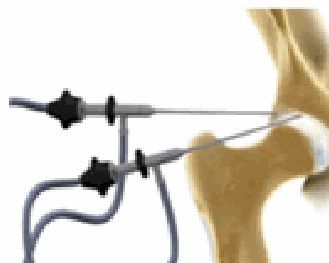


Orthopaedic and Sports Injuries Services "OASIS"

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Sports Injuries - Basic Principles

The potential scope of this topic is vast and no attempt will be made here to cover all the ground. The aim is to help the generalist who does not have special expertise in sports related injuries in the approach to diagnosis and management. Sportsmen and women are different from the rest. They are driven. They are passionate. They are eager to return to their activity. A cursory examination followed by the advice to "just rest it until it gets better" is not good enough.



Some people earn a living by playing sport and a number earn millions of pounds a year in doing so. Most professional sportsmen are rather less highly paid but it is still their livelihood and even amateurs may be very dedicated to what they do. It is a very important part of their lives. The term "sportsman" here includes all who partake in physical activity, both male and female, as a hobby or as a career. This will include dancers and some occupations such as fire fighters.

Common injuries

Some sports are associated with an increased risk of certain injuries. It would be wrong to call them "sports specific" as they can occur elsewhere too but it is useful to be aware of which injuries are common in a number of sports:

Footballers are at risk of injuries to ligaments or cartilages of the knee and also to ankle injuries.

In football and rugby there may be direct trauma to the knees.

Sports that involve jumping and rotating put the medial meniscus at risk.

Gymnasts and dancers may fulfil the diagnostic criteria for hyper mobility syndrome, even in the absence of a specific condition such as Ehlers-Danlos syndrome and this puts joints at risk.

The "**commentator's sign**" of a pulled hamstring is when the athlete starts to sprint and pulls up sharply with the leg stiff and grasping the back of the thigh. Field sports and 400 metres runners are where the victims are most often found. In the 400 metres it is usually down the back straight.

Fast bowlers in cricket and javelin throwers are susceptible to spondylolisthesis.

Footballers, and some other players who run and then suddenly stop or swirl on their hip are prone to Ligamentum Teres tear and instability of hip, most Athletes are prone to groin pain the commonest reason being Labral injury.

This list is far from exhaustive but aims to give an idea of how certain sports present certain risks.

History

Find out exactly how the injury occurred. This is essential to understand the mechanism of injury.

Was there direct trauma?

If so, where, how and in what direction?

Try to assess the force of the impact.

Was a rotating action involved?

What was the position of the joints when it happened?

Especially if you are not familiar with the sport, ask the athlete to explain exactly what was happening.

Was there any sound with the injury? A crack may suggest a fracture. A popping sound implies a ruptured ligament.

Was the athlete able to continue the game?

How long ago was the injury?

What has happened since? This may include marked improvement, little improvement or even deterioration. He may have attended A&E and been dismissed after an x-ray revealed no fracture.

Has there been a similar injury before?

The next part of the history may be completed before examination or between diagnosis and discussing management:

- How often does he compete?
- At what level does he compete?
- How often does he train?

This may include number of times a week and number of hours a week. This will give an indication of how seriously the athlete takes his sport. It may also indicate over-training. Training comes in many forms. There may be distance or endurance training, speed training, strength training and specific skills training. That part of the history is also important if the athlete is not complaining of an acute injury but a pain that is related to the sport.

- It may be a strain.
- It may be an overuse injury:

How long has it been a problem?

- Has it been progressive?
- What brings it on?
- Exactly where is the pain?
- Ask about training regimes.
- Has he discussed it with his coach?

Poor technique predisposes to overuse or other injuries. Poor equipment may be at fault. A wider handle on a racket may aid tennis elbow. Trainers wear out and lose their spring and protection. They need to be replaced.

