

reactivate

PUTTING
ACTIVITY
BACK INTO
YOUR LIFE

■ GROWTH ■ RESILIENCE ■ ENERGY ■ ATTITUDE ■ TEAMWORK

Quarterly **PHYSIOSOUTH** Newsletter

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PHOTO: Ollie Clifton and Chris North, Mt Rolleston. MARK WATSON



THE KNEE ISSUE

This newsletter is focused on the knee; its recovery from injury (repair), to its performance and long term health (perform), and yes – its connection with the central computer, the brain, with a focus on developing talent and skill, among other things.

Apart from the lumbar spine, the knee remains the biggest cause of musculo-skeletal pain and disability. It has its fair share of problems: from the high profile athlete who ruptures their ACL to the majority of us who experience increasing knee pain as we get older.

Certainly one of my reflections in terms of the human knee came from running the Routeburn Track race. Competitors under the age of 20 bounced down a steep descent – hopping from boulder to boulder with no fear, pain or weakness. However, panning back through the relative ages it was clear the older the competitors were, the worse their knees coped with the descent. Many of us over-50 racers were reduced to slow and sometimes sideways movement to descend the steeper sections and step downs. It hurt and it got worse the further down we went. We had less spring, strength and control; among other things. And these were normal knees!

The information in this issue of Reactivate is designed to help you understand about knees – your knees – and to give you some ideas on how to manage them better.

— Graeme Nuttridge



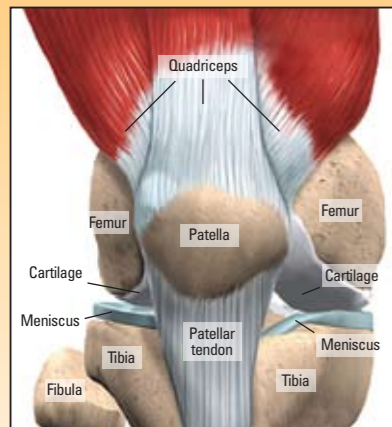
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Doctors can now make patient referrals online at www.physiosouth.co.nz. Our website now has an online referral page to make referring your patients to us even

simpler. Go to the referral tab, select *online referral*, complete the form and leave the rest to us. If you have any questions or suggestions to make this process easier please let us know.



GETTING TO KNOW YOUR KNEE



FRONT VIEW OF KNEE

The knee is a vulnerable joint that bears a great deal of stress from everyday activities such as lifting and kneeling, and from high-impact activities such as jogging and aerobics.

The knee is formed by the following parts:

- tibia - shin bone or larger bone of the lower leg.
- femur - thighbone or upper leg bone.
- patella - kneecap.

Each bone end is covered with a layer of cartilage that absorbs shock and protects the knee.

Basically, the knee comprises of two long leg bones held together by muscles, ligaments, and tendons.

There are two groups of muscles involved in the knee, including the quadriceps muscles (located on the front of the thighs), which straighten the legs, and the hamstring muscles (located on the back of the thighs), which bend the leg at the knee.

Tendons are tough cords of tissue that connect muscles to bones. Ligaments are elastic bands of tissue that connect bone to bone. Some ligaments on the knee provide stability and protection for the joints, while other ligaments limit forward and backward movement of the tibia (shin bone).

REPAIR FIXING THE INJURED KNEE

The knee is an unstable joint at best; it requires four key abilities to function optimally. These are normal movement, great strength (and power), balance and control (proprioception) and endurance (ability

to keep performing). Injury affects all of these and more. The injured knee is especially affected by central inhibition. By this I mean that any pain or feeling of instability is associated with a rapid and very aggressive turning off of the thigh and associated muscles. This is easily observed by

looking at the size of the relative quadriceps. In a painful knee the quads will almost always be smaller. Effectively the key control mechanism of knee health is reduced which leads to more knee stress and damage. It's a cycle that often gets worse and the main reason why strength is an essential part of knee health and recovery.

Patella femoral pain: The most common of all knee problems and is characterized by pain under the knee cap, worse with going down stairs or hills. This increases with age and usual treatment is conservative (specific strengthening) and research suggests is quite effective. Surgery is definitely the last option. Patella femoral pain often co-exists with other

knee conditions.

ACL (The Anterior Cruciate Ligament): The incidence of ACL rupture is reported to be up to 1 per 556 people in very active populations and 1 to 3200 in normal populations. It is associated with very significant disability (giving way) and if instability continues function is lost, and the knee gets secondary problems associated with the episodes of 'giving way'. ACL reconstruction is effective, but not everyone needs it. However the more pivoting and twisting in your life the more surgery will be part of the solution to return to function. ACL deficient knees either have surgery to reconstruct the ligament or conservative (non surgical management), both require a rehabilitation program to maximize outcome.

