

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

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ΣΥΝΔΕΣΜΟΠΛΑΣΤΙΚΗΣ
ΤΟΥ ΠΡΟΣΘΙΟΥ ΧΙΑΣΤΟΥ
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ΑΠΟΤΥΧΙΑΣ ΣΥΝΘΕΤΙΚΩΝ

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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 – 20 %
- With every surgical procedure the anatomical and technical conditions become worse
- 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

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

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

Database

Total No of ACL Revisions

29

Replacement with Autograft

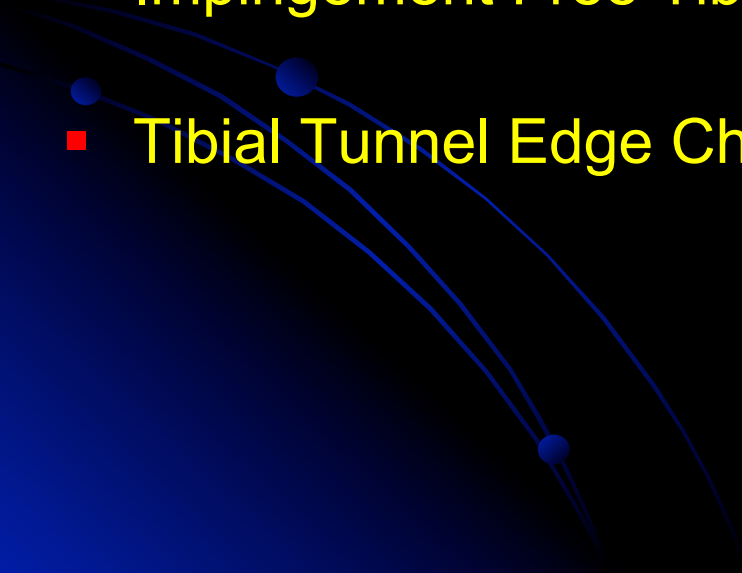
- Quadriceps Tendon Graft

5

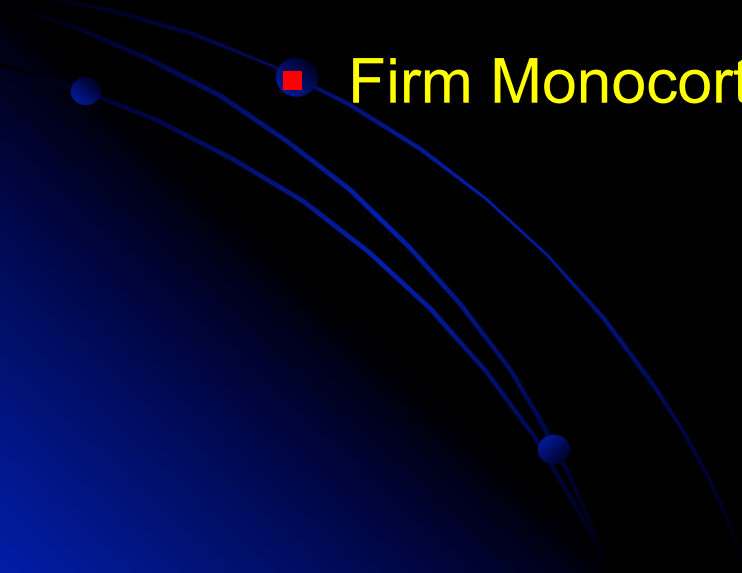
- Four Strand Hamstring Graft

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Orthopaedic Principles of Mayday ACL Revision Replacement Technique

- Double Incision Arthroscopically Guided Operation
 - Permanent Strong 4 Strand STG BH Polyester Suffix Complex
 - Impingement Free Tibial Tunnel with Mayday Jig
 - Tibial Tunnel Edge Chamfering
- 

Orthopaedic Principles of Mayday ACL Revision Replacement Technique

- “Straight through” Low Stress Placement
 - Grooved “Over the Top” Femoral Siting
 - Firm Monocortical Bollard Fixation
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Failed ABC Ligament



