Online supplement to: Definition and Reliability Assessment of Elementary Ultrasonographic Findings in Calcium Pyrophosphate Deposition Disease: A Study by the OMERACT Calcium Pyrophosphate Deposition Disease Ultrasound Subtask Force. *The Journal of Rheumatology.* doi:10.3899/jrheum.161057

## ONLINE SUPPLEMENTARY DATA

**Supplementary Table 1.** Definitions extrapolated from the SLR, divided according to the anatomical site and the US feature evaluated.

| ***Structure*** | ***Shape*** | ***Echogenicity*** | ***Localization*** | ***Behavior at dynamic scanning*** |
|---|---|---|---|---|
| ***Fibrocartilage*** | • spots ("punctuate pattern")<br>• rounded or amorphous-shaped areas<br>• rounded foci<br>• rounded deposits | • hyperechoic/ hyperechogenic<br>• characterized by echogenicity similar to the bone cortex even at very low levels of gain | • within the structure<br>• also on the surface of meniscal fibrocartilage | • remain fixed during movement and probe compression |
| ***Hyaline Cartilage*** | • images parallel to the surfaces, classified as punctiform or linear if longer than 1.5 mm<br>• linear deposits<br>• thin bands parallel to the surfaces of the hyaline cartilage<br>• spots not generating a posterior acoustic shadow | • hyperechoic/ hyperechogenic | • within the hyaline cartilage<br>• on the superficial margin of the hyaline cartilage, resembling the double contour sign | • remain fixed during movement and probe compression |

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| | • aggregates that could be linear or homogeneous | | | |
| ***Tendon*** | • linear deposits, parallel to the tendon fibrillar structure, not in continuity with the bone profile. they could be single or multiple<br>• spots - "punctate" pattern<br>• linear and extensive deposits and may generate an acoustic shadow | • hyperechoic/ hyperechogenic | • within the structure | • remain fixed during movement and probe compression |
| ***Synovial Fluid*** | • spots without acoustic posterior shadowing<br>• aggregates uniformly rounded in shape with a sharply defined outer profile<br>• aggregates uniformly rounded in shape with | • hyperechoic/ hyperechogenic | • within the synovial fluid | • Appear as mobile aggregates with joint movement and probe pressure |

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| | sharply defined margins | | | |

**Supplementary Table 2.** Results of the Delphi exercise.The statements that achieved the consensus, are underlined and put in bold. N new proposition included in the Delphi; N.A. not applicable; CPP calcium pyrophosphate.

| ***Statement Round 1*** | ***Agreement %*** | ***Statement Round 2*** | ***Agreement %*** | ***Statement Round 3*** | ***Agreement %*** |
|---|---|---|---|---|---|
| ***Fibrocartilage CPP crystals shape*** | | | | | |
| Areas | 33% | | | | |
| Aggregates | 67% | | | | |
| Spots | 67% | | | | |
| Foci | 56% | | | | |
| **Deposits** | **78%** | **Deposits** | **N.A.*** | **Deposits** | **N.A.*** |
| **Amorphous** | **67%** | Amorphous | 53% | **Variable shape** | **N.A.*** |
| Rounded | 50% | **Variable shape (N)** | **78%** | | |
| Oval-shaped | 56% | | | * *Consensus achieved at the previous Delphi rounds* | |
| Inhomogeneous | 50% | * *Consensus achieved at the 1st Delphi round* | | | |
| ***Fibrocartilage CPP crystals echogenicity*** | | | | | |
| Echogenicity similar to the bone cortex even at very low levels of gain | 61% | | | | |
| **Hyperchoic/Hyperechogenic** | **78%** | Hyperechoic/hyperechogenic | 72% | | |
| Not generating acoustic shadowing | 53% | **Hyperechoic/hyperechogenic similar to the bone cortex echogenicity (N)** | **76%** | **Hyperechoic/hyperechogenic similar to the bone cortex echogenicity** | **N.A.*** |
| Hyperechoic/hyperechogenic as compared to the fibrocartilage echogenicity | 72% | Hyperechoic/hyperechogenic as compared to the bone cortex echogenicity (N) | 12% | * *Consensus achieved at the 2nd Delphi round* | |
| Usually not generating acoustic shadowing | 67% | | | | |
| Maintaining similar echogenicity even at very low levels of gain | 33% | | | | |
| ***Fibrocartilage CPP crystals localization*** | | | | | |

