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## **Development of a supine walking machine for functional imaging of the knee**

### **Who are the patients?**

Patients requiring an imaging examination of their knee in motion.

### **What is the problem?**

Quantifying the function of the knee joint during walking is important in numerous clinical conditions. The most common method to do so is to use cameras to record the patients walking on the ground. With this method, it is not possible to see the bones in motion; only external measures are obtained. Advances in 3-D imaging, principally in computer tomography, allow the acquisition of data at sampling frequencies compatible with walking analysis. Nevertheless, such devices usually require the patients to be lying on their backs while they are imaged.

### **What is the need?**

There is a need for a machine, a sort of fitness machine, that would guide patients' lower limb movement in a way that would replicate walking biomechanics. The focus should be on sagittal plane kinematics and kinetics at the knee joint. The machine should be designed for supine use and able to accommodate patients of varying body sizes (and possibly walking styles). The material should be selected wisely to be compatible with computer tomography and magnetic resonance imaging.

### **What is the benefit (if the problem was solved)?**

Treatment could be further personalized, specifically quantifying the patient's knee function. The machine could also be an asset in research.

### **Wrap up?**

There is a need for patients with knee problems to be able to walk supine in an imaging device to obtain important data for their treatment.