

The use of near infrared spectroscopy as a diagnostic tool to measure the haemodynamics of blood supply to bone.

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Background:

Bone is a dynamic and highly vascular tissue, dependent on this high perfusion to meet its metabolic demands. However, measuring the haemodynamics of microvascular blood supply to bone is difficult with existing imaging modalities due to its high density and mineral content. Near infrared spectroscopy (NIRS) has the potential to measure markers of blood supply to bone including blood oxygenation, perfusion rates and blood volume. This could benefit knowledge in a range of bone pathologies, including the increased risk of fragility fracture in those with type 2 diabetes mellitus.

Aim:

To assess the potential of NIRS as an accurate, reliable and precise diagnostic tool when measuring markers of haemodynamics in bone.

Method of Investigation:

Initially a systematic review will be undertaken to establish the existing knowledge base on the use of NIRS in measuring haemodynamics in bone tissue. Feasibility studies of NIRS will validate its accuracy at exclusively measuring bone tissue; gauge inter and intra operator reproducibility; and correlate results with a currently accepted reference standard: dynamic contrast enhanced magnetic resonance imaging.

Conclusion:

If successful, this new diagnostic tool could inform research and guide clinical practice on a host of bone pathologies with suspected microvascular mechanisms in their pathogenesis.