Revision ACL STG Replacement

Removal of
failed
ABC
Ligament

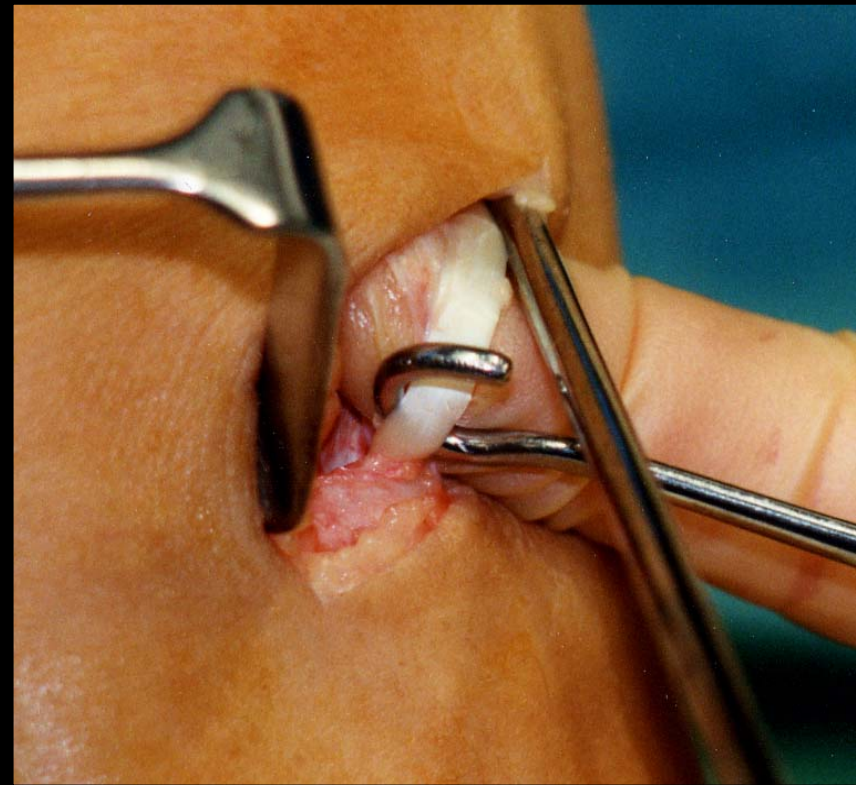


ACL STG Replacement Hamstring Harvesting

- Surgical Approach

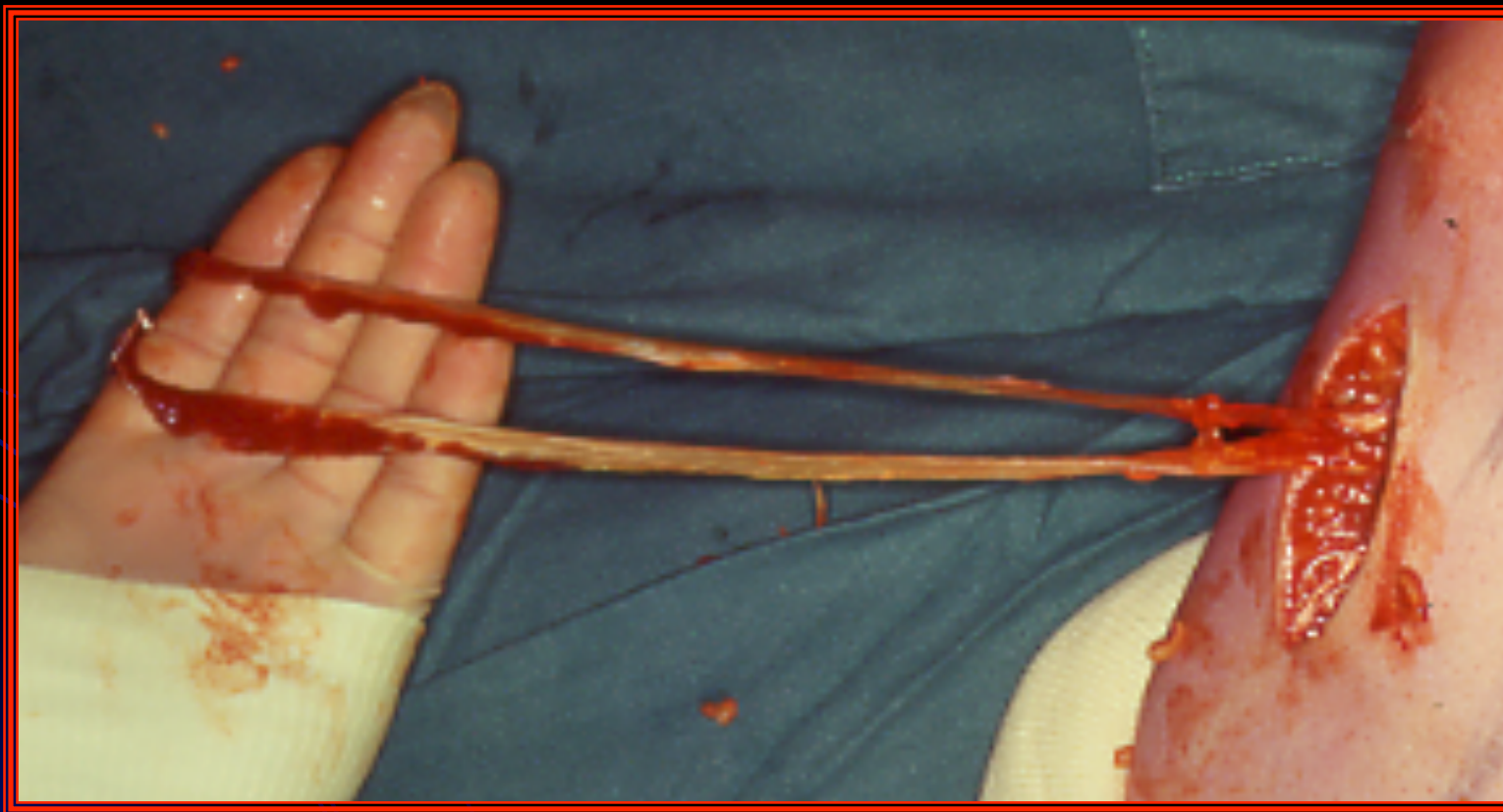


- STG Preparation / Stripping



