REVISION ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION FOLLOWING SYNTHETIC LIGAMENT FAILURE USING HAMSTRING TENDONS

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Background

- Increasing number of primary ACL reconstructions leads to increase of revision replacements
- The incidence of graft failure following primary ACL replacements is 0.7 – 8 %
- Restoration of the normal knee kinematics is a challenge after failed ACL ligament replacement
- Results of revision ACL reconstruction are not as favorable as primary ACL replacements
- With every surgical procedure the anatomical and technical conditions become worse

General Problems at Revision ACL Replacement

- Poor placement of the graft leading to impingement
- Anteriorly placed femoral tunnel
- Inappropriate graft length with loss of motion
- Tunnel enlargement needing bone grafting
- Intraosseous metal fixation devices removal +/- bone grafting
- Staged procedures

Introduction

- At Mayday University Hospital London
  - 1992 to 2000
  - 29 procedures

- Isolated ACL Revisions were carried out following failed previous ABC prosthetic ligament reconstruction

Database

Total No of ACL Revisions 29

Replacement with

- Prosthetic ABC ligament 5
- Autograft 24

- Quadriceps Tendon Graft 2

- Patellar Bone Tendon Bone Graft 1
- Four Strand Hamstring Graft 21

Orthopaedic Principles of Mayday ACL Revision Replacement Technique

- Double Incision Arthroscopically Guided Operation
- Permanent Strong 4 Strand STG BH Polyester Soffix Complex
- “Straight through” Low Stress Placement
- Impingement Free Tibial Tunnel with Mayday Jig
- Grooved “Over the Top” Femoral Siting
- Tibial Tunnel Edge Chamfering
- Firm Monocortical Bollard Fixation

Materials & Methods

Algorithm for ACL Revision replacement

- Return of Subjective Instability – Giving Way
- KT 2000 Assessment & Physical Examination
- Arthroscopy – Tightening / Removal
- Physiotherapy
- Autologous ACL Revision Replacement

