



**LARS<sup>®</sup>**

Ligament Augmentation  
& Reconstruction System



## Ligament Augmentation & Reconstruction System Brochure

Distributed by

**Corin**



## Introduction

LARS are a range of synthetic ligament augmentation and reconstruction devices, for use in a wide variety of applications from ACL and PCL reconstruction to ankle and shoulder repairs. Designed to mimic the normal anatomic ligament fibres, the intra-articular longitudinal fibres resist fatigue and allow fibroblastic ingrowth. The extra-articular woven fibres provide strength and resistance to elongation.

Clinically proven applications for LARS include:

- PCL reconstruction
- ACL repair
- Augmentation of the medial-collateral ligament
- Achilles tendon rupture
- Lateral instability of the ankle
- Acromio-clavicular joint dislocation
- Rotator cuff repair

## Construction

The construction of the LARS ligament is the result of many years' detailed research into finding a suitable material for this application and the best way to apply the material to produce the various ligaments available.

The material used is polyethylene terephthalate - an industrial-strength polyester fibre which has the ideal characteristics for ligament replacement applications. Each type of LARS ligament contains a specific number and length of fibres, depending on the intended use, and varying leaders to facilitate passage through the bony tunnels.

The intra-articular portion of the LARS ligament is made of longitudinal fibres without transverse or crossing components. The fibres are oriented to the ligament they are made for, to mimic the anatomic fibres. This patented structure allows a high resistance to fatigue, especially in flexion, as well as providing a porosity favouring fibroblastic ingrowth which then isolates the synthetic fibres. In the extra-articular portion the same parallel fibres are kept united by a process of warp knitting. This knitting process minimises secondary elongation (as opposed to braided or woven fibres).

Resistance to traction varies with the number of longitudinal fibres - approximately 1,500N for 30 fibres, 2,500N for 60 fibres, 3,600N for 80 fibres, and 4,700N for 100 fibres.

## Applications

LARS ligaments are intended for the intra or extra-articular reconstruction of ruptured ligaments.

LARS can be used in conjunction with suturing to the remnant of the ruptured ligament, or as an autogenous reconstruction. In both cases LARS allows the original ligament tissues to heal in the absence of traction and provides an earlier return to normal function. LARS can be used for extra-articular reconstructions in tendon repair, such as Achilles tendon, patella tendon, biceps tendon, rotator cuff, etc.

These ligaments must always be placed in the joint in an anatomical and isometric position. The diameter of the bony tunnels must correspond to the specific reference for each type of ligament and as a general rule should be as small as possible. The fixation of the ligament extremities must always be extra-articular. In acute cases, the artificial ligament must be placed in the centre of the autogenous remnant. Ligament extremities are cut flush with the fixation.

Biological and mechanical testing of resistance, fatigue and creep have shown that LARS ligaments are highly effective ligament reconstruction and augmentation devices, and long-term clinical results are excellent. The use of the LARS artificial ligament requires a specific surgical technique, for which dedicated LARS instruments are available.



## Implantation Method

A number of guidelines must be respected:

- Isometry is critical to the outcome
- Acute angles must be avoided when drilling the tunnels
- There must be no impingement or abrasion of the ligament in the joint
- Solid extra-articular fixation must be achieved using LARS interference screws
- Absence of tension in the synthetic ligament is important; the post-operative tension should not be more than that of the anatomical ligament being repaired
- Coverage by fibrous tissue is desirable, in particular when placing the ligament using arthroscopic techniques. Removal of the remnants in the intracondylar notch is contraindicated; the ligament must pass through this tissue
- Small incisions should be used to help retain proprioception<sup>1 2</sup>

### Clinical History

LARS ligaments have been in clinical use for over 15 years, with no acute examples of synovitis reported in many thousands of cases. There are many studies and publications supporting the use of LARS for all indications (see references).

