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Cycling has been described as balancing the body on an unstable system, while simultaneously providing motive forces combined with speed and direction.

The two major components are the machine (cycle) and the human body, the former is adjustable but not adaptable, while the latter is adaptable, but only to compensate within certain limits. If one goes outside those limits then injuries, traumatic or overuse, will almost certainly occur in the athlete's cycling career.

The human body makes contact with the bike at three points; hands (handlebars), pelvis (saddle) and the feet (pedals). If these three points of contact are disregarded and set up incorrectly then almost certainly overuse and traumatic injuries will occur. One can try to adjust the bike to the person but one cannot adjust the person to the bike without a great deal of difficulty.

## OVERUSE INJURIES

These type of injuries occur in most sporting activities and can be treated with similar treatment regimes, but when treating cycling injuries one must take into consideration the forces applied to a structure over a period of time. In cycling this can apply to an increase in mileage or the intensity of the training regime (hill work or big gears), these are the most common cause of overuse injury. Once again one has to look at the set up of the bike and its components ie. leg length discrepancy or misaligned cleats.

Overuse injuries can be graded according to pain or persistence of pain:  
Grade 1 Pain only after activity  
Grade 2 Pain starts during activity  
Grade 3 Pain persists the next day  
Grade 4 Pain is constant

### Treatment principles

Cycling is no exception, applying general principles which are common to most sports should prevent overuse injuries. Allow the body sufficient time to adapt to the increase in activity. Levels of activity should be increased gradually with allowance for rest, heavy and light training regimes, with time for a warm up, cool down and with stretching incorporated into the training. Track cyclists tend to

# CYCLING INJURIES – PREVENTION AND TREATMENT



spend more time in the above routines than their road or off-road colleagues.

### General treatment principles

- Adjust activity to allow healing, reduced activity maybe preferable to complete rest
- Reduce any inflammation using ice, oral non-steroidal anti-inflammatory drugs (NSAIDs), cortisone injections and manual (physical) therapy including ultrasound, contrast baths and massage
- Adjust if needed the biomechanical stress or external factors in cycling. Check and alter the bike if needed, cleat position. The bike must fit the rider not the other way round

INTERACTIVE 1



'Saddle up: Fitting Body to Bike'  
- Article in *sportEX health* issue  
9 - detailed information on  
how to achieve the correct  
biomechanical set up of a bike

### General injury types

- Tendinitis - inflammation or irritation of a tendon can be caused by different reasons ie. ill-fitting shoe or cleat position. Falls may also cause bruising to tendons and overuse or extra or sudden forces may cause strains. Pain can arise from nerve irritation within the tendon and must be taken as a warning that something is wrong, the tendon maybe swollen or stretched or small tears may

have occurred. Many overuse injuries around the knee are overuse tendon injuries.

- Bursitis - irritation or inflammation of the fluid filled cystic structures found between surfaces that facilitate movement over each other. When one of those surfaces is also tendon then it is difficult to distinguish between tendinitis and bursitis. This is of little relevance because the treatment regime is the same for both.
- Compression neuropathy - an abnormality of nerve function often caused by pressure on a nerve or the blood vessels that supply it. The common cycling neuropathies are cyclist's palsy (ulnar nerve) and penile numbness, a common problem related to the abnormal function of the pudendal nerve.
- Stress fracture - an overuse injury of bone which are relatively uncommon in cycling.

## SPECIFIC INJURIES

### Knee injuries

The most common area for injuries in cyclists is the knee, from possible overuse, trauma and the cycling position. Overuse injuries in and around the knee are due to the repeated and constant stresses of riding a bike and represent the most common problem that cyclists seek medical advice for. The common overuse injuries are chondromalacia patellae, patellar, quadriceps, anserine, tibialis anterior tendinitis, and prepatellar bursitis, plica (patellofemoral ligament inflam-



mation), iliotibial band syndrome and tight hamstrings.

Table 1 outlines the possible causes and possible solutions that can be made to the cyclist's position on the bike.

**INTERACTIVE 2**  
'Breaking the Cycle of Injury' - Article in *sportEX health* issue 9

**Intervention**

There are many treatment regimes for any of these problems but the most important thing is to check the riding position and alter as suggested above. After this use RICE and appropriate treatments such as massage, stretching and strengthening exercises.

**Neck pain**

The biggest problem cyclists have in this area is related to the musculoskeletal pain in the back of the neck, pain from this area usually travels upwards causing headaches. You must consider a neurological origin and examination should take place on those grounds especially if there are symptoms associated with upper-extremity symptoms such as pain and loss of sensation or loss of power in the arms/hands. If there is any pain in front of the neck or jaw consider urgent medical help as this may be a symptom of cardiac origin.

**Causes**

Neck pain can follow strain or overuse and a possible cause can be a fall or crash. The area may be at the back of the head but could become more generalised. If nerves are involved, radiating pains may travel to the upper extremities.