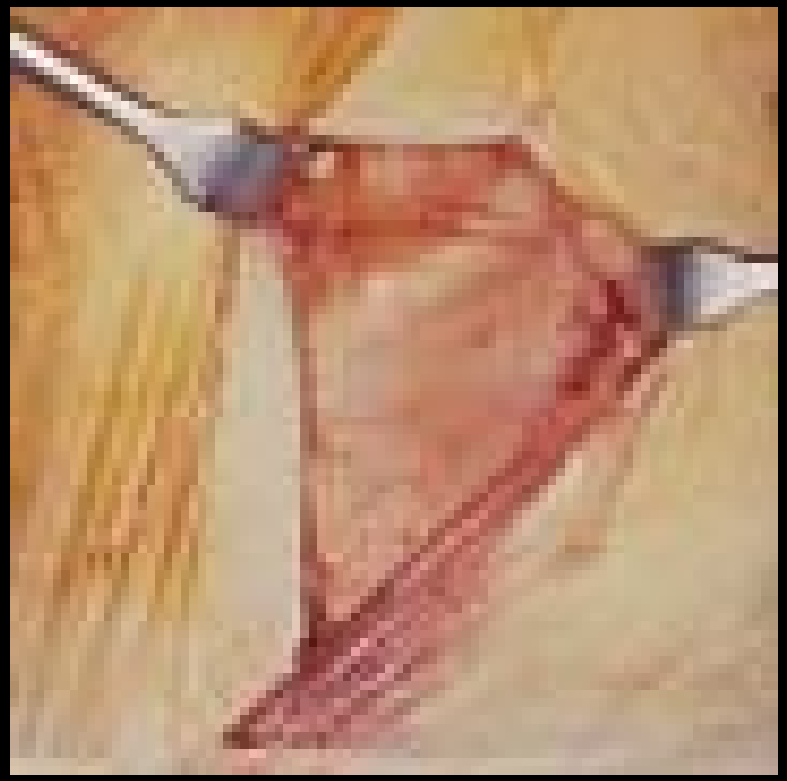
Failed ABC Ligament

Revision ACL STG Replacement

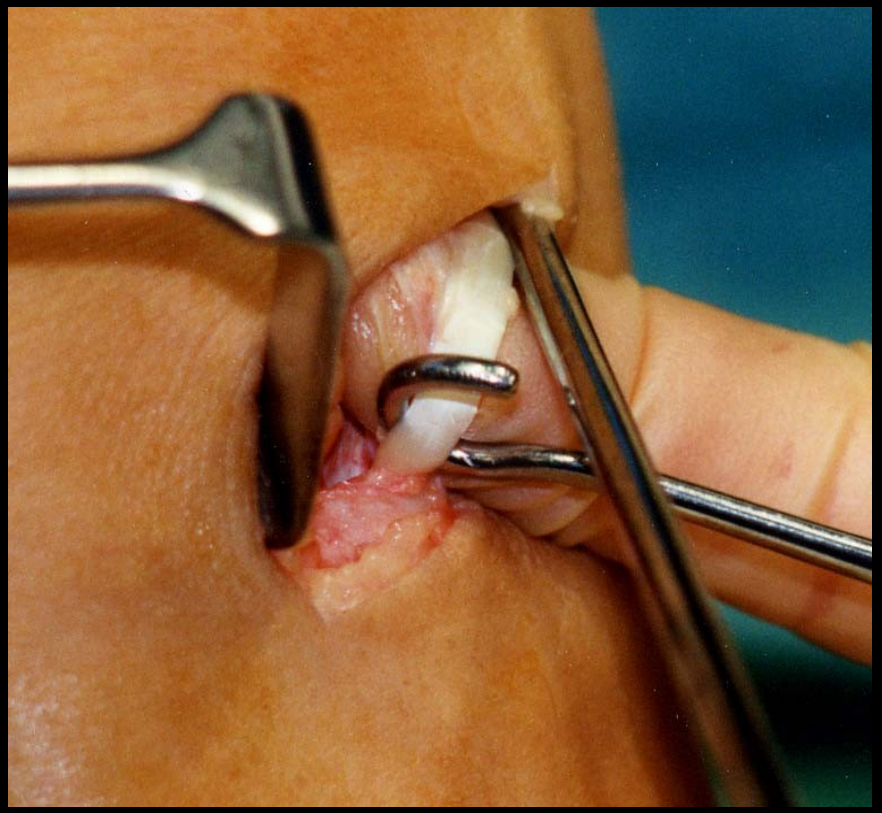
Removal of failed ABC Ligament

ACL STG Replacement
Hamstring Harvesting

- Surgical Approach

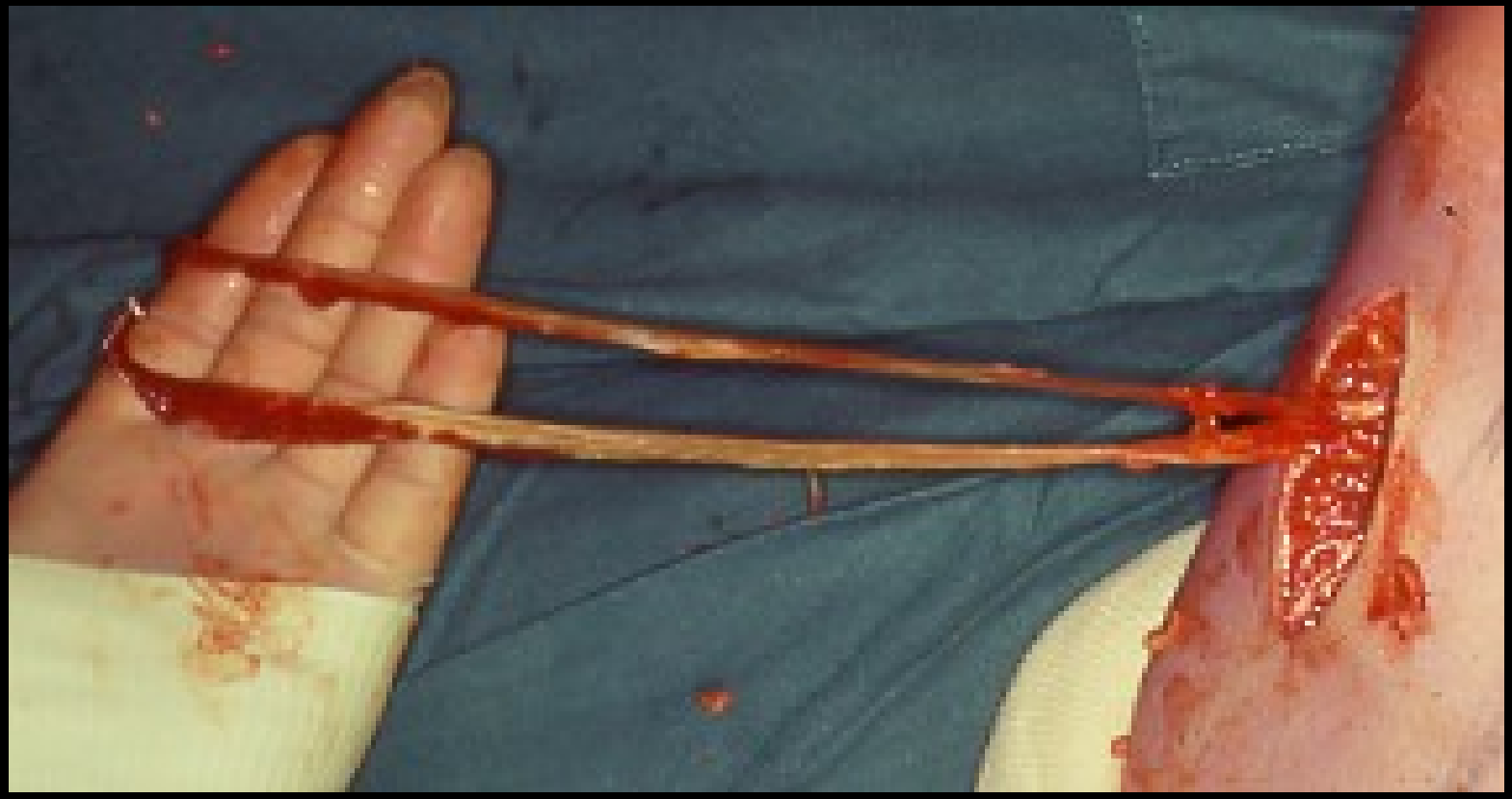


- STG Preparation / Stripping



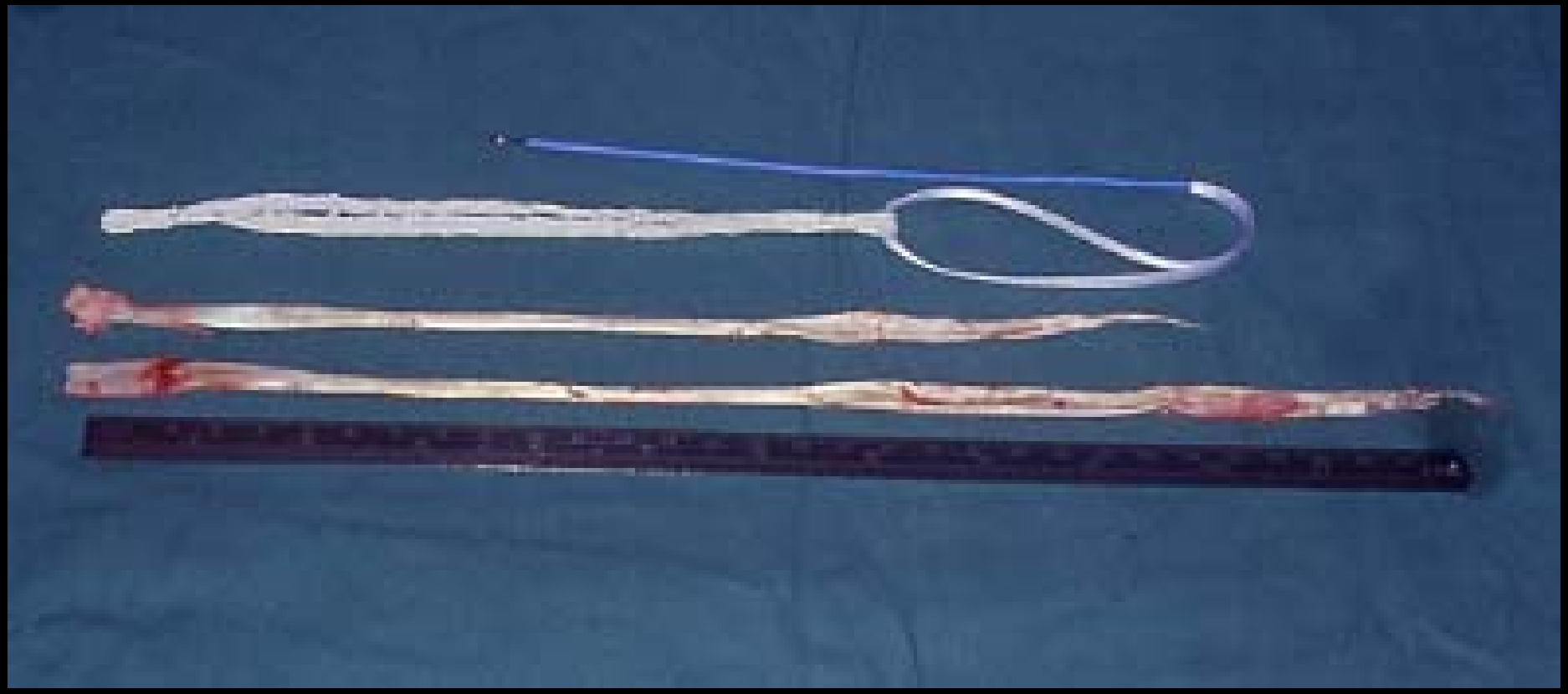
ACL STG Replacement

Hamstring Harvesting



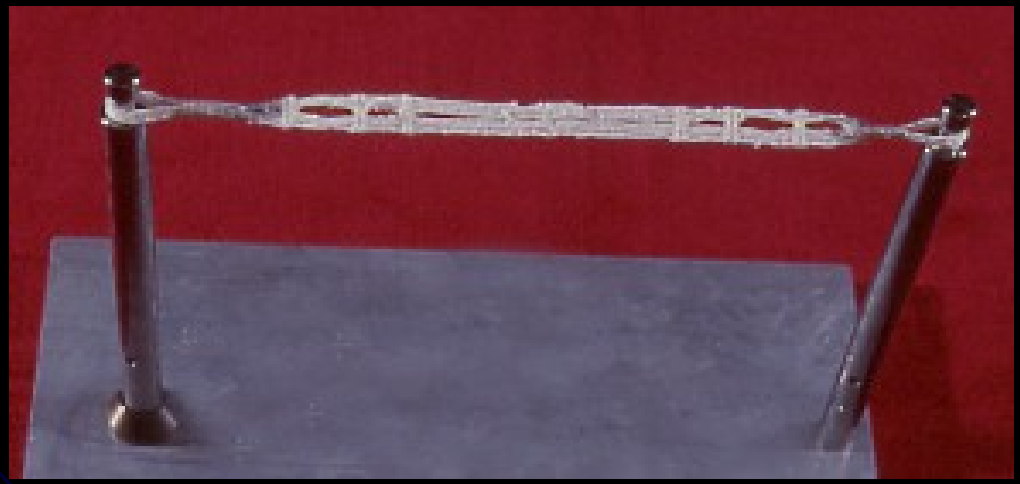
ACL STG Replacement

Harvested STG Tendons with Mayday BH Soffix

