

Development of an Ultrasound Guidance Method for Spinal Fusion Surgery

AlHassan Aly, BSc

Ultrasound Laboratory, Institute of Biomaterials and
Biomedical Engineering, University of Toronto, Toronto,
Ontario, Canada



Spinal Fusion Procedure

Trabecular bone

Cortical bone



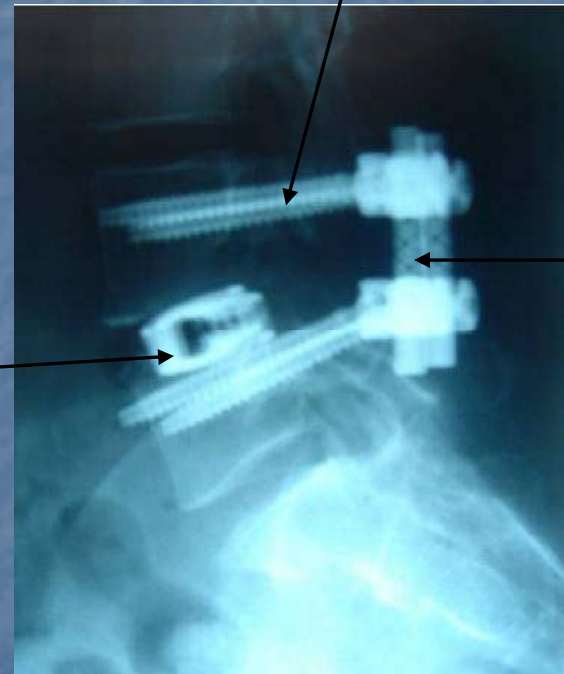
Hartl, R. et al. (2004) Technique of Thoracic Pedicle Screw Fixation for Trauma. *Operative Techniques in Neurosurgery*. 7(1), 22-30

Rib

Pedicle screw

Spinal canal

Pedicle screw

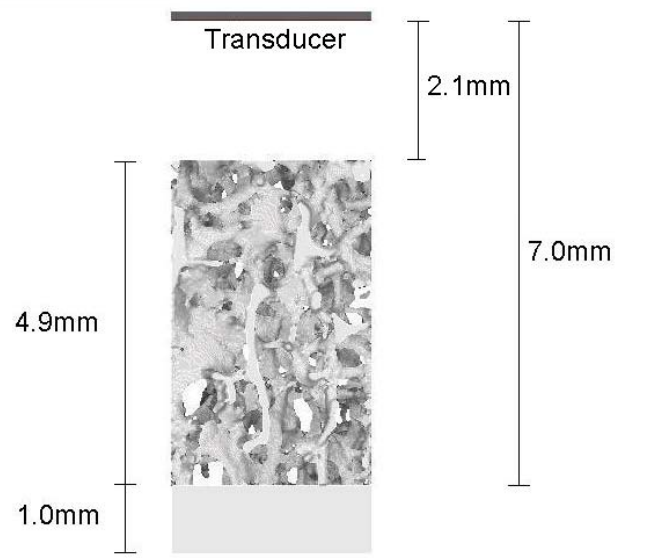


Bone graft

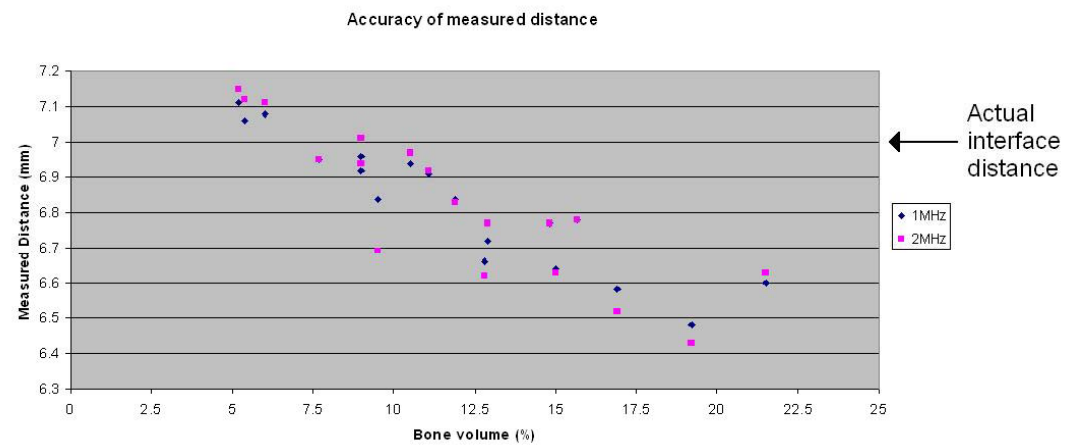
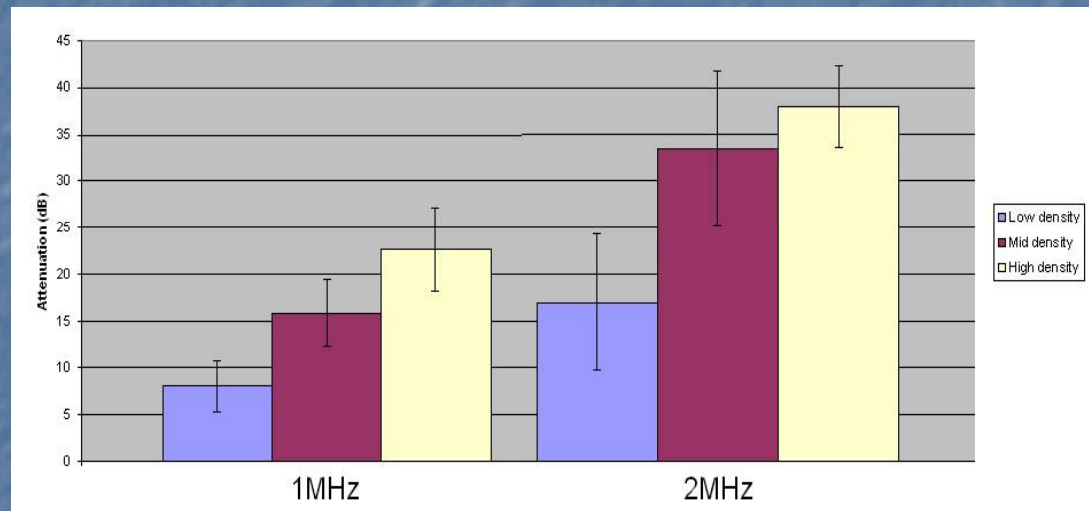
Rods

