Rarer insights from rarer microscopies in the study of the rare bone disease AKU

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Edge 3D head LM autofluorescence,
One of stereo pair

l_9414_d169lh.JPG
25/2/2010
Edge 3D head LM autofluorescence, One of stereo pair
Embedded in PMMA, polished block, Confocal autofluorescence LM married to 20kV BSE SEM, movie
Edge 3D head LM autofluorescence, One of stereo pair
Osteoarthropathy in AKU
Resorption of subchondral plate

Resistance of HAC to alkaline bacterial pronase digestion
Trabecular Excrescences FW 900µm
Trabecular Ex crescences FW 900 \( \mu \text{m} \)
Trabecular Excrescences
Trabecular Excrescences
Microtomography
Microtomography
Some features are common to \ with common OA
plane of crush fracture impaction
PMMA uncoated
PMMA uncoated

eburnated
crush fracture impaction
MaceratedNB excess low density bone or osteoid
Lumps and bumps in the neck region in AKU samples
Triiodide or iodine vapour staining
field 11

$\text{NH}_4\text{I}_3$

stain
NH₄I₃ stain

field 4

100 μm

18
PRODs
HDMPS
Icelandic Tarsals ECM 2014 MRI+CT+BSE+Iodine+CSLM

Tb Mc3 J Anat 2014 partly demin LM Turley…Broom

MRI DESS
XMT 26um
Faxitron
PMMA
XMT 6um
BSE
Triiodide

49y Male AKU Hip, our first case 2012, Faxitron
Methods
Remove the head of femur > MRI DESS, best resolution 230um
XMT high contrast x-ray microtomography, MuCat, 26um, 96 hours scanning >
Find the regions of interest, Slice the femoral head, Embed in PMMA
Digital microradiography of slices, Faxitron, 35kV > cut out & polish blocks
More XMT on blocks, Scanco uCT40, 6um voxels
BSE SEM, wide field and < 0.2um resolution imaging of mineral concentration
Repeat BSE after staining triiodide, Serial re-polishing and re-imaging
Hypointense HDMP be found with MRI DESS in isolated bones

Not seen in pre-op x-ray

Another case, 87y male
A simplified staging system based on the radiological findings in different stages of ochronotic spondyloarthropathy.

Jebaraj I1, Chacko BR, Chiramel GK, Matthai T, Parameswaran A.
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