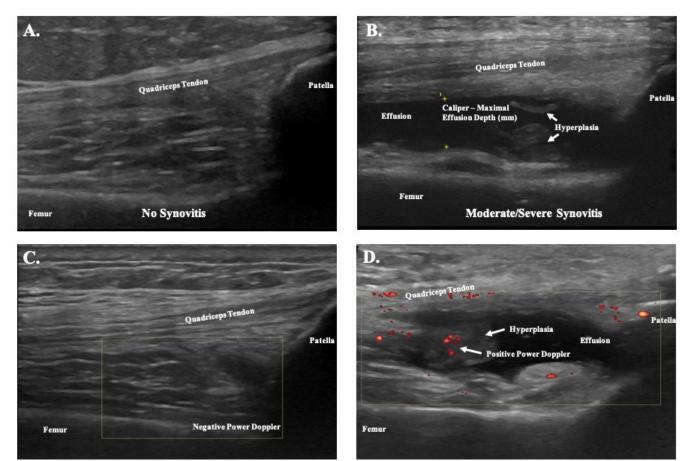
#### SUPPLEMENTARY MATERIAL



**Figure 1. Representative US images demonstrating OMERACT measurements.** The top panels show representative images of **(A)** no synovitis (Grade 0) and **(B)** Moderate/Severe synovitis (Grade 2/3). The bottom panels show **(C)** negative and **(D)** positive Power Doppler signal. Anatomical landmarks for patella, quadriceps tendon, and femur are labelled on each image (white). Example of effusion, hyperplasia, Power Doppler, and caliper measurement of maximal effusion depth are also indicated by labels and arrows (white).

Supplementary Table 1. Multivariate logistic and linear regression model estimates for ICOAP intermittent and constant pain sensitivity analyses (n=410 knees)

<b>V</b> ariable	Odds Ratios	Robust Standard Errors	95% CIs
Model 1: Intermittent pain (No/Yes)			
Synovitis Grade			
None	Reference	Reference	Reference
Mild	0.80	0.22	0.47 to 1.35
Moderate/Severe	1.10	0.34	0.60 to 2.01
Maximal Effusion Depth (mm)	0.99	0.03	0.92 to 1.05
Model 2: Constant pain (No/Yes)			
Synovitis Grade			
None	Reference	Reference	Reference
Mild	1.13	0.30	0.67 to 1.90
Moderate/Severe	1.86*	0.55	1.04 to 3.32
Maximal effusion depth (mm)	1.10*	0.04	1.03 to 1.18
Variable	β coefficient	Robust Standard Error	95% CIs
Model 1: Intermittent pain subscale score			
Synovitis Grade			
None	Reference	Reference	Reference
Mild	-2.82	3.27	-9.26 to 3.63
Moderate/Severe	3.99	3.70	-3.30 to 11.28
Maximal effusion depth (mm)	0.51	0.44	-0.36 to 1.38
Model 2: Constant pain subscale score			
Synovitis Grade			
None	Reference	Reference	Reference
Mild	2.59	3.41	-4.11 to 9.29
Moderate/Severe	8.19*	3.92	0.48 to 15.89
Moderate/Severe	0.19"	3.74	0.70 (0 13.0)

Adjusting for age, sex, BMI, and radiographic stage (early/late)

<sup>\*</sup>Indicates significance at the 5% level

Supplementary Table 2. Multivariate logistic regression model estimates for ICOAP intermittent and constant pain (n=453 knees)

Variable	Odds Ratios	Robust Standard Errors	95% CIs
Model 1: Intermittent pain (No/Yes)			
Power Doppler			
Absent	Reference	Reference	Reference
Present	1.51	0.40	0.89 to 2.55
Hyperplasia			
Absent	Reference	Reference	Reference
Present	0.94	0.23	0.58 to 1.53
Effusion			
Absent	Reference	Reference	Reference
Present	1.01	0.25	0.62 to 1.63
Model 2: Constant pain (No/Yes)			
Power Doppler			
Absent	Reference	Reference	Reference
Present	0.93	0.23	0.58 to 1.50
Hyperplasia			
Absent	Reference	Reference	Reference
Present	1.25	0.30	0.78 to 1.99
Effusion			
Absent	Reference	Reference	Reference
Present	1.13	0.26	0.71 to 1.77