Other ligaments: The PCL (posterior cruciate ligament), MCL (medial collateral ligament) are the two other reasonably common knee ligament injuries. Usually rehabilitation works well and very occasionally surgery is offered.

Fractures and Surgeries: Knee fractures and op management are initiated by the managing orthopaedic surgeon, who will recommend referral to a physiotherapist who knows about knees. These programs range from simple home exercises to fully supervised rehab programs.

Menisci: Little pads in the knee which are designed to absorb shock and stability. These are often torn or injured. Occasionally these need minor surgery but the rule is to keep as much of the menisci as you can. The more you lose the more likely is osteoarthritis. Often a wait and see approach is best but there are a wide variety of specific menisci conditions and options.

Patella Tendon: 'Jumpers knee', common with cricket, tennis and any jumping sport such as basketball. Good quality conservative management is best. Lots

of options here but its all about load: the right load, at the right time and it needs to be progressive.

Osteoarthritis and the older knee: The O/A knee has every opportunity to improve function and reduce pain with good quality rehab. Guidelines suggest, general exercise, weight loss, quadriceps strengthening and balance exercises. We are also running group sessions for O/A knees in the gym (see below). Of course terminal cases need and do well with a knee replacement. However the fitter and stronger you are pre surgery the better your recovery will go.

Overview of Rehab

1. ROM – regaining knee extension is always the number one priority.
2. Strength – The quads and associated knee and hip muscles are everything to the knee. To give you an idea it takes 6 weeks of high intensity training to increase muscle bulk. You can rarely start a painful knee at this point, so its take even longer.
3. Balance (Proprioception), agility, posture – Using the muscles and other sensors to gain control and function. This includes alignment, dynamic valgus (the knee is not aligned with landing), hop control, foot control, ability to balance on one leg and being able to move in pivoting and twisting motions.
4. Endurance – cycling, running and high reps on the resistance machines all help the knee maintain function over time.
5. Power. The ability to move mass over time, essentially quick rapid movements are important as they happen in life, as well as sports.
6. Specific fitness for the task, such as basketball, trampolining, skiing etc, require specific training which is as close as it can be to the real event. These need to be progressed and adapted.

PERFORMANCE GETTING THE MOST OUT OF YOUR KNEE AND KEEPING IT SO

Strength and its components

To have strong legs and especially quads helps the knee reduce mechanical load with all gait-related activities, even lifting. To safely and effectively strengthen the knee you build up to heavier levels of resistance. This should be initially supervised.

Power

Power requires strength and the ability to move a mass quickly. Healthy people can do this but as with strength, power reduces with age and injury. Its worth doing some plyometrics and balance type work in your program.

Alignment

Good alignment really does make a difference in the long term to how the knee ages. Neuromuscular training changes this.

Prevention

As well as the above, programs like the PEP program have been shown to reduce the risk of serious knee injury. These can be easily implemented and are recommended for those with poor landing alignment.

Thrive – Development of skill, programming the brain for better knee health

Knees are of course connected to the brain, and this can create rehabilitation issues. Without doubt stress in your life in any form can reduce your ability to bounce back and recover (resilience). Controlling stress, thinking positively, setting goals and changing long-held attitudes and beliefs (among other thing) can

really help you overcome any adversity, including your knee. This can be built into a program or specific sessions targeting key areas can make the difference.

Developing Talent or Skill

There is a process which includes deliberate practice (focused challenging practice), passion, and often effective coaching which facilitates the development on new motor pathways in the brain and the development of skill or talent. This is the fundamentals of skill and talent development. The brain does not care who you are (i.e. and a 'natural' or not), it really only cares about what you do. And you must do a lot of it.

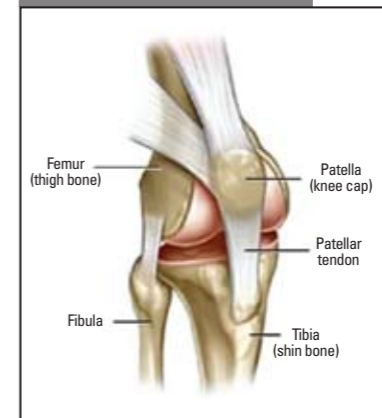
In fact the formula is:

Deliberate practice – ignition (passion) – master coaching x 10,000 hours = mastery of any skill or talent

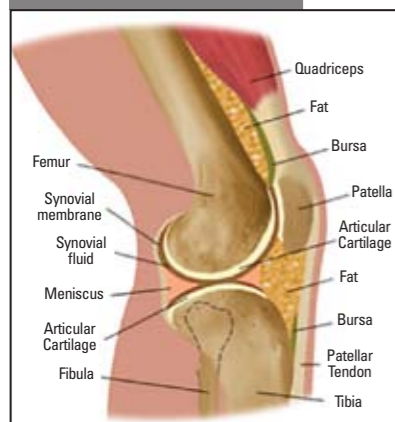
With repeated activity and training the brain develops new circuits and with challenged focused practice they get stronger and stronger, and you get better and better. If fact it's not just motor skills such as soccer or musical ability that improve but this system develops beliefs and attitudes in the same way. Change is possible; mastery is possible by almost anyone, its just takes time, passion, persistence and focus.