## Acromio Clavicular Dislocation

The LARS range includes two sizes of acromio clavicular ligaments, their use depending on patient weight and sporting activities. The LARS ligament acts as a reinforcement to allow the coracoclavicular ligament to heal and grow into the synthetic fibres. They allow immediate mobilisation with no material passing through the joint. The fixation is via two bony tunnels and not an 'over-the-top' approach, thus reducing clavicular erosions.<sup>3</sup>

The use of loop techniques offers the possibility of an earlier return to work<sup>4</sup> especially in younger, active patients or those with a high-grade dislocation.



Acromio clavicular ligament

## Rotator Cuff

LARS rotator cuff patches are indicated for large defects, forming a strong bridge over the humeral head. The ligament is fixed proximally onto the remnants of the rotator cuff muscles, and distally into tunnels drilled in the top of the humerus in abduction with screws. When the arm is back in adduction the patch pulls the cuff over the top of the humeral head into normal anatomic placement. The ligament comes in two sizes for compatibility with patient weight and activity.



LARS rotator cuff



## Anterior and Posterior Cruciate Ligaments

LARS ligaments can be used to reconstruct both the anterior and posterior cruciate ligaments and a special Y ligament is available to reconstruct the postero-lateral corner.

LARS ACL and PCL ligaments come in many different sizes so that selection according to weight and activity can be precise. The ACL and PCL synthetic ligaments have both been used extensively for many years with excellent clinical results.<sup>5 6 7 8</sup>

Both ligaments have free fibres in the intra-articular portion of the ligament, which allow for a smaller synthetic ligament volume in the knee, fibroblastic ingrowth<sup>9</sup> and better resistance to fatigue in flexion and extension (data on file).

The LARS ACL has the intra-articular bundles in clockwise or anticlockwise

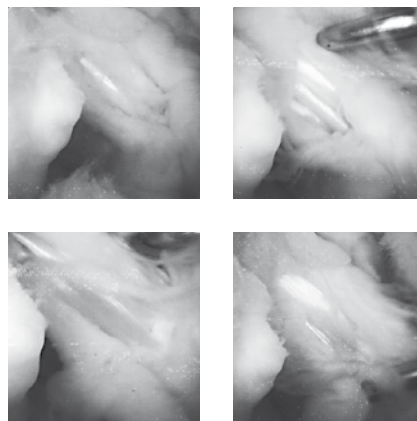
orientation; this is to mimic the natural ligaments in the right or left knee<sup>10</sup>. It can be used in acute injuries or where there is a good ACL stump that is well vascularised. In chronic cases, if the rupture is on the femoral part or the ACL has attached to the PCL, this can be dissected off the PCL and can then be reconstructed in a similar fashion to an acute case. In chronic cases where there are no usable ACL remnants, an autogenous reconstruction reinforced by a LARS Actor 8 or 10 is recommended<sup>11</sup>.

With the PCL, reconstruction is ideally made in the acute phase. In chronic cases, the Actor 8 or 10 ligaments can also be used with autogenous tissue if required.

A Y-shaped ligament is also available to reconstruct the postero lateral corner (PLC), lateral collateral, double bundle PCL, or a single bundle PCL with PLC.



Double bundle PCL with post lateral corner reconstruction



Arthroscopic images showing LARS ACL in-situ

## Actor 8 and 10 Ligaments

These are hollow tubes with an intra-articular free fibre portion. The autograft tissue is placed in the centre of the LARS, the free fibres are aligned in the knee, and fixed in the usual fashion.

The Actor 8 is used as an augmentation for the autogenous tissue and to protect it. The healing process for autogenous tissue may take 6-9 months and during that time the transplant undergoes many stages of healing. Excessive loading in the early post-operative rehabilitation period can elongate an autogenous graft. By reinforcing with LARS, the artificial ligament will take some of the strain and protect the fibres of the graft.

Actor 8 is indicated for use with hamstring grafts. Actor 10 is indicated for use with quadriceps grafts.

