MEDICO-LEGAL ISSUES ARISING FROM KNEE SURGERY

RL ALLUM FRCS

MIDLAND LAWYERS SUPPORT GROUP MEETING

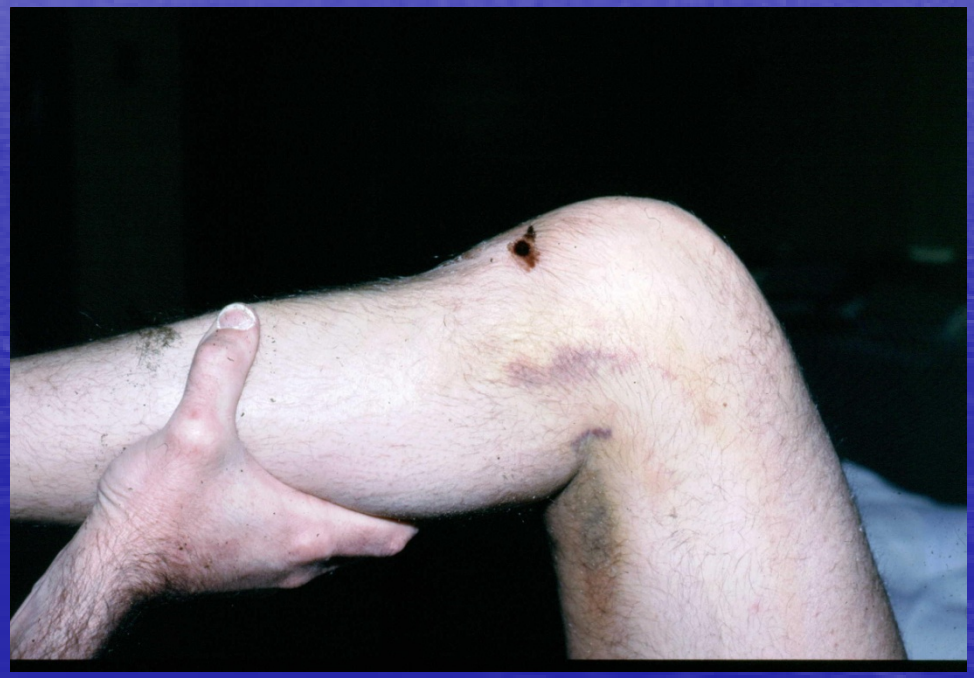
4th FEBRUARY 2014

THE INJURED KNEE
ARTHROSCOPY
ACL RECONSTRUCTION

THE INJURED KNEE

KNEE INJURY

- *HISTORY*
- *EXAMINATION*
- *X-RAY*
- *INVESTIGATIONS*



HISTORY

AGE IMPORTANT

TEENAGER

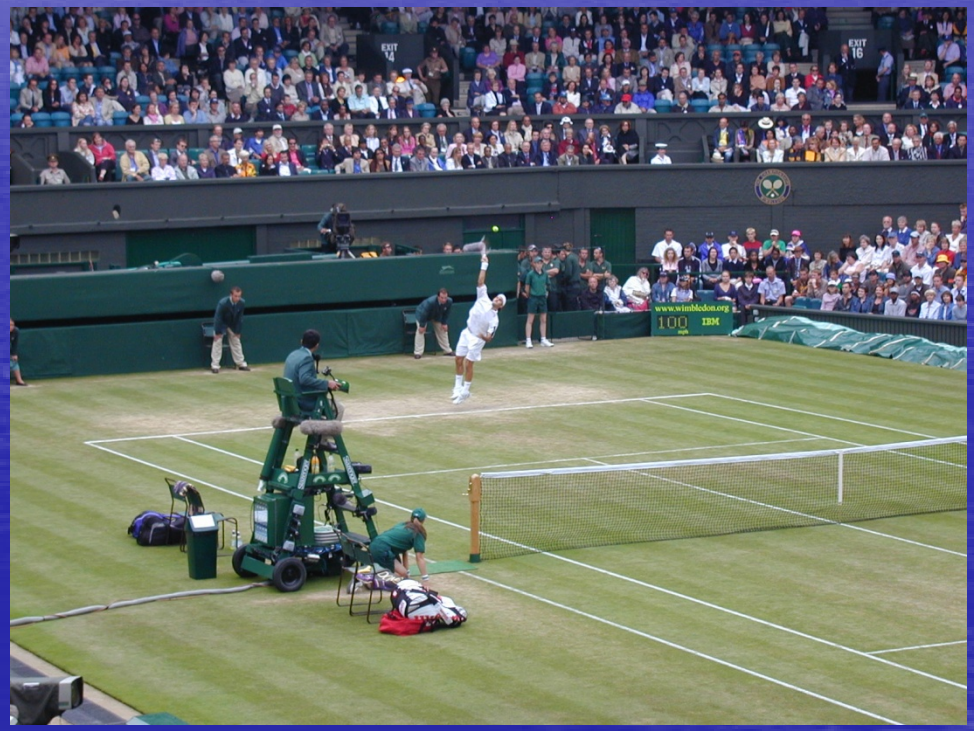
- ***DISLOCATED PATELLA***
- ***OSTEOCHONDRAL FRACTURE***

YOUNG ADULT

- ***TORN ACL***
- ***TORN MENISCUS***

MIDDLE AGED AND ELDERLY

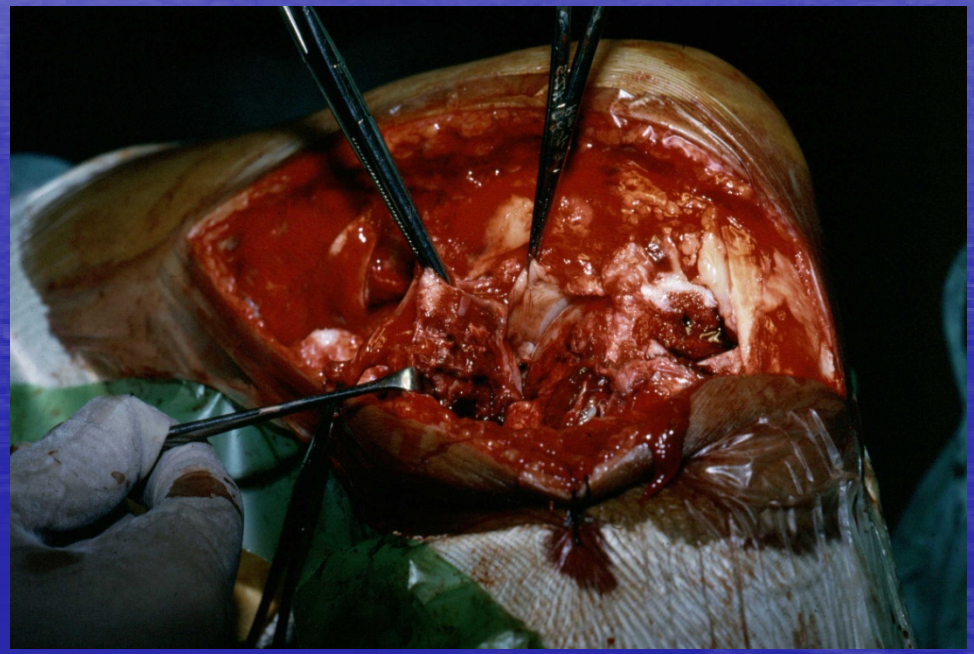
- ***RUPTURED EXTENSOR MECHANISM***



HISTORY

MECHANISM OF INJURY

- *USUALLY ROTATIONAL*
- *OFTEN NON-CONTACT*
- *TEARING OR POPPING*
- *IMMEDIATE PAIN*
- *SWELLING*
- *USUALLY LEAVE THE FIELD*



HISTORY

IMMEDIATE

SWELLING MEANS

BLOOD

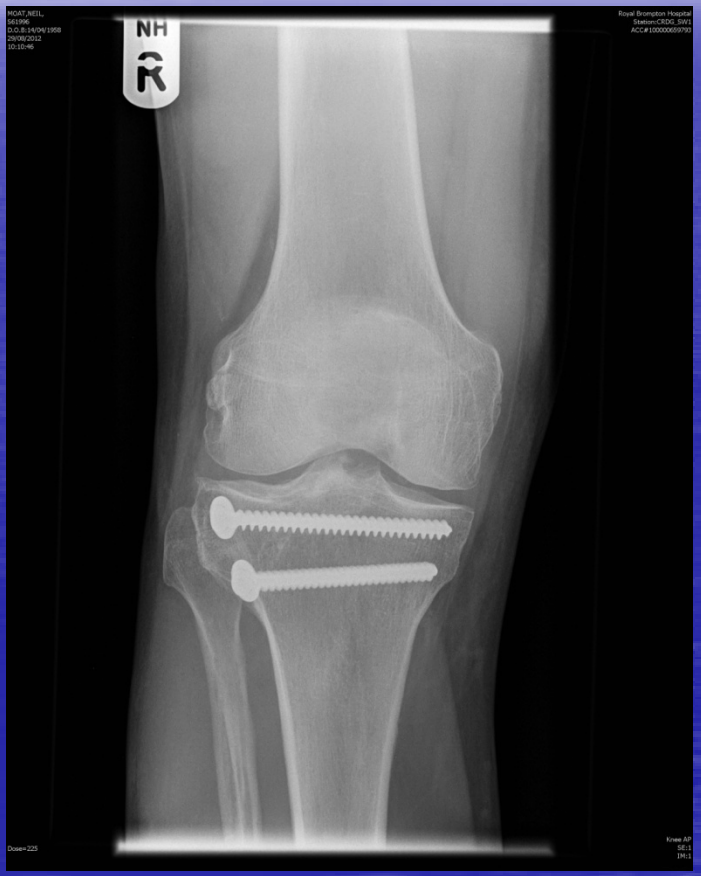
- ***VASCULAR TISSUE***
- ***BONE OR ACL***

OVERNIGHT

SWELLING IMPLIES AN

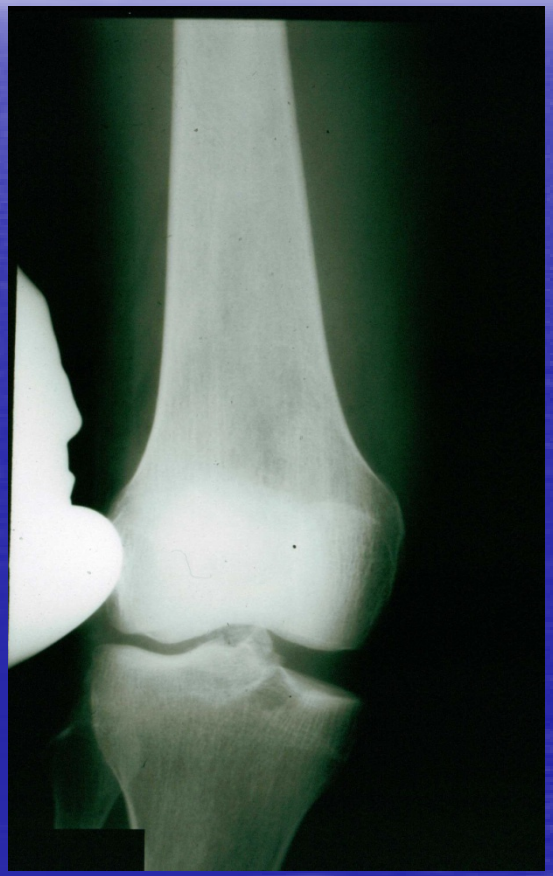
EFFUSION

- ***NON-VASCULAR TISSUE***
- ***MENISCUS***



HISTORY

- *“KNEE HAS NEVER FELT RIGHT”*
- *PAIN*
- *SWELLING*
- *LOCKING*
- *GIVING WAY*
- *TROUBLE FREE INTERVALS*



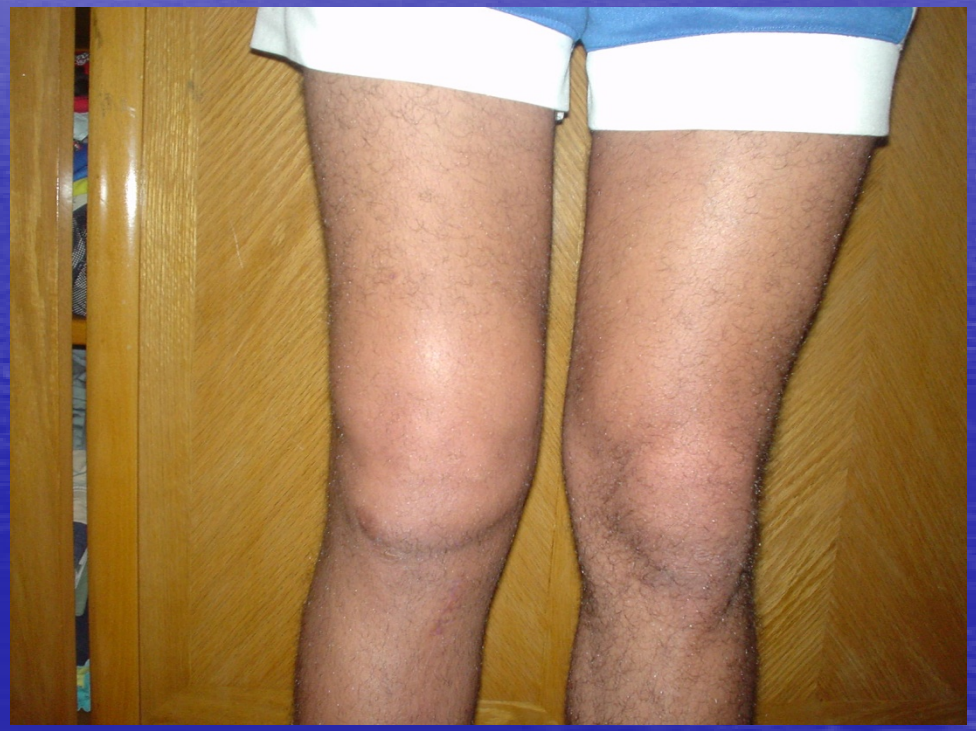
HISTORY

- *PATIENT PROFILE*
- *LEVEL OF ACTIVITY*
- *VERY IMPORTANT IN MANAGEMENT DECISION MAKING*

EXAMINATION

LOOK

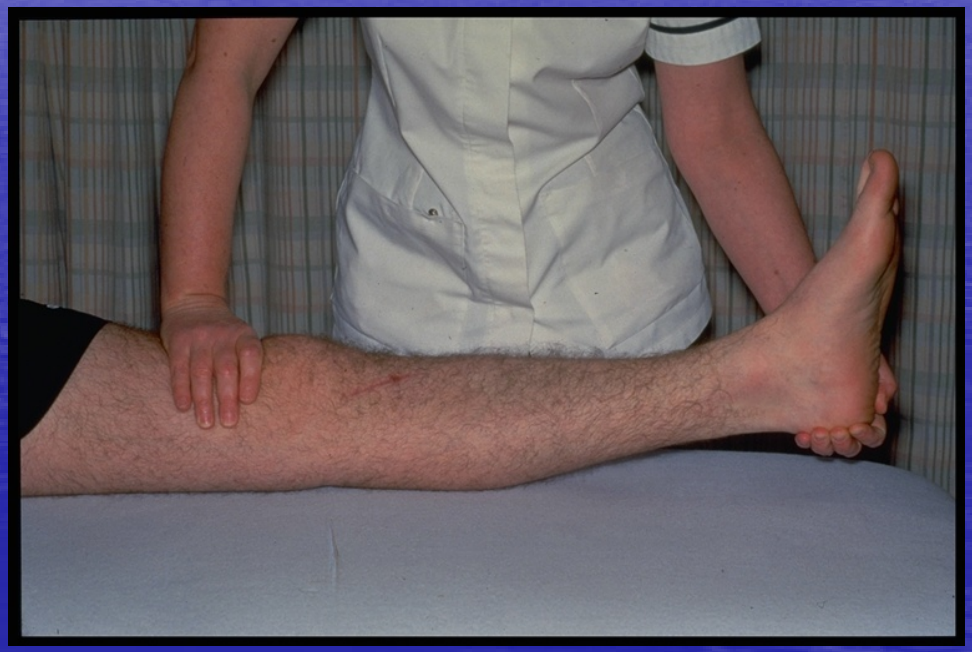
- ***GAIT***
- ***POSITION OF LEG***
- ***SLR***
- ***MUSCLE WASTING***
- ***SWELLING***
- ***BRUISING***



