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Management of rib pain in rowers: emerging issues

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INTRODUCTION

Rib stress fracture (RSF) is one of the most hotly debated and least understood of all rowing injuries. It has recently been stated that 'the pathology and prevention of rib stress fractures will be one of the most useful areas of research in rowing injuries'.[1] There is a pressing need for more quality research of RSF aetiology and epidemiology that will inform effective prevention strategies. The current 'best practice' management of RSF is principally based on clinical experience and expert opinions from the 20th century.[2–4] This is likely due to few major advances within the field of stress fracture healing. Current management strategies, therefore, focus mainly on fitness maintenance and a graded return to rowing.

CLASSIC MANAGEMENT

As previously described[2 3] a pain-dependent approach is taken, involving a period of complete rest until breathing deeply remains pain free, a period of non-rowing exercise—that is, stationary bicycling and lower extremity strength training—and, eventually, a gradual return to rowing. Initially, pain can be treated with analgaesics, electrotherapy, icing, thoracic spine mobilisation and strapping with tape. The use of non-steroidal anti-inflammatory drugs should be avoided as it has been reported to slow down fracture healing. Typically, rowing training is gradually resumed after 2–6 weeks of relative rest, with careful reintroduction of volume and intensity. Different treatment modalities have been suggested to accelerate RSF healing. It is beyond the scope of this editorial to provide a review of this topic. It seems fair, however, to say that solid evidence for a positive effect of any treatment modality is currently lacking.

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MORE AGGRESSIVE MANAGEMENT

A more aggressive strategy involving no or a very short period of rest, but intensified treatment of pain including constant strapping, has been used in rowers in the lead-up to or during major competitions.[4] This approach purportedly compromises pain relief to maintain performance, in conflict with the general practice in stress fracture management where the priority is to modify activity. Anecdotal reports of non-union of RSFs in elite rowers do exist. Consequently, great care should be taken to ensure that an adequate period of rest is introduced as soon as possible to avoid this potentially career-ending injury. The period of rest needed for sufficient healing is likely to be prolonged if the aggravating activity (rowing) is continued despite ongoing symptoms.

POTENTIAL RISK FACTORS FOR RSF

An important part of RSF management is to lower the risk for future RSFs by assessment and modification of known risk factors. This is limited, however, by the lack of studies with adequate baseline assessment of potential risk factors followed by prospective injury surveillance. Consequently, the level of evidence on which clinicians can currently base their assessment is low. Until studies providing direct evidence are published, we suggest that studies of other stress fracture types might be used to guide clinical practice.

EMERGING ISSUES REGARDING RISK FACTORS AND INJURY MECHANISMS

Low energy availability

The concept of low energy availability (EA), whether described by research on the female athlete triad or the hotly debated RED-S (Relative Energy Deficiency in Sport),[5] is a potential area of major importance in rowing—lightweight rowing in particular. Low EA is a result of either intentional or unintentional energy deficit due to a higher energy output than calorie intake and may negatively impact bone health and performance. It is one of the components of the female athlete triad and is also reported in male athletes with a prevalence of 18–50%.[5 6] Modifiable risk factors, such as low EA, menstrual disorders, and calcium and/or vitamin D deficits, should be considered and assessed to avoid recurrences.

Para athletes

As more athletes with disabilities enter the sport of rowing, there will likely be a rise in RSF incidence in this population, as altered rowing mechanics and segmental sequencing may play a role.[7] Additionally, athletes with spinal cord injury lack skeletal loading, which may result in osteoporosis. These athletes, as well as those ambulating with an amputation, may also be at risk for lower EA.[5]

Stationary versus dynamic rowing ergometers

Increasing numbers of biomechanical studies of stationary versus dynamic ergometer rowing—that is, from the research groups of Colloud and Vinther, respectively—indicate lower handle forces in dynamic ergometers at identical power outputs. Replacing stationary rowing ergometers with dynamic ergometers may hypothetically lower the risk of injury without compromising performance.

CALL TO ACTION

Focal rib pain in an elite rower in training should be regarded as a stress fracture until proven otherwise, and this alone should highlight the need for better preventive and management strategies. We see a pressing need for prospective surveillance of self-reported pain and dysfunction, as well as its effect on participation and performance.[8] Findings from these and studies of potential risk factors may have a profound effect on future prevention and management, keeping rowers on the water and performing optimally.

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REFERENCES

1 Budgett R, Hettinga DM, Steinacker J. Sports medicine. In: Secher NH, Voliannitis S, eds. *Rowing*. London: Blackwell, 2007:128.
2 Christiansen E, Kanstrup IL. Increased risk of stress fractures in elite rowers. *Scand J Med Sci Sports* 1997;7:49–52.
3 Palierne C, Lacoste A, Souveton D. Stress fractures in high-performance oarsmen and oarswomen: a series of 12 rib fractures. *J Traumatol Sport* 1997;14:227–34.
4 Wajswelner H. Management of rowers with rib stress fractures. *Aust J Physiother* 1996;42:157–61.

5 Mountjoy M, Sundgot-Borgen J, Burke L, *et al*. The IOC consensus statement: beyond the female athlete triad—Relative Energy Deficiency in Sport (RED-S). *Br J Sports Med* 2014;48:491–7.
6 Hackney AC. Effects of endurance exercise on the reproductive system of men: the 'exercise-hypogonadal male condition'. *J Endocrinol Invest* 2008;31:932–8.
7 Smoljanović T, Bojanić I, Pollock CL, *et al*. Rib stress fracture in a male adaptive rower from the arms and shoulders sport class: case report. *Croat Med J* 2011;52:644–7.
8 Clarsen B, Myklebust G, Bahr R. Development and validation of a new method for the registration of overuse injuries in sports injury epidemiology: the Oslo Sports Trauma Research Centre (OSTRC) overuse injury questionnaire. *Br J Sports Med* 2013;47:495–502.

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Notes