Advances in muscle assessment with Computed Tomography and Extended-Field-of-View Ultrasound

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PUBLIC PHD DEFENCE FOR THE DEGREE OF
DOCTOR IN MOVEMENT AND SPORT SCIENCES

THURSDAY, JUNE 12TH 2025 AT 17:00
AUDITORIUM VAN DEN DRIESSCHE, CAMPUS JETTE

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ABSTRACT OF THE RESEARCH

Muscle mass plays an important role in our overall health. It influences strength, mobility, and the risk of conditions such as sarcopenia and cachexia. To monitor muscle mass effectively, reliable measurement techniques are essential. Current gold standard methods, such as MRI and CT scans, are expensive and not easily accessible for routine use. Ultrasound is a promising, more affordable, and practical alternative, but until recently, there was limited research into its reliability and applicability.

This PhD research explored how muscle mass can be better assessed using ultrasound. One study examined whether muscle measurements at locations other than the lower back (L3) are also valid on CT scans. Another study demonstrated that muscle measurements using a specific ultrasound technique are reliable between different examiners. The research also investigated which ultrasound cut-off values currently exist for identifying low muscle mass and how these could be better standardized.

A systematic review analyzed existing prediction equations for estimating muscle mass and found that different populations require population-specific formulas. Finally, a new prediction equation was developed, based on MRI and ultrasound data, specifically for healthy adults of Caucasian descent. These equations are both accurate and practical for use in clinical settings. This research contributes to earlier and more effective detection of muscle loss in older adults and patients with chronic conditions.

CURRICULUM VITAE

Jona Van den Broeck began her PhD in October 2019 at the Faculty of Physical Education and Physiotherapy. She was appointed as a doctoral teaching assistant, a position that combined teaching responsibilities with scientific research. Driven by a strong interest in anatomy, she deepened her knowledge during her studies through in vivo and in vitro anatomy courses as well as dissection training. This passion continued throughout her doctoral research, which focused on muscle mass and its role in health and disease.

During her PhD, she worked with various imaging techniques, including CT, MRI, and ultrasound. These methods provided her with a refined understanding of muscle structure and function. This visual approach to anatomy enhanced her insight into muscle changes across a range of clinical conditions. Her dual role as researcher and educator allowed her to not only develop scientific expertise but also build strong teaching skills.