EXAMINATION

FEEL

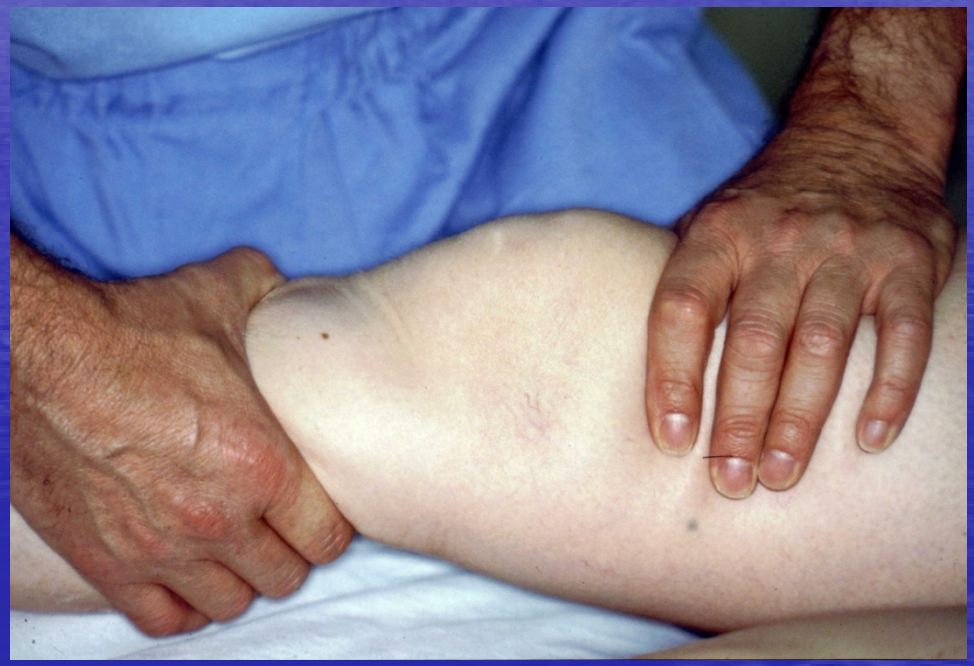
- ***LOCAL TENDERNESS e.g. JOINT LINE***
- ***SWELLING***
- ***INTEGRITY OF EXTENSOR MECHANISM***



EXAMINATION

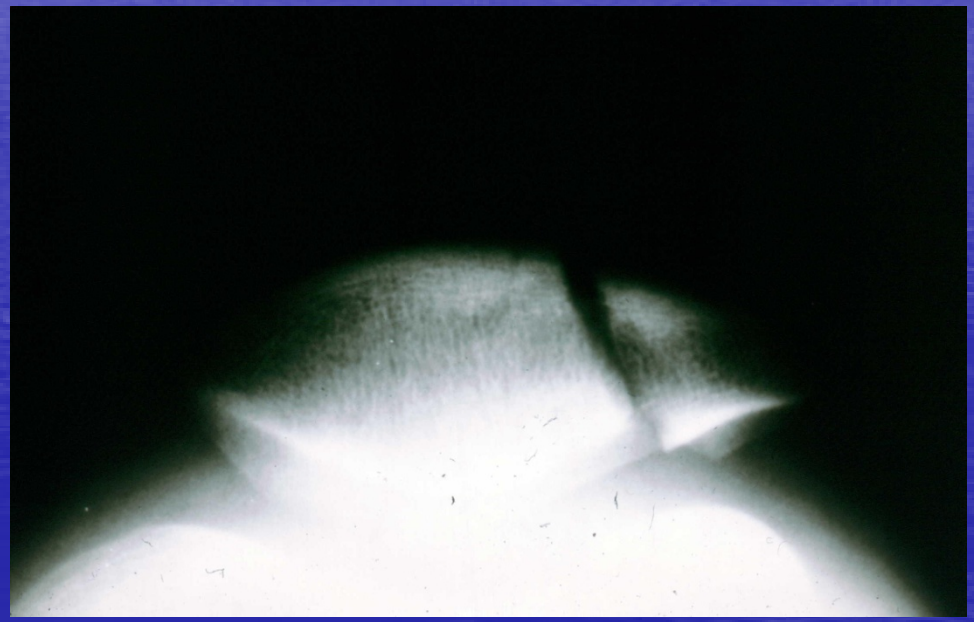
MOVE

- *RANGE OF MOVEMENT*
- *STABILITY COLLATERAL AND CRUCIATE LIGAMENTS*
- *PATELLAR APPREHENSION AND STABILITY*



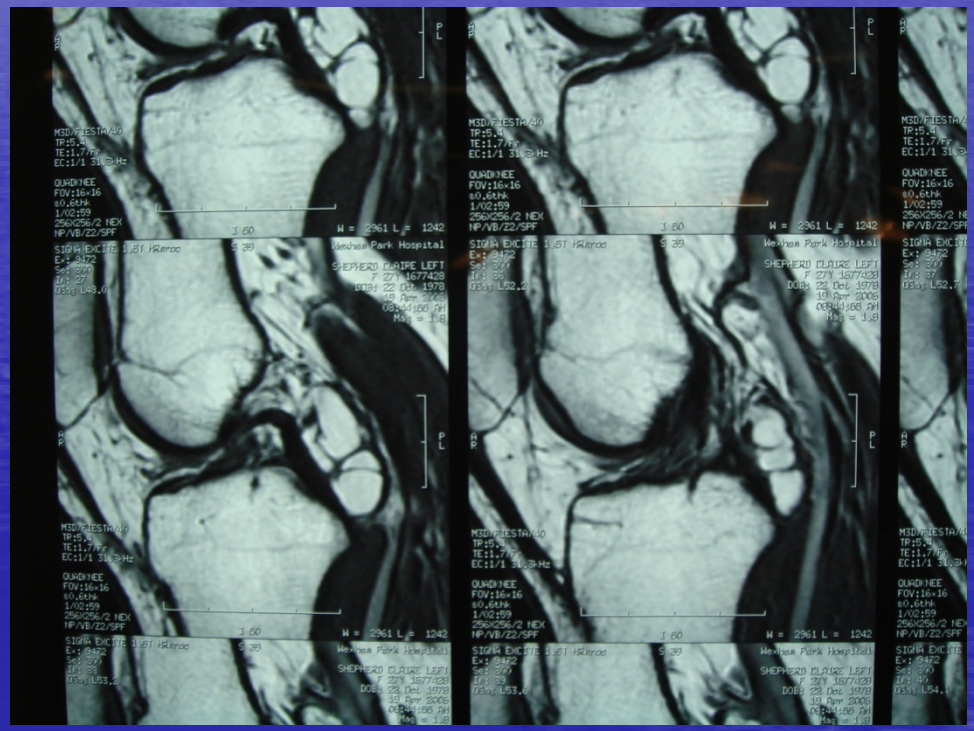
X-RAY

- *AP STANDING*
- *LATERAL*
- *30° SKYLINE*
- *TUNNEL OR ROSENBERG 30° FLEXION*



MRI

- *COMPREHENSIVE ANATOMICAL ASSESSMENT*
- *VERY SENSITIVE AND FALSE POSITIVES NOT UNCOMMON*
- *STATIC ASSESSMENT OF A DYNAMIC PROBLEM*
- *DIFFICULTY IN OBTAINING URGENT SCANS IN UK NHS PRACTICE*



BEWARE PATHWAYS

- *IN MEDICINE THERE IS NEVER A NEVER AND NEVER AN ALWAYS*
- *CLINICAL PRESENTATION NOT ALWAYS SIMPLE AND STRAIGHTFORWARD*
- *EXPECT THE UNEXPECTED*
- *PATHWAYS DO NOT ALWAYS LEAD YOU WHERE YOU WANT TO GO*

DIAGNOSIS AND MANAGEMENT

I was so much older then,

I am younger than that

now

MY BACK PAGES

BOB DYLAN

THE BYRDS 1966

DUTY

- *TAKE A CAREFUL HISTORY FOCUSSING ON MECHANISM OF INJURY*
- *CARRY OUT A CAREFUL EXAMINATION ACCEPTING THAT IN THE ACUTE STAGE NOT ALL TESTS ARE POSSIBLE*
- *INVESTIGATE APPROPRIATELY WITH X-RAY, MRI AND ARTHROSCOPY*
- *MANAGE EACH PATIENT AS AN INDIVIDUAL*
- *NOT EVERYONE NEEDS SURGERY*
- *NON-SURGICAL TREATMENT IS NOT NON-TREATMENT AND MUST BE CAREFULLY PLANNED AND SUPERVISED*

OR

- *DETAILED AND APPROPRIATE HISTORY*
- *DETAILED AND APPROPRIATE HISTORY*
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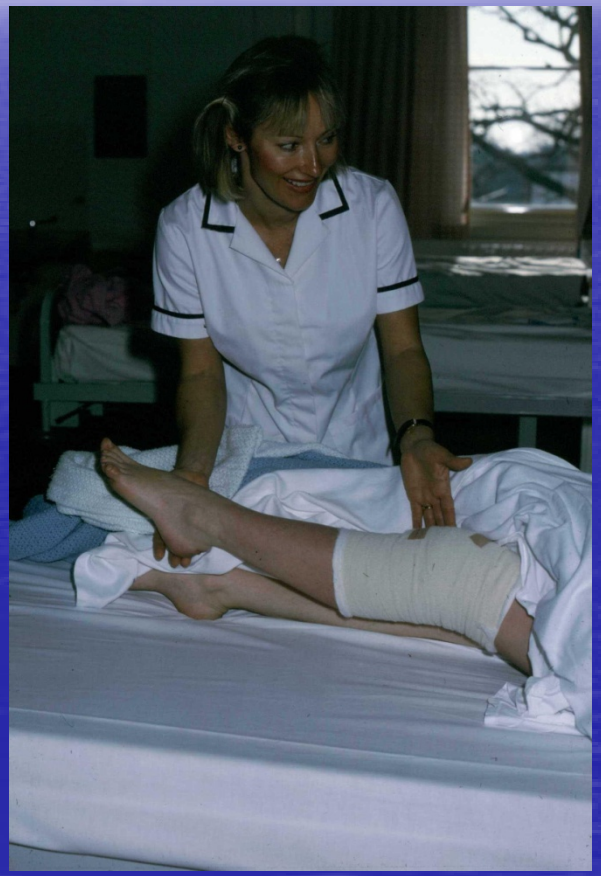
IF ALL ELSE FAILS ASK THE PATIENT!!!

CASE REPORT

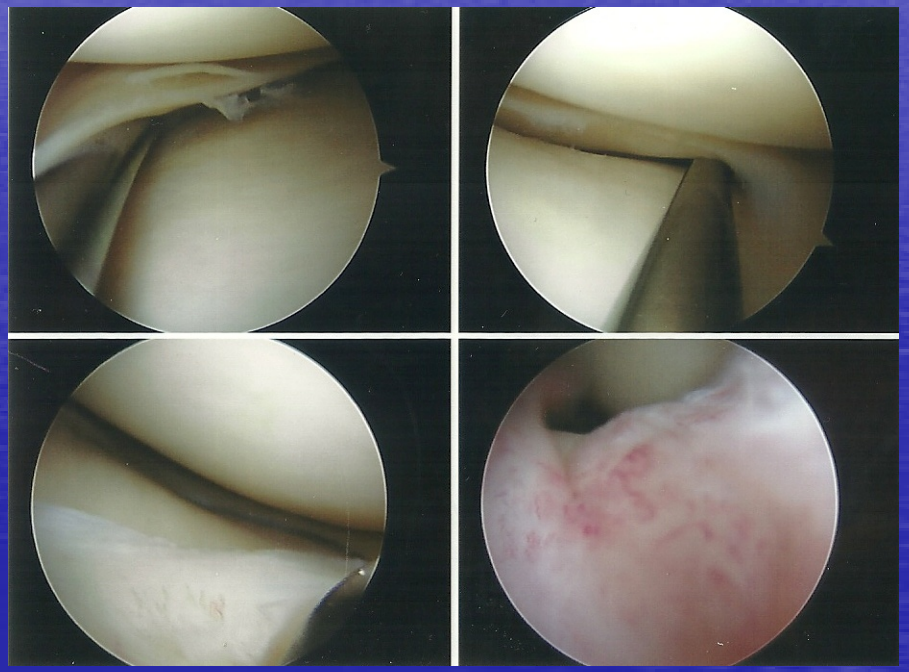
- *MALE 57*
- *SLIPPED ON GRAVEL, KNEE GAVE WAY, ANKLE TWISTED, KNEE HYPERFLEXED, SEVERAL THINGS WENT PING, COULD NOT STRAIGHTEN KNEE AND IT WAS BLACK AND BLUE*
- *SAW GP WHO REFERRED TO PHYSIOTHERAPY*
- *KNEE WOULD NOT STRAIGHTEN SO SAW ORTHOPAEDIC SURGEON 3 MONTHS LATER*
- *MRI SHOWED COMPLETE RUPTURE PATELLAR TENDON*
- *DELAYED REPAIR*



ARTHROSCOPY

COMPLICATIONS OF KNEE ARTHROSCOPY

- ***INFREQUENT BUT PROCEDURE CARRIED OUT IN LARGE NUMBERS SO ACTUAL NUMBER OF COMPLICATIONS POTENTIALLY QUITE HIGH***
- ***MORE LIKELY IN MORECOMPLEX SURGERY e.g. LIGAMENT RECONSTRUCTION, SYNOVECTOMY***



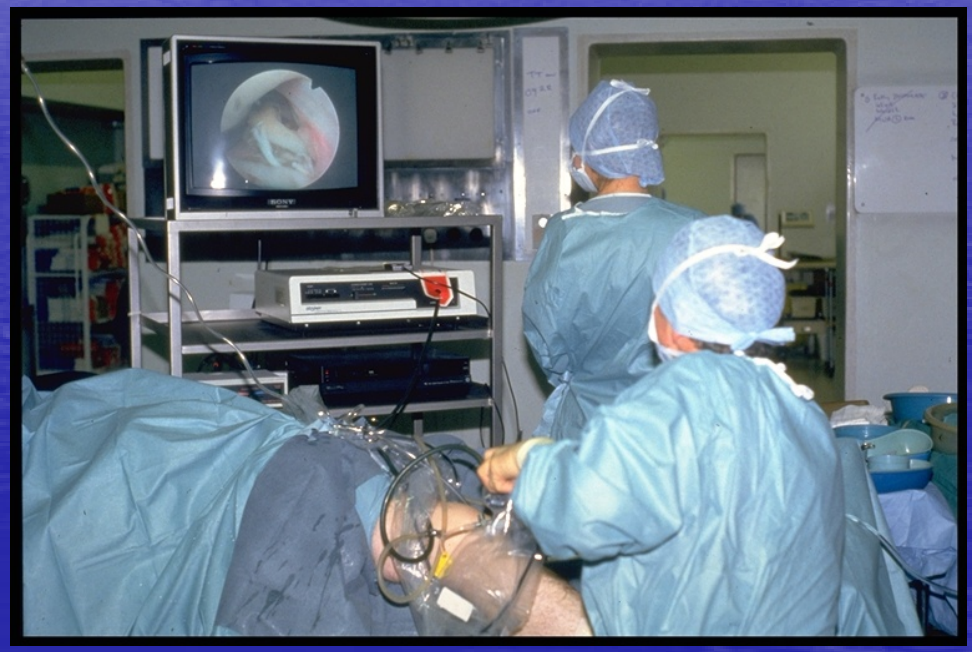
INCIDENCE

- ***DELEE 1985***

  0.8% RETROSPECTIVE
- ***SMALL 1986***

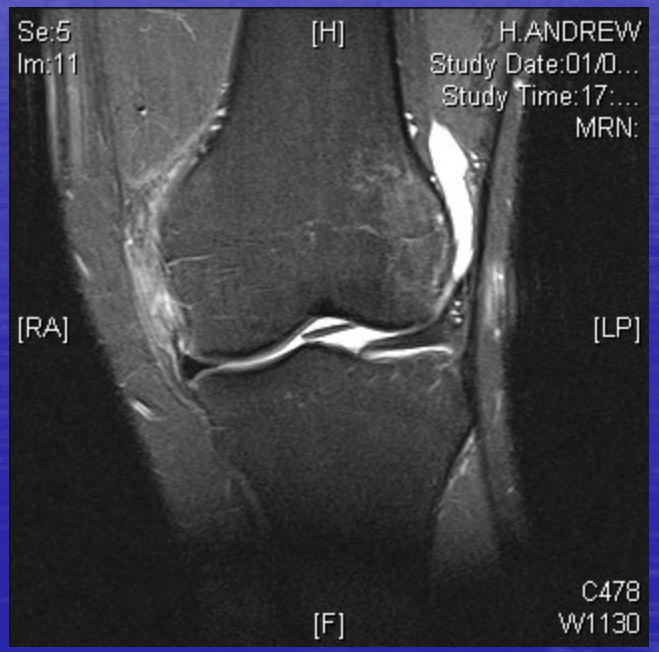
  0.56% RETROSPECTIVE
- ***SMALL 1988***

