# THE DEGENERATIVE KNEE PROBLEM

## ORTHOPAEDIC PAPER



Dear colleagues and interested parties,

This document is part of a series of Orthopaedic Papers 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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## THE DEGENERATIVE KNEE PROBLEM

# **SOCRATES**

469 to 399 be "Seek the truth. Act on knowledge"

#### Defining a degenerative knee with appropriate investigations, treatment options, including possible role of arthroscopy:

The role of arthroscopy in the degenerative/arthritic knee has come under scrutiny with more recent journal papers and articles, along with the popular press, questioning the role of arthroscopy in the degenerative knee.

Claims that such surgery is no better than a "sham" procedure, or purely joint wash-out. At best then, being a placebo effect that does not change the course of the disease.

It has risks, related to complications and worsening the clinical state, and precipitating the need for total kneereplacement at an earlier stage than would otherwise have been expected.

This has quite rightly raised many questions regarding its role and effectiveness in such pathological states, and therefore considered by some to be contraindicated.

The government and insurance companies (the "bean counters"), looking at the total number of arthroscopies performed, and the costs associated with these.

Therefore, the question asked is – "are they cost effective?!"







When jumping to these conclusions and making broad sweeping statements, we need to analyse things a little more carefully and see where all the criticism is coming from, and why.

This then raises the many complexities of any medical condition and the appropriate treatments, , understanding each of the multiple factors that contribute to the clinical outcome of a specific patient and the specific condition.

In these degenerative knees, the question does come down to:

- 1. What is cost effective investigation?
- 2. What is cost effective treatment?
- 3. What are the relative outcomes?

# Do any of these treatment options assist the individual patient, and do they possibly alter the course of the knee disease?

The public, patients, the "bean counters", and treating practitioners need to be aware that the aim of all treatment is "not cure", but that of improving the presenting clinical or functional disability – and not just viewing the treatment options in isolation (and when necessary arthroscopy) – but as part of the diagnostic and possibly therapeutic treatment modalities.

The orthopaedic surgeons should not consider arthroscopy purely as a ready income source!! – and the sceptics as purely a cost to society.



There is no "magic wand" or treatment that fits all degenerative knee problems.

There is a need to understand the role of appropriate treatment options, and often the combination of such treatments, with communication and dialogue between practitioners, and all being on the same wavelength.

The OPERATION The PATHOLOGY The PATIENT The MANAGEMENT



**Relative to arthroscopic surgery,** let us not throw the baby out with the bathwater.

We need to go back and look at the considerable advances that have taken place with the advent and use of the arthroscope. Remember that it is purely a small instrument that when properly and skilfully used, enables potential visualisation of the intra-articular structures of the knee.

This along with a probe to palpate and define the integrity, softness and instability of those structures.



The procedure performed under general anaesthesia provides the ability to undertake an examination under anaesthesia and so aid in assessing ligamentous and patellar stability, and true range of movement.

These are the components of a basic diagnostic arthroscopy since its advent in the late 1970s and 1980s.

Since that time, there has also been the development of the **MRI scanner**, with its advances and ability to "assist" in defining knee joint pathology, but remains as a **"static shadow of the truth"**. The MRI report is an interpretation and description of these shadows by a radiologist (of variable experience), and based on limited clinical information.

## M.R.I.

- INDICATIONS...
- COST.....to patient... ...to community.
- QUALITY....FILMS / SEQUENCES ...REPORTS / RADIOLOGIST
- INTERPRETING 'Shadows of the Truth'.
- DO NOT 'Treat a Radiologists' report'.



There is then a need to define what we are talking about in relation to a degenerative knee problem and osteoarthritis.

- The knee is a complex synovial joint with no bony stability, but dependent on capsular and ligamentous structures for stability, and enhanced by (or stressed by) bony congruity and alignment (both angular and rotational).
- Reliant on muscle balance, strength and co-ordination for movement and functional activities.
- The integrity of the intra-articular structures (menisci and articular cartilage), are required to enable cushioning and free flowing motion of the joint.
- These structures have a unique architecture related to the collagen scaffold, cellular distribution, ground substance – and being basically avascular – with reliance on joint

motion and intermittent compression to gain their nutrition from a healthy synovial fluid.

- The menisci having initially in the young, a peripheral/capsular blood supply, that significantly retracts with age.
- The chondral surface with a superficial layer or seal, an intermediate layer, and a basal cellular layer, has a reducing ability to reproduce with age.
- They therefore have no (or minimal) regenerative capacity, so that with any breakdown of their surface integrity by a single mechanical injury, excessive repetitive loads, with age, genetic factors, or caused by or predisposed to a primary inflammatory disorder.
- Thus is created a "vulnerable joint" resulting in a progressive degenerative deterioration of the knee joint and functional capacity.



