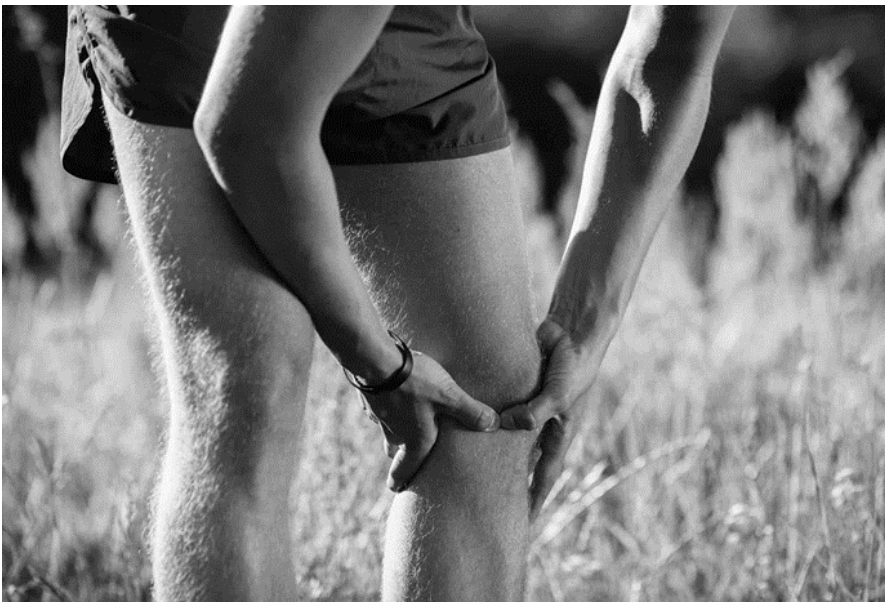


“CONSERVATIVE MANAGEMENT OF PCL INJURY”

ORTHOPAEDIC PRESENTATION



Dear colleagues and interested parties,

This document is part of a series of Orthopaedic Papers and Presentations drawn from the past 40+ years of medical practice I have enjoyed, primarily focused on the treatment of knee injury and degeneration.

The series includes a mix of conference papers presented over the years, as well as general knee injury management reference documents covering some of the challenges and solutions developed during this time.

We needn't reinvent the wheel too often, so I hope these documents prove useful to my fellow surgeons and those interested in the treatment of knee injury, degeneration, recovery and patient care.

Thank you for taking the time to read these papers, and please do not hesitate to reach out to discuss any of the issues covered further.

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“Conservative Management of PCL Injury”

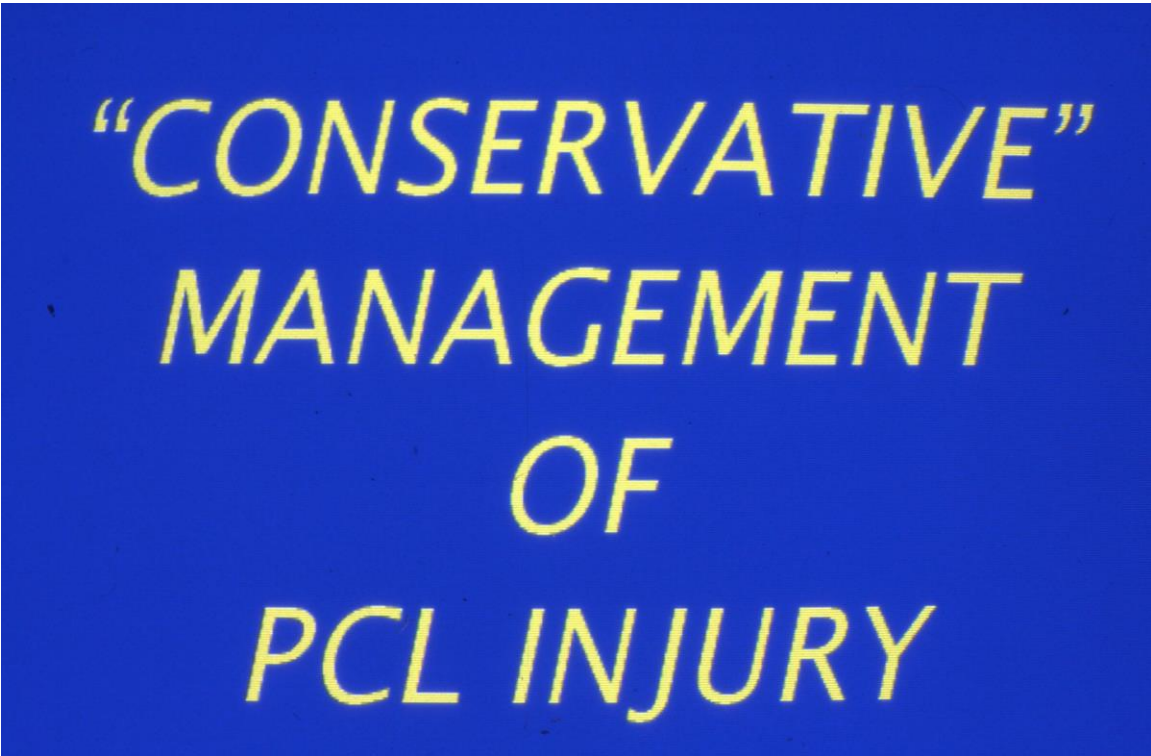
PRESENTATION DETAILS:

Prepared For Symposium On Posterior Cruciate Ligament Injuries

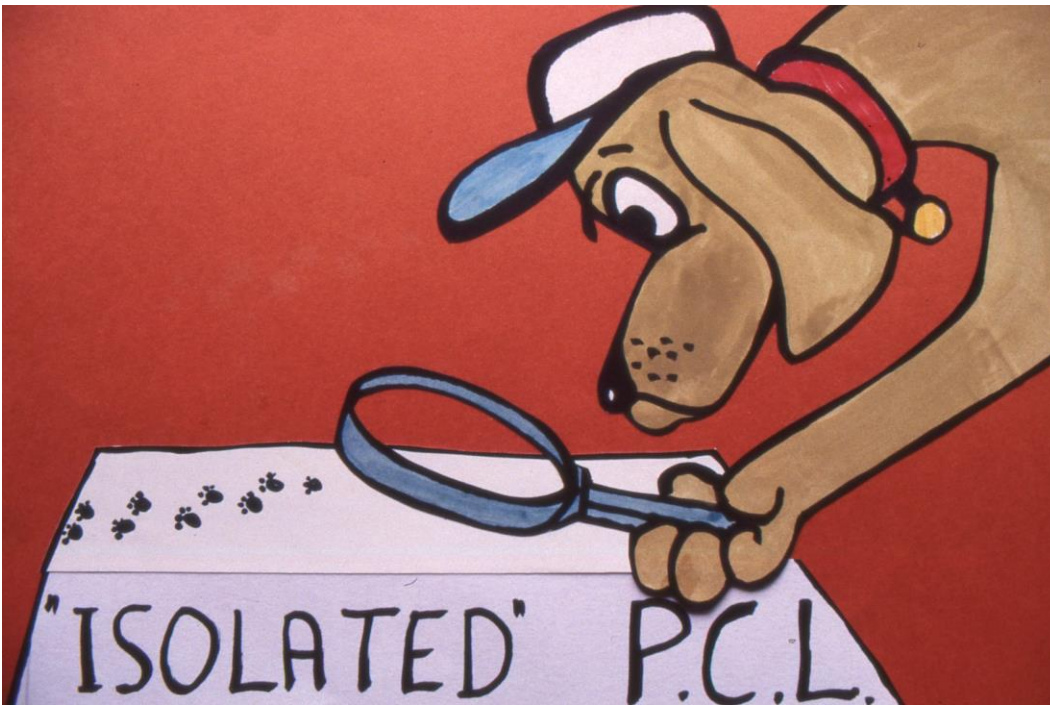
Location: Sicot Meeting, Sydney, April 1999

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Author/Presenter: Iain D McLean, Melbourne, Australia



“CONSERVATIVE” MANAGEMENT OF PCL INJURY

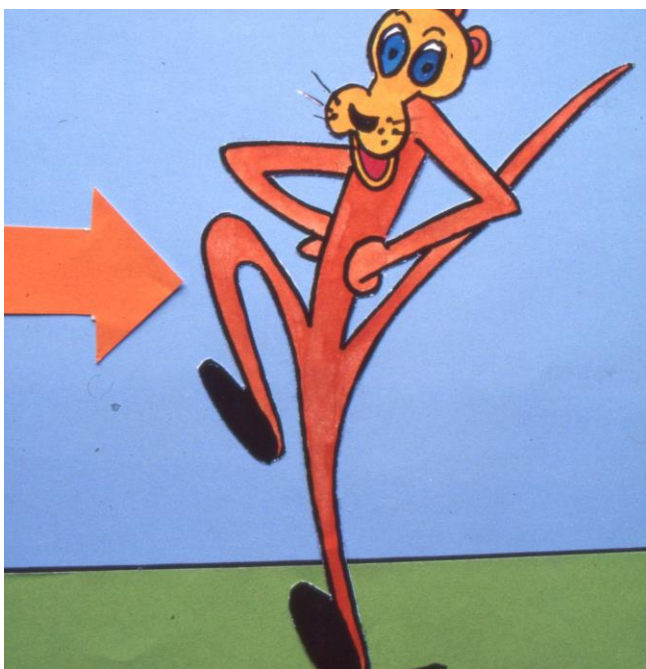


CONSERVATIVE MANAGEMENT OF POSTERIOR CRUCIATE LIGAMENT INJURY:

I will briefly introduce the topic for discussion and consider:

The natural history of non-operated posterior cruciate ligament injuries.

