

# Numerical Characterization of Ultrasound Elastography for the Early Detection of Deep Tissue Injuries

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science

by

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# Contents

## 1. Introduction

The reasons for and goals of this research

## 2. Quasi-Static Ultrasound Elastography (QS USE)

Estimating stiffness using manual palpation

## 3. Acoustic Radiation Force Impulse (ARFI) Imaging

Using transducer-generated forces instead of manual palpation

## 4. Shear Wave Speed Quantification

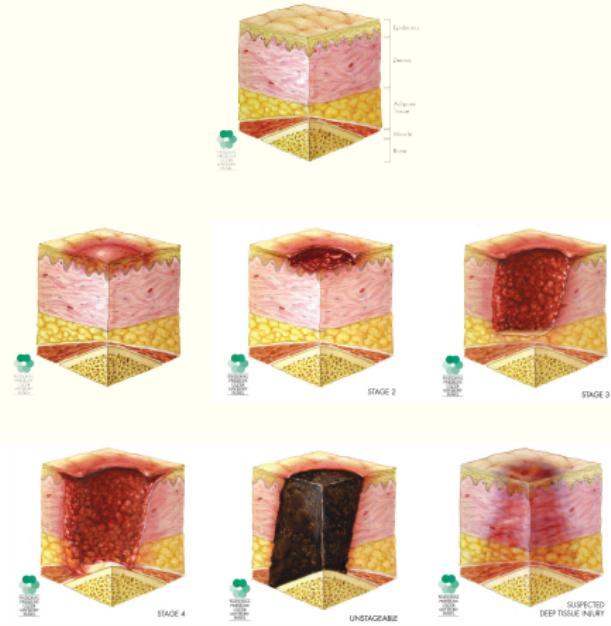
Quantifying tissue stiffness using shear wave speeds

## 5. Conclusions

Recommendations and final thoughts

# Pressure Ulcers

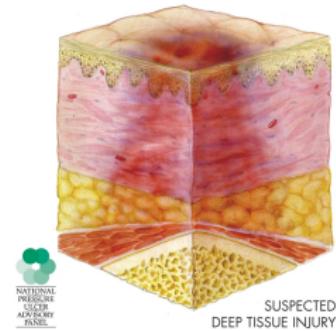
- Pressure ulcers are secondary injuries
  - People with reduced mobility
- Skin breakdown due to moisture, shear / friction
- Categorized by NPUAP in stages
  - From shallow to deep



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# Deep Tissue Injuries

- Not all PU form “top-to-bottom”
  - Deep tissue injuries (DTI) form “bottom-to-top”
  - Eventually break out into stage III – IV pressure ulcers
- Tissue damage due to pressure and deformation
- Almost impossible to detect clinically



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# Deep Tissue Injury Detection

- ❖  $T_2^*$ -weighted MRI in research settings
- ❖ Risk assessment scales in clinical settings
  - ❖ Norton, Braden, and Risk Assessment Pressure Sore scales

# What?

# The Status Quo

# Introduction

# Introduction

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# Comparing Methods

# Recommendations