maximum dorsiflexion was greater with moderate soles compared to hard soles and with soft soles compared to barefoot. The Differences observed in 1st MTPJ maximum dorsiflexion were minimal. The percentage of midstance for the left foot was larger in the barefoot condition than the soft and moderate sole conditions. Conclusion: For the 14 participants in this pilot study, moderate soles encourage left ankle range of motion (ROM) whereas hard soles restrict left ankle ROM. A limited range of motion has been cited as a cause of injury and a risk factor for diabetic ulceration. This pilot study may be particularly important in the management of diabetic patients and patients who walk for a long time routinely. The effect of sole hardness on joint motion and gait phases still warrant further investigation. It may be worth examining the long-term effect of sole hardness on different joints and the walking gait. It is hoped that optimal sole hardness could be recommended to patients based on their age, weight and biomechanical presentation in the future.

3

Plantar loading patterns of elite rowers on a fixed ergometer: Comparison of a commercially available rowing specific shoe to a training shoe

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Background
In the sport of rowing, load applied through the feet must be efficiently and effectively translated into propulsive force at the oar. Factors inherent to this process include; technique, anthropometric variables and equipment. By studying forces applied at the foot, one can develop a model of the most effective loading pattern. By comparing these loading patterns between equipment variables, such as footwear, an ideal setup can be chosen based on the athletes' specific anthropometry or technique. It could even be possible to advise the athlete, based on the observed loading pattern, how to adjust technique to achieve greater performance. The first aim was to build on previous research regarding plantar load in rowing using an inshoe plantar pressure device. The second, to compare loading patterns using a commercially available rowing shoe, to a training shoe.
Methods
10 elite male university rowers conducted two identical rowing trials, once with a training shoe (TS) and once with a commercially specific rowing shoe (RS). The ergometer was instrumented at the stretcher with a capacitive insole placed in each shoe. The foot was masked, subdividing into 7 anatomical areas; heel, midfoot, 1st Metatarsal head, 2nd + 3rd Metatarsal heads, 4th +5th Metatarsal heads, 1st digit and 2nd -5th digits. For each area and the total surface outcomes recorded include: Maximum force (N), Instant of maximum force (%ROP), Force-time integral (N*s), Mean pressure (kPa), Peak pressure (kPa), Instant of peak pressure (%ROP), Pressure-time integral (kPa*s), Contact area (cm2), Begin of contact (%ROP), End of contact (%ROP), Contact time (p) (%ROP).
Results
Maximum force is greater over the 1st Met head in RS ($p < 0.01$). Instant of maximum force occurred earlier over the 2nd-3rd Met head in RS ($p = 0.027$). Force time integral is greater over the 1st Met head in RS ($p < 0.01$). Peak pressure and pressure time integral is higher over total area and 1st Met head in RS ($p < 0.01$ for all). Contact area is greater in TS over all areas but 3rd-5th digits ($p < 0.01$ for all). Of the anatomical areas; Maximum force is highest over the heel in TS and 1st Met head in RS, 2nd-3rd Met had the greatest Force time integral in RS and TS, highest peak pressures under the 1st Met head in RS and TS and highest pressure time integral under the 1st Met head in RS and TS.
Conclusions
The softer nature and size of the training shoe allow for a greater spread of the force beneath the foot during the rowing stroke and facilitated heel contact. By contrast, the rowing shoe focussed the force beneath the 1st Met head and, due to the reduced contact area, resulted in a greater peak pressures.

4

Importance of accurate identification of arterial perfusion using different physiological tests

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Background
Although diagnostic and therapeutic decisions in patients with peripheral arterial disease are guided primarily by the history and physical examination, the use of non-invasive investigations has increased significantly in recent years, mainly as a result of technological advances in ultrasonography. Ultrasonic hand held doppler velocimeters are widely utilized by healthcare professionals for the assessment of lower limb arterial perfusion. However, a clinical assessment tool is only of value if the interpretation of the results is correct and repeatability has been clinically established. Ankle Brachial Pressure Index, TBIs, toe pressures and spectral waveforms at the ankle are all used to assess arterial perfusion especially in high risk populations.
Design
Single centre prospective non-experimental study design.
Methods
This paper presents the findings of two studies conducted to compare the accuracy of different physiological tests used by various health care professionals for the identification of arterial perfusion in the foot. Vascular testing included assessment of arterial spectral waveforms at the ankle, absolute toe pressures, toe-brachial pressure index (TBI), ankle-brachial pressure index (ABPI) and pulsatiliy index (PI).
Results
TBIs, toe pressures and spectral waveforms at the ankle are better predictors of likelihood of healing and non-healing after minor amputation than ABPIs. ABPI alone is a poor indicator of the likelihood of healing of minor amputations and should not be relied on to determine the need for revascularization procedures in the high risk foot. The PI, being a continuous variable allows classification of patients on a scale, making it easier to diagnose severity of disease, thus resulting in a more accurate interpretation of the extent of disease. The advantage of PI over spectral waveforms is that it is a quantitative measure, rather than a subjective assessment of spectral waveforms thus ensuring no variability in user interpretation between waveforms especially in severely diseased arteries which can prove to be difficult to interpret correctly.
Conclusions
Results from the two studies presented support the evidence that toe pressures above 30 mmHg could predict healing as proposed by the European Consensus Document [ECD] but also indicate that spectral waveforms at the ankle are also good predictors of arterial perfusion. As importantly it highlights the fact that reliance on ABPIs to predict accurate perfusion is inadvisable. Results also conclude that pulsatility index can safely be used to identify patients' with peripheral arterial disease. Using PI, which is a quantitative measure, rather than a subjective assessment of spectral waveforms removes the variability of user interpretation.