Biomechanical Imaging Techniques

Developing and applying novel Magnetic Resonance Imaging and ultrasound imaging and analysis methods across a range of clinical disorders to quantify tissue mechanical properties, tissue deformation, and fluid flows. These methods are valuable in understanding disease mechanisms, and in providing information for diagnosis and monitoring of disease progression.

More Information

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Competitive advantage

- First in the world large deformation MR elastography methods that can quantify the nonlinear viscoelastic mechanical properties of soft tissues in living humans
- World-leading anisotropic MR elastography methods with application to brain tissue and muscles
- Novel ‘tagged’ MRI methods for quantifying upper airway and skeletal muscle function
- Unique ultrasound methods to track upper airway muscle function
- New real-time fluid flow techniques for quantifying cerebrospinal fluid flow with respiration, to complement cardiac-gated fluid flow measurements

Impact

- MR elastrography studies showing impact in muscle degeneration in animal models and liver fibrosis in children
- Novel analysis of tongue muscle structure in sleep apnoea patients
- Real time CSF flow studies

Successful outcomes

- New insights into differential treatment outcomes in obstructive sleep apnoea
- Novel MR elastography techniques adopted for use in cancer research (EU2020), sleep apnoea, liver disease, and central nervous system disorders

Capabilities and facilities

- Research-dedicated state-of-the-art 3T MRI scanner (Philips Ingenia CX 3T)
- Multiple biomechanical imaging capabilities

Our partners

- Philips Healthcare
- Inserm, France

- ETH Zurich