

Injuries in sports and exercise | case studies



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\n[toc title="Table of Contents"]\n

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1. [Introduction](#) \n \t
2. [Mechanism and pathophysiology of injury](#) \n \t
3. [Psychology of sports injury](#) \n \t
4. [Injury management](#) \n \t
5. [Lecture to club](#) \n \t
6. [References](#) \n

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Understanding Injury in Sport and Exercise Settings – Self-Selected Case Studies

Introduction

In this case study we shall consider three athletes who are superficially similar and have presented with injuries as a result of their sport. The athletes will be referred to as Mr. A, Mr. B and Mr. C. Each is in their twenties and are club standard runners. Mr. A fell during a training run and sustained an inversion injury to his left ankle. Mr. B presented with a pre-patella bursitis of his right knee and Mr. C could not compete because of severe metatarsalgia.

Mechanism and pathophysiology of injury

If we consider the aetiology and mechanisms of each injury we can see that although they are largely sports related and, to a degree sports specific,

each is fundamentally different in terms of presentation, cause, treatment and outcome.

Let us consider Mr. A. who fell during training. He was a modest club runner who ran sporadically for personal enjoyment. He sustained an acute inversion injury which resulted in a partial tear of the lateral malleolar ligament. This ligament effectively joins the Tibia to the talus and calcareous and is largely responsible for the lateral stability of the joint. (Clemente C D 1975). There was immediate pain and subcutaneous swelling and, although he could weight bear immediately after the injury, Mr. A could only walk with great pain. Lateral distortion of the joint was extremely painful. The fundamental aetiology of the injury was a sudden inversion stress to the ankle which was greater than the ligament could withstand and this resulted in rupture of some of the collagen fibres of the lateral ligament together with the underlying joint capsule. This allowed substantial bleeding to track into the surrounding tissues which, together with both extravasation of synovial fluid and accumulation of tissue oedema, led to the clinically apparent swelling over the lateral malleolus.

Mr. B, by contrast, was a fiercely competitive sub-elite runner who noticed his injury developing more slowly over a period of about ten days. He was preparing for a race and had increased his running schedule both in intensity and distance covered. Initially he was aware of a discomfort in the anterior aspect of his knee which felt superficial. This was apparent at the end of his training sessions and persisted for a few hours while travelling home. As the training sessions intensified, the pain grew more persistent until it occurred throughout his running session. Although it was a nuisance, it was not

severe. By the end of ten days it had become very severe to the point that there was demonstrable swelling over the lower pole of the patella which was tender to the touch and constantly painful. The mechanism of this injury is typical of the overuse injury seen with overtraining. It is believed to arise initially from micro tears within the body of the patella ligament which become inflamed and the constant stresses involved with training do not let the injury heal sufficiently and the inflammation becomes accumulative to the point that histology would show inflammatory changes occurring throughout the ligament and this, in turn, causes friction on the surrounding structures. (Hewett T E et al. 1999)

This is manifest as a constant progressively painful swelling localised in the region of the patella ligament and is aggravated by movement of the knee joint. It is tender to the touch and limits exercise.

Mr. C was a club runner of modest ability, but with an over optimistic appreciation of his own ability, who trained with the elite runners at the club. He frequently complained of minor injuries that were blamed for his particular lack of performance in races. On this occasion he presented with pains in his forefoot over the metatarsal heads which was very specific and occurred when the toes were flexed but not when they were extended (an unphysiological finding). He could run, but complained bitterly of forefoot pain after the race and could be seen hobbling off the track and around the changing rooms after the race. Examination of his foot was completely unremarkable and no consistent physical abnormality could be found. It was noticeable that Mr. C vociferously blamed this problem for his inability to perform well. No physical diagnosis was made but the aetiology of his

complaint was thought to be a psychosomatic manifestation of his anxiety relating to his inability to beat the better runners at the club. This equated to a mechanism of cognitive distortion and denial together with a compensatory conversion symptom complex to rationalise his poor performance. (Patel D R et al. 2000)

In short we see three competitive runners with common presentations of injury, but three very different mechanisms of pathophysiology and aetiology. Each will require a different approach to treatment and will follow a very different illness trajectory.

Psychology of sports injury

There are a number of different theoretical concepts (with differing degrees of security of evidence base) that can be usefully employed in describing sporting motivation and are therefore relevant to the incidence of sporting injury. (Wigfield A et al. 2000)

The literature on these subjects is very extensive and beyond the scope of this essay to consider in any degree of detail. Reversal theory (Apter M J 2001) is commonly utilised in this regard and can describe relationships between the personality characteristics and motivational stimuli. Paratelic dominant athletes commonly enter the paratelic motivational state and are typically arousal seekers and engage in high risk and highly competitive sports (viz Mr. B)(Cogan N A et al. 1998)

Mr. A, by contrast is the typical telic dominant athlete who tend to be arousal avoiders, who plan and consider their training carefully and prefer low intensity experiences. (Kerr J H et al. 1999)

Let us start this consideration of the psychology of sports injury with an assessment of Mr. C who presents with a primarily psychological complaint

Mr. C has an overtly psychosomatic presentation. This can be conveniently described in terms of reversal theory (Apter M J 2001).

and the paratelic concept (Murgatroyd S et al. 1978). There are aspects of the metamotivational states described in the theory which are relevant to Mr. C's perception of his motives for continued participation in running even when he was clearly failing to achieve his set targets.