  1.68% PROSPECTIVE



DIAGNOSTIC ERRORS

- ***ARTHROSCOPY IS NOW A THERAPEUTIC RATHER THAN A DIAGNOSTIC PROCEDURE***
- ***AS FAR AS POSSIBLE A FULL DIAGNOSIS SHOULD BE SECURED PRIOR TO SURGERY***
- ***WITH RARE EXCEPTIONS THE DAYS OF EXPLORATORY SURGERY OF THE KNEE HAVE FORTUNATELY PASSED***
- ***YOU WILL NOT SEE A BONE TUMOUR WITH THE ARTHROSCOPE!***



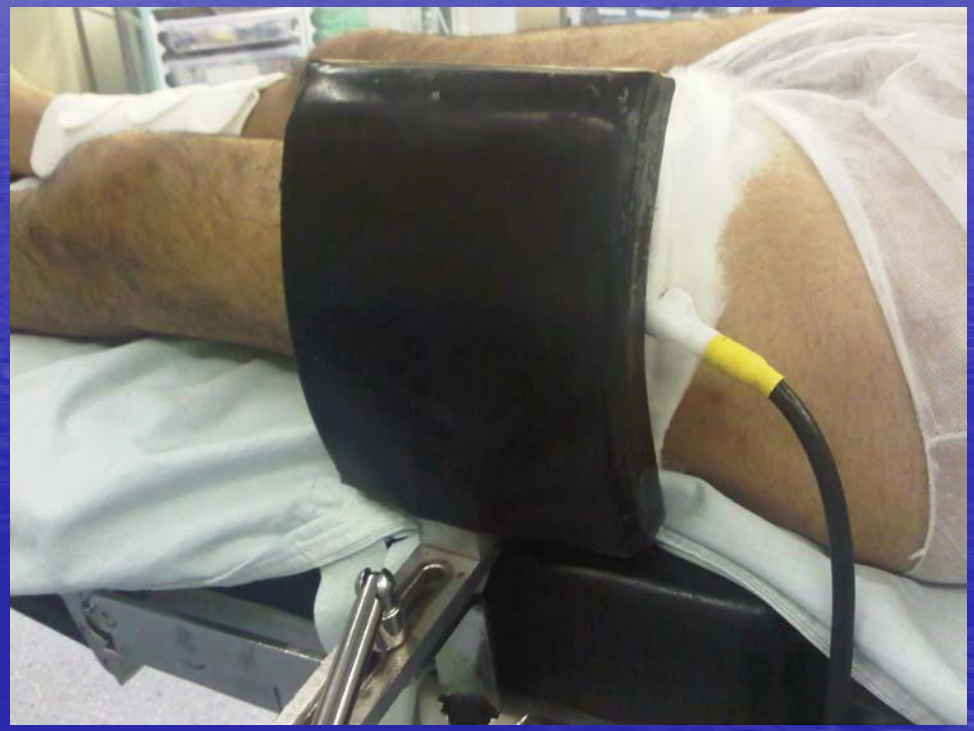
OPERATIVE COMPLICATIONS

POSTOPERATIVE COMPLICATIONS

OPERATIVE COMPLICATIONS

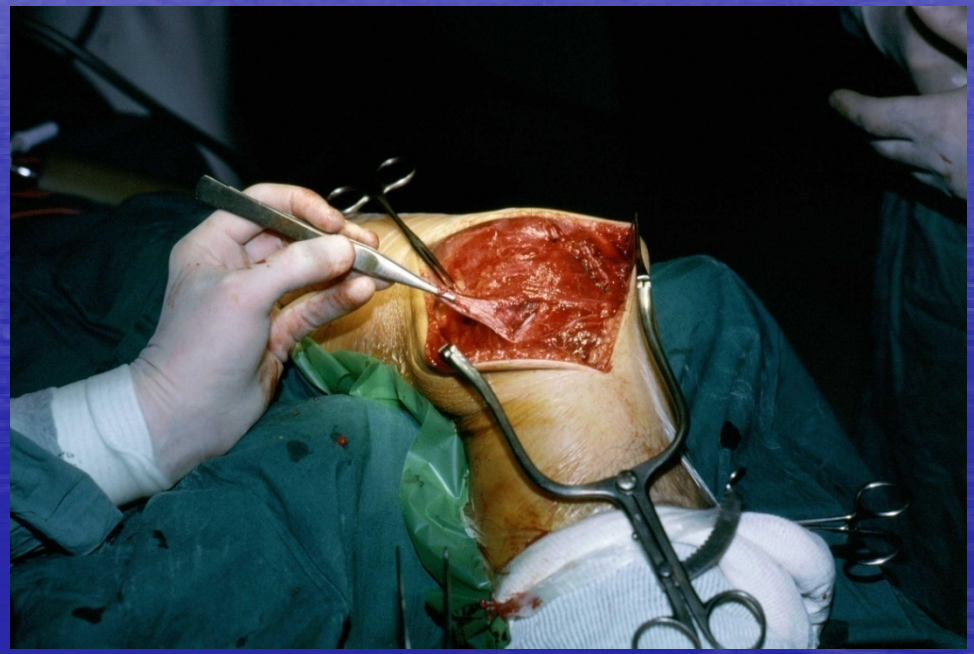
OPERATIVE COMPLICATIONS
MEDIAL LIGAMENT DAMAGE

- *POSTERIOR HORN MEDIAL MENISCUS IN A TIGHT MEDIAL COMPARTMENT*
- *OLDER PATIENT WITH LESS FLEXIBLE TISSUES*
- *USUALLY HEALS SATISFACTORILY*



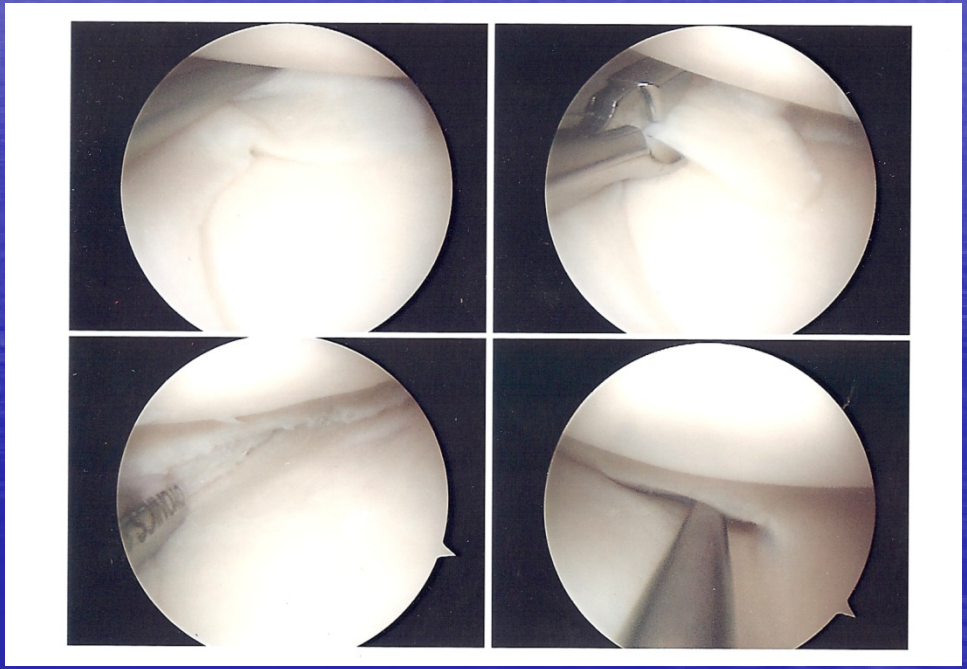
OPERATIVE COMPLICATIONS
COMPARTMENT SYNDROME

- *LEAKAGE OF FLUID INTO THE CALF OR RARELY THE THIGH CAUSING COMPROMISE TO THE CIRCULATION*
- *ISOLATED REPORTS*
- *CAPSULAR DEFECT THEREFORE CARE WITH COLLATERAL LIGAMENT INJURY*
- *PROLONGED PROCEDURE*
- *INCREASED IRRIGATION PRESSURE e.g. PUMP*
- *BLOCKED DRAINAGE*



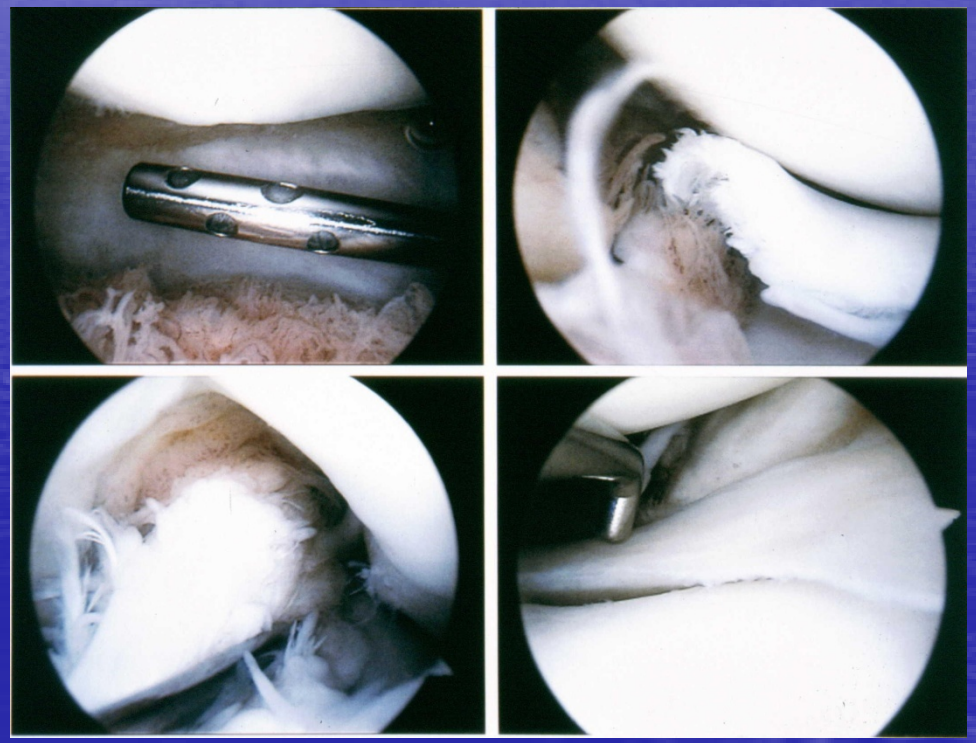
OPERATIVE COMPLICATIONS
INTRA-ARTICULAR DAMAGE

- *CARE WITH PORTALS (INCISIONS)*
- *ALWAYS OPERATE UNDER DIRECT VISION*
- *PARTICULAR CARE WITH POWER INSTRUMENTS*



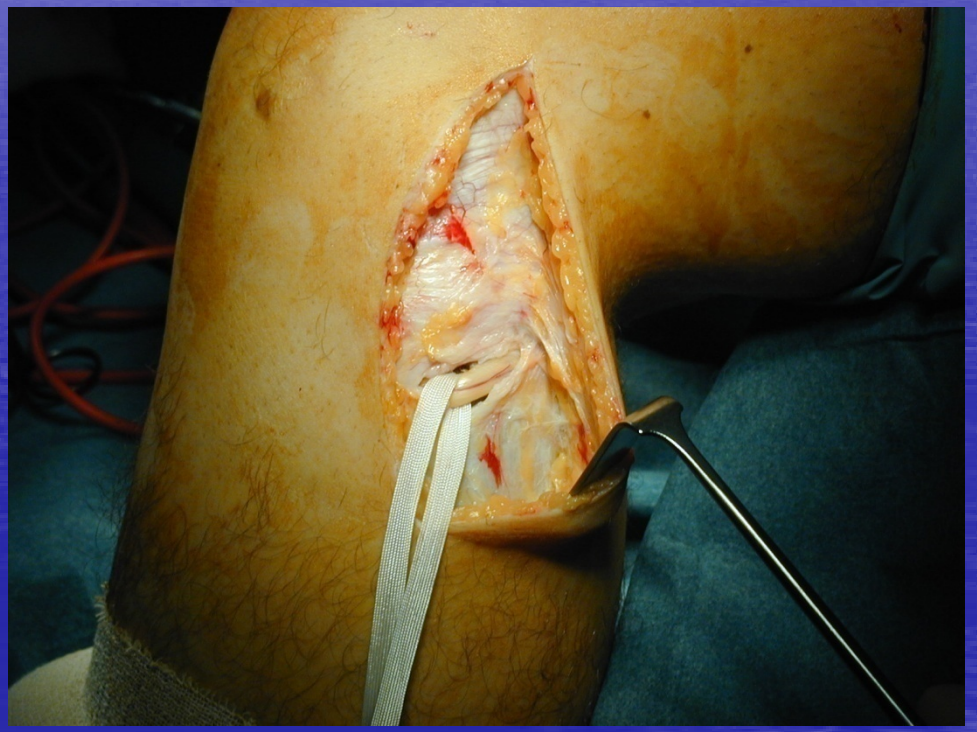
OPERATIVE COMPLICATIONS
INSTRUMENT BREAKAGE

- *LESS COMMON NOW AS DESIGN IMPROVED AND INSTRUMENTS MORE ROBUST*
- *X-RAY MAY BE REQUIRED TO LOCATE*



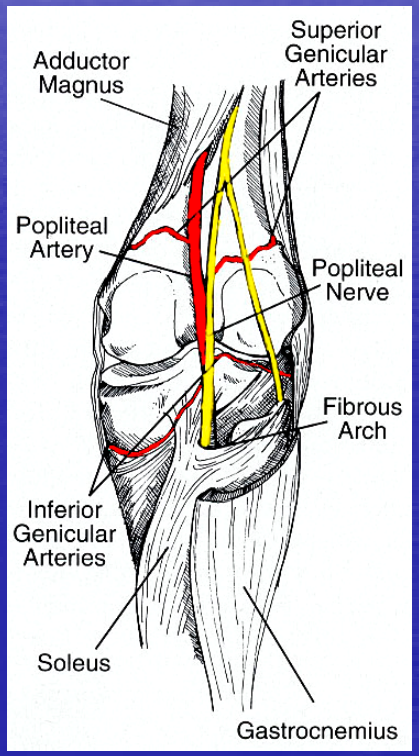
OPERATIVE COMPLICATIONS
NEUROLOGICAL INJURY

- *LATERAL POPLITEAL NERVE MOST VULNERABLE*
- *VERY CLOSE TO THE LATERAL MENISCUS AND MAY BE DAMAGED IN LATERAL MENISCAL REPAIR*
- *LEADS TO A FOOT DROP*
- *RECOVERY UNPREDICTABLE*
- *SENSORY SYMPTOMS DUE TO CUTANEOUS NERVE DAMAGE RELATED TO THE PORTALS ARE NOT UNUSUAL*
- *DO NOT NORMALLY CAUSE A PROBLEM*



OPERATIVE COMPLICATIONS
VASCULAR INJURY

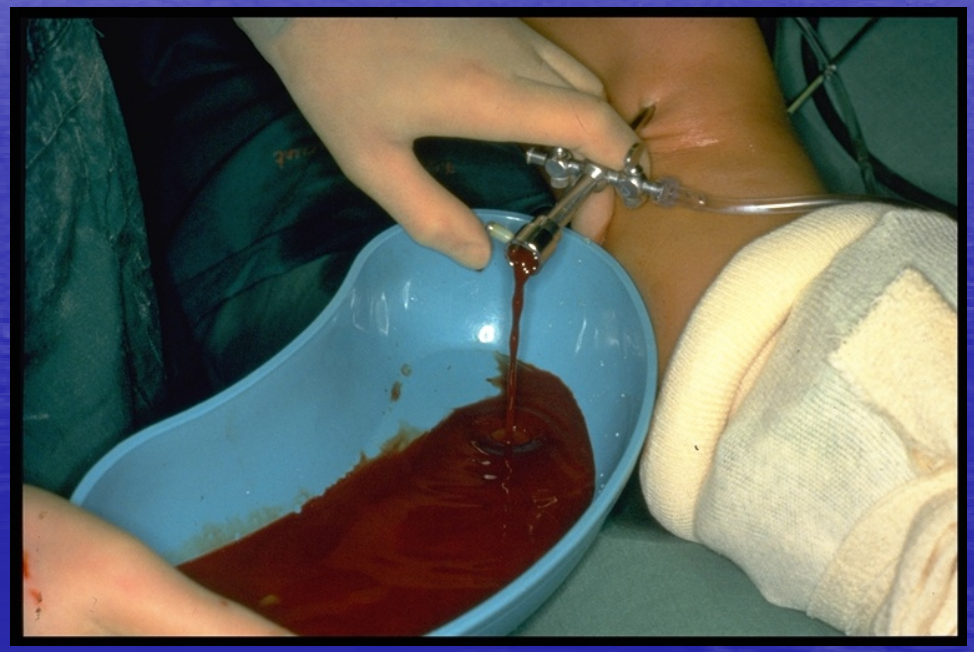
- *POPLITEAL ARTERY VERY CLOSE TO THE BACK OF THE KNEE*
- *EARLY RECOGNITION AND REFERRAL TO A VASCULAR SURGEON MANDATORY*
- *REPAIR UNDER 6 HOURS AMPUTATION RATE 6% AND AFTER 8 HOURS 86%*