ACL STG Replacement

Hamstring Harvesting



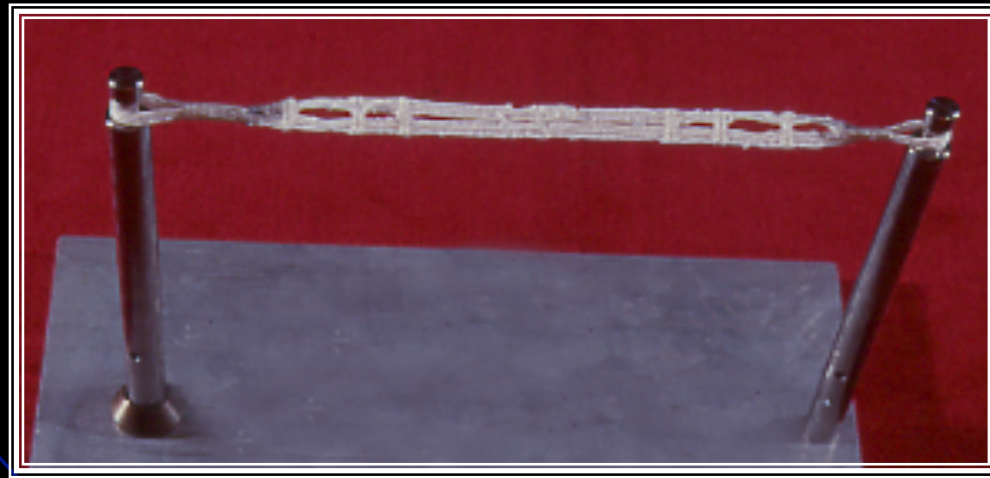
ACL STG Replacement

Harvested STG Tendons with Mayday BH Soffix

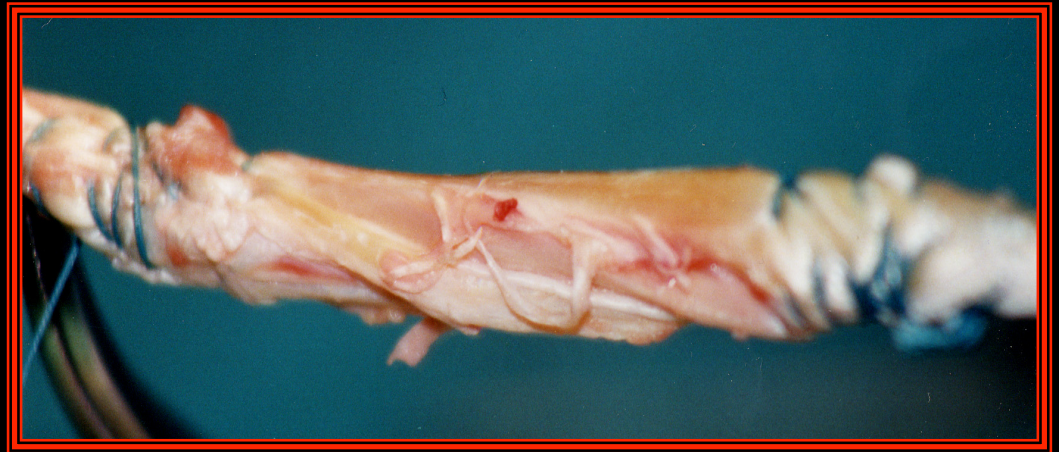
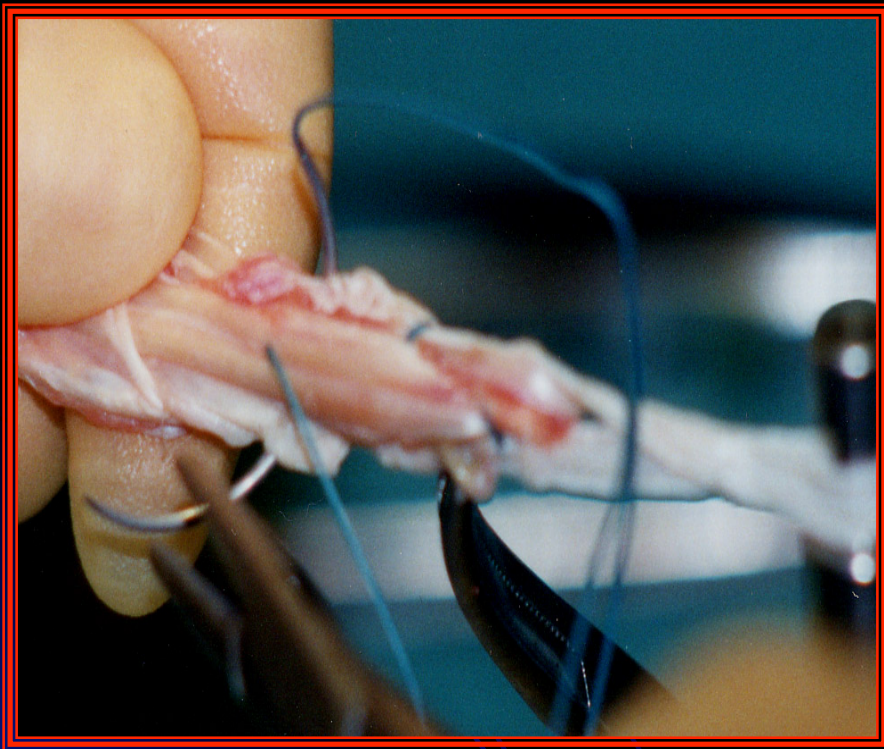


