

Ortopedi – nya diagnostiska möjligheter

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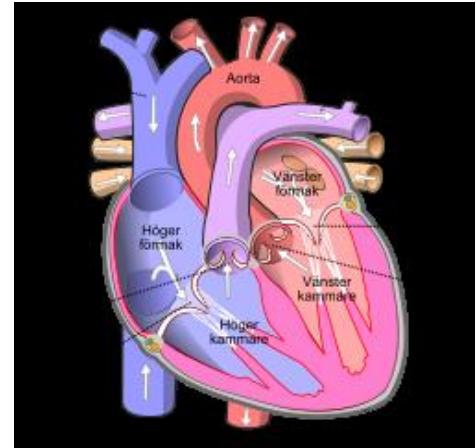


Skeletal bone tissue

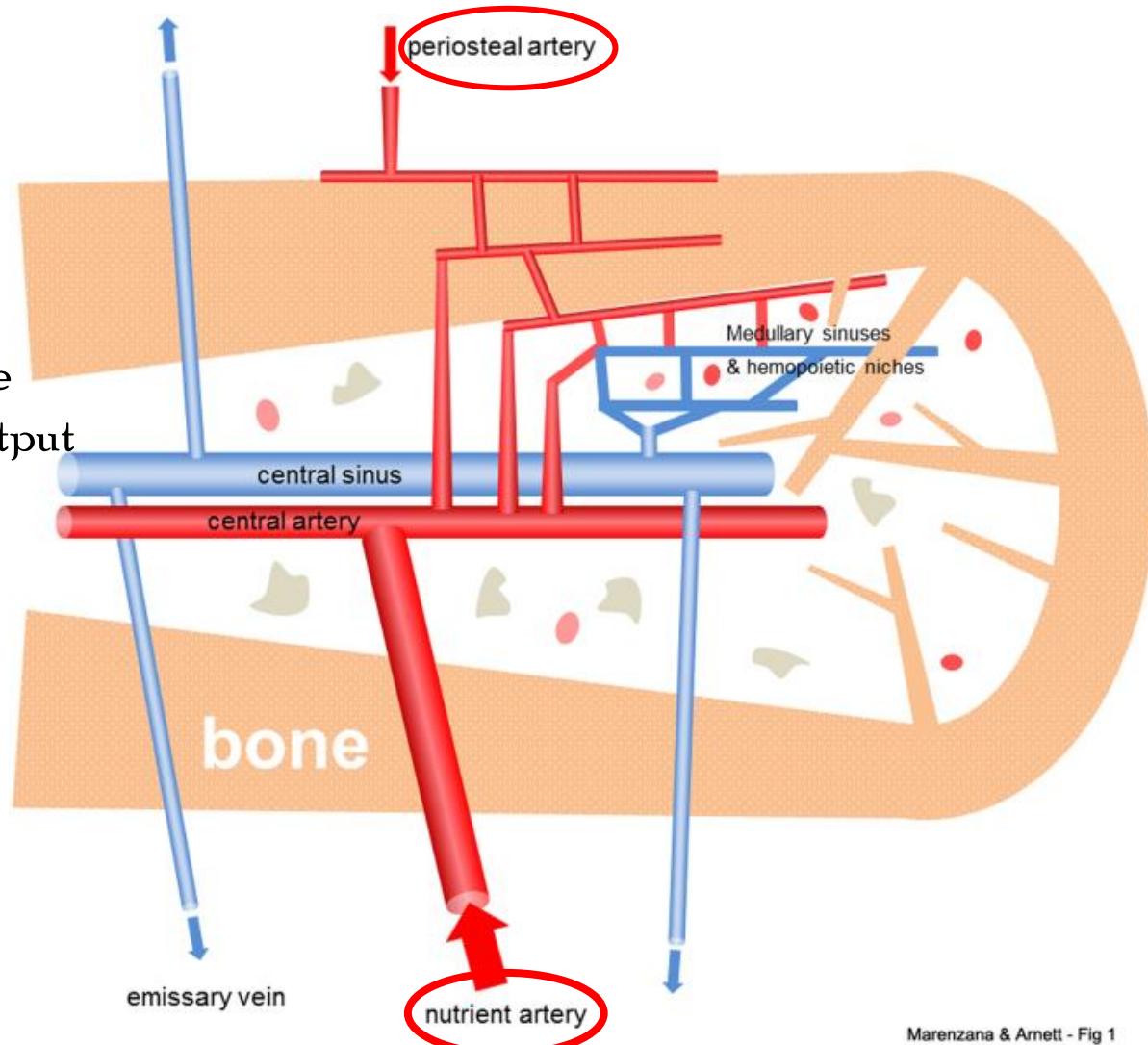
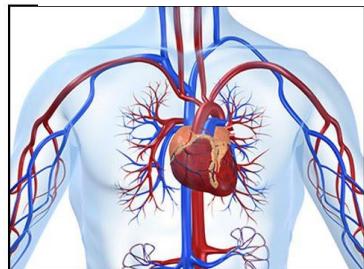
Yuan Yang rice terraces China

