

PerformBike: The Facts!

Cycling has a very high profile within the New Zealand sporting landscape due to the continuing success of New Zealand's elite cyclists on the world stage. Events such as the Tour de France and the success of the N.Z Track cycling team have increased the interest of cycling within our country. The popularity of cycling within the 35yrs to 55 yrs age group is growing annually with 18 % of all active exercisers choosing cycling as their modality of exercise choice (Sparc, 2008). Cycling incorporates the benefits of a low impact workout with high cardiovascular demands. Many people who suffer from running injuries have turned to cycling to receive the cardiovascular benefits without the risk of high impact injuries.

Body alignment major cause of cycling injuries

The most common injury sites associated with cycling are to the neck, shoulder girdle, lower back and knees. Much of this pain is due to joint malalignment issues that manifest over the duration of a long bike ride (Walker, K. 2010).

Core strength improves knee alignment and reduces knee pain

Knee pain is a common cycling injury due to the fact the knee is an important fulcrum between the hip and the foot in the power production of the cycling action. It has been suggested that fatigue of the core musculature produces inefficient movement patterns such as excessive pelvic and thoracic rotation. A recent study by Abt et al (2007) found that lower limb cycling kinematics were altered following a core fatigue workout and concluded that during long rides the reduction in core endurance could lead to repetitive mal-alignment injuries of the knee. Therefore a strong and stable core that maintains a neutral spine has been advocated for cyclists as this provides proximal stability to enhance lower limb kinematics (Abt et al, 2007, Walker, 2010).

Emma Colson, a former commonwealth games athlete and team physiotherapist for the Australian bike team writes a great article regarding cycling and knee pain.

<http://www.topbike.com.au/pdfs/ba-marchapr06-emma-colson.pdf>

Rotator cuff strength reduces shoulder pain when biking

Shoulder pain when cycling can be associated with rotator cuff fatigue. The body position of a cyclist involves the cyclist sustaining a forward leaning position. A forward body position results in the cyclists stabilising their body weight through the arms when holding onto the handle bars. The rotator cuff musculature is responsible for the dynamic stabilisation of the shoulder girdle and therefore stability of the entire upper limb when gripping the handle bars. This is specifically important with downhill mountain biking as the cyclists arms are pushing against the handle bars so that the cyclist does not go over them. If the rotator cuff fatigues during a ride the dynamic stabilisation of the shoulder joint can be compromised. Injury of the shoulder girdle

may occur resulting in the cyclist experiencing reduced overall body stability and control when cycling. As mentioned earlier, the reduction of total body stability will increase excessive movement patterns, reduce power and increase the risk of injury. Therefore the rotator cuff musculature must have efficient endurance strength to maintain dynamic shoulder control.

Reduction of lower back pain by strengthening core muscles

Lower back pain (LBP) is another common injury complaint due to the increased lumbar flexion moment when sitting on the bike saddle. The lumbar flexion angle is increased with a changing body position such as riding uphill or lowering the body for aerodynamic improvement. Sustaining these end range positions over a period of time increases the pressure on posterior lumbar disc structures and associated lumbar spine ligaments (Juker et al, 1998). Specific studies have shown that cyclists suffering of LBP have reduced activation of the deep core stabilisers, specifically transverse abdominus and multifidus (Srinivasan & Balasubramanian (2007). The reduced strength of these muscles lowers the intra-abdominal pressure within the abdominal cavity further decreasing the overall stability of the spine and allowing for excessive movement that may cause micro-trauma to pain producing structures.



Prolonged lumbar flexion during riding.

The muscles that make up the deep core are activated at different rates depending on the position that the cyclist adopts when cycling. These muscles include TABS, external and internal obliques, multifidus. Studies show that when cycling in a relaxed speed the deep core musculature is activated at constant low intensities. As the cyclist increases the intensity to a sprint and lifts off the saddle the TABS musculature reaches maximal voluntary contraction (MVC) levels of up to 20%. The external obliques can reach up to 30% of MVC and psoas MVC levels have been recorded as high as 60%. From a conditioning stand point, the core musculature must be trained at low intensities to enhance overall endurance strength but also these same muscles need to be strengthened at higher MVC % levels to correspond to the physical demands of sprinting at high intensities when cycling.

See this great article by Trish Wisbey-Roth from the Australian Olympic Cycling Team in regards to the importance of core strength and cycling conditioning.

<http://www.bbclasses.com.au/files/36.pdf>

The hip abductors are another group of important muscles that help stabilise the pelvis when a rider is off the saddle. Any dysfunction in the hip abductors will increase the amounts of lateral sway the cyclist experiences and thus reduces the amount of power transferred through the lower limb.

From a clinical perspective exercises chosen must be performed in positions specific to cycling. That means exercises that maintain a neutral spine in a hip flexion position are optimal in the conditioning of the core musculature of cyclists.

Have a look at another excellent article by Emma Colson in regards to core strength.

<http://www.topbike.com.au/pdfs/ba-janfeb06-emma-colson.pdf>

PerformBike

At Back in Motion we have developed a Pilates based cycling specific conditioning program called PerformBike. This program focuses on strengthening the shoulder rotator cuff, deep abdominals and hip abductors as well as improving mobility of areas prone to tightness in cyclists. The program incorporates exercises that are performed in cycling specific positions to enhance a cyclist's performance and reduce injury.

Visit the link below to get further information about the PerformBike program and start dates.

References

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