Mayday BH Polyester Soffix

Mayday BH Soffix on Frame



STG / Soffix Complex
Tendon Braiding & Fixation with Ethibond Sutures

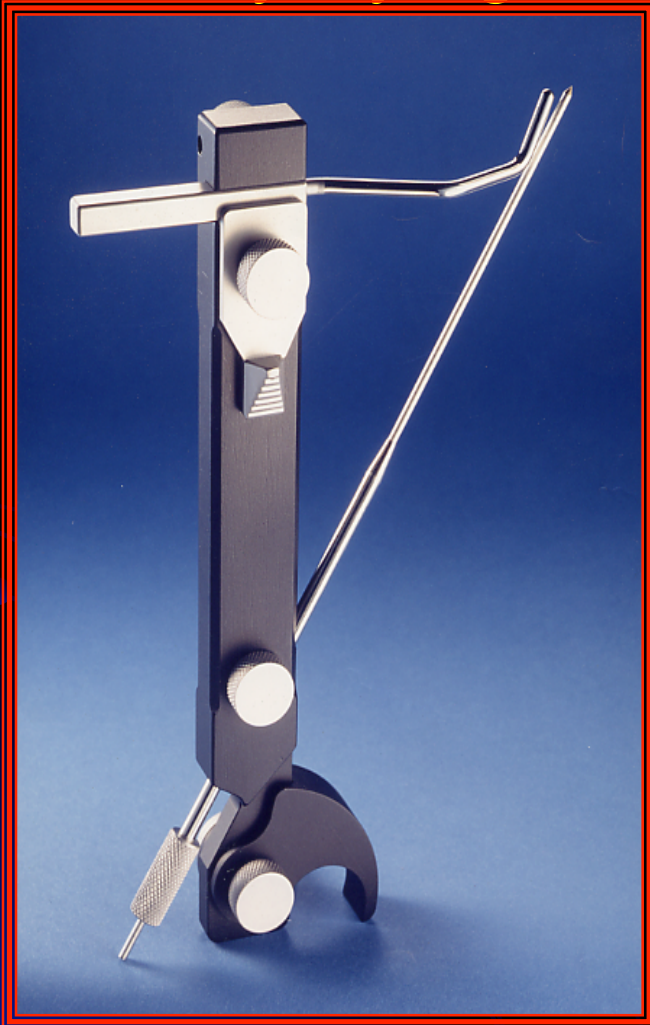


4 Strand STG Mayday BH Suffix Complex

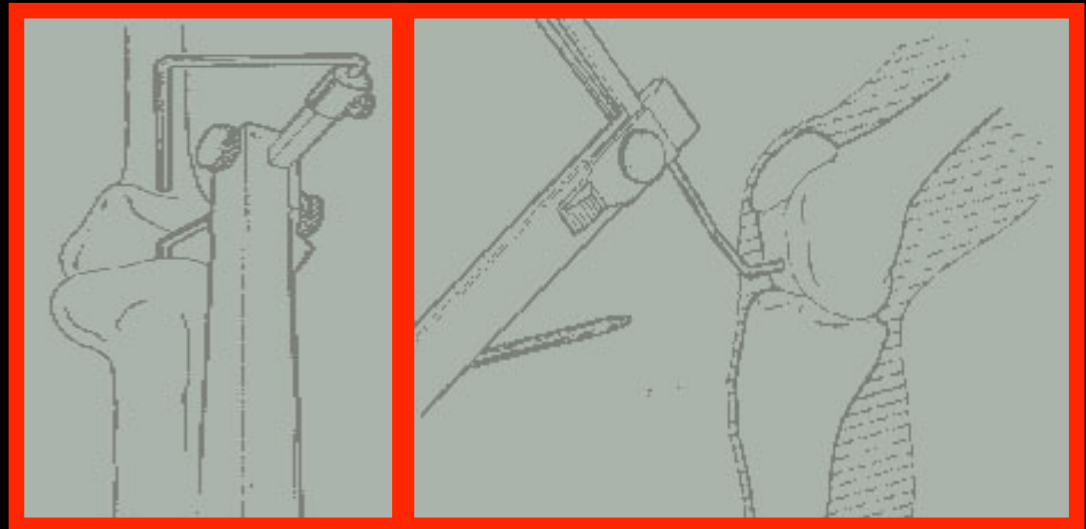


Tibial Tunnel Placement with Mayday Jig

- **Mayday Jig**



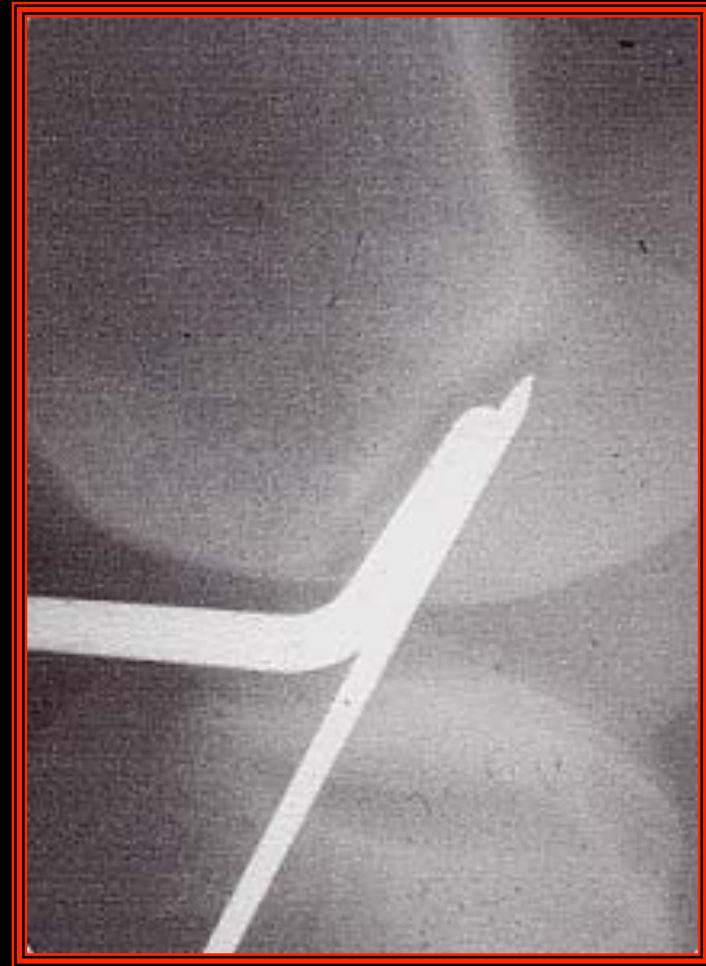
- **Jig Placement into the Intercondylar Notch**