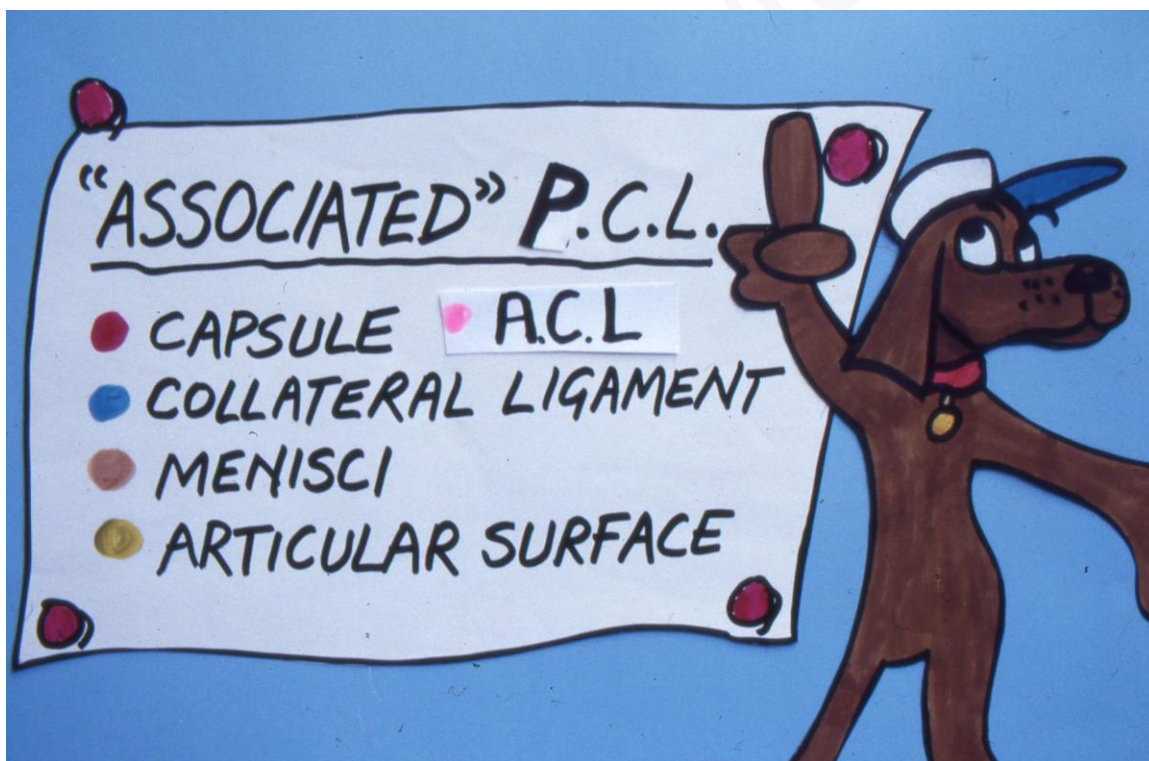
NATURAL HISTORY OF NON-OPERATED PCL



And draw attention to the excellent articles in the literature.

The PCL injury in the knee can be **associated with any combination of lesions** –

Capsule, ACL, collateral ligaments, menisci, chondral and osteochondral lesions.



A reminder that, with all injuries, we need to

- diagnose and assess the damaged knee ligaments,
- but also the peri and intra-articular haemorrhage; and
- the "response" to this damage;
- In the knee, muscles, and the mind, with its effects on ability to work, study and family activities, and not just the sport.

Particular note when assessing the "pain response", the "quadriceps function/inhibition", as a guide to future management.

ASSESS THE INJURY

1. DAMAGE
2. HAEMORRHAGE
3. RESPONSE

We must examine carefully for **posterolateral rotational instability (PLRI)** and/or other complex lesions of **neurovascular origin/injury, as they may require early intervention**, and with a significantly worse prognosis.

P.L.R.I.

- ACUTE / CHRONIC
- DEGREE
- \pm MENISCO CHONDRAL
 - 1°, 2° PATELLO FEMORAL
 - ALIGNMENT

In assessing PLRI relative to:

- acute/chronic;
- its degree/severity +/- meniscal/chondral;
- and primary or secondary patellofemoral pathology.

Vital assessment and noting the **limb alignment**:



...relative to varus-valgus, as this may play a definite part in the prognosis and treatment.

An isolated PCL injury can vary in its severity or laxity; grade I+, II+, III+.

"ISOLATED" PCL
= STRAIGHT POSTERIOR
- DEGREE 1-2-3

But it is a **"straight PA laxity"**.

The vast majority of sports injuries are grade II+/-.

Exceptions being high velocity sports of skiing (snow/water), cycling, and motor sports.

However, an isolated PCL injury can be associated with acute meniscal/chondral injury.

± "ASSOCIATED"

- MENISCO - CHONDRAL***
- INFLAMMATORY***
- QUADS / PROPRIOCEPTION ↓***

Or there may be pre-existing pathology.

There will be a variable pain and inflammatory reaction to injury, with associated quadriceps and proprioceptive deficiency.

“ISOLATED” PCL

~

SPORTS INJURY

My further discussion will relate to the isolated PCL as the result of a sports injury and is based on review of the literature and a personal study, where I looked at the factors influencing return to sport after PCL injury.

Looking at

- 48 acute injuries being less than 4 weeks.
- 24 subacute being less than 4 months, and 36 chronic injuries.
- Ages range from 17 to 44 years, with the **majority being 17 to 30 years of age.**
- **Males 10:1** compared to females.

The most common sports activities in my study producing PCL injuries were:

- Australian Rules Football (AFL)
- Basketball
- Volleyball
- Soccer
- Field hockey
- Indoor cricket

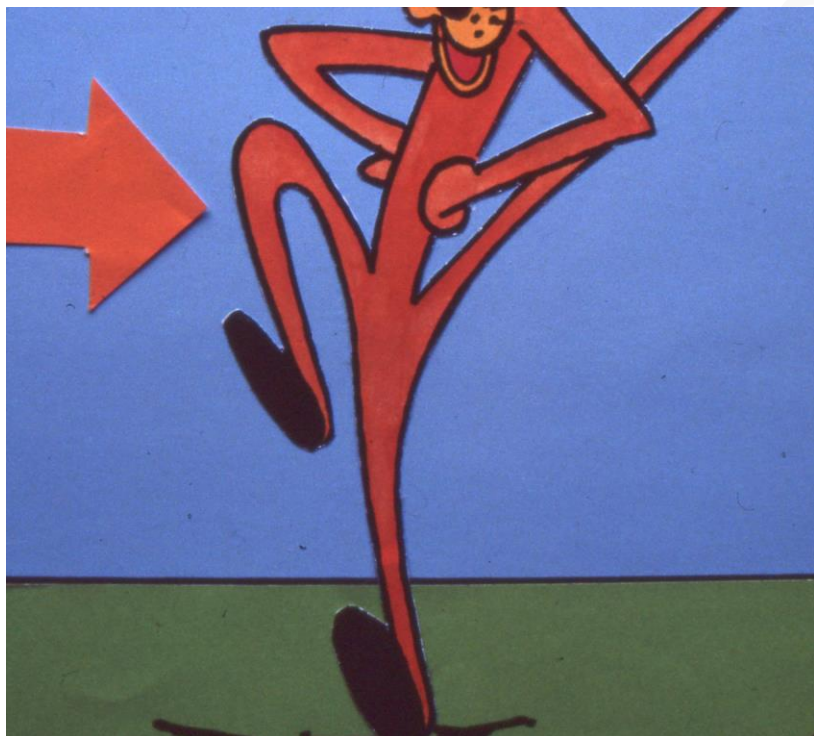
P.C.L.