POSTOPERATIVE COMPLICATIONS

POSTOPERATIVE COMPLICATIONS
HAEMARTHROSIS

- *APPROX 1%*
- *MORE COMMON AFTER LATERAL RELEASE (BETWEEN 5 AND 42% REPORTED)*
- *WASHOUT IF PAINFUL*

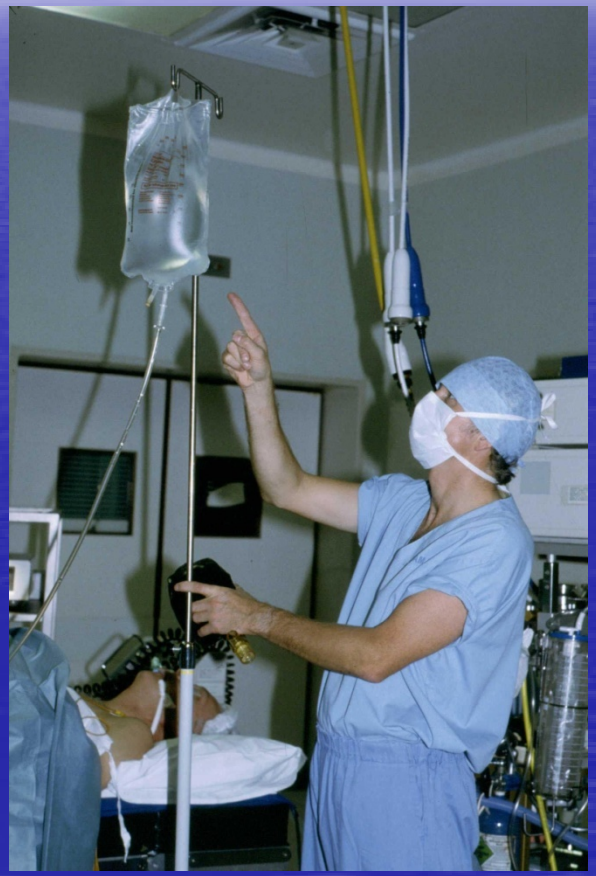


POSTOPERATIVE COMPLICATIONS
THROMBOEMBOLISM

- *LESS THAN 0.1%*
- *CONTINUING UNCERTAINTY*
- *ALL PATIENTS MUST BE ASSESSED*
- *LOW RISK – MECHANICAL PROPHLAXIS AND EARLY MOBILISATION*
- *HIGH RISK – MECHANICAL AND CHEMICAL PROPHLAXIS*
- *STOP PILL*
- *?STOP HRT*
- *?NO LONG HAUL FLIGHT FOR 6 WEEKS*

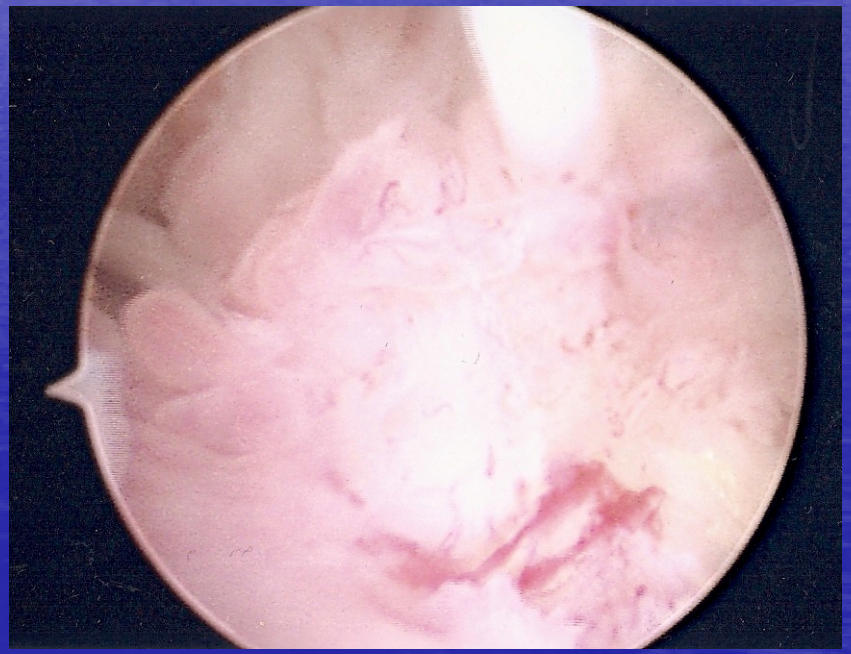
POSTOPERATIVE COMPLICATIONS
INFECTION

- *LESS THAN 0.1%*
- *POTENTIALLY VERY SERIOUS CONSEQUENCES*
- *EARLY DIAGNOSIS AND PROMPT TREATMENT*
- *APPROPRIATE ANTIBIOTICS IN CONSULTATION WITH MICROBIOLOGIST*
- *VIGOROUS EARLY SURGERY IN POTENTIALLY INFECTED CASE WITH COPIOUS WASHOUT AND CONSIDER REPEATING AFTER 48 HOURS*



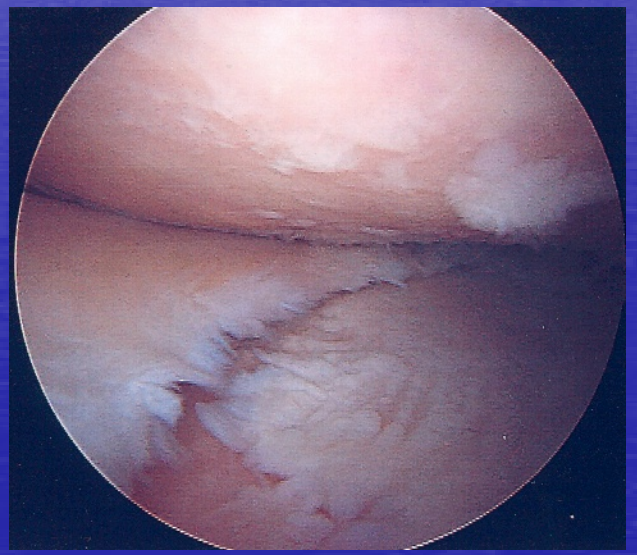
POSTOPERATIVE COMPLICATIONS
EFFUSION AND SYNOVITIS

- *EFFUSION 0 - 15%*
- *POSTOPERATIVE SYNOVITIS CAN BE DIFFICULT TO MANAGE*
- *CONSERVATIVE INITIALLY*
- *FBC, ESR, CRP TO EXCLUDE INFECTION OR INFLAMMATORY JOINT DISEASE*
- *X-RAY*
- *MRI*
- *BONE SCAN*
- *POSSIBLY REPEAT ARTHROSCOPY*



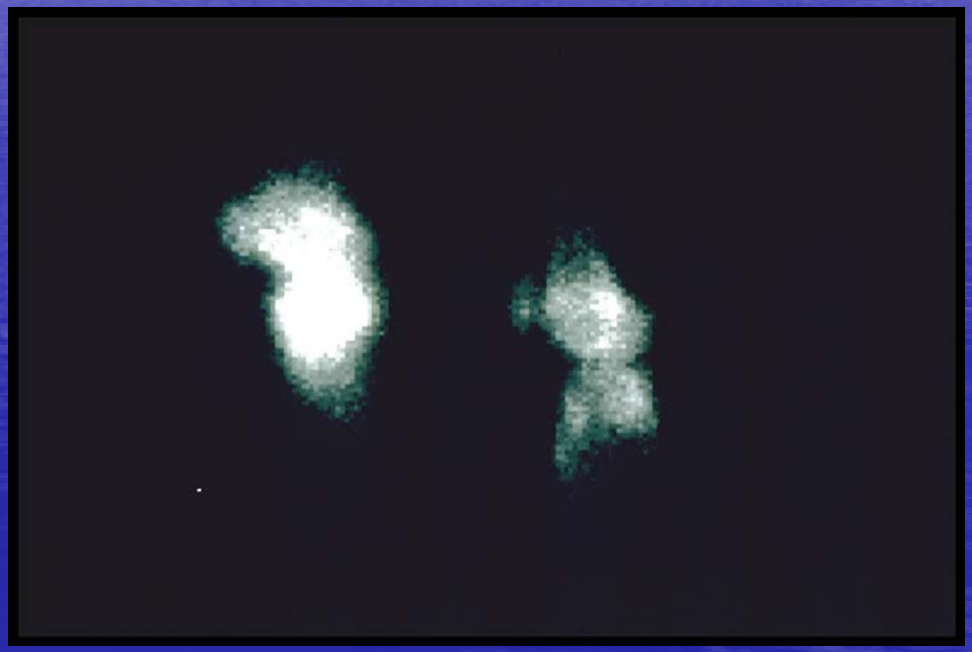
POSTOPERATIVE COMPLICATIONS
SYNOVIAL FISTULA

- *CONTINUED LEAKAGE OF SYNOVIAL FLUID FROM PORTAL*
- *MORE COMMON IN DEGENERATIVE JOINT DISEASE*
- *MORE COMMON WITH POSTERIOR PORTALS*
- *IF FLUID CAN GET OUT INFECTION CAN GET IN THEREFORE ANTIBIOTICS UNTIL THE LEAKAGE HAS CEASED*
- *AGGRAVATED BY MOVEMENT OF THE KNEE THEREFORE REST*
- *NEARLY ALWAYS SETTLES*



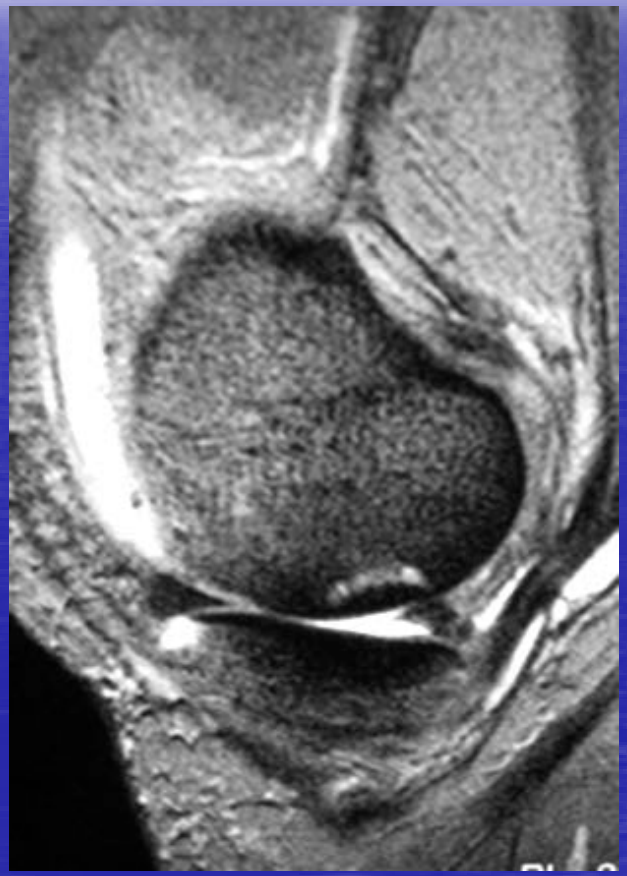
POSTOPERATIVE COMPLICATIONS
COMPLEX REGIONAL PAIN SYNDROME 1

- CONSIDER IN ANY PATIENT WITH UNEXPLAINED POSTOPERATIVE PAIN
- FEMALES 3rd AND 4th DECADES AND PATELLOFEMORAL JOINT
- CLINCAL PICTURE VARIABLE
- DIFFICULT TO DIAGNOSE
- SKIN RED, HYPERSENSITIVE, WARM AND SHINY
- KNEE STIFF
- DEMINERALISATION ON X-RAY
- BONE SCAN SHOWS INCREASED ACTIVITY
- MANAGEMENT BY A PAIN SPECIALIST



POSTOPERATIVE COMPLICATIONS
OSTEONECROSIS

- *CAN OCCUR POST ARTHROSCOPY*
- *CAN BE VERY PAINFUL*
- *MORE COMMON IN ELDERLY*
- *MORE COMMON IN FEMALE*
- *MORE COMMON IN MEDIAL FEMORAL CONDYLE*
- *AETIOLOGY UNCERTAIN BUT POSSIBLY RELATED TO LASER*
- *WISE TO OBTAIN MRI FOR PERSISTENT SYMPTOMS FOLLOWING ARTHROSCOPIC SURGERY*
- *MANAGEMENT DIFFICULT*

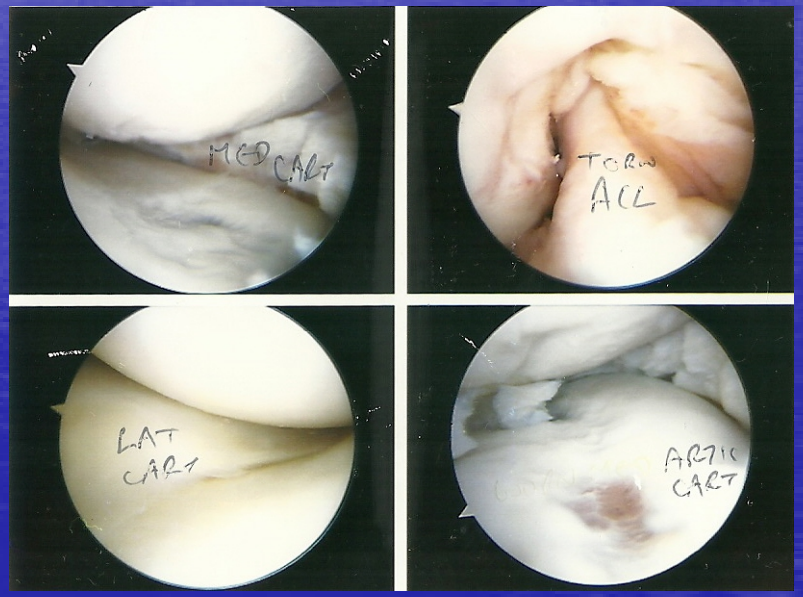


DUTY

- *MAKE EVERY EFFORT TO SECURE A FIRM DIAGNOSIS PRIOR TO SURGERY*
- *CARRY OUT THE SURGERY WITH DUE RESPECT TO THE IMPORTANT ANATOMICAL STRUCTURES RELATED TO THE KNEE*
- *RECOGNISE DAMAGE IMMEDIATELY (OR AS SOON AS IS FEASIBLE) AND ACT APPROPRIATELY*
- *ASSESS FOR THROMBOEMBOLISM RISK AND ACT ACCORDINGLY*
- *TREAT INFECTION FULLY AND VIGOROUSLY*
- *FOLLOW PATIENTS UP UNTIL SUCH TIME AS YOU ARE SURE THAT THEY ARE RECOVERING FROM THE SURGERY SATISFACTORILY AND IF THEY ARE NOT INVESTIGATE ACCORDINGLY*

CASE REPORT

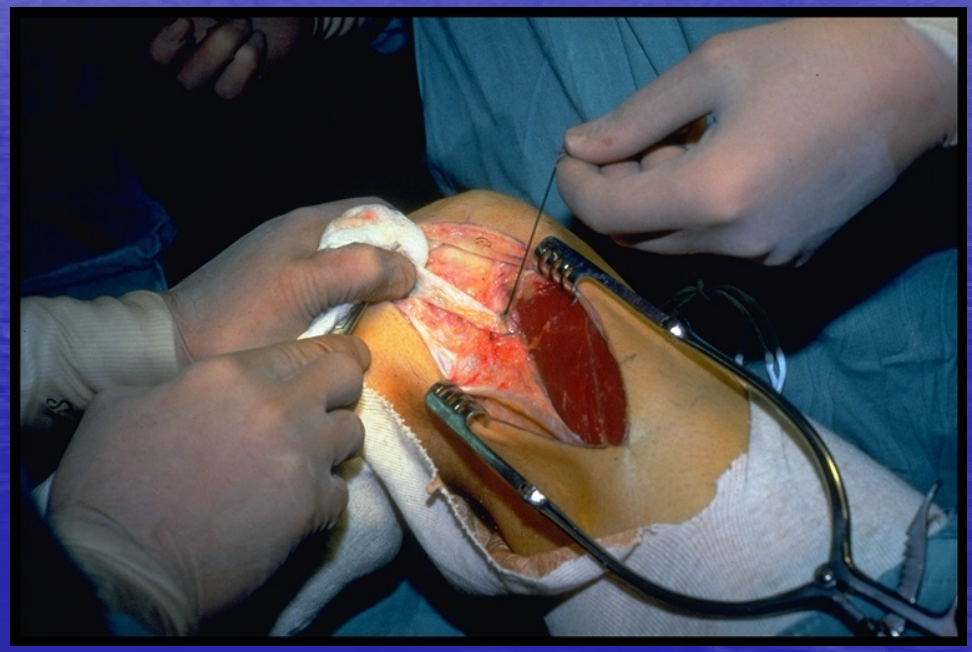
- *FEMALE 39*
- *ARTHROSCOPY AND MEDIAL MENISCECTOMY*
- *DIFFICULT PROCEDURE WITH "TIGHT" MEDIAL COMPARTMENT*
- *SIGNIFICANT ARTICULAR CARTILAGE DAMAGE LEADING TO ARTHRITIS*



