NSOSMC

LARS ligament for ACL Reconstruction
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SURGEON OPINION –ASSOCIATE PROFESSOR LEO PINCZEWSKI

There has been considerable recent media interest on the LARS ligament for reconstruction of the anterior cruciate ligament (ACL). This is of concern as all prior attempts to reconstruct the ACL with artificial ligaments and Ligament Augmentation Devices have failed with poor medium and long term outcomes for the patient. The Surgeons at the North Sydney Orthopaedic & Sports Medicine Centre consider it appropriate to summarise their collective experience, the current evidence and provide an opinion regarding the use of the LARS and other artificial ligaments.

THE HISTORY OF ARTIFICIAL LIGAMENTS

Artificial ligaments for reconstruction of the ACL were introduced in the 1970's. In 1992 the International Knee Society reviewed artificial ligaments. They noted uniformly poor clinical outcomes and recommended cessation of their use. A recent resurgence in Australia is related to a new generation of surgeons who have not shared this experience and to a marketing push with no new clinical evidence provided. Their marketing strategy is to emphasise the theoretical benefits over using autograft (the patient's own tissue, patella tendon or hamstring tendon). These include artificial ligament's early strength at implantation, the lack of harvest site morbidity and a technically easier surgical technique for the surgeon (with a potentially faster rehabilitation for the patient). There is no question that our early experience with artificial ligaments showed that they were successful in restoring knee stability in the short term. However, all man-made materials suffer from fatigue fracture of the fibres and, with time, they all ultimately wear and fail. This process is accelerated in poorly positioned ligaments, however, even when ligaments are well placed, the expected survival is only 7-10 years.

The most popular artificial ligament used to date is the Leeds-Keio ligament which has been used in over 50,000 cases worldwide[1]. It is made of a similar polyester material as that of the LARS ligament. Early results were very encouraging with failure rates of less than 10% at 3 years[2]. With increasing time however, inflammation of the synovial lining of the joint due to fragments of polyester has been reported as well as increasing instability with 66% of patients at 10 years having unstable joints. Also of great concern is that 100% of patients had developed osteoarthritis at 10 years post operatively. The best results were reported by Ventura[3] in 2010 with an 18-21 year follow up. Ventura showed that only 25% of patients considered their knee normal, with 75% demonstrating laxity on clinical testing and 100% of patients having signs of osteoarthritis. The mechanism for this osteoarthritis has been studied[4]. Artificial ligaments form wear particles that cannot be absorbed by the body. These particles produce an inflammatory reaction which alters the cartilage cells initiating a breakdown of articular cartilage leading to osteoarthritis.

THE LARS LIGAMENT

The LARS ligament is advocated by the Corin Company and the surgeons who use it, as having a superior design to previous polyester ligaments. It has been recommended to be used as a stent through the native anterior cruciate ligament to prevent the polyester particles from entering the joint. Unfortunately the nature of ACL injury rarely allows enough tissue to cover the stent even if surgery is carried out immediately. Whilst this coverage might prevent polyester wear particles from entering the joint should the native cruciate ligament heal, the native ligament tissue is stress shielded by the stent and when finally the stent fails, the stress shielded tissue is unable to support knee stability resulting in rupture, laxity and exposing the joint to polyester particles.

The LARS ligament has received considerable press since being used in several high profile athletes. If the surgery is performed technically correctly, a good short term outcome is to be expected with a return to sport appearing possible at 3 months rather than the 5 or 6 months with the use of the patients own tissue. However, whilst such a quick return to sport may be indicated in the professional athlete reaching the end of his career, for the younger professional athlete or the general population, the inevitable failure of the

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ligament leading to the need for further surgery to stabilise the joint and the markedly increased risk of premature osteoarthritis makes their use unacceptable.

On current evidence the LARS ligament should only be used in ethically based clinical trials in a research setting with informed consent of the patient regarding known failure rates and osteoarthritic outcomes at the 10-15 year post operative mark.

The LARS ligament has been used and licensed in France for over 25 years for repair and augmentation of the posterior cruciate ligament. However French surgeons have reported a high failure rate of this ligament and inevitable osteoarthritis after posterior cruciate ligament reconstruction with LARS. These results, and the difficulty in covering the artificial ligament with soft tissue in ACL reconstruction, suggest a similar poor outcome.

With 15 year follow-up of patella tendon and hamstring tendon grafts for ACL reconstruction, the long term results of this surgery have been shown to provide long standing ligamentous stable joints that allow full participation in sport at the highest level without damage to the menisci due to instability and the subsequent development of osteoarthritis.

SUMMARY
Whilst an argument can be made for the implantation of a LARS or any other artificial ligament into a professional sportsperson who is reaching the end of his/her career in the hope, of a few more seasons, the known risks from artificial ligament failure, the need for further surgical procedures and the subsequent osteoarthritis are rarely appreciated or emphasised to the patient.

The current evidence is that artificial ligaments will have good short term results over 5-7 years but will have an inevitably higher risk of revision surgery for increasing laxity and inflammatory synovitis secondary to artificial ligament particle debris resulting in premature osteoarthritis. Accordingly, it cannot be ethically recommended to our patients.

A/ PROF LEO PINCZEWSKI

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