'stem cell'

- 'rule of thirds'
- cells=chondrocytes....culture.. /
- collagen framework = fibroblasts
- ground substance = glucosamine/chondroitin...
- sequence / organization = 'specific architecture'!!!!<sup>42</sup>

### Causal Factors

There are a multiplicity of causative factors, all contributing to a degenerative knee joint problem.

These are broadly grouped into:

 (a) Primary inflammatory state – including rheumatoid arthritis, psoriatic arthritis, crystalloid arthropathy (gout and pseudo-gout), and other inflammatory states (including obesity).

- (b) Nonspecific inflammatory predisposition encompassing a broad group of individuals who tend to swell/joint effusion, being reactive in nature; occurring with any meniscal or chondral pathology, or with arthroscopic intervention, or to inappropriate loaded activities.
- (c) **The wear/tear/injury group of osteoarthritis** presenting as a "dry" degenerative knee.



Recognise the fact that any breakdown in joint integrity then has a mechanical and inflammatory/ humero-chemical process affecting all components of the knee.

This process can be recognised by the more advanced MRI techniques and sequences, and by serum biomarkers, relative to collagen breakdown and inflammatory cytokines.



#### Outcomes

A multiplicity of factors determines the possible outcome or satisfaction of any patient following treatment of a degenerative knee condition.

In order to attempt to consider the complex questions then look at the problem under four specific headings:

- 1. PATHOLOGY OF DEGENERATIVE KNEE PROBLEMS
- 2. THE INDIVIDUAL PATIENT
- 3. THE MANAGEMENT
- 4. SURGERY/SURGEON



## 1. PATHOLOGY – OF THE DEGENERATIVE KNEE

The degenerative knee can be seen at any age, from early 20s through to the 70-80 year-old and beyond.

Degeneration is initiated by:

- 1. Excessive force of a single incident, or in a repetitive manner, on normal tissues; or
- 2. A normal force being applied to abnormal tissues.

Therefore, having wear from mechanical loads and imbalance, breakdown resulting from humeral/ chemical/ lysosomal factors, all then leading to **clinical presentation**.



The severity of any presenting symptoms – are influenced by, and often relating to the site, size and degree of those pathologies – and then related to time and activities.

Symptoms can relate to pain, catch/lock, click/crepitus, or giving-way, and presenting clinically with swelling, decreased range of movement, quadriceps/VMO muscle wasting and dysfunction.

Again, noting the:

(a) Primary inflammatory conditions of gout or pseudogout, rheumatoid or seronegative arthritis, psoriatic or other inflammatory GI conditions.

Recognise that obesity has an inflammatory component on the joints.

Those with:

- (b) Inflammatory predisposition with effusion and reactive swelling;
- (c) Family and genetic predispositions;
- (d) Anatomical alignments and malrotations; or
- (e) Injury (with or without surgery) to menisci and/or chondral surfaces, patellofemoral instability, ligamentous injury and laxity.

These in a "knee abuser" lead to rapid joint breakdown.



### 2. THE INDIVIDUAL PATIENT

There are many factors relative to individual patients that influence the joint pathology, the clinical presentation, and then possible outcomes.

- Age: specifically physiological as opposed to chronological age.
- Psycho-emotional: including anxiety and fear of doing more damage, with multiple factors potentially having impact including social/ cultural and family.
- "Intelligence": not so much "IQ" as common sense and attention/awareness.
- Pain perception: that then relates to pain, anxiety and fear. These then have a definite neuro-humeral effect, as well as impacting on joint motion, range of movement, and on muscle activation (or inhibition), then resulting in secondary quadriceps/VMO muscle wasting, imbalance and dysfunction.

The psycho-emotional state also then impacts patient motivation and persistence, along with the gaining of appropriate knowledge, and whether they have had a positive or negative past experience.

 Preconceived ideas: that may then relate to realistic or totally unrealistic expectations, gained or influenced by family, peers, press, TV, and "Dr Google".

There is – particularly here in Melbourne – the belief that with any knee problem you will have an MRI and then arthroscopy, and will be as good as gold/new in a "couple of weeks" – no matter your age or pathology – **"just like the AFL footballers"**.



- Anxious
- Pain sensitive
- Dependent
- Aggressive
- W/C
  - Third party (W/C, TAC): These factors may mean that a patient may not engage, simply wanting it fixed, and/or blaming others for the outcome.

Patient may be influenced also by the work environment and possibly secondary gain, with potentiation of the problem and possible "way out".

- Self-employed and competitive athletic individuals are generally/usually more perceptive, curious and informed, with motivation and a competitive drive – but in some individuals, this leading to "too much too soon" and aggravation of the pathology.
- Perception what the patient considers is good and appropriate treatment by good and appropriate personnel, may have a placebo effect.