- Mayday Jig in use



- X ray





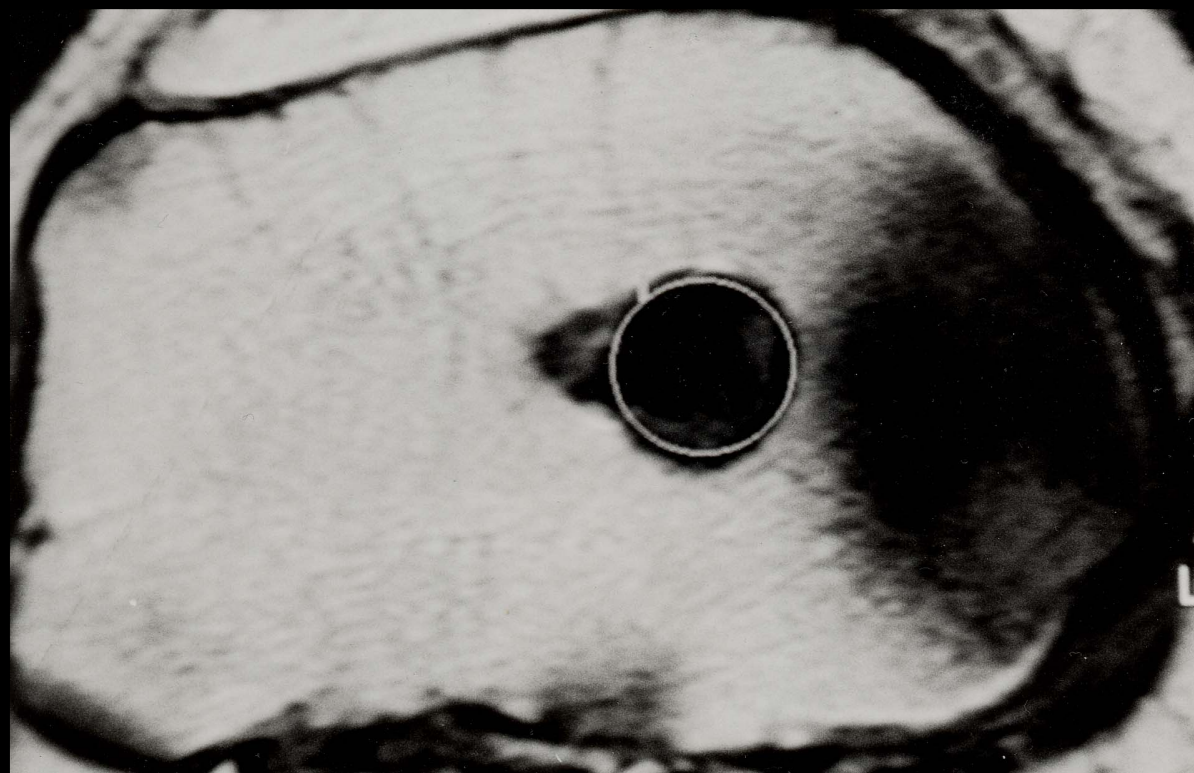
Check the Guide Wire

- Position of Guide wire



Re-Drilling of the Tibial Tunnel

Cross sectional MR from Re-Drilled Tibial Tunnel



Tunnel Edge Radiusing & Chamfering

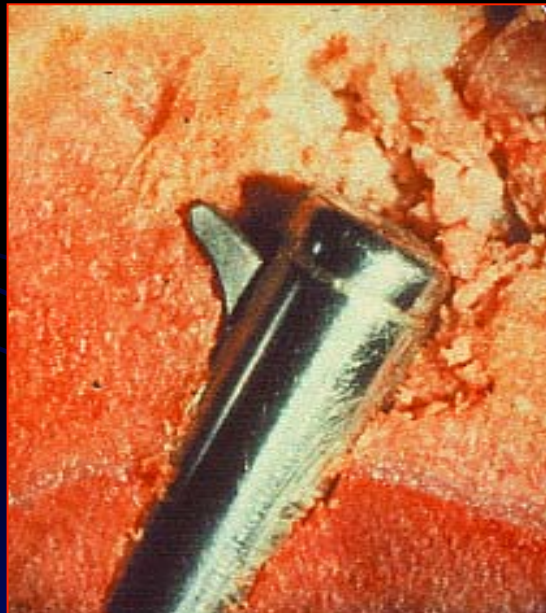
- Back Radius Cutter



- Position on AP & Lateral X-ray



- Back Radius Cutter
in Bone Tunnel



- Chamfered tunnel
outlets



Graft-Soffix Complex Preconditioning

1. Pre-implantation Preconditioning
(300 N Maximum Manual Pulling Force)
2. Intraoperative Preconditioning
3. Fixation under tension (80 N)