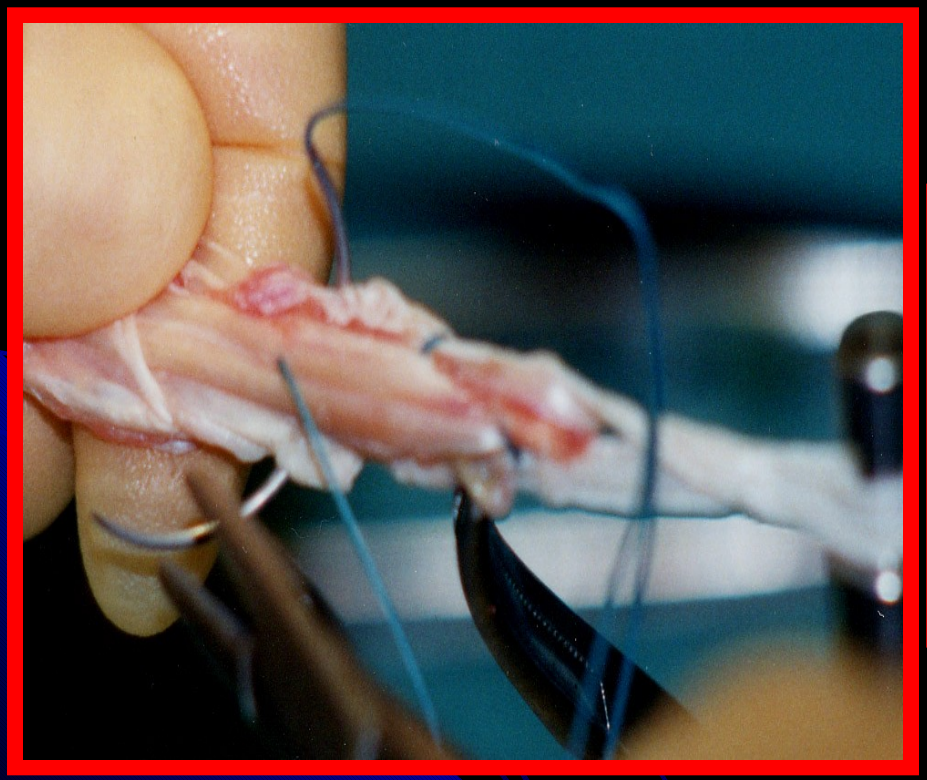


Mayday BH Polyester Soffix

Mayday BH Soffix on Frame



STG / Soffix Complex Tendon Braiding & Fixation with Ethibond Sutures

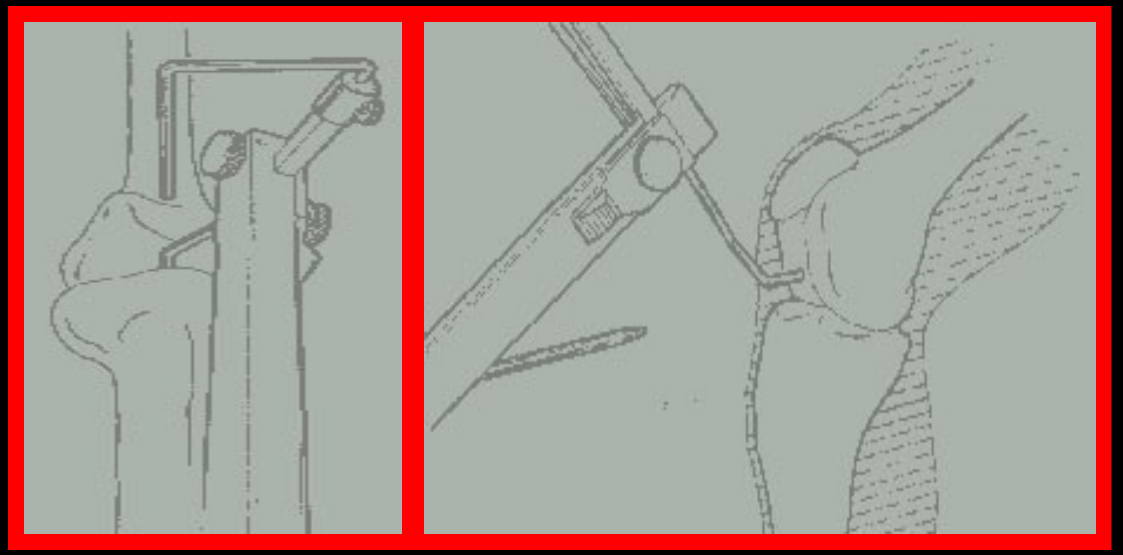


4 Strand STG Mayday BH Soffix

Tibial Tunnel Placement with Mayday Jig

- Mayday Jig

- Jig Placement into the Intercondylar Notch



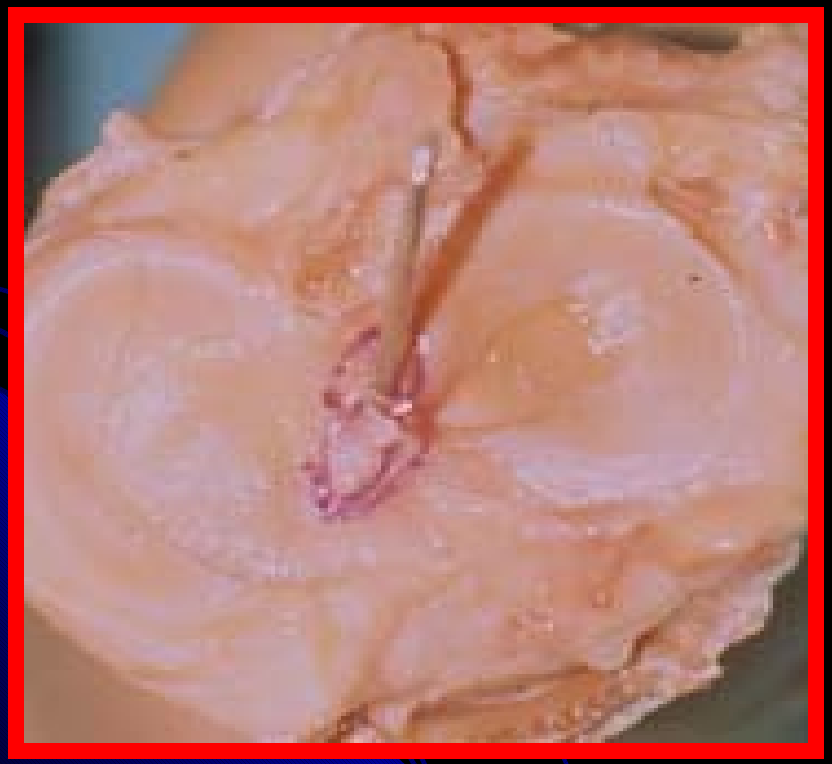
- Mayday Jig in use

- X ray

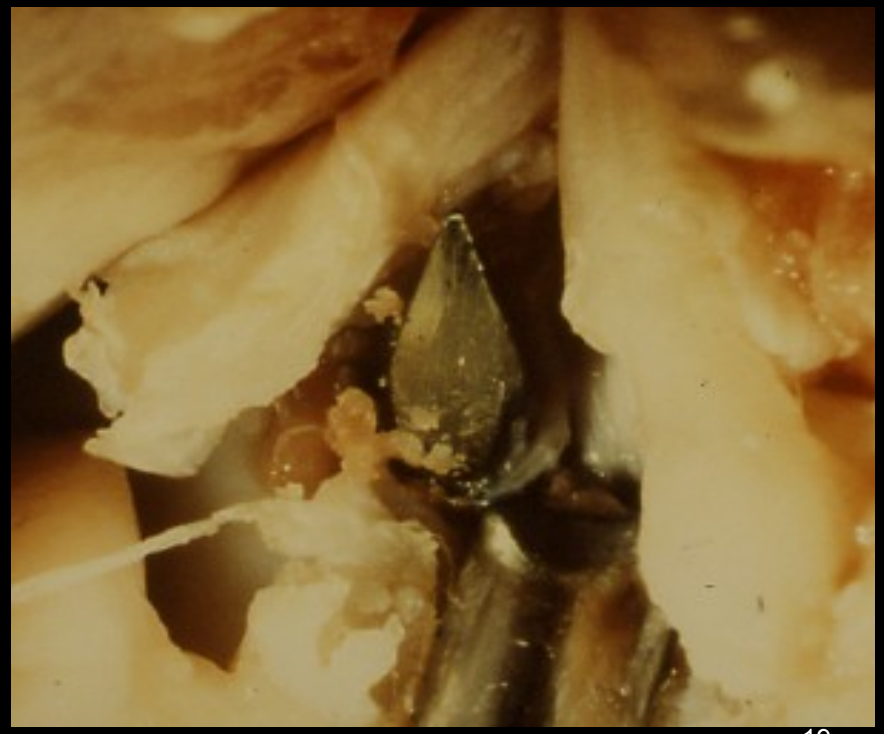