Conversely, having a negative perception, with the patient being poorly informed and guided, and leading to a nociceptive problem.

 Protoplasm – of trained versus untrained tissues. The untrained and obese have different building materials in relation to muscle, bone and neuromotor function; as opposed to a trained, fit, body-aware, co-ordinated/ proprioceptive, muscle tendon unit.  Anatomy, alignment, and biomechanics all having significant contributing factors to possible outcomes.

# The psycho-emotional factors and mental state have a major impact on pain, perception and interpretation.

#### • Optimistic/positive:

This relates to motivation and 'positive vibes', leading to joint motion and activation of muscles and activation of the neuromotor system.

This leads to a positive approach to appropriate rehabilitation and the likely improvement and recovery.

#### • Pessimistic/depressive/anxious:

Tend to lack or have no motivation, 'negative vibes', leading to lack of movement and lack of muscle activation. This leads to a negative vicious circle, with clinical state worsening, ongoing and then towards more permanent debility and disability (chronic complex pain component).



#### PAIN

- PATHOLOGY
- TOLERANCE
- ANXIETY ....1\*
- 2\* to parents / spouse etc.
- SECONDARY GAIN... ..W/C....school....home.
- R.S.D.....Pain Syndromes.
- = Quads inhibition / stiff / Pat-fem...

## 3. MANAGEMENT OF DEGENERATIVE KNEE CONDITION

This may depend on the **presentation** to the primary clinician.

- (a) Acute onset or injury in previously asymptomatic but constitutional degenerative or vulnerable knee ("but I didn't have arthritis before...");
- (b) Recurrence, aggravation, episodic, activity-related, pain +/- swelling;
- (c) Chronic progressive, with acceptance of limitations, to the point of worsening or no return.

The pathway of care, investigation and treatment will then be dependent initially on who they consult with about their particular problem – with a bit of the "luck of the draw".

All practitioners have their particular interests, knowledge and biases relative to their line of care, and a degree of preconceived ideas.

Whether these practitioners treat that patient with their particular modalities, or purely recommend ongoing referral.

The primary or initial consultation with any particular patient can be to a chiropractor/osteopath, to a naturopath, or to their local chemist (are we questioning their cost effectiveness?).

Those attending an emergency department, their general practitioner, or physiotherapist, generally consider that they need an MRI study on which to decide their treatment options (and generally consider x-rays will show nothing).

It is our responsibility to educate and inform relative to the importance of initial good quality, appropriate plain X-Rays (AP, lateral, intercondylar, skyline) but also AP weight bearing and PA 45° flexion weight bearing (Rosenberg) views in the suspected degenerative knee.



All treatment options have their upsides/benefits, and their downsides/problems or possible complications.

These needing to be recognised and reviewed by the knowledgeable practitioner, and not biased by those with self-interest.

Referral with **consideration relative to a conservative program** would be to a rheumatologist, sports physician, physiotherapist, or a conservative orthopaedic surgeon.

#### (a) SPORTS PHYSICIAN:

The majority generally have a very good overall perspective on the management of degenerative knee problems, with weight loss and exercise, and the role of arthroscopy (as they do assist orthopaedic surgeons in these procedures) and aware of their outcomes.

They may, however, be subject to bias' if referring to, and assisting, an aggressive orthopaedic surgeon – or even have financial interest in promoting the as yet unproven, but expensive, intra-articular injections of PRP or stem cells, etc.

#### (b) RHEUMATOLOGIST:

Undertakes the appropriate investigations and specific treatments in regard to the inflammatory knee conditions.

Institutes specific diagnostic and therapeutic regimes for those conditions.

The medication(s) have possible benefits, but needing to consider the allergies, appropriate doses, and possible toxic effects on the gut, kidneys or liver, and on co-morbidities or medication.

**Intra-articular injections:** initially related to steroids – need to note the response and consideration relative to intervals between – or need for multiple injections.

Consider their effects on the articular cartilage, and avoiding the intra-articular use of local anaesthesia.

Intra-articular high molecular weight hyaluronic acid (Synvisc etc) are considered in some degenerative knees. These are expensive and have variable and unpredictable outcomes relative to improving aching pains, but not in inflammatory joints or with mechanical symptoms. There is then the variable duration of such possible improvements, and consideration of repetitive injections (how many, how often).

# Be aware of the placebo effect when "sold" to the patient as "lubricating" the joint.

There should be a respectful co-operation and cross referrals between rheumatologist and orthopaedic surgeon, each recognising their own limitations.

#### (c) RADIOLOGY DEPARTMENT/RADIOLOGIST:

These facilities now play a vital role in the diagnosis and management of degenerative knee pathology. However, they do need to play a part in educating the referring practitioners and patients to the primary place of quality plain X-Rays (including weight bearing views) – and the limited value of ultrasound studies – prior to considering or requesting MRI scans.