Mandigo, C. et al. (2007) Posterior Dynamic Stabilization of the Lumbar Spine: Pedicle-Based Stabilization with the AccuFlex Rod System. *Neurosurgery Focus*. 22(1).

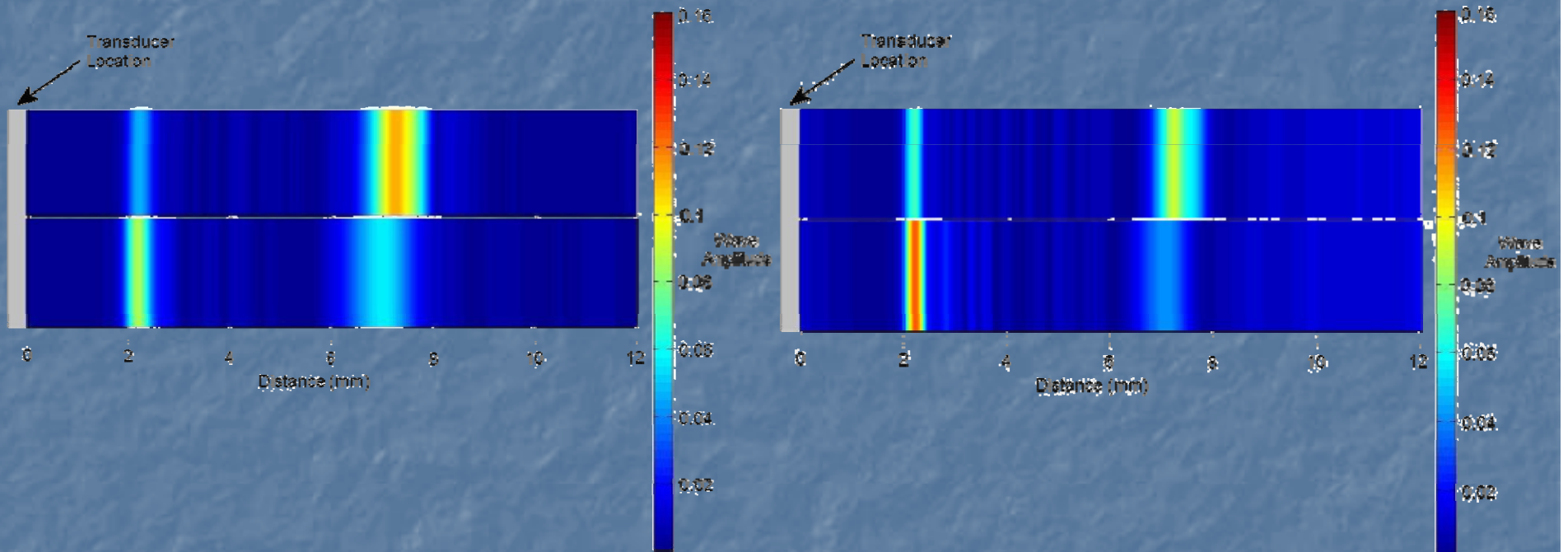
Current simulations



N = 6 for
each bone
density



Current simulations (cont'd)



1MHz images. Low density bone slice (top) and high density bone slice (bottom)

2MHz images. Low density bone slice (top) and high density bone slice (bottom)

Current experiments