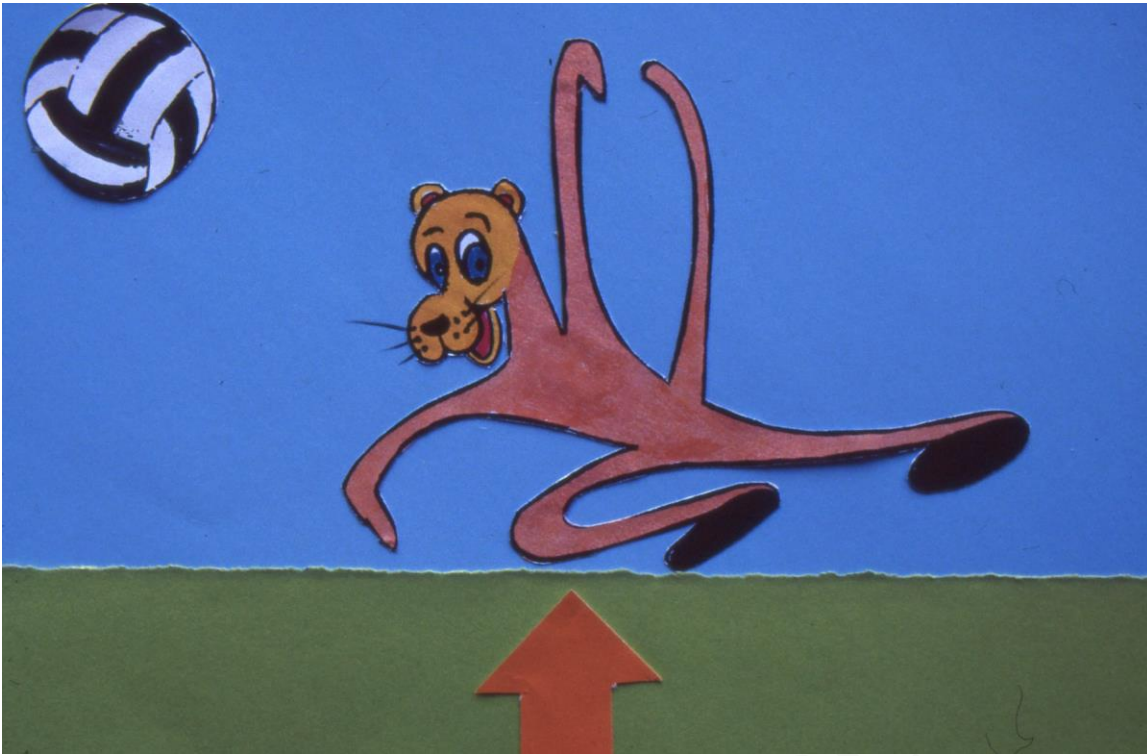
48 ACUTE (< 4 weeks)

24 SUBACTUTE (< 4 months)

36 CHRONIC

The most common cause being a blow to the protecting leg at football, or a blow/fall to the ground/floor.





Generally there is not a lot of pain associated with the injury – but more a **"sensation in the knee, or posteriorly"**, of a numb feeling, elastic band breaking or stretching, a feeling of weakness, and the knee "not right".

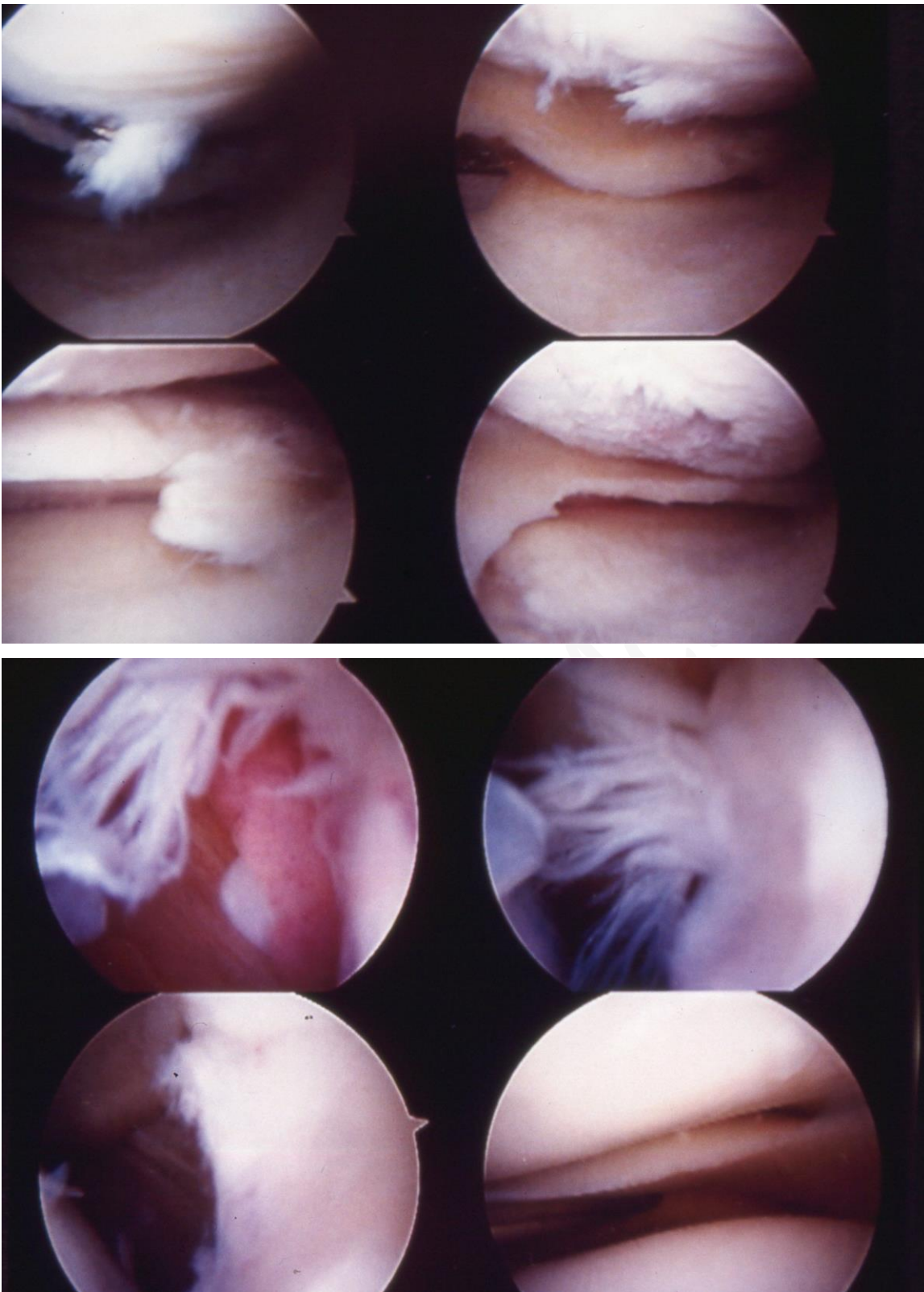
Then translated into difficulty related to stop/start and to jump/land, particularly if that is the dominant leg.