Examination

Examination must be adequate and competent. The knee is very often injured and ability to examine the knee must include the ability to detect instability of ligaments and effusion. Shortly after an injury, especially if there is effusion or spasm of muscles due to pain, it may not be possible to detect instability. The general principles of examining a joint are as follows:

- Look at the area. Is there bruising or swelling? Is there any distortion?
- Put the joint through its full range of passive movements in all direction. Some joints have a great variety of movements, for example the shoulder can flex, extend, abduct, adduct, internally and externally rotate.

- Ask the patient to perform that range of movement actively.
- Test active movement against resistance.
- Stress the joint to detect instability of ligaments.
- Palpate the joint and around it for local tenderness, swelling or effusion and muscle spasm.

If cause for the pain has not been found, look elsewhere. For example, trouble in the hip can cause pain in the knee and, less often, vice versa. Pain from the back may be referred to the lower limb. Look at stance and gait. A problem lower down may cause trouble higher up. Flat feet will cause hyperpronation and this may strain the ankle. It can also put a valgus strain on the knee and present as pain and effusion after running. Inequalities of legs may cause back pain. Thus, correcting flat feet may solve many problems higher up.

- Look at the patient standing with both feet bare. Does the stance look normal? Is it possible to get a finger under the medial longitudinal arch of the foot?
- Look at the heels from behind. Is the line of the Achilles tendon straight? With hyperpronation it will curve out laterally as it descends.
- With the patient seated, inspect the soles of the feet. There should be callus over the 1st and 5th metatarsal heads and the heel. Callus over other metatarsal heads or elsewhere on the sole suggests flat feet.
- If the patient is complaining of pain associated with running, it is helpful, if possible, to inspect the trainers that are used. If not, at least look at the current pair of shoes. The sole of the shoes may show uneven wear with perhaps excessive wear on the lateral side of the shoe. Trainers may have a high heel tab that rubs on the Achilles tendon. The trainers may be worn out and have lost their spring and resilience. They may need to be changed.

Investigations

X-rays are mandatory if a fracture or dislocation is suspected but they are of little value otherwise as they do not show soft tissue well. It is important to get the balance right between excessive requests for x-rays and missing fractures. It should be possible to reduce the number of ankle x-rays whilst not missing fractures.

If a knee is swollen, aspiration of the joint, using a wide bore needle after appropriate infiltration of local anaesthetic is a useful diagnostic and therapeutic exercise. The fluid may be straw-coloured and an inflammatory exudate. It may be blood stained or frank blood. If there is blood in the fluid or frank blood, something is torn. This may be a tendon or cartilage. If the fluid is left to stand and a layer of fat globules appears on the surface, this is bone marrow and there is a fracture at the joint. Removal of fluid helps pain and aids recovery, even if it reforms. Muscle wasting around the knee is accelerated by effusion. Blood is very irritating and damages joints, as shown by the joints of those with haemophilia. If the fluid seems purely inflammatory, there may be some benefit from injecting steroid into the joint.

Imaging for soft tissue injury usually requires MRI scan or ultrasound and it may be necessary to refer to secondary care to get access to this.

The arthroscope is a useful, minimally invasive tool, to inspect the inside of joints and perhaps to undertake some repair. It is often used on the knee but now surgeons use arthroscopy of the shoulder elbow, wrist, hip and ankle joint too. Hip Arthroscopy is now the preferred option for diagnosing treating and managing hip pathology of the

relative young adult, Arthroscopic surgery of the hip offers the opportunity of treatment of many previously unrecognised intra-articular abnormalities. Sportsmen may also suffer disease, as may anyone else and so other investigations may be indicated.