The vascular supply to healthy adult bone

Cardiac Output

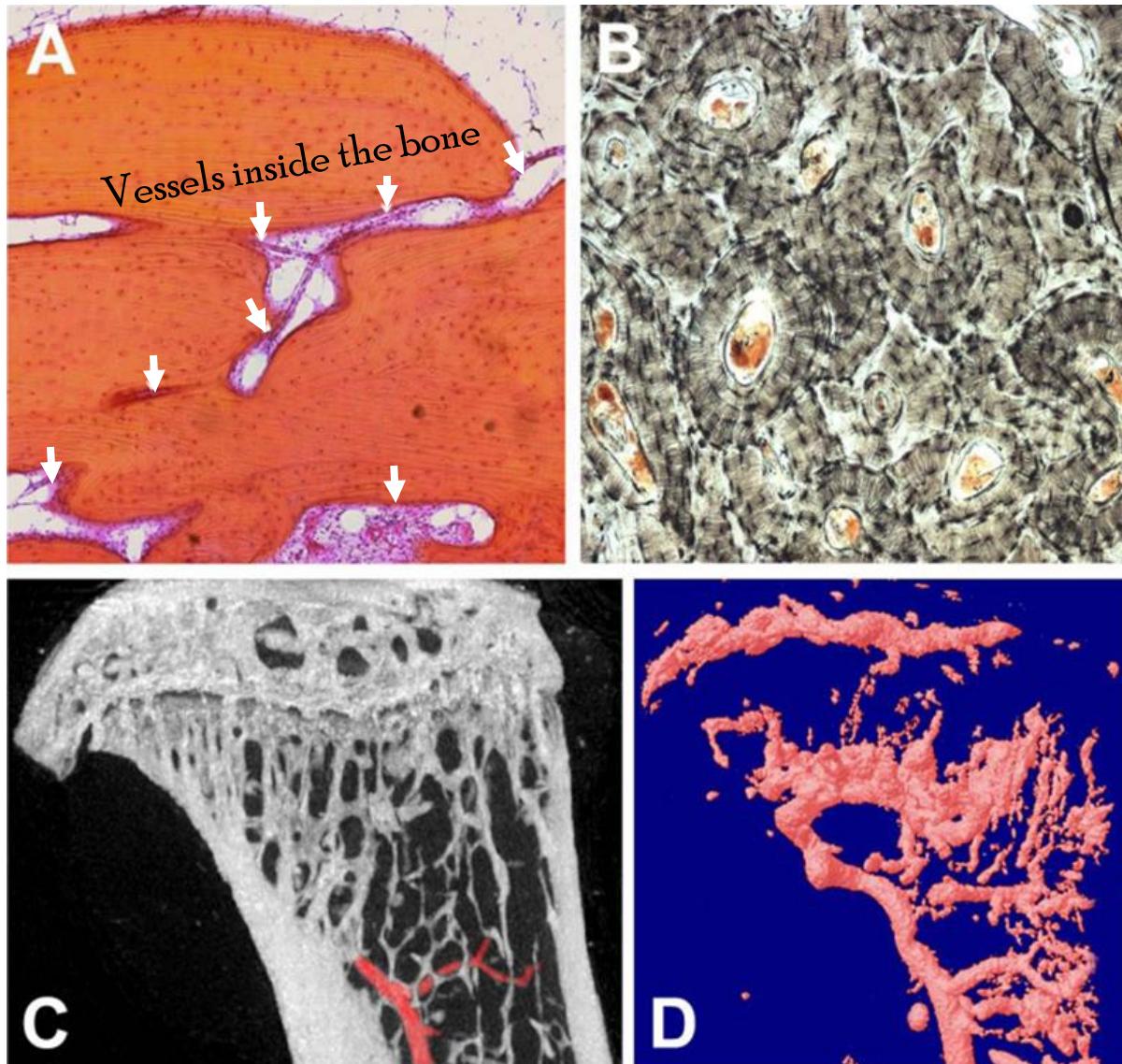


The skeletal bones receive about 10% of the cardiac output



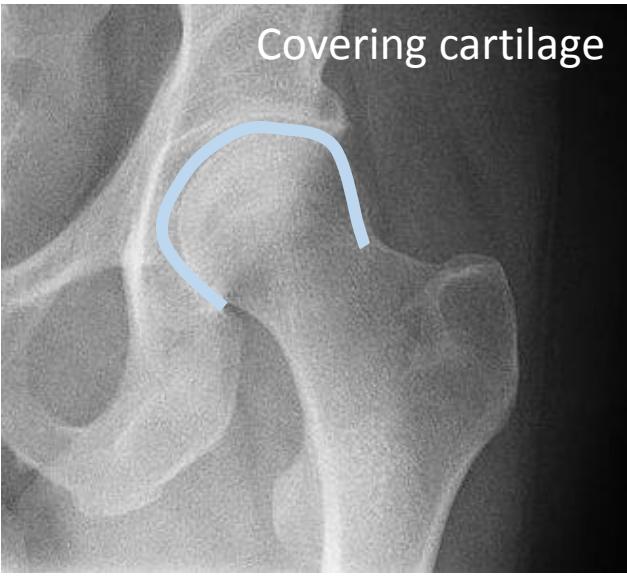
Marenzana & Arnett - Fig 1

Bone vasculature



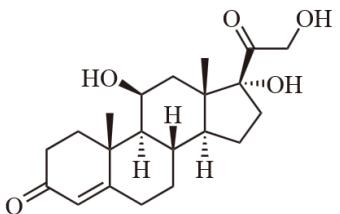
Femoral head (hip) pathology

Primary - Non-traumatic

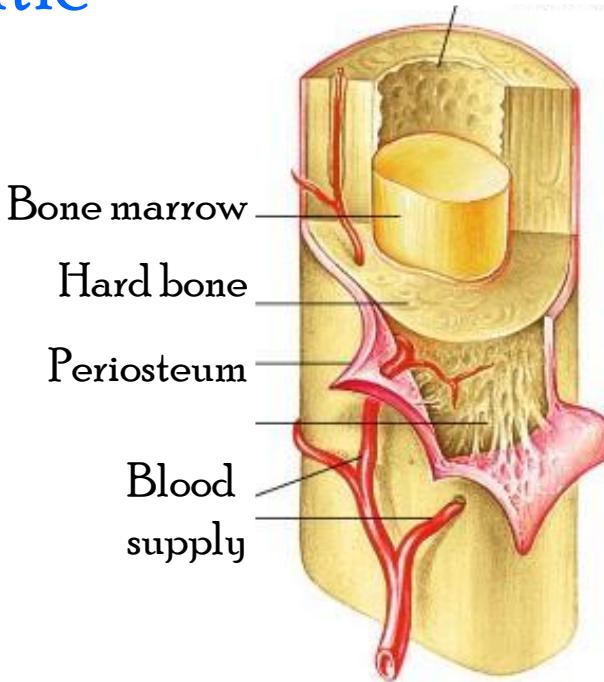


Non-accidental bone necrosis

Medication, e.g.,