Pulling the Graft into the Tibial Tunnel



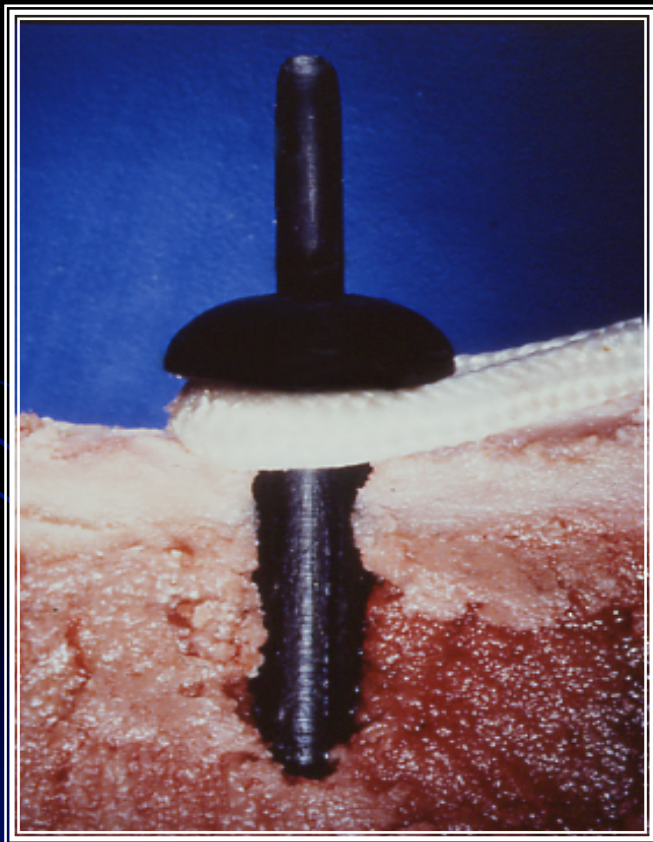
Fixation - Bollard

**Poly Sulphone Carbon
Monocortical
Fixation
Device**



Bollard Fixation

- **Bollard in Bone Tunnel**
- **Spread Bollard in Tunnel**



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

- **Proximal Femoral
Bollard Fixation**

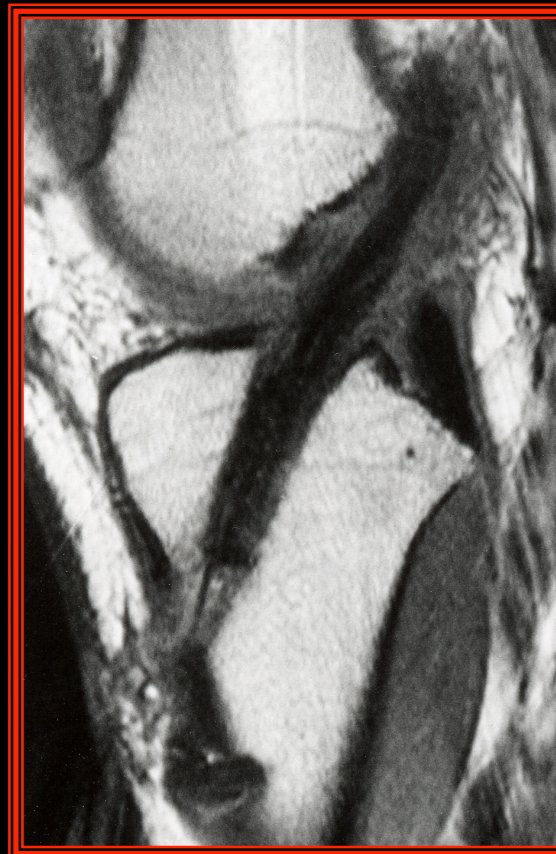
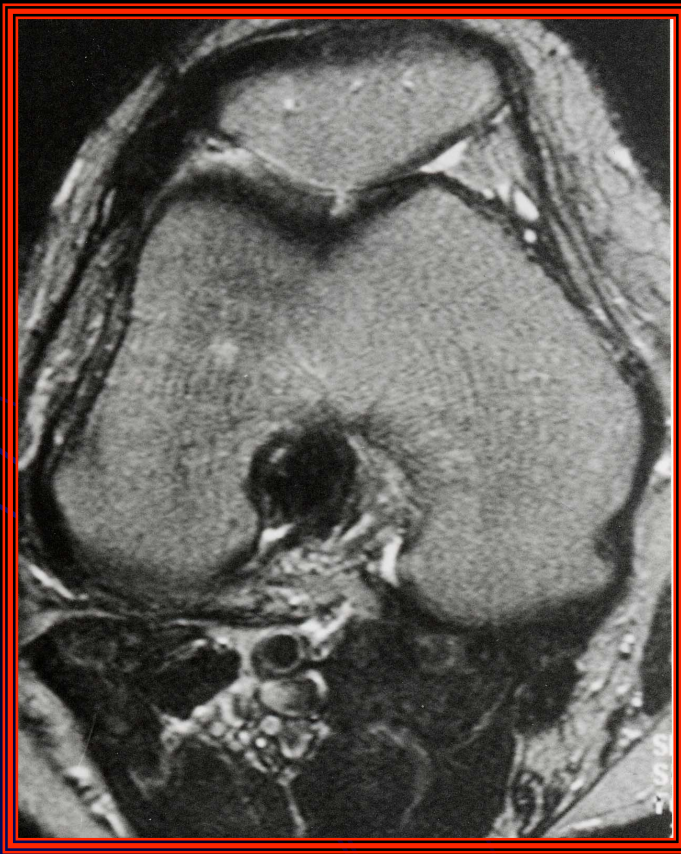