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| **Are localized within the structure** | **94%** | | | | |
| Could be localized also on the surface of meniscal fibrocartilage | 50% | | | | |
| Could be localized also on the fibrocartilage surface | 50% | **Are localized within the structure** | **N.A.*** | **Are localized within the structure** | **N.A.*** |
| Occasionally could be localized also on the fibrocartilage surface | 61% | * *Consensus achieved at the 1st Delphi round* | | * *Consensus achieved at the 1st Delphi round* | |
| In rare cases could be localized also on the surface of meniscal fibrocartilage | 28% | | | | |
| Surrounding the fibrocartilage surface | 6% | | | | |
| ***Fibrocartilage CPP crystals behavior at dynamic scanning*** | | | | | |
| Remain fixed during movement and probe compression but not when are lying on the surface | 17% | | | | |
| **Remain fixed during movement and probe compression** | **67%** | Remain fixed during movement and probe compression | 41% | | |
| **Remain fixed and move together with the fibrocartilage during dynamic assessment (i.e. joint movement and probe compression)** | **72%** | **Remain fixed and move together with the fibrocartilage during dynamic assessment (i.e. joint movement and probe compression)** | **89%** | **Remain fixed and move together with the fibrocartilage during dynamic assessment (i.e. joint movement and probe compression)** | **N.A.*** |
| Remain fixed with regard to the fibrocartilage (but not for the surrounding structure) | 44% | Remain fixed to the fibrocartilage structure during dynamic movement (N) | 59% | * *Consensus achieved at the 2nd Delphi round* | |
| Remain fixed during movement and probe compression but not when are lying on the surface | 17% | | | | |
| ***Hyaline Cartilage CPP crystals shape*** | | | | | |
| Aggregates | 44% | | | | |
| Foci | 61% | | | | |
| Bands | 39% | | | | |
| Areas | 44% | | | | |
| Spots | 56% | | | | |

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| Linear | 67% | | | | |
| **Deposits** | **83%** | **Deposits** | **NA*** | **Deposits** | **NA*** |
| **Varying in size and shape** | **89%** | **Varying in size and shape** | **NA*** | **Varying in size and shape** | **NA*** |
| Rounded | 44% | *Consensus achieved at the 1st Delphi round | | *Consensus achieved at the 1st Delphi round | |
| Oval | 44% | | | | |
| Punctiform | 56% | | | | |
| Homogeneous | 19% | | | | |
| Amorphous | 61% | | | | |
| Could converge and appear as linear bands, parallel to the hyaline surface | 72% | | | | |
| ***Hyaline Cartilage CPP crystals echogenicity*** | | | | | |
| **Hyperechoic/ hyperechogenic** | **78%** | Hyperechoic/ hyperechogenic | 71% | | |
| Hyperchoic as compared to the cartilage echogenicity | 61% | Hyperchoic/hyperechogenic as compared to the bone cortex echogenicity (N) | 13% | | |
| **Not creating posterior shadowing** | **89%** | **Not creating posterior shadowing** | **82%** | **Not creating posterior shadowing** | **NA*** |
| Echogenicity similar to the bone cortex even at very lows levels of gain | 61% | Usually not creating posterior shadowing (N) | 72% | **Hyperechoic/hyperechogenic similar to the bone cortex echogenicity** | **NA*** |
| | | **Hyperechoic/hyperechogenic similar to the bone cortex echogenicity (N)** | **78%** | * Consensus achieved at the 2nd Delphi round | |
| ***Hyaline Cartilage CPP crystals localization*** | | | | | |
| In rare cases could be found on the superficial margin of the hyaline cartilage, resembling the double contour sign | 44% | | | | |
| Could be localized on the superficial margin of the hyaline cartilage, resembling the double contour sign | 44% | | | | |
| **Localized within the hyaline cartilage** | **100%** | **Localized within the hyaline cartilage** | **N.A.*** | **Localized within the hyaline cartilage** | **N.A.*** |
| Sometimes could be found also on the superficial margin of the hyaline cartilage | 39% | *Consensus achieved at the 1st Delphi round | | *Consensus achieved at the 1st Delphi round | |
| May also be found on the superficial margin of the hyaline cartilage | 50% | | | | |
| ***Hyaline Cartilage CPP crystals behavior at dynamic scanning*** | | | | | |

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| Remain fixed during movement and probe compression | 50% | | | | |
| Remain fixed during movement and probe compression but not when are lying on the surface | 17% | | | | |
| **Remain fixed and move together with the hyaline cartilage during dynamic assessment (i.e. joint movement and probe compression)** | **78%** | **Remain fixed and move together with the hyaline cartilage during dynamic assessment (i.e. joint movement and probe compression)** | **N.A.*** | **Remain fixed and move together with the hyaline cartilage during dynamic assessment (i.e. joint movement and probe compression)** | **N.A.*** |
| Remain fixed with regard to hyaline cartilage (but not the surrounding structures) | 56% | **Consensus achieved at the 1st Delphi round* | | **Consensus achieved at the 1st Delphi round* | |
| Remain fixed during movement | 28% | | | | |
| ***Tendons CPP crystals shape*** | | | | | |
| Single | 44% | | | | |
| **Multiple** | **78%** | **Multiple** | **N.A.*** | **Multiple** | **N.A.*** |
| **Deposits** | **78%** | **Deposits** | **N.A.*** | **Deposits** | **N.A.*** |
| **Linear, parallel to the tendon fibrillar structure, not in continuity with the bone profile** | **83%** | **Linear, parallel to the tendon fibrillar structure, not in continuity with the bone profile** | **N.A.*** | **Linear, parallel to the tendon fibrillar structure, not in continuity with the bone profile** | **N.A.*** |
| Spots - 'punctate' pattern | 56% | **Consensus achieved at the 1st Delphi round* | | **Consensus achieved at the 1st Delphi round* | |
| Linear | 61% | | | | |
| Linear and estensive | 28% | | | | |
| Linear and/or extensive | 44% | | | | |
| Linear in the longitudinal scan and rounded in the transverse scan | 71% | | | | |
| Aggregates | 50% | | | | |
| Heterogeneous | 56% | | | | |
| Irregular round shaped | 22% | | | | |
| Round | 17% | | | | |
| ***Tendons CPP crystals echogenicity*** | | | | | |
| **Defined as hyperechoic/ hyperechogenic** | **78%** | Defined as hyperechoic/ hyperechogenic | 59% | | |