Corticosteroid



Smoking
Alcohol abuse



Secondary - Traumatic

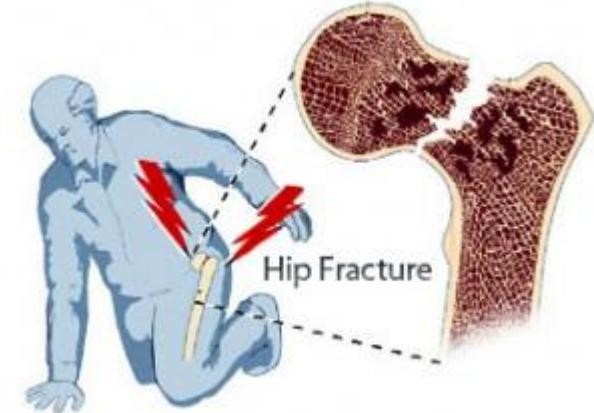


Avascular bone necrosis

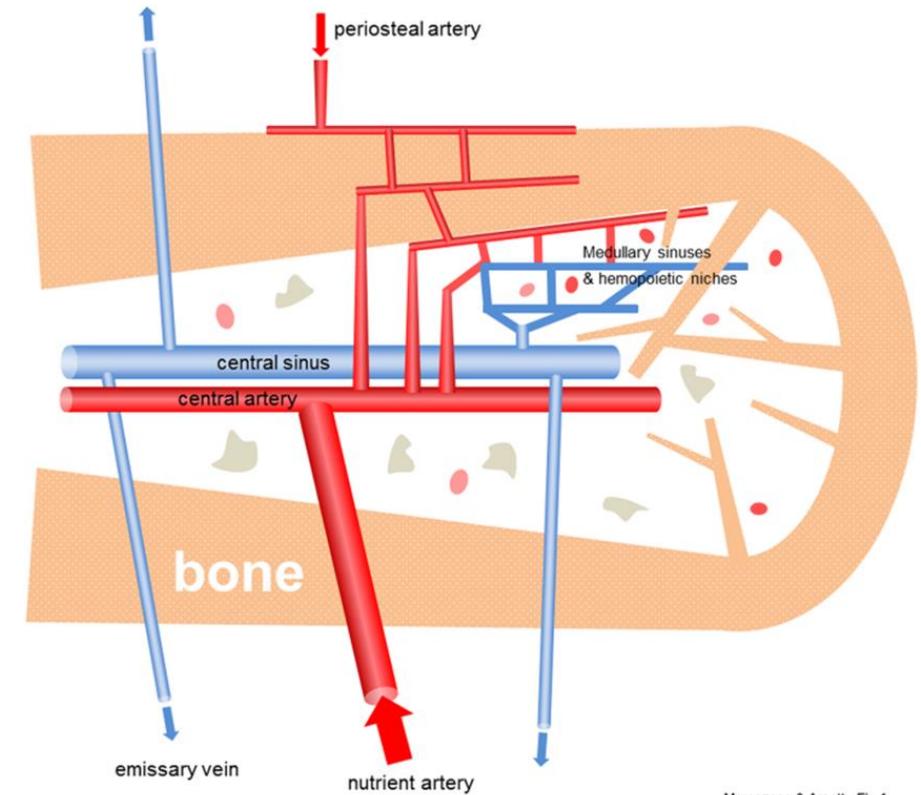
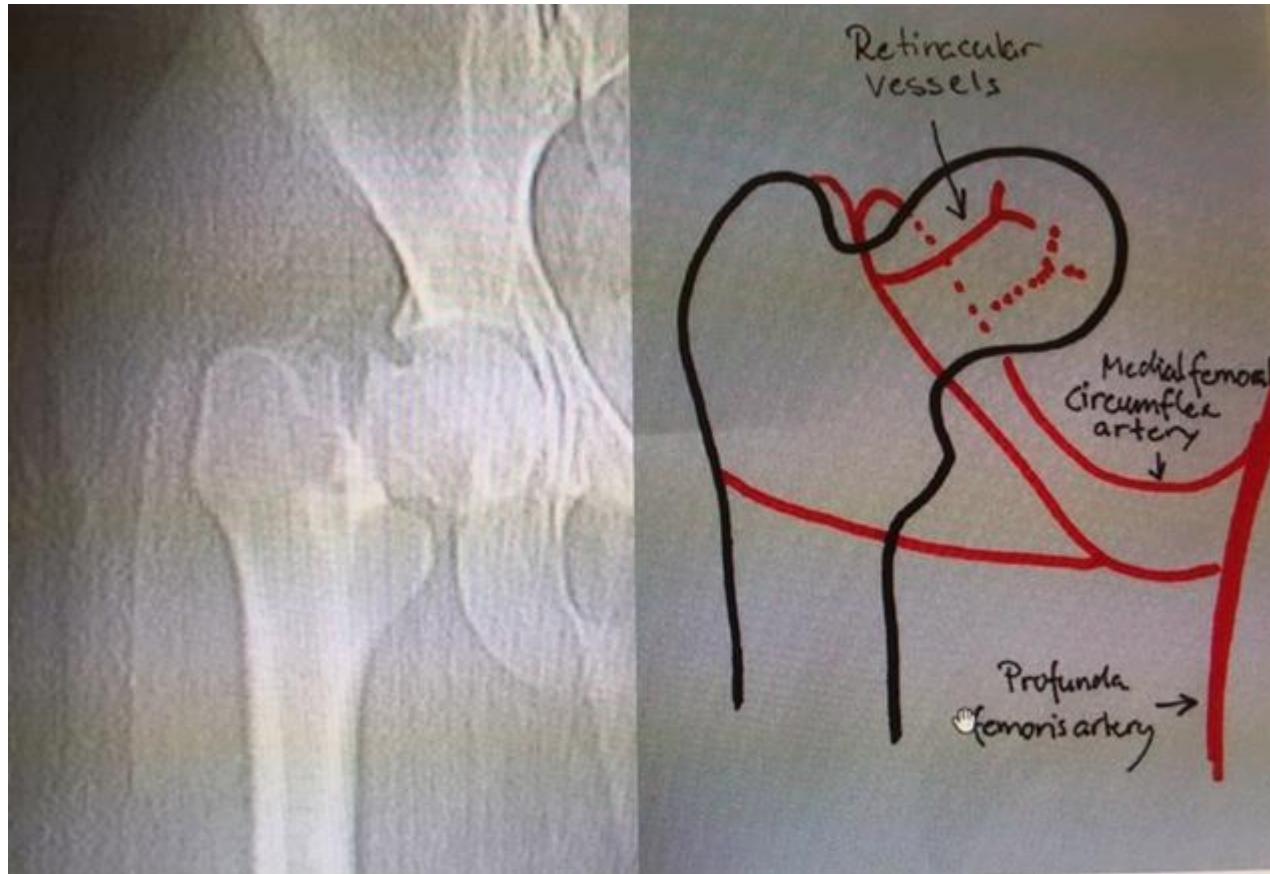
Caput necrosis



Osteoarthritis

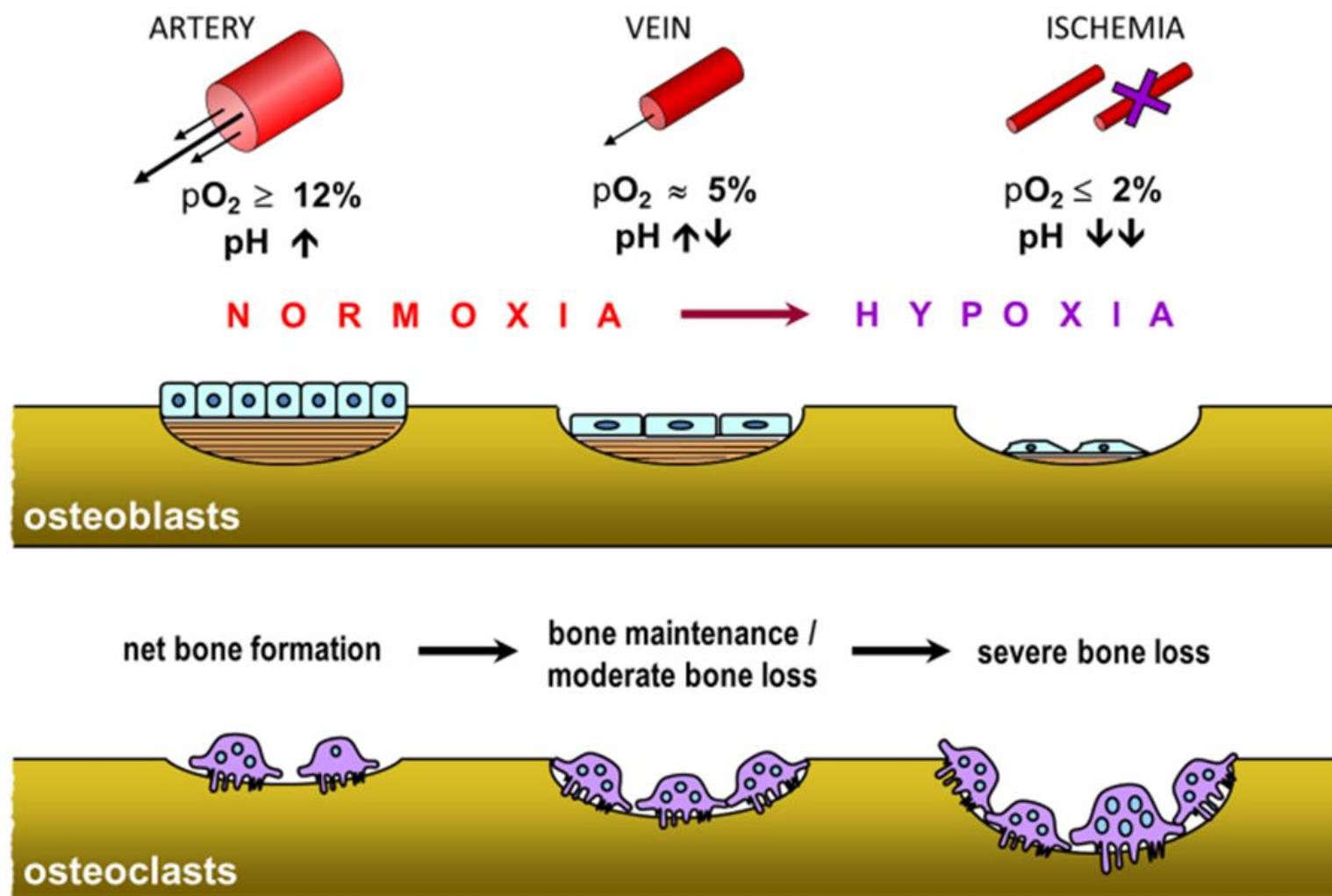


Femoral neck fracture



Marenzana & Arnett - Fig 1

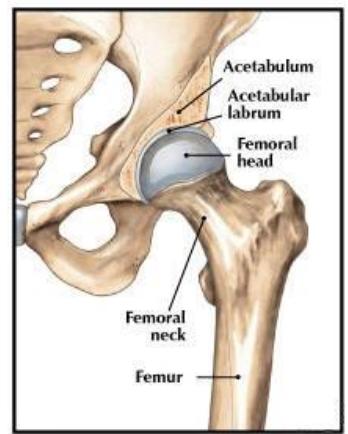
Key effects of oxygen on bone cell function