SURGICRAFT

Check the Guide Wire

- Position of Guide wire

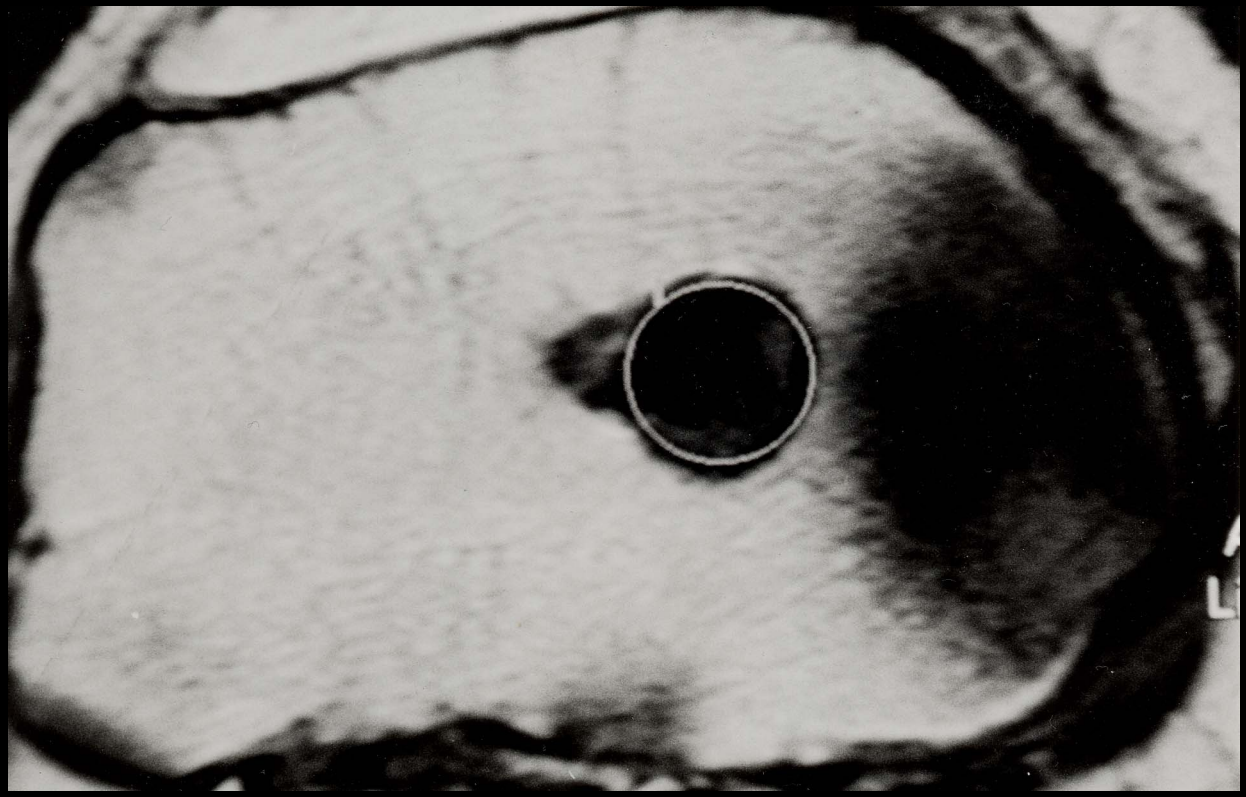


- Arthroscopic view



Re-Drilling of the Tibial Tunnel

Cross sectional MR from Re-Drilled Tibial Tunnel



Tunnel Edge Radiusing & Chamfering

- Back Radius Cutter

- Position on AP & Lateral X-ray

Preconditioning of the Graft-Soffix Complex

- With 2-300 N Maximum Manual Pulling Force

Pulling the Graft into the Tibial Tunnel

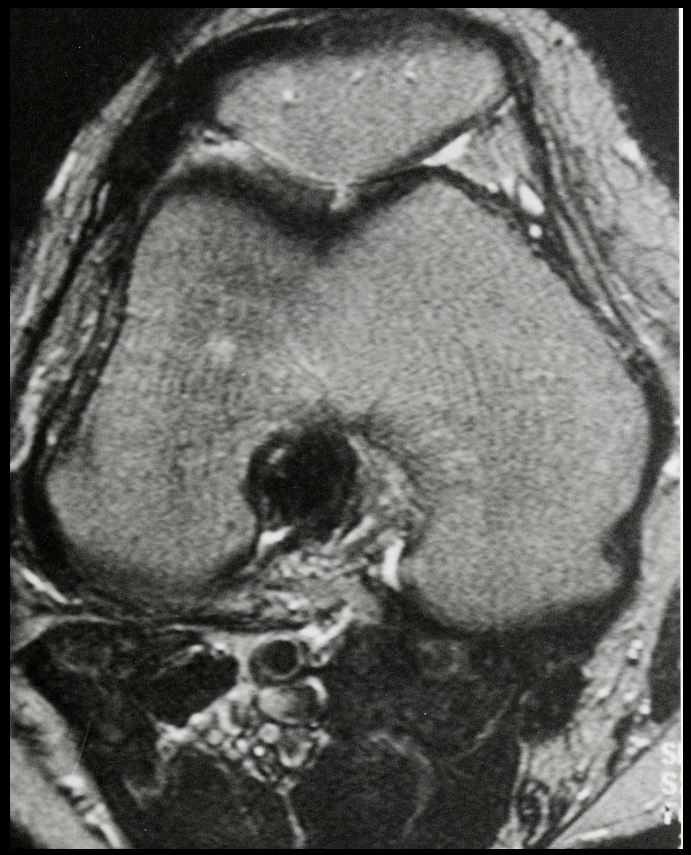