Careful examination is necessary, with **"suspicion"**.

I arthroscoped 45% of the acute and subacute injuries, i.e. 31 of 72 for associated acute and pre-existing internal derangements, or requiring EUA in assessing associated ligamentous injuries.

Good quality MRI studies are of assistance, when taken in conjunction with the history and clinical findings.

Assistance relative to bone bruising and meniscochondral lesions.



Other or associated IDK were common in this active athletic age group, with histories of previous arthroscopy, meniscectomy, or knee pain in keeping with patellofemoral chondral pathology.

Chondral lesions noted, particularly to the medial femoral condyle; medial and lateral meniscal lesions; posterior cruciate ligament remnant flaps; and aggravation of patellofemoral chondral pathology.

PCL rehabilitation is individual, and dependent on the associated lesions and to the general inflammatory response or "irritability" of the knee. With simple quadriceps exercises and graduated mobilisation until these improve.

ACTIVITY

- TIME
- PATHOLOGY
- INFLAMMATORY
- NEUROMUSCULAR

Minimal bracing is required – initially in extension – and then purely for comfort.

A simple neoprene hinged brace for when up and about.

Avoiding active hamstring exercises.

Early quadriceps/VMO activating exercises, early graduated swimming and pool exercises;

Exercise cycle with seat high, and graduated progression to the outside cycle.

Outside cycling is encouraged as the main component of rehabilitation.

Initially on relatively flat surfaces, **and always with emphasis on safety.**

Careful, individual; assessment and progression to appropriate gym equipment.

Assessment relative to their **hopping ability and co-ordination** before commencing running activities.

Return to sport: in my study:

- 70% of the sportsmen between 6 weeks and 6 months;
- 20% returned to sport 6 to 12 weeks following injury;
- With 50% returning between 3 and 6 months;
- 30% took longer or did not return to their previous sports.

The rate of progress following PCL injury depends so much on pre-existing CMP or to the development of secondary patellofemoral pain, often related to "too much too soon" when the knee is still **"irritable"**.

Caution is required, along with modification of rehabilitation and work activities.

In others there may be a need to **motivate and encourage**; to a **graduated, progressive and sustained co-ordination and strengthening program**.

Problems occurred:

- Particularly in **self-employed tradesmen attempting to kneel and squat**.
- Needing to "modify" performing lower level activities and not kneeling onto that knee.
- Caution relative to climbing and heavy lifting.
- **Attempting "too much too soon"**.

In the sportsperson; slower progress or problems may occur if the affected **PCL deficient knee, is the leg/knee used for take-off/landing, accelerate or decelerate, or used for protection**.

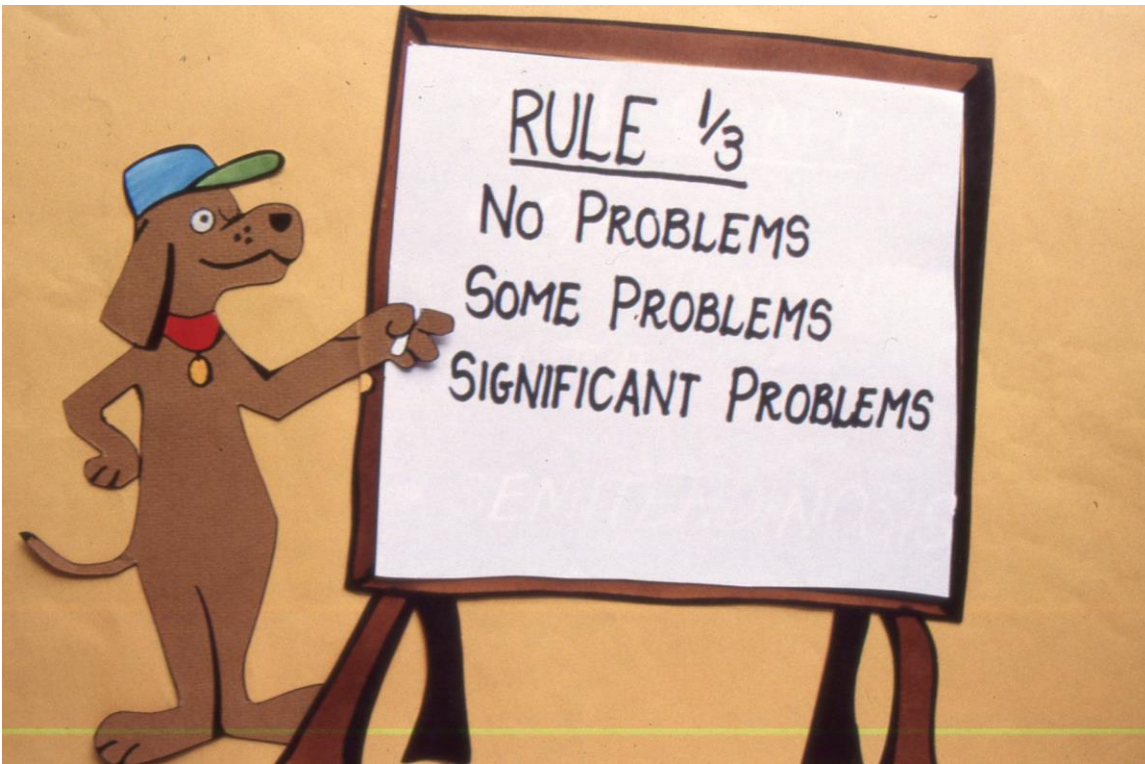
If so, time may be needed retraining that sportsperson to take off from the other leg etc, or to protect the knee from further direct blows by technical changes in approaching other players or when falling.