Conventional X-ray and Magnetic Resonance Imaging of the hip joint



A healthy hip



Bilateral osteoarthritis
visualized by conventional X-ray

- Sclerosis
- Flattening
- Sequestrum (dead bone)

MRI of the same
osteoarthritis

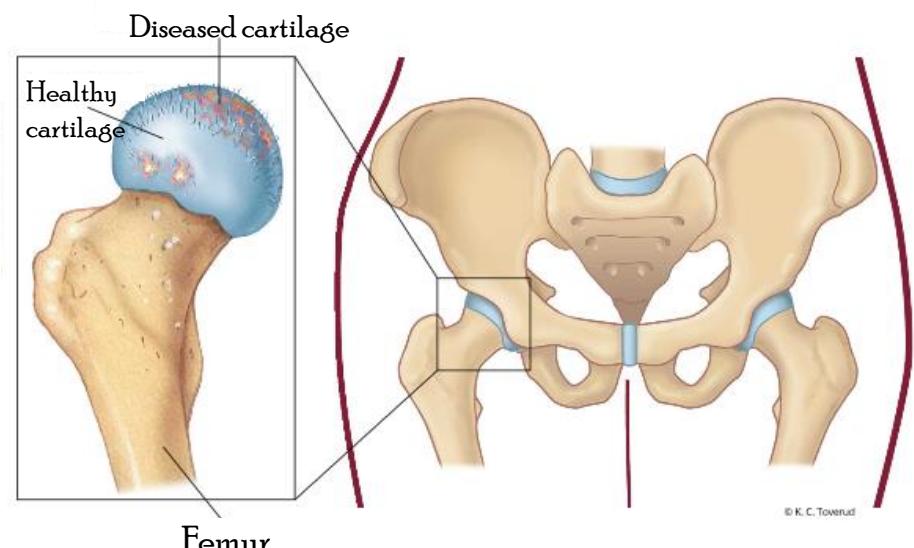
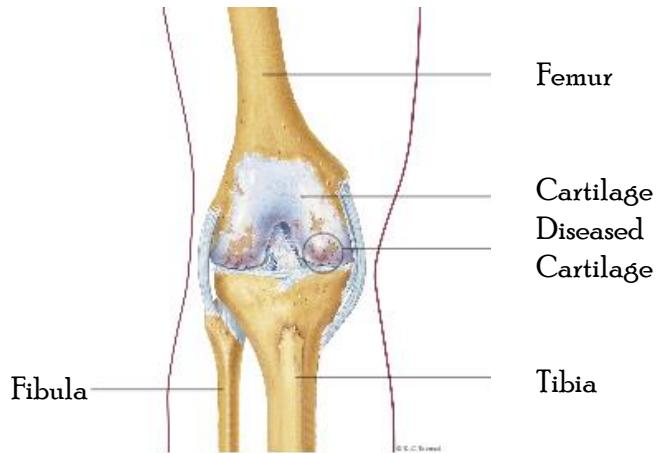
How common is arthrosis?

A population 45 years and older:

Approximately $\frac{1}{4}$ - 25% are affected by arthrosis

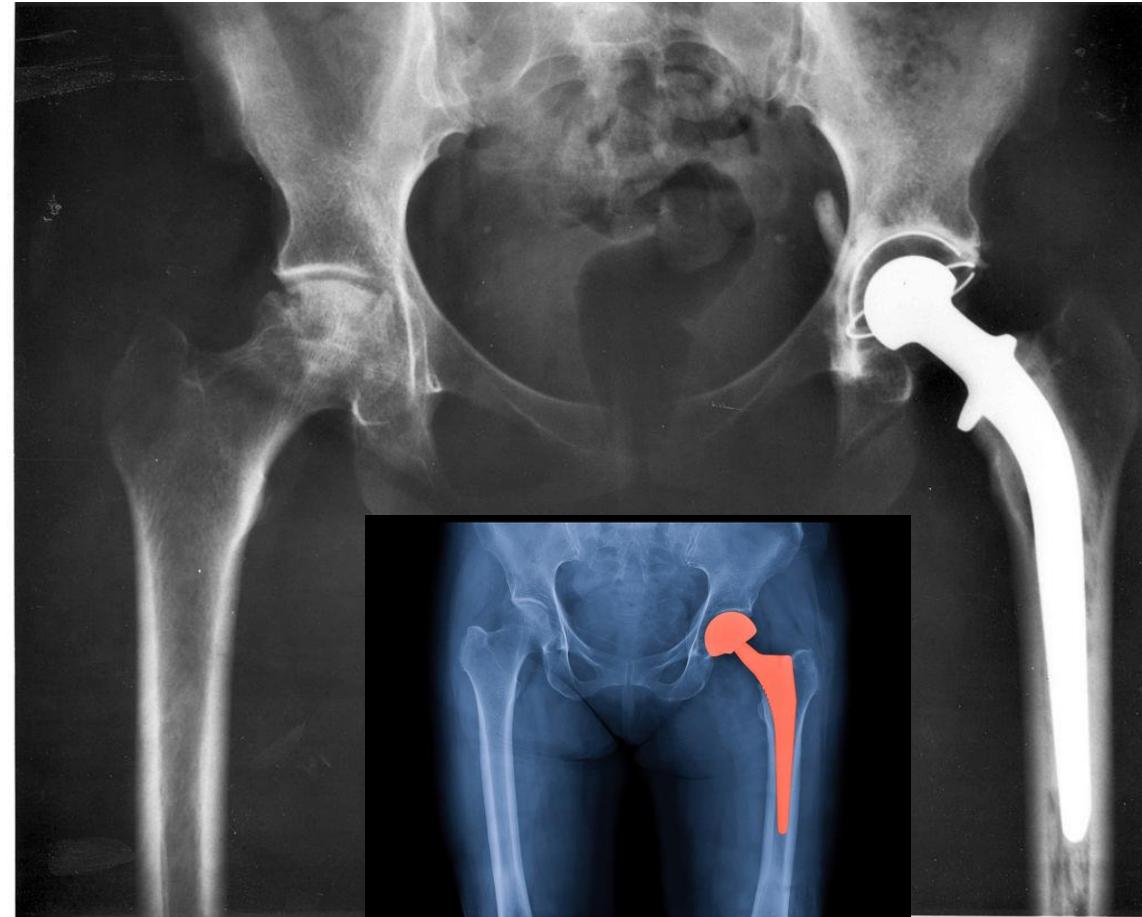
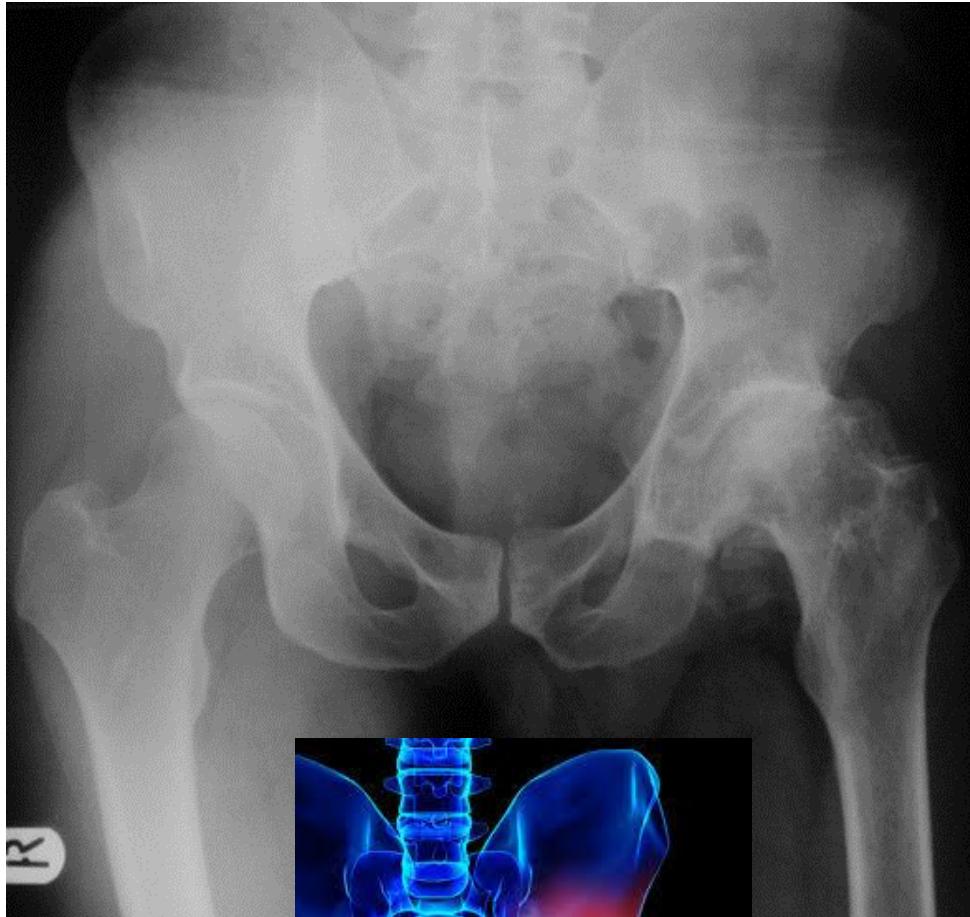
Scandinavian data:

Hip arthrosis	5.8 %
Knee arthrosis	13.8 %
Finger arthrosis	3.1 %
Other joints (foot, shoulder, jaw, arm bow)	12.4 %

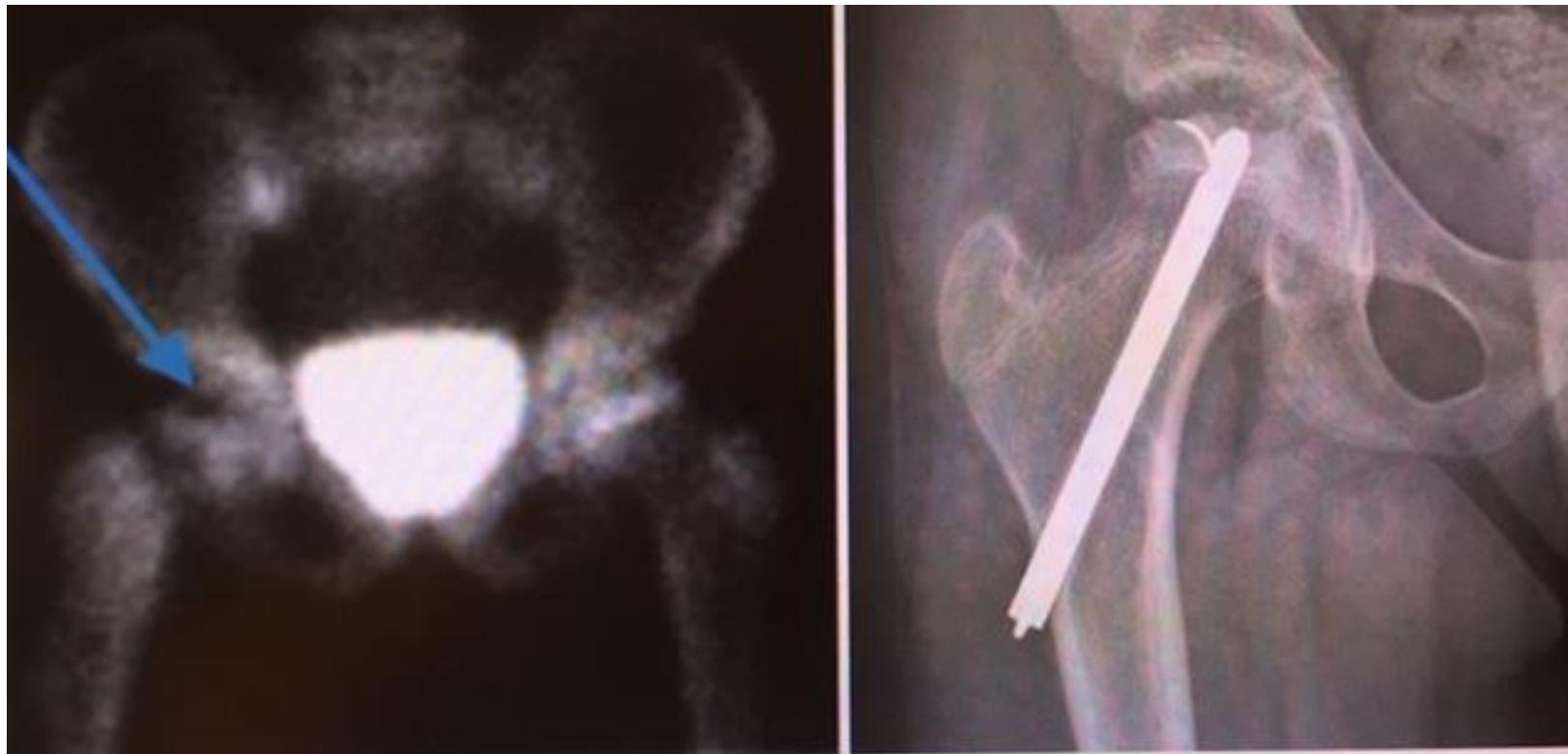




