Musculoskeletal Core

Advisory Committee:
Joe Spadaro, PhD
Jerry Calabrese LRT, CDT
Kent Ogden, PhD
Kerry Greene-Donnelly, MBA, RT
Mike Sun, MD

Location:
1200 IHP

Nat Ordway, MS, PE
Director
Purpose of the Core

- Provide quality radiography for research studies and clinical trials to investigators at Upstate
- DXA, RSA, X-ray, Fluoroscopy
- Support clinical and animal model research studies
  - DXA advisor: Joe Spadaro
  - RSA advisor: Nat Ordway
- Areas of research have included osteoporosis, diabetes, orthopedics, exercise science, and obesity
Bone Densitometry (DXA)

- To determine the size, mass, bone mineral density (BMD) of skeletal elements
- To estimate bone strength & fracture risk
- To monitor effects of treatment or disease

*Very low radiation
*Compare to large databases.
*Clinical trials or exploratory studies
DXA Technology

X-ray Source
(produces 2 photon energies with different attenuation profiles)

Photon

Collimator
(pinhole for pencil beam, slit for fan beam)

Patient

Detector
(detects 2 tissue types - bone and soft tissue)
DXA:
Total Body Composition

The standard tissue quantitation report from a LUNAR DPX includes data on major regions of the body as well as information on both the left and right sides of the body.
DXA:

Lumbar Spine   Proximal femur
DXA:

**Forearm**

- Tibia, femur, hand, peds
- Animal
- Cadaveric

**Other**
Radiostereometric Analysis (RSA)

- Biplanar radiographic technique to quantify 3D motion of bones in vivo
  - Joint assessment within a session
  - Longitudinal assessment of bone adaptation and growth
- Accuracy of \(\sim 100\mu m\) for translation and 0.5 degrees for rotation
- Low dosage of radiation
- RSA technique
  - Insertion of radio-opaque beads
  - Radiographic examination
  - Marking & measurements (3D position)
  - Computation of movements between body positions or between several exams (change over time)
RSA: Radiographic Exam

Two x-ray tubes fired simultaneously

Calibration cage
RSA: Example Radiographic Pair

* Low radiation dosage
* Clinical trials or exploratory studies
Other Exams

- Standard x-ray
- Fluoroscopy
Summary of Core

- Radiology with licensed, certified technologist:
- Research only - IRB, CHUA, IBS, RSC approval
- Protocol is flexible - standard or customized
- Convenient and outside of Hospital stream
- Cost tailored to study
Thank You!!

More information:
http://www.upstate.edu/researchadmin/facilities/musculoskeletal.php

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