- **Distal Tibial Bollard
Fixation**



Graft in Straight Through final "Over the Top" Position

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



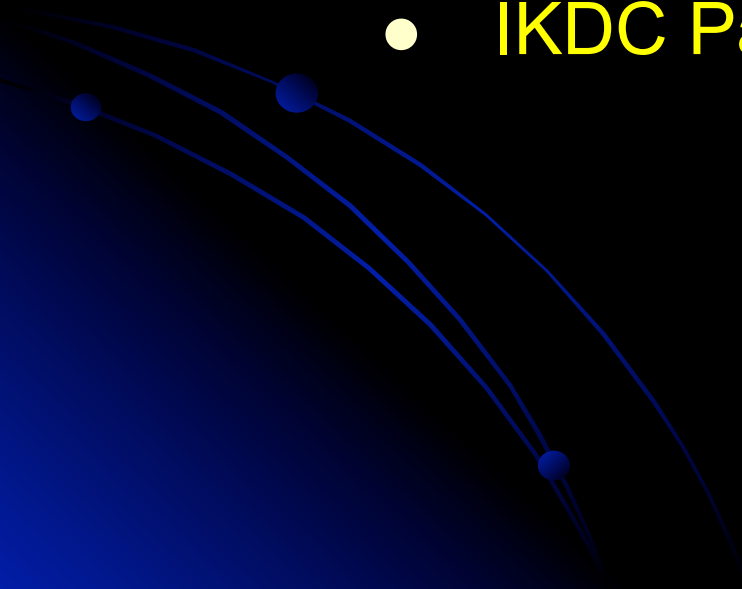
Early Rehabilitation

- 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

Patients - Methods

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

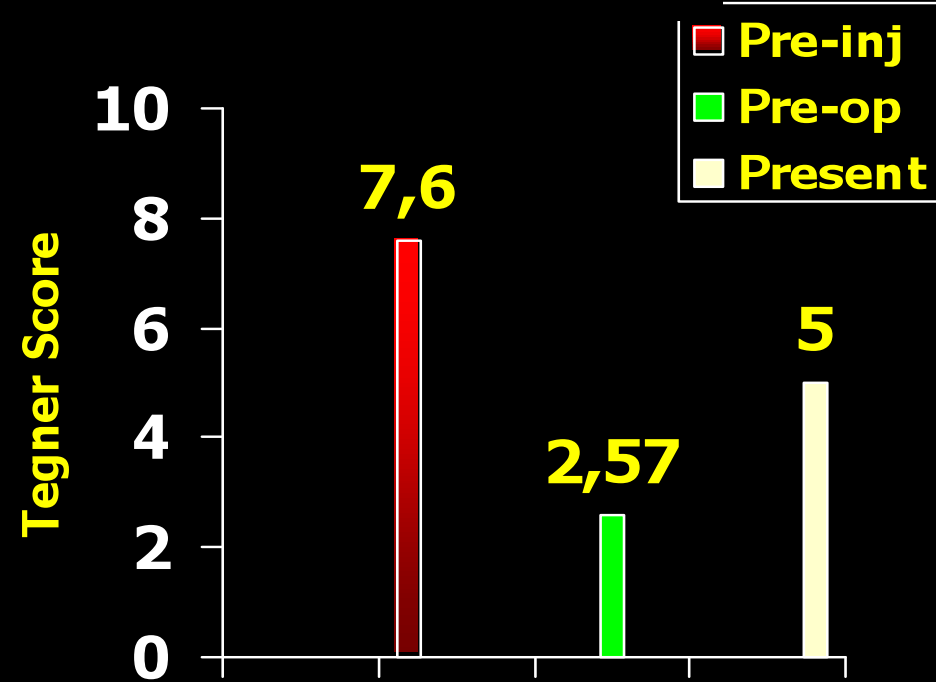
Subjective Assessment

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

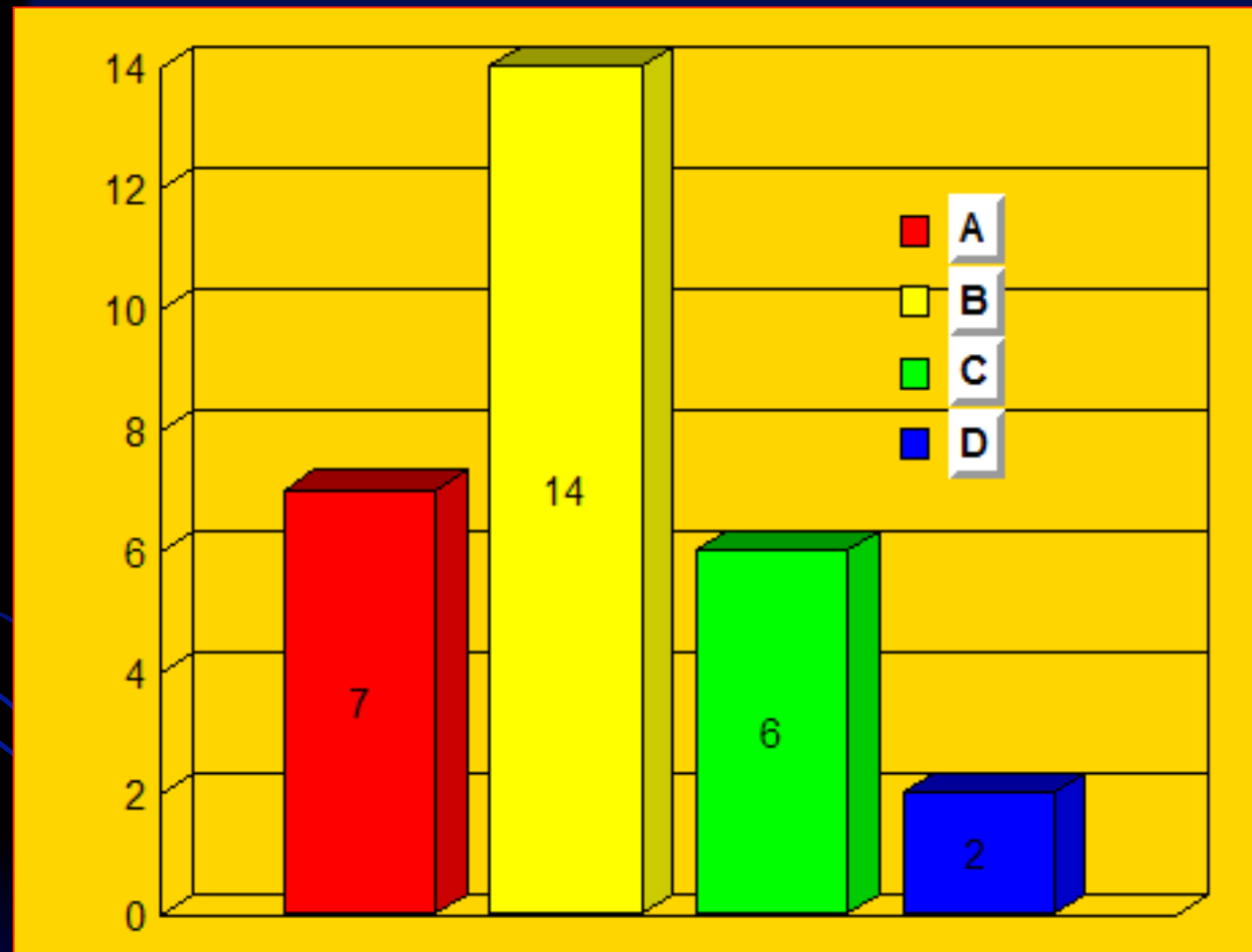
Objective Assessment

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

