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NAPA01
8.00 REGISTRATION

8.25 INTRODUCTION: N P THOMAS

ANTERIOR CRUCIATE LIGAMENT CHAIRMAN: N P THOMAS

8.30 The 3-dimensional orientation of the tibial tunnel and its influence on femoral tunnel position
D T T Lie, A A Amis, J Mountney
Imperial College, London

8.37 The biomechanical properties of four methods of fixation used for hamstring tendon anterior cruciate ligament grafts
R K Goddard, H Wynn Jones, B I Singh, P J Fules, J C Shelton, M A S Mowbray
Mayday University Hospital, Croydon

8.44 Mechanical performance of two different methods of suturing semitendinosus grafts for anterior cruciate ligament reconstruction
A Blythe, T P B Tasker and P Zioupos
Gloucester Royal Hospital and Cranfield University Postgraduate Medical School, Shrivenham

8.51 Does the use of hamstring graft for ACL reconstruction compromise the knee flexion strength and proprioception
A S Bajwa, A Lakhdawala, P Finn, C M E Lennox
University Hospital of Hartlepool

8.58 DISCUSSION

9.08 Antero-inferior reattachment of the anterior cruciate ligament – an unrecognised pattern of injury
S R Bollen
Bradford Royal Infirmary

9.15 Degenerate anterior cruciate ligament
S M Gajjar, A D Narveka
K B Bhabha Hospital, Bombay, India

9.20 Reduction of post-operative pain following arthroscopic ACL reconstruction using low temperature arthroscopy irrigation fluid
J K Borrill, A J Porteous, J Seddon-Porteous, H G Morris
Virny House Hospital, Melbourne

9.25 Day case anterior cruciate ligament reconstruction and postoperative community care by rapid response team
S Raja, S Nuttall, G Tselentakis, A J Banks
Royal Bolton Hospital, Bolton

9.32 DISCUSSION
Comparison of early results of two methods of femoral fixation for four strand hamstring graft in anterior cruciate reconstruction - one year study
N P Thomas, H Pandit, R Kankate, R Venkatesh, F Wandless
North Hampshire Hospital, Basingstoke

The short term results for a new technique for reconstruction of the anterior cruciate ligament using the Soffix fixation device
R K Goddard, P J Fules, C Yiannakopoulos, M A S Mowbray
Mayday University Hospital, Croydon

Follow up of anterior cruciate ligament reconstruction in skeletally immature patients: The Windsor experience
H Davies, A J Unwin, N P Morgan
Windsor Orthopaedic Clinic

ACL reconstruction using the quadriceps tendon autograft: Two year follow-up
C K Yiannakopoulos, E Antonogiannakis, K Karliaftis, G Babalis
General Army Hospital, Athens

Prospective trial to compare anterior cruciate ligament reconstruction using bone-patella-tendon graft and the Leeds-Keio polyester ligament; five-year follow up.
A Bonshahi, S J Parsons, A T Helm, D S Johnson, R B Smith
Royal Preston Hospital, Sharoe Green Lane, Lancashire

The patients and surgeon's view of anterior cruciate ligament reconstruction - match or mismatch?
J E Graham, P G Turner, D S Johnson
Stepping Hill Hospital, Stockport

Knee kinematics following successful ACL reconstruction - A dynamic MRI analysis of tibio-femoral motion
M Logan, A Williams, J Lavelle, W Gedroyc, M A R Freeman
St Mary's Hospital London & Chelsea and Westminster Hospital, London

In-vivo fluoroscopic analysis of the sagittal plane kinematics of the Avon patello-femoral replacement
D Hollinghurst, J Stoney, T Ward, H Pandit, D Beard, D Murray and C Ackroyd
Nuffield Orthopaedic Centre, Oxford and Avon Orthopaedic Centre, Bristol

Patello-femoral arthroplasty in younger patients with patello-femoral disease
C E Ackroyd, J H Newman, G Bedi
Avon Orthopaedic Centre, Bristol

In vivo dynamic imaging of patellar tracking
A M Bull, A M Hill, P Aichroth
Imperial College, London

DISCUSSION
11.39 Oxford unicompartmental knee arthroplasty using a minimally invasive surgical technique—a prospective multicentre study
H Pandit, D Beard, C Jenkins, S Issac, L Lisowski, Z Abidien, G Keys, A Lisowski, A W F M Fievez, H S Gill, C A F Dodd and D W Murray
Nuffield Orthopaedic Centre, Oxford. University Medical Centre, Holland. Macclesfield District General Hospital. Atrium Medical Centre, Holland. Amphia Hospital, Holland

11.46 The outcome of medial compartment unicompartmental arthroplasty of the knee in Scotland
J Bidwell, R Nutton, P Gianfreda, R Buxton, K Giannikas, D Finlayson, N Craig
Princess Margaret Rose Orthopaedic Hospital, Edinburgh Victoria Hospital, Kirkaldy. Raigmore Hospital, Inverness

11.53 DISCUSSION

12.00 ADRIAN HENRY LECTURE
(INTRODUCED BY N P THOMAS)

GUEST LECTURER PROFESSOR RENE VERDONK
(Ghent University Hospital, Belgium)

12.45 LUNCH

1.30 ANNUAL GENERAL MEETING

TOTAL KNEE REPLACEMENT
CHAIRMAN: T WILTON

2.00 A technique to aid assessment of intra-operative femoral component rotation in total knee arthroplasty the anterior femoral cortical line
S H Palmer. Australian Institute of Musculo Skeletal Research

2.07 Comparison of sagittal plane kinematic profile of two designs of total knee replacement: In-vivo fluoroscopic analysis
H Pandit, D Hollonghurst, T Ward, R Gill, D Beard, D Murray and N P Thomas
Nuffield Orthopaedic Centre, Oxford North Hampshire Hospital, Basingstoke

2.14 Post operative alignment in primary knee arthroplasty surgery; a predictive index for long term survival
A K Gambhir, N Pradham, L Bale, A Gregoria, M L Porter
Centre for Hip Surgery, Wrightington Hospital

2.21 Tibial tubercle osteotomy in total knee replacement
C R W Southgate, J R Wootton
Wrexham Maelor Hospital, Wrexham

2.28 DISCUSSION

2.36 Omnifit total knee arthroplasty: A clinical and radiographical evaluation with minimum five year follow up
N Aslam, C Pasapula, R Gunn
Milton Keynes Hospital
2.43 Consistent results with the rotaglide total knee arthroplasty. A 2-5 year follow up
C Wilson, G Tait
Crosshouse Hospital, Kilmarnock, Scotland

2.50 Does patient's pre-operative mental state influence post-operative physical outcomes in total knee arthroplasty? A prospective study.
E V Wood. Arrowe Park Hospital, Wirral

2.57 DISCUSSION

3.05 The Perth CT protocol for total knee replacement. A comparative study of computer navigated knee replacement with a conventional technique
S K Chauhan, G W Clark, R G Scott, S Lloyd, J M Sikorski, W Breidahl
Perth Radiological Clinic & Royal Perth Hospital, Australia
The Hollywood Private Hospital, Nedlands, Western Australia

3.15 A prospective randomised controlled trial of computer assisted versus conventional knee replacement
S K Chauhan, R G Scott, W Breidahl, J M Sikorski, R A Beaver
Royal Perth Hospital, Perth, Western Australia

3.22 DISCUSSION

3.30 COFFEE

SYMPOSIA - COMPLICATIONS OF TOTAL KNEE REPLACEMENT

CHAIRMAN: R B SMITH

4.00 Vascular Complications
J Mosley - General Surgeon
Wigan

4.15 Neurological and Other Soft Tissue Complications
T Wilton
Derbyshire Royal Infirmary, Derby

4.30 Complications and re-operations following primary total knee replacement from the Trent arthroplasty joint register
A K Singh, C N A Esler, W M Harper
Trent & Wales Arthroplasty Audit Group, University of Leicester

4.40 DISCUSSION

6.30 pm COCKTAILS - GALLERY LOUNGE

7.30 pm for

8.00 pm DINNER - WINDERMERE RESTAURANT
CHAIRMAN: D BICKERSTAFF

8.40 Meniscofemoral ligaments reduce tibiofemoral contact pressure
H Amadi, A M J Bull, C M Gupte, D T T Lie, A A Amis
Imperial College, London

8.45 The meniscofemoral ligaments are secondary restraints to posterior drawer
C M Gupte, A M J Bull, R D Thomas, A A Amis
Imperial College, London

8.52 Isolated laxity of the postero-lateral corner (PLC) of the knee
J Flanagan
Chelmsford Knee Clinic

8.59 Posterolateral corner injuries - the sooner the better
P J Schranz, S Sathyamurthy
Princess Elizabeth Orthopaedic Centre, Exeter

9.06 Ligament reconstruction and repair in knee dislocation
R Y L Liow, M McNicholas, J F Keating and R W Nutton
Princess Margaret Rose Orthopaedic Hospital, Edinburgh

9.13 DISCUSSION

9.28 Production of accurate 3 dimensional rigid models of articular cartilage lesions in the patella from MRI images
R J Minns, S Young, R Bibb, P Moliter
University Hospital Durham

9.35 Femoral osteochondral autograft transfer complications
V Bobic
The Grosvenor Nuffield Hospital Knee Clinic, Chester

9.42 Clinical outcome of autologous chondrocyte implantation with and without mosaicplasty
G D Smith, T Smith, J B Richardson
Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry

9.49 DISCUSSION

CHAIRMAN: P HIRST

9.59 Improving arthroscopic still images of the knee
A P Chandratreya, R Vadivelu, T J W Spalding
University Hospitals Coventry & Warwickshire NHS Trust, Coventry

10.05 An anatomical study of meniscal allograft sizing
I D McDermott, F Sharifi, A M J Bull, C M Gupte, R deW Thomas, A A Amis
Imperial College, London

10.12 Lateral meniscal allograft transplantation. Surgical technique and study of the effects on intra-articular contact pressures
I D McDermott, F Sharifi, A M J Bull, R deW Thomas, A A Amis
Imperial College, London

10.20 DISCUSSION

10.30 COFFEE
10.50 A kinematic study of the effect of tibial tray rotation on a mobile bearing total knee arthroplasty
E A H Chowdhury, M L Porter
Wrightington NHS Trust Hospital, Wigan

10.57 The reproducibility of the femoral antero-posterior axis in normal femora
G Semple
Worthing and Southlands Hospitals NHS Trust. Australian Institute of Musculoskeletal Research

11.04 DISCUSSION

CHAIRMAN: M L PORTER

11.10 2 stage revision in infected knee replacements. A minimum 1 year follow up study of 34 patients.
W J Hart, R Spencer-Jones
The Robert Jones and Agnes Hunt Orthopaedic Hospital, Shropshire

11.17 Correcting bone loss in revision knee arthroplasty: results using an uncemented prosthesis and bone grafting
D P Powles, W J S Aston
The Lister Hospital, Hertfordshire

11.24 Revision total knee replacement after primary UKR versus primary TKR
A J Porteous, M Hassaballa, J H Newman
The Avon Orthopaedic Centre, Southmead Hospital, Bristol

11.31 A review of 45 revision total knee arthroplasties at 5 years: Lessons learnt
N Pradhan, A K Gambhir, P Kay, M L Porter
Centre of Hip Surgery, Wrightington Hospital, Wigan

11.38 DISCUSSION

CHAIRMAN: R L ALLUM

11.53 Pigmented villonodular synovitis around the knee joint. Our twelve year experience from a tertiary oncology and arthroscopic
I Bisbinas, H Nasr, U DeSilva, R J Grimer, D J A Learmonth
The Royal Orthopaedic Hospital, Birmingham

VISCO SUPPLEMENTATION

12.00 Can surgical intervention be avoided using viscosupplementation therapy in osteoarthritis of the knee joint?
A S Bajwa, M Allami, P Finn, P J Gregg
Middlesbrough General Hospital, Cleveland

12.07 Viscosupplementation - who's it for?
T J W Spalding, D Clark, J Kulkarni, W Taylor, A Chandratreya
University Hospitals Coventry and Warwickshire

12.14 DISCUSSION

12.30 LUNCH

END OF MEETING
A blinded randomised controlled biomechanical study of the material properties of human meniscal allografts, comparing three different processing techniques
I D McDermott, D Lie, F Sharifi, A M J Bull, R deW Thomas, A A Amis
Imperial College, London

What really happens during the Lachman test? - a dynamic MRI analysis of tibiofemoral motion
M Logan, A Williams, J Lavelle, W Gedroyc, M A R Freeman
St. Mary's Hospital, London. Chelsea and Westminster Hospital, London

The Sheffield experience of patellofemoral joint replacements
T Cresswell
Northern General Hospital, Sheffield

Scorpio total knee arthroplasty: a clinical and radiographic evaluation with minimum two year follow up
N Aslam, C Pasapula, R Gunn
Milton Keynes Hospital

The biomechanical properties of a technique for reconstruction of the anterior cruciate ligament in a porcine knee model
R K Goddard, P J Fules, C Yiannakopoulos, J C Shelton, M A S Mowbray
Mayday University Hospital, Croydon

A gait analysis study of patients with posterior cruciate ligament and posterolateral corner deficiency
S H Palmer
The Nuffield Orthopaedic Centre, Oxford

Total knee arthroplasty in a patient with Gaucher disease
P Kalsi, R W J Carrington, J A Skinner
Royal National Orthopaedic Hospital, Stanmore

A surgical planning tool for patellofemoral distal realignment
A M J Bull, M Weyland, P Ingelstrom, A A Amis
Imperial College, London

Compression of the bone block in patella autograft cruciate ligament reconstruction: a controlled study
A C Maury, C R W Southgate, M D Holt
Morriston Hospital, Swansea

Does tibial tray alignment to the femoral prosthesis matter in a total knee arthroplasty? A consensus of opinion from BASK.
E A H Chowdhury, M L Porter
Wrightington Hospital NHS Trust, Wigan

An assessment of patient expectations of knee arthroplasty in Leicester
M C Forster, C S Milner and C N Esler
University Hospitals of Leicester

Survival analysis of primary cemented total knee replacements: Which designs last?
M C Forster
Lincoln County Hospital, Lincoln
Wound complications after Maquet osteotomy are unnecessary!
S S Kadambande, J Aeyeung, A Ghandour, W Mintowt-Czyz
Royal Gwent Hospital, Newport

Sequential hip and knee replacement under one anaesthetic
A N Murty, M Y ElZebdeh, J Ireland
Holly House Hospital, Essex

Cost effectiveness of pre-operative autologous blood donation in total knee replacement
K Ho, A M Khan, D H Sochart
North Manchester General Hospital, Manchester

Post-operative drainage after cemented, hybrid and uncemented total knee replacement
A J Porteous, R J Bartlett
Warringal Private Hospital, Melbourne, Australia

Flexion instability in total knee replacement
A J Porteous, R J Bartlett
Warringal Private Hospital, Melbourne, Australia

The sportsmans coronary - injury to the deep part of the medial collateral ligament
S R Bollen
Bradford Royal Infirmary

The use of the central portal during arthroscopically assisted four strand hamstring ACL reconstruction
S R Bollen
Bradford Royal Infirmary

How accurate can tunnel placement be, using anatomical landmarks during arthroscopically assisted ACL reconstruction
S R Bollen
Bradford Royal Infirmary

Revision TKR with the PFC/TC3 system - septic versus aseptic loosening
M Hassaballa, A Porteous, J Newman
Avon Orthopaedic Centre, Southmead Hospital, Bristol

Reamer breakage in the femoral medulla during total knee arthroplasty: Should reamers have a finite lifetime?
M R Carmont, I Bisbinas, P C Shewell & D J A Learmonth
Royal Orthopaedic Hospital, Birmingham. Hereford County Hospital, Herefordshire

Femoral component rotation in total knee arthroplasty. A comparison of two different techniques
S K Chauhan, R G Scott, G W Clark R A Beaver
The Department of Elective Orthopaedics, Royal Perth Hospital, Western Australia

The tensile properties of meniscal repair techniques
P Hopgood, J Monk
University of Wales, Cardiff

The x-ray packet test for the diagnosis of injury to the posterior cruciate ligament
D Clark, G Selzer, H Young, J Tweedie, T J W Spalding
University Hospitals Coventry and Warwickshire

Arthroscopic medial plication and lateral release for recurrent patellar dislocations/subluxations: medium term results
A Bhatti, M S Ali
Corbett Hospital NHS Trust, Stourbridge, West Midlands
In-vivo fluoroscopic analysis of the sagittal plane kinematics of the St George Sled medial unicompartmental knee replacement
J Stoney, D Hollinghurst, T Ward, R Gill, D Beard, D Murray and J Newman
Oxford Orthopaedic Engineering Collaboration, Nuffield Orthopaedic Centre, Oxford
Avon Orthopaedic Centre, Southmead Hospital, Bristol

Arthroscopic evaluation of concomitant injuries after acute and chronic ACL tears
C K Yiannakopoulos, E Antonogiannakis, K Karliaftis, G Babalis
401 General Army Hospital, Athens

A normogram of recovery following ACL reconstruction - a useful incentive for patients
T J W Spalding, D Clark, P Dunleavy, M Dunbar, A Chandratreya
University Hospitals Coventry and Warwickshire and Royal Hospital Haslar

Congenital dislocation of the patella - a modified operative procedure
R W Paton, A Bonshahi, W Kim
Blackburn Royal Infirmary

9.5 CME POINTS HAVE BEEN ACCREDITED TO THIS MEETING
THE 3-DIMENSIONAL ORIENTATION OF THE TIBIAL TUNNEL AND ITS
INFLUENCE ON FEMORAL TUNNEL POSITION
D T T Lie, A A Amis, J Mountney
Imperial College, London

Aim: To determine optimal tibial tunnel orientation that projected onto isometric positions of the LFC.