## Medial and Lateral Collateral Ligaments

Reinforcement of the medial collateral ligament is indicated in multiple injuries and after reconstruction of the cruciate ligaments. The synthetic ligament comprises three parts: the cylindrical and knitted part for the femoral tunnel; the medial portion with free fibres that correspond to the MCL itself (these allow fibroblastic ingrowth from the MCL into the LARS ligament)<sup>9</sup>; the flat distal part is for fixation to the tibia.

The lateral collateral ligament is normally reconstructed with a Y ligament. One arm acts as the LCL, wrapping around and then through the fibular head to prevent the fibular head articulating against the tibia, and then through a trans-femoral tunnel. The other arm follows the path of the popliteus tendon and completes the postero-lateral instability repair.

## Patellar Tendon

Patellar tendon reconstruction is often a problem after trauma or in revisions (TKR or others). In the case of total rupture, the ideal reconstruction involves using two LARS ligaments.

PTR30's are used, one medially and one laterally, to balance the tension and patella tracking. The flat parts are sutured in front of the patella under the fibrous tissues, and the cylindrical parts are anchored with two screws into two tibial tunnels.

The PTR30 can also be used to medially derotate the patellar tendon in cases of femoro-patellar pain syndrome due to excessive tibial torsion, or to reinforce the medial patellar retinaculum in cases of recurrent patellar instability.

## Achilles Tendon

These injuries mainly result from sporting activities and are ideally treated acutely.

Rupture of the Achilles tendon is not easy to treat. The length of immobilisation and time off work is costly and the return of ankle mobility and muscular strength is slow. Suturing of the retracted Achilles fibres is complicated and does not always give a satisfactory result.

**The LARS Achilles tendon consists of three parts:**

- The proximal portion is flat, corresponding to the proximal part of the ruptured tendon and is sutured
- The central portion has open longitudinal fibres which overlay the ruptured tendon, allowing for fibroblastic ingrowth
- The distal portion is cylindrical with a diameter of 5.5mm that corresponds to the distal part of the ruptured ligament and is fixed with an interference screw into the calcaneum

The LARS Achilles tendon can aid a quick return to sporting and normal activities, with active-passive mobilisation of the ankle commencing on day one, partial weight bearing started with caution immediately, returning to full weight bearing on day 35.



The LARS Achilles tendon

## Lateral Ankle Instability

These ligaments are often indicated for sporting injuries, or where the type of ligament injury does not allow for a solid repair and needs reinforcement, or there is long-term chronic instability.

This implant consists of a special Y-shaped ligament: one arm is passed into the distal fibular tunnel, and the other two are anchored into bony tunnels drilled at the lateral aspect of the calcaneum.

The patient may start passive and active mobilisation from day five. A back splint is applied at 90° to provide protection. A return to sporting activities can be expected at around day 75.



Y-shaped ankle ligament



## Case Studies

### Dimitra Dova: Professional Runner

Dimitra Dova is a 33-year-old Greek National. She is a professional sportswoman who competed in the 2004 Olympic Games 400m relay in Athens, after tearing her anterior cruciate ligament (ACL) one year beforehand, threatening her sporting career. She is also a 2nd Lieutenant in the Greek Air Force and has a variety of sporting interests including water and snow skiing.

In July 2003 Dimitra fell over and ruptured her right ACL. In August 2003 she had her ACL ligament reconstructed by Dr Stelios Maheras in Athens. Dr Maheras used a synthetic ligament to reconstruct Dimitra's torn ACL so that she could return to sport more quickly than if she had a conventional reconstruction using her own tissues. Conventional treatment would have seen her out of action for up to nine months and she would have missed competing in the 2004 Olympic Games.

Dimitra says, "I had some pain for the first two days after the operation, but I started physiotherapy and swimming after four days. I started running 30 days after the operation and three months later I was in a full Olympic Games roadwork programme. The following year (2004) I ran in the 400m women's relay at the Olympic Games in Athens. In 2005 I won the gold medal in the Mediterranean Games and bronze in Bruno Jaouli Golden League for the 400m.