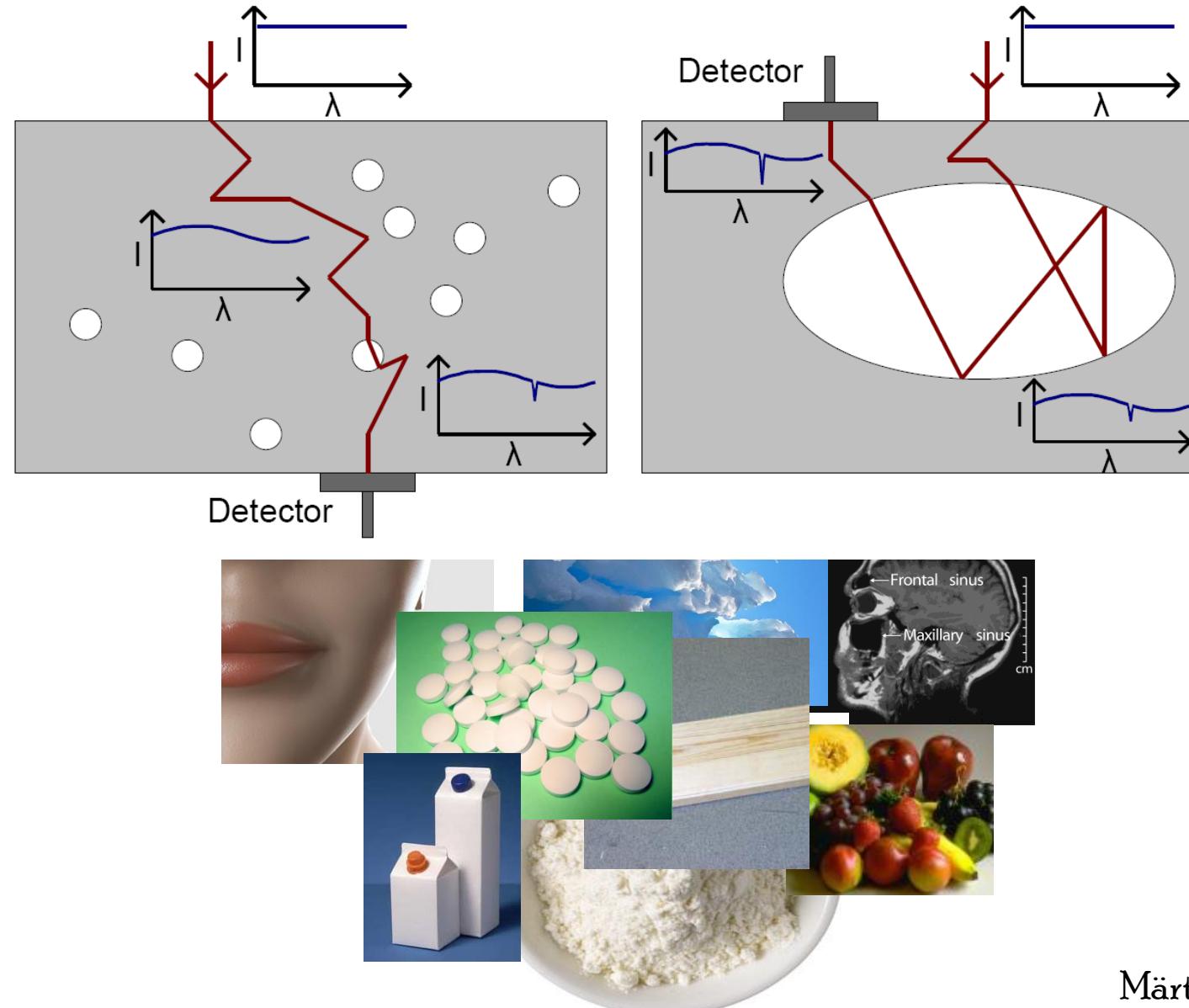
Total Hip Arthroplasty

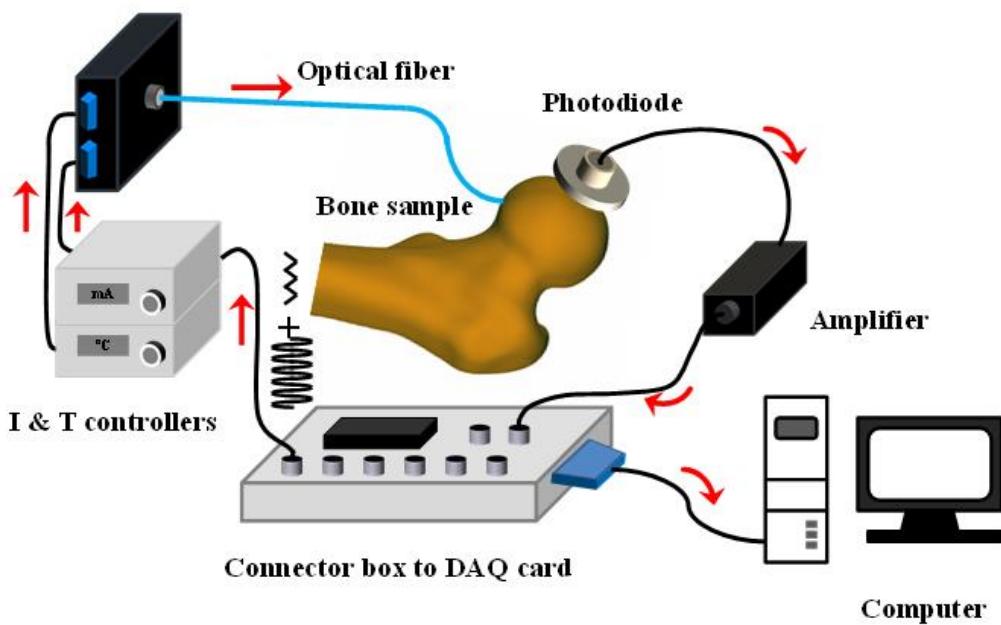
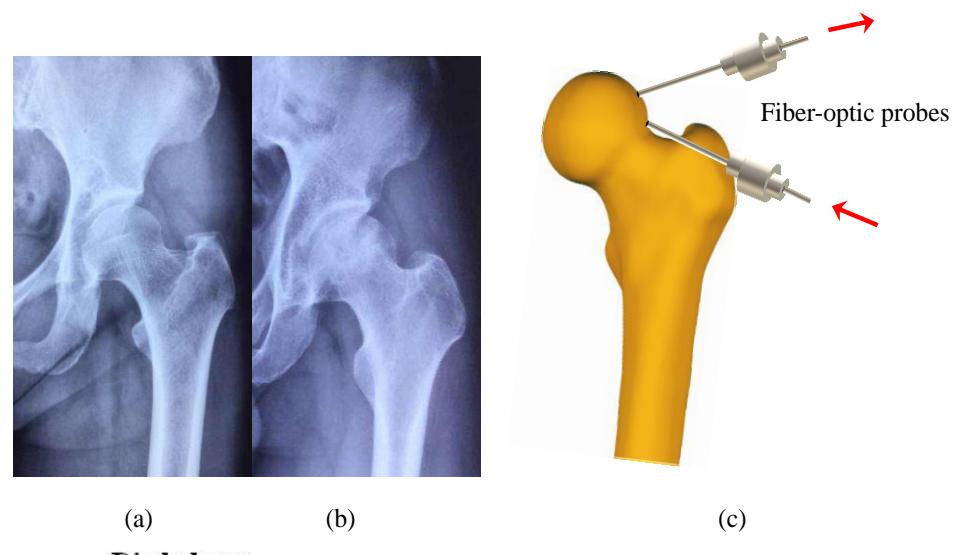