Methods: Tibial tunnels were described by transverse rotations about tibial long axes, angles of elevation and tilt. In each of 8 cadaver knees, 18 tibial positions were drilled with 2mm wires to exit at the centre and posterior end of the tibial footprint. The linear projections of these wires onto the LFC were marked by 1.6mm wires and were described as x-y co-ordinates with reference to the geometric centre of the LFC.

Results: The isometric femoral tunnel positions were approximated (within a 2mm radius) by tibial tunnels rotated 39.3°, elevated 55.7°, exiting at the posterior end of the footprint with knees flexed 90°. Tunnels rotated between 20-45° and elevated 60° had highest probability of isometric projection and those that exited at the centre of the footprint could not be linearly projected anywhere near the isometric point. Applying 50N posterior force on the tibia brought the projections proximally by 4.1mm (p=0.001).

Conclusion: Transtibial tunnel directions are known to affect siting of femoral tunnels, and hence outcome of ACL surgery. This study demonstrated the orientation of tibial tunnels that could linearly project to isometric femoral tunnel positions.

Projections of Tibial Tunnels on the Lateral Condyle

Knees were flexed 90deg during drilling. Femoral shafts were kept vertical during measurement of projections. Measurements were in mm, normalised over the radius of the LFC (21mm in the above). Units in both axes are thus relative ratios. Geometric centre of the LFC taken as centre of axes.
THE BIOMECHANICAL PROPERTIES OF FOUR METHODS OF FIXATION USED FOR HAMSTRING TENDON ANTERIOR CRUCIATE LIGAMENT GRAFTS
R K Goddard, H Wynn Jones, B I Singh, P J Fules, J C Shelton, M A S Mowbray
Mayday University Hospital, Croydon

Aims: The aims of this study were to evaluate the biomechanical properties and mode of failure of four methods of fixation of hamstring anterior cruciate ligament (ACL) grafts. The fixation methods investigated included titanium round headed cannulated interference (RCI) screws, bioabsorbable RCI screws, Endobuttons and Bollard fixation. A 2-strand equine extensor tendon graft model was used because a previous study has shown it to have equivalent biomechanical properties to that of 4-strand human semitendinosus and gracilis tendon grafts.

Method: Thirty-two stifle joints were obtained from skeletally mature pigs, the soft tissues were removed and the ACL and PCL were sacrificed. Tibial tunnel preparation was standardised using the Mayday rhino horn jig to accurately position a guide wire over which an 8mm tunnel was drilled. A 2-strand equine tendon graft was then introduced into the tibial tunnel and secured with either a titanium RCI screw, a bioabsorbable RCI screw, an Endobutton or an expansile Bollard. The proximal part of the graft was attached to the crosshead of a materials testing machine using the Soffix. Five of each method of fixation were tested mechanically to ultimate failure and under cyclical loading.

Results: The mean ultimate tensile loads (UTL) were: titanium RCI screw = 444 N, bioabsorbable RCI screw = 668 N, Endobutton = 999 N and Bollard = 1153 N. The mode of failure for all RCI screws involved progressive tendon slippage past the screw. Under cyclic loading conditions the titanium and bioabsorbable RCI screws rapidly failed after several hundred 5 to 150 N cycles due to tendon damage and slippage. Both the Bollards and Endobuttons survived 1500 cycles at 50-450N, with less tendon slippage.

Conclusion: Titanium and bioabsorbable RCI screws provide poor initial fixation of tendon grafts used for ACL reconstruction and fail rapidly under cyclic loading. Both Bollards and Endobuttons provide sufficiently high UTL’s and survive cyclic loading to allow early postoperative mobilisation and rehabilitation. Caution must be used in the early postoperative period when using interference screws to secure a hamstring tendon graft because early progressive tendon slippage may result in excessive graft elongation and early clinical failure.
MECHANICAL PERFORMANCE OF TWO DIFFERENT METHODS OF SUTURING SEMITENDINOSUS GRAFTS FOR ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION
A Blythe, T P B Tasker and P Ziopos
Gloucester Royal Hospital and Cranfield University Postgraduate Medical School, Shrivenham

Purpose: To perform a biomechanical comparison between an older established and a recently introduced technique, used in suturing semitendinosus quadrupled grafts.

Methods: Flexor tendons were harvested from pigs giving a tendon of similar dimensions to semitendinosus. Specimens were prepared using an older established suturing method utilising a Bunnel 'whip' stitch (group A, 21 specimens), and a recently introduced\(^1\) method where the tendon is sutured back on itself having an overlap of either 20mm or 30mm and forming a closed loop (group B, 40 specimens). In group A, a tibial fixation button was used and grafts were prepared as to have a common representative overall length. Consideration was given in mounting either end of these grafts in representative conditions. The lengths of Group B specimens were of comparable dimensions to group A, but were mounted by using custom-made grips incorporating roller bars. Tests were performed in a DARTEC servohydraulic materials testing machine in fatigue and in single loading at various strain rates and by using physiological loading patterns and in physiological ambient conditions.

Results: Group A specimens failed in a small load range of 200-250N and at the whipstitch, which snapped at the knot tied around the tibial button. Group B specimens failed either in the overlap region (for the shorter overlaps) or in mid-tendon substance (for longer overlaps). In general group A showed low fatigue strength and high unpredictability in its fatigue lifetime. Group B showed nearly 3 times as high fatigue strength and consistent predictable results throughout the range of loads used (200-600N).

Conclusion: The new technique for suturing quadrupled semitendinosus grafts has been evaluated in tests under more physiological loading and ambient conditions. The technique significantly improves the fatigue life of the graft and should permit the goal of a more aggressive rehabilitation programme.

\(^1\) 'A new technique for suturing quadrupled semitendinosus grafts for anterior cruciate reconstruction.' TPB Tasker & P Zioupos, BASK meeting, 23rd March 1999, Bristol, UK.
DOES THE USE OF HAMSTRING GRAFT FOR ACL RECONSTRUCTION COMPROMISE THE KNEE FLEXION STRENGTH AND PROPRIOCEPTION

A S Bajwa, A Lakhdawala, P Finn, C M E Lennox
University Hospital of Hartlepool

Aims: Whether the harvesting of Hamstring graft for ACL reconstruction results in compromised knee flexion strength and proprioception, and hence knee function?

Methods: A prospective study, approved by the local Ethics committee, was undertaken to assess the function and strength of the knee joint in patients who had ACL reconstruction performed using a four-strand Hamstring graft. The contralateral knee acted as control. 28 knee joints were studied with mean follow up 70.1 weeks (range 52-156). All operated knees received an extensive set regime of pre and post-operative physiotherapy. Assessment tools were Biodex dynamometry and stabilometry for hamstring and quadriceps strength and proprioception, clinical examination, Laxometer arthrometry for measured anterior draw. The knee function was assessed using a questionnaire incorporating International knee documentation committee (IKDC) proforma, Lysholm 2 score and Tegner’s activity scale.

Results: Objective assessment using Biodex dynamometer pre-operatively showed that mean peak flexion torque was 67.86 N-m (SD± 24) in the involved knee and 76.1 N-m (SD± 22.2) in the healthy knee. Following reconstruction (mean 70.1 weeks post-op), mean peak flexion torque around the knee joint was 69.8 N-m (SD± 20.6) and 76.2 N-m (SD ±22.1) in the operated and non-operated knee (control) respectively. Flexion torque in the operated knee was as good as the control and not significantly different from the pre-operative levels. Mean Flexion: Extension ratio around the knee joint was 53.9% in the operated and 53.2% in non-operated sides. Mean stability index, measured using open eye stabilometry, was 3.5 (SD±2.4) on the operated and 3.1 (SD±1.8) on the non-operated side, with no significant difference demonstrable. The mean age of patients was 28.3 (range 18-44) years. Mean IKDC score following reconstruction was 74.8 (range 49-100), SD±18.5. There was significant improvement in pre and post reconstruction mean Lysholm 2 and Tegner’s activity scores (p<0.01). Subjective function of the knee on a scale of 0-100 improved from pre-operative 31 to post-operative 77 (p<0.01). Arthrometry at 25-degree flexion and 130 N force using Laxometer showed mean anterior laxity 5.3mm on the operated side and 3.1 on the healthy side (side to side difference 2.2mm).

Conclusion: The function of the knee improved significantly following ACL reconstruction both objectively and subjectively. The harvesting of Hamstring as a graft neither compromises the flexion torque nor the proprioception around the knee joint.
ANTERO-INFERIOR REATTACHMENT OF THE ANTERIOR CRUCIATE LIGAMENT – AN UNRECOGNISED PATTERN OF INJURY
S R Bollen
Bradford Royal Infirmary

Antero-inferior reattachment of a femoral peel off type injury of the Anterior Cruciate Ligament (ACL) occurs fairly commonly when an injury involves a valgus strain in addition to the more common external rotation strain of the knee.

This produces a recognisable and consistent pattern of clinical signs with an increased Lachman but with a solid end stop, an increased anterior drawer with no end stop and a pivot glide or 1+ pivot shift. This pattern of signs can be explained on a biomechanical basis.

From a functional point of view the reattachment often provides enough stability to allow a patient to return to a reasonable level of sporting activity.

Problems arise however when functional instability does occur and an inability to interpret the clinical signs, an MRI that is often interpreted as normal, and an arthroscopy when, to the inexperienced, the ACL may look relatively normal, leads to an error in decision making with regard to ACL reconstruction.

This variety of ACL injury has not been previously reported.
DEGENERATE ANTERIOR CRUCIATE LIGAMENT
S M Gajjar, A D Narveka
K B Bhabha Hospital, Bombay, India

Purpose: Mucoid degeneration of the Anterior cruciate ligament (ACL) is not a well-known entity. Only 1 case of mucoid degeneration of the ACL has been reported in the English literature. This article describes 5 cases of mucoid degeneration of the ACL with clinical features, MRI findings and a method of arthroscopic management of these cases.

Type of study: case series

Methods: Over a period of 18 months from 1999-2001, 5 patients were diagnosed to be suffering from mucoid degeneration of the ACL using MRI, histopathological and arthroscopic criteria. All patients presented with progressive knee pain and restriction of flexion without history of a significant trauma or instability preceding the symptoms. MRI showed an increased signal in the substance of the ACL both in the T1 and T2 weighted images with a mass like configuration that were reported as a partial or complete tear of the ACL by most radiologists. At arthroscopy the ACL was homogenous, bulbous, hypertrophied and taut occupying the entire intercondylar notch. The ligamentum mucosum was absent in all patients. A debulking of the ACL was performed by a judicious excision of the degenerate mucoid tissue taking care to leave behind as much of the intact ACL as possible. Releasing it and performing a notchplasty treated impingement of the ACL to the roof and lateral wall. The ACL was not fully excised in any of the patients.

Results: All patients were pain free and had recovered full flexion except one who had painful flexion beyond 120°. None of the patients had symptoms of instability.

Conclusion: Mucoid degeneration of the ACL is a clinical condition afflicting active middle aged people without a single significant traumatic episode with a specific MRI picture. They respond well to a judicious arthroscopic release of the ACL with notchplasty.

Key words: Anterior Cruciate ligament-degeneration-notchplasty
Introduction: Cold therapy is known to reduce pain and swelling after surgical procedures on the knee. We hypothesised that if cold therapy is started earlier, then there would be a reduction in pain and swelling in patients undergoing arthroscopic anterior cruciate ligament (ACL) reconstruction.

Methods: We prospectively randomised 40 patients undergoing arthroscopic ACL reconstruction with hamstring autograft, to receive either room temperature (19°C) or cold (4°C) arthroscopy irrigation fluid. Patients were then assessed over the following 7 days, with regard to pain (measured on a visual analogue scale), and swelling (measured with limb girth at 4 points around the knee).

Results: Pain scores were consistently reduced in the cold fluid group compared to the room temperature group throughout the post operative period, and this difference was significant ($p \leq 0.05$) from 6 hours until 7 days post-operatively. At day 7 the swelling measured at 5cm below the joint and 5cm above the joint were significantly lower in the cold group compared with the room temperature group.

Drainage from the intra-articular drain was significantly lower in the cold group.

Conclusion: The use of cold irrigation fluid is a simple and safe measure by which pain and swelling (at day 7), can be reduced in the early post-operative period for arthroscopic ACL reconstruction.
In British National Health Service although some units perform ACL reconstruction as a day case, others continue to admit patient's overnight due to a possible medicolegal implication of complication including postoperative pain, nausea and vomiting and urinary retention. The aim of this study is to assess the safety, efficacy of post operative pain control, cost effectiveness of the day case procedure and the role of extended acute hospitalcare in the community by Rapid Response Team.

We did a retrospective review of data of fifty-seven patients who underwent day case ACL reconstruction with pre-emptive analgesia and postoperative pain control with analgesics and non-steroidal anti-inflammatory drugs. Rapid Response Team consisting of qualified nurses who provide intensive level of nursing cares in-patients home provided the postoperative community care. Aim of this team is to reduce the pressure of acute hospital beds.

Out of fifty-seven patients, adequate pain relief was achieved in 92.8%. One patient needed admission for pain relief, one patient needed admission for excessive bleeding and five patients had nausea and vomiting. Cost analysis showed that ACL reconstruction is cost effective. We conclude that ACL reconstruction is a safe procedure provided attention is given to patient selection, preadmission screening, patient education, pre-emptive analgesia with appropriate pain management and post operative community care.
COMPARISON OF EARLY RESULTS OF TWO METHODS OF FEMORAL FIXATION FOR FOUR STRAND HAMSTRING GRAFT IN ANTERIOR CRUCIATE RECONSTRUCTION - ONE YEAR STUDY
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Introduction: The aim of this study was to compare two methods of femoral fixation for four strand Hamstring (4SH) primary ACL reconstruction: namely a recently introduced suspensory fixation using absorbable polylactic acid cross pins versus our traditional method of anchor fixation.

Method: Forty-five consecutive patients, who had undergone primary ACL reconstruction using 4SH graft and the suspensory femoral fixation were prospectively evaluated by an independent observer. IKDC scores were recorded and laxity was assessed using cruciometer. These results were compared with a similar well-matched cohort of patients whose femoral fixation was with an anchor. Tibial fixation in both the groups was similar.

Results: No significant difference was noted between the two groups on comparison of IKDC scores or cruciometer readings at a minimum one-year follow-up.

<table>
<thead>
<tr>
<th>Type of femoral fixation</th>
<th>Meniscal Surgery</th>
<th>Chondral Pathology</th>
<th>IKDC Subjective</th>
<th>IKDC Obj.(A/B)</th>
<th>Laxity in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspensory</td>
<td>33%</td>
<td>24%</td>
<td>66.7</td>
<td>92%</td>
<td>1.2</td>
</tr>
<tr>
<td>Anchor</td>
<td>42%</td>
<td>32%</td>
<td>69.8</td>
<td>94%</td>
<td>1.17</td>
</tr>
</tbody>
</table>

Conclusions: This suspensory method of femoral fixation for a four-strand hamstring graft provided a secure fixation with satisfactory early clinical results. As this method of fixation is a new technique, further follow-up is needed for long-term validation.
Aims: We present the short term results of a method of reconstruction of the anterior cruciate ligament (ACL) using the Soffix, polyester soft tissue fixation device.