These scans do have a definite value, particularly with the new/modern/advanced equipment, to more clearly image the anatomical structures, their integrity, and compositional changes (to the biological and microstructure).

However, the common MRI machines/equipment, and the particular sequences (in this setting) of the knee, will be determined, both on ability to perform "adequate" imaging for their clinicians.

This is also determined by cost-effectiveness factors, with limiting of sequences for the sake of expediency and quicker procedure, and therefore the greater the patient throughput/volume of studies. (rebate only MRI !!!)

#### The interpretation/radiological report:

Of the particular images by a radiologist (sitting in a room continuously looking at images on a computer screen), will then vary according to the care, time and experience of that radiologist.

Depends also on their individual descriptions and terms used to describe what is seen – i.e. the pathology (interpreting, describing, but "shadows of the truth") and on the limited clinical information given by the ordering clinician.

It is not wise or appropriate to base treatment purely or substantially on an MRI report with descriptive terms of 'tear', 'rupture', 'fracture', and 'arthritis' often provoking inappropriate guarding and apprehension.

The treating clinician or orthopaedic surgeon must visualise the MRI images themselves to aid in the clinical decisions regarding an appropriate treatment program for that individual patient.

So often on MRI images, "changes" are seen in the menisci, articular cartilage and/or bone, with these needing to be correlated or applied to the individual clinical setting.

#### INTRA-ARTICULAR and PERI-ARTICULAR INJECTIONS:

The radiology departments/radiologists are being requested to perform intra-articular injections, generally under ultrasound control, often relative to cortisone/steroids, and at times relative to high molecular weight hyaluronic acid (Synvisc etc).

These departments set up a sterile injecting environment and procedures (as opposed to some medical practitioners' offices).

There are some entrepreneurial radiology departments with equipment and facilities to perform PRP, autologous conditioned serum, or in some, adipose and other stem cell treatment.

Their cost and effectiveness are unpredictable, with a definite placebo factor.

#### (d) PHYSIOTHERAPIST:

Physiotherapists play a vital and significant role in the management of degenerative knee problems, including:

- i. As the initial patient contact for assessment and organising ongoing investigations or referral;
- ii. The central role in conservative or non-operative treatment;
- iii. In preoperative preparation, by instruction relative to appropriate exercises, education; and use of crutches;
- iv. Postoperative management and assistance with mobilising, appropriate exercises, in both type and timing;
- v. Structuring and guiding towards a self-managed, interesting and sustainable program for the future.

There needs to be a good working relationship and communication between the physiotherapist and orthopaedic surgeon, recognising each individual patient's joint pathology and responses.

Understanding the basics of quadriceps inhibition and the requirements of quadriceps activation, and, if necessary, the use of stims and biofeedback equipment.

The importance of gaining range of movement, particularly into extension, by frequent movements to a tight pressure sensation, holding and releasing, but not forcing into pain or performing jerky or sudden passive manipulation to pain.

Understanding the concept of **"joint irritability"** relating to pain, swelling, restricted movement and quadriceps dysfunction.

Not attempting to push forward with further activities, before these are controlled, or when doing more loaded exercise to produce recurring irritability; (of pain +/- swelling). This is counter-productive and results in failure to progress.

To make progress need to initiate quadriceps activity, ability to straight leg raise with no lag, progress gradually with range of movement, particularly to extension initially and then further flexion, reducing joint swelling, reducing joint pain, and then concentrating on gaining a normal walk pattern before undertaking any more advanced activities. The physiotherapists, in association with the orthopaedic surgeon, need to be aware of the various joint pathologies relative to the site of the lesions and their stability or instability –

Recognise that persistent or recurring joint effusions (contain inflammatory cytokines).

- (a) make the articular surface chondral more vulnerable to more rapid break down and leading to the 'degenerative cascade'
- (b) inhibit Quads / VMO function and development.

Needing to then progress individuals, dependent on their interests and their joint pathology, into functional activities that they may then pursue progressively into the longer term.

Understand that most people might undertake some specific exercises set by their physiotherapist initially, but not continue to pursue these into the longer term.

There lies the basics of walk a bit, swim a bit, cycle a bit, and incorporate a core stability component.

And, if you don't use it; you lose it...

1. "Walk a bit":

Determined by the joint pathology, but the aim always is to gain a normal walking pattern/gait. Once this is achieved, then walking slowly, "stroll" for short distances, and gradually increase if/as tolerated. Always on the flat surfaces, wearing good cushioned shoes, on a regular basis.

#### 2. "Swim a bit":

Meaning to exercise in the pool.

Commence slow, light walking straight forwards and then backwards in waist or chest-high water.

