# TISSUE INTERROGATION DEVICE

Many medical conditions impact the mechanical properties of tissue. Measuring and monitoring tissue properties can be both challenging and difficult, especially within different care environments.

A method for directly measuring tissue stiffness and viscosity would advance clinical diagnosis and tracking of pathological conditions. Some devices exist which estimate tissue stiffness or Young's modulus, but these methods result in qualitative descriptions of these properties, and can be cumbersome and difficult to use. As a result, they have not gained wide clinical acceptance.

## Device Design

*The instrument comprises a pair of compact, piezoelectric bimorph benders which are arranged to make it possible to achieve large skin strains by pulling the skin from two traction surfaces moving in opposite directions.*

The objective was to develop a portable, point-of-care instrument with the following design goals:

a) Compact, point-of-care device: The device should be able to assess tissue in myriad clinical locations (i.e., clinic room, bedside, home, office) by different clinical personnel (i.e., nurse, physical therapist, physician, prosthetist).

b) Precise and high bandwidth: To detect subtle biomechanical property changes, the device must precisely and reliably load the skin. Both static and dynamic loading patterns are needed to test for relaxation, creep, hysteresis, and stiffness.

c) Localized assessment: Instruments that measure large areas of tissue are incapable of detecting localized changes in tissue resulting from acute conditions. The TID was designed to be able to detect localized changes in tissue properties as well as monitor gross changes from chronic conditions.

## Potential applications

- Chronic venous diseases such as lipodermatosclerosis, lymphedema and scleroderma as well as any condition that is accompanied by edema or fibrotic changes in skin.

- Acute conditions such as bruising and incipient pressure ulcers

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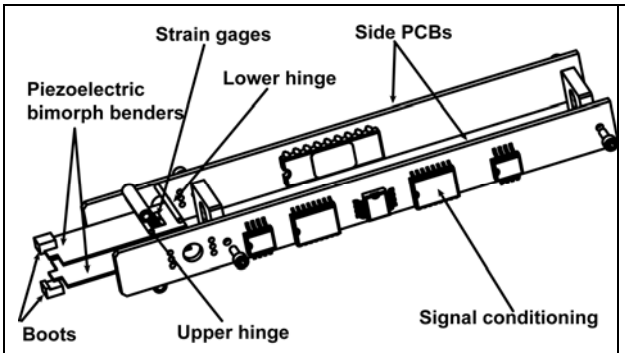
<td> 
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<td>Schematic of TID</td>
<td>TID being applied to the patellar tendon</td>
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