Management

Drugs

The list of banned substances in sport is such that for the serious sportsman, prescription needs some consideration. This is discussed in drugs and sport. There should not be any problem with Paracetamol or the NSAIDs but avoid any codeine-based substances. Topical NSAIDs may be a valid alternative.¹

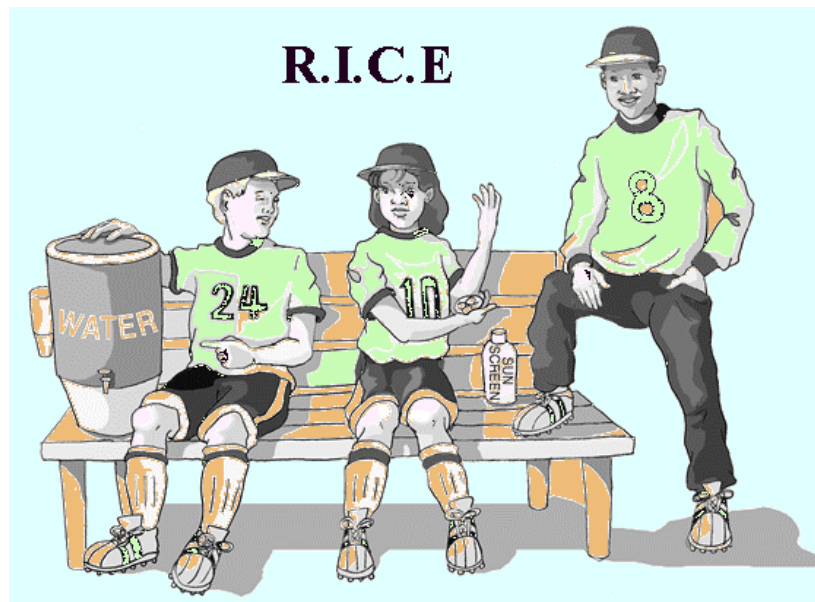
Acute injury

If a part is injured it will need to be rested but simply telling a sportsman to rest it until it gets better will lead to lack of compliance and risk of further injury. A discussion is needed about a programme of rehabilitation back to full activity again. Active rehabilitation is applicable not just to sports related injuries but should be part of any programme of rehabilitation.

Acute soft tissue injuries need management specific to the region.

The mnemonic **RICE** is well known and stands for:

- Rest
- Ice
- Compression
- Elevation.



It is often extended to **PRICER**, in which the **P stands for protection**, that may mean immobilising the joint and the last **R stands for rehabilitation**.

Another variation of the mnemonic is **PRICEMMM** in which the last 3 letters stand for:

- Medication requires NSAIDs or paracetamol for pain relief.
- Mobilization early on when pain free to expedite return to play. Mobility should be graded.
- Modalities are exercise and proprioception training² to prevent re-injury.

Active rehabilitation

Advice needs to be adjusted to the person and the injury but as an example, specific advice to an athlete with an injured knee may go like this:

For the next 4 or 5 days you need to keep off that knee as much as possible. Keep it elevated when you can. Take the anti-inflammatory painkillers. If you need to train then just do upper bodywork. (Similarly, if the upper body is injured, the sportsman may do lower body training and cardio-respiratory fitness whilst resting the upper body). Static quads exercises can be done at an early stage. Extend the knee to the horizontal position. Pull tightly with the quads. Now invert the foot and feel how the tension moves to the lower vastus medialis. Keep any weights on the ankle light at an early stage.

After that, it is possible to do some gentle lower bodywork, but start with low intensity and short duration. Avoid running. Cycling or a step machine, cross-trainer or rowing machine in a gym may be satisfactory.

About 10 to 14 days from the injury there will be some muscle wasting around the knee and this needs to be built up again. When exercising the muscles, keep movements slow and controlled. Build up the quads but also, when building one group of muscles (agonists), work on the opposing group (antagonists) too. In this case it is the hamstrings.

If the knee gets painful or starts to swell, ease back on training again and then gradually build it up.

Fitness training can be started again using cycling, step machine or cross trainer.

Swimming may be possible but see how it goes and avoid breaststroke.

You can start some gentle jogging about 3 weeks after the injury. Keep it slow and in a straight line.

As you get more confident, build up speed. When you can sprint at full speed in a straight line you are about half way through rehabilitation.