Further damage or irritation can occur in the sportsman or tradesman by repetitive falls and knocks, producing pain, swelling and further medial femoral condylar chondral pathology, or other meniscochondral lesions.

Particular examples in my follow-up series related to AFL ruckmen, basketballers, and field hockey.

The knee may be vulnerable, with persisting symptoms, related to loss of articular surface or damage.

As with almost any injury, we see the **rule of one-thirds applying**.



- (i) 1/3 no problems
- (ii) 1/3 some problems
- (iii) 1/3 significant problems

P.C.L. - 1/3 PROBLEMS

- ASSOCIATED M/C LESION
- INFLAMMATORY RESPONSE
- 2° PATELLO FEMORAL

P.C.L. - 1/3 PROBLEMS

- *INAPPROPRIATE or INADEQUATE REHABILITATION*
- *UNREALISTIC EXPECTATION*

In the one-third PCL injuries with problems –

These had associated meniscochondral lesions, inflammatory response to the pathology, and primary or secondary patellofemoral/quadriceps mechanism pathology.

Or we can have problems because of **Inadequate inappropriate rehabilitation; or unrealistic expectations.**

These can be difficult management problems, when they are told by a third party that they should be "doing whatever – by now".

The need for perspective and realistic expectations, with these coming from the patient, their peers, and from the press/media.

May involve the physiotherapist or GP and at times an unrealistic surgeon.

The literature indicates that **degenerative changes occur in the PCL deficient knee**, with the progression of time from injury.

CHRONIC P.C.L.

→ DEGENERATION

- 1. MEDIAL COMPARTMENT*
- 2. PATELLO FEMORAL*
- 3. LATERAL*

These being **predominantly to the medial compartment**, but also to the patellofemoral, and at times laterally.

My studies show a **peak/group at 5 to 8 years following initial PCL injury**, in the active sportsman, continuing to play impact and propulsive sports such as football, basketball, squash and hockey;

Returning with degenerative knee symptoms

DEGENERATION

- 5 - 8 years*
- ACTIVE*
= IMPACT

The extent of osteoarthritis did not correlate directly with the degree of laxity or the quadriceps strength, but more to the activity levels pursued and to the lower limb alignment.

The definitive treatment of any knee problem depends on the condition or pathology as assessed by the treating surgeon, on his philosophy and treatment options, as well as the patient's and surgeon's expectations.

Surgery should not be undertaken because of:

- a preconceived idea that conservative treatment does not work;
- Or purely "wanting it fixed";
- Or if having undergone an inappropriate or inadequate rehabilitation.

SURGERY not because

- *? Conservative treatment*
- *'Want it fixed'*
- *Inappropriate or inadequate rehabilitation*

CONDITION TREATMENT EXPECTATIONS

Activity modifications in the PCL deficient knee relate to:

- (a) **Sports** involving jumping, leaping and landing, accelerating/decelerating, and protective mechanism.
- (b) **Work** involving kneeling, squatting, climbing.

ACTIVITY

SPORT

- *JUMP - LEAP - LAND*
- *ACCELERATE - DECELERATE*
- *PROTECT*

WORK

- *SQUAT - KNEEL - CLIMB*

Conservative treatment from an orthopaedic surgeon does not mean – neglect, or arthroscopy and then neglect without supervision of appropriate rehabilitation.

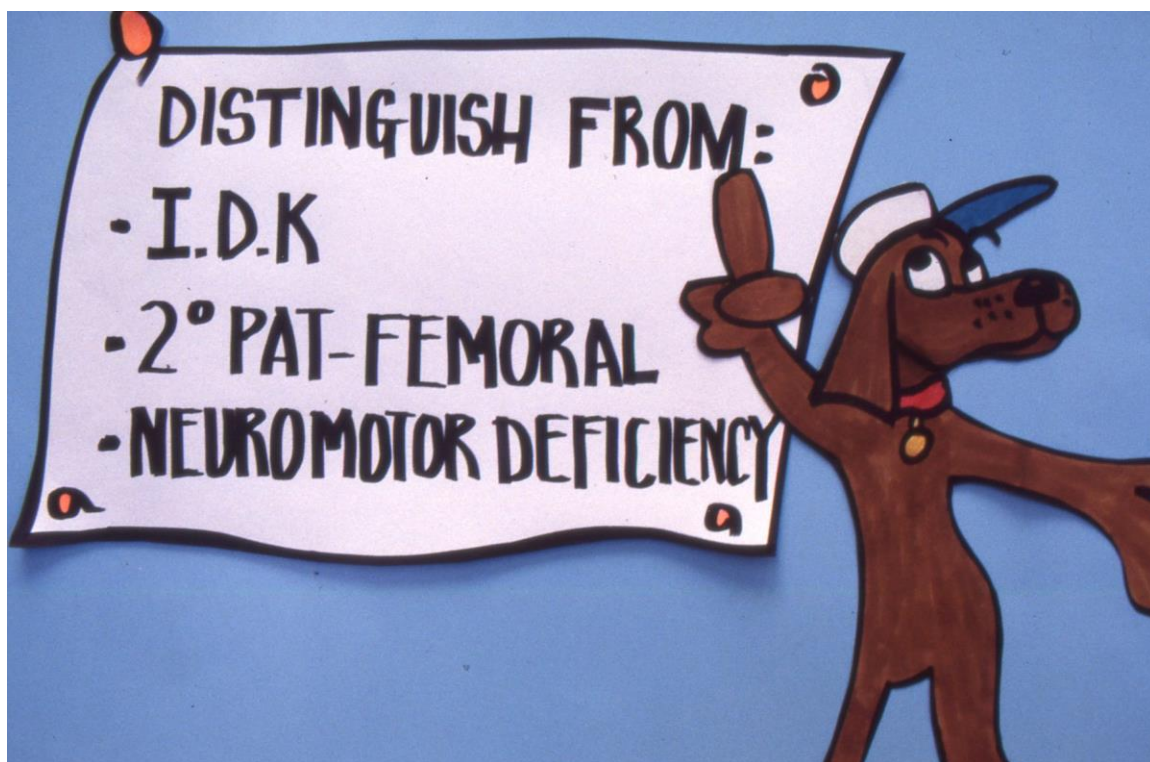
“CONSERVATIVE TREATMENT”

