(3): 292-299