Then holding onto the edge/wall, do cycling type movements. If tolerated, then do a quarter type squat.

All performed slowly and deliberately, commence initially with only 10 to 15 minutes in the pool, then increasing each session if tolerated.

Then – using a vest or noodle for buoyancy – perform suspension type walking/cycle movements.

If a good or reasonable swimmer, then commence swimming "a few laps", initially with a **pool buoy** 

between the thighs/knees that keeps the legs buoyant, and needing minimal or no kicking action initially. As the patient regains their swimming ability and can do some laps, being careful when pushing off from the wall, increasing the laps and mixing up their strokes of freestyle and backstroke (but not breaststroke); progressing to some laps with and some laps without the pool buoy.

After each session, being sure to not produce the reactivity of pain and/or swelling, before progressing further.

#### 3. "Cycle a bit":

Generally recommended, at least initially, the upright as opposed to reclining (recumbent) cycle.

Instruction relative to the use of exercise cycle or at home with their normal cycle on turbo-trainer, at all times with the seat high and minimal resistance.

Having gained a range of motion of zero, or close to full extension, with at least 100 degrees of knee flexion before commencing.

Do not use the cycle to gain range of movement by rocking type movement, or by lowering the seat height.

Starting with just three or four minutes and progressing gradually if tolerated.

The cycle – in the vast majority of knee problems, as they lose the swelling, pain and irritability – is one of the best activities to pursue, but mix this up with other appropriate pursuits.

Cycling is excellent and tolerated well in 80 to 90% of predominately tibio-femoral degenerative change and also in many patella-femoral problems.

The physiotherapist's role is also to guide or **caution relative to gym equipment** in those recovering from degenerative flare-ups or surgery, with caution regarding the use of treadmills – patients are far better advised to walk / stroll outside on a flat surface, gaining a more normal walk pattern / gait. Beware of leg extension machines, high step-ups and forced lunges.

The physiotherapist also has a role (along with the orthopaedic surgeon) in teaching individuals the way to perform a part squat in the correct manner so as to not

stress either knee or their back. Note a weight-lifters technique.

Instruct how to avoid deeper squatting beyond 70 to 80 degrees, and needing to avoid or modify getting down to the ground or floor and then arising by using appropriate stools or chairs in the home setting, and for tradesman or handyman, and others, the use of hydraulic stools or toolkits.

For grandparents looking after young children, to sit on chairs, stools or the coffee table, and have the children come to them.

Not sitting in low chairs and couches, and if necessary the raised toilet seats.

"You need to build up your quadriceps!!" is a common statement from orthopaedic surgeons and physiotherapists, but often with aggravation of the degenerative knee condition with further pain, swelling and disability.

While there is this irritability, then one will not make progress as this is then counterproductive and inhibitory in nature.

The aim always is to gain mobility, lose irritability, **so as to gain muscle tone, form and function**.

Often the best exercises to build up quadriceps strength in the young normal knee is the worst possible on the degenerative knee.

Those in particular being weighted squats, leg extensions, heavier deep leg press, and loaded or deep lunges.

Physiotherapists should not tell the patient "there is nothing I can do until you have had surgery".

There are multiple simple explanations and guidance required.

#### (e) ORTHOTIST

Referral to orthotist can be of value with guidance relative to:

- Appropriate footwear, cushioned insert, as opposed to rigid orthotics.
- Simple knee supports in the way of pull-on elastic or neoprene sleeves, or possibly

requirements of specific braces for particular instabilities or unloading.

**These supports** need to be trialled, and with appropriate size and fitting. If they help, then continue their use.

**They do not make your knee weaker.** In fact, if they enable you to be more confident and secure, then they have a significantly beneficial effect on form and function.



#### (f) NATURAL THERAPIES

Before dismissing these as "hocus pocus"/ a con and advertising triumph with no substance / at best a placebo effect...

We need to understand and explain to the patient that **they do not make "anything re-grow"**, but each culture has particular substances that have been used over many decades (or much longer) and continue to be used, with patients claiming improvement in their joint symptoms by their use.



For example:

"Grandma's" cod liver oil: the English/Europeans pursue the fish oils that basically contain Omega-3.

• Omega-3:

- Omega-3 has been shown to have an antiinflammatory effect (though likely not many of the other claims). Omega-3 is contained in fish oil, krill oil, and flaxseed oil.
- Chinese/Japanese/Asian shark cartilage:
  Being the basis of glucosamine and chondroitin.
- Italian/Southern European high dose garlic: Needs caution as this can cause bleeding/ clotting problems with surgery or trauma.
- Maori/Polynesion/Melanesian green mussel extract:

Caution required relative to adverse effects or cross-reactivity with other medication.