Possible causes include:

- Muscle strain or spasm
- Arthritis usually degenerative osteoarthritis. Strain on vertebral joints from misalignment, usually secondary to disc problems
- Herniation or bulge of an intervertebral disc, pain may radiate to the upper extremities.

**Intervention**

The older cyclist tends to have a combination of muscle strain and degenerative changes often associated with age. In younger cyclists neck pain is usually caused by muscle strains. Cycling neck strains are often caused by long rides and over-exertion during racing. The position on the bike can be a factor in helping overcome this problem. The racing posi-



tion is usually more aerodynamic than the normal training/riding position, therefore cyclists should be encouraged to ride at least some of their training rides in racing posture. Stretching and flexibility exercises are recommended for relieving this problem.

**Scapular syndrome**

The pain is usually situated in the scapula/upper back area where it may or may not be associated with neck, shoulder or arm symptoms. It is possible that it may not be cycling related and can overlap the back pain areas.

**Causes**

Extended riding time, longer training/racing rides giving more time for other factors to develop causing tension in the area and rough terrain causing jarring especially in off road cyclists are common causes. Another cause may be too much pressure due to abnormal weight distribution, particularly more weight on the upper arm and neck area, causing excessive use of upper back and neck musculature ie. during sprinting, climbing.

**INTERACTIVE 3**  
'A Balancing Act for Cyclists' - Article in *sportEX dynamics* issue 6

**TABLE 1: BIKE ADJUSTMENTS BASED ON LOCATION OF KNEE PAIN**

Location	Causes	Solutions
<b>Anterior</b>	Seat too low	Raise seat
	Seat too far forward	Move seat back
	Climbing too much	Reduce climbing activity
	Big gears, low rpm Crank to long	Lower gears, more rpm Shorten cranks
<b>Medial</b>	Cleats - toes point out	Modify cleat position - toes in
	Floating pedals	Limit float to 5° or fixed cleat
	Exiting clipless pedals	Lower tension
	Feet too far apart	Modify cleat position move closer Shorten bottom bracket axle Use cranks with more offset Shim pedal on crank 2mm
<b>Lateral</b>	Cleats - toes point in	Modify cleat - toe out
	Floating pedals	Consider float pedals
	Feet too close	Limit float to 5° or fixed cleat Modify cleat position move apart Longer bottom bracket axle Use cranks with more offset Shim pedals on crank 2mm
<b>Posterior</b>	Seat too high	Lower seat
	Seat too far back	Move seat forward
	Floating pedals	Limit float to 5° or fixed cleat



### Intervention

Check bike position, make sure nothing has caused a change to posture on the bike. Stop any upper body exercises (weights), which may cause increase in symptoms, RICE, strengthening of upper back/neck muscles, increase in ROM and flexibility.

### Cyclist's palsy (ulnar neuropathy)

There can be a number of signs and symptoms in relation to this condition which can sometimes be ignored when the symptoms overlap with carpal tunnel-like symptoms, but both can be related to the two nerves of the forearm (ulna and medial). In cyclist's palsy (ulnar nerve) the heel of the hand along with the little and ring (third) fingers are usually involved, causing pain, tingling, numbness and weakness, it is usually the hand that stays on the bars when drinking. The symptoms are worse whilst riding and for several hours afterwards.

### Causes

Extended riding time, rough terrain, improper hand positions, too much pressure with weight distribution placed onto hands and wrists.

### Intervention

Alter the position to take pressure of the hands and wrists and use extra padding (mitts/gloves or handlebar tape). Reduce the time spent on the bike if really needed. Mobility of the carpal area will help and massage to the forearm musculature, stretching and strengthening also helps along with NSAIDS.

### Carpal tunnel syndrome

The pain pattern for this complaint consists of tingling, pain, numbness and weakness in the hand following the path of the medial nerve. Symptoms usually present in the thumb, index, middle and ring fingers, with symptoms travelling above the wrist, elbow or even to the shoulder and are often worse at night. It is common amongst those who bend their wrist at work ie. therapists and keyboard operators.

### Causes

The medial nerve is compressed at or in the wrist and inflammation caused by the compression can be present. Cycling-related causes are once again extended time on the bike, rough terrain, improper wrist positioning or too much weight bearing.

### Interventions

Treatment on the bike is the same as cyclist's palsy. Off the bike try reducing repetitive motions at work or at home. Use RICE, wrist braces or splints, and work on strengthening of the wrists, shoulders and arms reducing pressure on the carpal area. Cortisone injections may be helpful as may NSAIDS. Surgery should be a last resort.

### THE AUTHOR

*Warren G. Hutson MSc DO gained his masters in sports injuries and therapy in 2001 from Manchester Metropolitan University and was the first osteopath to do so. He has over twenty five years experience in treating cyclists at every level from club to elite riders. He has worked with a number of professional teams as well as the Great Britain Olympic teams since 1982.*

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## INTERACTIVE 4

'Sports Massage in Cycling' - Article in sportEX health issue 14