

## ezROM: extending our computerized 3D hip planning EZplan with spino-pelvic measures and simulation of the femoral mobility (ROM)

Publications on Total Hip Arthroplasty (THA) show that optimal reconstruction of the hip joint with implants should take into account postures like standing and sitting and the dynamic transition between them. Suboptimal positioning parameters of the reconstruction represents more than 30% of the post-operative causes leading to a second surgery (revision) and happen early with younger patients reducing implants longevity. These unresolved issues induce pain for patients and increase costs for the healthcare system.

Surgeons need therefore a pre-operative tool based on CT scan to analyze the hip joint and simulate these postures to reconstruct optimally the injured articulation.

Prior to this project a solution with two essential products has been developed:

- EZplan a CE marked software medical device certified in 2018 supporting a THA workflow.
- EZcloud a digital platform available online deploying EZplan and offering web services for user access and 3D data handling.

To ultimately answer the problem, this project sets out to develop an innovation called ezROM extending the current EZplan introducing a reference frame based on the spine to assess the pelvic motion related to the posture with a realistic Range Of Motion (ROM) simulation using a low dose protocol.

The aim of the project is to develop ezROM through the following main steps of the research:

- Collect CT images and biomechanical data from cadavers in order to generate evidence for dose optimisation and spine-

pelvis analysis based on dorsal and lateral decubitus positioning.

- Develop a functional Range of Motion to assess transition in postures to optimize positioning parameters of implants.

---

### Research team

Franco Loris, HESAV

Veronika Schoeb, HESAV

Jeanne Bertuit, HESAV

Alexandre Dominguez, HESAV

Damien Racine, CHUV-IRA

Julien von Siebenthal, SeedIMPULSE

Ernesto Durante; SeedIMPULSE

### Funding

Innosuisse

### Duration

18 months