

It is conceivable that the onset of pneumomediastinum occurred during the episode of asthma on the night before presentation; however, the mild nature of this attack suggests otherwise. This attack was probably a factor in increasing the amount of mediastinal air following the initial leak initiated by the patients unusual exertion.

This case represents the first report of pneumomediastinum occurring as a result of surf lifesaving. Of importance is the associated history of mild chronic asthma and this case also represents the first description of this complication of asthma in an asthmatic athlete. The importance of impeccable control of asthma in the athlete—and in particular the monitoring of lung function before activities involving straining and the Valsalva manoeuvre—and the correct use of prophylactic medication is highlighted.

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Exercise induced leg pain—chronic compartment syndrome. Is the increase in intra-compartment pressure exercise specific?

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Abstract

Intra-compartment pressure studies remain the main investigative method in diagnosing chronic compartment syndrome (CCS). Standard exercise protocols have been used to cause the raise in pressure measured in the laboratories. This case suggests that CCS cannot be excluded without the specific sports activity being used to raise the intracompartmental pressure.

(*Br J Sports Med* 1996;30:360-362)

Key terms: chronic compartment syndrome; intra-compartmental pressure; exercise

Exercise induced leg pain is a common

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Accepted for publication 20 February 1996

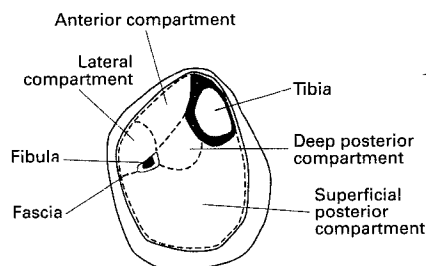


Figure 1 Transverse section through the left leg showing the four compartments.

problem encountered by young athletes after an increase in activity or at the start of the season.¹ The terms shin splints² or freshers leg³ are often used to describe the condition. These terms are non-specific and are falling out of favour. The pivotal symptom is pain, which occurs on exercise and is relieved by a variable period of rest. The cause of pain will usually fall into one of the following four categories:

- (1) Pain of bony origin, for example focal stress fracture or diffuse micro-stress fractures.^{4,6}
- (2) Pain of osteofascial origin, for example periostitis and medial tibial stress syndrome.^{7,8}

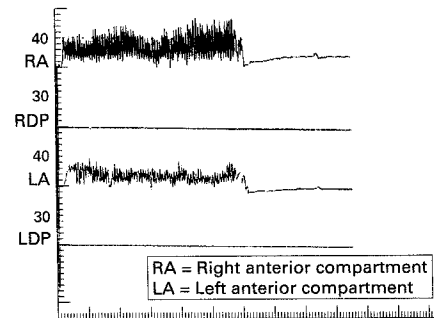


Figure 2 Pressure change following jogging on the spot.

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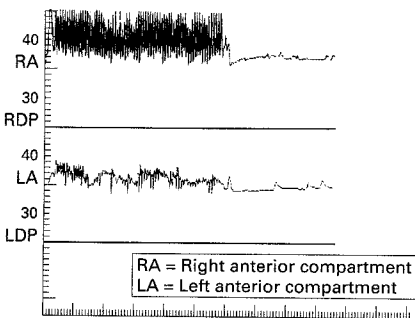


Figure 3 Pressure change following step aerobic routine.

- (3) Pain of muscular origin, for example chronic compartment syndrome.^{9,11}
- (4) Pain of nerve compression, for example superficial peroneal nerve compression.¹²

Chronic compartment syndrome is the most common cause, particularly affecting the anterior and deep posterior compartments of the leg (fig 1). The condition is characterised by an increase in intra-compartmental pressure, resulting in pain¹³ which may well be localised.

Case report

A 32 year old Caucasian woman presented with activity related pain affecting the anterior compartment of the right leg. She was a step aerobic instructor with average of six high impact classes a week. Resting and dynamic pressure studies were performed using a slit catheter¹⁴ and a Medex pressure transducer as described by Barnes *et al.*¹⁵

A "standard" exercise protocol (jogging on the spot for 60 seconds with 30 seconds rest) was used and the pressure remained within normal limits (<40 mm Hg)¹⁵ (fig 2). A study using a step aerobic routine showed a dramatic rise in the pressure (>40 mm Hg),¹⁵ the normal diagnosis of CCS (fig 3).

After failed conservative management she underwent superficial fasciotomy of the anterior compartment (fig 4). She returned to her sport 12 weeks after the operation.



Figure 4 Superficial fasciotomy.

Discussion

Chronic compartment syndrome of the leg was first described by Mavor in 1956⁹ and is characterised by exercise induced pain, swelling, and impaired muscle function.¹³ Increase in intra-compartmental pressure on exercise is regarded as diagnostic but there is a variation in parameters used by various authors. French and Price¹⁰ and Wallenstein¹⁶ considered raised intra-compartmental pressure at rest after exercise to be crucial; Puranon and Alavaikko¹¹ cite raised intra-compartmental pressure during exercise; McDermot *et al.*¹⁷ claim muscle contraction pressure to be critical; and Styf *et al.*¹⁸ regarded increase in muscle relaxation pressure to be the important variable.

Exercise protocol has also varied with individual researchers. Styf *et al.*¹⁸ used the foot and shoe attached to a device loaded with 4-6 kg and linked it to an ergometer. Patients were asked to dorsiflex both feet once a second for five minutes. Logan *et al.*¹⁹ and Rorabeck *et al.*²⁰ used a treadmill with varying speeds to exercise their subjects. Allen and Barnes¹ used jogging on the spot for 60 seconds with 30 seconds rest, which was repeated three times and results averaged.

CONCLUSION

Despite variations in detail, an exercise protocol is generally used in an attempt to demonstrate pressure changes in the compartment affected by CCS. Our case suggests that changes in pressure may only come about when a specific activity is used, and adherence to a set protocol may not reveal some cases.

Our grateful thanks to Amineh Khatib and Tahir Mahmud, medical physicists, for their dedication and expertise in setting up the ICP monitoring system. Our sincere thanks to the following for supporting this study: Medex Ltd, Ellman (UK) Ltd, Baurfeind (UK) Ltd, Canonbury Products Ltd, and Special thanks to Mr S Keswick.

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