Scintigraphy of the *caput femoris* with an avascular area

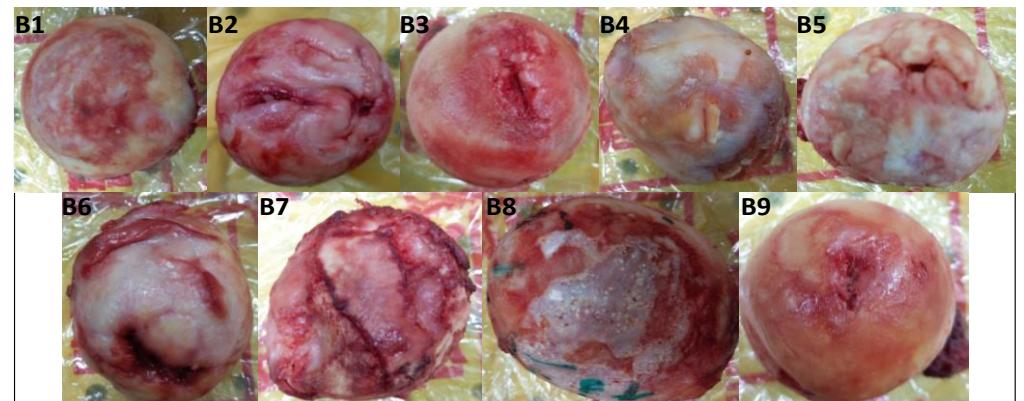
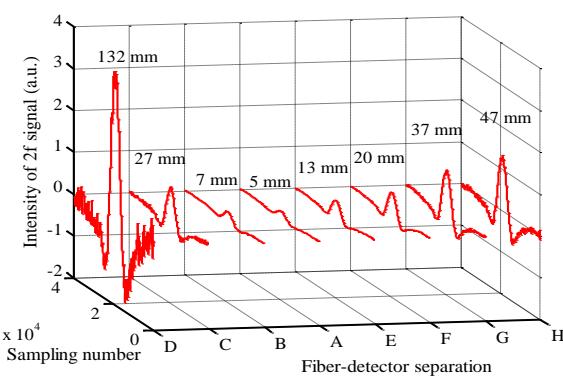
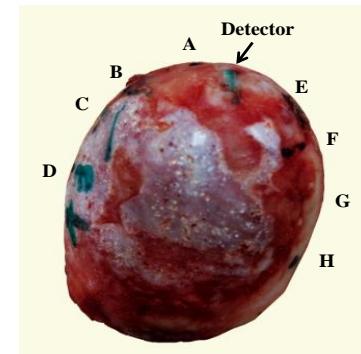
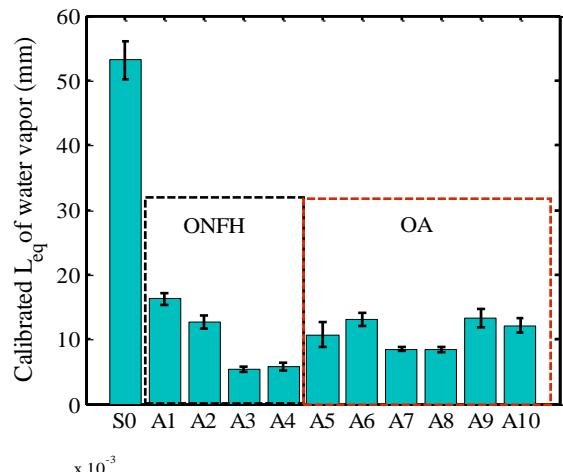
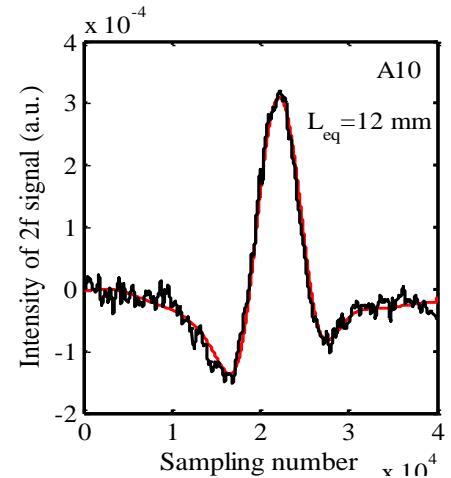


Gas in Scattering Media Absorption Spectroscopy (GASMAS)





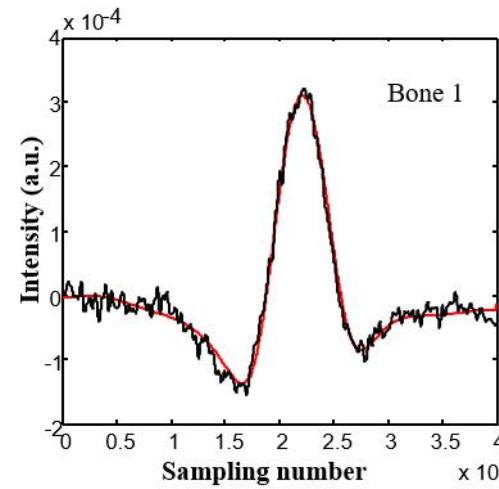
Femoral head necrosis detection



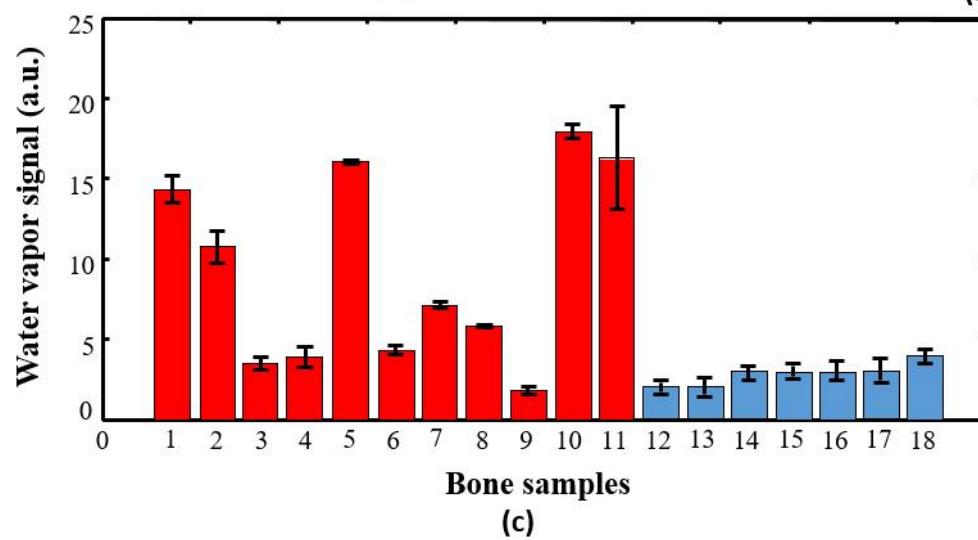
Water vapor signal in osteonecrosis and normal femoral head bone *in-vitro* monitored by the GASMAS-technique



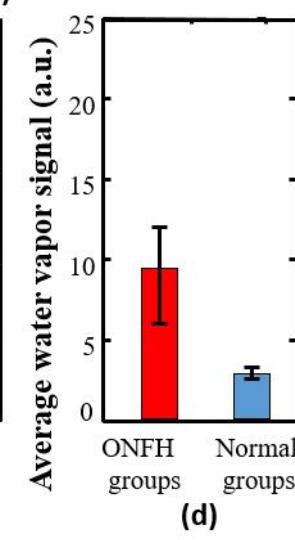
(a)



(b)



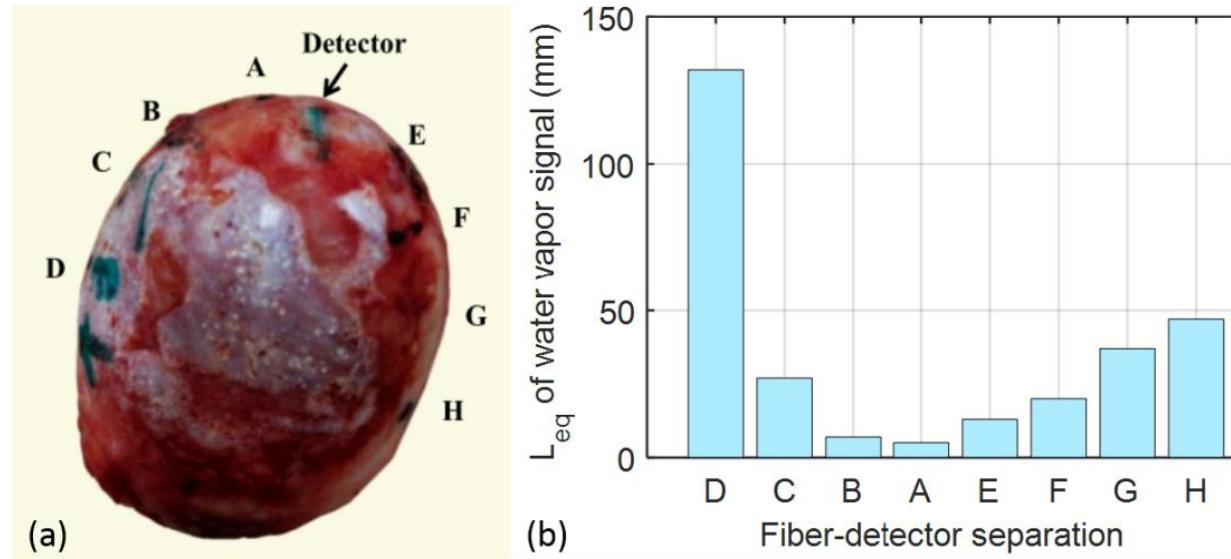
(c)