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| **Hyperchoic in relation to the tendon echogenicity** | **82%** | **Hyperchoic in relation to the tendon echogenicity** | **94%** | **Hyperchoic in relation to the tendon echogenicity** | **N.A.*** |
| **Generally does not create posterior shadowing** | **94%** | **Generally does not create posterior shadowing** | **94%** | **Generally does not create posterior shadowing** | **N.A.*** |
| **Maintains their high degree of echogenicity even at very low levels of gain** | **89%** | **Maintains their high degree of echogenicity even at very low levels of gain** | **N.A.*** | **Maintains their high degree of echogenicity even at very low levels of gain** | **N.A.*** |
| **Not affected by anisotropy as the surrounding tendon** | **78%** | **Not affected by anisotropy as the surrounding tendon** | **N.A.*** | **Not affected by anisotropy as the surrounding tendon** | **N.A.*** |
| Not affected by anisotropy | 56% | May or not create posterior acoustic shadowing (N) | 65% | | |
| | | Hyperchoic/hyperechogenic as compared to the bone cortex echgenicity (N) | 18% | *Consensus achieved | |
| | | Hyperechoic/hyperechogenic similar to the bone cortex echogenicity (N) | 71% | | |
| | | * *Statements not re-submitted in the 2nd round* | | | |
| ***Tendons CPP crystals localization*** | | | | | |
| Surrounding the tendon, especially those with synovial sheath | 28% | | | | |
| **Localized within the structure** | **94%** | **Localized within the structure** | **N.A.*** | **Localized within the structure** | **N.A.*** |
| Not in continuity with the bone profile | 83% | *Consensus achieved at the 1st Delphi round* | | *Consensus achieved at the 1st Delphi round* | |
| On the margin of the tendon | 22% | | | | |
| ***Tendons CPP crystals behavior at dynamic scanning*** | | | | | |

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|---|---|---|---|---|---|
| Remain fixed during movement and probe compression | 44% | | | | |
| **Remain fixed and move together with the tendon during tendon movement and probe compression** | **89%** | **Remain fixed and move together with the tendon during tendon movement and probe compression**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** | **Remain fixed and move together with the tendon during tendon movement and probe compression**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** |
| ***Synovial Fluid CPP crystals shape*** | | | | | |
| Aggregates | 61% | | | | |
| Deposits | 44% | | | | |
| Spots | 72% | | | | |
| **Variable size (from punctuate to large deposits)** | **82%** | **Variable size (from punctuate to large deposits)**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** | **Variable size (from punctuate to large deposits)**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** |
| Uniformly rounded in shape with a sharply defined outer profile | 29% | | | | |
| Uniformly rounded in shape with sharply defined margins | 50% | | | | |
| Irregular | 39% | | | | |
| Amorphous-shaped | 59% | | | | |
| Rounded | 38% | | | | |
| ***Synovial Fluid CPP crystals echogenicity*** | | | | | |
| **Hyperechoic/hyperechogenic** | **83%** | Hyperechoic/hyperechogenic | 69% | | |
| **Hyperchoic/hyperechogenic as compared to the synovial fluid** | **78%** | **Hyperchoic/hyperechogenic as compared to the synovial fluid** | **56%** | Hyperchoic/hyperechogenic as compared to the synovial fluid | 47% |
| Could create posterior shadow when they reach large dimensions | 33% | **Hyperechoic/hyperechogenic similar to the bone cortex echogenicity (N)** | **71%** | **Hyperechoic/hyperechogenic similar to the bone cortex echogenicity (N)** | **88%** |
| Not generating acoustic shadow | 61% | **Generally not creating posterior shadowing (N)** | **94%** | **Generally not creating posterior shadowing** | **N.A.*** |
| | | Hyperchoic/hyperechogenic as compared to the bone cortex echogenicity (N) | 27% | | |
| | | | | **Consensus achieved at the 2nt Delphi round* | |

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| ***Synovial Fluid CPP crystals localization*** | | | | | |
| **Are localized within the synovial fluid** | **94%** | **Are localized within the synovial fluid**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** | **Are localized within the synovial fluid**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** |
| ***Synovial Fluid CPP crystals behavior at dynamic scanning*** | | | | | |
| **Are mobile according to joint movement and probe pressure** | **94%** | **Are mobile according to joint movement and probe pressure**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** | **Are mobile according to joint movement and probe pressure**<br>**Consensus achieved at the 1st Delphi round* | **N.A.*** |