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Supplementary Material

Supplementary Table 1: EMBASE search terms 1974 to March 2016

1	Exp *RHEUMATOID ARTHRITIS/	19	Exp*IMMUNOHISTOCHEMISTRY
2	(Rheumatoid AND arthritis).ti,ab	20	Pathol*. ti,ab
3	RA.ti,ab	21	Histo*.ti,ab
4	Rheumatoid.ti,ab	22	Immuno*.ti,ab
5	“inflammatory arthritis”.ti,ab	23	17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23
6	1 OR 2 OR 3 OR 4 OR 5	24	Exp *JOINT SURGERY/
7	Exp *NUCLEAR MAGNETIC RESONANCE IMAGING/	25	Exp *ARTHROSCOPY
8	(magnetic AND resonance AND imaging).ti,ab	26	Exp*BIOPSY/
9	MRI.ti,ab	27	Exp*JOINT/
10	DCE.ti, ab	28	Surgery.ti,ab
11	(magnetic AND resonance AND imag*).ti,ab	29	Arthroscopy.ti,ab
12	7 OR 8 OR 9 OR 10 OR 11	30	Joint.ti,ab
13	6 AND 12	31	Biopsy.ti,ab
14	Exp *SYNOVITIS/	32	24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30
15	Synovi*, ti,ab	33	16 AND 23 AND 32
16	14 OR 15	34	13 AND 33
17	Exp *PATHOLOGY/	34	[Limit to: Human and English Language]
18	Exp *HISTOPATHOLOGY/		

Supplementary Table 2: Cochrane Search Terms

1	MeSH descriptor: [Arthritis, Rheumatoid] explode all trees	10	MeSH descriptor: [Synovitis] explode all trees
2	Rheumatoid arthritis	11	Synovi*
3	RA	12	10 OR 11
4	1 OR 2 OR 3 OR 4	13	MeSH descriptor: [Pathology] explode all trees
5	MeSH descriptor: [Magnetic Resonance Imaging] explode all trees	14	MeSH descriptor: [Histology] explode all trees
6	MRI	15	MeSH descriptor: [Immunohistochemistry] explode all trees
7	MR	16	pathol* or immuno* or histo* pathol* or immuno* or histo*
8	5 OR 6 OR 7 OR 8	17	13 OR 14 OR 15 OR 16 OR 17
9	4 AND 8	18	9 AND 17

Supplementary Table 3: Quality Scoring Tool

Item	Criterion	CH	CS	RCT
Study population				
1	Selection of patients from a uniform disease stage (e.g. early, established, late)			

2	Uniform patient population i.e.concomittant DMARDs/biologics controlled			
3	Description of patient baseline demographics (disease duration, sero positivity, erosive)			
MRI assessment				
4	MRI outcome assessed using standardized method i.e. OMERACT-RAMRIS or DCE MRI			
5	MRI performed on same joint from which synovium sampled			
	MRI >0.5T			
Histopathological assessment of synovial tissue				
6	Number of biopsies sampled >6 for large and >4 small joints			
7	Microscopic examination of synovial tissue			
8	Immunohistochemical analysis of synovial tissue			
9	Gene expression analysis of synovial tissue			
Study design				
10	Prospective study design used			
11	Time between biopsy and MRI <7 days			
12	Stable doses of steroids/DMARDs between MRI and biopsy (if not stated automatically score 0)			
13	Randomization defined			
14	Blinding of participants			
15	Blinding of clinicians			
16	Blinding of assessors			
17	Follow up of >85% of participants			
Analysis and data presentation				
18	Appropriate analysis techniques used (statistical or comparative techniques)			
	Maximum Score	13	12	17

Supplementary Table 4: Quality Scoring Results

Study	Study design	Quality scoring criteria																		total	% (Quality score)
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Konig et al [1]	Cross sectional	0	0	0	0	1	1	0	1	0	0		0	0					0	3	25 (low)
Tamai et al [2]	Cross sectional	0	0	1	1	1	1	0	1	0	0		0	1					1	7	58 (high)
Gaffney et al [3]	Cross sectional	0	0	1	1	1	0	0	1	0	0		0	0					1	5	42 (low)
Gaffney et al [4]	Cross sectional	0	0	0	1	1	0	0	1	1	0		1	1					1	7	58 (high)
Ostergaard et al [5]	Cross sectional	0	0	1	0	1	1	0	1	0	0		0	0					1	5	42 (low)
Ostergaard et al [6]	Cross sectional	0	0	1	1	1	1	0	1	0	0		0	0					1	6	50 (low)
Ostendorf et al [7]	Cross sectional	0	0	1	0	1	1	1	1	0	0		1	1					1	8	67 (high)
Takase et al [8]	Cross sectional	0	0	1	1	1	1	0	1	1	0		1	1					1	9	75 (high)
Axelsson et al [9]	Cross sectional	0	0	0	1	1	1	0	1	0	0		0	0					1	5	42 (low)
Vordenbäumen et al [10]	Cross sectional	0	0	1	1	1	1	1	1	1	0		1	0					1	9	75 (high)
Paramarta et al [11]	Cross sectional	1	1	1	0	1	0	0	1	1	0		1	1					1	9	75 (high)
Vordenbäumen et al [12]	Cross sectional	0	0	0	1	1	1	1	1	1	0		1	0					1	8	67 (high)
Mean (cross sectional)																					56.3

Veale et al [13]	Randomised controlled Trial	0	0	1	1	1	1	0	1	1	0		1	1	0	0	1	1	1	1	12	71 (high)
Buch et al [14]	Cohort	1	1	1	1	1	1	0	1	1	1	1	1	1						1	12	93 (high)
Kirkham et al[15]	Cohort	0	0	1	1	0	1	1	1	1	1	1						1	9	82 (high)		
Anandarajah [16]	Cohort	0	0	1	0	1	1	1	1	0	0	0	0	0						1	6	46 (low)
Kennedy et al [17]	Cohort	0	0	1	0	1	1	0	1	1	0	1	1	0						1	8	62 (low)
Maijer et al [18]	Cohort	1	1	1	1	1	1	0	0	0	0	1	0	0						1	8	57 (low)
Mean (cohort)																					68	

Supplementary table 5: Excluded studies with reasons

Study	Reason for Exclusion
Andersen et al [19]	Synovial explants in vitro used for analysis
Andersen et al [20]	Synovial explants in vitro used for analysis
Stoeniou et al [21]	Abstract only (conference presentation)
Mo et al[22]	Abstract only (conference presentation)
Harty et al [23]	Abstract only (conference presentation)
Anandarajah et al [24]	Abstract only (conference presentation)
Agarwal et al[25]	Abstract only (conference presentation)
Dalbeth et al [26]	No synovial histology
Jimenez-Boj et al [27]	No synovial histology

Tanaka et al [28]	Not RA – monoarthritis patients
Volck et al [29]	Not relevant to task (no comparative evaluation of MRI/histopathological features)
Fujii et al [30]	Not in English language
Stiskal et al [31]	No synovial histology
Schweitzer et al [32]	Not RA
Andersen et al [33]	Abstract only (conference presentation)
De Hair, et al [34]	Not RA at the time of enrollment
Konig [35]	Not in English language
Anandrajah et al [36]	Not RA

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