It appears that Mr. C has developed a variation of a paratelic protective framework with somatic constructs. He needs the high arousal gratification of the paratelic dominant athlete by lining up on the starting line with the elite athletes, but has developed his idiosyncratic phenomenological frame as a coping mechanism which allows him a sensation of safety from his perception of failure with a series of somatic excuses for his failure to perform. (Kerr J H 2001)

One psychological technique that has been demonstrated to work in this type of case is a form of cognitive behaviour therapy which allows a realisation of the implications of an action to be re-evaluated by the client. (Fowler D et al. 1995) This was combined with a strategy of the setting of “step-by-step” short term goals. This effectively allowed the client to consider his need to unrealistically compare himself with the elite athletes and to allow him to achieve progressive attainable targets, thereby recognising and capitalising on achievement rather than ruminating on poor past performance comparisons with other (better) athletes. (Pain M et al. 2004).

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The idea is that by setting and achieving some short term goals, the client can focus on the present, make small progressive steps, and recognise new achievements, instead of ruminating on past performance level. (Hall H K et al. 2001). Complicity by the clinician in agreeing that his symptoms may actually be physical can be completely counterproductive in this type of case (see on)

Injury management

The object of management of any injury is clearly to maximise the degree of recovery possible and to limit and residual disability that may occur as a result of the injury. In broad terms we can consider the immediate (first aid) treatment and the subsequent longer term management as separate issues. (Hergenroeder A C 2003)

In the case of Mr. A's acute injury the essential elements of treatment (once the diagnosis has been confidently made) should be to prevent further tissue damage and bleeding by immobilisation of the joint (splinting), prompt cooling to reduce the tissue reaction to the injury, analgesia to relieve the pain (but with the caveat that pain relief should not be an indication to stress the joint) and pressure to minimise blood and tissue fluid accumulation. The longer term considerations should be that weight bearing should be kept to a minimum for about 7-10 days. Mobilisation should then begin in a graded fashion over about four to six weeks. Running on flat surfaces could realistically begin (possibly with an ankle support) after that time. Mobilisation (both active and passive) is necessary to ensure that the fibroblastic activity of the ligament repair mechanism does not restrict

movement of the joint to the degree that the long term restriction of movement becomes a problem. (Orchard J 2003)

Mr. A would be well advised to avoid running on uneven surfaces for a period of many months and to undertake a course of physiotherapy involving modalities such as wobble board training to improve his proprioceptive capabilities. (Lephart S M et al. 1997) Because of the injury, Mr. A should always regard himself as more prone to get a recurrence if he were to have another fall.

Mr. B should be treated in a distinctly different way. There is no “ acute” first aid treatment as such, as the critical factor here is to recognise that the injury is the result of overuse of a joint. Rest, or in some cases simply a reduction in the training schedule, is often all that is needed to allow the condition to resolve.

(Krivickas L S 1997)

There is some evidence to suggest that the use of NSAIDs may help to reduce the inflammatory reaction and thereby increase the speed of recovery but their use must be undertaken with caution because of the propensity of runners to consider that the analgesic properties of the NSAID group can be equated with evidence of suppression of the pathophysiology of the lesion, and therefore they can start to increase their training schedule thinking that the inflammation has settled because the knee is pain free.

(Nickander R et al. 2005)

Some clinicians would recommend the use of steroid injections in the paratendon tissues. It has to be noted that this is contentious because of the risk of tendon damage if the steroid is injected into the wrong area.

Mr. C requires no immediate physical treatment. Indeed on an intuitive basis, physical treatment could be considered counterproductive as it could be viewed as reinforcing his aberrant adaptive and compensatory mechanisms by colluding in the physical nature of his pathology. By entrenching his position, the clinician could be actually aggravating the problem. Once confidently diagnosed, Mr. C should be promptly referred to a competent sports psychologist for treatment along the lines that we have outlined above.

Lecture to club

The first serious examination of sports injuries as a specific entity was carried out by William Haddon in 1962 (Haddon W et al. 1962). The growth in interest since then has been exponential. In terms of general observation about sports related injuries we can observe that it is generally accepted that one of the common predictive factors for an injury is a history of previous injury. (Watson A W 2001) (Lee A J et al. 2001) Various studies have reported increased odds ranging from 1. 6 to 9. 4. (Chalmers D J 2002). In order to accommodate this information it is clearly important to know the other risk factors involved

The practical problem is that in order to assemble a coherent evidence base on this issue it is vital to have well designed and robust trials to consider. In short, there are very few of these. (Parkkari J et al. 2001). A critical analysis

of the literature on the subject reveals that there is a surprising paucity of evidence for any significant preventative measure for sports injury. Part of the reason for this is that if there is anecdotal evidence that a procedure reduces the risk of injury then it is likely that a substantial proportion of participants will already be using it. This makes double blind trials almost impossible. Van Mechelen ran a trial of the prophylactic value of warming up and down only to find that over 90% of participants were using the technique already. (van Mechelen et al. 1993)

It is clearly of dubious ethical possibility, quite apart from a practical possibility to get a control group of athletes not to warm up just to see if they are more likely to get injured.

The management of sports injuries is therefore largely a combination of intuition based on anatomical and physiological principles, guided by experience and validated by what scientific evidence base there is on the subject.

The three case studies presented above have all occurred in similar status club runners for completely different reasons. This therefore exemplifies the need to undertake a holistic assessment of each case in order to be in a position to make a confident and accurate diagnosis. One should note that there are occasions when the injury or the pathology is blindingly obvious, but it is more common to have to undertake further investigations in order to firmly establish the diagnosis. Mr. A might require X-Rays to exclude a chip fracture of his lateral malleolus. Mr. B might require some blood tests to

exclude a connective tissue disorder and Mr. C may need further assessment in order to be confident that there is no genuine physical pathology.

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