ACL RECONSTRUCTION

ACL RECONSTRUCTION 1978

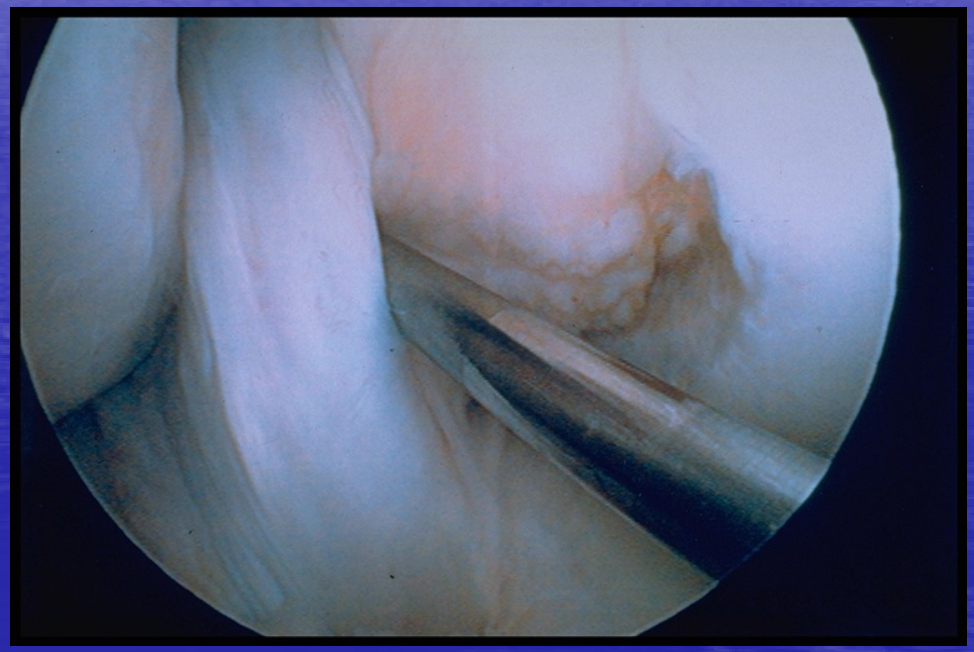
- *RESULTS UNRELIABLE*
- *ONLY IN SEVERE INSTABILITY*



ACL RECONSTRUCTION 2014

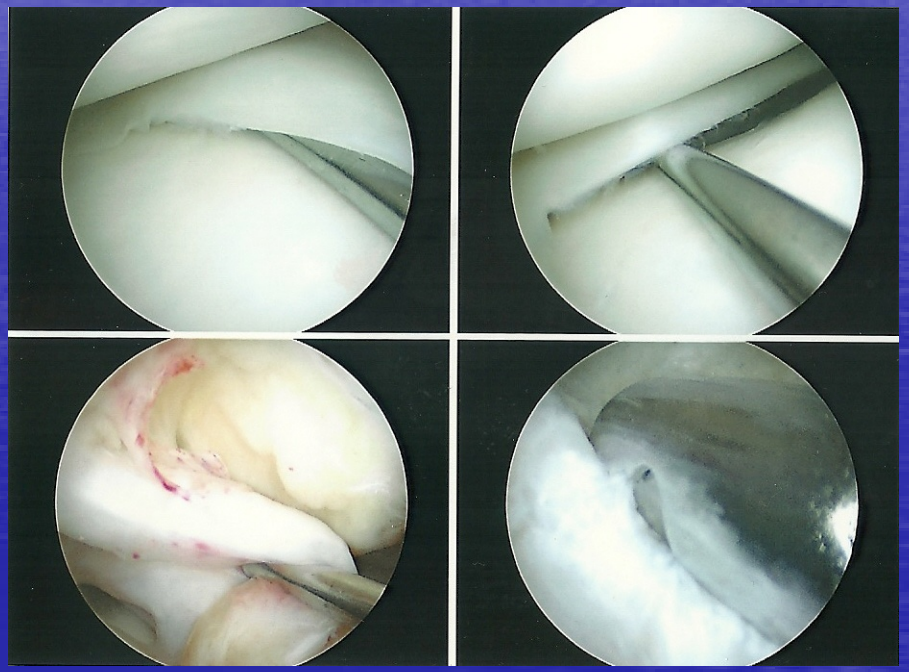
ON THE WHOLE SUCCESSFUL BUT

- ***DIFFICULT AND DEMANDING***
- ***UNFORGIVING AND SMALL ERRORS CAN HAVE A MAJOR EFFECT***



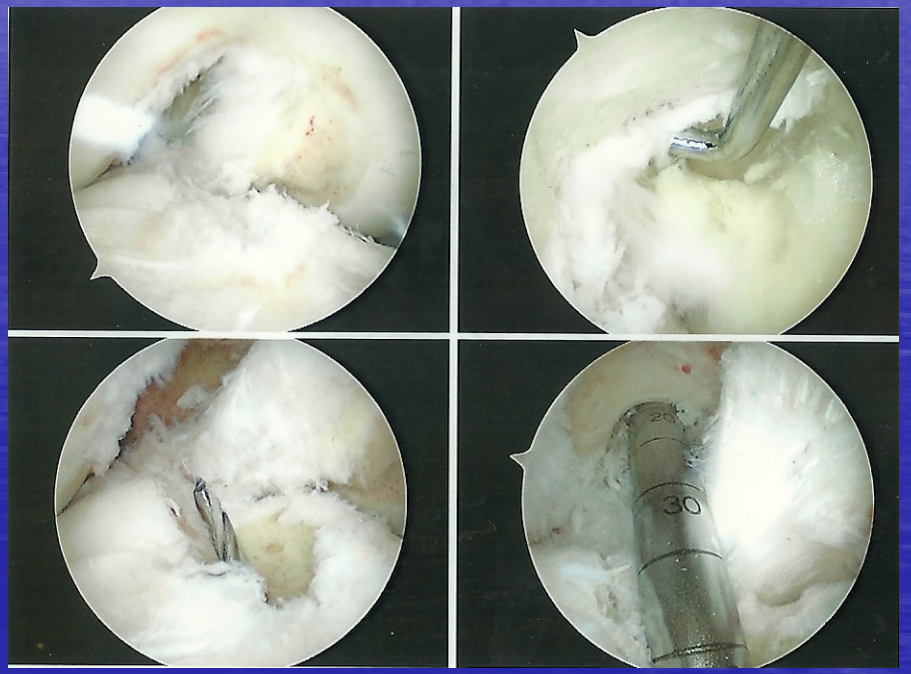
ACL RECONSTRUCTION

- *CHECK MENISCI AND OTHER INTRAARTICULAR STRUCTURES*
- *CONFIRM RUPTURED ACL*
- *REMOVE ACL STUMP AND SCAR TISSUE*



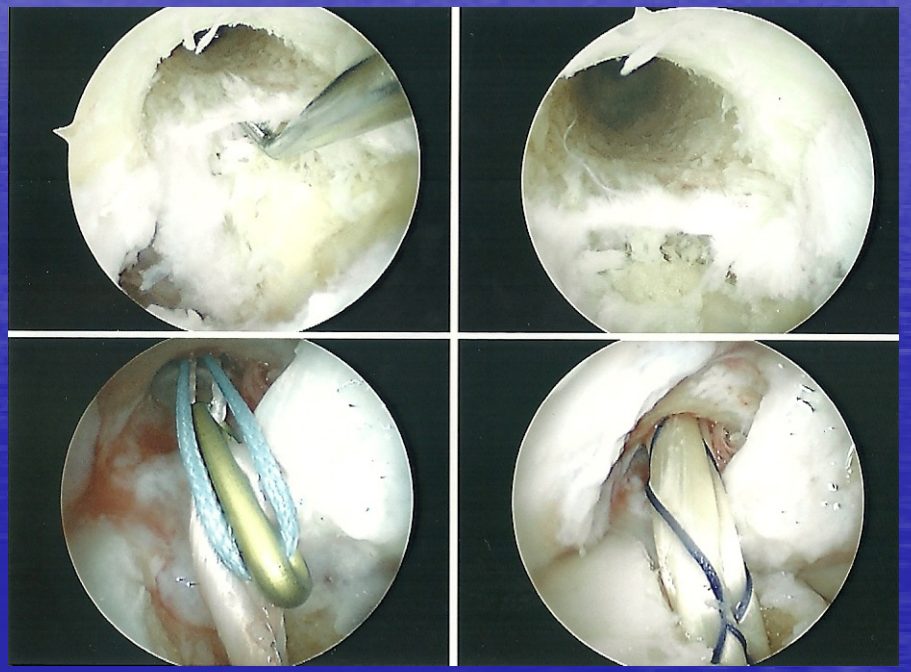
ACL RECONSTRUCTION

- *CHECK INTERCONDYLAR NOTCH CLEAR*
- *DRILL TIBIAL AND FEMORAL TUNNELS*



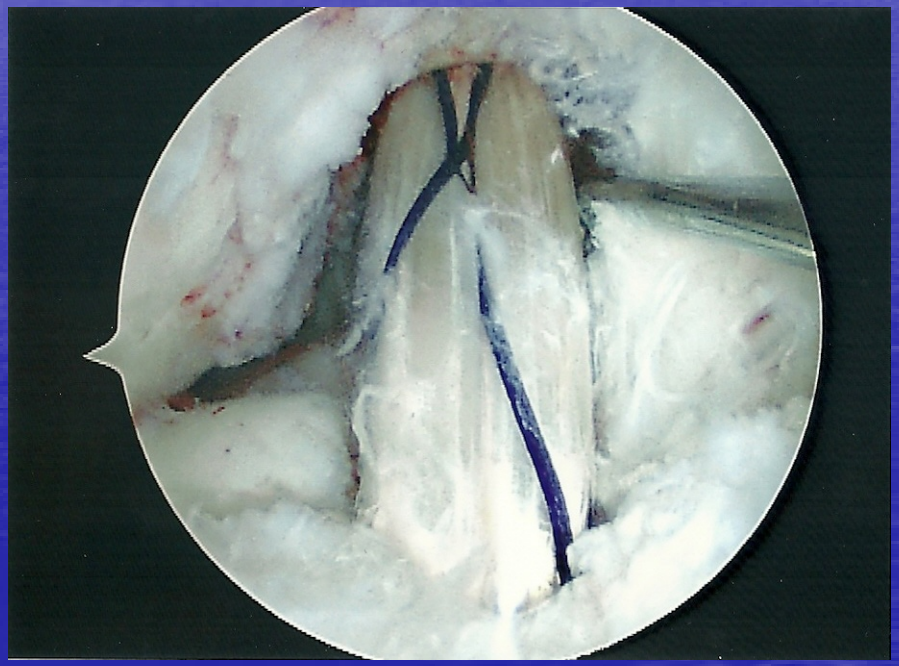
ACL RECONSTRUCTION

- *CHECK POSITION OF TUNNELS*
- *INSERT GRAFT*
- *FIX BOTH ENDS*



ACL RECONSTRUCTION

- *CHECK GRAFT FIRMLY FIXED*
- *CHECK FULL RANGE OF MOVEMENT POSSIBLE AND NO IMPINGEMENT*



DIAGNOSIS

DECISION MAKING

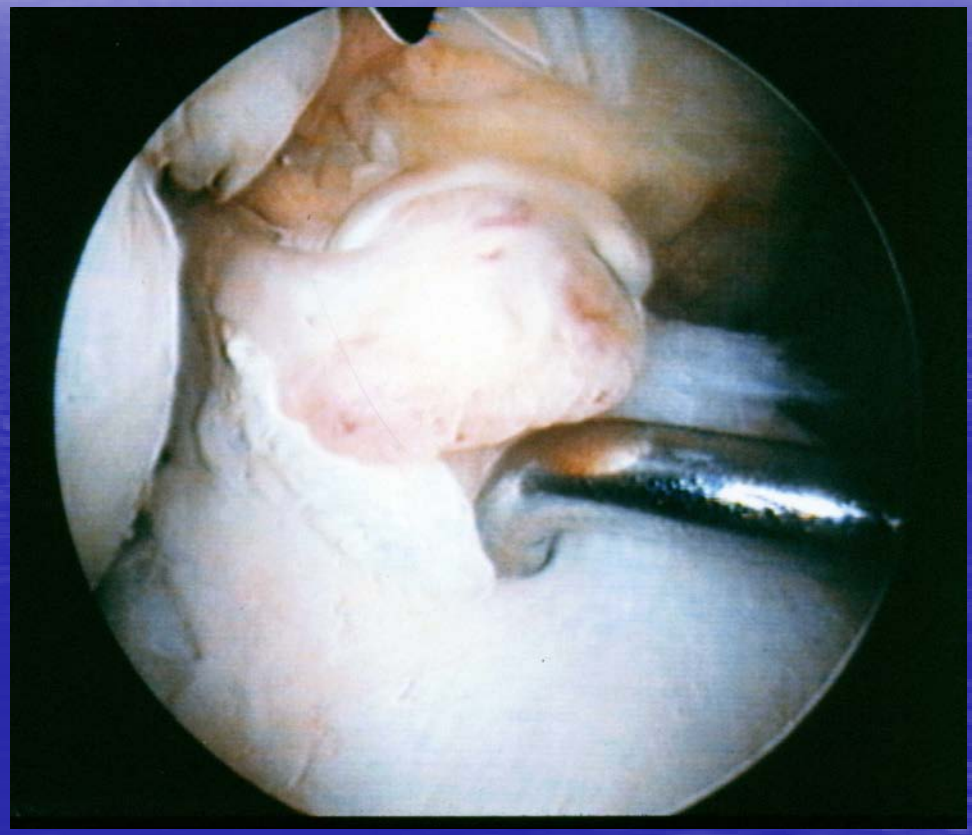
SURGERY

COMPLICATIONS

DIAGNOSIS

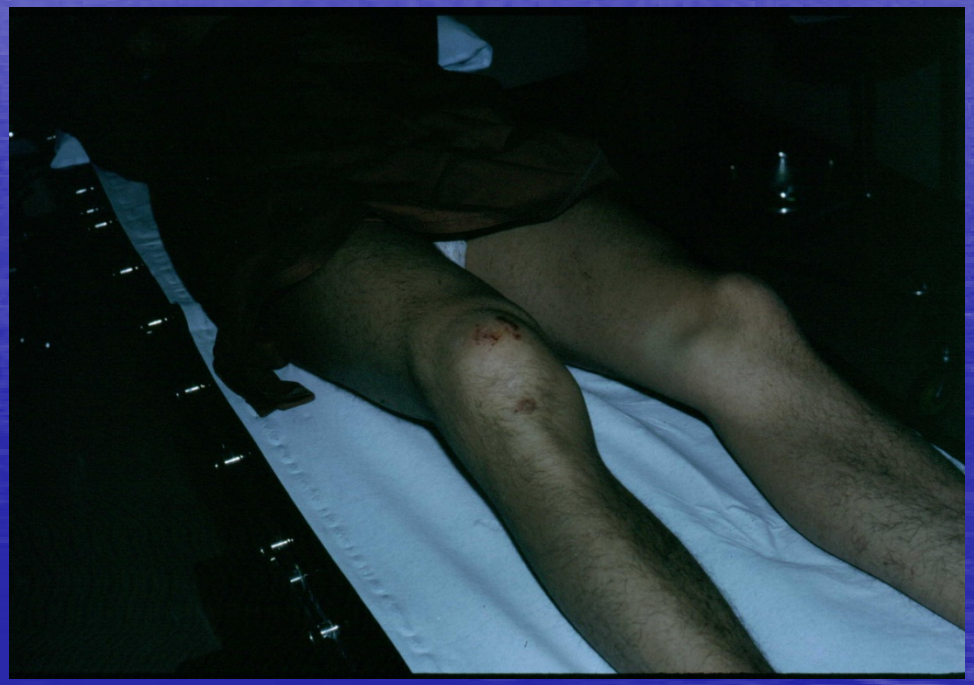
DIAGNOSIS
ACUTE HAEMARTHROSIS

- *HISTORY*
- *EXAMINATION*
- *X-RAY*
- *INVESTIGATIONS*



DIAGNOSIS
HISTORY

- *MECHANISM OF INJURY*
- *PAIN*
- *TEARING OR POPPING*
- *LEAVE THE FIELD*