Tegner Activity Scoring



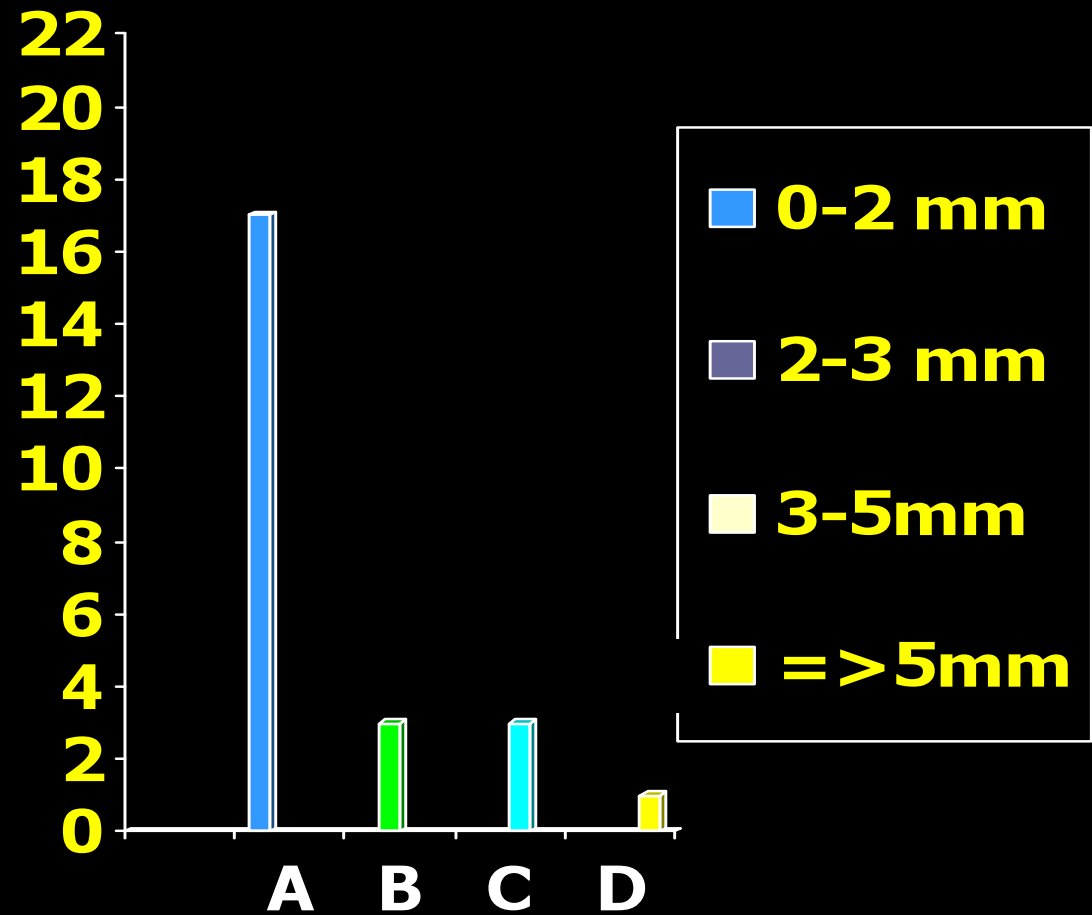
IKDC Score



KT 2000 Arthrometer

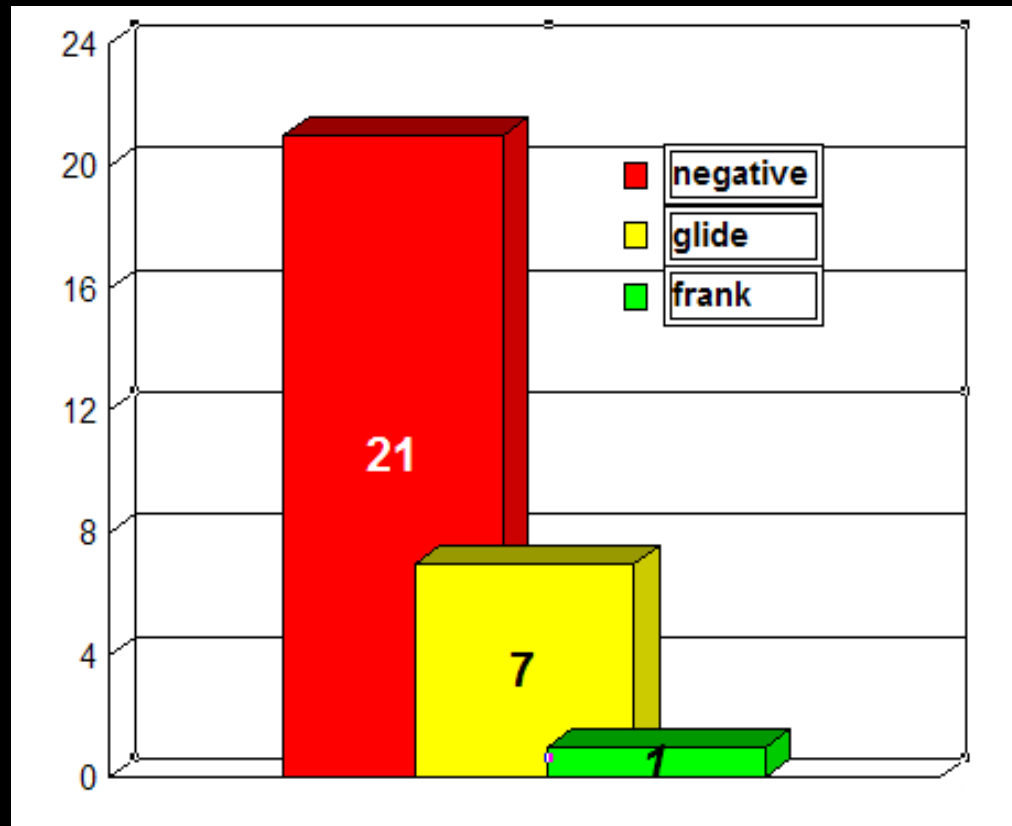
Total mean KT-2000
Measurement

SSD 1.70 ± 1.64 mm



Pivot Shift

- Negative 21
- Glide +/- 7
- Frank 1
- Total 29



Multiply Operated Knees (> 4 procedures)


7 cases

- Mean SSD: 2.48 ± 1.09 mm
- Lysholm Score: Mean 72
- IKDC Knee Score
- B:2 C : 5

Conclusion

- Revision reconstruction of the ACL 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.
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Thank you
for your attention