"My operation was totally successful and with the physiotherapy programme that I followed I did not have a decrease in my speed times for the 400m, I actually had my personal best time the following year in Florence at the Super League, 51.89 seconds for 400m."



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The following year I ran in the 400m women's relay at the Olympic Games in Athens

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Since the operation I have been able to participate in full sporting activities and now feel able to train to a high standard in karate again

”



#### Phil Shufflebotham: Teacher and Athlete

Phil is a 32-year-old Business Studies teacher from the UK. He enjoys a number of different sporting activities but his main interest is karate where he is a 5th Dan black belt. Phil has been involved in karate since the age of 16 and has competed in international competitions.

In January 2005 Phil took a bad fall during training which caused severe disruption of the acromioclavicular joint in his shoulder. He attended his local Accident and Emergency department immediately, where he was put under the care of two orthopaedic surgeons. Due to the severity of the injury, surgical correction was necessary and a LARS synthetic ligament was used to reduce and correct the damage to the joint.

“My recovery was a slow process in the beginning due to the nature of the operation and the associated pain that came with it. My shoulder was kept in a sling for six weeks to minimise any movement of the shoulder. I was advised that it would be six months before I could get back to karate again.

“Some weeks later I was able to return to work and drive again. My sling came off approximately five weeks after the operation when I started to regain full use of my right arm. Movement and strength were restricted initially, but I soon gained the confidence to use it again and I was back teaching at school and at my karate classes as though I had not been away.

“Since the operation I have been able to participate in full sporting activities and now feel able to train to a high standard in karate again, which I thought I would not be able to do. I am able to drive, cycle, play squash, swim and play golf and I can do everything that I did before my operation. Without this operation I would not be able to lead my life to the full and enjoy participating in sport which to me is a major part of my life. In late 2005 I was able to lead an association karate team to win the SSU World Cup in France, a feat I never dreamed possible at the start of the year.”

### Efi Sfyri: Olympic Beach Volleyball Player

Efi Sfyri competed in the 2000 Sydney and 2004 Athens Olympic Games in beach volleyball after overcoming an injury that had threatened to end her sporting career.

Efi is a 35-year-old coastal policewoman in Greece and also a professional beach volleyball player. She was seeded 6th at the 2004 Athens Olympic Games. In her spare time she plays squash and tennis. Efi had no previous history of ligament damage prior to her injury.

At the beginning of 2000 she tore her right ACL in a sporting accident; she was operated on by Mr Greg Papadopoulos in Athens. He reinforced her torn ACL with an artificial ligament (LARS) so that the

torn ACL could heal and be as strong, if not stronger than before the operation.

Efi left the hospital walking and not in a brace.

The surgery allowed Efi to compete six months later at the World Open Tour in Brazil in beach volleyball. Conventional

surgery would have seen her out of action for at least nine months.

Efi describes how after the operation she walked on the first day, was driving within one week and on the eighth day she returned to the gym. She started with slow careful exercises to keep her knee safe, but also to maintain her fitness levels. Efi said that the first month after the operation her life as a professional player was obviously slower and more limited, but after six months she was back to pre-injury fitness levels.

“The operation was really important for the future of my career - 11 months after the operation I became the European Champion. I won the gold medal in beach volleyball in Italy 2001 and had great success the following year, winning a bronze medal in Rhodes 2002. Without the operation this would have never been possible.”

In total, in 2001 Efi competed in 12 major volleyball tournaments, some of which resulted in medal positions.

### Orthoula Papadakos: TV Host and Retired Pro Basketball Player

“

The operation was really important to the future of my career, 11 months after the operation I became the European Champion

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Orthoula Papadakos is 36 years old and was born in Toronto, Canada. From a young age she was involved in competitive sports, and wanted to become a professional basketball player. She played for the Canadian National Team in both soccer and basketball and was offered scholarships for both sports in the USA. However she decided to become a professional athlete instead, signing at the age of 17 with Panathinaikos, a professional basketball team in Greece.

Her first injury occurred in 1988 at the age of 18, when she tore her ACL during a match. She was operated on immediately and returned after one year to play at the same level.