We can set a program on skill development for any sport. Once you have learnt the system its up to you.

KNEE STRUCTURE



ANATOMY OF THE KNEE



SPECIALIST CLINIC

THE KNEE CLINIC

To better manage the health of Canterbury knees **PHYSIOSOUTH** have set up 'The Knee Clinic'. This clinic offers focused and advanced clinician assessment for problem knees.

Our assessment is more detailed and our intervention more focused, thanks to our linkages to other knee specialists.

PHYSIOSOUTH has considerable experience in treating knee injuries. Knee pain and disability can always be improved, usually with simple exercises, sometimes with complex rehab, but of course sometimes problems can only be resolved with surgery. Patients can be referred by GPs, specialists or self refer.

GPs: Referrals to the knee clinic can be made via the website, or on the new referral pad or via phone, requesting the 'Knee Clinic' so we know a knee referral. Referrals to the knee class should be made similarly.

THE KNEE CLASS

Run at our gym locations the knee class is simply a knee specific exercise program, which includes

1. A brief knee assessment
2. A home program
3. A weekly knee specific circuit class at the gym

It is targeted for the O/A knee but any knee will benefit. Classes are at specific times and details can be gained from ringing **PHYSIOSOUTH** on 3326 487. The knee class is a fun, safe and effective way to increase knee function, reduce pain and can be a beginning of a more active life-style not limited by painful knees.



PHYSIOSOUTH



FIND US ON THE WEB

www.physiosouth.co.nz

PHYSIOSOUTH BASIC KNEE EXERCISES

'In almost all cases simple exercises can make very definite improvements in reducing knee pain and improving knee function.'



SIMPLE KNEE TESTS

Two really simple tests are:

3 hops

From a single leg stance, hop as far as you can three times, with minimal contact time on the ground. The distance is the measure, and left should equal right. If not you have an impairment that should be addressed.

Thigh girth

Measure from the top of your patella up with tape measure to 15cm. Then from this mark measure your thigh girth with the tape measure. The difference is the amount of wasting in the muscle of the injured leg.

THE SINGLE LEG SQUAT

Without doubt this is the most simple and effective home strengthening exercise for knees. This exercise is functional, loads the knee without undue stress, and is able to be progressed quite easily. As with all strengthening exercises progression is important. That means increasing the load or resistance.

Usually a good starting regime is 3 x 15 (with 1 minute rest) once or twice per day. This builds strength endurance but is a good place to start. General rules are

- If pain during is more than 5/10 then modify or stop the exercise, get in contact with your therapist to discuss options
- If pain is worse after (meaning the next morning) then it's too much, and modify or review with your therapist
- Once you can achieve 3 x 15 with good control and minimal discomfort then increase the load (see progressions below)
- Do not go any deeper than you feel comfortable with
- Move to a 1 second hold at the bottom and a 2 second up and down rhythm
- Knee cap should be aligned with the second toe and hips/pelvis straight
- Suggested progressions in load
 - a. Start with flat surface and use both legs
 - b. Progress to single leg
 - c. Progress to decline board (15-20 degree incline suggested)
 - d. Add weight by holding a weight or using a pack with weights in it
 - e. Increase the weight
 - f. Take 4 seconds to go down and hold for 4 more seconds at the bottom of the squat
 - g. Under supervision start to use quicker movements (power).



KNEE EXTENSION

Unlike the squat this is not as functional but does localize the load to the quadriceps. Most the same principles as described in the squat apply. Except progressions in weight can come from using an ankle weight or band over the ankle.

Home exercises are easy and effective to a point. For athletes or those who require rehabilitation to a higher or more challenging level then progression from the home exercise regime to the gym based rehabilitation model may be required. This again needs initial supervision by a therapist but once you understand the basics it can become non-supervised.

Summary

Most of us have at some time knee pain; this depends on the loads we generate during our day as well as the structure or damage to the knee. In almost all cases simple exercises can make very definite improvements in reducing knee pain and improving knee function. The response rate varies from uncomplicated to highly complex knees problems requiring specific exercises or surgery. The good news is you really do not have to put up with it.

