



Assessment of Ultrasonic Tissue Characterization

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MSc Report

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Abstract

During delivery, a trauma of the levator ani muscles (LAM) may occur causing, within time, urinary incontinence and pelvic organ prolapse. Since it is unclear how pregnancy and delivery change the pelvic floor muscles, it is necessary to provide more information about their structure to better understand their (dys)function. Ultrasonic tissue characterization (UTC) is used to characterize biological tissue and can probably be used to better understand the pelvic floor muscles structure. The echointensity parameter was already used on the LAM to better understand the structure of the pelvic floor but this parameter was found to change significantly depending on the scan operator. Here we show how the Nakagami method can be used to characterize skeletal muscles with parameters that are less operator and machine dependent. It was shown that the Nakagami results did not depend on the orientation of the transducer probe, on the different experimental set up and on the different stretching of the muscle. However, the results changed between different subjects. In literature, the Nakagami method is mainly applied on the envelope of the radio frequency (RF) data. In fact, on B-mode data, the results were found to lose most of the structure information. The Nakagami method was used on B-mode data which was transformed back into RF data. This shows similar results to the original RF data. Our results demonstrate how Nakagami imaging can give structural insights into the skeletal muscle with less dependency on the user and the machine. To use it for clinical purposes, we applied the Nakagami method on B-mode data.