Cycling

by Kate Carter, Brighton University

How does cycling impact on the lower limbs?

Cycling is, by nature, a very repetitive activity with knee flexion and extension occurring about 4800 times an hour at an average of 80 revolutions per minute. Soft tissues and joints of the lower limbs are, therefore, susceptible to repetitive stress and injury.

The angles and position of the knee, leg, and foot, change and the function and power needed from the muscles adjusts when cycling. Ideally, a cyclist's legs should function like pistons as they pump straight up and down over the pedals. A straight leg allows the muscle pull on the joints to be straight and balanced during cycling, without a lot of side-to-side knee rocking. If a cyclist's position on the bicycle is not optimal, and the structure and function of the cyclist's legs are altered, this can reduce efficiency, speed, and cause injury.

What are common injuries in cycling?

Injuries can occur in cyclists whether professional or amateur. Most cycling injuries result from overuse, with knee problems the most common. Overuse injuries develop when soft tissue (muscle, tendon, fascia and ligament) is damaged from repetitive stress that occurs quicker than the body's ability to repair it. Of the leg joints, the knee passes through the greatest range of motion and, of the leg muscles, the hamstrings are the most active during cycling.

Common injuries include:

1) Patellofemoral pain syndrome

This is pain on and around the patella (knee cap) that results from irritation to the joint surface between the patella and femur (thigh bone). This typically results from poor alignment of the patella due to the position of the leg, tight muscles or overdevelopment of certain muscles.

2) Iliotibial band syndrome

The iliotibial band is a band of tissue that provides stability to the outside part of the knee joint. Iliotibial band syndrome is caused by repeated knee flexion and extension creating excessive friction between the iliotibial band and the underlying bones of the knee. This results in pain and swelling to the outside of the knee joint.

3) Hamstrings strain or pull

This is pain occurring at the back of the thigh in the location of the hamstring muscles or tendons. This can be a result of tight hamstrings or overextension of the knee when cycling.

Please turn over...

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What can be done to prevent overuse injury?

Cyclists commonly develop muscle strength imbalances as a result of poor position on the bicycle. If a muscle group becomes overdeveloped, it can dominate and will pull more on one side of the knee causing alignment problems and pain. The bicycle can be adjusted to enable the cyclist to ride in the most efficient position or in a position less likely to result in injury.

Leg muscles will tighten with prolonged riding and tight muscles can restrict motion and increase friction at the joints, particularly the knee, which may lead to pain and discomfort. Stretching the calf and thigh muscles correctly and after exercise can help to improve muscle flexibility. The cyclist can also make sure training techniques such as speed and gear selection are appropriate and that they have good general fitness.

What can a podiatrist do to help?

It is important that a cyclist's foot sits straight on the pedals and the heel sits directly under the ankle, so the downward force from the leg is centred on the foot, on the pedal. If you have a low-arched or high-arched foot, then you may be more likely to develop problems, because these conditions can disturb the alignment of the leg and increase stress at the knee.

A podiatrist can assess the position of the cyclist's foot relative to the knee and can advise on the preferred foot position on the pedal. Toe clips, cleated cycling shoes, wedging the cycling shoe or placing insoles within the shoe can be used to improve the foot position and stabilise the foot on the pedal. This may help to improve leg position leading to greater comfort and increased power when cycling.

Amateur cyclists usually wear recreational shoes when cycling. Bicycle shoes have a stiff sole to protect the foot from the pedal and are more efficient in transmitting force to the pedal. Ill-fitting shoes that are too narrow or too short can cause pain and numbness in the foot due to nerve compression. A podiatrist can advise on the correct fit and shoe design.

By studying the movement patterns of the joints, activity of the muscles and the position of the legs during cycling, alterations can be made to improve efficiency, speed and prevent injury. Podiatrists also work with other health professionals for effective treatment and quick recovery.

Equipment check

It is essential for a cyclist to achieve the best position on the bicycle which can help to improve efficiency and prevent injury. The size and shape of the bike frame can be changed or the bicycle can be adjusted by, for example, changing the seat height and handle bar position.

Top tip

Cycling is an excellent alternative for runners and other athletes seeking low-impact exercise.

If you experience neck pain, back pain, hip pain, knee pain, leg or foot pain whilst cycling, you should get a bicycle fit assessment. The following website may be useful www.cyclefit.co.uk

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