

## PREVENTION OF SHIN SPLINTS

As the Physiotherapist for the Australian Triathlon team, one sees similar patterns of over-use injuries in both elite and age-group tri-athletes. The prevention of these injuries is the ultimate aim when working with the Australian team to ensure optimal performance on the day, free of niggling pain and injury. The aim of this article is to give you strategies to prevent some common injuries related to triathlon training and competition.

The foundation of the injury prevention strategy for the Australian triathlon team is the pre-participation musculo-skeletal screening of each of the tri-athletes. This is preferably done in the off-season where the training load has been reduced. The screening entails an initial interview where the athletes' injury history is thoroughly recorded, relevant joint ranges of motion and muscle strengths are tested and the tri-athletes swimming, cycling and running biomechanics are recorded on video.

The purpose of these tests is to detect any pre-disposing factors that, if present in the athlete, may lead to injury. Some examples are asymmetry between the left and right sides, joint or muscle inflexibility, any muscular weakness or joint instability and any biomechanical faults. If any relevant factors are detected, the athlete is prescribed an individually-tailored program of specific stretches and exercises to rectify the problem and reduce the risk of future injury.

It is also important to rule out extrinsic factors that can relate to injury such as training errors and footwear issues. For example if the athlete increases their running training load too sharply and/or potentially runs in shoes that are too old and have lost their structure the incidence of lower limb injuries will more than likely increase.

A commonly seen injury in triathlon is shin splints and, less frequently but much more severely, the tibial stress fracture. There are numerous pre-disposing factors to shin splints and generally the causes are multi-factorial but a few signs are consistently seen in the injured athlete suffering shin splints. These include tight calves and stiff ankle joints.

Past ankle sprains can result in ankle stiffness and calf tightness but obviously poor infrequent stretching habits can also be a cause. Therefore it is important that the ankles and calves are stretched daily and before and after activity to optimally prevent the development of shin symptoms. As for all stretches, they should be held for approximately 30 seconds without bouncing, performed gently and slowly to the point of tension but never pain.

Adequate shock-absorption by the lower limbs during running is another important factor in the prevention of shin splints and stress fractures. Due to the endurance nature of triathlon training and racing, quadriceps and gluteal strength and single leg balance and control are all very important requirements to reduce these shock stresses on the lower limbs whilst running. If there is inadequate leg strength and endurance present then once the athlete is fatigued the shock generally absorbed in the lower limb by the muscular contraction of the calves, quads and gluteals is transmitted to the shins and bones of the leg.

One component of shock absorption can be assessed very easily by watching the Triathlete perform single leg squats. One should be able to execute 3 sets of 10 slow squats without the loss of balance and with good alignment where the knee traces a path over the middle toe when bending. If this cannot be executed with good form and alignment exercises should be performed daily until 3 sets of 10 can be achieved.

If the loss of single leg balance is the main issue preventing the performance of controlled single leg squats then at every opportunity throughout the day, one should practice standing on one leg concentrating on the reduction of sway. Balance is relevant to the prevention of many lower limb injuries, such as shin splints, due to the fact that if one can't stand on one leg at rest without excessive ankle and leg movement then whilst running when the foot strikes the ground there may be too much uncontrolled foot and ankle movement. This can lead to overactive shin muscles such as within the tibialis posterior muscle (muscle on the inner side of the shin bone) which can cause excessive pulling of the muscle off the bone which can lead to shin symptoms. One common cue I give to patients to improve their balance is to stand on one leg whilst putting on their opposite shoe and sock. If that becomes too easy, then try to perform it daily with eyes closed.

Another component of adequate shock absorption whilst running is calf muscle endurance which is measured by the number of single leg calf raises one can do off a step on one leg. Ideally, 30-40 repetitions should be able to be performed on each leg to ensure that calf endurance is not related to injury production. If this is not the case then one set of calf raises to failure (fatigued to the point where no more reps can be performed) should be performed daily but not before a run to ensure the calves are not pre-fatigued.

The final aspect of the screening is to view the tri-athletes biomechanics on video. Efficient and well-aligned running biomechanics are vital to prevent most lower limb injuries from developing. I am sure you have all seen various running styles that, even to the untrained eye, are far from ideal and that may lead you to believe that the athlete may be at risk of developing some form of injury. I use the analogy that our legs should move up and down vertically like a piston within an engine. If a piston is mal-aligned within a cylinder there would be friction that would lead to the engine breaking down. Similarly, if the legs don't move up and down like a piston then various body parts will be stressed and slowly via this micro-trauma inflammation and hence pain will develop.

The solution is to seek out a qualified athletics or triathlon coach that can assess running technique and prescribe various running drills and strategies to rectify any biomechanical flaws.

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