Adjusting for age, sex, BMI, and radiographic stage (early/late)

<sup>\*</sup>Indicates significance at the 5% level

# Supplementary Table 3. Multivariate linear regression model estimates for ICOAP intermittent and constant pain scores (n=453 knees)

Variable	β coefficient	Robust Standard Error	95% CIs
<b>Model 1: Intermittent pain subscale score</b>			
Power Doppler			
Absent	Reference	Reference	Reference
Present	3.83	3.01	-2.09 to 9.75
Hyperplasia			
Absent	Reference	Reference	Reference
Present	2.00	2.95	-3.79 to 7.78
Effusion			
Absent	Reference	Reference	Reference
Present	0.20	2.98	-5.67 to 6.06
Model 2: Constant pain subscale score			
Power Doppler			
Absent	Reference	Reference	Reference
Present	-0.56	3.26	-6.96 to 5.84
Hyperplasia			
Absent	Reference	Reference	Reference
Present	4.58	3.07	-1.46 to 10.62
Effusion			
Absent	Reference	Reference	Reference
Present	2.04	3.09	-4.04 to 8.12

Adjusting for age, sex, BMI, and radiographic stage (early/late)

<sup>\*</sup>Indicates significance at the 5% level

Supplementary Table 4. Multivariate logistic model estimates for secondary analyses (early-/late-stage OA)

Variable	Odds Ratio	Robust Standard Error	95% CIs
Model 1: Intermittent pain (No/Yes)			
Power Doppler			
Absent	Reference	Reference	Reference
Present	1.24	0.49	0.58 to 2.69
Hyperplasia			
Absent	Reference	Reference	Reference
Present	0.96	0.33	0.52 to 1.80
Effusion			
Absent	Reference	Reference	Reference
Present	1.15	0.38	0.60 to 2.18
Model 2: Constant pain (No/Yes)			
Power Doppler			
Absent	Reference	Reference	Reference
Present	1.05	0.41	0.49 to 2.25
Hyperplasia			
Absent	Reference	Reference	Reference
Present	1.81	0.61	0.93 to 3.52
Effusion			
Absent	Reference	Reference	Reference
Present	1.81	0.64	0.91 to 3.61
Late-stage OA (KL ≥ 3) (n=239 knees)			
Variable	Odds Ratio	Robust Standard Error	95% CIs
Model 3: Intermittent pain (No/Yes)			
Power Doppler			
Absent	Reference	Reference	Reference
Present	1.55	0.58	0.75 to 3.23
Hyperplasia			
Absent	Reference	Reference	Reference
Present	0.80	0.31	0.38 to 1.72
Effusion			
Absent	Reference	Reference	Reference
Present	0.73	0.27	0.36 to 1.52
Model 4: Constant pain (No/Yes)			
Power Doppler			
rower Doppier	D . C	Reference	Reference
Absent	Reference		
	0.91	0.29	0.49 to 1.68
Absent Present		0.29	0.49 to 1.68
Absent Present		0.29 Reference	0.49 to 1.68 Reference
Absent Present  Hyperplasia	0.91		0.49 to 1.68  Reference 0.44 to 1.73
Absent Present  Hyperplasia Absent	0.91	Reference	Reference
Absent Present  Hyperplasia Absent Present	0.91	Reference	Reference

Supplementary Table 5. Multivariate linear model estimates for secondary analyses (early-/late-stage OA)

Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score         Present         8.4 4.32         -7.68 to 9.35           Present         0.84 4.32         -7.68 to 9.35           Hyperplasia	Early-stage OA (KL ≤ 2) (n=214 knees)				
Power Doppler         Absent         Reference         Reference         Reference           Present         0.84         4.32         -7.68 to 9.35           Hyperplasia           Absent         Reference         Reference         Reference           Present         1.09         3.68         -6.17 to 8.35           Effusion           Absent         Reference         Reference         Reference           Present         -0.18         3.90         -7.87 to 7.51           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         0.66         4.52         -8.24 to 9.56           Hyperplasia           Absent         Reference         Reference         Reference           Present         6.60         3.60         -9.49 to 13.69           Effusion           Absent present         β coefficient         Reference         Reference           Present         β coefficient         Robust Standard Erro         95% CIs           Model 1: Intermittent pain subscale score <th col<="" th=""><th>Variable</th><th>β coefficient</th><th>Robust Standard Error</th><th>95% CIs</th></th>	<th>Variable</th> <th>β coefficient</th> <th>Robust Standard Error</th> <th>95% CIs</th>	Variable	β coefficient	Robust Standard Error	95% CIs
Absent   Reference   Reference   Present   0.84   4.32   -7.68 to 9.35	Model 1: Intermittent pain subscale score				
Present         0.84         4.32         -7.68 to 9.35           Hyperplasia           Absent         Reference         <	Power Doppler				
Hyperplasia         Reference	Absent	Reference	Reference	Reference	
Absent         Reference         Reference <th< td=""><td>Present</td><td>0.84</td><td>4.32</td><td>-7.68 to 9.35</td></th<>	Present	0.84	4.32	-7.68 to 9.35	
Present         1.09         3.68         -6.17 to 8.35           Effection           Absent         Reference         Reference         Reference           Present         -0.18         3.90         -7.87 to 7.51           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         0.66         4.52         8.24 to 9.56           Hyperplasia           Absent         Reference         Reference         Reference           Present         6.60         3.60         -0.49 to 13.69           Effusion         Reference         Reference         Reference           Present         5.53         3.65         1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)         Reference         Reference         Reference           Present         \$ coefficient         Robust Standard Erro         95% CIs           Model 1: Intermittent pain subscale score         Reference         Reference           Present         \$ .00         4.27         -3.42 to 13.41           Hyperplasia         Reference         Reference <t< td=""><td>Hyperplasia</td><td></td><td></td><td></td></t<>	Hyperplasia				
Effusion         Reference         Reference <t< td=""><td>Absent</td><td>Reference</td><td>Reference</td><td>Reference</td></t<>	Absent	Reference	Reference	Reference	
Absent         Reference         Reference         Reference         Reference           Present         -0.18         3.90         -7.87 to 7.51           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         0.66         4.52         -8.24 to 9.56           Hyperplasia           Absent         Reference         Reference         Reference           Present         6.60         3.60         -0.49 to 13.69           Effusion           Absent         Reference         Reference         Reference           Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         8.20 to 13.41         -7.52 to 11.60           Effusion           Absent         Reference         Reference <td< td=""><td>Present</td><td>1.09</td><td>3.68</td><td>-6.17 to 8.35</td></td<>	Present	1.09	3.68	-6.17 to 8.35	
Present         -0.18         3.90         -7.87 to 7.51           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         0.66         4.52         -8.24 to 9.56           Hyperplasia           Absent         Reference         Reference         Reference           Present         6.04         3.60         -0.49 to 13.69           Effusion           Absent         Reference         Reference         Reference           Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63	Effusion				
Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         0.66         4.52         -8.24 to 9.56           Hyperplasia           Absent         Reference         Reference         Reference           Present         6.60         3.60         -0.49 to 13.69           Effusion           Absent         Reference         Reference         Reference           Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         8.60         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         8.61         -7.52 to 11.60           Effusion           Absent         Reference         Re	Absent	Reference	Reference	Reference	
Power Doppler           Absent         Reference         Reference         Reference           Present         0.66         4.52         -8.24 to 9.56           Hyperplasia           Absent         Reference         Reference         Reference           Present         6.60         3.60         -0.49 to 13.69           Effusion           Absent         Reference         Reference         Reference           Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         B coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Present         Reference         Reference         Reference           Present         8.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39	Present	-0.18	3.90	-7.87 to 7.51	
Absent         Reference         Reference <th< td=""><td>Model 2: Constant pain subscale score</td><td></td><td></td><td></td></th<>	Model 2: Constant pain subscale score				
Present         0.66         4.52         -8.24 to 9.56           Hyperplasia           Absent         Reference         Reference         Reference           Present         6.60         3.60         -0.49 to 13.69           Effusion           Absent         Reference         Reference         Reference           Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference	Power Doppler				
Hyperplasia           Absent         Reference         Reference         Reference           Present         6.60         3.60         -0.49 to 13.69           Effusion         Reference         Reference           Absent         Reference         Reference           Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL≥3) (n=239 knees)           Variable         B coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score:           Power Doppler           Absent         Reference	Absent	Reference	Reference	Reference	