Method: Over a 4-year period, 111 patients underwent reconstruction of the ACL using a 4-strand hamstring graft in combination with a Soffix fixation device. The hamstring tendons were harvested and woven around the Soffix. The tendons are then sutured to the Soffix using polyester baseball type sutures to create a 4-strand graft. Prior to implantation in the knee joint the central part of the Soffix is resected leaving a free tendon window, which eventually becomes intra-articular. Tibial tunnel placement was standardised using the Mayday rhino horn jig. An over the top femoral placement was used together with polysulphon bollard fixation. These patients underwent prospective evaluation in a dedicated research clinic, which included clinical assessment, KT-2000 arthrometric assessment, Lysholm, Tegner and IKDC scoring.

Results: A total of 93 from 111 patients (84%) were available for follow up. The mean follow up time was 22 months (range 12-48). There were 79 males and 14 females with a mean age at operation of 30 years (range 16-48). The pivot shift was abolished in 85% of patients and the mean side to side difference (SSD) was 2.2mm ±1.8. The mean post operative Lysholm score was 93.4 ±8.6, the mean drop in Tegner score was 1.3. 84 patients (90%) scored normal or nearly normal (A or B) using the IKDC system, with no patients scoring D.

Conclusions: We conclude that reconstruction of the ACL using a Soffix-4 strand hamstring graft with an over the top femoral route has good short term subjective and objective outcome measures with a low mean SSD. We recommend this technique in the vast majority of ACL deficient patients.
FOLLOW UP OF ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION IN SKELETALLY IMMATURE PATIENTS: THE WINDSOR EXPERIENCE
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Windsor Orthopaedic Clinic

Purpose of Study: To review the results of anterior cruciate ligament (ACL) reconstruction in the skeletally immature patient.

Methods and Results: 13 skeletally immature patients average age 13.6 (range 11-16) who underwent intraarticular ACL reconstruction using hamstring autograft were followed up retrospectively, at an average of 23 months postoperatively (range 12-60). Patients were scored with International Knee Documentation Committee (IKDC) subjective knee score, IKDC objective knee score and KT-1000 arthrometer scores. They were also examined for leg length inequalities and angular deformities. At follow up the average subjective knee score was 86.6 (range 51.7-97). On objective testing 5 knees were rated normal, 6 knees nearly normal, 1 knee abnormal and 1 knee greatly abnormal. KT-1000 testing at 30N of force showed an average side-to-side difference of 2.77mm (range1-7mm) at maximum force side to side difference was 3.62mm (range 1-13mm). No leg length discrepancy or angulation was detected. All patients had returned to a higher level of function than pre-operatively.

Statement Of Conclusion: Our results show that intraarticular reconstruction of the ACL in skeletally immature patients is a safe and effective procedure. It does not carry a significant risk of damage to the growth plate of the femur or tibia. Objective results achieved are not as good as with the adult population as it would appear that in some cases there is a lengthening of the graft postoperatively. Subjective results are very good. Overall results are far superior to the alternative of conservative management, which risks further damage to the intraarticular structures of the knee.
ACL RECONSTRUCTION USING THE QUADRICEPS TENDON AUTOGRRAFT: TWO YEAR FOLLOW-UP
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The middle third of quadriceps tendon is an autograft of sufficient size and strength and is stronger than the patellar tendon autograft with the same dimensions. We present the results from the use of a quadriceps autograft for the reconstruction of the chronically ACL deficient knee.

Between March 1999 and March 2000 we treated 36 patients with chronic ACL deficiency using a quadriceps tendon autograft, harvested from the middle third of the tendon with and without a patellar bone block.

The tendinous side of the graft was stabilized using the Mark II and Patella Soffix fixation systems (Surgicraft, UK). In the tibia the graft was passed through a tunnel and in the femur it was passed over the top. In those cases where the graft was harvested with a bone block, his was fixed to the tibia using interference screw fixation. The mean postoperative follow up was 21 months. The results have been evaluated using the IKDC, the Lysholm and the Tegner scales. According to the International Knee Documentation Committee rating system most of the patients had normal or nearly normal ratings. Knee laxity was evaluated using the arthrometers KT-2000 and Rolilimeter. There were no significant complications related to the harvesting site and there was no significant differences between the two groups regarding stability and function. MRI evaluation and second look arthroscopies in 7 patients revealed graft survival.

The quadriceps tendon-patellar autograft is a reasonable alternative ACL reconstruction in primary and probably revision ACL reconstruction with minimal donor site morbidity and restoration of knee stability.
The study was established to assess the long-term results and differences between autogenous and synthetic anterior cruciate ligament (ACL) reconstruction.

We randomised 50 patients into 2 groups: 26 (52%) underwent reconstruction with middle third patellar tendon graft (PTG) harvested using the 'Graftologer' (Neoligaments), and 24 (48%) underwent reconstruction with the Leeds-Keio ligament (LK).

Subjective knee function was assessed using the Lysholm score, Tegner activity score, IKDC grading, and clinical assessment of anterior knee pain. Laxity was tested clinically, including anterior draw at 20° (Lachman), pivot shift, and arthrometric measurements using the Stryker laxometer.

At five years we have noted a slight reduction in Lysholm scoring in the LK group, as well as reduced Tegner activity level. Pivot shift and laxity were significantly greater in the LK group.

Compared with earlier results, which showed little subjective difference between the groups, the autogenous PTG group show more sustainable long-term results than the synthetic (LK) group. There is no significant difference in anterior knee symptoms between the groups.
THE PATIENTS AND SURGEON'S VIEW OF ANTERIOR CRUCIATE 
LIGAMENT RECONSTRUCTION - MATCH OR MISMATCH? 
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Stepping Hill Hospital, Stockport

Purpose: To compare the patient's experience of anterior cruciate ligament (ACL) 
reconstruction with previously validated outcome measures.

Methods: Forty-five patients who had previously undergone ACL reconstruction 
performed by a single surgeon at least one year previously were assessed. A 
mean time of 33 months had elapsed between surgery and assessment. Each 
assessment included the Modified Lysholm Score, the Tegner Activity Score and 
the one-legged hop test (OHT). Patient's subjective assessment included visual 
analogue scales (VAS) for pain, knee function, achievement of expectations and 
satisfaction. Correlation of all these items was performed using SPSS.

Results: The mean Lysholm score was 90.3, with mean Tegner scores of 6.9 pre-
injury, 5.2 currently and 6.3 desired. The mean OHT index was 0.92. The VAS 
scores (range 0 to 100) were 24 mm for pain, 79 mm for knee function and 77 mm 
for satisfaction. The VAS score (range -50 to 50) for expectations was 16 mm. 
Highly significant correlations were found between the Lysholm scores and all 
VAS scores; all VAS scores with each other; and the discrepancy between the 
current/desired Tegner scores and satisfaction. Significant correlations were 
found between age and achievement of expectations; the current Tegner score 
and achievement of expectations/satisfaction; and the discrepancy between the 
current/desired Tegner scores and achievement of expectations/time following 
surgery. There was a poor correlation between the OHT and the other variables 
in this post-operative population.

Conclusions: Patient assessed measures of symptoms and satisfaction following 
ACL reconstruction correlate well with accepted outcome measures. A 
discrepancy between current and desired activity levels influence satisfaction 
following ACL reconstruction to a greater degree than actual activity levels. 
Patients should therefore be warned pre-operatively of a potential reduction in 
activity level post-operatively.
KNEE KINEMATICS FOLLOWING SUCCESSFUL ACL RECONSTRUCTION - A DYNAMIC MRI ANALYSIS OF TIBIO-FEMORAL MOTION
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Purpose: To assess if ACL reconstruction restores normal knee kinematics.
Methods: Tibiofemoral motion was assessed weightbearing through the arc of flexion from 0 to 90° in ten patients who were at least 6 months following successful hamstring graft ACL reconstruction. Lachman's test was also performed using dynamic MRI. Mid-medial and mid-lateral images were analysed in all positions to assess the tibiofemoral relationship.

Results: The laxity of the reconstructed knees was reduced to within normal limits. However the normal tibiofemoral relationship was not restored after ACL reconstruction with persistent anterior subluxation of the lateral tibial plateau throughout the arc of flexion 0-90°(p<0.001).

Conclusion: Successful ACL reconstruction reduces joint laxity and improves stability but it does not restore normal knee kinematics.
Aim: To study the sagittal plane kinematics of the Avon patello-femoral replacement (Stryker-Howmedica), PTA.

Introduction: Replacement of the patello-femoral joint for end stage osteoarthritis has previously been associated with inconsistent results. Retention of the cruciate ligaments is likely to be important in maintaining normal kinematics and hence improved functional outcome.

Methodology: Twelve patients who had undergone Avon PFR least two years previously were recruited following ethical approval. American Knee Society, Bristol and Oxford knee scores were obtained. Patients performed open chain flexion and extension against gravity, in addition to closed chain step up. Video fluoroscopy of these activities was used to obtain the Patellar Tendon Angle (PTA), which is the angle between the long axis of the tibia and the patella tendon, at specific angles of knee flexion. This is a previously validated method of assessing the kinematic profile of a knee joint. These measurements were used to determine the kinematic profile of each knee and they were then compared to a group of twelve normal knees.

Results: A one way ANOVA revealed no significant differences between the kinematic profile following Avon PFR and that of the normal knee. All patients had good or excellent knee scores.

Conclusion: The kinematic profile after Avon PFR is similar to that of the normal knee. In contrast all TKRs we have studied have abnormal kinematics, which are associated with abnormal patello-femoral joint loading. This suggests that isolated PFR should have a functional advantage over TKR.
PATELLO-FEMORAL ARTHROPLASTY IN YOUNGER PATIENTS WITH PATELLO-FEMORAL DISEASE
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Avon Orthopaedic Centre, Bristol

Purpose: A new design of patello-femoral arthroplasty has been used to treat patients under 55 years suffering severe symptoms from chondral and early arthritic disease of the patello-femoral joint.

Materials and Methods and Results: Fifty-two patello-femoral arthroplasties were performed in 45 patients under the age of fifty-five years when other treatments had failed. The average age was 48 years (range 36-54 years). Thirty-seven cases had undergone previous surgery for a variety of conditions, and the causes of the disorders were analysed. Results were assessed using pain scores and Bartlett’s and Oxford functional scores. 35 cases were reviewed at 8 months and 22 cases at two years. The median pain score improved from 10/40 points to 35 at two years. The Bartlett score increased from 10/30 points to 27 and the Oxford score from 19/48 points to 35 at two years. The range of movement increased from 114° to 121°. There have been no cases of deep infection, loosening, wear or instability. Disease progression, a potential risk has occurred in one case.

Conclusions: This prosthesis offers a solution in younger patients with disabling symptoms of isolated early patello-femoral disease who have not responded to conservative surgical management.
IN VIVO DYNAMIC IMAGING OF PATELLAR TRACKING
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Imperial College, London

The objective of this study was to image patellar tracking dynamically. EBT uses electron beam technology to provide scan times of 50ms. This allows the realtime imaging and reconstructive evaluation of cardiopulmonary function and blood flow. A GE Imatron EBT C300 scanner was used with a MultiSlice sequence imaging protocol, in which the electron beam sweeps along four tungsten target rings in 200 mseconds. With two arrays of x-ray detectors per slice, eight cross-sectional images were obtained in this time, covering 76 mm. This is achieved without mechanical moving parts. The subjects were seated to flex and extend their knees over a period of five seconds (open-chain). 20 volumes of the patellofemoral joint per movement were obtained and each slice was segmented using Amira software and three-dimensional volumes of the patella and femur obtained. Anatomical landmarks were identified and the patellofemoral motion described in terms of flexion, tilt, shift and rotation.

Patellar maltracking occurs under dynamic conditions. Any diagnostic technique must allow the measurement of patellar tracking under these conditions without inconveniencing the patient. We believe that this is the first time that this has been achieved and this could now be applied to the symptomatic population.
Introduction: Oxford Unicompartmental knee arthroplasty (UKA) is now performed using a minimally invasive surgical (MIS) technique. Although early results are encouraging, the studies assessing outcome could be criticised for the restricted number of patients and centres involved. A multi-centre follow-up of patients is required to confirm the preliminary findings.


Materials and Methods: This prospective study was carried out in three centres with involvement of six surgeons. All patients undergoing cemented Oxford UKA for medial OA using MIS were included. 231 consecutive UKAs with a minimum follow up of 2 years (mean: 2.84) were assessed using objective and functional Knee Society Score (KSS).

Results: There were 108 females and 102 males (21-bilateral) with average age of 66.8 years (42 - 86). No significant difference was noted between various age groups or between different surgeons. Three knees were revised: one for infection, one for unexplained pain and one for bearing dislocation. Cumulative survival rate at 2 years was 98.6% with 93% patients having good or excellent KSS rating.

Conclusions: This multi-centre study has confirmed preliminary findings that Oxford UKA using a minimally invasive approach is safe and effective.
THE OUTCOME OF MEDIAL COMPARTMENT UNICONDYLAR ARTHROPLASTY OF THE KNEE IN SCOTLAND

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Victoria Hospital, Kirkaldy. Raigmore Hospital, Inverness

We have reviewed retrospectively the survival of 93 medial compartment OXFORD unicompartment arthroplasties performed in 3 units between 1985 and 1999. The median follow up was 7 years and patients were reassessed independently at a special clinics to ascertain both the function and survivorship of the retained implants. The total average cumulative survival at 7 years is 89.7%. Implant survival was defined as time to revision. Implants at risk were also identified by quantifying loosening and polyethylene wear.

Knee function was assessed using the American Knee Society Score, and showed good to excellent function in 80% of reviewed patients.

Conclusion: This compares favourably with similar studies in total knee arthroplasty, and provides balanced support for findings from Oxford and Sweden on survivoship of this implant.
Purpose of study: The purpose of this study was to present the anterior femoral cortical line (AFCL) as a new anatomical landmark to aid the assessment of intraoperative femoral component rotation. The AFCL was compared with an established axis (the anteroposterior (AP) axis or Whiteside’s line) in both a cadaveric and clinical study.

Methods: Two points indicating the AP axis were identified and marked on 50 normal cadaveric femora. The AFCL was identified and marked with a rigid wire secured on the surface and the distal femur was photographed. A perpendicular to the AP axis was drawn on each image and the angle between this line and the AFCL was measured.

68 Consecutive patients undergoing total knee arthroplasty for osteoarthritis of the knee were included in the clinical part of the study. After a routine exposure the AP axis was marked on each distal femur. The AFCL was identified and the anterior cortical cut was made parallel to this line. The angle between this cortical cut and the perpendicular to the AP axis was measured with a sterile goniometer.

Results: In the cadaveric study the AFCL was a mean 7.0 degrees internally rotated to the AP axis (SD = 5.1 degrees). In the clinical study in 8 patients it was impossible to draw the AP axis because of dysplasia or destruction of the trochlea by osteoarthrosis. In the remainder the mean difference between the anterior femoral cortical line and the AP axis was 1.5 degrees internally rotated (SD = 1.9 degrees).

Conclusion: The anterior femoral cortical line has been shown in this study to be a useful clinical axis for assessing rotation of the femoral component and is without some of the disadvantages associated with other landmarks.
COMPARISON OF SAGGITAL PLANE KINEMATIC PROFILE OF TWO DESIGNS OF TOTAL KNEE REPLACEMENT: IN-VIVO FLUOROSCOPIC ANALYSIS
H Pandit, D Hollonghurst, T Ward, R Gill, D Beard, D Murray and N P Thomas
Nuffield Orthopaedic Centre, Oxford

Aim: To compare the kinematic profile of two types of TKRs - a single-axis design Vs a polyradial design, with that of the normal knee.

Methodology: An in-vivo fluoroscopic analysis was carried out as part of a four-armed prospective randomised trial comparing the clinical outcome of two commonly used types of TKRs each with posterior cruciate retaining -CR and sacrificing -CS models. The kinematic profile was obtained by measuring patella tendon angle at specific angles of knee flexion using an established fluoroscopic method whilst the patients performed close and open chain exercises. The data was compared with the kinematic profile of the normal knee.

Results: Fifty-five patients who had undergone TKR at least one year prior, were invited to take part in this ethically approved study. They were matched for age and gender and had a similar clinical outcome. The kinematic profile of single axis design TKR was closer to normal especially near extension. During mid-flexion, abnormal anterior femoral translation was noticed with the polyradial design. No significant difference was noted between CR and CS designs.

Conclusions: Kinematics after a TKR differed from that of a normal knee. Reproducible differences were found between the two designs, which may predict mode of failure and longevity.
Restoration of the mechanical axis is thought to be a critical factor in determining the outcome of knee replacement surgery. There is strong theoretical evidence that reproduction of this axis improves mechanical loading and hence longevity of the implant. Clinical studies are small in number.