- *SWELLING*



DIAGNOSIS
EXAMINATION

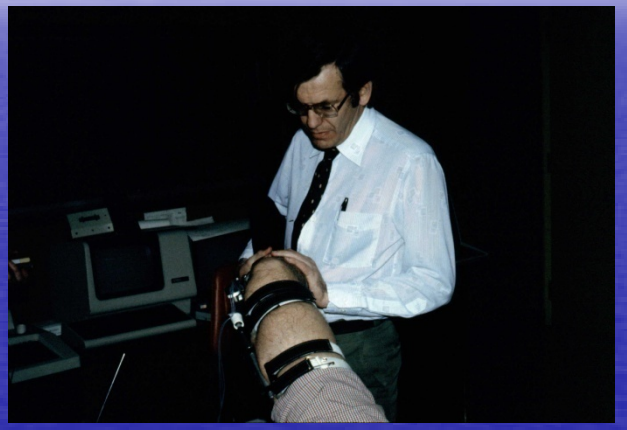
PIVOT SHIFT TEST

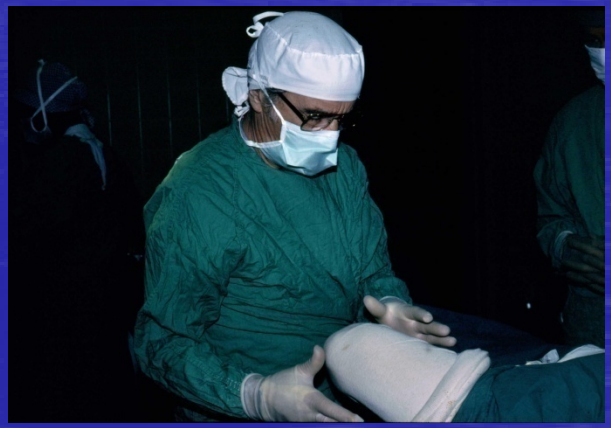
GALWAY, BEAUPRE

AND MACINTOSH

1972

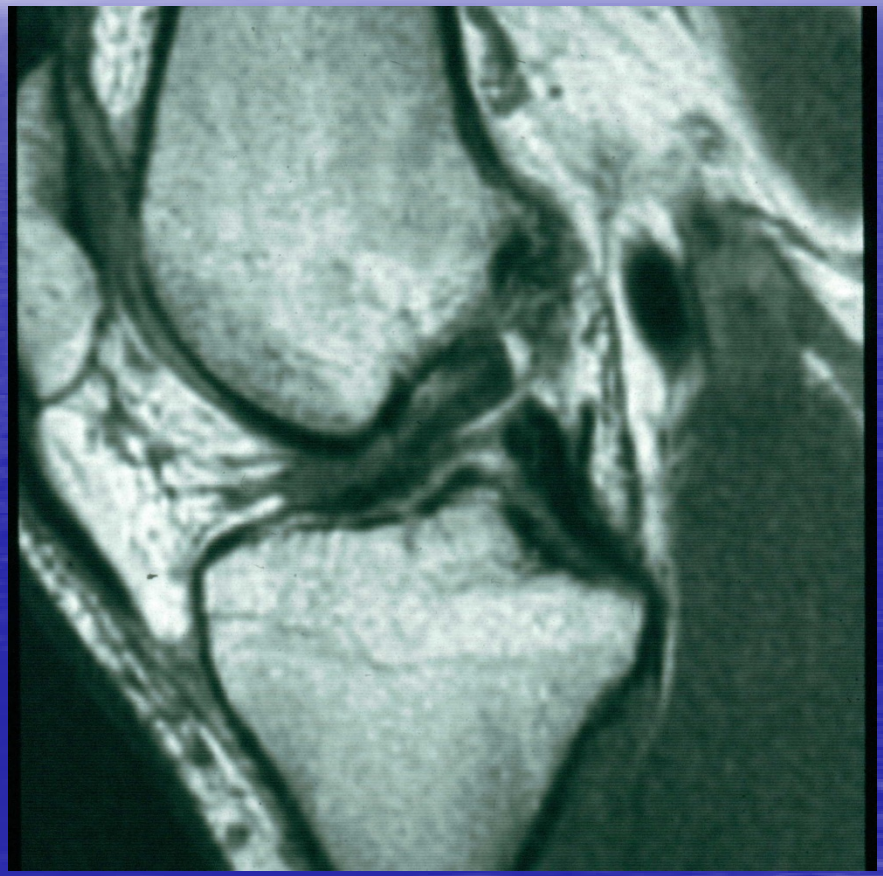
- ***WHEN THE PATIENT PIVOTS, THE KNEE SHIFTS***





DIAGNOSIS
MRI

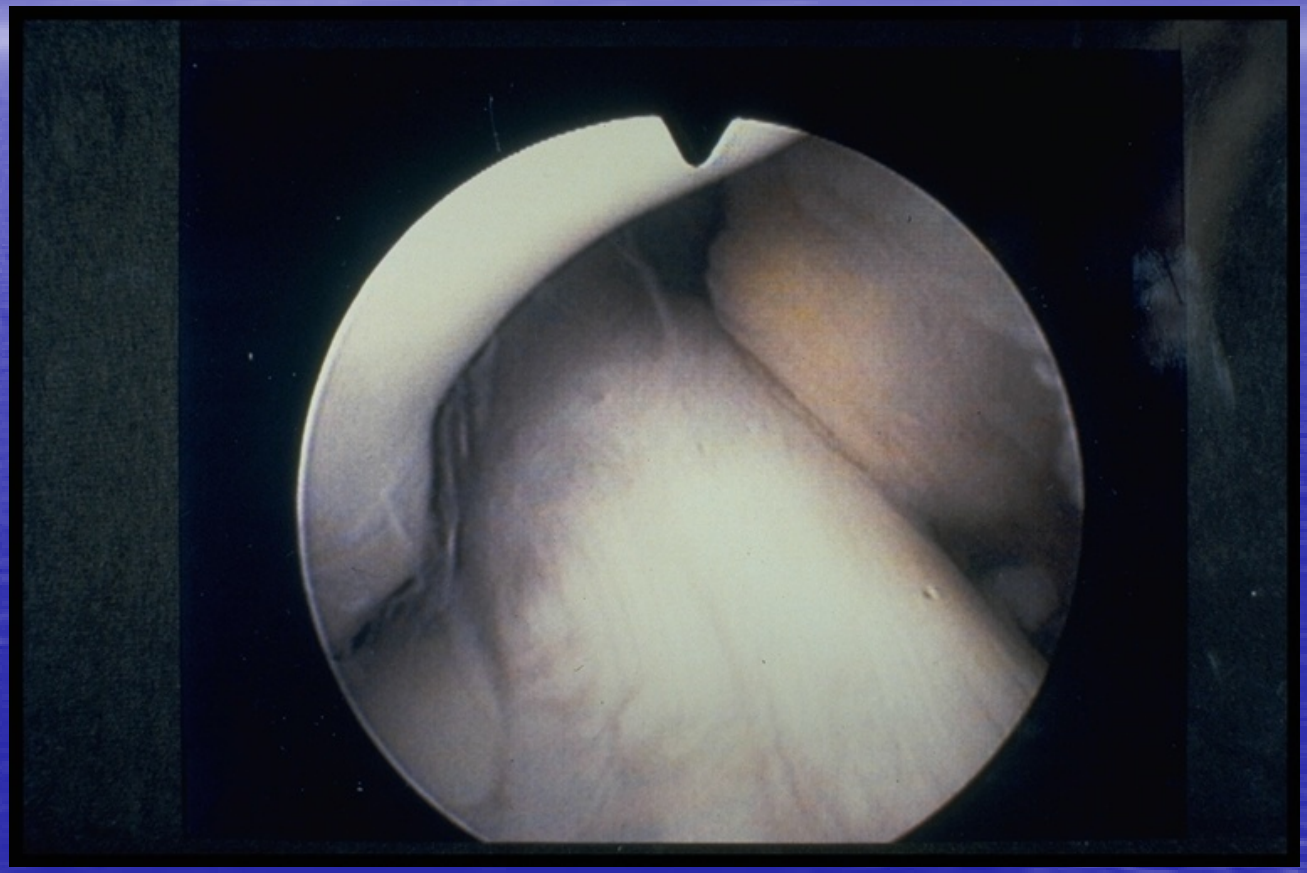
- *CONFIRMS DIAGNOSIS*
- *PRESENTATION CAN BE CONFUSED WITH OTHER INJURIES e.g MENISCAL TEAR OR PATELLAR DISLOCATION*
- *THERE MAY BE OTHER INJURY SPECIFICALLY MENISCAL AND ARTICULAR CARTILAGE*
- *BONE BRUISING*



DECISION MAKING

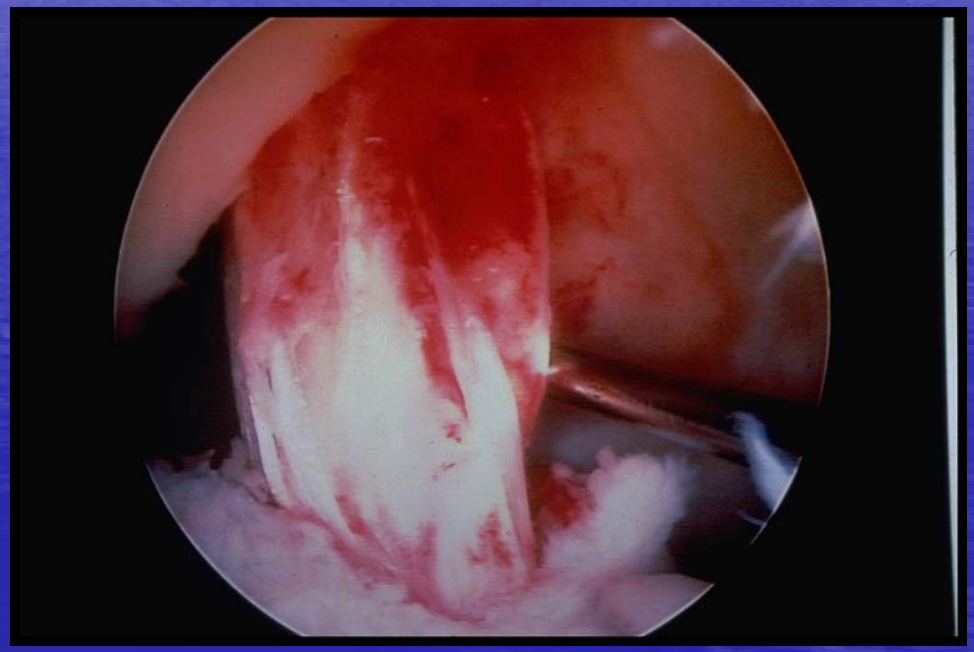
DECISION MAKING
THE ACL IS UNIQUE

- *ANATOMY*
- *PHYSIOLOGY*
- *BIOMECHANICS*



DECISION MAKING
ACL GRAFT

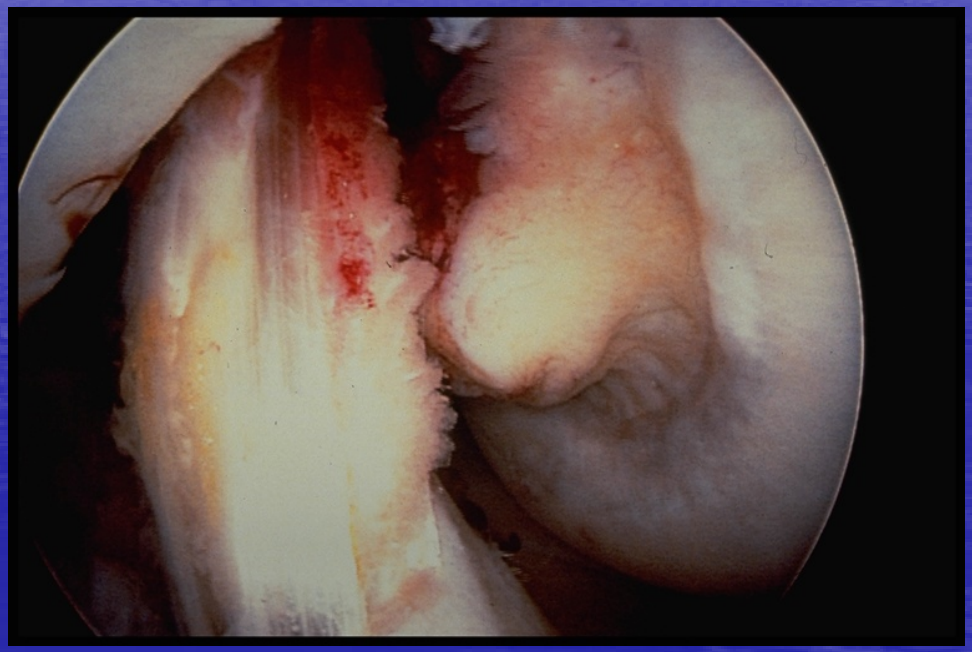
- *AT BEST THIS IS A STRIP OF DEAD CONNECTIVE TISSUE*
- *ANATOMICALLY DIFFERENT*
- *AVASCULAR*
- *NO NERVE SUPPLY INCLUDING PROPRIOCEPTION*



DECISION MAKING
IS SURGERY NECESSARY?

ASSUMPTIONS

- ***THE ACL IS VITAL FOR KNEE FUNCTION***
- ***ACL DEFICIENT KNEES ALWAYS DEGENERATE***
- ***SURGICAL RECONSTRUCTION WILL RESTORE NORMAL OR NEARLY NORMAL FUNCTION***

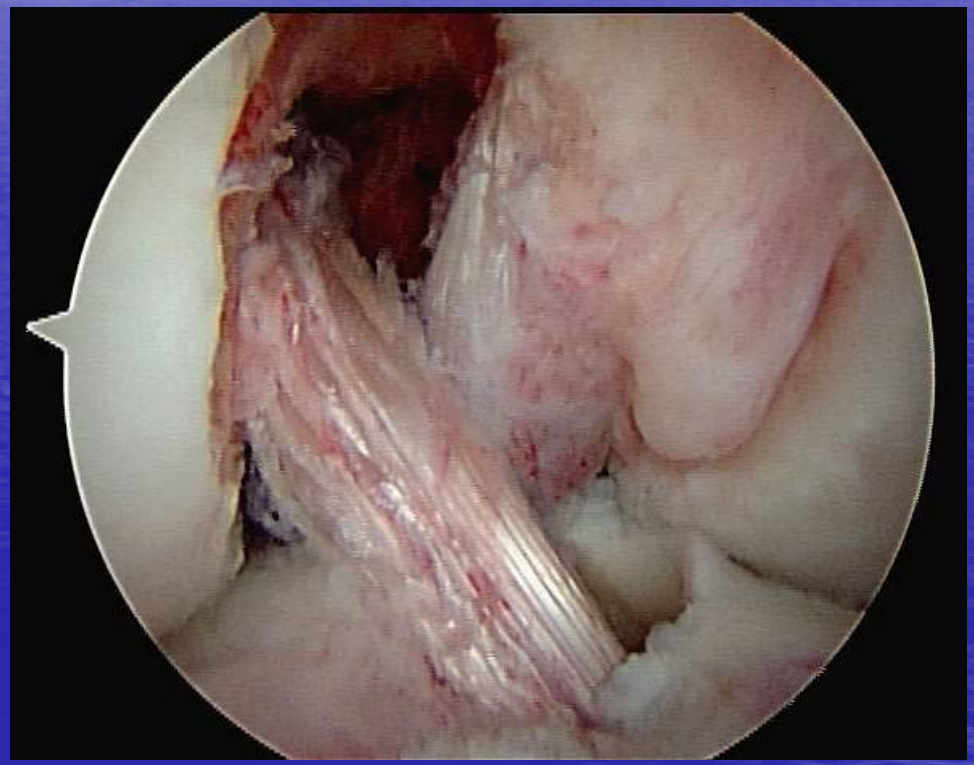


CAN WE SAY ANY OF THESE WITH ABSOLUTE CERTAINTY?