Then start zigzagging. Work on rapid changes in direction and twisting around. This builds up strength and position sense (proprioception).

Only when you can do all of this with great confidence is it safe to go back to active competition.

Common injuries

This is only a brief overview of sports injuries but two injuries are so common that they are worthy of mention.

Knee Injuries

The knee is very susceptible to injury in sport. It is a vulnerable joint that is made stable by the medial collateral, lateral collateral and two cruciate ligaments along with the muscles around the knee. The muscles are extremely important and even if the

anterior cruciate ligament is ruptured, good muscles can permit sport at a very high level. Top-level football players may require ACL reconstruction but even sports such as football, rugby and judo can be managed at a high level if the muscles are adequate. The quadriceps waste rapidly when there is injury to the knee and this is accelerated if there is an effusion. The quadriceps pull upwards through the patella tendon but as the hips are wider apart than the knees, there is a tendency to pull the patella laterally. This requires attention to the lower part of vastus medialis. As mentioned above, if agonists are built up, antagonists must be built too. Usually the hamstrings should have about 70% of the power of the quads but with a deficient ACL, that figure may need to be higher.



Not everyone has access to a gym with quads and hamstring machines and so a couple of easy exercises to perform at home are useful:

Stand with the feet parallel, a little further apart than the width of the shoulders. Dip down about 25 to 30cm and up again. Do not go right down or it creates enormous pressure inside the knee joint. Hence they are better called dips than squats. Start at about 60 repetitions and work up to 120.

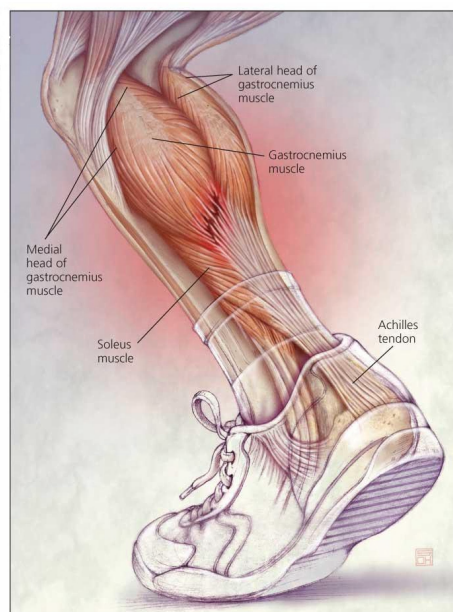
Lie on the back on the floor with feet up on a chair. Lift the buttocks off the ground and down again to exercise the hamstrings. Again, start at 60 repetitions, working up to 120.

Pulled muscles

Pulled muscles, especially hamstrings, are very common, as mentioned above. The injury probably represents some minor tear in the muscle fibres that may bleed a little but they need the chance to heal and regain tensile strength without being subjected to repetitive trauma. They are often attributed to poor warming up although the evidence for this is poor.



With a torn hamstring, avoid running at first. Some gentle stretching is in order without being too enthusiastic and aggravating the injury. Fitness may be maintained with cycling, swimming, rowing and steps or cross-trainer but avoid running, probably for a few weeks. Start running at a gentle pace and as confidence is built, it is possible to increase the pace until sprinting is possible. If the muscle gives discomfort, ease back on the training and gradually work up again over the next few days.



Injuries in children

Children often get injured in the fun and games of everyday playing and life and usually they heal very fast and without problem. For some children, sport is more than just some fun and they train very hard and long to a very high standard.



This is particularly true of swimming, gymnastics and dancing. Children are still growing and the epiphyses of their bones have not yet fused. This makes them very vulnerable to overuse injury and to injuries of those parts, including avulsion. Weight training before puberty should be with the utmost caution if at all. Beware of the coach who is pushing the child too hard. This is especially a problem if the coach is a parent. Some people try to live their own frustrated ambitions through their children. The child may be under enormous pressure and whereas they can usually go home and moan about the coach, if the coach is a parent this outlet is closed. Some children, especially boys, get very awkward and accident-prone at the growth spurt of puberty. This is because their bodies are growing so fast and muscles and proprioception have not yet caught up. Reassurance is required whilst the body catches up with its growth.