Per operative use of intra and extra medullary alignment jigs help to determine the distal femoral and proximal tibial cuts. Studies have shown large margins of error using the standard jigs provided with most total knee replacement systems. On this basis computer assisted guidance systems are being introduced such as Orthopilot® and BrainLab®. These systems allow more accurate placement of the bony cuts and hence improve overall lower limb alignment.

No study has shown conclusively that accurately reproducing the mechanical axis of the lower limb improves survivorship of the implant. Prior to investing in these systems we felt it would be prudent to investigate how critical reproduction of the mechanical axis was in the primary total knee replacement.

We assessed 100 primary kinematic total knee replacements performed in 1990. All case notes were reviewed looking for basic demographics, pathology, preoperative HSS (Hospital for special surgery) scores, and clinical outcome.

All cases had a long leg film weight bearing alignment film taken post operatively. These were digitised using a Nikon CoolPix 880® camera. These images were then analysed using Design CAD 97® software and from this the mechanical axis calculated.

Using this data the patients were divided into two groups. The first were within 3 degrees varus / valgus of the mechanical axis. The second were outside this range. These two groups were then correlated to clinical outcome.

Our results suggest that accurate reproduction of the lower limb alignment and the mechanical axis improves clinical outcome and survivorship of the implant using revision as an endpoint. Our data would support the introduction and use of intraoperative computer aided guidance systems.
TIBIAL TUBERCLE OSTEOTOMY IN TOTAL KNEE REPLACEMENT
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Aim: A study to determine the results of tibial tubercle osteotomy in a series of revision and difficult primary total knee replacements.

Method: A consecutive series of total knee replacements in which tibial tubercle osteotomy was performed were reviewed retrospectively. 18 revision knees and 5 primary knee replacements were identified. All of the operations performed were by the senior author.
The technique was the same in all cases, involving 9cm osteotomy with screw fixation. In cases with marked restricted flexion and patella baja, the tubercle was deliberately moved proximally to gain length in the extensor mechanism.

Results: All osteotomies had united by 8-12 weeks as assessed on a lateral radiograph.
Range of movement increased on average 45° in the revisions, and by 60° in the primaries.
An active extensor lag in 4 cases (all deliberate proximalisations) post operatively which all recovered.

5 patients underwent MUA for stiffness at 12 weeks.

Conclusion: Tibial tubercle osteotomy allows predictable extensile exposure in primary and revision total knee replacement. It also allows lengthening of a contracted extensor mechanism. Union rate was excellent and complications low. It allows preservation of the quadriceps mechanism and a normal post-operative rehabilitation.
OMNIFIT TOTAL KNEE ARTHROPLASTY: A CLINICAL AND RADIOGRAPHICAL EVALUATION WITH MINIMUM FIVE YEAR FOLLOW UP

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We reviewed the outcome of 116 primary cemented Omnifit 7000 series total knee arthroplasties implanted into 108 patients over a period of two years with a mean follow up of 68 months (range, 48-90). During the review period, 12 patients died and 8 patients were lost to follow up (24 knees). The mean Knee Society score postoperatively at review was 86 (range, 65 to 95). The mean functional score at review was 76 (range, 60 to 100). The mean range of motion at review was 100 degrees (range, 85 to 115). Radioluscent lines greater than or equal to 1mm in width were present in 9 (10%) of the femoral views, 12 (14%) of the tibial AP views, 4 (4%) of the tibial lateral views and there was no evidence of progression of the radioluscent lines.

There were three revisions; one because of an early deep joint infection, one due to instability in the AP plane and one due to aseptic loosening. The clinical and radiographic results with a minimum five year follow up show very satisfactory results. The Omnifit 7000 series provides results, which compare well with other cemented arthroplasties in the medium term.
CONSISTENT RESULTS WITH THE ROTAGLIDE TOTAL KNEE ARTHROPLASTY: A 2-5 YEAR FOLLOW UP
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Aims: In this study we present the outcome for patients with the Rotaglide mobile meniscal knee prosthesis implanted for osteoarthritis. All patients reviewed had this prosthesis implanted as a primary total knee Arthroplasty in Crosshouse Hospital. The minimum follow up period was 2 years (range 2-8.2).

Method: Patients were assessed clinically by the junior author (CW) and results were standardised using the Hospital for Specialist Surgery (HSS) knee score. Complications were quantified from patient history and examination of the case notes.

Results: Two hundred and two knees were reviewed. The results were then consolidated into groups with a minimum follow up of 2, 3, 4 and 5 years. The average HSS score was consistent at 91 for all four groups. Complications were also consistent ranging between 10 and 11% in all groups. These are summarised in Tables 1-4 below. The commonest complication was superficial wound infection (4.95%). There were also three deep infections (1.49%) and two revisions due to meniscal failure (0.99%).

Conclusions: These results suggest the Rotaglide total knee Arthroplasty offers safe and effective treatment for osteoarthritis with constantly good clinical results at 2-5 years follow up. The complication rate was also consistent over this period with a low incidence of meniscal failure and deep infection. There have been no failures due to aseptic loosening in this group to date.
DOES PATIENT'S PRE-OPERATIVE MENTAL STATE INFLUENCE POST-OPERATIVE PHYSICAL OUTCOMES IN TOTAL KNEE ARTHROPLASTY? A PROSPECTIVE STUDY

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Purpose of study: The purpose of the study was to determine the influence of patient's pre-operative mental state on post-operative physical outcomes in primary and revision total knee arthroplasty (TKA).

Methods: 100 Primary and 60 Revision TKA patients were prospectively assessed using SF-12 and WOMAC outcome measures. They were assessed pre-operatively and at six and twelve months post-operatively. All surgery was performed by a single surgeon, using one prosthesis design in each group.

The data were assessed for any correlation between the pre-operative MCS and post-operative PCS, Pain, Stiffness and Function scores using Spearman’s Rank Correlation.

Results: There was a significant positive correlation between pre-operative MCS and post-operative PCS scores at six and twelve months (P=0.01 and P=0.031 respectively) in the primary TKA patients. There was no correlation in the revision patients.

There was a statistically significant negative correlation between pre-operative MCS and six month WOMAC Pain, Stiffness and Function scores (P=0.025, P=0.019 and P=0.011 respectively) in the primary patients. There was no significant correlation with twelve months WOMAC scores.

There was no significant correlation in terms of pre-operative MCS and six months WOMAC scores in the revision patients, but there was a statistically significant negative correlation between pre-operative MCS and the twelve months pain score (P=0.039).

Conclusion: The results support the concept that high generic mental health scores in patients prior to primary TKA are associated with good physical outcomes in terms of both generic health outcome measures and disease-specific outcome measures.
THE PERTH CT PROTOCOL FOR TOTAL KNEE REPLACEMENT. A COMPARATIVE STUDY OF COMPUTER NAVIGATED KNEE REPLACEMENT WITH A CONVENTIONAL TECHNIQUE
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The Hollywood Private Hospital, Nedlands, Western Australia

Introduction: We describe a CT method that allows the seven alignment characteristics of a knee arthroplasty to be defined in a single investigation.

Method: A multislice CT scanner, scans in 2.5mm slices from the acetabular roof to the dome of the talus with the legs in a standard position.

The mechanical and anatomical axes are identified, from 3 dimensional landmarks, in both AP and lateral planes. The coronal and sagittal alignment of the prostheses is then measured against the axes.

The rotation of the femoral component is measured relative to the transepicondylar axis. Tibial rotation was measured with reference to the posterior tibial condyles and the tibial tuberosity. Coupled femoro-tibial rotational alignment was assessed by superimposition of the femoral and tibial axial images.

The results of 100 scans show a low inter and intra observer error rate whilst independent assessment shows a mean measurement error of 3mm in a three dimensional plane. The radiation dose is 2.7mSV.

Conclusions: The technique provides the only currently available measure of all the alignment characteristics required to assess the quality of a knee arthroplasty. It will become a gold standard in planning revision surgery and provide a valuable tool in assessing alignment of painful knee replacements.
A PROSPECTIVE RANDOMISED CONTROLLED TRIAL OF COMPUTER ASSISTED VERSUS CONVENTIONAL KNEE REPLACEMENT
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Royal Perth Hospital, Perth, Western Australia

Aim: To compare the new technique of computer assisted knee arthroplasty (CAK) against the current gold standard conventional jig based technique (JBK).

Methods: Seventy-Five consecutive patients underwent knee replacement and were randomly allocated to either the CAK or J BK group. Pre and postoperative Knee society scores were collected. Post-operative CT scans were performed according to the Perth CT Knee Arthroplasty protocol and pre and post operative Maquet views of the limb performed. Intra operative soft tissue release together with post operative pain scores and blood loss where also assessed.

Results: CT scans performed show a statistically significant improvement in component alignment when using computer assisted surgery for femoral varus/valgus (p=0.032), femoral rotation (p=0.001), tibial varus/valgus (p=0.047) tibial posterior slope (p=0.0001), tibial rotation (p=0.011) and femoral-tibial mismatch (p=0.037). Standing Maquet limb alignment was also improved (p=0.004) as was blood loss (p=0.0001). CAK surgery took longer- a mean increase of 13minutes(p=0.0001).

Conclusions: This is the first controlled study to assess all seven alignment characteristics of knee arthroplasty in these two groups of patients.

The improvement in alignment resulted in this trial being stopped prematurely as 6 out of 7 of the initial variables had reached significance. It shows a clear improvement in component alignment with computer navigation.
COMPLICATIONS AND RE-OPERATIONS FOLLOWING PRIMARY TOTAL KNEE REPLACEMENT FROM THE TRENT ARTHROPLASTY JOINT REGISTER
A K Singh, C N A Esler, W M Harper
Trent & Wales Arthroplasty Audit Group, University of Leicester

Purpose: To determine the incidence of complications and re-operation up to one year following primary total knee replacement in a single health region.

Methods: The Trent Arthroplasty Audit group collects prospective data on all knee replacements performed within this health region (population 5.2 million). All patients are sent a validated self-administered questionnaire one year after surgery. The questionnaire addresses patient satisfaction and any complications and re-operations following surgery. We analysed the returned questionnaires of patients who had their arthroplasty in the years 1998 to 2000. Responses were received from 4317 patients (response rate 75%). Clinical records were also examined to obtain additional information.

Results: Patients reported complications in 516 knees (500 patients). Complication rate (12%). We have no knowledge of the complexity of the surgery but 60% of the complications occurred in patients operated on by a Consultant, 29% by a Specialist Registrar and 10% by an Associate Specialist/ Staff Grade. 2.2% (125 patients) of the patients died within one year of their arthroplasty. The incidence of complications, as stated by the patient was as follows:

Complication: Pain 7%, Stiffness 2%, Superficial infection 1%, Swelling 0.7%, Deep infection 0.7%, DVT 0.4%.

Re-operation / Revision Surgery:
Revision: 1.2% (infection 0.5%: Instability 0.7%: Patellar resurfacing 0.4%), Manipulation (1.3%), Arthroscopy (0.7%), ORIF of Peri-prosthetic # (0.06%).

Conclusion: 12 % of the patients who had a primary knee replacement in Trent region between 1998 and 2000 considered that they had a complication. The deep infection rate was 0.5% and one-year post surgery the revision rate, for all causes was 1.2%. The Manipulation rate was 1.3%.
MENISCOFEMORAL LIGAMENTS REDUCE TIBIOFEMORAL CONTACT PRESSURE
H Amadi, A M J Bull, C M Gupte, D T T Lie, A A Amis
Imperial College, London

The objective of this study was to characterise the effect of MFLs on tibiofemoral contact pressure.

Five cadaveric knee joints were harvested and denuded of muscular tissue. For each knee the presence of MFLs was noted, and the knee was positioned in a four degree of freedom loading rig at full extension. Paddles of pressure sensitive film were produced and one was inserted into the joint covering the entire lateral tibial plateau. The joint was loaded to 700 N and the paddle removed. This was conducted for the following conditions: intact (unrestricted rotation), intact (tibial rotation fixed at full internal rotation), MFL-sectioned (unrestricted rotation), MFL sectioned (internal rotation fixed). Contact pressures were analysed using digital image processing techniques.

The absence of MFLs increased the mean and peak tibiofemoral contact pressures by 10% and 10%, respectively for unlocked knees. For knees with locked tibial rotation the increase was 4% and 9%, respectively.

The MFLs have already been shown to contribute to posterior stability of the knee. This finding of an effect on the tibial contact pressure would suggest that the absence of this structure might cause OA.
THE MENISCOFEMORAL LIGAMENTS ARE SECONDARY RESTRAINTS TO POSTERIOR DRAWER

C M Gupte, A M J Bull, R D Thomas, A A Amis
Imperial College, London

Aim: To test the hypothesis that the meniscofemoral ligaments (MFLs) make a significant contribution to resisting anteroposterior and rotatory laxity of the posterior cruciate ligament (PCL) deficient knee.

Methods: The anterior and posterior MFLs of eight cadaveric knees were identified using previously described dissection techniques\(^1\), which were shown not to affect overall knee stability in control studies. These specimens were tested for anteroposterior and rotatory laxity in a materials testing machine. The posterior cruciate ligament was then divided, followed by division of the MFLs. Laxity results were obtained for intact, PCL-deficient and PCL/MFL-deficient knees. Results were analysed using repeated measures analysis of variance and paired t-tests.

Results: Division of the MFLs in the PCL-deficient knee significantly increased posterior laxity between 15° and 90° of flexion (p<0.01). Force/displacement measurements revealed that, at 90° flexion, the MFLs contributed to 28% of total resistance to posterior drawer in the intact knee and 70% in the PCL-deficient knee (p<0.01). There was no effect on rotatory laxity (p>0.2).

Discussion: Previous studies have demonstrated a high prevalence of the MFLs in knees\(^1\) and that these ligaments have a strength similar to the posterior fibre bundle of the PCL\(^2\). The current in vitro study suggests that they contribute to overall resistance to posterior drawer, especially in the PCL-deficient knee. If this is confirmed in vivo, patients with PCL injuries may have a reduced posterior drawer sign if their MFLs are intact, and this may result in a more stable knee. Thus the MFLs should be accurately identified and assessed during MRI scanning and arthroscopy\(^3\).

Conclusion: This is the first study demonstrating a function for the MFLs as secondary restraints to posterior drawer in the PCL-deficient knee. The integrity of these structures should be assessed during both MRI scanning and arthroscopy of PCL-injured patients, as this may affect the diagnosis and management of such injuries.

References:
Aim: To describe the presentation, clinical signs and arthroscopic features of isolated laxity of the PLC.

Methods: The records of 50 patients who had a reconstruction for isolated laxity of the PLC were reviewed. Any patient with injuries to the anterior cruciate, posterior cruciate or lateral collateral ligaments were excluded.

Results:
- History
  - 21 patients could not remember an injury
  - 12 patients had twisting/squatting injuries
  - 17 patients had sporting injuries

Presenting Symptoms: The commonest presenting symptoms were associated with overloading the anterior structures of the knee. These presenting symptoms tended to overshadow symptoms of instability which were quite subtle and usually only emerged on direct questioning or after painful lesions had been dealt with arthroscopically.

Clinical Signs: All patients had increased posterior translation of the tibia compared to the other side when the knee was examined in 20° of flexion using a modified Lachman test.

Arthroscopic Features: The lateral compartment opened easily in 38 (76%) and the posterior half of the lateral meniscus subluxed as far as the equator of the lateral femoral condyle in 32 (64%).

Discussion: When the knee is held in 20° of flexion, posterior translation of the tibia is prevented by the structures in the postero-lateral corner. A modification of the Lachman test is described which easily demonstrates laxity of the PLC to both clinician and patient.

Conclusion: Laxity of the PLC is a common clinical finding, easily detected by a modification of the Lachman test. Patients may present without a history of injury, complaining of pain at the front of the knee and with subtle symptoms of instability. Laxity of the PLC should be considered in patients with recurrent or persistent symptoms following arthroscopy.
POSTEROLATERAL CORNER INJURIES - THE SOONER THE BETTER
P J Schranz, S Sathyamurthy
Princess Elizabeth Orthopaedic Centre, Exeter

We wish to report our observations on a prospective series of 22 patients with high energy posterolateral corner injuries undergoing surgery at our Unit.

Since 1997, all patients presenting to our Unit with posterolateral corner injuries were analysed prospectively. Twenty two patients are presented with a mean follow-up of two years. Thirteen patients underwent acute exploratory surgery within two weeks of injury. The majority of patients had four or more injured structures identified at operation. The surgery involved reattachment of the injured structures together with selective staged intra-articular reconstruction in high demand individuals. Nine patients were referred to our unit a number of years after their original accident. The majority of these chronic cases underwent popliteofibular reconstruction using semitendinosus. All patients from both groups returned to activities of daily living after surgery. Ten patients returned to sport after reconstruction. Eight out of ten of these had undergone acute reconstruction.