Distal & Proximal Fixation at 15° Knee Flexion With 50 N Manual Pulling Force

- Proximal Femoral Bollard Fixation

- Distal Tibial Bollard Fixation

Graft in Straight Through final "Over the Top" Position

- Coronal & Lateral MR Scan from 4 Strand STG ACL Graft



Early Rehabilitation

- Brace Wearing in Full Extension for 2 weeks
- Early Full Weight Bearing
- Closed Chain Exercises for 3 month
- Jogging over 4 month
- Return to full activity, cutting & contact sports over 1 year

Results

- Male : 25
- Female : 4
- Average Age at Follow-up (Years) : 36
- Range (Years) : 25-51
- Mean Total Follow up Time: 34 Months (4-80)

Subjective Assessment

- Modified Lysholm Scoring System
- Tegner Activity Scoring System
- IKDC Patient's Subjective scoring

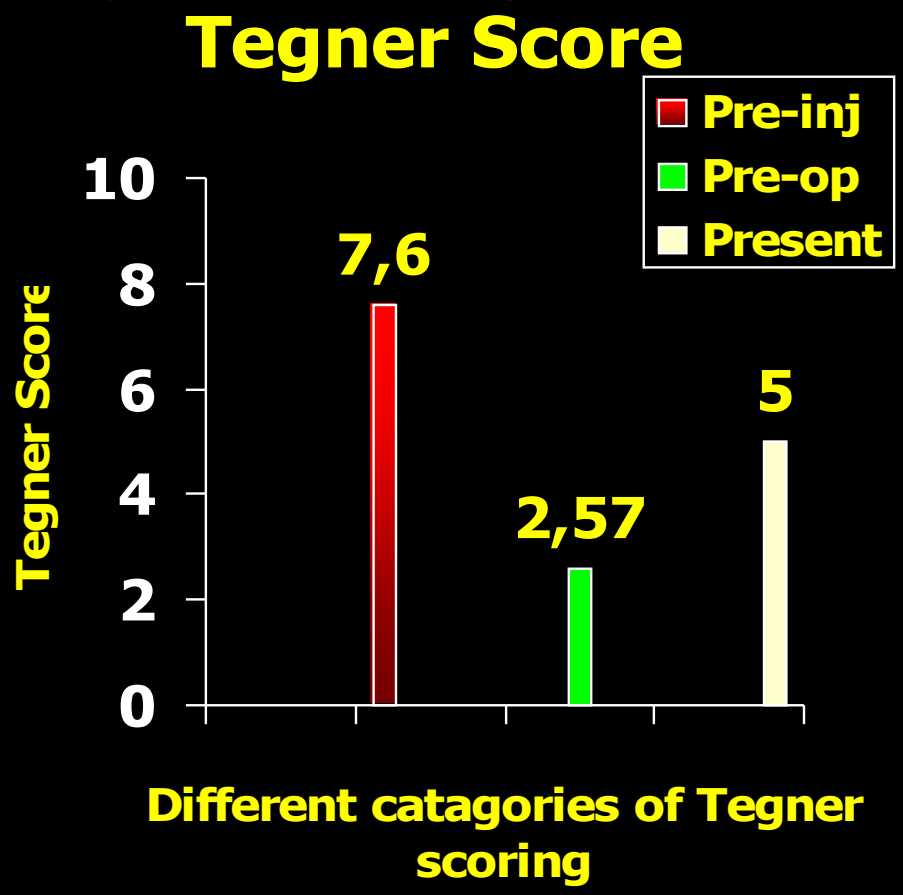
Objective Assessment

- Lachmann's Test
- Pivot Shift Test
- Instrumented Measurement
  (KT 2000 Arthrometer Side to Side Difference, SSD)