Complications

Proper rehabilitation is essential to enable the injury to heal and to reduce the risk of recurrence.

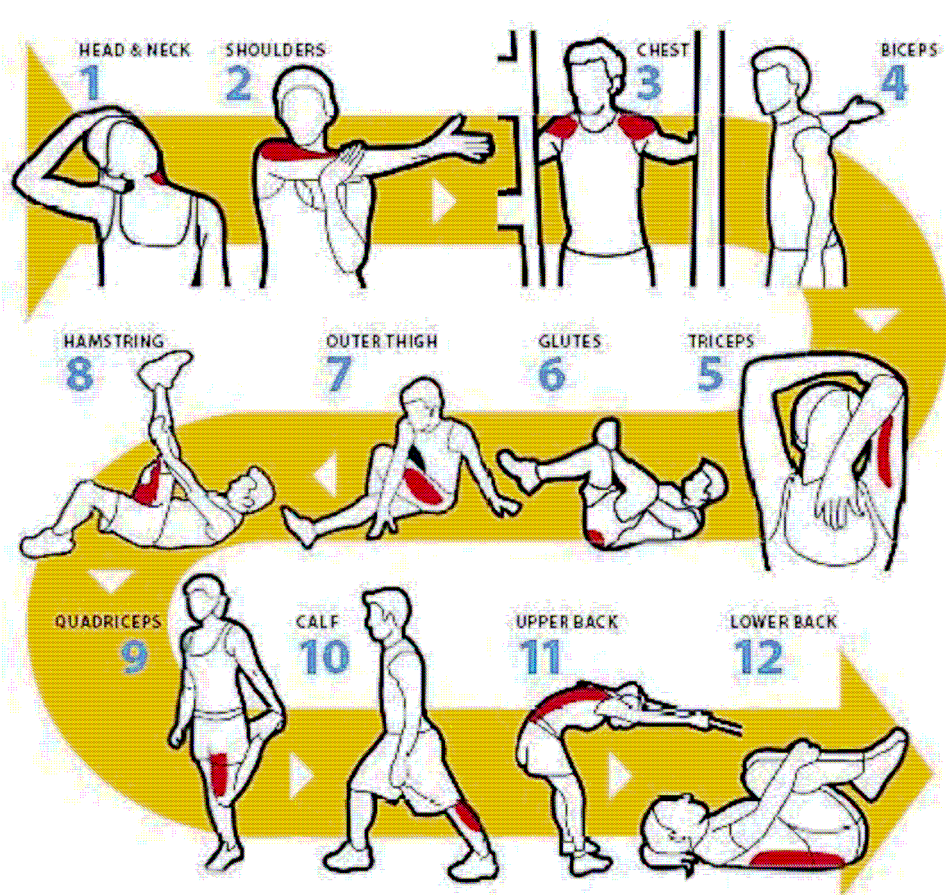
Prognosis

Sportsmen will work very hard to recover as quickly as possible but their impatience must be tempered by the need to achieve full recovery, especially before returning to competition. Different people recover at different rates but, generally, healing is slower with older age.

Prevention

As we encourage people to take more exercise, we can expect to see more sports related injuries. The rules of sport are often designed or amended to help reduce the risk of injury. There is a widely accepted dictum that warm up before exercise and, to lesser extent, warm down and stretching after exercise, reduces the risk of injury. The level of evidence for this is very poor but the dictum has not been shown to be untrue.

Before engaging in sport it is important to have adequate training to assure fitness, especially if sport is being taken up after a period of abstinence. Equipment must be suitable and adequate. This does not apply simply to protective equipment.



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