Posterolateral corner injuries are high-energy multiple ligament injuries. Acute repair with staged selective intra-articular reconstruction in our series led to 61% of the acute patients returning to sport. Only 22% of the patients presenting late, returned to sport after reconstruction. This suggests that patients are more likely to return to sport if their knees are reconstructed early and we would encourage an assertive approach to these high-energy injuries.
LIGAMENT RECONSTRUCTION AND REPAIR IN KNEE DISLOCATION
R Y L Liow, M McNicholas, J F Keating and R W Nutton
Princess Margaret Rose Orthopaedic Hospital, Edinburgh

Introduction: Traumatic knee dislocations are rare but devastating injuries. We have evaluated the clinical results of ligament repair and reconstruction. Knee dislocation was defined as an acute event that produced multidirectional instability with at least 2 of the 4 major ligaments disrupted.

Materials: Twenty-one patients with 22 knee dislocations presented between 1994 and 2001. There was one vascular and one common peroneal nerve injury. Eight (38%) patients were treated in the acute period (<14 days), 5 (24%) had reconstructions within 1 year of injury. The remainder were late reconstructions. The patients were evaluated at mean follow-up of 32 months (11 to 77). This included ROM measurement, clinical and instrumented ligament laxity testing. Posterior stress view with 10kg weight was used to evaluate the PCL reconstruction. Function was evaluated using the IKDC chart, the Lysholm Score, the Tegner Activity Level, the Knee Outcome Survey and WOMAC.

Results: The mean extension deficit was 6.8 degrees (0-25) and mean flexion deficit was 8.6 degrees (0-20). Of the ACL reconstructions, 4 knees had 0-3mm side-to-side difference, 15 knees had 3-5mm and 1 knee had 6-10mm. Of the PCL reconstructions, 2 were within 3-5mm of side-to-side difference, 9 knees were 6-10mm and 4 were more than 10mm. Posterolateral corner repair/reconstructions appeared durable.

None of the knees were IKDC Grade A, 8 knees were Grade B, 9 were as Grade C and 5 were Grade D. The mean Lysholm Score was 81 (66-100) and the mean Tegner Activity Level was 4.9 (1-7). The mean Knee Outcome Survey score was 75 (41-99). Acutely treated knees had better scores than late reconstructions.

Conclusion: Our study has demonstrated good function in the operatively treated knee dislocations at 1-7 years. Nearly all had few problems with daily activities. The ability to return to high-demand sports and heavy manual labour was less predictable.
The purpose of this study was to characterise accurately, the extent and geometry, and produce representative rigid resin models of full thickness articular cartilage lesions of various types, shapes and sizes on the articular surface of pig patellae. Ten adult pig patellae and three adult Ox patellae were obtained and cleared of adhering tissue. Full thickness lesions were induced from oval shaped to “U” shaped scarifications by careful use of a hand held bur, and the geometry noted by taking appropriate dimensions with a Vernier calliper in the horizontal and vertical planes, and plan view photographs. MRI images using fat-suppressed weighted 1.5 mm thick slices scans in the horizontal plane, were produced in DICOM format for conversion to SLE files used in the reconstruction in the computer. The patellae were then held in a stone plaster mix to produce a male mould of the articular surface. The computer images were generated and the physical dimensions taken with the Vernier calliper were recorded from the reconstructed image in the computer using graphics software. The computer data was used to produce a rigid full scale model of the articular surface in resin using laser stereolithography which is using in the rapid prototyping industry. The resin models were matched with the male plaster moulds to confirm an accurate match of the 3-dimensional shape of the computer generated in all the types of lesions we produced. It is proposed to use the rigid models to produce sterile templates that could be used by surgeons to fashion an area around a lesion using a suitable reamer/bur using a predetermined criteria of cartilage thickness (say 2 mm), and the same geometrical data would be used to produce a suitable semi rigid scaffold shaped to the lesion. Our study has shown that very accurate 3 dimensional data can be quickly processed from MRI images to produce, using current rapid prototyping techniques, templates and implants to fit lesions accurately in the patella. There is no reason why this technology could not be applied to any joint surface that can be accessed by MRI.
FEMORAL OSTEOCHONDRAL AUTOGRRAFT TRANSFER COMPLICATIONS
V Bobic
The Grosvenor Nuffield Hospital Knee Clinic, Chester

**Purpose:** The aim of this study is the mid-term analysis of osteochondral autograft transplantation for the repair of focal femoral defects.

**Methods:** We present clinical data based on arthroscopic and MRI appearances of 18 patients, from 2 to 6 years postoperatively, which illustrate growing concern about the progressive deterioration of articular cartilage surrounding the OAT graft. It seems that the osteochondral autograft transfer (OAT) can restore the height and the shape of articulating surface in osteochondral defects with composite autologous material that contains hyaline articular cartilage and a firm carrier. However, limited availability of autologous osteochondral grafts, dead spaces between circular grafts, the lack of integration of donor and recipient hyaline cartilage, and different thickness and mechanical properties of donor and recipient hyaline cartilage are frequent sources of clinical concern.

**Results:** Typically, the OAT graft itself maintains its mechanical and histological integrity over the years, but surrounding articular cartilage continues to deteriorate, leading to a wide area of further chondral damage. Although this is difficult to understand and explain, it seems that the damage to articular cartilage surrounding the defect, and probably most importantly the lack of chondral integration, are the main reason for further chondral damage.

**Conclusion:** Adherence to clear indications, correction of concomitant pathology, precise surgical technique and realistic goals are most important when considering OAT surgery in symptomatic patients with femoral osteochondral lesions. Treatment of focal femoral chondral lesions in active individuals remains a significant challenge with many controversies remaining.
CLINICAL OUTCOME OF AUTOLOGOUS CHONDROCYTE IMPLANTATION WITH AND WITHOUT MOSAICPLASTY
G D Smith, T Smith, J B Richardson
Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry

Introduction: Autologous Chondrocyte Implantation (ACI) was first described in 1994 and has been shown to be an effective technique for treating chondral defects. We describe the results of the 90 patients treated with this technique with up to six years follow-up.

Materials and Methods: We have established a NHS laboratory service for supplying autologous chondrocyte cells.

91 Consecutive cases (90 patients) with chondral defects in the knee were treated with ACI in between April 1996 and October 2001. In 63 cases ACI was performed alone. In 20 cases ACI was combined with Mosaicplasty, and in 8 cases ACI was combined with other techniques. The areas treated varied from solitary femoral condyle lesions (FC), Patella or trochlea lesions (PFJ) and complex (multiple or bone-on-bone) lesions (CX).

Data is collected prospectively: Patients were assessed pre-operatively with MRI Lysholm and satisfaction scores. At 1 year MRI was repeated and arthroscopic biopsy performed to assess the graft clinically and histologically. Clinical scores were collected at regular intervals.

Conclusions: Satisfaction is high in all groups. Increase in score from pre-op to last follow-up is significant in all groups except patella and trochlea lesions.

<table>
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<th>No</th>
<th>Mean Age (yrs)</th>
<th>Mean Size (cm²)</th>
<th>Mean Follow-up (yrs)</th>
<th>Patient Satisfaction</th>
<th>Mean pre-op Lysholm</th>
<th>Mean Lysholm At last follow-up</th>
<th>Paired T-test</th>
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<tr>
<td>All cases</td>
<td>87</td>
<td>34.3 (17-54)</td>
<td>5.47</td>
<td>2.4</td>
<td>82%</td>
<td>49.5</td>
<td>69.4</td>
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<td>FC</td>
<td>25</td>
<td>37.6</td>
<td>4.09</td>
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<td>53.8</td>
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<td>PFJ</td>
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<td>4.56</td>
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<td>86%</td>
<td>45.2</td>
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<td>CX</td>
<td>16</td>
<td>39.8</td>
<td>3.46</td>
<td>2.2</td>
<td>85%</td>
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<td>52.7</td>
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<td>63</td>
<td>34.6 (15-53)</td>
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<td>87%</td>
<td>50.3</td>
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<td>5.92</td>
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<td>82%</td>
<td>48.2</td>
<td>62.3</td>
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<td>ACI + Other</td>
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<td>100%</td>
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<td>83.6</td>
<td>P=0.0005</td>
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IMPROVING ARTHROSCOPIC STILL IMAGES OF THE KNEE
A P Chandratreya, R Vadivelu, T J W Spalding
University Hospitals Coventry & Warwickshire NHS Trust, Coventry

Purpose: To audit the quality of the still images and documentation of arthroscopic surgery of the knee and to provide guidelines to optimize photographic records.

Methods and Results: The study was conducted in 4 parts

Questionnaire of surgeons views on photographic records: This showed that less than 50% of surgeons felt they could interpret their own photographs and only 25% felt other surgeons records were useful. 80% felt that single image photographs gave clearer information than 4 small images per sheet.

Retrospective audit of 70 arthroscopic records. This showed that the diagnosis was demonstrated in only 60% of records when taken. Small images had been recorded in 75% of cases.

Production of guidelines for improving photographic records.

Re-audit of 50 subsequent records. This showed a significant improvement such that the diagnosis was clearly demonstrated in 84% of records.

Conclusion: Poor picture labelling, inadequate pictures and documentation were found in the majority of the cases. New formulated guidelines led to an improvement in the accuracy and usefulness of recorded images.

This may lead to a reduction in the need for repeat arthroscopy when patients are referred for second opinions to specialist knee surgeons, thereby reducing costs and morbidity.
AN ANATOMICAL STUDY OF MENISCAL ALLOGRAFT SIZING
I D McDermott, F Sharifi, A M J Bull, C M Gupte, R deW Thomas, A A Amis
Imperial College, London

Introduction: Accurate size-matching of meniscal allografts is essential to maintain tibiofemoral congruity, and therefore function, especially when the surgical technique of using a bony bridge is employed.

Methods of accurately assessing the required dimensions of an ideal meniscal allograft for each patient are limited. One popular method used is to choose the appropriate graft according to the bony tibial plateau dimensions of the patient, as determined from plain radiographs.

Aims: To correlate meniscal dimensions with the bony dimensions of donor tibial plateaus.

Methods: 22 left and right pairs of donor tibial plateaus with intact meniscal allografts were obtained, giving a total of 88 individual meniscal allografts. Using a digital micrometer, the following meniscal dimensions were measured: anteroposterior length, medial-lateral width, and the radial width at the mid-point of the meniscal body. Peripheral circumference was measured using flexible steel wire. Medial and lateral bony tibial plateau width and length, and total plateau width were also recorded. Linear regression analysis was used to obtain a formula, relating each meniscal dimension to the various bony plateau measurements. The resulting equations were used to calculate an expected meniscal dimension from the measured plateau dimensions, and this was compared to the size of the actual dimension measured.

Results: The magnitude of the meniscal dimensions measured approximately fitted a normal distribution amongst all the specimens studied. The tibial plateau widths ranged from 69.2mm to 88.4mm (mean 78.5mm, s.d. 5.4mm), a 28% difference. The mean difference between meniscal measurements between the left and right knee of each pair was 7.3%. However, the greatest individual difference observed was 41.8%.

The mean percentage error between meniscal dimensions calculated from specific compartmental tibial plateau dimensions, and the actual measured meniscal dimensions was 5.3% (s.d. 4.1%). When using just total bony tibial plateau width to calculate meniscal dimensions, the percentage error was 6.2% (s.d. 4.9%). This difference was not statistically significant. The maximum error between calculated and actual meniscal dimensions was 32%.

Conclusions: This anatomical study shows that the use of plateau dimensions as a determinant for the sizing of meniscal allografts can be used to predict meniscal dimensions. However, mean errors are in the region of 5% – 6%, and can be as high as 32%. The potential mechanical effects of such graft to host size mismatching must be carefully borne in mind.
LATERAL MENISCAL ALLOGRAFT TRANSPLANTATION. SURGICAL TECHNIQUE AND STUDY OF THE EFFECTS ON INTRA-ARTICULAR CONTACT PRESSURES
I D McDermott, F Sharifi, A M J Bull, R deW Thomas, A A Amis
Imperial College, London

Aims: To evaluate different surgical techniques of lateral meniscal allograft transplantation in cadaver knees, and to assess how these techniques affect tibial contact pressures.

Methods: The femoral and tibial shafts of five human cadaver knees were cemented into steel pots. Fresh-frozen irradiated human meniscal allografts were supplied by the East Anglia Tissue Services Department of the National Blood Service.

The knees were mounted into an Instron materials testing machine. Paddles of pressure-sensitive Fuji Prescale Film were inserted into the lateral compartment of the knee, underneath the lateral meniscus. Each knee was then loaded to 700N for 10 seconds. The Fuji Film paddles were digitally scanned and then analysed using Scion Image Analysis software to determine the intra-articular contact pressures.

Contact pressures were then determined after (i) total lateral meniscectomy, (ii) lateral meniscal allograft transplantation using a bone plug-keyhole technique to secure the horn attachments, and (iii) after insertion of the graft by suturing only.

Results: Total lateral meniscectomy led to a mean increase in maximum contact pressures of 103% (s.d. 63). Mean maximum contact pressures after lateral meniscal transplantation with a bone cylinder were 59% (s.d. 60) greater than the intact state, and after suturing only of the graft, were 85% (s.d. 74) greater than the intact knees.

Conclusions: Overall, lateral meniscal transplantation did partially restore contact pressures within the knees, and the use of a graft attached to a bone cylinder appeared to be more effective than just simple suturing of the graft. However, the results varied greatly between the different knees. In two knees, the results of meniscal transplantation were excellent. However, results were poor in knees with inaccurate graft-to-host size matching or where there was significant articular degeneration.
A KINEMATIC STUDY OF THE EFFECT OF TIBIAL TRAY ROTATION ON A MOBILE BEARING TOTAL KNEE ARTHROPLASTY
E A H Chowdhury, M L Porter
Wrightington NHS Trust Hospital, Wigan

We wanted to know if a mobile bearing TKA was able to cope with rotation of the tibial tray about the femoral prosthesis, by studying the tibio-femoral and patello-femoral joints.

This was a kinematic study that used a mobile bearing TKA mounted on a jig that allowed rotation of the tibial tray. The TKA was moved through a 90° range of flexion and we used photography to record the effects at the tibio-femoral and patello-femoral joints. We found that with a fixed tibia, increasing the degree of external rotation increased the degree of medial femoral condyle lift off from the polyethylene insert which was complete at 25° of tibial tray external rotation. The lift off increased with the degree of flexion. The patello-femoral joint remained congruent. If the rotated tibial tray was mounted on a tibia that was allowed to freely rotate, it led to congruity at the tibio-femoral joint. Now we found that there was medial facet impingement and lateral facet lift off of the patella button in extension and flexion.

We concluded that this mobile bearing prosthesis did not cope well with rotation of the tibial tray. The relatively low congruency at the tibio-femoral articulation meant that there was a reduced “driving force” at the tibio-femoral joint resulting in less than adequate rotation of the mobile polyethylene insert. We feel that the tibial tray must be placed in neutral to the femoral prosthesis and failure to do so will result in abnormal polyethylene loading that would increase wear and may culminate in early prosthesis revision.
THE REPRODUCIBILITY OF THE FEMORAL ANTERO-POSTERIOR AXIS IN NORMAL FEMORA

G Semple
Worthing and Southlands Hospitals NHS Trust. Australian Institute of Musculoskeletal Research

The femoral antero-posterior axis (AP or Whiteside's Line) is one of the frequently used landmarks during total knee arthroplasty for determining rotation of the femoral component. Femoral morphology is assumed to be relatively constant and bone cuts made to prepare the distal femur are referenced from this landmark. Few studies have confirmed the consistency or reproducibility of this axis in normal femora even though the effect of malrotation on patella tracking and valgus-varus knee stability has been well documented.

Fifty normal (non-degenerate) cadaveric femora (27 right, 23 left) were studied. The AP axis was identified and marked on each. An end-on photograph was taken to give a two dimensional image. The trans-epicondylar axis (TEA) was then drawn on each image. The angle between these two axes was recorded.

Measurement of the TEA referenced from the AP axis gave a mean angle of 90.82 degrees (range 80-102; standard deviation=4.72).

