

Southport Physiotherapy Centre

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Overuse Knee Injuries

Overuse injuries are a result of repetitive forces that exceed a person's ability to withstand them. In children these injuries can stem from repetitive microtrauma to tissues overstressed by training regiments.

The child is not merely a small adult. The most obvious difference between an adult and child is that the child is growing.

The growth process itself may predispose children to injury through muscle imbalances.

Adolescent growth spurt usually occurs between the ages of 11-13 for girls and 13-15 for boys.

The loss of flexibility during this period predisposes children to overuse injuries of muscle tendon units from repetitive stress.

Risk factors can be classified as intrinsic or environmental.

Intrinsic risk factors are innate features that are not preventable such as anatomical malalignment or acquired arthritis.

Environmental risk factors may be preventable such as training areas, muscle tendon imbalance, footwear and playing surface.

Begin to train 1-2 months before the season begins following a 10% rule for increasing the total amount of training for child athletes (that is, each week there should be no more than a 10% increase in the amount of training time, amount of distance covered and number of repetitions performed).

It also includes sport specific skills.

Look for patterns of tightness such as strong quads, tight and strong calf and tight and weak hamstrings.

Footwear should be correctly fitting.

Playing surface should have adequate shock absorption.

Overuse injuries of the knee

1.Osgood-Schlatter's Disease

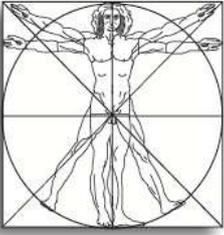
Osgood-Schlatter's disease is a disorder involving the growing tibial tuberosity. It tends to affect more active children, boys 3 times more likely than girls.

The condition is bilateral in 25% of patients.

The most popular theory is that it is an overuse trauma causing avulsion of the proximal cartilaginous part of the tibial tuberosity.

It tends to occur in the extremely athletic child or the very obese child.

Both involve increased loading at the tibial tuberosity.



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Sufferers typically complain of pain in the region of the tibial tuberosity.
A growth spurt or an onset of repetitive training activity may set off the symptoms.

Activities such as running, jumping, stair climbing and kneeling commonly aggravate the pain.
Rest alleviates the pain.

Physical examination often reveals a prominent tibial tuberosity with some swelling and tenderness.

Full range of movement is usually present.

Resisted extension with the knee flexed 90° and passive hyperflexion can reproduce pain, but resisted leg extension with the knee extended is usually painless.

Quadriceps muscle is both tight and weak.

It is a self-limiting condition, often spontaneously recovers though it can take 12-18 months to resolve.

Management should involve restriction of aggravating activities, ice, pulsed ultrasound (0.5 watts per cm²), quadriceps stretches (stretches performed twice daily followed by ice).

When the child can easily touch the gluts with the heel of the affected leg, quad strengthening is added – 3 sets of 10 straight leg raise, add resistance of 5-7kgs.

Athletes should attain 90% strength of the uninvolved limb prior to returning to sports.

Knee brace can be effective.

In addition, heel inserts may be used to decrease low extremity impact forces.

2. Sinding-Larsen-Johansson Disease

Sinding-Larsen-Johansson Disease is found at the proximal end of the patella tendon.

It is usually in active boys between 10-14 years of age.

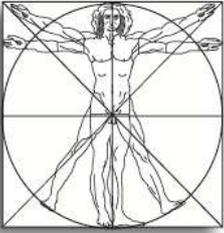
Presentation similar to OSD.

Often have an antalgic gait pattern.

Resisted knee extension increases pain.

Natural duration of the condition is 9-12 months.

Treatment is restricting aggravating activities, ice, massage and a knee sleeve/brace.



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3. Patello-Femoral Pain Syndrome

Patello-Femoral Pain Syndrome can account for up to 40% of all knee problems.

Can affect men and women (particularly obese women with genu valgus/knocked knees).

Can be bilateral in one third of cases.

It results from excessive patella compression.

Rapid growth may produce a tight TFL/ITB leading to lateral patella tracking and increased pressure on the patella facets.

Hamstring is often tight.

There can be an anatomical malalignment such as patella alta, increased Q angle, tibial torsion and pronation of the feet (flat feet) that alters the biomechanics.

There can also be atrophy (wasting) of the VMO muscle.

Pain is usually peripatellar. It often happens from running, jumping, going up and down stairs, squatting and kneeling.

Stiffness is commonly felt after prolonged sitting (the movie-goers knee)

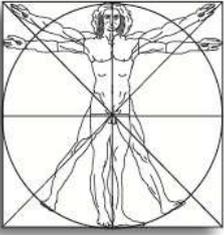
Crepitus may be felt, pain on full flexion, atrophy of the VMO, tightness of the TFL, gastroc (calf) and hamstring muscles.

Management involves activity modification, ice, pool running and swimming, cycling, quad strengthening and addressing the muscle imbalances, stretches, TFL/ITB and hamstring releases.

Closed kinetic exercises: recommend standing on an extended knee for one minute followed by holding the knee at 45° for 30 seconds and completing 4 repetitions. Progress with step-downs and lunges and partial squats. You can perform these with an adduction pillow to help recruit the VMO.

Braces, taping and orthotics may be used.

Consider shoe orthotics if the foot excessively pronates.



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4.Osteochondritis Dissecans

Osteochondritis Dissecans is a disorder involving partial or complete separation of the growth cartilage and subchondral bone from the articular surface of the joint.

Often during the growth spurt (3 times more common in boys).

Can be bilateral in 25% of cases.

Can present with intermittent knee pain aggravated by activities involving repetitive flexion/extension movements such as running or bicycle.

Presents with an antalgic limp.

Occasional locking if the fragment has become loose.

The “Wilson sign” is the most common physical finding – This sign is given by flexing the knee to 90°, medially rotating the tibia and slowly extending the knee. The pain will be produced at 30° of flexion.

Lateral rotation relieves the discomfort.

Often it will resolve within 6-12 months.

Restrict aggravating activities, quad strengthening program, and possible knee splint.

These conditions all have a long time frame and there is no quick fix.