

Meeting U.Z. Gent October 17th, 2008

“The past and the future of artificial ligaments”

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Failures in the 80's :

1/ insufficient strength: early mechanical failure due to:

- ◆ quality of the materials
- ◆ structure of the ligament (manufacturing)
- ◆ fibres fretting and fraying (flexion, extension and rotation)
- ◆ no specific operative technique

2/ insufficient biocompatibility: sinusitis acute/chronic due to:

- ◆ partial desizing (eliminating cytotoxic agents)
- ◆ insufficient microporosity (50 µ)

3/ Imprecise technique : failures mechanical/biological due to :

- ◆ no precise isometric graft positioning (arthrotomy)
- ◆ impingement with the notch and killer angles
- ◆ excessive tension (friction on cartilage)
- ◆ not using the ACL remnants therefore no fibroblastic reaction (growth factors, mechanoreceptors, vessels, cells)

LARS synthetic ligaments : why do we work? :

- ◆ polyester fibres (Polyethylene Teraphtalate)
- ◆ intra articular free longitudinal fibres avoiding fretting which leads to rupture and synovitis
- ◆ 50% fibres working alternatively during flexion – extension
- ◆ fibroblastic colonisation into the free fibres
- ◆ mechanical behaviour: traction load
 - 80 fibres : 3.600 Newton
 - 100 fibres : 4.700 Newton
- ◆ improved surgical technique: isometry, linearity, respecting the native remnants, no excessive tensioning of the synthetic ligament, specific surgical equipment, arthroscopic approach which is conservative (proprioception).

Post-op & outcome ACL:

- ◆ mobilization and immediate weight bearing
- ◆ isometric quadriceps exercises
- ◆ isokinetic lock chain exercises
- ◆ at 21 days : proprioception rehabilitation
- ◆ at 30 – 40 days : running
- ◆ at 60 days return to sport activity once proprioception has been regained.

“5 years Follow-up : optimal results”

Pr. Dr. G. Cerulli SIOT 2007

Dr. Duval 2008

14 years after ... What did we learn ?

- ◆ 0% viral or microbic transmission.
- ◆ 0% synovitis in more than 25.000 implanted ligaments.
- ◆ no case of tunnel widening reported
- ◆ cartilage lesions reported in the 80's were due to mechanical problems
- ◆ the LARS ligament is not a prosthesis but a soft tissue internal fixation device allowing fibroblastic re-colonization

The future : third generation LARS ligament :

- ◆ a bioactive polymer grafted ligament on PET : fibroblastic activity onto a bioactive PET surface.