- ***NO!***

DECISION MAKING
CASE SELECTION

- ***EVERY PATIENT IS AN INDIVIDUAL AND NO TWO PATIENTS ARE THE SAME***
- ***SURGERY FOR DISABLIMG INSTABILITY***



DECISION MAKING

MIRF	0	1	2
Age	Over 40	20 - 40	Under 20
No Hours / Year Level 1 and 2 sports	Under 50	50 - 200	Over 200
KT - 1000 mm	Under 5	5 - 7.5	Over 7.5
Repairable Meniscus	No		Yes

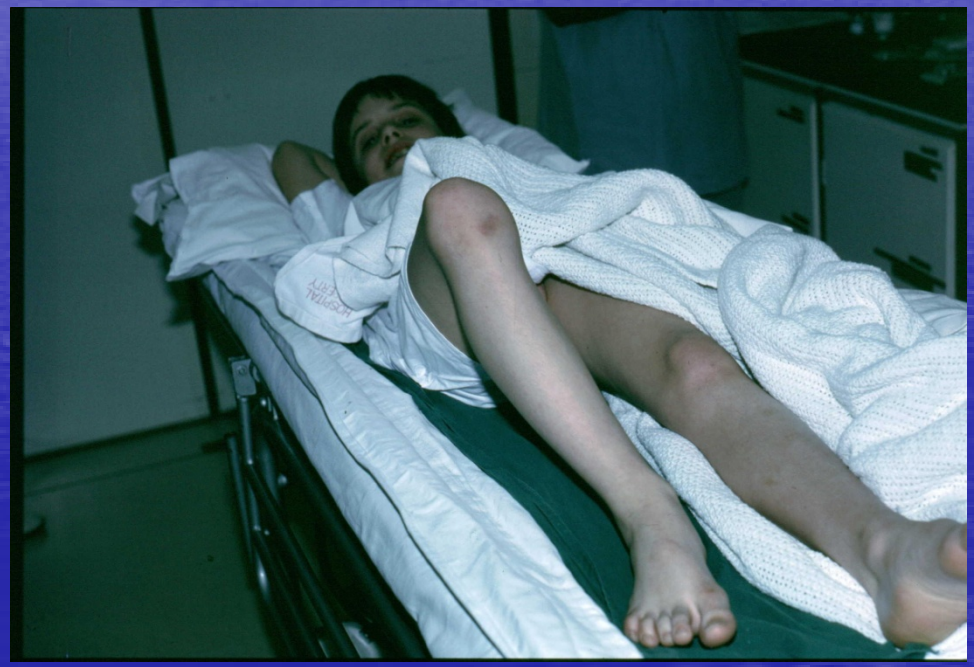
Level 1 sports = sports with cutting, jumping

Level 2 sports = sports with lateral motion

Early surgery recommended for MIRF 3 or greater

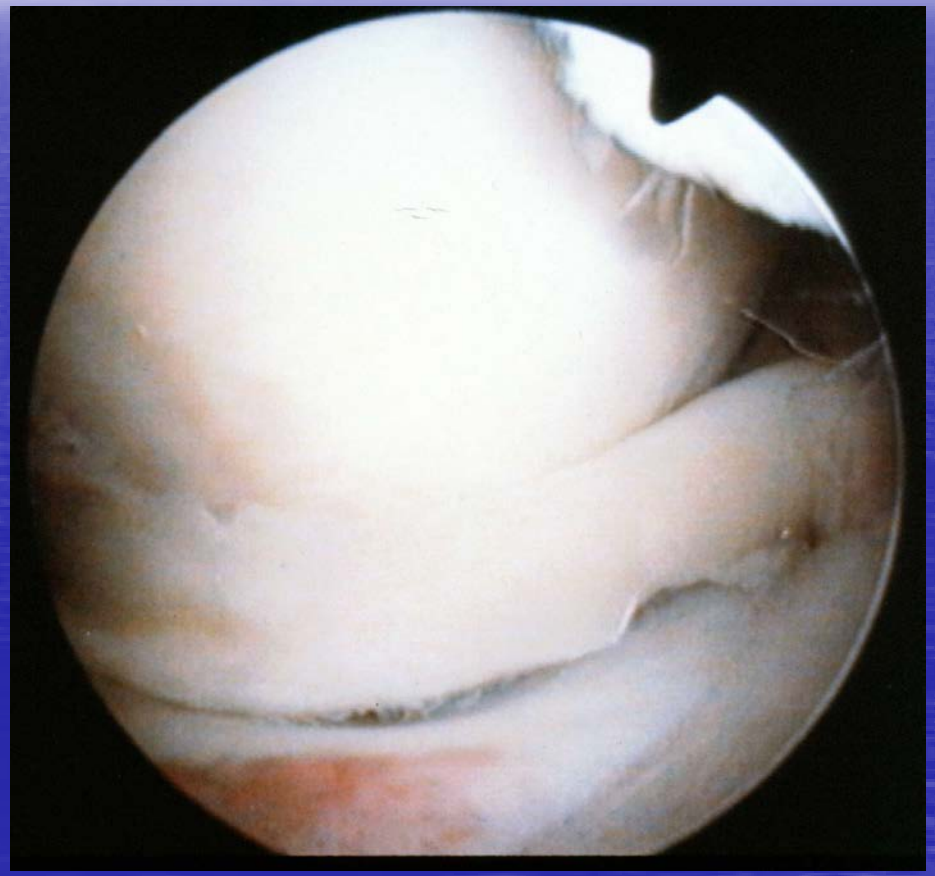
DECISION MAKING
ADOLESCENT

- *VERY CHALLENGING*
- *CONSERVATIVE TREATMENT DOES NOT WORK*
- *HIGH INCIDENCE OF ASSOCIATED MENISCAL INJURY*
- *CONCERN RE GROWTH DISTURBANCE AND KNEE CAPTURE FORTUNATELY NOT BORNE OUT BY CLINICAL EXPERIENCE*



DECISION MAKING
THE MENISCI

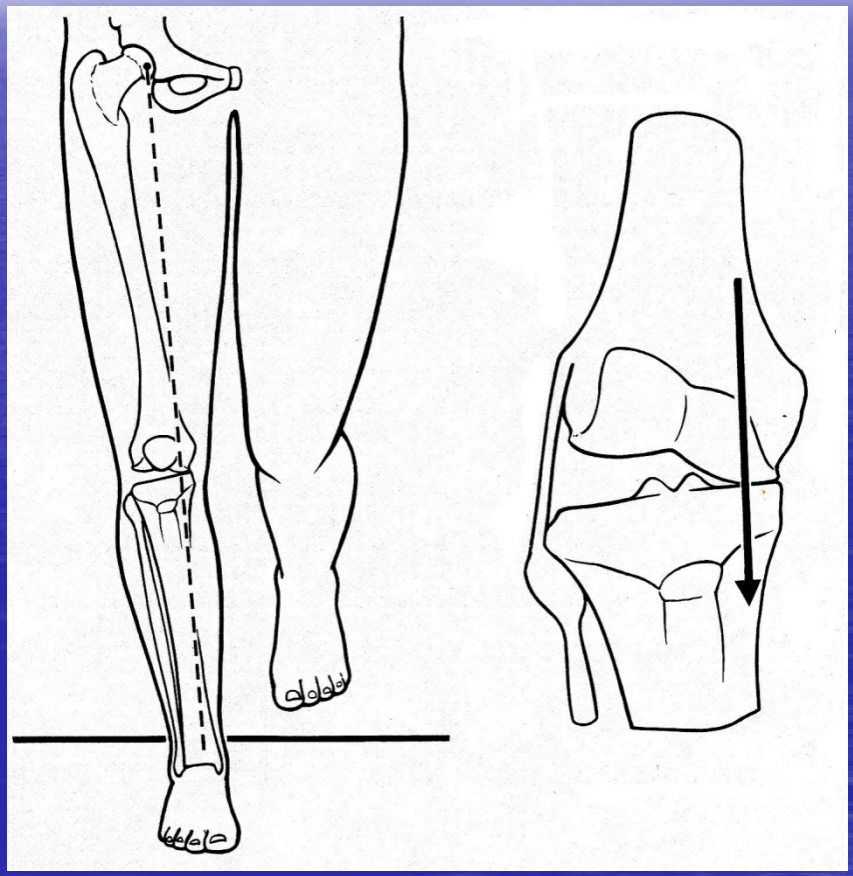
- *IMPORTANCE PARTICULARLY WITH RESPECT TO DEGENERATIVE JOINT DISEASE CANNOT BE OVERSTRESSED*
- *REPAIRABLE MENISCUS IN A YOUNG PATIENT POSSIBLY THE STRONGEST INDICATION FOR SURGERY*



SURGERY

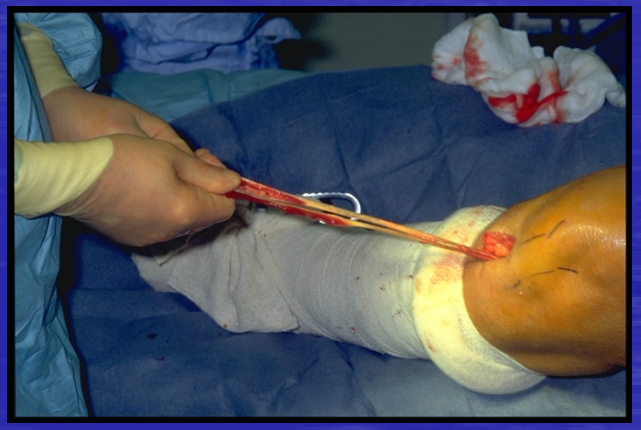
SURGERY
ENGINEER'S NIGHTMARE

- *LONG LEVER ARMS*
- *LARGE FORCES*



SURGERY
GRAFT SELECTION

- *PATELLAR TENDON OR HAMSTRING?*
- *CAREFUL PATIENT SELECTION*
- *CAREFUL SURGICAL TECHNIQUE*
- *CAREFUL REHABILITATION*
- *SATISFACTORY RESULT NO MATTER WHAT GRAFT IS USED*



OPERATIVE STEPS

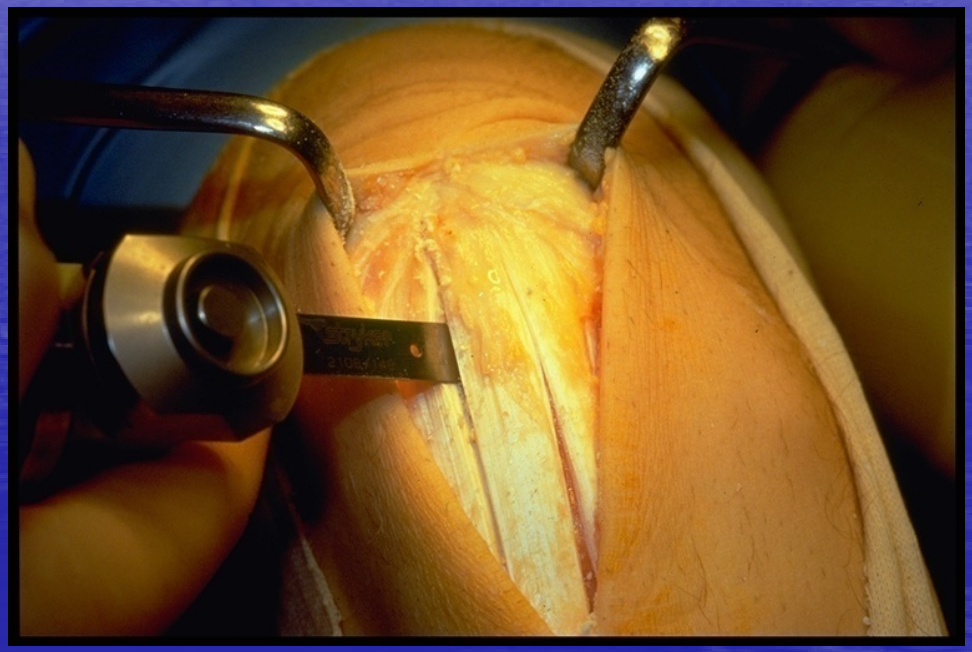
GRAFT HARVEST

GRAFT PLACEMENT

GRAFT FIXATION

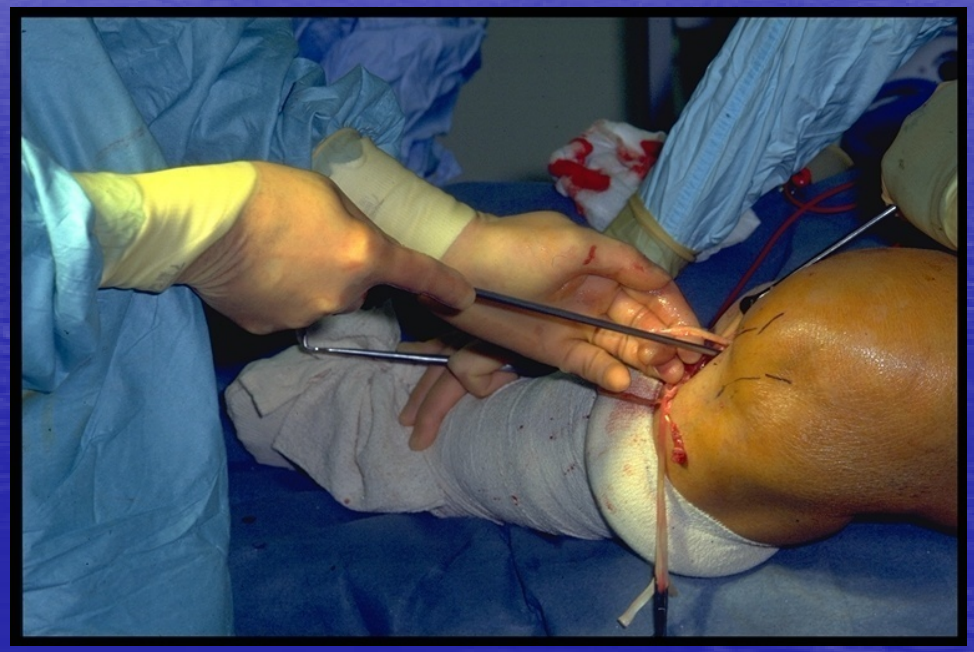
SURGERY
GRAFT HARVEST
PATELLAR TENDON

- *BE GENTLE!*
- *PRECISE MEASUREMENTS*



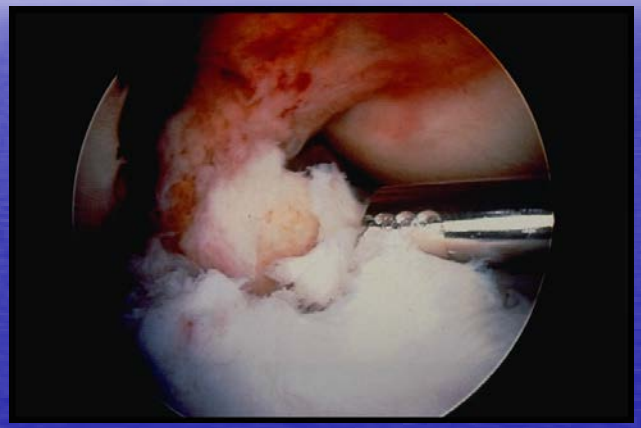
SURGERY
GRAFT HARVEST
HAMSTRING

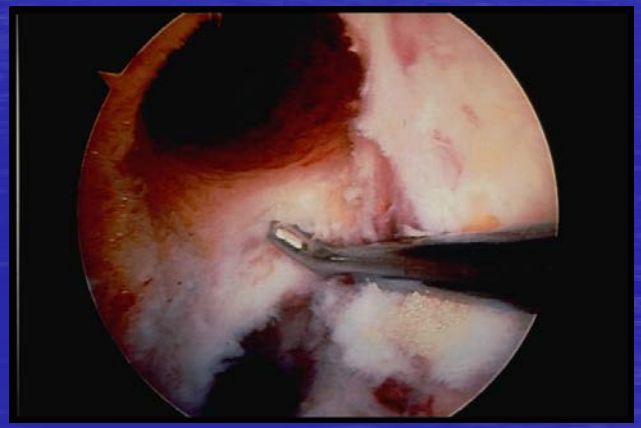
- *MORE DEMANDING THAN PATELLAR TENDON*
- *PLAN B IF TENDONS INADEQUATE*
- *SWITCH TO PATELLAR TENDON PROBABLY BEST OPTION*