If any of these are undertaken, then taking whatever the manufacturer's recommendations are for the first three or four weeks, before then purely taking a single capsule each morning, in an ongoing fashion, if being of benefit.

## 4. THE ARTHROSCOPIC SURGERY

## TRIM & TIDY 'raggy / daggy' broken down bits

- TIME
- APPROPRIATE ACTIVITIES == REHAB. WORK / SPORT.
- to 'heal & seal'...[ not re-grow ]
- to 'mature & stabilize
- to reduce the 'rate of progression'.

# SURGEON failed to...

- EXPLAIN,
- LISTEN or
- FOLLOW UP = TOO BUSY

The OPERATION The PATHOLOGY The PATIENT The MANAGEMENT "There is an operation for all knee conditions."

...but there is no condition that surgery cannot make worse.

No surgery is immune from the risk of complications.

Surgery inappropriate in timing or type can be a disaster.

Meticulous portal placement. Care to avoid iatrogenic chondral damage.

Micro-fracture has no place in the degenerative knee. Why damage the vital sub-chondral bone integrity??



The role of arthroscopy then is to define the pathology more clearly (not reliant on MRI report).

Deal with any reversible components (limited to debriding "raggy daggy" meniscochondral pathologies – similar to 'lawn mowing'/ a 'tidy up').

So as to set an appropriate exercise and rehabilitation program.

Leading to appropriate work, recreation, or possible sports activities (modified).

The role of arthroscopy in the degenerative knee – only following adequate history, examination and radiological studies.

Undertake adequate and appropriate conservative measures, and **adequate and appropriate preoperative preparation, relative to quadriceps activation**, teaching appropriate method of using crutches.

Discuss impacting factors including obesity, inflammation, alignment, as well as **"realistic expectations" regarding outcome and time.** 

Explain the pathology in simple terms relative to the articular surface and menisci, their inability to regrow/regenerate., and with the possible aim of achieving the pathology/lesion surgically dealt with to "heal, seal and stabilise".

This with acknowledgement of it being a second-rate material; and not the same as nature created.

To give the biology/repair response any chance of proceeding to a best possible outcome;

There is the need for recognition of joint "irritability"; of pain; limited movement; and swelling; with this needing to settle/subside before progress can be made in that particular knee and patient.



Recognise **time factors (**simplified by "the threes and fours") in the postoperative period.

- i. **Three or four hours post-surgery** is when the patient should be assessed prior to discharge home, including ability to adequately contract their quadriceps, perform a leg raise (having practised these pre-operatively), have adequate analgesia, and without having postoperative bleeding or complications.
- Within the first three or four days post-surgery is when the patient should have been mobilising between crutches to the toilet or refrigerator, then to elevate the leg and knee, ice the area, and perform the simple calf and quadriceps exercises at home.

The aim during the first three or four weeks postoperatively (the irritable period) is to regain quadricep activation and control with straight leg raise and no lag, progressively weight bearing and walking with as normal a walking pattern as possible, but not standing for any length of time or walking any great distance. Progression with range of movement, particularly into extension and also flexion, but not having performed loaded and stressed activities.

If failing to activate the quadriceps within this time period, there is a need for assistance with muscle stims and biofeedback.

# HEAL BY SCAR NOT REPLICATION

iii. Following the first three to four weeks (entering the biological phase) where any tissues/debrided/trimmed/tidied and tapered will have attracted a blood or fibrin clot that is initially very friable, but (if subjected to physiological stress/loading) will undergo functional adaptation, with ingrowth of fibroblasts +/- multi plural stem cells, to form a scaffold of collagen, ground substance and cellular components.

Aim at gaining adequate range of movement so as to have commenced (or close to commencing) light rolling over of an indoor exercise cycle with the seat high. Do not use the exercise cycle to gain movement, and do not lower the seat height. Use comfortable "flat pedals" and shoes, avoiding clipless/cleat shoes during this time.



Pool exercise or swimming with a floatation pool buoy.

No twisting, squatting, loading onto the knee.

From this time, **progress in a graduated, rhythmic fashion**, with the aim of gaining the more normal walking pattern, swimming and performing light exercises in the pool, progressive exercise cycle work (at all times with the seat high), and adding in, as appropriate, a core stability/Clinical Pilates component.

Stressing the joint with inappropriate activities including twisting and loading will prejudice any biological repair responses, causing breakdown and often recognised by producing pain +/- swelling.

# iv. By three or four months post-arthroscopic surgery (the 'maturation / stabilising phase').

Appropriate activities are required for the biological repair response to **"heal, seal and stabilise"**, with a degree of maturation of the fibrous scar or possible fibrocartilage.

Be aware of this prolonged time period of vulnerability. Then maintain a functional knee and general health, including body weight, by appropriate degrees of walking, swimming and cycling.

