Building on a pioneering training program at ULB, the Osteopathic Sciences Research Unit has developed recognised expertise in joint and soft tissue biomechanics, sensorimotor neuroscience, and movement neurophysiology for neuro-musculo-skeletal therapies.

Developing the osteopathic profession through research and training: this is the dual mission of the Osteopathic Sciences Research Unit (URSO). The hundred or so students inscribed over the last 5 years in the bachelor's program, the 5 doctoral students and the confirmed Ph.D.s working on this mission attest to the enthusiasm for this new university discipline, developed in close collaboration with the ULB Faculty of Medicine.

With a team of 6 investigators, URSO is equipped with a robotic "haptic" arm to conduct research in 3 intertwined areas: haptic sensation for the identification of musculoskeletal system mobility; mechanisms underlying the onset of chronic musculoskeletal pain (lower back, among others); and improved treatment of pathologies of the musculoskeletal system. URSO's advances in the fields of neurophysiology and biomechanics combine to characterise tissue characteristics (stiffness, viscosity) that affect the functioning of muscle, tendons and fascia receptors, all of which are essential for tuning muscle tone and movement commands, leading to novel approaches to understanding the aetiology of pain in the musculoskeletal system.

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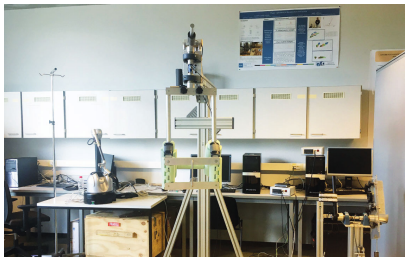
These three issues are reflected in the URSO's three types of activities, i.e. basic science, clinical research and public health, with the aim of incorporating osteopathy into integrative care centres to improve the first line of care. In this respect, URSO is participating in the national Be.Hive project (interdisciplinary initiative for the first line of care) which brings together three universities and three "hautes écoles". This initiative aims to train primary care professionals and benefits from URSO's evidence-based clinical approach to musculoskeletal pain. URSO is also involved in two flagship international projects.

ISMORE (Intracranial System for MOtor REhabilitation), a clinical trial launched in July 2017 with 7 academic partners, uses brain-machine interfaces, neural decoding and AI to facilitate regeneration of sensorimotor neural connections after stroke. Following encouraging results from an initial patient suffering from stroke-induced hemiplegia, the groundwork is being laid to continue testing with four additional patients with the same chronic condition. The InteX project, completed in 2023, aimed at developing test benches to evaluate next-generation AI for wearable robotics. With 6 European partners and the collaboration of ULB's Cardio-Pulmonary Exercise Physiology research unit (Prof. Faoro), this project examined the benefits of exoskeletons for worker health and wellbeing: a battery of movement tests was created to check whether fatigue and the risks of musculoskeletal injury can effectively be reduced through the use of this emerging technology. In this context, URSO contributed expertise in clinical functional testing, assessment of muscle coordination, fatigue detection and 3D movement analysis.

Today, URSO aims to position itself in a new promising area of research: the physiology of well-being. The objective is to gain a better understanding of interoceptive processes, i.e. the way in which the brain processes pain. In addition to the interoceptive signals themselves, we also need to take into account the management of the emotions associated with chronic pain. This will enable practitioners to adopt a more global vision (in alignment with osteopathic principles), adapt their treatment to individual patients and circumstances, and better understand the effectiveness of their interventions. The multidimensional nature of pain and pathologies of the musculoskeletal system must be precisely understood: through touch, signals, symptoms, etc. These are all challenges for the fundamental and clinical research carried out by URSO in support of evidence-based therapeutics and patient well-being.



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