SURGERY
GRAFT PLACEMENT

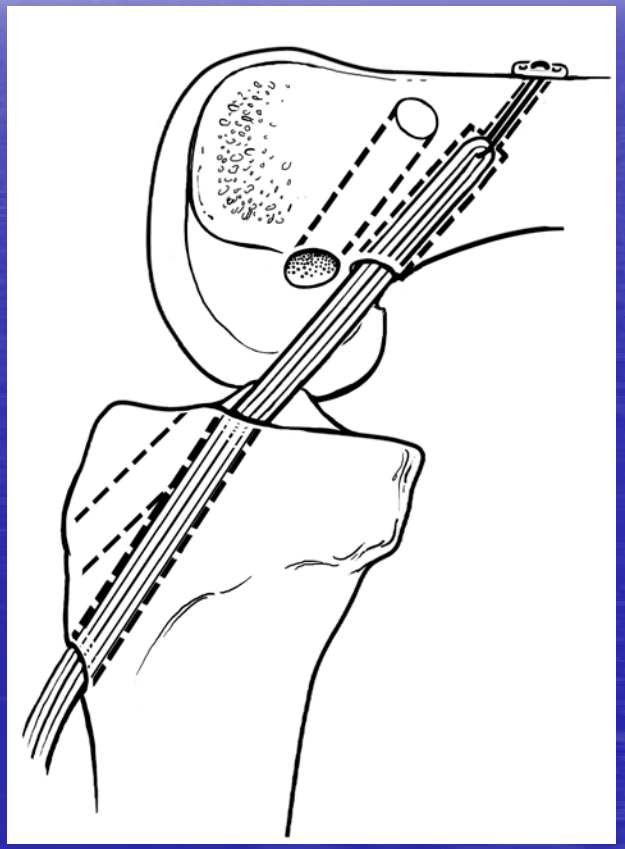
- *VERY IMPORTANT*
- *INCORRECT TUNNEL POSITION WILL COMPROMISE RESULT*
- *COMMONEST CAUSE OF LITIGATION*





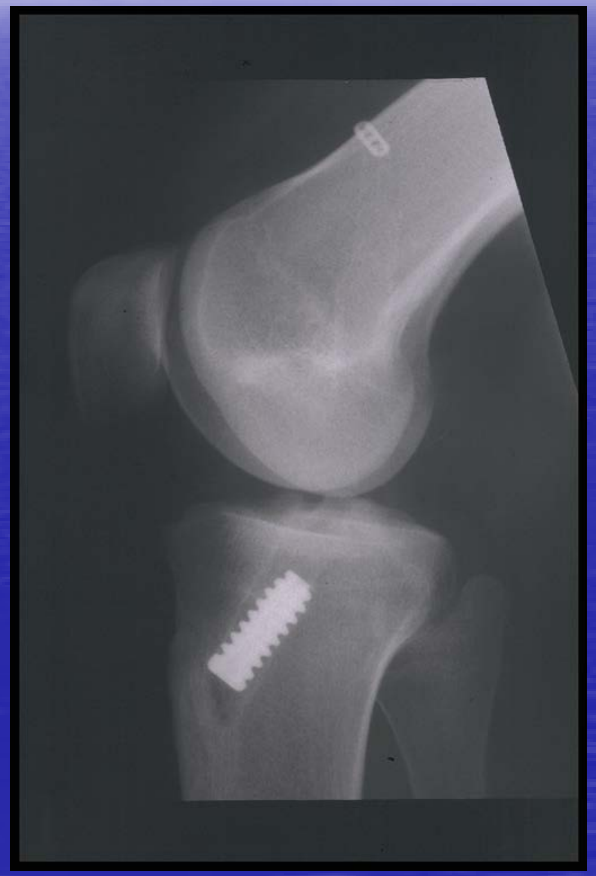
SURGERY
GRAFT PLACEMENT

- *COMMON FAULT IS POSITIONING TOO ANTERIOR*
- *IN THE TIBIA CAUSES BLOCK TO EXTENSION*
- *IN THE FEMUR CAUSES RESTRICTION OF FLEXION*



SURGERY
GRAFT FIXATION

- *A NUMBER OF DIFFERNT TECHNIQUES AVAILABLE*
- *ALL RELIABLE IF USED PROPERLY*

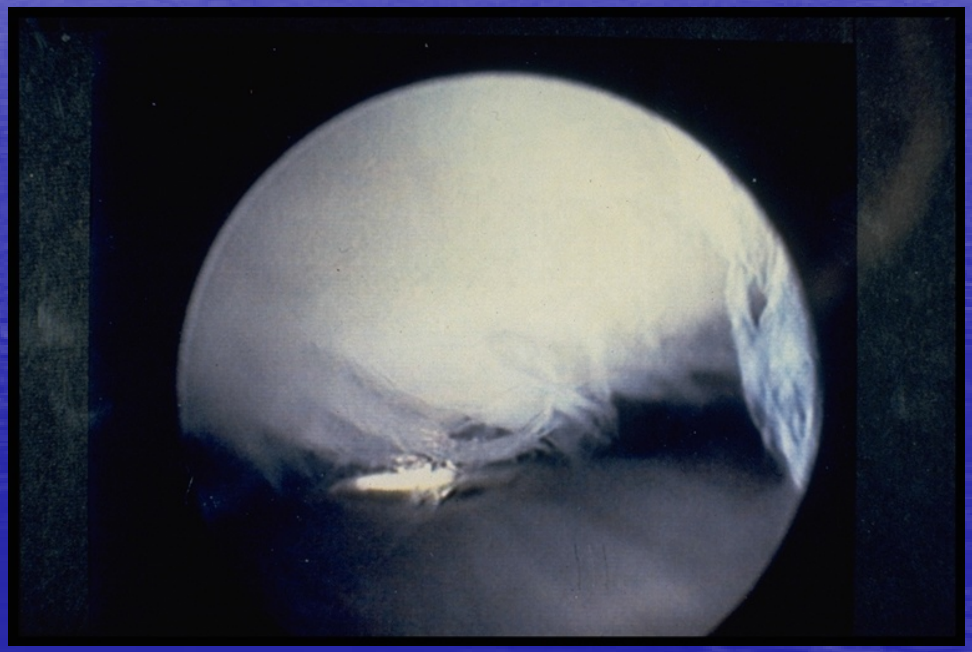


COMPLICATIONS

(SPECIFIC)

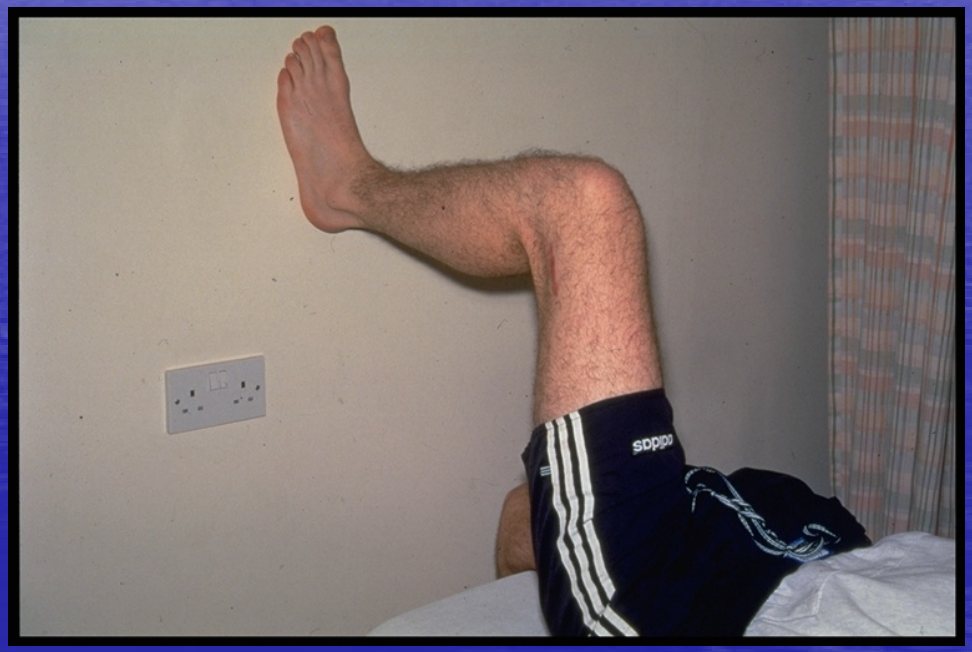
COMPLICATIONS
ANTERIOR KNEE PAIN

- *NOT JUST AFTER PATELLAR TENDON BUT ALSO HAMSTRINGS*
- *ANY ANTERIOR ANATOMICAL STRUCTURE CAN CAUSE PAIN*
- *USUALLY SELF-LIMITING*



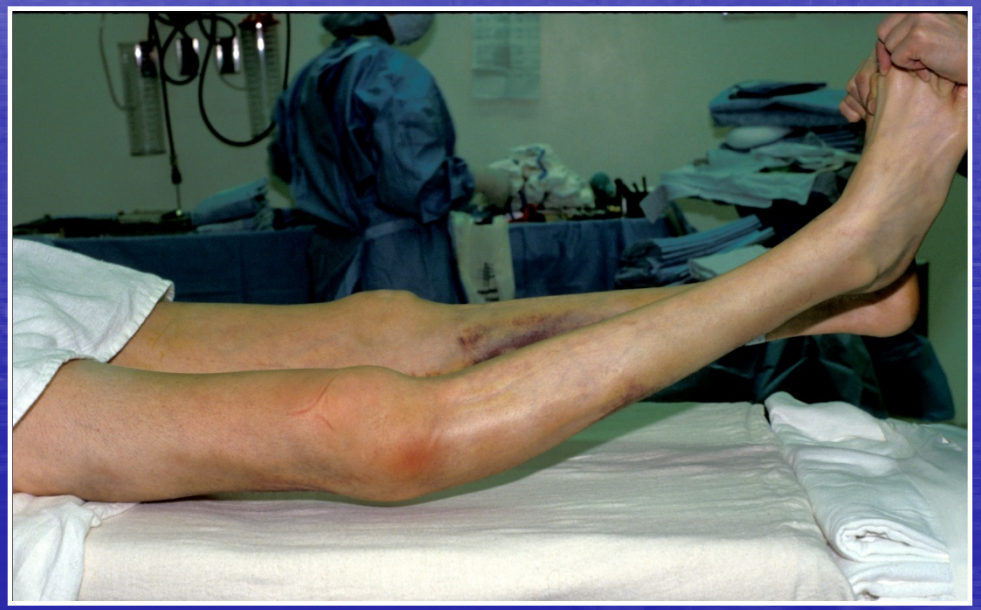
COMPLICATIONS
LIMITATION OF MOTION

- ***PREVENTION BETTER THAN CURE***
- ***IMPORTANCE OF REHABILITATION PROGRAMME***
- ***IDEALLY FULL EXTENSION AND 120º FLEXION BY 6 WEEKS***
- ***CAREFUL FOLLOW-UP WITH SURGERY IF REQUIRED***



COMPLICATIONS
OTHER INSTABILITIES

- *MEDIAL LIGAMENT, LATERAL LIGAMENT OR RARELY POSTERIOR CRUCIATE LIGAMENT*
- *MISSED INJURY TO OTHER LIGAMENTS WILL CAUSE THE KNEE TO REMAIN UNSTABLE*



COMPLICATIONS
ARTIFICIAL LIGAMENTS

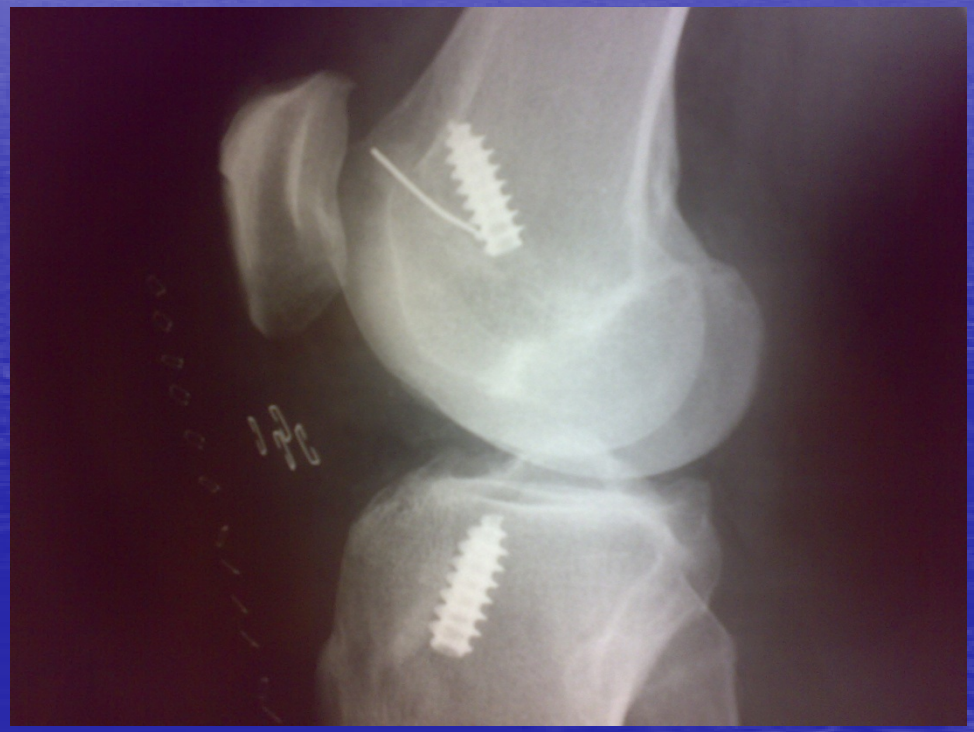
- *CARBON FIBRE, GORETEX, POLYESTER*
- *UNFORTUNATELY DUE TO COMPLICATIONS HAVE NOT STOOD THE TEST OF TIME*

DUTY

- *EARLY DIAGNOSIS WITH AWARENESS OF OTHER DAMAGE*
- *CAREFULLY SELECT PATIENTS FOR SURGERY*
- *TAKE STEPS TO AVOID DAMAGE DURING GRAFT HARVEST*
- *POSITION THE TUNNELS CORRECTLY*
- *FIX THE GRAFT SECURELY*
- *PREVENT AND OR TREAT LIMITATION OF MOTION WITH AN APPROPRIATE REHABILITATION REGIME AND SURGERY IF NECCESSARY*
- *TREAT OTHER INSTABILITIES IF PRESENT*
- *DO NOT USE ARTIFICIAL LIGAMENTS EXCEPT UNDER EXCEPTIONAL CIRCUMSTANCES (SOME WOULD DISAGREE!)*

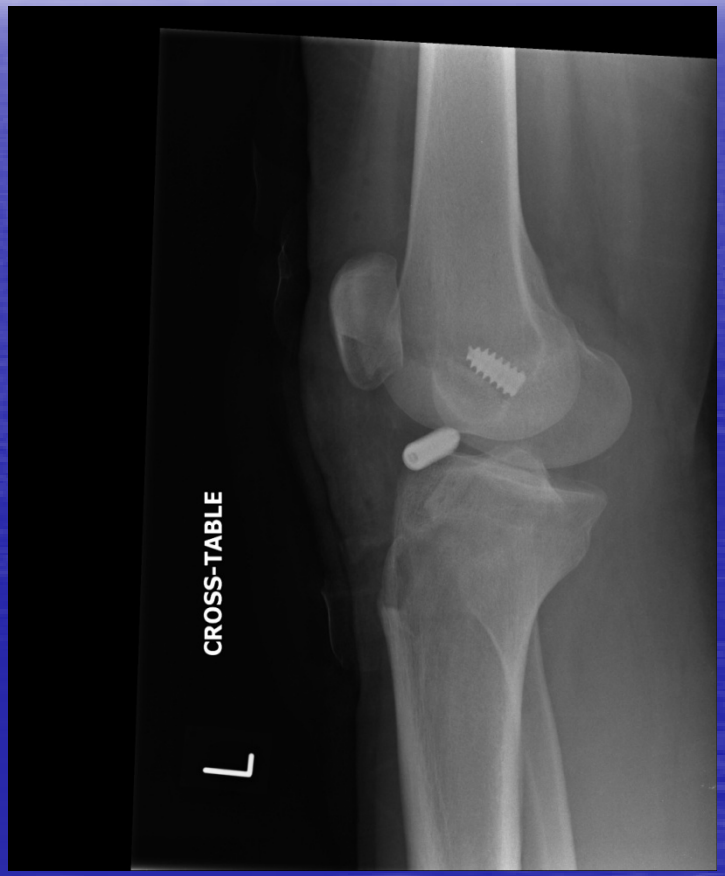
ACL CASE STUDY 1

- *SIGNIFICANT MALPOSITION FEMORAL SCREW*
- *BROKEN GUIDE WIRE NOT NEGLIGENT IN ITSELF*



ACL CASE STUDY 2

- *EVEN WORSE*
- *FEMORAL SCREW MALPOSITION*
- *TIBIAL SCREW NOT EVEN IN THE BONE*




THANK YOU