This **pathological process** – or **inappropriate activities** – during this biological period, may result in failure to heal, seal and stabilise, and likely progression into the **"degenerative cascade"**.

Pool exercises / swimming is encouraged for all knee problems.

Patello-femoral degenerative problems generally progress well with walking on flat surfaces and avoiding bent knee loading activities. Tibio-femoral degenerative problems generally progress well with light cycle, seat high initially on indoor exercise cycle.

Always need to consider the multiplicity of contributing factors to each individual patient's clinical state.

There is no magic formula or path that 'fits all'.

The aim in treating the degenerative knee – which must be understood by the patient, surgeon, and any  $3^{rd}$ party – Is to "improve" the clinical status and understanding, not to "fix it" like it was before...

The role of arthroscopy in the degenerative knee is generally considered for a change in symptoms, with associated mechanical factors of catching, locking, or possible 'giving way'.

All parties must be aware of the **unpredictability of such intervention**, with there being no quick fix or cure.

Be aware that the whole process may take over a period of three, four, or possibly up to six months, for the knee to stabilise. With appropriate activities and learning the appropriate modification of activities, as an ongoing management strategy.

Even then however, a simple explanation relative to the unpredictability of arthroscopy in the degenerative knee (and even more so, in the inflammatory joint) relates to:

#### The rule of one-thirds.

- (a) One-third may have good "improvement" and are happy;
- (b) One-third have mild improvement or some help but with persisting limitations, yet hopefully with a better understanding of their condition and the status stabilising over that three to six months.
- (c) One-third show **no improvement** with no help.

The surgery may in fact initially stir up the knee, but with time and appropriate activities, settle down to basically the same as previously.



One-third of these, approximately 10% overall (in conservative, meticulous procedures), remain worse off and spiral into the degenerative cascade, precipitating the possible requirement of total knee replacement surgery at an earlier time than would otherwise have been expected.

This group is significantly expanded if appropriate care and caution is not undertaken at the time of surgery, or with inappropriate procedures for that patient or clinical setting, particularly related to such procedures as:

- 1. Micro-fracture!!;
- 2. lateral patellar release;
- 3. fat pad and synovial debridement; and
- 4. poorly tapered/debrided meniscochondral pathology; and
- 5. with inadequate lavage.

Arthroscopic surgery aims to reduce or eliminate mechanical symptoms, along with assisting in reducing joint effusion and swelling.

This does mean a "meticulous debridement" of unstable meniscal and chondral pathology (lawn mowing of "raggy-daggy" areas), without producing iatrogenic damage / pathology.

Have well tapered and stable margins of chondral surfaces and of meniscal margins, to reduce or eliminate the chances of new or persisting clicks/clunks/catching.

Follow by a thorough lavage/irrigation of all aspects of the knee joint to remove all debris that may contribute to possible persistence of joint effusion.

This enables a progressive and appropriate rhythmic exercise program and aiming to / hopefully reducing the rate of progression of the degenerative knee status. Recognise that each individual knee has its specific pathology and technical challenges – with individual biological responses relative to pain, swelling, range of movement, and muscle activation – leading to either a functionally stable knee or to ongoing functional disability.

#### **BEST POSSIBLE OUTCOMES/PATIENT SATISFACTION:**

The best possible outcome occurs in a setting of a knowledgeable, caring team of medical practitioners all "on the same wavelength", communicating one to the other, recognising each of their particular skills and contributions, and in educating the patient to undertake appropriate treatments, activities, and limitations.

A good team approach, with realistic expectations, is more likely to attain the best possible outcome of satisfaction for the patient. 5. PROBLEMS IN THE MANAGEMENT OF DEGENERATIVE KNEE CONDITIONS



### THE ORTHOPAEDIC SURGEON

Orthopaedic surgeons cover a diverse spectrum of personalities, attitudes, and motivations that may be other than for purely patient benefit – for instance financial and/or status/ego factors.

There is a spectrum of knowledge, experience, technical skills, and variable follow-up and review of their procedures to assess patient progress and satisfaction, and as to why such results occur.

It is always stated that "nothing spoils success like review and follow-up".

A multiplicity of factors in the operating theatre require an alert, knowledgeable team...

- At the operation including the anaesthetist and surgical assistant, assisting staff (scrub and scout nurses, technicians) and their co-operation
- Adequate, appropriate and sharp equipment;
- Appropriate care and consideration of the patient's presenting problems;
- Absence of poor attitude such as this being "just another scope";
- The expectation of a quick simple procedure with perceived pressure on the surgeon to move on before systematically and adequately dealing with that individual's pathology;

- Questions raised regarding arthroscopic surgery in the degenerative knee because of the numbers of procedures undertaken;
- Questions relative to the indications of the surgery if they do not appear to alter the course of the disease, but may accelerate that process;
- Unrealistic expectations of both surgeon and patients;
- Questions then relate to measuring the **outcomes** of the various reported studies and how **patient satisfaction** is measured.

