The XtremeCT (3DpQCT)
To measure bone density and bone microarchitecture

The XtremeCT is a high resolution peripheral CT for human in vivo measurements of both bone density and bone microarchitecture.

The system is designed to measure the bone density and to quantify the 3D microarchitecture of the bone at the human extremities (at the level of the radius and the tibia – isotropic resolution of about 100μm).

Up to now, the only way to get information on bone microarchitecture was to take and to analyze bone biopsies. The XtremeCT allows to get similar results but with a totally non-invasive technique (virtual biopsy).

Finite Element Analyses can also be performed on the high resolution images obtained by XtremeCT to calculate the mechanical properties of the imaged bone, to get an estimation of the fracture risk.

The XtremeCT is thus a very interesting technique for any type of research on bone disorders and especially on osteoporosis: to evaluate the effects of a drug on bone microarchitecture or the effects of a specific exerciser as a prevention mean.

The XtremeCT could in the future allow an earlier detection of osteoporosis and a better follow-up of the treatments against this disease.

* **The XtremeCT was also used for measurements in the WISE bed rest study, which was realized in MEDES in 2005** (24 female volunteers aged between 25 and 40 years old in bed rest position during 2 months). The objective was to evaluate the evolution of bone quality during and after a long term bed rest.

* In the coming future, the XtremeCT will be used for pre and post flight measurements on cosmonauts in Russia to evaluate bone microarchitecture changes induced by spaceflight.

* This system is also used for pharmaceutical studies.
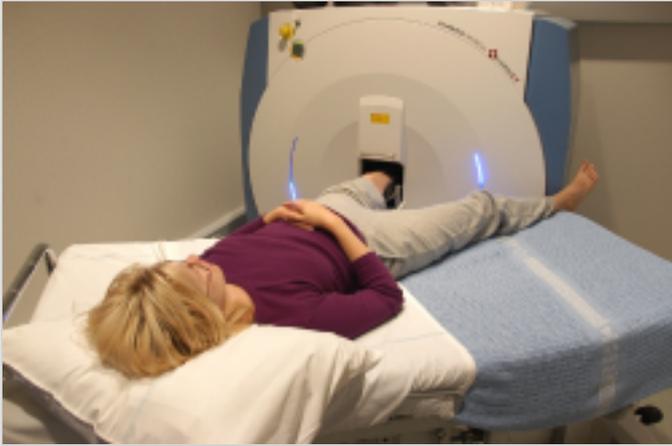
More particularly, the XtremeCT allows:

* Evaluation of trabecular and cortical bone from radius and tibia
* Density parameters:

- Cortical and trabecular density in different regions

- BMD and BMC

* Structural parameters:

- Trabecular thickness

- Trabecular separation

- Trabecular number

- Volume fraction

- Cortical thickness

* Matching Regions of Interest for follow-up measurements.

For more information on the XtremeCT: http://www.scanco.ch