

Exercise prescription: What, Where, When and HOW!



1. Accurate diagnosis
2. Applied Anatomy
3. Biomechanics-specificity/detail

KNEES

Subjective

- 1. Mechanism of injury
- 2. Signs/Symptoms
- 3. Aggravating factors/forces

At this point a provisional diagnosis of stability, intra articular, peri-articular cause can be made.

Subjective assessment is dependant on basic understanding of biomechanics and the forces involved with movement.

The following forces occur at the knee

- Cycling 1,2 times body weight (BW)
- Walking 3-4 times BW
- Running 7-9 BW
- PFJ stair climbing (squat) 7-8 times BW
- Downhill skiing 8 times BW
- Ballet 12 times BW on pointe

(Kuster 2000)

* All dependant on knee angle

The physics explain why tissue failure and injury occur and why the strength to weight ratio is vital. This also explains the body types of professional ballet dancers.



Mechanisms of injury.

- 1. Stabilizers-landing one leg, cutting maneuver, fatigue
- 2. Articular surfaces- twisting with foot anchored
- 3. Peri-articular- patella- stairs, squats
Patella tendon- jumping, running
- 4. Other- fat pad

Knee Assessment

- 1. Observe- the artists eye
- 2. Feel- surface anatomy-joint line
- 3. Stability-MCL, LCL, ACL, PCL
- 4. Meniscal/articular surfaces
- 5. Patella
- 6. Other

Now what?

Conservative Vs Operative

Now/Later

- Stability-Surgical Vs Conservative
(Frobell et al, Sweden 2010)

Long term outcomes-OA

- Mensical/articular surfaces- Surgical Vs Conservative

Long term outcomes- OA

- Patella

- Other

ACL REPAIRS-WAIT AND WATCH?

- Frobell et al Sweden, New England Journal of Medicine. 2010
- N=111 knees with rotational trauma with ACL instability on a previously uninjured knee presented to A&E (age 18-35)
- Randomly allocated early OP/ NON-OP
- Reviewed at 3, 6 12 an 24 months
- Of Non -Op. group 39% underwent surgery at the average of 1 year post injury.
- At 2 years no difference between the three groups.

ACL REPAIRS? HELPING PATIENTS DECIDE

- Stability- return to twisting heavy weight bearing exercise- 65%-88%(19%-82% non-surgical)
- Early retirement (Roos et al)

At 3 years ACL repairs 80% still playing compared to 30% non repaired.

At 7 years none of the elite athletes where playing regardless of treatment.

Gender?(Male 17 Female 6 degrees.Huston et al 2000)

OA-advise re continuing heavy WB exercise.

These statistics are of elite athletes who have resources (time)for the extensive rehabilitation process.

One hour/day 12-18mths.

MENISCAL INJURIES

Prognosis(Brukner)

- Conservative treatment-
Symptoms develop later (i.e.. 24-48hrs)
No recall of specific injury.
Able to WB
Minimal swelling
Full ROM with pain only at end of range
McMurrays cause pain only in inner flexion
PHx rapid recovery similar injury
Early degenerative changes on plain x-ray

MENISCAL INJURIES(cont.)

- Surgical?

Severe twisting injury, athlete unable to continue playing.

Locked knee or severely restricted range of movement .

Positive McMurrays test(palpable clunk).

Presence of associated ACL tear.

Little improvement of clinical features after 3 weeks of conservative treatment(esp.ROM)

REHABILITATION

- Decrease swelling. Ice, Ice, Ice, Compression
- RELATIVE REST(crutches, support etc)
- MOVE REGULARLY THROUGH AVAILABLE ROM -CPM helps with articular cartilage repair(CPM, Knees swings, Bike)
- WORK THE SURROUNDING MUSCLES-
Quads/HS strengthening can decrease knee loading by 14% (Thorstensson et al 2007)and pain by 23%(O'Reilly SC et al 1999).
- Functional exercise ASAP
- Refer to specific rehab sheets. Time frames are for elite athletes in the ideal world.

Ageing gracefully. Adapting to the changes and the seasons.

- Cross training- mixing weight bearing and non-weight bearing exercise. Articular cartilage repair.
- Including flexibility, strengthening especially focused on core stability/posture.
- Maintain/ reduce body weight
- Walk- 12km/week maintain body weight. 16km/week for weight loss.

Cross training.

From a cardiovascular perspective the body does not care what form of exercise you choose. Varying the type, shares the forces over ageing joints. It also varies the range of joint movement muscles groups involved to spread the forces through a wider range of soft tissue.

Body Weight

- Obesity increases the risk for knee OA.
- Multi-factorial- chronic inflammation produced by adipose tissue that leads to both cardiovascular and joint disease. Even small amounts of weight loss can dramatically change mechanical knee loading. One kg loss reduces 4kg compressive force at the knee and 7kg at the foot. Also reduces medial loading. (Messier 2005). Weight loss, even in those mildly overweight should become a mainstay approach very early in the disease process.

Posture

- The years can weigh us down
- Adding yoga, hydrotherapy, swimming, zumba etc maintains flexibility and posture functionally reducing loads. i.e. Head posture and loads to Cx and Thx spine.
- Core stability- need to transfer the core stability to the functional setting i.e.. posture and trunk in walking, cervical flexor strength.
- Hip/Lx stability and posture can dramatically change the loading of the lower limb.

Where to start?

Walking- Remember 4 times
BW going through the knees.

Benefits- Weight loss/maintenance

With good posture helps strengthen and
maintain core stability. Walking tall is like
doing sit ups!

Mental health gains.

Cheap

Alone/friend/groups

SPS/Poles - decrease loads by 27%(Fregly BJ
et al 2009)