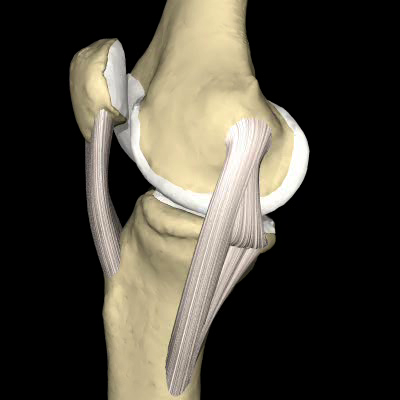
**Dynamisk RSA**

One of the major goals in orthopaedic surgery and allied specialities is to restore normal function and movement of an injured joint. Therefore it is important to know the physiological kinematic parameters of a normal joint as well as the joint after treatment. Computer simulations are often used to mimic the kinematics in joints but these mathematical models may often not fully reflect reality.



In vivo the golden standard for obtaining reliable 3D measurements is RSA, however these are often static. This is because of even most advanced x-ray film exchanger limit the number of pictures taken to less then 10 per second.

Modern flat panel fluoroscopy technique allows imaging of up to 30 frames per second (Figure 1). This is an imaging technique that produces real time x-ray video of body structures. In orthopaedic research, this technique is primarily used to study (total) joint kinematics.

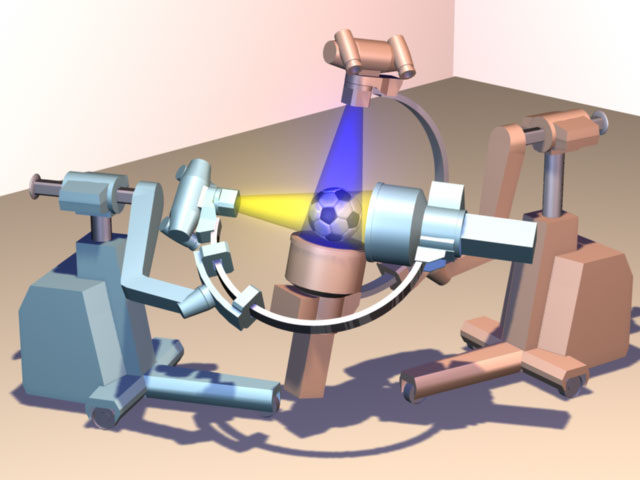
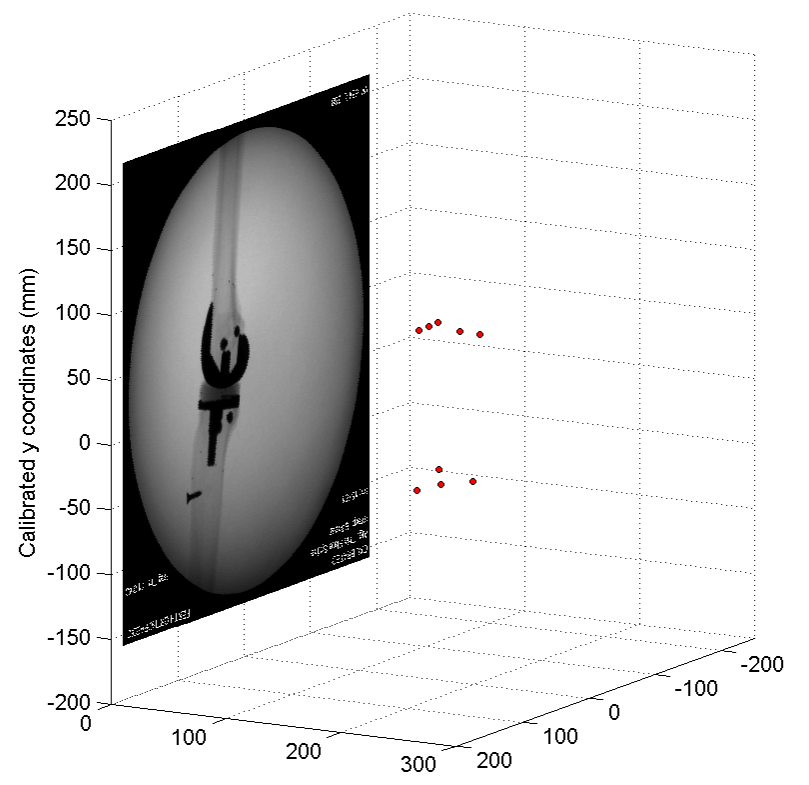
 

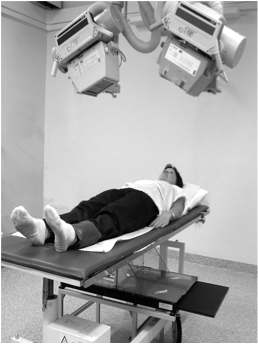
Figure 1: Uniplanar fluoroscopy and biplanar fluoroscopy

Roentgen Fluoroscopic Analysis allows a combination of standard marker or model based RSA and fluoroscopy. This enables high speed analysis of movements in joints. The developer of the technique is Medis special, Leiden, Netherland. For further information please see: http://www.medisspecials.com/



**Work flow of marker based Roentgen Fluoroscopic Analysis is as follows:**

* As in conventional RSA markers are placed in the implant or joint to define during surgery
* Postoperatively a standard RSA double examination is performed



* These allow to define a three dimensional marker modell.

