Palpating muscles, massaging the evidence? An editorial relating to 'Terminology and classification of muscle injuries in sport: The Munich consensus statement'

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PRACTICE-BASED CLASSIFICATION

There is no denying the fact that appropriate classification of muscle injuries is a major challenge for both clinicians and researchers. The classification system proposed in this issue has been developed by highly experienced clinicians, and has the potential to impact upon both our daily practice and future research.[1]

Although the proposed classification of muscle injuries may reflect the daily practice of many physicians, it will likely challenge the practice and mindset of others. Notably, this classification system is broadly inclusive of various forms of muscle-related pain, and reaffirms the central role of history taking and physical examination in the diagnosis of muscle injuries and in predicting their subsequent clinical trajectory. The emphasis on clinical assessment contrasts with manuscripts in recent years which have prioritised the use of imaging as a key diagnostic determinant—at the expense of clinical assessment.[2 3] The authors are therefore to be commended.

The proposed classification, perhaps more than any other classification, highlights the paucity of evidence from which to develop classifications. We lack high-level studies to confidently guide clinical management of muscle injuries. As a result of both the poor state of evidence and the complexity of the challenge, this proposed classification of muscle injuries raises as many questions as solutions and, thus, it has the potential to promote urgently needed research in this area.

MASSAGING, MANAGING OR IGNORING THE EXISTING EVIDENCE?

When determining an athlete's prognosis after muscle injury, the only consistently reported (level II) evidence suggests that 'MRI-negative' muscle injuries have a better prognosis than injuries which are evident on MRI (MRI-positive).[4–7] Several studies have provided convincing evidence that 'MRI-negative' (without increased signal intensity) predicts a favourable outcome and a quick return to sports.[4–7] For example, Ekstrand *et al*[4] compared return to sports in MRI-negative (without increased signal) with MRI-positive (with increased signal, but no macroscopic architectural fibre distortion) injuries. They reported a significantly and clinically relevant quicker return to sports for MRI-negative lesions. Similar prognostications for RTS in athletes with MRI-negative scans are reported by others.[4–7]

Furthermore, Ekstrand *et al* also showed that grade I lesions (according to the Peetrons radiological classification) in the presence of increased MRI signal (so-called functional muscle disorder, without fibre disruption) had comparable prognosis as Grade II injuries positive for fibre disruption (so-called structural muscle injuries).[3 4]

Unfortunately, this seemingly discriminative variable of MRI-negative scans appears largely ignored in this classification, whereby MRI-positive findings may be present in both 'functional' and 'structural' muscle injuries, apparently neglecting what little scientific evidence there is in this area.

Similarly, at least in certain instances, the injury mechanism, stretch or contraction[8] as well as the length of the lesion on imaging correlate with return to play[5 8]. For example, Askling's two types of hamstring injuries (high-speed running or stretching type) have very different prognosis. In Askling's series, the median time for return to play was 16 and 50 weeks for the high-speed running and stretching type injuries, respectively.[8]

We feel these are important parameters (for which we have evidence) and could add prognostic value to a revised or future classification system. Given this evidence, it surprised us that these important findings are not accounted for in the new classification as discriminative criterion.

Hence, although it is likely that the limited evidence will require 'massaging' to fit any new classification, ignoring the available evidence may challenge its academic credibility.

TERMINOLOGY: REAL CONSENSUS, OR JUST UP FOR DEBATE?

One of the major challenges of consensus meetings is to actually reach consensus on complex issues. Subsequently, compromises are required, which may not reflect the strength or knowledge of all participants. As a result, consensus may not be the easiest or most appropriate manner to formulate a classification system, which has requirements of being strictly defined, detailed and discriminative. The resulting consensus-based classification system may reflect this challenge.

The authors have highlighted convincingly the multitude of terms, currently in use, to describe non-contact muscle injuries, and it is clear, to date, that this has created inconsistencies and variability in both scientific and clinical approaches. For these reasons, a rational approach to considering this area is supported. However, it is not clear that 15 answers to a survey regarding the understanding of the term strain appropriately reflect the body of evidence. A review of six sports medicine journals over the 5-year period 2007–2011 illustrates 22 relevant articles related to hamstring injury, 11 of which utilise the term strain in their title (compared with 10 utilising injury, and 1 using tear). Similarly, a comparison in the English dictionary of the meanings of 'strain' and 'tear' does not clearly support the use of one term over another. Finally, in the late 1990s, there was a great deal of research performed on the mechanisms of non-contact muscle injuries, and, in this research, the term strain was utilised to describe the lesion as well as imply an aetiology.[9 10] In contrast to the consensus statement, we recommend that the term 'strain' should be used for non-contact injuries.

FUNCTIONAL VERSUS STRUCTURAL INJURIES

Perhaps the most challenging concept in this new classification is the differentiation of a 'functional' from a 'structural' injury. Clinically, there appears a good rationale for this theoretical distinction, with

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increasing recognition of referred sources for muscle pain in many of our athletes. However, in sports medicine, the term 'functional' may have a different meaning. As suggested for the term 'strain', we would postulate that 'functional' is not well defined and is used with various ambiguous and inconsistent meanings. For example, both functional and structural disorders may result in a 'functional limitation of the athlete'. Furthermore, it is possible that 'functional' lesions may in fact represent yet-to-be understood 'structural' pathology.

This distinction is further complicated by the fact that it is unlikely that MRI is sensitive enough to detect the presence of microscopic sarcomeric, myofibre or even fascicle disruption, which may ultimately be decisive in differentiating 'functional' from 'structural' muscle injuries. Indeed, a recent study suggests that diffusion tensor MRI offers promise over traditional MRI to detect subtle changes such as Z-band streaming in human skeletal muscle post-exercise.[11] In the same manner, it is debatable whether the presented imaging criteria can differentiate adequately between minor and moderate structural injuries. Hence, the decision to differentiate between these two injuries on the extent of macroscopical 'fibre disruption' conflicts with both the limitations of physical examination (palpable defect) and imaging capabilities (positive for fibre disruption). Subsequently, both the terminology and the ability to distinguish these two entities pose challenges. Given the importance of this distinction to this classification system, it would appear more logical to utilise terms such as structural and non-structural muscle injuries.

NO (MUSCLE) STRENGTH WITHOUT STRUGGLE

The beauty of this classification system is that it poses questions, issues and struggles to be resolved, which should both promote and guide a wealth of research leading to improved diagnostic and prognostic ability for all of us caring for athletes with muscle injuries. As with improving muscle strength, struggle and adaptation will be essential!

It is a challenge for us all to strengthen the scientific base and adapt the classification to the latest available evidence. Whether the current system stands the test of scientific scrutiny is yet to be seen, but without question, the authors should be commended for their efforts—let the debate begin.

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