



## ROYAL AIR FORCE TRIATHLON ASSOCIATION

RAFTri/Triangles

Frank Whittle, 2005

### HIDDEN INJURIES AND HOW TO AVOID THEM

Sometimes when you are feeling great about your training, you appear to be injury free, and you are looking forward to achieving new heights in performance, your muscles may actually be in a state of chaos. No hobbling, or even niggling, pain will necessarily reveal this chaotic state, and only a disappointing performance in a key competition will show that something has gone seriously wrong. The poor performance will be an indication that your training has injured your muscles significantly – and yet kept you in the dark about the nature of the problem.

How can athletes be unaware of the damage they are doing to themselves during training? Unfortunately, some muscle problems can exist below an athletes “radar screen”; they may significantly interfere with muscle function and yet produce few or no symptoms that something is wrong.

For example, think about what happens to an Ironman triathlete or a marathon runner after completing their event. A week after the event is over, the athlete usually feels great, with no pain, stiffness or swelling to announce that anything is wrong with their muscles (unlike the day after a race, when their discomfort is usually intense). However, if the athletes muscles were biopsied and the cells examined under a microscope, many problems would be apparent. Recent research from Harvard reveals that portions of some muscles would be missing, other cells would be swollen, muscle membranes would be ruptured, blood vessels would be damaged and glycogen levels would be low. Yet, despite this, the athlete would be “feeling fine”.

Unfortunately, it doesn’t take an Ironman event or a marathon to induce such muscle damage. If a significant increase in training is undertaken over a prolonged period, then this will produce a similar effect. Causing such damage is not a trivial thing. For one thing, it is simply not possible for muscles to perform at optimal levels when muscle glycogen levels are low, energy producing mitochondria are damaged and contractile proteins within muscle cells are disrupted. For another, these kinds of problems can not be cleared up overnight. The research from Harvard suggests that it may take three months for muscles to be restored after such damage, and complete restoration may occur only if an athlete trains lightly or not at all.

As an athlete, what should you do to achieve your greatest possible improvement in fitness without doing damage to your muscular system? First, you should make sure that your training program contains adequate recovery time; at least one day off each week and at least one week of light training for every three weeks of strenuous training. Recovery periods allow your muscles to “catch up” on key repair processes, which are often retarded by the relentless pace of high frequency, high volume training.

Second, you should attempt to emphasise quality over quantity in your training. High intensity training is the most potent producer of fitness, and pathological changes in muscle cells appear to be much more closely related to training volume rather than training

speed. Research shows that when a comparison is made between what happened to runners muscles following a marathon and a 25km race, they found the muscle damage to be much more extensive after the marathon, even though the 25km competition was completed at a much faster pace.

Third, you should engage in functional strength training two to three times a week. Such strength training should revolve around movements which actually mimic the biomechanics of your chosen sport, so that you will be less likely to get frayed around the edges as a result of your training and competition (compared with weak muscles, strong muscles are damaged much less by the forces created during exertion).

Finally, you should devise a performance test with which you can assess your progress over time. For running, this could be a 6 minute test on the track, for cycling it could be a 10km time trial and for swimming it could be an 800 metre all out effort, and so on. Such tests can be performed every 4 to 6 weeks or so during training, and if you are feeling good but your test results are getting worse rather than better, chances are good that there are muscle problems "below your radar". The solution is not to work harder and damage your muscles further; the optimal strategy is usually to significantly reduce training volume, maintain fitness with an occasional intense workout, and thus give your muscles a chance to recover from all the abuse you have put them through. For most athletes whose performances have headed south, such periods of lighter training will help to wipe away any muscular chaos and get performance capacity on an upward slope again.