This study shows that the femoral AP axis is a reasonable method of determining femoral component rotation during total knee arthroplasty. However the variance in the results would suggest that other landmarks should also be used as a means of cross-checking femoral component rotation.
2 STAGE REVISION IN INFECTED KNEE REPLACEMENTS. A MINIMUM 1 YEAR FOLLOW UP STUDY OF 34 PATIENTS
W J Hart, R Spencer-Jones
The Robert Jones and Agnes Hunt Orthopaedic Hospital, Shropshire

Aims: The purpose of this study was to review the success rates of a new management strategy when dealing with deep infection in knee arthroplasty.

Methods: Since 1998 a management plan consisting of an initial debridement, insertion of vancomycin loaded prostolac spacers and 2 weeks of intravenous antibiotics has been used. If inflammatory indices are improved at 12 weeks reimplantation occurs with antibiotic treatment until cultures are completed. The necessary data has been prospectively collected and reviewed to identify predictors of success.

Results: 34 patients have been identified with a minimum of 12 months follow up. 27 of these have at least 24 months follow up. With an endpoint of a functioning prosthesis clear of infection we have achieved an 82% success rate. If the inflammatory indices and frozen section were normal at the time of reimplantation this was 90% predictive of a successful outcome. Although 13 patients had a combination of abnormal blood tests, cultures and frozen sections at the time of reimplantation only 4 of these went on to develop recurrent infection. 2 patients with normal investigations at reimplantation went on to demonstrate residual infection.

Conclusion: Short courses of parenteral treatment can produce comparable results to previously published series when treating deep infection after knee replacement. Allowing weight bearing and range of motion exercise does not appear to hamper the eradication of infection. None of the investigations currently employed have been shown to be 100% reliable in this series of cases. Whilst attention to detail and careful planning are pre-requisites for this surgery one still has to prepared for failure.
CORRECTING BONE LOSS IN REVISION KNEE ARTHROPLASTY: RESULTS USING AN UNCEMENTED PROSTHESIS AND BONE GRAFTING
D P Powles, W J S Aston
The Lister Hospital, Hertfordshire

Object: To determine whether moderate bone loss in revision total knee arthroplasty can be corrected using an uncemented prosthesis combined with cancellous bone grafting.

Methods and results: 23 revision total knee replacements for aseptic loosening or sepsis were undertaken by the senior author between May 1999 and August 2002. All cases involved bone loss of grades F2 and or T2 according to the Anderson Orthopaedic Research Institute Classification (Engh 1998). Bone loss was treated with a mixture of morselized autograft, morselized allograft and bone reamings loosely packed into any contained or uncontained defects following the technique of Whiteside (1992). Uncemented prostheses with long contact bearing stems were then inserted.

All 23 cases were able to partially weight bear immediately postoperatively, indicating satisfactory early press fit. No cases of loosening or cases suspicious of loosening have been noted.

Of the 23 cases 19 have been followed for at least 1 year. 18/19 showed consolidation of bone defects and in 1 case there was significant bone resorption under the tibial base plate due to stress shielding.

Conclusion: This technique is successful in building up moderate bone loss in revision total knee arthroplasty, therefore avoiding the need for excessive bone resection, large metal augments, mass allografts or custom prostheses.
Aim: The aim of this study was to evaluate the functional results and ease of performing revision surgery after a primary unicompartmental arthroplasty versus primary total knee arthroplasty.

Method: 114 revision TKRs had data collected prospectively as part of our unit’s Knee Database. 45 were revisions of UKR’s and 79 revisions of TKR’s. This data included Bristol Knee Scores (BKS), reason for revision, use of implant augments and bone graft. Measurements were also made of the ability to restore joint-line after revision.

Results: In both groups there was a significant improvement in BKS post-operatively. In the UKR group the commonest reason for revision was progression of disease, while in the TKR group it was aseptic loosening. Bone graft was required in significantly fewer UKR cases (20% vs 40%, P<0.05). Distal femoral augments were used in 45% of the TKR revisions but in none of the revisions from UKR. The joint line was elevated in a significantly higher proportion of revision from TKR cases versus revision from UKR cases (P<0.001). Revisions from UKR had higher Total BKS and Functional BKS score than revisions from TKR.

Conclusions: Revision TKR after a primary UKR requires less bone graft, fewer augments, restores the joint line more frequently and gives improved functional results over revisions after primary TKR.
Fifty-seven revision total knee arthroplasties were performed in our hospital using the TC3 system between 1995 and 1997. Twelve patients died. Forty-five patients were followed up for an average of 5.6 years (range 4 – 7 years). No patients were lost to follow-up.

All patients were clinically and radiologically evaluated. A postal patient satisfaction questionnaire was completed. Two patients were revised; one for infection and one for instability. Survivorship using revision as the end point was 93.3% at 7 years.

Indications for revision were infection(4;9%), instability(38;84%), pain and stiffness(3;7%). 32(71%) patients were satisfied with their outcome, 7(16%) were noncommittal and 6(13%) were disappointed at 5 years. We have analysed the 13 dissatisfied patients and highlight the lessons learnt.

Pain and stiffness are not good indications for revision.
Insert thickness of more than 17.5mm is suggestive of elevation of the joint-line. Instead the femoral component should be distalised.
Step wedges should be used in preference to angular wedges.
Always long stem the tibial implant if augments are used.
Stems should be canal filling with adequate grip on the diaphysis.

We suggest the above lessons we have learnt from our initial revision arthroplasty learning curve may correlate to the clinical outcome of this small group of dissatisfied patients.
PIGMENTED VILLONODULAR SYNOVITIS AROUND THE KNEE JOINT. OUR TWELVE YEAR EXPERIENCE FROM A TERTIARY ONCOLOGY AND ARTHROSCOPIC
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Aim: The aim of this study was to identify the presentation, management and outcomes this rare disease using the large series of patients treated at our unit.

Material and Methods: We reviewed the medical records and x-rays of all the patients who were referred – treated for PVNS around the knee joint between 1990 and 2002.

Results: 42 patients totally were treated or had second opinion for PVNS disease. 37 have been analysed in detail.

Their mean age was 33 years old and 11 patients were below 17 years of age. There was a predilection for females with 22 (59.5%) out of 37 patients. There was average 3.3 years period of time with swelling/knee symptoms before diagnosis.

The MRI scan was the cornerstone for the patient’s assessment. It has proved useful in recurrent disease and posterior “Bakers cyst” disease. 2 of the patients had been managed with arthroscopic synovectomy alone, 10 patients have undergone simultaneous arthroscopic synovectomy combined with open excision of any “Bakers cyst” disease.

10 had “open synovectomy”. 3 patients have had radiotherapy. 3 patients have had TKR. Complications included 3 superficial wound infections, 1 DVT, 1 PE, 1 stress fracture after radical bone curettage, common temporary/refractory stiffness (needing physio/MUAs). Recurrence was high and managed with repeat arthroscopic synovectomy.

Conclusion: PVNS is a rare disorder with typical monoarticular involvement affecting most commonly the knee joint. MRI and biopsy is the golden standard for the establishment of diagnosis and often needs a combined approach with arthroscopic and open posterior cyst excision. Radiotherapy is helpful in aggressive cases. TKR is suggested when there is associated articular erosion. The patient should be warned about the long course of treatment and often multiple procedures because of high recurrence rates.
Aims: To ascertain the efficacy of viscosupplementation with Supartz intra-articular knee injections when used in the absence of a specific protocol for its use.

Methods: Retrospective cohort study using data from a dedicated injection clinic, patient case notes and knee radiographs. Patients received the therapy in the absence of a protocol for its use. Patient's age, gender, symptoms, walking ability, presence of deformity, medication history, previous injection or surgical intervention, physiotherapy, co-morbidity, date of presentation, delivery of course of supartz injections and indication were recorded. Knee radiographs were analysed using Kellgren and Lawrence grading system. Pain relief and avoidance of surgical intervention (when surgery was an option) were the outcome measures.

Results: 965 intra-articular injections in 193 courses of supartz therapy were given in 143 patients. 45.6% were male and 54.4% were female patients. At presentation, 33.2% patients were able to walk <1/2 a mile, 35.2% patients 1/2-1 mile and 31.6% >1 mile. Radiological assessment (using Kellgren and Lawrence grading) showed 2 cases with stage 1 disease, 83(43%) with stage 2, 102(52.3%) with stage 3, and 6 cases with stage 4 disease. The medial compartment was involved in 185 cases (95.9%), the lateral compartment in 44 (22.8 %) and patellofemoral joint (PFJ) was involved in 122 (63.2 %).

Pain relief was obtained in 84/193 cases (43.5%). In 122 cases where the aim was to avoid surgery, this was achieved in 52 cases (42.6%). Success rate decreased with increasing severity of disease (Fisher's Exact test; p<0.01). Only 25/122 cases with PFJ involvement had pain relief (21%), compared to 59/71 cases without PFJ involvement (83%), (Chi squared test; \( \chi^2(1) = 71.57, p<0.01 \)). Younger age (<60 years) is a poor prognostic factor (Chi squared test; \( \chi^2(1) = 5.86, p=0.02 \)).

Conclusions: Younger patients and those with PFJ involvement and advanced disease are unlikely to benefit from Supartz intra-articular injection. We consider it inappropriate to use this therapy in the absence of a protocol for its use.
VISCOSUPPLEMENTATION - WHO'S IT FOR?
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Purpose: To determine which patients respond best to viscosupplementation injections for osteoarthritis of the knee.

Methods and Results: We undertook a prospective study of all patients undergoing Hylan G-F 20 injections in the knee recording the indication, severity of symptoms, baseline demographic details and the WOMAC score. Outcome data was collected at 3, 6 and 12 months at an independent telephone interview to determine if patients were improved, the same or worse, and by postal WOMAC score.

100 patients were studied. 3 records were excluded, as there was no follow-up recorded. The demographics on 97 were: mean age 67 (range 37-91), male 56%, mean duration of symptoms 8.8yrs and primary OA in 65%.

Overall 43% were improved at 3 months, 31% at 6 months and 29% at 12 months. When the results were analysed according to indication, patients with 'moderate non-mechanical osteoarthritic symptoms after failed medical management and not severe enough for arthroplasty' did best (49% at 3 months and 38% at 6 months). Patients with 'persisting arthritic symptoms after attempted arthroscopic debridement for mechanical type knee symptoms' had less predictable results (42% improved at 3 months and 23% at 6 months). Patients with 'severe or deteriorating symptoms while awaiting knee replacement' or who were 'too medically ill for TKR' had a low rate of improvement (18% at 3 months).

Conclusion: Viscosupplementation is unreliable in patients with end stage OA awaiting TKR. This study allows for better targeting of this useful expensive treatment modality.
A BLINDED RANDOMISED CONTROLLED BIOMECHANICAL STUDY OF THE MATERIAL PROPERTIES OF HUMAN MENISCAL ALLOGRAFTS, COMPARING THREE DIFFERENT PROCESSING TECHNIQUES

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Introduction: Meniscal Allograft Transplantation is gaining popularity as a potential treatment option for the painful meniscus-deficient knee. Fresh allografts can be used, but worries exist regarding the potential for disease transmission. Furthermore, fresh grafts can only be kept for a maximum of about 2 weeks prior to implantation, which makes the formation of a banked store of grafts infeasible. Thus, various processes are available for the sterilisation and storage of human meniscal allografts.

Aims: To assess whether different processing techniques have any significant effect on the material properties of human meniscal allografts prior to transplantation.

Methods: Human meniscal allografts attached to the tibial plateau were obtained by the East Anglia Tissue Services Unit. Three processing techniques were investigated: fresh freezing to −80°C with gamma irradiation, chemical sterilisation of fresh grafts with 70% ethanol followed by freezing to −80°C, and cryopreservation.

Paired left and right tibial plateaus with menisci from 22 donors were obtained. Each sample from the pair was randomised into one of the processing techniques. Specimens were stored at the tissue bank and then sent to Imperial College in identically appearing coded packaging to be tested.

Multiple samples from each meniscal allograft were prepared for tensile and compressive testing. Tensile stress to failure, tensile stiffness, compressive stiffness and creep were determined using a materials testing machine. The values for each randomised blinded pair of samples were compared.

Results: Statistical analysis showed that there were no significant differences in any of the material properties measured between frozen-irradiated, frozen chemically treated, or cryopreserved grafts.

Conclusions: The functions of the menisci are dependent on their material and mechanical properties. The same must also be true for meniscal allografts. This study failed to demonstrate any significant differences between the tensile or compressive material properties of grafts prepared by three different common processing techniques. However, the testing situation represents the initial properties of graft tissue prior to implantation. Further studies are necessary to investigate how the material properties of various allograft types may alter with time in-vivo after implantation.
WHAT REALLY HAPPENS DURING THE LACHMAN TEST? - A DYNAMIC MRI ANALYSIS OF TIBIO-FEMORAL MOTION

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Background: Lachman’s test is the most reliable clinical test for diagnosing rupture of the anterior cruciate ligament. The relative contributions of the medial and lateral sides of the knee during this anterior translation of the tibia are not known. This study addresses this issue.

Hypothesis: From our knowledge of the kinematics of the normal knee we believe the lateral side of the ACL deficient knee contributes more than the medial side to anterior tibial translation.

Methods: Lachman’s test and the radiological Lachman’s test were performed on ten patients with isolated rupture of the anterior cruciate ligament while the knee was scanned dynamically using open-access magnetic resonance imaging. The amount of movement in the mid-medial and mid-lateral compartments of both the contralateral normal knee and the ACL deficient knee was measured.

Results: In both normal and ACL deficient knees the lateral compartment contributes more than the medial to anterior translation of the tibia (p<0.001). Rupture of the ACL leads to increased laxity in both medial and lateral compartments with a statistically significant greater contribution from the lateral side. (p<0.0001)

Conclusion: Rupture of the ACL leads to increased anterior tibial translation coupled with tibial internal rotation.

THE SHEFFIELD EXPERIENCE OF PATELLOFEMORAL JOINT REPLACEMENTS

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Introduction: Patellofemoral joint replacement is one of the treatments for osteoarthritis that is isolated to the patellofemoral joint. There are published results for survival of 65% at six years. The experience of this arthroplasty in Sheffield is not known and this study was an attempt to review the results to date.

Methods: Theatre records were scrutinised to identify all patients who had had a patellofemoral replacement arthroplasty. Patient notes and x-rays were reviewed. A questionnaire based on the Knee Society Score was sent to all patients.

Results: Fourteen patients were identified. Twelve replied to the questionnaire (86%). These 12 patients had 14 patellofemoral replacements. There were 3 males and 9 females. The median age was 63.5 years (range 47 to 71) and the median follow-up was 18 months (range 6 to 24). There have been 6 revisions including tracking correction, fat pad excision and conversion to total knee replacement. Median pain scores were 21.5 (range 5 to 25, possible scores 5 to 25), median mobility scores were 26.5 (range 16 to 44, possible scores 12 to 60) and median scores for overall satisfaction were 14 (range 3 to 14, possible score 3 to 15); high scores represent poor performance. 3 patients felt that their pain was better than before surgery and 6 that pain was rarely or never better than before surgery. 4 would have surgery again and 6 would not recommend this operation to others.

Conclusion: Achieving predictable results with the patellofemoral joint replacement arthroplasty in terms of patient satisfaction appears to be difficult; many still report high pain levels postoperatively and the revision rate is high. Most revisions are for problems with tracking.
We reviewed the outcome of 133 primary cemented Scorpio total knee arthroplasties implanted into 123 patients over a period of four years with a mean follow up of 34 months (range, 24-47). During the review period, 8 patients died and 10 patients were lost to follow up (18 knees). The mean Knee Society score post operatively at review was 89 (range, 70 to 100). The mean functional score at review was 85 (range, 66 to 100). The mean range of motion at review was 105 degrees (range, 90 to 125). Radiolucent lines greater than or equal to 1mm in width were present in 5 (4%) of the femoral views, 9 (8%) of the tibial AP views, 4 (4%) of the tibial lateral views and 3 (3%) of the patellae. Osteolysis was not observed in any of the views and there was no evidence of progression of the radiolucent lines.

There were two revisions; one because of an early deep joint infection and one due to aseptic loosening secondary to trauma. The clinical and radiographic results with a minimum two year follow up show very satisfactory results. The single AP and ML radius of curvature provides results, which compare well with other cemented arthroplasties in the short term.

**THE BIOMECHANICAL PROPERTIES OF A TECHNIQUE FOR RECONSTRUCTION OF THE ANTERIOR CRUCIATE LIGAMENT IN A PORCINE KNEE MODEL**

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Aims: The aims of this study were to evaluate the biomechanical properties and mode of failure of four methods of fixation of hamstring anterior cruciate ligament (ACL) grafts. The fixation methods investigated included titanium round headed cannulated interference (RCI) screws, bioabsorbable RCI screws, Endobuttons and Bollard fixation. A 2-strand equine extensor tendon graft model was used because a previous study has shown it to have equivalent biomechanical properties to that of 4-strand human semitendinosus and gracilis tendon grafts.