A satisfied patient is one whose expectations of treatment have been met. This treatment may not have altered the course of the pathology, but the patient gained an understanding and guided into an ongoing management strategy.



As opposed to an **unhappy/dissatisfied patient** who may in fact be worse-off because of the procedure, provided with inappropriate guidance, or can be those who cannot/or do not want to accept or understand their pathology and the need to adapt and modify expectations and activities.

The basics have not changed – all patients/knee problems require the clinician to undertake a careful and appropriate history, examination, quality plain x-rays, and if / when quality MRI studies are conducted, that these are visualised by the surgeon, and treatment is not based on radiological reports.

#### Public perception and expectation of knee problem:



The public and many physiotherapists, medical practitioners (and often reinforced by the orthopaedic surgeon) conclude that knee problems require and lead to MRI studies to see "what is wrong", and then to arthroscopy to "fix it".

This is so often based on the perception of treatment of AFL footballers as seen on TV or the press, including that the sooner it is done, the quicker they will get going.

Denial of surgery or the suggestion of a more conservative approach can precipitate frustration if not guided, explained and followed by appropriate physiotherapy and surgeon review.

This can lead to the patient seeking opinion from another orthopaedic surgeon "who will operate" and fix the torn cartilage.

The expectation then is for "keyhole surgery" and to be "right again in a few weeks" (irrespective of age, pathology or activity demands).



There is a definite or potential **placebo effect**, if the patient gains confidence in the treating team, and the status of the operating surgeon.

There can be, however, the opposite clinical picture if the patient has had previous bad experience from surgery themselves (or family, friends or colleagues) that may have been made worse.

Or, if seen by a clinician/rheumatologist referring to the recent literature and suggesting avoiding arthroscopy/ intervention, even if this would be appropriate despite some "degenerative changes".

Defining a knee problem as having a degenerative nature based on MRI reports can be both inappropriate and misleading. Certainly, being aware of the degrees of chondral and meniscal pathology (in good quality studies), along with any reactive bone changes can be useful and helpful in decision making however.

# The best "technical" surgeon in the world cannot beat the biology.

Related to the underlying joint pathology, the preparation for, and then undertaking appropriate surgical intervention relative to its nature and timing, and then in understanding the biological response to that procedure and the time taken for stabilisation. To appreciate these factors, the surgeon must review his patients at different time periods post-operatively...

The orthopaedic surgeon, having performed the arthroscopic procedure, **should not** have the attitude so often conveyed to the patient...

- "I have done all I can ...until you have/need a knee replacement";
- You are purely an 'operating technician'!!

There is a need to emphasise:

- The role of an orthopaedic surgeon as being a "team leader" of caring, knowledgeable members;
- To ensure overall patient management and appropriate guidance;
- Treatment may be ongoing;
- At least to put in place suitable strategies for the future.



**The MBS item number/schedule of fees,** related to knee arthroscopy, can tend to encourage –

i. **To do things/meddle** that may not always be beneficial, and possibly can be to the detriment of the patient

Or possibly perceived as for financial gain.

 No follow-up, as the cost of postoperative follow-up is supposedly included in the surgical fees for that item number.

This, along with the fact that the procedure is considered to be "just a scope", leads to no postoperative reviews, or (if lucky) one review and rarely greater follow-up and review by the surgeon.

If the surgeon does follow-up more conscientiously and **charges the patient**, he may be pursued by the relevant government department for fraudulent claims.

This means the postoperative care is left in the hands of clinicians (the general practitioner or physiotherapist) who may not understand the pathology and exactly what was performed at the time of the surgery .

At times there is nobody, either appropriate or otherwise, guiding the patient post-surgery, and possibly being left to their own devices.

This leads to variable outcomes depending on:

- (a) well-motivated, sensible individual, who understand and 'listens to' their body; OR
- (b) an anxious, apprehensive, pain perceptive individual, who is afraid to make things worse, and ends up with a poor pain and functional outcome; OR
- (c) the self-employed tradesman or gung-ho type with unrealistic expectations doing 'too much, too soon', giving the joint no chance to 'heal, seal and stabilise'.
- iii. Re-referral: the above factors then lead to the patient, if they are not happy with the progress, then needing to return to his general practitioner for a "new referral",
- iv. If having confidence, then seeing the original orthopaedic surgeon; or if as often occurs, blaming the surgeon either justifiably or otherwise for their predicament, and seeking a second opinion from another surgeon (with a new MBS claim).



Please visit <u>https://www.iainmclean.com.au/</u> 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.