



## The early management of muscle strains in the elite athlete: best practice in a world with a limited evidence basis

John W Orchard, Thomas M Best, Hans-Wilhelm Mueller-Wohlfahrt, Glenn Hunter, Bruce H Hamilton, Nick Webborn, Rod Jaques, Dean Kenneally, Richard Budgett, Nicola Phillips, Caryl Becker and Philip Glasgow

*Br. J. Sports Med.* 2008;42;158-159  
doi:10.1136/bjism.2008.046722

---

Updated information and services can be found at:  
<http://bjsm.bmj.com/cgi/content/full/42/3/158>

---

*These include:*

### References

This article cites 13 articles, 4 of which can be accessed free at:  
<http://bjsm.bmj.com/cgi/content/full/42/3/158#BIBL>

### Rapid responses

You can respond to this article at:  
<http://bjsm.bmj.com/cgi/eletter-submit/42/3/158>

### Email alerting service

Receive free email alerts when new articles cite this article - sign up in the box at the top right corner of the article

---

### Notes

---

To order reprints of this article go to:  
<http://journals.bmj.com/cgi/reprintform>

To subscribe to *British Journal of Sports Medicine* go to:  
<http://journals.bmj.com/subscriptions/>

# The early management of muscle strains in the elite athlete: best practice in a world with a limited evidence basis

John W Orchard,<sup>1</sup> Thomas M Best,<sup>2</sup> Hans-Wilhelm Mueller-Wohlfahrt,<sup>3</sup> Glenn Hunter,<sup>4</sup> Bruce H Hamilton,<sup>5</sup> Nick Webborn,<sup>6</sup> Rod Jaques,<sup>7</sup> Dean Kenneally,<sup>7</sup> Richard Budgett,<sup>8</sup> Nicola Phillips,<sup>9</sup> Caryl Becker,<sup>8</sup> Philip Glasgow<sup>10</sup>

From 12 to 14 December 2007 UK Sport held a think tank on "muscle strains" in London.

This brought together many of UK Sport's top sports medicine clinicians along with three invited international experts. Many issues of muscle strains were discussed over the three days, but the aspect that attracted the most attention was the early management of strains in the elite athlete. A consensus summary of conclusions on this specific topic from the think tank is presented here.

The international experts were chosen by request of the UK clinicians for different reasons. Drs Best (basic science) and Orchard (epidemiology) are recognised internationally by the peer-review system as experts in their fields. Dr Mueller-Wohlfahrt is also recognised internationally as Europe's premier clinician in the early management of muscle strains. This recognition was initially bestowed on him by his patients, most notably from the thousands of professional football players he has managed over the past 30 years from every country in Europe. Increasingly this recognition has been accorded by the "mainstream" clinicians in the United Kingdom, hence his invitation to the think tank.

<sup>1</sup> Sports Medicine at Sydney University, University of Sydney, Australia; <sup>2</sup> Ohio State University Medical Center, Columbus, Ohio, USA; <sup>3</sup> Bayern Munich, Munich, Germany; <sup>4</sup> UK Sport, London, UK; <sup>5</sup> UK Athletics Medical Department, Solihull, West Midlands, UK; <sup>6</sup> University of Brighton, Brighton, UK; <sup>7</sup> English Institute of Sport, Manchester, UK; <sup>8</sup> Olympic Medical Institute, London, UK; <sup>9</sup> Cardiff University, Cardiff, UK; <sup>10</sup> Sports Institute Northern Ireland, Jordanstown, UK

**Correspondence to:** Dr J W Orchard, Sports Medicine at Sydney University, Western Ave & Physics Rd, University of Sydney 2006, Australia; [johnorchard@msn.com](mailto:johnorchard@msn.com) au

With the reserve typical of both the British and the scientific community, a common assessment of Dr Mueller-Wohlfahrt's methods by delegates was "initially I had to be sceptical, but I have seen and heard of so many good results that I am now curious to know why these good outcomes are occurring".

