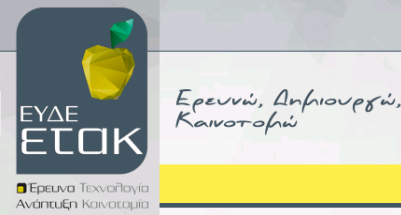


EU R&D Project



SafeACL: ACL SURGERY ASSISTANT

POLYTECH SA. in cooperation with the DEPARTMENT OF MEDICAL SCIENCE OF HEALTH SCIENCES UNIVERSITY OF THESSALY, the INSTITUTE OF RESEARCH AND TECHNOLOGY OF THESSALY (IETEΘ/ EKETA) and the INFORMATION AND VIRTUAL REALITY VISUALIZATION TEAM (VVR), DEPARTMENT OF ELECTRICAL ENGINEERING & COMPUTER TECHNOLOGY, UPAT (UNIVERSITY OF PATRA), will proceed with the implementation of the project "**SafeACL - Decision support software for anterior cruciate ligament reconstruction based on individualized musculoskeletal computer models**" after submitting the research proposal which was approved by the ESPA 2014-2020 "Research-Create-Innovate" business program.

PARTICIPANTS

1. POLYTECH SA
2. DEPARTMENT OF MEDICAL SCIENCE OF HEALTH SCIENCES UNIVERSITY OF THESSALY
3. INSTITUTE OF RESEARCH AND TECHNOLOGY OF THESSALY (IETEΘ/EKETA)
4. Information and Virtual Reality Visualization Team (VVR), DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER TECHNOLOGY, UPAT (UNIVERSITY OF PATRAS)

PROPOSAL

An Anterior Cruciate Ligament (ACL) tear is a devastating injury to an athlete and unfortunately is one of the more common knee injuries in athletes involved in rapid deceleration moves. An ACL deficient knee has a very high risk of instability, subsequent injury and long-term osteoarthritis. It is estimated that between 100,000 and 250,000 of these injuries occur each year in the United States (no data for Europe). Reconstruction of the ACL is commonly performed to restore stability to the knee and allow the patient to return to a healthy and active lifestyle. The past 2 decades have seen significant advancements in the ability to restore stability and function to an ACL deficient knee with a primary ACL reconstruction. Although the procedure and rehabilitation has become more predictable, it still requires many months of rehabilitation and time away from the sports. After committing the time, effort and expense of a primary ACL reconstruction, to have it then re-tear is not only a frustrating and discouraging event for all involved, but there is also growing evidence that the long-term health of the knee is then at even greater risk. Recent prospective analysis of a multicenter cohort has shown failure rate after ACL reconstruction to be 3.0 % at 2 years and a systematic review of randomized- controlled trials showed this rate to be 3.6 % at short-term follow-up. Revision ACL reconstruction is clinically challenging and associated with worse clinical outcomes than primary reconstructions, and a

recent systematic review revealed a 13.7 % overall failure rate. Avoidable technical errors, including tunnel malposition, inadequate fixation, and failure to address concomitant malalignment and/or ligamentous injuries, have been implicated in 53–79 % of primary ACL graft failures. Due to the aforementioned reasons the development of an effective treatment to restore ACL function to avoid any postoperative complications is an important health and societal challenge. In current clinical practice, the ACL reconstruction plan is selected from a standard menu of options rather than customized to the unique characteristics of the patient. Furthermore, the treatment selection process is normally based on subjective clinical experience rather than objective prediction of post-treatment function. The net result is treatment methods that are less effective than desired at restoring lost knee joint' s function. The aim of the present proposal is to develop a decision support system based on the integration of neuromusculoskeletal computer models with imaging (MRI, X-ray, ultrasound) and motion analysis data (kinematics, kinetics) to simulate the surgery and to improve customization, objectivity, and ultimately effectiveness of treatments for ACL reconstruction.

OBJECTIVE

With this project, the business Partnership aims to create a new product that is missing from the international market. After intense search, there seems to be a great interest from health systems and rehabilitation centers for advanced decision support systems. So there is room for the Partnership to penetrate a new market in the world, creating an innovative supportive medical decision-making system for the surgical repair of the anterior cruciate ligament (ACL). The Partnership will acquire identity with its own product in the health sector.