Results

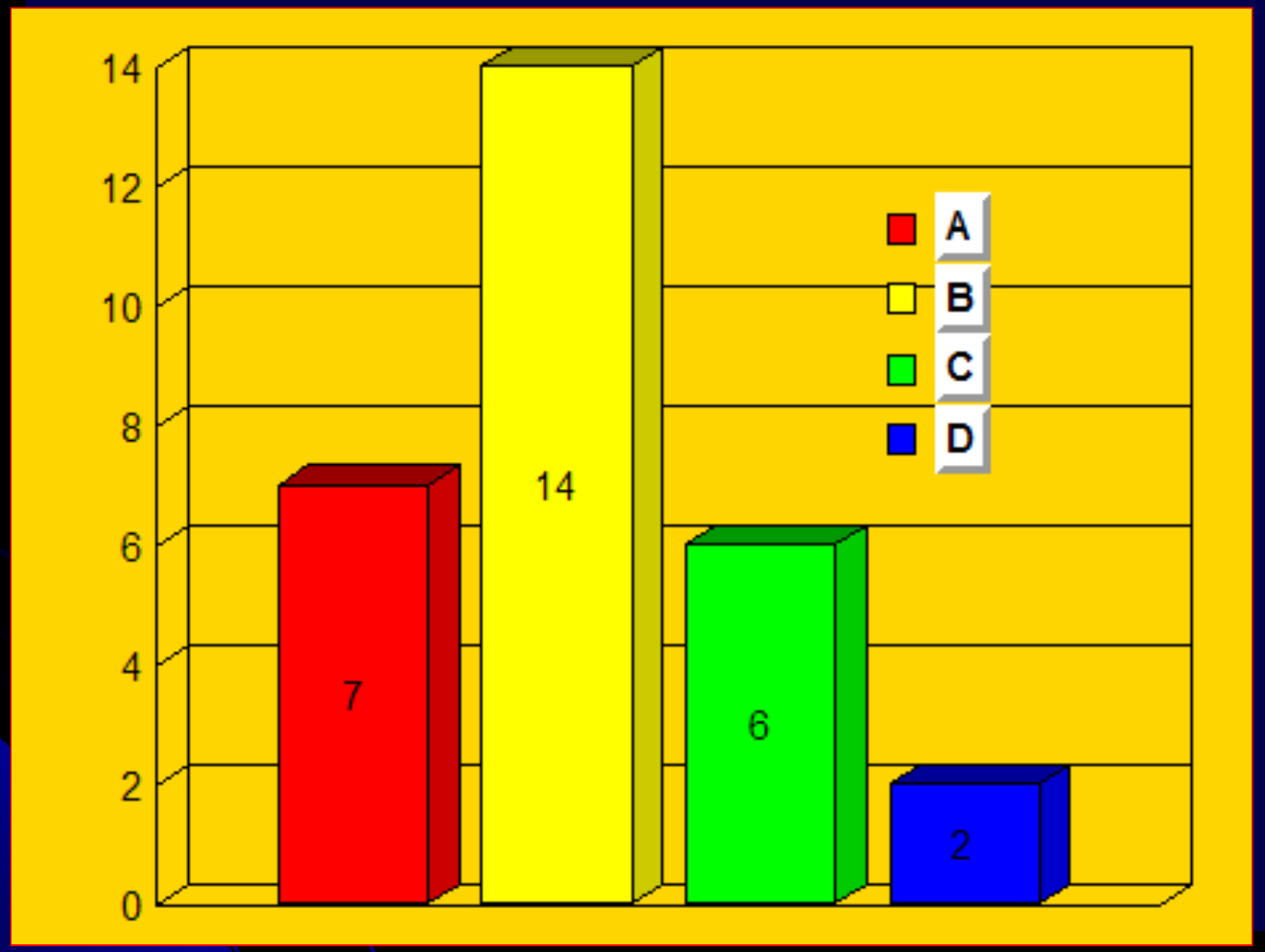
Tegner Activity Scoring

- Pre-inj
- Pre-op
- Present



Results

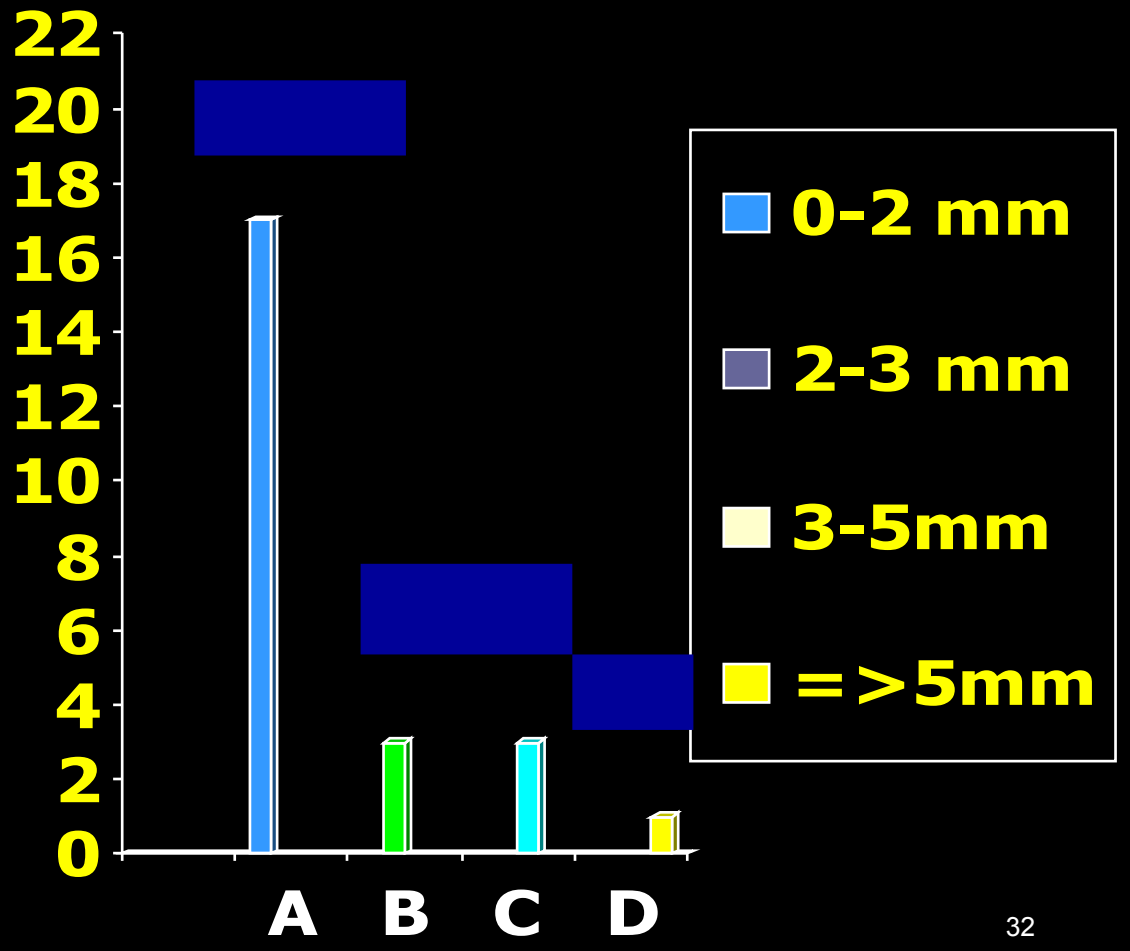
IKDC Score



KT 2000 Arthrometer

Total mean KT-2000 Measurement

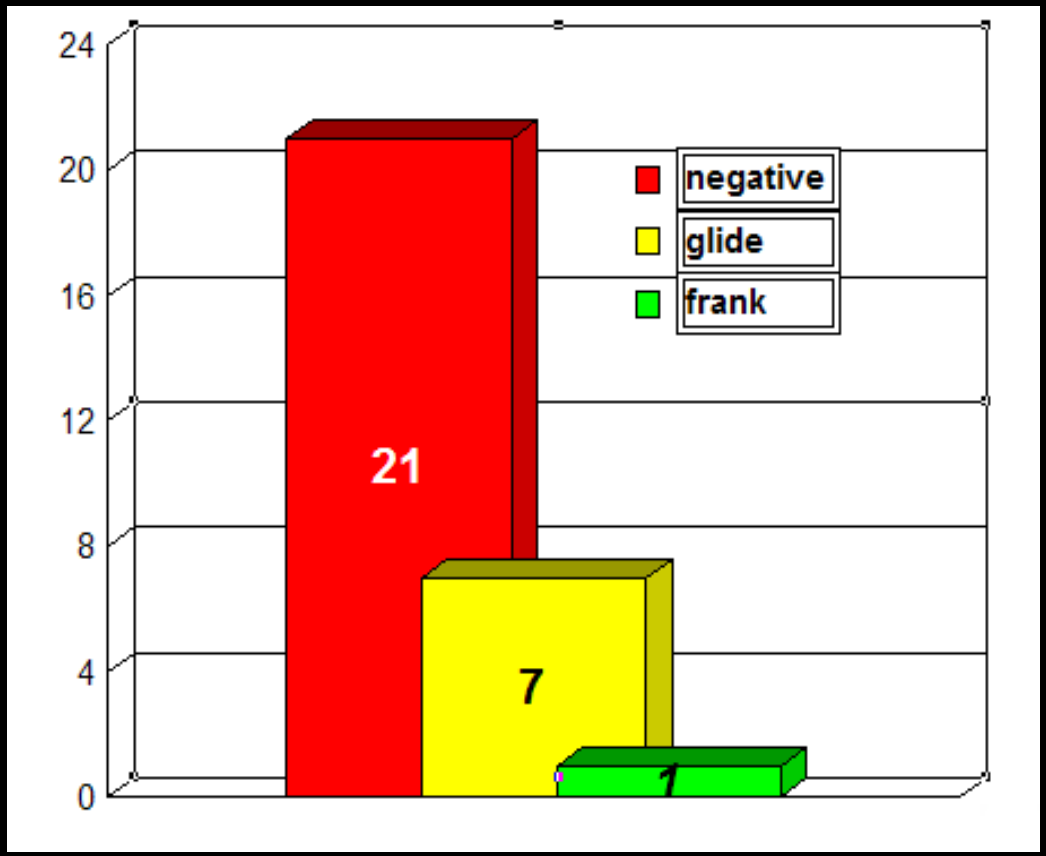
SSD 1.70 mm
+/- 1.64 SD



Pivot Shift

- Negative 21
- Glide +/- 7
- Frank 1

- Total 29



Conclusion

- Revision reconstruction of the anterior cruciate ligament can provide improvement in function and stability in the short to medium term

- The outcome following revision surgery is not as satisfactory as that the following primary procedure.

- We feel that highly accurate low stress, straight through placement of the tibial tunnel and over- the-top routing of the reconstruction avoiding the complications associated with re-drilling the femoral tunnel is the best routing for this type of surgery.

Conclusion

- Our technique has the advantage of being relatively easy to perform in what is otherwise difficult surgery.

- Use of a double looped hamstring tendon graft device can restore stability to the knee following failure of the primary reconstruction and even good results can be obtained in the short term in the multiply re-operated knee.

Thank you for your attention