- NOT NEGLECT
- OR ARTHROSCOPY
THEN NEGLECT

Need to distinguish the **symptoms of PCL insufficiency**.

SYMPTOMS OF P.C.L. ‘INSUFFICIENCY’

Distinguish from – IDK of meniscochondral origin, secondary patellofemoral pathology, and neuromotor deficiency (strength, endurance and proprioception).



Each aspect of the problem requires attention, appropriate treatment, explanation to the patient –



...and lots of outside cycling and then sport-specific training.



In order to assess the short-term and long-term results, we need to look "critically" at our options.

Consider any indication for surgery only when the benefits may be considered to outweigh the **possible problems** – Neurovascular and technical.

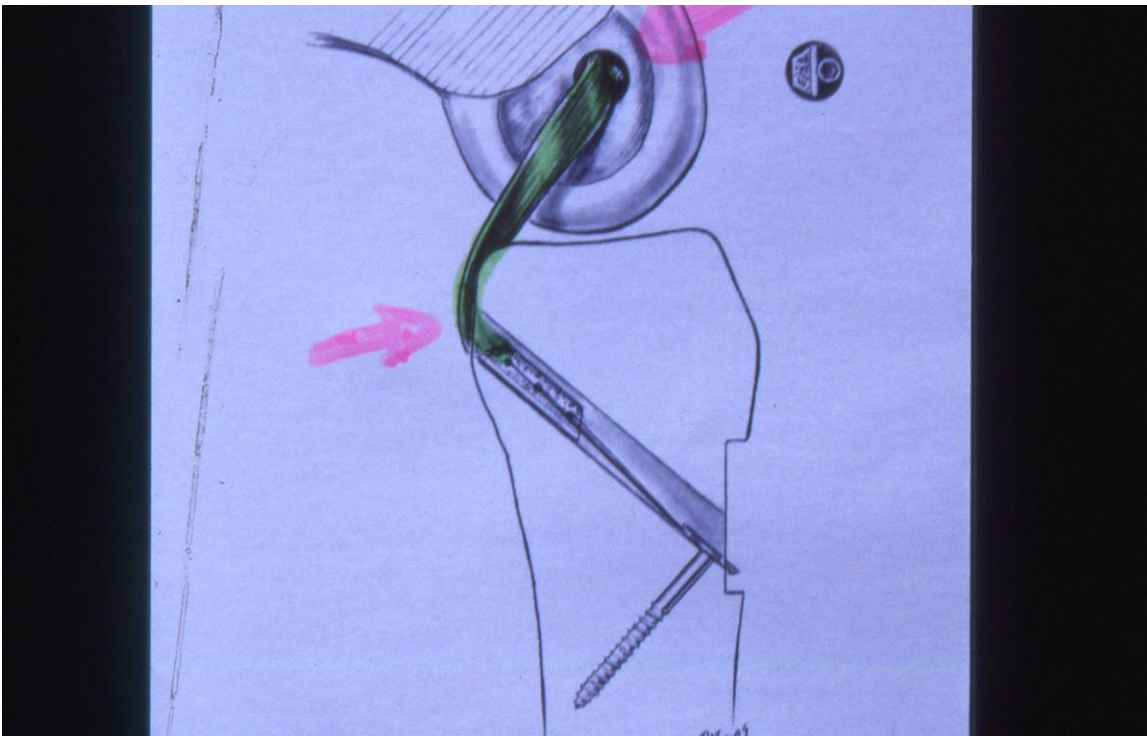
*INDICATIONS
FOR SURGERY
BENEFITS OUTWEIGH
THE PROBLEMS*

LAXITY
SINGLE PLANE
V
ROTATIONAL
(INSTABILITY)

PCL reconstruction, in my hands, being **not predictable**.

