



## Dual-Energy CT: Painting the Horizon of Musculoskeletal Imaging

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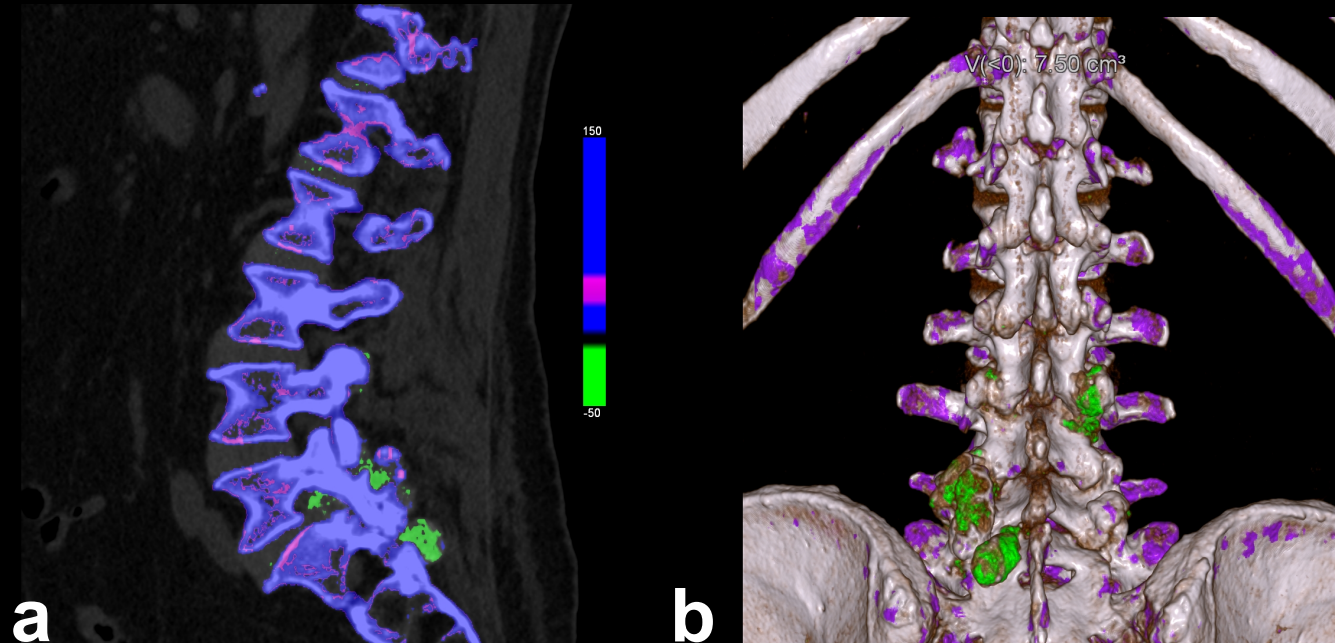
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UBC has a master research agreement with Siemens.

- OBJECTIVE: Discuss how dual-energy CT (DECT) adds value as a problem-solving tool in emergency musculoskeletal imaging