(d)

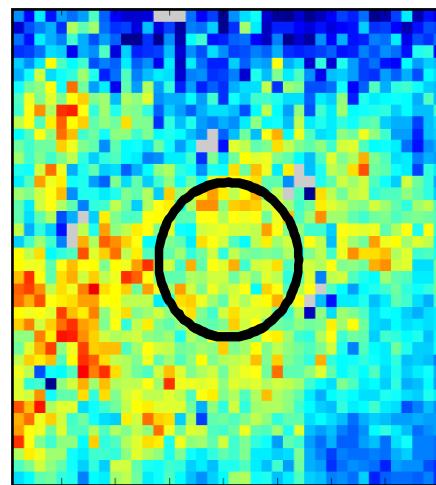
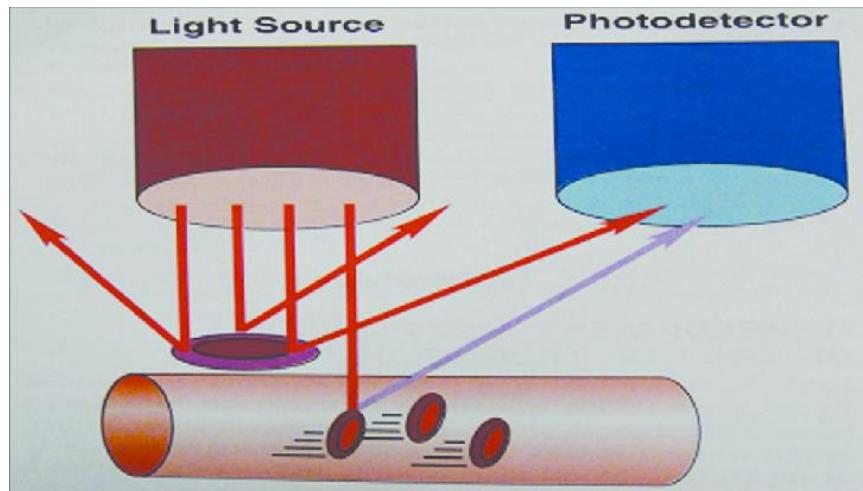
ONFH – Osteonecrosis of the Femoral head

In-vitro monitoring of Osteonecrosis in the hip joint

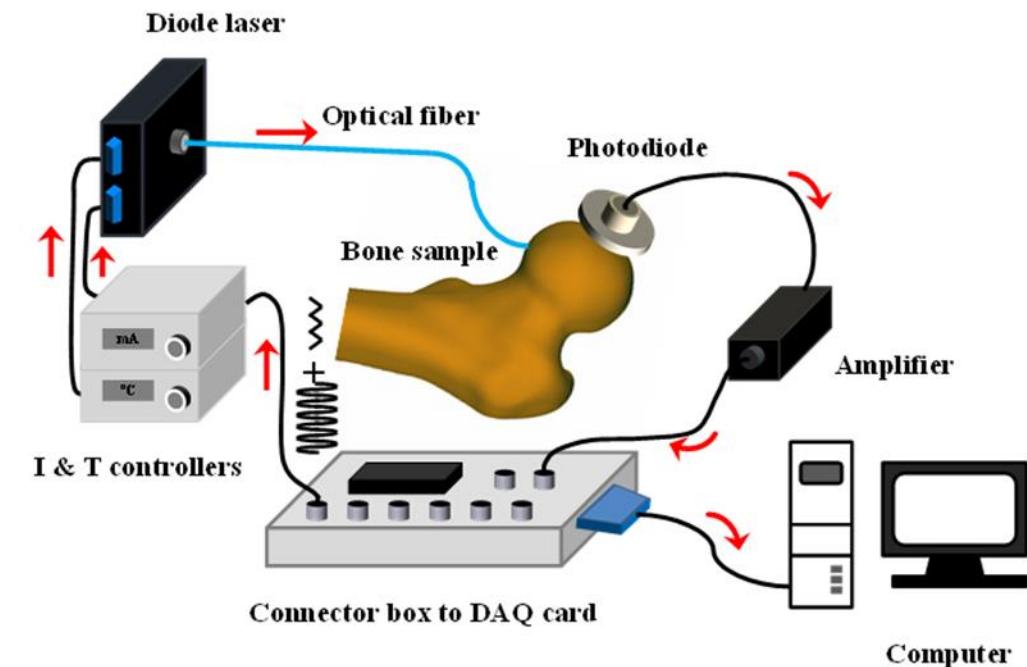


Water vapor signal from pores inside the diseased bone tissue monitored by the GASMAS technique
The L_{eq} of the water vapor signal shown for each position

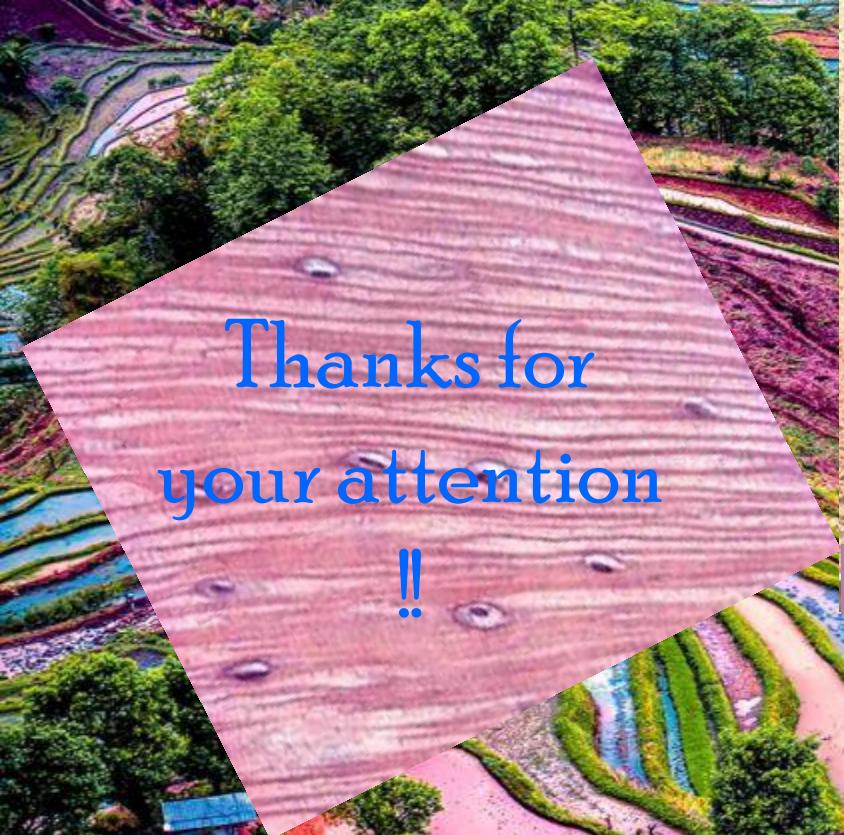
Laser-Doppler monitoring combined with the GASMAS technique



Laser-Doppler blood perfusion monitoring



GASMAS set-up



Thanks for
your attention
!!



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Yuan Yang rice terraces China