

# Micro-CT Imaging of Fracture Repair in a Rat Model

Ian Parkinson<sup>123</sup>, Carolyn Geddis<sup>4</sup>, Glenn Dickson<sup>4</sup>, David Marsh<sup>4</sup>, Nick Fazzalari<sup>123</sup>

---

1. Division of Tissue Pathology, Institute of Medical and Veterinary Science, South Australia.
2. Bone and Joint Research Lab, Hanson Institute, South Australia.
3. Department of Pathology, University of Adelaide, South Australia
4. Trauma Research Group, Department of Trauma and Orthopaedic Surgery, Queen's University Belfast, Northern Ireland.

Rodent models of fracture repair have been developed, which allow the temporal sequence of the biological events to be characterized. To the present, histological sections have been used to identify the progress of fracture repair and this is often correlated, using similarly produced samples, with functional mechanical testing, a destructive process.

Micro-CT imaging allows individual trabeculae to be resolved, which enables the bone phase of the repairing fracture to be investigated in 3D. Subsequent histological sectioning of these specimens facilitates correlation of the micro-CT findings with the histological appearance of key events in fracture healing. Also, micro-CT images allow cross-sectional bending and torsional properties to be estimated using the same samples.

This presentation will detail the protocol developed for micro-CT imaging of a rat model of fracture repair. This will include imaging conditions, image segmentation and quantitative methods. The extent to which features observed in histological sections can be observed in micro-CT images will be presented and discussed. This presentation will show the degree to which micro-CT imaging augments histological examination in characterizing the biological sequence of fracture repair.

<sup>4</sup> *Funding from Action Medical Research is gratefully acknowledged.*