One session of the think tank involved an assessment of our "expert recommendations" for the early management of muscle strains in the elite athlete and a judgement of the evidence base for making the recommendations. The evidence base part was generally easy: almost all of our so-called knowledge has a basis of level 4 or level 5 quality. Our expert opinions are merely opinions, albeit based on many years of clinician experience but not having withstood the rigours of controlled studies. Although there was some debate regarding the recommendations from the various experts, for a panel of 12–15 there was a surprising number of common beliefs, including that:

- ▶ Early ice and compression are anywhere from useful to essential.
- ▶ Early mobilisation and motion (but not to the point of pain or aggressive stretching or overloading the muscle group in question) are also important, perhaps even within the first 24 h.
- ▶ Early massage of the affected muscle (peripheral to any lesion) and mobilisation of the lumbar spine are also valuable.
- ▶ Magnetic resonance imaging scans and ultrasound are somewhat helpful (and perhaps inevitable) investigations in the elite athlete but they should carry less weight than the clinical assessment.

- ▶ Early return to activity and sport are sensible goals in the elite athlete, with the speed determined by both the muscle affected and the sport (and position within the sport) of the player.<sup>1</sup>
- ▶ That there is a differentiation in diagnosis and prognosis between a muscle strain without and with actual fibre damage.<sup>2</sup> The former usually occurs early in a match, whereas the latter would typically result in a visible lesion on imaging, occurs later in a game and leads to a slower time to recovery. Dr Mueller-Wohlfahrt was adamant that this differentiation in the acute stage could be made by palpation of muscle fibre damage.
- ▶ The role of non-steroidal anti-inflammatory drugs (NSAID; both traditional and COX-2) is not well defined.<sup>3</sup> Whereas practices among the experts varied, there was a clear majority opinion against the automatic prescription of NSAID for all muscle strains, with a view that they may possibly predispose to recurrences as a result of pain masking. This trend against the automatic use of NSAID has probably occurred in the past five years and is supported by a number of basic science studies.<sup>4</sup>

The most exciting part of the management discussion was consideration of the injection protocols of Dr Mueller-Wohlfahrt. His standard regime consists of the injection of local anaesthetic, followed by Actovegin and Traumeel S on days 0, 2 and 4 after a muscle strain: (1) to the site of the strain itself; (2) in a vertical line along the same muscle and (3) infiltration therapy in the corresponding area of the lumbar spine (both central and paravertebral). This treatment regime has not previously received attention in the English sports medicine literature although publications concerning both compounds have appeared in the international literature.<sup>5–8</sup> Actovegin, a physiological amino acid mixture, is reported to show a considerable acceleration of muscle fibre synthesis in damaged muscle and detoning of the hypertonic muscle bundle.<sup>7</sup> Traumeel S, a homeopathic formulation, is alleged to suppress the release of inflammatory mediators and stimulate the release of anti-inflammatory cytokines.<sup>9</sup> The use of these products for treating muscle injuries is currently considered to be standard practice in sports medicine in Germany.<sup>6,7</sup>

The level of scientific evidence to support the use of Actovegin and

Traumeel is low, considering the lack of controlled trials. With respect to muscle strains, however, the humble opinion of the expert panel is that we have no more justification than expert opinion for the use of the vast majority of our practices, including even ice and compression. There is, however, some parallel between Dr Mueller-Wohlfahrt's theories about muscle healing and recent basic science studies that suggest that controlling certain aspects of inflammation may be beneficial in minimising the early damage and subsequent loss of function.<sup>10</sup>

Does this mean that we could and even should add local intramuscular and lumbar spine injections of Traumeel and Actovegin to the list of expert-recommended practices? It definitely is a form of management that can be considered but it is hard to recommend worldwide as "best practice". The major problem is that in many countries the products Traumeel and Actovegin are not available or registered as permitted injectable drugs.

On the basis of the available evidence, it is unlikely that governing bodies such as the US Food and Drug Administration would change their stance on these compounds.

This raises the question of whether there are alternatives that would be as effective as Traumeel and Actovegin. Prolotherapy with agents such as glucose has had advocates for many years, particularly in north America, although typically for more chronic problems.<sup>3</sup> Autologous conditioned serum injections have been used as an alternative and even compared with a "standard" of Traumeel and Actovegin in a recent study,<sup>6</sup> although autologous blood injections are thought to be "banned" manipulations by the World Anti-Doping Agency code.