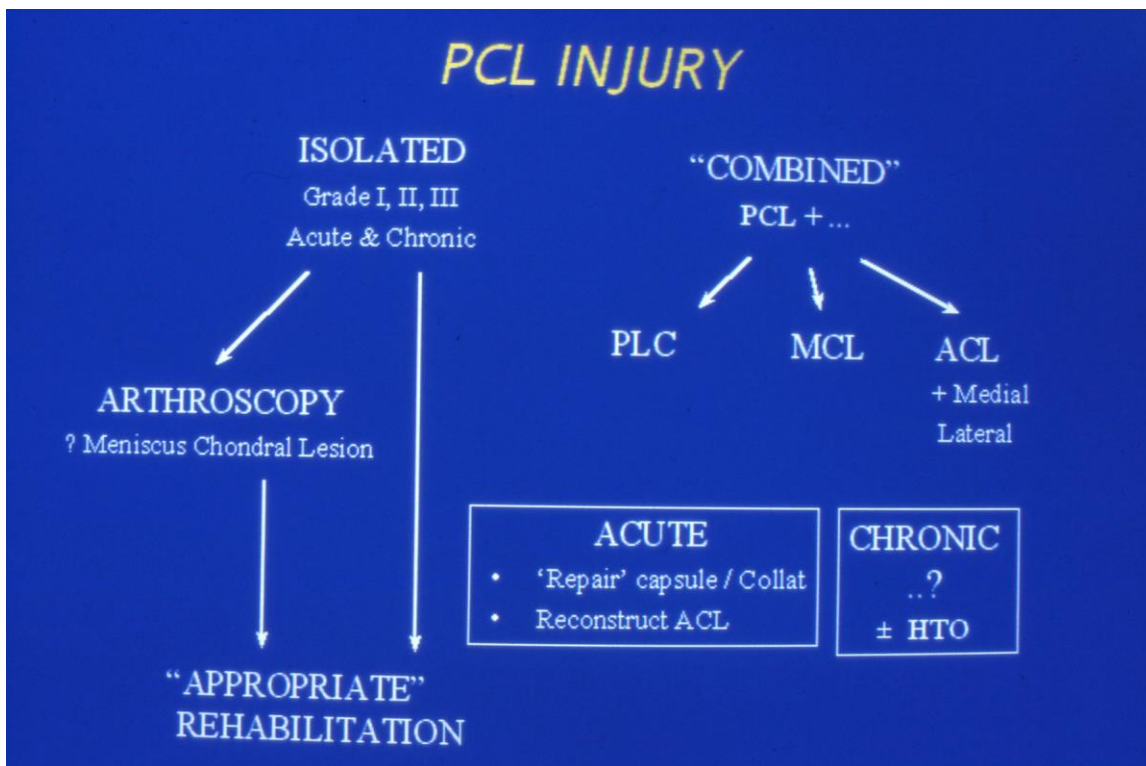
This relates to the course of the graft through the bony angles and edges, and then with no adequate protection through the graft remodelling phase/period.

P.C.L. RECONSTRUCTION
NOT PREDICTABLE
• ANGLES / EDGES
• NO PROTECTION
– 'REMODELLING'



Operation should not be considered as a technical challenge purely for financial reward.





Remember with all surgery and joint pathology that **"biology is the common ground"**; this being a composite of tendon graft and scar tissue.

Do not meddle –and if not familiar and technically confident in these clinical problems – then consider sending to an appropriate expert.

IN CONCLUSION:

PCL injury may be isolated, but may be complex ligamentous and other associated internal derangement.

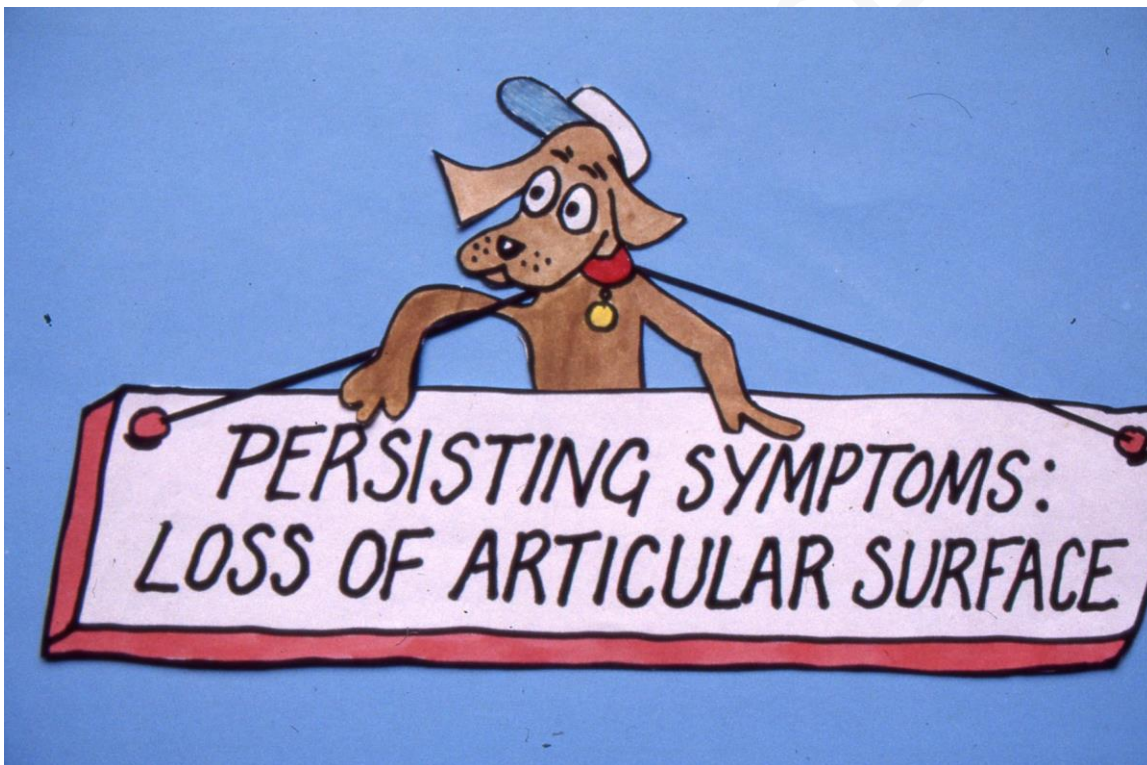
Posterior cruciate ligament deficiency is a single plane lesion, but always need to consider and assess related to rotational laxity and the increased risk of instability and degeneration.

The conservatively managed sportsman with posterior cruciate ligament injury requires a team approach with appropriate and progressive rehabilitation, – both related to type of exercises and timing, and with an interested and knowledgeable rehabilitation team and orthopaedic surgeon.

SYMPTOMS O.A. + EXTENT

NOT DIRECTLY RELATED

- DEGREE OF LAXITY*
- QUADS' STRENGTH*



Please visit <https://www.ianmclean.com.au/> for further information and links to reputable online orthopaedic resources.

NOTE: No warranty, liability or responsibility can be claimed whatsoever in relation to the information provided, its use or application. Any information, advice or recommendations must be considered in accordance with, and conducted under, expert medical supervision.

Iain D McLean