

Research Project Details	
Title	Can HR-pQCT Be Used to Assess Fracture Healing for Earlier Rehabilitation in Stable Distal Radius Fractures?
Investigator(s)	Dr. Prism Schneider, University of Calgary
Funding Period	2017 – 2021
Budget	\$44,315.00
Issue/Rationale	Distal radius fractures (DRFs) are the <i>most common fracture in the upper extremity</i> and despite a high incidence; there is significant variability in fracture care. The majority of DRFs are treated non-operatively with cast immobilization and serial radiographs to assess for fracture healing. However, <i>there are currently no clinical guidelines</i> for duration of cast treatment, or best method for determining radiographic fracture union. This study will use serial high-resolution peripheral quantitative computed tomography (HR-pQCT) imaging to evaluate fracture healing in patients with stable DRFs, in order to better inform standard clinically used serial radiographs. By correlating clinical and functional outcomes with time required for complete fracture healing based on HR-pQCT, we aim to develop evidence-based clinical guidelines to direct the duration of cast immobilization for patients with stable DRFs.
Objective(s)	<p>Research Objectives:</p> <ol style="list-style-type: none"> <li>1) To quantify the error introduced in the measure of bone microarchitecture of the distal radius as a result of overlying plaster and fiberglass cast material</li> <li>2) To determine if HR-pQCT can define fracture healing compared with current standard healing evaluation using radiographs and clinical assessment for DRFs</li> <li>3) To determine if PROMs and clinical outcomes correlate with bone density, geometry, and microarchitecture based on HR-pQCT</li> <li>4) To use time to complete fracture healing, based on HR-pQCT to inform radiographic assessment of fracture healing for widespread clinical application</li> </ol>
Anticipated Results/ Impact	This new knowledge obtained from HR-pQCT analysis will be used to better inform the clinical follow-up for patients with this very common injury. By further correlating HR-pQCT-based fracture healing with validated patient-reported outcome measures (PROMs) and functional outcome measures, this study will be used to develop clinical practice guidelines to better direct duration of cast immobilization. The practical importance of this study will be to better quantify fracture healing, in order to avoid unnecessary cast immobilization or, conversely, inadequate treatment of stable DRFs.
Keywords	Distal radius, fracture healing, HR-pQCT, rehabilitation, evidence-based care