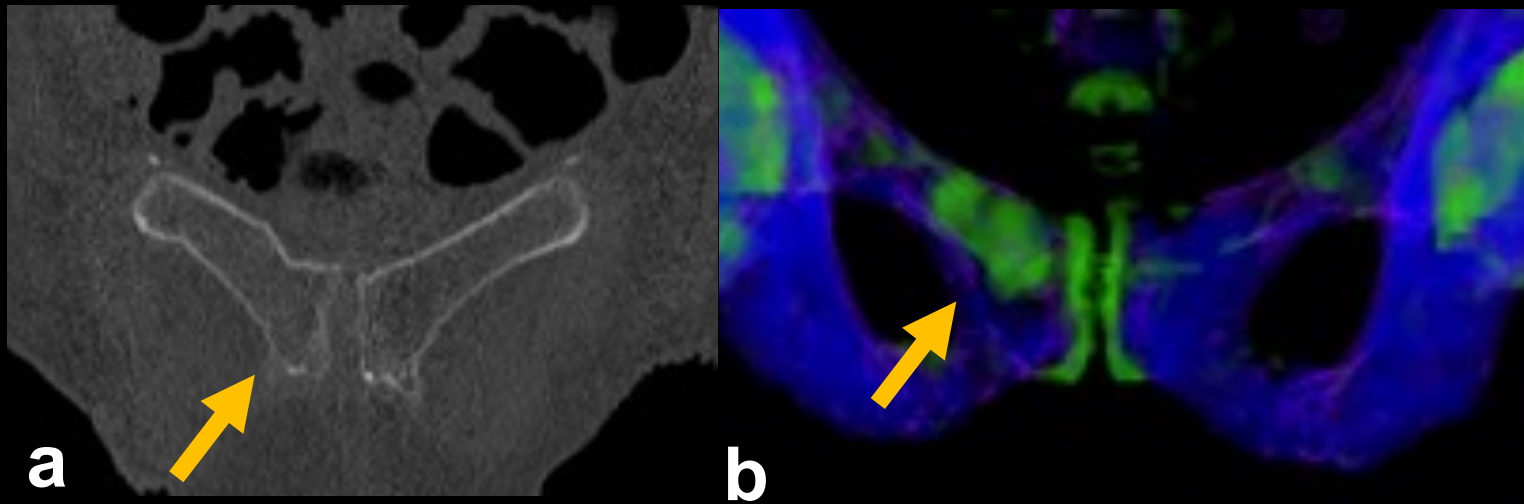
# GOUT



- 74-year-old man with a history of gout. DECT (a) Sagittal and (b) 3D reformats display urate deposits (green) with encroachment on the right L5/S1 neural foramen (a)

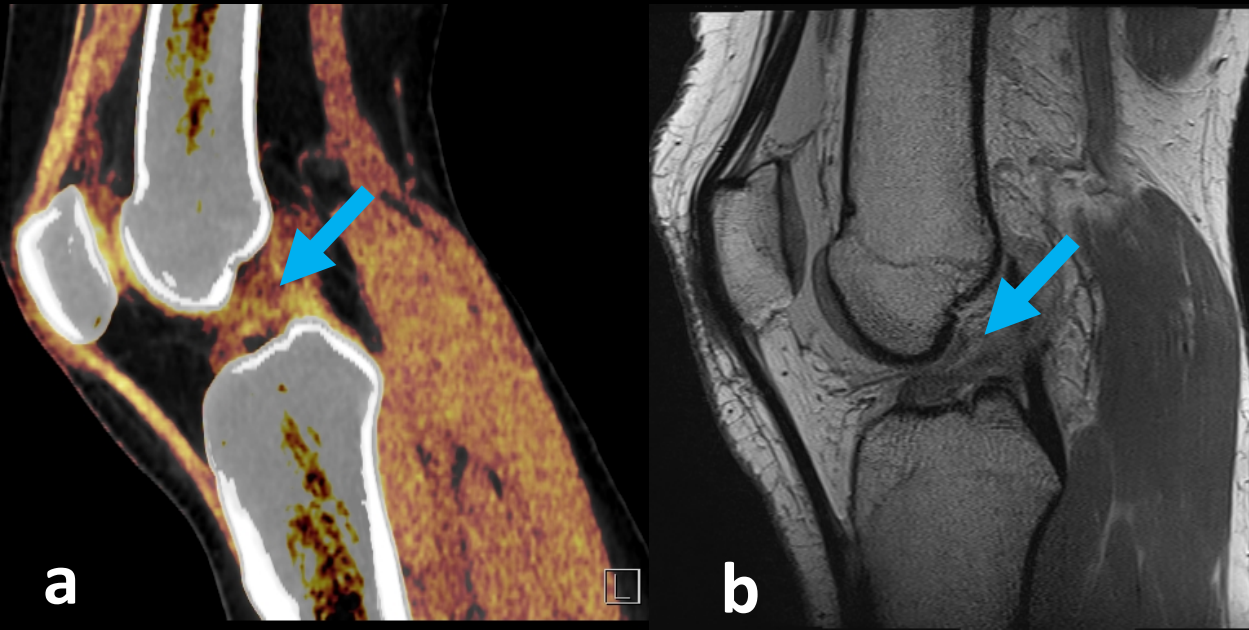
- DECT can highlight monosodium urate deposits in gout
- Non-invasive nature permits examination of inaccessible areas, such as the spine, small joints, periarticular tissues, tendons, and ligaments.
- Can allow clinicians to visualize disease burden and track resolution

# BONE MARROW EDEMA



- (a) Conventional CT of a 95 year-old female demonstrates a very subtle pubic ramus fracture. (arrow)
  - (b) DECT VNCa technique demonstrates bone marrow edema on a 3D image, highlighting the fracture
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- Virtual non-calcium (VNCa) technique subtracts bone, allowing **evaluation of bone marrow edema**
    - Added problem-solving power in **trauma**
    - Highlights marrow abnormalities such as in **multiple myeloma, osteomyelitis, or sacroiliitis**

# COLLAGEN ANALYSIS



- 20-year-old female with a twisting injury.
- (a) DECT tendon application demonstrates discontinuity of ACL fibres (arrow).
- (b) Confirmation on subsequent PD MRI

- DECT can highlight collagen, permitting **evaluation of tendons, ligaments, menisci, and discs**
- Adding VNCA to non-contrast CT has been shown to increase sensitivity and specificity for detecting **disc herniations**

# MALIGNANCY

37-year-old female with breast cancer. **Metastases (arrows)** can be rendered more conspicuous with:

- (b) **Virtual non-contrast images:** subtraction of contrast can confirm enhancement of lesions
- (c) **VNCa:** subtraction of bone highlights abnormal soft tissue
- (d) **Iodine overlay:** confirmation of vascularity