Absent Present         Reference 6.60         Reference 3.60         Reference -0.49 to 13.69           Effusion         Reference Present         Reference Reference Reference Reference Present         Reference S.53         3.65         -1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         β coefficient         Robust Standard Error Reference Pose CIS         95% CIS           Model 1: Intermittent pain subscale score           Power Doppler Absent Reference Reference Reference Reference Present         Reference Reference Reference Reference Reference Present         Reference Reference Reference Reference Present         Reference Reference Reference Reference Present         Reference Present Reference Reference Reference Present         Reference Present Reference Reference Reference Present         Reference Reference Reference Present         Reference Reference Reference Present         Reference Reference Reference Reference Present         Reference Reference Reference Reference Present         Reference Referenc	Present	0.66	4.52	-8.24 to 9.56	
Fresent         6.60         3.60         -0.49 to 13.69           Effusion           Absent         Reference         Reference           Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80 <t< td=""><td>Hyperplasia</td><td></td><td></td><td></td></t<>	Hyperplasia				
Effusion         Reference         Refusion         South         South         South         South         South         Reference	Absent	Reference	Reference	Reference	
Absent Present         Reference 5.53         Reference 3.65 to 1.67 to 12.72           Late-stage OA (KL ≥ 3) (n=239 knees)           Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68	Present	6.60	3.60	-0.49 to 13.69	
Present         5.53         3.65         -1.67 to 12.72           Late-stage OA (KL≥3) (n=239 knees)           Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41 </td <td>Effusion</td> <td></td> <td></td> <td></td>	Effusion				
Late-stage OA (KL≥3) (n=239 knees)         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score         Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Absent	Reference	Reference	Reference	
Variable         β coefficient         Robust Standard Error         95% CIs           Model 1: Intermittent pain subscale score         Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score         Reference         Reference         Reference           Power Doppler         Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia         Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion         Reference         Reference         Reference	Present	5.53	3.65	-1.67 to 12.72	
Model 1: Intermittent pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion         Reference         Reference         Reference	Late-stage OA (KL ≥ 3) (n=239 knees)				
Power Doppler           Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Variable	β coefficient	Robust Standard Error	95% CIs	
Absent         Reference         Reference         Reference           Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	<b>Model 1: Intermittent pain subscale score</b>				
Present         5.00         4.27         -3.42 to 13.41           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Power Doppler				
Hyperplasia           Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Absent	Reference	Reference	Reference	
Absent         Reference         Reference         Reference           Present         2.04         4.85         -7.52 to 11.60           Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Present	5.00	4.27	-3.42 to 13.41	
Present         2.04         4.85         -7.52 to 11.60           Effusion         Reference           Absent         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Hyperplasia				
Effusion           Absent         Reference         Reference         Reference           Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion         Reference         Reference         Reference	Absent	Reference	Reference	Reference	
Absent Present         Reference -0.39         Reference 4.69         Reference -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent Absent Present         Reference Reference Reference Present         Reference Reference Reference Reference Present         Reference Reference Reference Reference Reference Present         Reference Reference Reference Reference Reference Reference Present         Reference	Present	2.04	4.85	-7.52 to 11.60	
Present         -0.39         4.69         -9.63 to 8.84           Model 2: Constant pain subscale score           Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Effusion				
Model 2: Constant pain subscale scorePower DopplerAbsentReferenceReferenceReferencePresent-0.554.74-9.89 to 8.80HyperplasiaAbsentReferenceReferenceReferencePresent2.985.41-7.68 to 13.64EffusionAbsentReferenceReferenceReference	Absent	Reference	Reference	Reference	
Power Doppler           Absent         Reference         Reference         Reference           Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia           Absent         Reference         Reference         Reference           Present         2.98         5.41         -7.68 to 13.64           Effusion           Absent         Reference         Reference         Reference	Present	-0.39	4.69	-9.63 to 8.84	
Absent Reference Reference Reference Present -0.55 4.74 -9.89 to 8.80  Hyperplasia Absent Reference Reference Reference Present 2.98 5.41 -7.68 to 13.64  Effusion Absent Reference Reference Reference Reference	Model 2: Constant pain subscale score				
Present         -0.55         4.74         -9.89 to 8.80           Hyperplasia         Absent         Reference         Reference         Reference         2.98         5.41         -7.68 to 13.64            Effusion           Absent         Reference         Reference	Power Doppler				
HyperplasiaAbsentReferenceReferenceReferencePresent2.985.41-7.68 to 13.64EffusionAbsentReferenceReferenceReference	Absent	Reference	Reference	Reference	
Absent Reference Reference Reference Present 2.98 5.41 -7.68 to 13.64  Effusion Absent Reference Reference Reference	Present	-0.55	4.74	-9.89 to 8.80	
Present 2.98 5.41 -7.68 to 13.64  Effusion Absent Reference Reference	Hyperplasia				
Effusion Absent Reference Reference Reference	Absent	Reference	Reference	Reference	
Absent Reference Reference	Present	2.98	5.41	-7.68 to 13.64	
	Effusion				
Present -0.78 5.28 -11.19 to 9.63	Absent		Reference	Reference	
	Present	-0.78	5.28	-11.19 to 9.63	