In 2002, she again tore her ACL in a basketball match and was operated on by Dr Papagianopoulos from Greece. He reinforced her torn ACL with an artificial ligament (LARS). This method gave her the confidence that her knee would be stronger than before, and allowed her to compete again a lot sooner than if she had undergone conventional surgery.

Orthoula compared both methods used on her ACL and describes the conventional method as being very painful, needing

months of rehabilitation, and keeping her out of athletic competition for ten months.

The artificial LARS ligament used in her second operation allowed her to walk the same day, drive within the week and start rehabilitation (pool and gym) within ten days. Devoting all her time and effort towards her rehabilitation, she started playing basketball professionally again after 75 days to the surprise of her doctors and physiotherapists.

Orthoula feels that the operation allowed her to continue her professional career without the loss of any strength or speed. She can participate in any sport she chooses without any pain, and the only thing to remind her of the operation is the scar on her knee.

Orthoula is now a TV host and celebrity in Greece after her participation in a TV reality show 'Survivor' in 2002-2003.

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The artificial Lars ligament used in her second operation allowed her to walk the same day

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## Abstracts

### **In vivo and in vitro cellular ingrowth into a new generation of artificial ligaments**

K Trieb, H Blahovec, G Brand, M Sabeti, M Doninkus, R Kotz

Eur Surg Res 2004; 36:148 – 151

Although the new generation of artificial ligaments is showing encouraging clinical results in contrast to earlier generations, studies on the biological properties are lacking. Biopsies were taken from a LARS, six months post implantation and investigated by histochemistry. An in vitro study seeding human fibroblasts or osteoblast-like cells (up to 106 cells for 21 days) on ligament pieces (5 x 5mm) was concluded and analysed. The biopsies showed complete cellular and connective tissue ingrowth in the LARS. In vitro fibroblasts and osteoblast-like cells encapsulated the fibres by bending a cellular net around them. This mechanism might explain the strength and inert behaviour of the ligament without the synovitis associated with previous artificial ligaments.

### **Repair of achilles tendon with a LARS**

Fletcher Dural Guern Cardinal

1st Symposium of Biomaterial Advances. (Montreal, Canada 1997)

According to the five cases reported, the use of the LARS ligament for achilles tendon repair seems promising, allowing early range of motion and weight bearing with overall excellent function and return to activities.

### **Patient satisfaction needs as related to knee stability and objective findings after ACL reconstruction using the LARS**

Lavoie, Fletcher, Duval (Montreal, Canada)

The Knee (2000) 157 – 163

The purposes of this study are to compare patient satisfaction with the objective measurement of knee stability and assess early complications following ACL reconstruction using a LARS. 47 patients were reviewed 8–45 months after surgery. The LARS may be a safe device to reconstruct an ACL tear.

### **Posterior cruciate ligament reconstruction: The role of synthetic ligaments, 28 cases of PCL reported between 1993 – 1999 15 chronic, 13 acute**

Teule

Riv Lt Biol Med 20 2000

The treatment of acute PCLs are possible, logical and will be identified in the future. As for chronics, the results which were not as promising were described as follows: “probably the cause of the failure is the complexity of the lesions in which the differential tensions at the artificial ligament are next to impossible to adjust”.

### **Outcome of 19 patients with combined ACL and PCL injuries**

New Zealand Orthopaedic Association 3 – 6 October 1999 (Wellington)

Early surgical repair with prosthetic ligaments allows early mobilisation of the knee joint, improving stiffness, and favours the anatomic cicatrisation of the peripheral structures. Considering how severe the trauma was and the relevant lesions of the surveyed cases, the treatment was validated.

**A new generation of artificial ligaments in reconstruction of the ACL. A two year follow-up of a randomised trial bone patella bone in 27 patients vs LARS in 26 patients. Assessment before and at 2, 6, 12, 24 months after surgery**

Nav, Lavoie, Duval (Montreal, Canada)

JBJS (UK) 2002 – 356-60

There were no cases of synovitis or of infection of the knee. There was no difference regarding the failure rate of the groups. The IKDC showed no significant differences between the two groups at any stage of the follow-up. The KOOS evaluation showed consistently higher results in all subscales for the LARS group during the first year of follow-up.