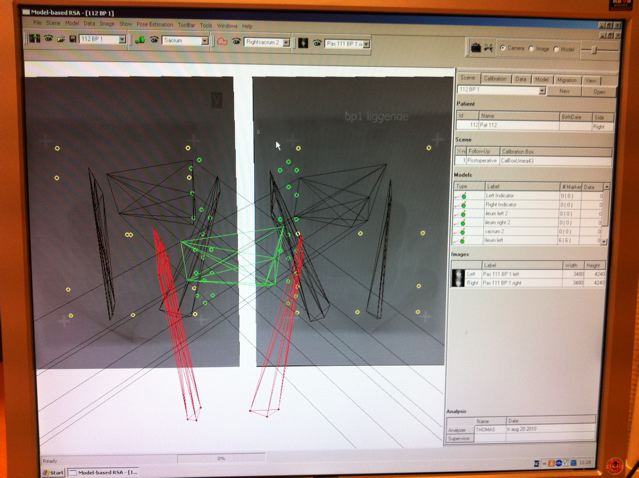


* The patients are performing a movement filmed high speed fluoroscopy

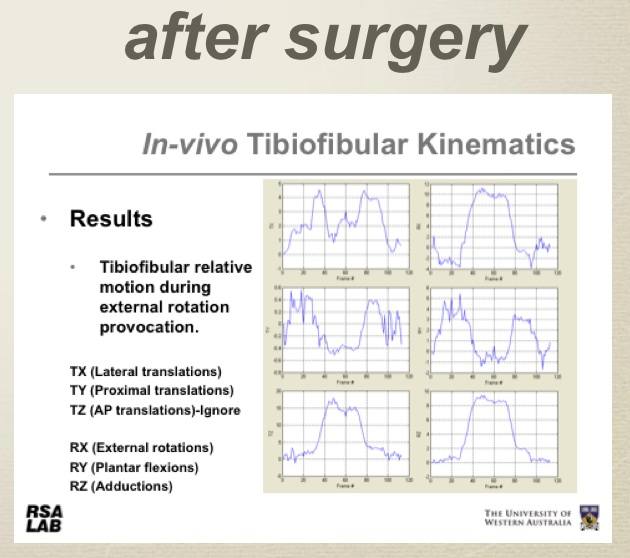




* The marker models are then projected over the fluoroscopy pictures.



* All pictures are marked consecutively.
* The movements are analyzed with the sophisticated software.
* Example of results



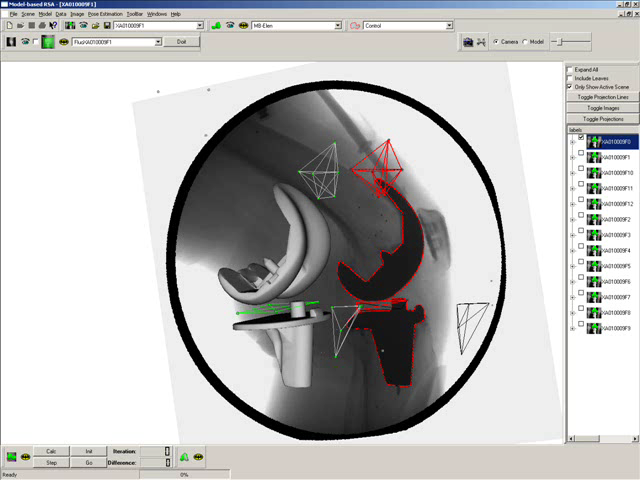
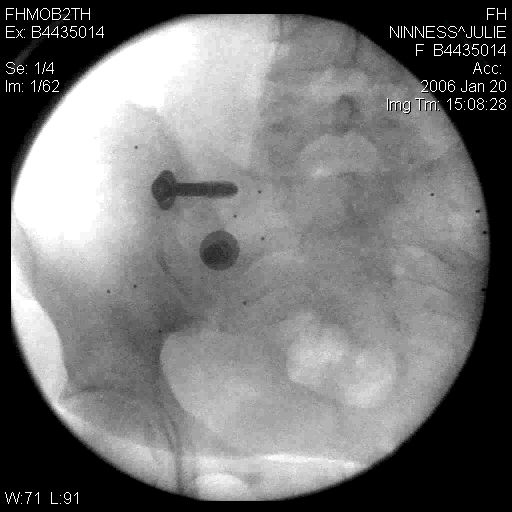
**General information**

The precision for dynamic RSA with fluouroscopy is 0.1-0.2 mm for translasjoner og 0.3 grader for rotasjoner (Garling et al. 2005, Iopollo 2006, Ioppolo et al 2007).



Stephan Maximillian Röhrl, Alexis Hinojosa and Thomas Kibsgård after the first recording of a patient at Oslo university hospital on the 3rd of June.

This technique may be used in basically any joint. All equipment and software is installed, working and in use.



Currently we have started 1 pilot study in the pelvis and developing a tool to standardize knee testing for stability. This will allow knee stability evaluation with dynamic RSA.

We are open for any new study idea. Interested researchers may contact us for collaboration and study support (Stephan M. Röhrl).

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