Adjusting for age, sex, and BMI

<sup>\*</sup>Indicates significance at the 5% level

## Supplementary Table 6. Multivariate linear regression model estimates for KOOS pain and US measures of inflammation

Variable	β coefficient	<b>Robust Standard Errors</b>	95% CIs
Model 1: KOOS Pain (n=453 knees)			
Synovitis Grade			
None	Reference	Reference	Reference
Mild	-3.48	2.52	-8.42 to 1.46
Moderate/Severe	-10.54*	2.63	-15.70 to -5.38
Maximal effusion depth (mm)	-1.30*	0.30	-1.89 to -0.72
Model 2: KOOS Pain - Early-stage OA	(KL < 2) (n=214 kg)	naas)	

### Model 2: KOOS Pain - Early-stage OA (KL ≤ 2) (n=214 knees)

Synovitis Grade			
None	Reference	Reference	Reference
Mild	-2.98	3.37	-9.62 to 3.67
Moderate/Severe	-12.70*	3.92	-20.43 to -4.97
Maximal effusion depth (mm)	-1.44*	0.51	-2.44 to -0.44

### Model 3: KOOS Pain - Late-stage OA (KL $\geq$ 3) (n=239 knees)

Synovitis Grade			
None	Reference	Reference	Reference
Mild	-4.00	3.84	-11.56 to 3.56
Moderate/Severe	-9.12*	3.71	-16.43 to -1.81
Maximal effusion depth (mm)	-1.21*	0.36	-1.92 to -0.50

Model 1: Adjusting for age, sex, BMI, and radiographic stage (early/late)

Model 2 and 3: Adjusting for age, sex, and BMI

CI, confidence interval; KL, Kellgren-Lawrence grade; KOOS, Knee Injury and Osteoarthritis Outcome Score; mm, millimetre; n, number; OA, osteoarthritis

Supplementary Table 7. Multivariate linear regression model estimates for KOOS pain (n=453 knees)

Variable	β coefficient	Robust Standard Errors	95% CIs
Model 1: KOOS Pain			
Power Doppler			
Absent	Reference	Reference	Reference
Present	-2.82	2.29	-7.32 to 1.68
Hyperplasia			
Absent	Reference	Reference	Reference
Present	-6.07*	2.33	-10.65 to -1.49
Effusion			
Absent	Reference	Reference	Reference
Present	-4.08	2.30	-8.59 to 0.44

Adjusting for age, sex, BMI, and radiographic stage (early/late)

<sup>\*</sup>Indicates significance at the 5% level

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