After 24 months these differences were no longer evident. Our findings suggest that at follow-up at 24 months the LARS seems to be a satisfactory treatment option, especially when an early return to high levels of activity is demanded.

**The 'Y' ligament in combined PCL and PLC injuries**

Beacon, Laboureau, Ravikumar

Biomaterial Advances – 1997 (Canada)

126 patients – the external rotation had markedly reduced and good stability was restored following this reconstruction.

**Posterior Cruciate Ligament Injuries**

**A practical guide to management**

Johnson & Laboureau

Springer Publications

Considering the risk of severe degenerative changes in non-operated PCL injuries and considering the results that we are able to obtain now, it seems logical to operate on them. Our study suggests that PCL injuries in young and active patients should be operated acutely, where the results appear to be even better than for the ACL, for which surgery is widely accepted. The frequency and the importance of a combined postero lateral instability must lead us to think about it. The concept of early 'ligament synthesis' using synthetic ligaments which have proven their excellent tolerance and efficacy is now the procedure of first choice for many knee surgeons.

### ACL arthroscopic reconstruction with LARS - 220 ACL's 1997 – 2000

Maheras, Alexakis

Poster 4th Seminar in Arthroscopic Surgery & Sports Medicine – June 2000

We believe that the future belongs to synthetic grafts. LARS does not create any damage to the already injured knee and is the ideal graft today for ACL injuries in acute cases and in chronics with the presence of a well vascularised stump.

### Biomechanical analysis of different operative techniques with complete ACJ disruption

Krenn

Osteo Trauma Care 2005 – 154 – 159

The goal of this study was to evaluate three different operative techniques for acromioclavicular joint fixation: trans-articular K-wire fixation; ligament reconstruction along with a synthetic augmentation device (LARS); and coracoclavicular Bosworth screw. Mechanical properties were tested in a cadaver study in order to determine the primary mechanical stability during repetitive passive motions. Eighteen fresh cadavers were used to test a cyclic load (50,000 cycles). Secondary joint dislocation and the rate of implant loosening were monitored by standard AP stress X-ray. Metal markers in the coracoid, the acromion and the lateral clavicle were used to measure the acromioclavicular distance increase and the coracoclavicular distance increase. The range of motion was set on 30° – 90° of abduction for the first 25,000 cycles and then was raised to 60° – 120°.

The least amount of vertical dislocation was seen in the K-wire and the LARS group. The Bosworth group showed significantly higher dislocation rates. This was true especially when the abduction range was extended to a maximum of 120°. The rate of implant loosening in the K-wire group was higher than that in the other two groups. This study shows that the LARS procedure and the K-wires technique give equal results concerning stability after repetitive passive motion but with a high rate of implant loosening in the K-wire group. According to our findings, abduction should be limited to 90° after implanting a Bosworth screw in order to prevent loosening or failure of the hardware.

### Traumatic ACJ separation. Current concept

Fialka, Stampf

European Surgery Journal - 2004 20 – 24 (Vienna, Austria)

LARS has offered the option of early postoperative functional treatment, especially in cases of biodegradable devices there is no need for a secondary operation.

### Preliminary results in ACJ dislocation using a LARS

Fialka

Poster - ESSKA 2000 (Vienna)

The use of an augmentation device (LARS) in addition to ligament reconstruction after ACJ separation seems to give satisfactory early functional results. This technique can be recommended regarding the possibility of early postoperative functional rehabilitation.

### Our experience with LARS in massive rotator cuff tear, 44 cases

Ramon, Alonso, Nistal

Poster

European Congress of Sport Traumatology - 2003 (Monaco)

This poster discusses different surgical approaches for LARS in the RC application, including a modified osteotomy of the acromion in an anterior-lateral approach to decrease complication. Good results for reinforcement (18) and replacement of the RC for massive (11) and large (15) tears.