Method: Thirty-two stifle joints were obtained from skeletally mature pigs, the soft tissues were removed and the ACL and PCL were sacrificed. Tibial tunnel preparation was standardised using the Mayday rhino horn jig to accurately position a guide wire over which an 8mm tunnel was drilled. A 2-strand equine tendon graft was then introduced into the tibial tunnel and secured with either a titanium RCI screw, a bioabsorbable RCI screw, an Endobutton or an expansile Bollard. The proximal part of the graft was attached to the crosshead of a materials testing machine using the Soffix. Five of each method of fixation were tested mechanically to ultimate failure and under cyclical loading.

Results: The mean ultimate tensile loads (UTL) were: titanium RCI screw = 444 N, bioabsorbable RCI screw = 668 N, Endobutton = 999 N and Bollard = 1153 N. The mode of failure for all RCI screws involved progressive tendon slippage past the screw. Under cyclic loading conditions the titanium and bioabsorbable RCI screws rapidly failed after several hundred 5 to 150 N cycles due to tendon damage and slippage. Both the Bollards and Endobuttons survived 1500 cycles at 50-450N, with less tendon slippage.

Conclusion: Titanium and bioabsorbable RCI screws provide poor initial fixation of tendon grafts used for ACL reconstruction and fail rapidly under cyclic loading. Both Bollards and Endobuttons provide sufficiently high UTL's and survive cyclic loading to allow early postoperative mobilisation and rehabilitation. Caution must be used in the early postoperative period when using interference screws to secure a hamstring tendon graft because early progressive tendon slippage may result in excessive graft elongation and early clinical failure.
A GAIT ANALYSIS STUDY OF PATIENTS WITH POSTERIOR CRUCIATE LIGAMENT AND POSTERO-LATERAL CORNER DEFICIENCY
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Aim: To study the differences in gait and muscle activation around the knee in posterior cruciate ligament and postero-lateral corner deficiency and normal controls using computerised gait analysis.

Method: Gait analysis was performed on 20 patients with posterior cruciate ligament and postero-lateral corner deficiency. This include kinematic and kinetic analysis and electromyography of quadriceps, hamstrings and posterior calf muscle groups.

Results: An adduction moment through stance was a common finding. Many patients also abnormal and premature contraction of the hamstrings and gastrocnemius muscles. Quadriceps activation was within normal limits. The results were correlated with functional knee scores.

Conclusion: This study provides a useful baseline for future studies in patients with PCL/PLC deficient knees and will provide a useful baseline for assessment of gait normalisation following reconstruction. The findings may improve physiotherapy programs in such patients.

TOTAL KNEE ARTHROPLASTY IN A PATIENT WITH GAUCHER DISEASE
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Gaucher Disease (GD) is an autosomal recessive lysosomal storage disease with a highly variable clinical spectrum. We report a unique case of total knee arthroplasty (TKA) due to periarticular fractures and degenerative changes secondary to Type I GD.

A 55-year-old gentleman with a history of GD presented with an acutely painful, swollen left knee and exercise tolerance of 100 yards. He previously had a splenectomy, multiple rib fractures, bilateral hip replacements and significant osteoporosis secondary to GD, which was managed with analgesia, enzyme replacement infusions (Cerezyme®) and blood transfusions.

Examination revealed tenderness over the left tibial tuberosity and lateral tibial plateau, 15° fixed varus deformity, range of movement of 0-100° and marked crepitus. Radiographs showed a 3 x 2.5 cm lytic lesion in the tibial metaphysis and a collapsed lateral tibial plateau with cortical fractures of the tibia and femur, confirmed by CT. MRI showed marrow replacement and extravasation of marrow into the suprapatellar pouch. CT guided biopsy confirmed the presence of Gaucher cells.

Following initial treatment with analgesia and a knee brace there was progressive, intolerable pain and recurrent haemarthroses. A total knee replacement was performed using a posterior stabilised knee with stem augmentation on the femoral and tibial sides. He subsequently made a full recovery. We present the pre, intra and post-operative management of this rare condition.
A SURGICAL PLANNING TOOL FOR PATELLOFEMORAL DISTAL REALIGNMENT
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The aims of this study were to develop a patient specific computer model of the patellofemoral joint in order to plan tibial tubercle transfer surgery and then to test the model on datasets of clinical cases. The program is currently based on a 2-D model of the patellofemoral joint. Three transverse MR images are used to get patient data. One image is through the quadriceps to give the direction and relative magnitudes of the forces from these. Another image is taken through mid-patella to get the surfaces of the patella and the femoral trochlear groove. A third image is taken through the tibial tubercle in order to get the direction of the patellar tendon force. The program has facilities for tracing the boundaries of different structures in the images manually and interactively. The model includes the forces from the quadriceps muscles and the patellar tendon plus contact forces between the patella and the femur. Cartilage compression is used to make the patella deformable. Ten datasets of pre and post operative MRIs were taken from subjects undergoing this surgery and the output used to quantify patellar contact forces. The model was found to be easy to implement, yet there are some issues concerning the description of the mechanics of the joint which need to be addressed.

COMPRESSION OF THE BONE BLOCK IN PATELLA AUTOGRAPH CRUCIATE LIGAMENT RECONSTRUCTION: A CONTROLLED STUDY
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Aim: To investigate the effect of bone block compression on the initial fixation strength of bone - patellar tendon - bone grafts secured with an interference screw.
Method: 14 bovine phalanx / tendon units were split to yield matched pairs of bone blocks with tendon. For each matched pair, 9mm and 11mm diameter cylindrical blocks were prepared. The 11mm block was compressed, reducing its diameter to 9mm.

Each pair of blocks was mounted in 10mm diameter tunnels in the same specimen of metaphyseal bone, and secured with 25mm interference screws. The constructs were tested to failure.

Results: Mean load to failure in uncompressed group was 267N, in compressed group was 113N, p<0.05 (paired t test).

90% of the uncompressed group failed by bone block pullout, while 80% of the compressed group failed by bone block fracture. Four pairs were excluded due to tendon slippage.

Conclusion: In this study, bone block compression reduced fixation strength by 58%. The reduction in strength was largely due to brittle fracture. The authors caution against compressing bone in ligament reconstruction.
DOES TIBIAL TRAY ALIGNMENT TO THE FEMORAL PROSTHESIS MATTER IN A TOTAL KNEE ARTHROPLASTY? A CONSENSUS OF OPINION FROM BASK
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We wanted to determine the opinion of BASK members concerning how they orientated the tibial tray to the femoral prosthesis of a TKR and why they chose that position?

An anonymous questionnaire was sent to 200 fellows of the BOA who were also members of BASK. We asked if they rotated or neutrally aligned the tibial tray to the femoral prosthesis. Was this done with the knee flexed or extended and what reference points did they use to achieve it?

80 members responded to the questionnaire. 60 (75%) placed the tibial tray in neutral to the femoral prosthesis. 24 (30%) placed the tray in neutral with an extended knee, while 36 (38%) did this with the knee flexed. 20 (25%) rotated the tray to the femoral prosthesis and all achieved this with the knee flexed. There were numerous reasons why they chose a position, and on the reference points for tray positioning.

A literature review revealed that there was no evidence to suggest the optimum alignment between the tibial tray and the femoral prosthesis. There was little evidence to indicate the effect of malalignment between the tibial and femoral prostheses on the on the tibio-femoral and the patello-femoral joints. There was some evidence to suggest that the chosen tibial tray alignment should be positioned with the knee in extension. There was no evidence to suggest that anatomical landmarks afforded sufficient accuracy to position the tray.

We concluded that on such a fundamental and important issue in TKA, there was a lack of information to answer these questions and that this was reflected in the wide range of responses from the BASK members. We felt that this issue required further research.

AN ASSESSMENT OF PATIENT EXPECTATIONS OF KNEE ARTHROPLASTY IN LEICESTER
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Aims: The aim of this study was to assess the patient expectations of TKR in Leicester and investigate if they varied with demographic factors.

Methods: A Hospital for Special Surgery Knee Replacement Expectations questionnaire was mailed to all 252 patients awaiting TKR in Leicester.

Results: 201 completed questionnaires were returned (80%). With increasing age, expectations of walking distance (p<0.05), earning capability (p<0.001), exercise ability or sports participation (p<0.05), interaction with others (p<0.001) and sexual activity (p<0.001) were lower. Men's expectations of walking distance (p=0.028), recreational activities (p=0.041), exercise ability or sports participation (p=0.0039) and sexual activity (p=0.01) were higher. Women's expectations on improving the ability to perform daily activities were higher (p=0.034). The relief of all pain (p=0.027), the ability to change position (p=0.041) and psychological well-being (p=0.037) were all more important to Asian patients. Patients due to have surgery on their 2nd knee had higher expectations of improving the ability to perform daily activities (p=0.0088).

Conclusions: Expectations varied significantly with age, gender, ethnicity and between the 1st and 2nd operated knee but not diagnosis. Most patient expectations are realistic but expectations vary considerably between patients. It is important to know what each patient expects as unrealistic expectations may lead to disappointment.
SURVIVAL ANALYSIS OF PRIMARY CEMENTED TOTAL KNEE REPLACEMENTS: WHICH DESIGNS LAST?
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Aims: In this study, data from previously published survival analysis life tables of primary total condylar type TKRs has been combined to enable comparison of different design features. In particular, does posterior stabilisation or metal backing of the tibial component improve the longevity of primary cemented fixed bearing condylar type TKRs?

Methods: To be included, the article had to give 5 or more years results of a primary cemented fixed bearing condylar type TKRs including a survival analysis life table. Series performed on selected patient groups were excluded to reduce possible bias.

Results: Survival analysis data from 16 papers (5950 knees) was combined to compare design features. There was no difference in survival between posterior stabilised implants and those that were not or between metal-backed and all-polyethylene tibial components. Those all-polyethylene tibial components that were not stabilised had significantly better survival than metal-backed, non stabilised tibial components and posterior stabilised, metal-backed components (p<0.05) but not posterior stabilised, all-polyethylene components.

Conclusions: Using the currently available literature, posterior stabilisation or metal backing of the tibial component does not improve the longevity of primary cemented fixed bearing condylar type TKRs.

WOUND COMPLICATIONS AFTER MAQUET OSTEOTOMY ARE UNNECESSARY!
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Maquet osteotomy is associated with upto 37% wound complications that can be unnecessary. A consecutive series of 42 Maquet osteotomy performed by a single surgeon between 1990 to 2002 is reported. This osteotomy was performed using a long anterolateral incision. None of the patients had evidence of flap necrosis, wound dehiscence or infection postoperatively. Use of an anterolateral incision with knowledge of the blood supply of the leg has helped us in eliminating the wound complications reported previously in the literature. Identification and preservation of the feeding musculocutaneous vessels on the lateral and medial side help in preservation of the skin flaps. Use of an anterolateral incision reduces the damage to the major lymphatics decreasing the incidence of wound oedema and infection. This approach avoids skin necrosis, wound dehiscence and any plastic surgical procedures or skin releasing incisions.
SEQUENTIAL HIP AND KNEE REPLACEMENT UNDER ONE ANAESTHETIC
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Introduction: For patients to present with a combination of hip and knee pathology is not uncommon. It has been our practice to replace the hip and then the knee in ipsilateral cases. Traditionally this requires two anaesthetics and a delay in rehabilitation. We report a collection of four cases in which both joints were replaced sequentially under one anaesthetic.

Patients and Methods: Between 1995 and 2002 four patients presented to the senior author with disabling osteoarthritis of the hip and Knee. The hips and knee involvement was on the same side in two cases and on opposite sides in the other two. All four patients underwent cemented total hip and knee arthroplasty under same anaesthetic. The hips were replaced first through an anterolateral approach and then the knees. Post operative recovery and rehabilitation were same as for standard total hip and knee replacement.

Results: There were three women and one man. The mean age at surgery was 79 years. The mean anaesthetic time was 3 hours and thirty minutes. The mean blood loss was 2 litres and the mean transfusion requirement was 4 units. The mean in hospital stay was 18 days. All patients were able to walk independently with either an elbow crutch or walking stick at the time of discharge. There were no operative or postoperative complications.

Conclusions: In patients with disabling hip and knee arthritis, immediately sequential hip and knee replacement appears to be a reasonable undertaking.

COST EFFECTIVENESS OF PRE-OPERATIVE AUTOLOGOUS BLOOD DONATION IN TOTAL KNEE REPLACEMENT
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Aims: To investigate whether blood transfusion practice in primary total knee replacement (TKR) was being managed appropriately, and to assess the cost effectiveness of pre-operative autologous donation (PAD).

Methods: A retrospective survey of blood transfusion practice was conducted for all TKR. An analysis of all pre-operative and post-operative haemoglobin concentrations (Hb) was performed. Using Hb concentration of 8 g/dl or 9 g/dl as the transfusion criteria, the total units of blood used, saved or discarded was calculated.

Results: 174 TKR were performed, 84 (48%) patients were transfused. 52 patients (117 units) received allogenic blood, 35 patients (61 units) received PAD blood, 8 patients received both. 60 units (50%) of PAD were discarded. Using a level of Hb of 8 g/dl, 46 patients (69 units) would have received allogenic blood, 22 patients (36 units) would have received PAD blood and 6 patients both. 85 units (70%) of PAD would have been discarded. If the transfusion threshold used were <8 g/dl and <9 g/dl, the potential saving was estimated at approximately £9578 and £6884 respectively.

Conclusions: PAD service is considerably more expensive than allogenic blood. With high percentages of PAD being discarded, the service is not cost effective. Substantial saving can be achieved with a firmer transfusion policy for post-operative patients.
POST-OPERATIVE DRAINAGE AFTER CEMENTED, HYBRID AND UNCEMENTED TOTAL KNEE REPLACEMENT
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Aim: The purpose of the study was to compare the volume of post-operative drainage after cemented, hybrid and un cemented primary knee arthroplasty and when it occurred, to see if this had implications for provision of blood products or the timing of drain removal.

Method: We recorded the total and eight-hourly post-operative drainage of 100 consecutive total knee replacements (33 cemented, 35 hybrid and 32 un cemented).

Results: The cemented, hybrid and un cemented prostheses had mean total drainage of 745ml, 1035ml and 1220ml respectively. The difference in drainage between cemented and both hybrid and un cemented was statistically significant (P<0.05 and P<0.001). A significantly higher percentage of drainage occurred in the first eight-hour period in the hybrid and un cemented groups. Total drainage in the cemented group was lower, but occurred more slowly with a significantly higher percentage of drainage in the 17 to 48 hour post-operative period, when compared with the un cemented group (P<0.05). Within the cemented group, posterior stabilised implants drained significantly more than those with an AP-lipped tibial insert(P<0.05).

Conclusions: This information has implications for planning of blood product usage and timing of drain tube removal.

FLEXION INSTABILITY IN TOTAL KNEE REPLACEMENT
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Aim: The aim of the study was to compare the flexion stability of primary PCL sacrificing total knee replacement using a posterior-stabilised versus a deep-dished implant.

Method: 36 primary posterior-cruciate-sacrificing knee replacements were assessed using posterior stress radiographs in 90 degrees of flexion. 26 knees had deep-dished tibial inserts and 10 had posterior stabilised implants. Comparisons were made between pre and post-operative views, as well as between the 2 types of tibial insert used.

Results: The deep-dished inserts all showed posterior displacement in flexion with a mean of 5.1mm (Range: 2 – 12mm). The posterior stabilised implants had all been displaced anteriorly with respect to the pre-operative position. The mean anterior displacement was 6.7mm (Range: 3 – 12mm). In seven patients, comparison was possible between a deep-dished component in one knee and a posterior stabilised implant in the other. There was a mean post-operative side-to-side difference of 11mm (Range 5 – 21mm). The difference between the translation that occurred in each group was significant (P<0.0001). Spearman’s correlation test showed a high correlation between implant (DD vs PS) and relative position of the tibia.

Conclusions: This study validates a simple new method for flexion stress x-rays and has implications for assessing flexion stability in deep-dished prostheses. It also has implications for the design of posterior stabilised prostheses and wear of the post.
THE SPORTSMANS CORONARY - INJURY TO THE DEEP PART OF THE MEDIAL COLLATERAL LIGAMENT
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Injury to the medial collateral ligament is common. Myasaka (1991) reported an incidence of 29% of all ligament injuries of the knee. The pattern of injury is recognised to be variable with the commonest being injury to the femoral attachment (Tria 1995).