As we constantly recommend in most areas, further studies would be desirable, to test all of: (1) the relative effect of any wet injection technique; (2) the specific value of the preparations of Traumeel and

Actovegin, compared for example with autologous serum, glucose, cortisone and saline local anaesthetic injections; (3) the comparative value of local muscle injections to lumbar spine injections.<sup>11</sup> It would, however, be difficult to justify spending government research funds on testing these hypotheses. In the non-elite athlete, most muscle strains recover uneventfully in a matter of weeks.<sup>12</sup> The challenge in elite athletes is to minimise the recovery time without adversely affecting the recurrence rate. These types of studies would be best funded by the professional sports associations. The difficulty in the professional environment is in getting volunteers for randomised controlled trials. Elite athletes want to get active treatment that is "cutting edge" now; they care far less about answering scientific questions for the athletes of the future.

Elite athletes (from Europe and increasingly from the United Kingdom and even Australia) have voted with their feet in that many believe that the Mueller-Wohlfahrt protocol works and for them is current best practice. Our evidence base for agreeing with them in a scientific sense is lacking but this is a familiar story in sports medicine. A comparable analogy may be surgery for chronic groin pain in athletes. Inguinal canal repairs,<sup>13</sup> adductor tenotomies<sup>13</sup> and hip arthroscopies<sup>14</sup> are all used for chronic groin pain but there is little evidence (other than case series and testimonials) that they actually work. Sceptics consider that many of the successes of these surgeries are a result of the placebo effect. Yet they are considered an optional part (but not necessarily an essential part) of the management of chronic groin pain in athletes.

Injection treatment for muscle strains should be seen in a similar light. It is not essential practice that every muscle strain in every elite athlete be treated in this manner, but it is important now to consider injection therapy as an important

part of the landscape of management options.

**Competing interests:** None declared.

Accepted 22 January 2008

*Br J Sports Med* 2008;**42**:158–159.  
doi:10.1136/bjism.2008.046722

## REFERENCES

1. Orchard J, Best T, Verrall G. Return to play following muscle strains. *Clin J Sport Med* 2005;**15**:436–41.
2. Verrall G, Slavotinek J, Barnes P, et al. Diagnostic and prognostic value of clinical findings in 83 athletes with posterior thigh injury: comparison of clinical findings with magnetic resonance imaging documentation of hamstring muscle strain. *Am J Sports Med* 2003;**31**:969–73.
3. Paoloni J, Orchard J. 1. The use of therapeutic medications for soft-tissue injuries in sports medicine. *Med J Aust* 2005;**183**:384–8.
4. Orchard J, Best T. The management of muscle strain injuries: an early return versus the risk of recurrence. *Clin J Sport Med* 2002;**12**:3–5.
5. Schneider C, Klein P, Stolt P, et al. A homeopathic ointment preparation compared with 1% diclofenac gel for acute symptomatic treatment of tendinopathy. *Explore (NY)* 2005;**1**:446–52.
6. Wright-Carpenter T, Klein P, Schäferhoff P, et al. Treatment of muscle injuries by local administration of autologous conditioned serum: a pilot study on sportsmen with muscle strains. *Int J Sports Med* 2004;**25**:588–93.
7. Pfister A, Koller W. [Treatment of fresh muscle injury]. *Sportverletz Sportschaden* 1990;**4**:41–4.
8. McLauchlan G, Handoll H. Interventions for treating acute and chronic Achilles tendinitis. *The Cochrane Database Syst Rev* 2001:CD000232.
9. Lussignoli S, Bertani S, Metelmann H, et al. Effect of Traumeel S, a homeopathic formulation, on blood-induced inflammation in rats. *Complement Ther Med* 1999;**7**:225–30.
10. Brickson S, Ji L, Schell K, et al. M1/70 attenuates blood-borne neutrophil oxidants, activation and myofiber damage following stretch injury. *J App Physiol* 2003;**95**:969–76.
11. Orchard J, Farhart P, Leopold C. Lumbar spine region pathology and hamstring and calf injuries in athletes: is there a connection? *Br J Sports Med* 2004;**38**:502–4.
12. Gabbe B, Finch C, Wajswelner H, et al. Australian football: injury profile at the community level. *J Sci Med Sport* 2002;**5**:149–60.
13. Orchard J, Read J, Neophyton J, et al. Ultrasound findings of inguinal canal posterior wall deficiency associated with groin pain in footballers. *Br J Sports Med* 1998;**32**:134–9.
14. Brukner P, Crossley K, Morris H, et al. Recent advances in sports medicine. *Med J Aust* 2006;**184**:188–93.