### Permanent tendon replacement for RC defect. Nonsense, alternative or a solution? 33 patients, 2 months – 3½ years, average age 57.6

Kienn, Friesach

Jatros Orthopaedics 2005, 11 – 13

No post-operative complications. Time in hospital was four days. The Constant score and ASES index reflected clear improvements.

LARS rectifies chronic, primary, non-closable rotator cuff defects in terms of pain relief and usability. It meets doctor and patient expectations. It offers a simple solution to a serious problem.

## Comparison of two methods – over the top and trans-osseous – for augmented reconstruction of the supraspinatus tendon in terms of abduction movement arms

University of Vienna – 2005

Bone & Joint Biomechanical Laboratory

LARS RC 30 patch was used on 14 cadaveric shoulders. The LARS patches were fixed to a type A or B method. The difference between methods A and B was the re-insertion point.

Method A was done trans-osseous in the anatomical neck e.g. the sulcus at the edge of the greater tuberosity. Method B is an over the top procedure, the LARS is bent over the greater tuberosity and fixed trans-osseous at the surgical neck, e.g. latero-caudal of the greater tuberosity. Each used a 7mm drill hole with a 7 x 30mm LARS screw. No sutures ruptured, no defect was found in the LARS patch after the test, the screws did not loosen.

The X-rays showed a 10.6% difference in lower arm conditions comparing A to B. Type A is recommended for normal muscle conditions and for when the augmentation acts as a spacer between the humeral head and the acromion, this fixation prevents more impingement. In cases with weak muscle conditions and combined with an acromioplasty procedure, the over the top technique B can give the muscle about 25% more efficiency. The lateral insertion makes it easier to lift the arm and has an advantage especially in chronic defects with muscle degeneration.

## A novel use for synthetic ligaments in hip surgery.

Trauma and Orthopaedic Department, Royal Cornwall Hospital, Truro, Cornwall.

Annals Royal College of Surgery English 2008.90:253-259

B Holroyd, DE Fern

A bare trochanter is a lesion similar in pathology to a rotator-cuff tear in the shoulder and is occasionally seen during an anterolateral approach to the hip. Small defects can be repaired by suturing the abductors onto the bare area, but larger defects require a different strategy. Similar defects can be found after posterior approaches to the hip particularly at the time of revision surgery. We describe the novel use of a synthetic ligament to reconstruct these defects.

Dynamically reconstructing damaged muscles following hip surgery can be achieved successfully with synthetic ligaments which have inherent strength whilst acting as a scaffold into which native tissue can grow. Previously described repairs have been static tethers with an inherent hard end point to movement making the dynamic technique described an attractive proposition.

## Knee section

### ACL reconstruction, using artificial ligament, 5 year follow-up

S.I.C.O.T. 2007; 33 (suppl.1): S238-S242

G Cerulli et al

Conclusion: Based on the results of our study with a five year follow-up and on the data of the international literature, we can say that the new generation of LARS artificial ligament used as graft in the ACL reconstruction is a “happy reality”, although actually the choice of the patients is selective. The five year follow up, in our opinion, is a sufficient period to judge the results as scientifically “valid”. We did not experience the bad complications of the 80s; none of the patients had significant swelling of the knee as signs of chronic post-op synovitis, and the objective and subjective results were positive in over 95%. However the positive evaluation from the neutral examiner observer is another positive result on the final evaluation. From the 25 cases tested, only one of them had bad results, based on the clinical and instrumental evaluation, which showed residual knee instability. It is important to point out that the results using the biological graft as autograft or allograft are the same or even worse.

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P116/606

XDT

Knee Anatomy

Musculoskeletal anatomy of the knee. Anterolateral view.

JOHN DAUGHERTY/SCIENCE PHOTO LIBRARY

P100/148

HTS

Relay runners, X-ray artwork

Relay runners exchanging a baton during a

race, computer artwork based on an X-ray.

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