In the past five years of the authors' practice, a variation of this common injury, which does not seem to have been previously reported in the literature, has been frequently seen. No previous description of this injury could be found either in textbooks or in the published literature.

The importance of this injury is that it presents with medial joint line pain and pain on twisting and turning activities which may persist for several months. Examination reveals postero-medial joint line tenderness and an increase in pain on McMurrays testing. The subtle increase in medial ligament laxity is very difficult to detect clinically. MRI examination may be reported as normal. At arthroscopy the medial meniscus can be seen to lift off the tibial plateau on applying a valgus stress to the knee and granulation tissue can frequently be seen underneath the meniscus at the junction of the middle and posterior thirds.

While the outcome is almost invariably good, persisting symptoms may precipitate arthroscopic intervention and unless the specific features of this injury are recognised, the clinician will be none the wiser and unable to give accurate counselling and a precise prognosis, particularly important when dealing with professional sportsmen.

References:-
Tria A.J. Ligaments of the Knee. Publ Churchill Livingstone 1995

THE USE OF THE CENTRAL PORTAL DURING ARTHROSCOPICALLY ASSISTED FOUR STRAND HAMSTRING ACL RECONSTRUCTION
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Error in tunnel placement is the commonest technical problem during arthroscopically assisted ACL reconstruction and usually leads to early graft failure.

The use of a central portal for the arthroscope allows better visualisation of the back of the notch and accurate femoral tunnel placement. In BPTB ACL reconstruction this is not a problem as the scope can be placed through the site of tendon harvest. In hamstring ACL reconstruction access requires an incision through the patella tendon.

To ascertain whether this approach caused any morbidity, 20 consecutive patients attending for their final 6 month review after four strand hamstring ACL reconstruction, were specifically questioned with regard to symptoms at the portal site and then underwent ultrasound examination of the patella tendon.

In all patients a small defect in the patella tendon was identifiable on ultrasound examination, but no patient had any symptoms related to the portal and all patients had returned to pre-injury level of sporting activity.

In conclusion a trans patella tendon central portal may be safely used if visualisation of the back of the notch is difficult using standard portals.
HOW ACCURATE CAN TUNNEL PLACEMENT BE, USING ANATOMICAL LANDMARKS DURING ARTHROSCOPICALLY ASSISTED ACL RECONSTRUCTION
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At operation the anatomical landmarks of a line drawn between the anterior horn of the lateral meniscus and the medial tibial spine and the back of the notch were used to place the tibial and femoral tunnels respectively.

The immediate post-operative x-rays of 100 consecutive patients who had had an ACL reconstruction as part of their surgery (primary ACL, revision ACL and complex reconstructions) attending for review in the authors knee clinic, were taken and reviewed by an independent musculoskeletal radiologist.

The tibial tunnel was regarded as being correct if the tunnel exited on the tibial surface on the edge of the medial tibial spine or between the tibial spines on the AP film and with the back edge of the tunnel 50% of the way between the anterior and posterior aspects of the tibial plateau and the whole tunnel behind Blumenstedt's line on the lateral film.

The femoral tunnel was regarded as being correct if at 11 o'clock for a right knee and 1 o'clock for a left knee on the AP film and the whole tunnel within the posterior third of Blumenstedt's line on the lateral film.

Within the margins of error of measurement all tunnels were in the correct position.

Previously reported studies have suggested that an acceptable rate of error in tunnel placement may be in the order of 5%. This study suggests however that improvements in this figure are achievable.

While correct tunnel placement does not guarantee a successful outcome it does reduces the rate of inevitable failure secondary to technical error.

REVISION TKR WITH THE PFC/TC3 SYSTEM - SEPTIC VERSUS ASEPTIC LOOSENING
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Aim: To assess the results of infection versus aseptic loosening cases when revised using the PFC/TC3 system, and to correlate this with the restoration of joint line height.

Method: 148 patients underwent revision TKR using the PFC/TC3 system. No re-revision cases were included in this series. Data was prospectively collected (using the Bristol Knee Score) pre-operatively and at a mean of 4.2 years post-revision. 31 revisions were for infection and 53 revisions were for aseptic loosening. Measurements of the joint line height were made pre and post-operatively using Figgie's method. The cases were divided into 3 groups: lower by more than 5mm, restored and elevated more than 5mm.

Results: The mean pre-op total score for the infection group was 35/100 and 40/100 for the aseptic loosening group. The total score post-operatively was 67 for the infection group and 73 for the aseptic loosening group. The joint line height was reproduced in 50% of infected cases and in 60% of aseptic loosening cases.

Conclusion: Although the overall results were less satisfactory for the infection revision group, there was no significant difference between the two groups either in total BKS scores or in reproduction of the joint line.
REAMER BREAKAGE IN THE FEMORAL MEDULLA DURING TOTAL KNEE ARTHROPLASTY: SHOULD REAMERS HAVE A FINITE LIFETIME?
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Introduction: Total Knee Replacement is a common procedure, performed daily in operating theatres throughout Europe. Operating sets are sterilised and reused thousands of times leading to eventual fatigue and potential for failure. We present 2 cases of intra-operative breakage of the intramedullary femoral reamer during total knee replacement with different operative solutions.

Case Report 1: During the insertion of a TKR (AGC, Biomet-Merck) the intra-medullary femoral hand reamer broke, leaving a 14cm tip lodged within the femoral isthmus. The broken tip was unobtainable from the exposed distal femur. The patient was redraped and an antegrade 9mm Kuntscher Nail was inserted from the piriformis fossa, pushing the broken tip back into the knee joint. The remainder of the TKR procedure was completed without incident.

Case Report 2: The femoral intramedullary guide rod snapped during insertion of a right TKR (PFC Cruciate Sacrificing, Sigma) for a varus knee with fixed flexion deformity in a known rheumatoid patient. The remaining 8cm fragment of reamer could not be extracted from the canal isthmus and was therefore left in situ. The knee replacement was completed without incident. Preoperative planning had confirmed the absence of hip osteoarthritis.

Figures: Photographs illustrating the broken hand reamer, demonstrating metal fatigue. Radiographs showing the broken reamer tips within the femoral isthmus.

Discussion: Broken implants requiring extraction are common following total hip replacement, however instrument failure is less common in knee arthroplasty. We discuss the operative decisions and techniques used for extraction, together with a review of current literature.

References & Acknowledgements

FEMORAL COMPONENT ROTATION IN TOTAL KNEE ARTHROPLASTY. A COMPARISON OF TWO DIFFERENT TECHNIQUES
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Purpose of study: The purpose of this study was to present the anterior femoral cortical line (AFCL) as a new anatomical landmark to aid the assessment of intraoperative femoral component rotation. The AFCL was compared with an established axis (the anteroposterior (AP) axis or Whiteside’s line) in both a cadaveric and clinical study.

Methods: Two points indicating the AP axis were identified and marked on 50 normal cadaveric femora. The AFCL was identified and marked with a rigid wire secured on the surface and the distal femur was photographed. A perpendicular to the AP axis was drawn on each image and the angle between this line and the AFCL was measured.

68 consecutive patients undergoing total knee arthroplasty for osteoarthritis of the knee were included in the clinical part of the study. After a routine exposure the AP axis was marked on each distal femur. The AFCL was identified and the anterior cortical cut was made parallel to this line. The angle between this cortical cut and the perpendicular to the AP axis was measured with a sterile goniometer.

Results: In the cadaveric study the AFCL was a mean 7.0 degrees internally rotated to the AP axis (SD = 5.1 degrees). In the clinical study in 8 patients it was impossible to draw the AP axis because of dysplasia or destruction of the trochlea by osteoarthrosis. In the remainder the mean difference between the anterior femoral cortical line and the AP axis was 1.5 degrees internally rotated (SD = 1.9 degrees).

Conclusion: The anterior femoral cortical line has been shown in this study to be a useful clinical axis for assessing rotation of the femoral component and is without some of the disadvantages associated with other landmarks.
THE TENSILE PROPERTIES OF MENISCAL REPAIR TECHNIQUES
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Aim: To determine the ultimate strength at failure of three different methods of repairing meniscal tears.

Method: Artificial tears were created in 18 fresh bovine menisci. These were then divided into three groups. Group one were repaired using a single 2-0 Ticron vertical suture. Group 2 were repaired using a single Clearfix meniscal screw. Group 3 were repaired using a single Mitek fastener from the Mitek meniscal repair system. The repaired constructs were then loaded onto a tensiometer and distracted at a rate of 16mm/min. The extension during loading, maximum tensile strength and mode of failure were all recorded.

Results: The single vertical suture failed by breaking at the knot at a mean load of 64.38N and mean extension of 19.91mm. The Clearfix screw failed by pulling out of the peripheral portion of the meniscus. The mean load at failure of the Clearfix screw was 38.06N and mean extension was 17.10mm. The Mitek fastener failed by pulling out of the peripheral meniscus at a mean load of 15.50N and mean extension of 13.87mm.

Conclusion: The single vertical suture failed at higher loads than both the Mitek fastener and the Clearfix screw in the bovine meniscus.

THE X-RAY PACKET TEST FOR THE DIAGNOSIS OF INJURY TO THE POSTERIOR CRUCIATE LIGAMENT
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Purpose: To describe and validate the x-ray packet test for the diagnosis of posterior cruciate ligament (PCL) injury.

Methods and Results: Diagnosis of PCL injury by the detection of posterior sag of the tibia by eye can sometimes be difficult, especially for the milder grades of injury. We describe the use of the edge of an x-ray packet as a straight edge applied against the anterior aspect of the tibia to provide a reference point to help detect posterior sag.

100 consecutive patients attending clinic underwent clinical examination and measurement of both knees. With the knee at 90° and the packet applied to the distal tibia and tibial tubercle, the distance from the packet edge to the lower pole of the patella was measured. When viewed by eye from the side a difference in the degree of sag was only noted clinically when the measured difference was greater than 3mm.

In 10 patients (10%) the difference between the two sides was 4mm or greater. Of these, 6 had anatomical abnormalities affecting the patella or tibial tubercle (eg Osgood Schlatters), 1 had very obese legs making landmarks difficult, and 3 had unrecognised true PCL sag with a history of a compatible injury.

In 12 patients with known unilateral PCL injury the difference in all 12 was 4mm or greater and the difference correlated with the Step-off sign for grading PCL injury.

Conclusion: The assessment of posterior sag can be difficult without a reference line. The x-ray packet test is a useful test for the detection of subtle injury to the PCL. In the absence of previous Osgood Schlatter deformity of the tibial tubercle, a difference of 4mm or greater in the x-ray packet test indicates a high probability of PCL injury.
ARTHROSCOPIC MEDIAL Plication AND LATERAL RELEASE FOR RECURRENT PATELLAR DISLOCATIONS/SUBLUXATIONS: MEDIUM TERM RESULTS
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Aims: The aim of this study is to present a new arthroscopic surgical technique for proximal realignment of patella for recurrent dislocations/subluxations and its medium term results.

Methods: This is a retrospective study reviewing the results of a single surgeon performing a new method of arthroscopic medial plication and lateral release for recurrent patellar dislocations/subluxations. The surgical technique will be described. The patients were reviewed clinically and Lysholm scores were recorded.

Results: 37 patients (38 knees) underwent the procedure during the study period. 2 patients were lost to follow-up. Patients were reviewed with a mean follow-up of 51 months. 83% of patients scored excellent or good using the Lysholm scoring scale, 11% were scored as fair and 6% as poor. In our series complication rate and morbidity overall is much lower than the open operations.

Conclusion: The results reported in our series are comparable with those of the established open procedures. This technique however has advantages in terms of a shorter hospital stay and earlier rehabilitation—which makes it a cost effective procedures. Also resultant scarring is cosmetically acceptable.

IN-VIVO FLUOROSCOPIC ANALYSIS OF THE SAGITTAL PLANE KINEMATICS OF THE ST GEORGE SLED MEDIAL UNICOMPARTMENTAL KNEE REPLACEMENT
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Aim: To study the sagittal plane kinematics of the Avon patello-femoral replacement (Stryker-Howmedica), PTA.

Introduction: Replacement of the patello-femoral joint for end stage osteoarthritis has previously been associated with inconsistent results. Retention of the cruciate ligaments is likely to be important in maintaining normal kinematics and hence improved functional outcome.

Methodology: Twelve patients who had undergone Avon PFR least two years previously were recruited following ethical approval. American Knee Society, Bristol and Oxford knee scores were obtained. Patients performed open chain flexion and extension against gravity, in addition to closed chain step up. Video fluoroscopy of these activities was used to obtain the Patellar Tendon Angle (PTA), which is the angle between the long axis of the tibia and the patella tendon, at specific angles of knee flexion. This is a previously validated method of assessing the kinematic profile of a knee joint. These measurements were used to determine the kinematic profile of each knee and they were then compared to a group of twelve normal knees.

Results: A one way ANOVA revealed no significant differences between the kinematic profile following Avon PFR and that of the normal knee. All patients had good or excellent knee scores.

Conclusion: The kinematic profile after Avon PFR is similar to that of the normal knee. In contrast all TKRs we have studied have abnormal kinematics, which are associated with abnormal patello-femoral joint loading. This suggests that isolated PFR should have a functional advantage over TKR.
ARTHROSCOPIC EVALUATION OF CONCOMITANT INJURIES AFTER ACUTE AND CHRONIC ACL TEARS
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Acute and chronic ACL tears are accompanied by several secondary injuries to other anatomical structures of the knee, especially of the menisci and the cartilage. The purpose of this study was to describe these secondary injuries in a group of young active male patients. This is a retrospective study conducted in a series of 471 male military recruits with acute (76 pts, 16%) and chronic (395 pts) ACL tears. The mean age of the patients was 24.2 years. Most chronically injured patients complained of symptomatic instability but most acutely injured patients reported no instability. All patients underwent arthroscopic knee examination and all secondary injuries were recorded according to a protocol. There was statistically significant difference of secondary meniscal and chondral injuries in the patients with chronic instability compared to those with acute ACL tear.

The results of our study support the concept of early reconstruction of those ACL deficient knees with symptomatic instability.

A NORMOGRAM OF RECOVERY FOLLOWING ACL RECONSTRUCTION - A USEFUL INCENTIVE FOR PATIENTS
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Purpose: To determine the normal rate of recovery of knee function after ACL reconstruction by monitoring the improvement in the Single Leg Hop Test (SLHT) over time.

Methods and Results: The SLHT has been shown to correlate with knee function following ACL reconstruction and is used to provide a guide for return to sport. 75 patients undergoing autograft primary ACL reconstruction using patella tendon or a 4-strand hamstring construct were evaluated at 6, 9 and 12 months post surgery.

The single leg hop test was recorded as the percentage of the distance achieved in a static hop on the post reconstruction leg against the non-operated leg. The best of 3 hops were recorded and patients were instructed to land in control and not to run on.

The graph shows the results at the time intervals and includes the lines for 5th, 25th, 50th, 75th and 95th centile score. Improvement is seen over time though nearly 25% have a hop score below 85% at 1 year.

Conclusion: At the specific follow up points of 6, 9 and 12 months the result of this simple outpatient test can be used against the above graph to determine actual versus expected result allowing for redirection of rehabilitation.
CONGENTIAL DISLOCATION OF THE PATELLA - A MODIFIED OPERATIVE PROCEDURE
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We describe a successful modified operative procedure at an average 19 months follow-up in 3 patients with a rare congenital problem and compare its merits to the other procedures already reported in the literature.

Congenital dislocation of the patella is a rare condition and may be associated with other congenital conditions or syndromes i.e. Down's syndrome, congenital vertical talus and cerebral palsy. Numerous operative techniques have been described in the literature which may be divided into 3 basic groups. A modification of the Langenskiold & Ritsila procedure is described. The original procedure describes an extensive lateral release with detachment and medial transfer of the patellar tendon through a curved incision. The tendon is routed through a fold of synovium medially and fixed distally to bone with sutures through drill holes in the proximal tibia. We found at surgery this synovium was too fragile to hold the transferred tendon and the use of drill holes unnecessary. The main alterations include a limited and straight anterior skin incision, a fashioning of a 'buckle' of the transferred distal patellar tendon to a distally based flap which avoids drill holes in the growing bone. This modification of the Langenskiold procedure was used successfully in 3 cases, including a revision of a failed Goldthwaite- Roux procedure in a mentally handicapped child. The results at average 19 months follow up are successful. The early results confirm that the patella remains located and tracks normally. The valgus and flexion deformities have significantly improved.

This modification of the Langenskiold & Ritsila procedure requires less dissection than other operations, with no bony surgery and a cosmetic scar.

The Langenskiold & Ritsila procedure has been successful and we feel that this modification simplifies and improves on the original technique.