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Appendix:

Appendix 1.

Literature Search Strategies:

Ovid Medline
832 results on 05/18/20

1. 18511 results
   Exp meniscus/ OR Meniscus.mp. OR meniscal.mp. OR Menisci.mp. OR (Semilunar adj1 Cartilage*).mp. OR knee cartilage.mp. OR knee joint cartilage.mp. OR knee joint disk.mp.
2. 329586 results
   Repair.mp.
3. 6159686 results
   Exp follow-up studies/ OR Exp treatment outcome/ OR Exp retrospective studies/ OR Exp time factors/ OR Exp patient reported outcome measures/ OR Exp patient outcome assessment/ OR ((treatment OR therapy OR clinical OR patient*) adj4 (outcome* OR effective* OR efficacy)).mp. OR (fail* adj3 (rate* OR treatment OR therapy OR repair*)).mp. OR (outcome* adj2 (evaluat* OR assess*)).mp. OR retrospective*.mp. OR cohort*.mp. OR follow up.mp. OR followup.mp. OR longitudinal.mp. OR (outcome* adj3 ("long term" OR "longterm" OR "self reported" OR "patient reported")).mp. OR proms.mp. OR prom.mp. OR score.mp. OR scale.mp. Or index.mp. OR koos.mp. or questionnaire.mp. OR Lysholm.mp. OR tegner.mp. OR reoperat*.mp. OR womac.mp.
4. 1524 results
   1 AND 2 AND 3
5. 1387

   4 NOT (Exp Animals/ NOT (Exp Animals/ AND Exp Humans/))
6. 832 results

   limit 5 to (english language and yr="2010 -Current")

Embase
1184 results on on 05/18/20

1. 'meniscal repair'/exp OR (repair near/23 (Meniscus OR meniscal OR Menisci OR ‘Semilunar Cartilage’ OR ‘knee cartilage’ OR ‘knee joint cartilage’ OR ‘knee joint

disk')):ti,ab,kw,de OR (repair:ti AND (meniscal:ti,ab,kw,de OR meniscus:ti,ab,kw,de OR menisci:ti,ab,kw,de)) = 3281

2. 'treatment outcome'/exp OR 'treatment response'/exp OR 'musculoskeletal disease assessment'/exp OR 'follow up'/exp OR 'retrospective study'/exp OR 'time factor'/exp OR 'patient-reported outcome'/exp OR ((treatment OR therapy OR clinical OR patient*) near/4 (outcome* OR effective* OR efficacy)):ti,ab,kw,de OR (fail* near/3 (rate* OR treatment OR therapy OR repair*)):ti,ab,kw,de OR (outcome* near/2 (evaluat* OR assess*)):ti,ab,kw,de OR retrospective*:ti,ab,kw,de OR cohort*:ti,ab,kw,de OR 'follow up':ti,ab,kw,de OR followup:ti,ab,kw,de OR longitudinal:ti,ab,kw,de OR (outcome* near/3 ('long term' OR 'longterm' OR 'self reported' OR 'patient reported')):ti,ab,kw,de OR proms:ti,ab,kw,de OR prom:ti,ab,kw,de OR score:ti,ab,kw,de OR scale:ti,ab,kw,de Or index:ti,ab,kw,de OR koos:ti,ab,kw,de or questionnaire:ti,ab,kw,de OR Lysholm:ti,ab,kw,de OR tegner:ti,ab,kw,de OR reoperat*:ti,ab,kw,de OR womac:ti,ab,kw,de = 7,951,272
3. #1 AND #2 = 1854
4. #1 AND #2 AND [2010-2020]/py = 1308
5. #1 AND #2 AND [2010-2020]/py AND [english]/lim = 1263
6. #5 NOT ('animal'/exp NOT ('animal'/exp AND 'human'/exp)) = 1184

Scopus
1075 results on 5/18/20

1. ((TITLE-ABS-KEY (repair W/23 (meniscus OR meniscal OR menisci OR "Semilunar Cartilage" OR "knee cartilage" OR "knee joint cartilage" OR "knee joint disk")))) OR (((TITLE-ABS-KEY (meniscal OR meniscus OR menisci))) AND ((TITLE (repair)))) = 3236
2. (TITLE-ABS-KEY ((treatment OR therapy OR clinical OR patient*) w/4 (outcome* OR effective* OR efficacy)) OR (fail* w/3 (rate* OR treatment OR therapy OR repair*))) OR (TITLE-ABS-KEY (outcome* w/2 (evaluat* OR assess*))) OR (TITLE-ABS-KEY (outcome* w/3 ("long term" OR "longterm" OR "self reported" OR "patient reported"))) OR (TITLE-ABS-KEY (retrospective* OR cohort* OR "follow up" OR followup OR longitudinal OR proms OR prom OR score OR scale Or index OR koos or questionnaire OR Lysholm OR tegner OR reoperat* OR womac)) = 10,699,423
3. #1 And #2 = 1899
4. #3 AND NOT ((KEY (animals))) AND NOT ((KEY (animals)) AND (KEY (humans))) = 1690
5. #4 AND (LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (

PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010)) = 1116

6. #5 AND (LIMIT-TO (LANGUAGE , "English")) = 1075

Cochrane Central
87 results on 05/18/20

1. (repair near/15 (Meniscus OR meniscal OR Menisci)):ti,ab,kw OR (repair:ti AND (meniscal:ti,ab,kw OR meniscus:ti,ab,kw OR menisci:ti,ab,kw))
2. ((treatment OR therapy OR clinical OR patient*) near/4 (outcome* OR effective* OR efficacy)):ti,ab,kw OR (fail* near/3 (rate* OR treatment OR therapy OR repair*)):ti,ab,kw OR (outcome* near/2 (evaluat* OR assess*)):ti,ab,kw OR retrospective*:ti,ab,kw OR cohort*:ti,ab,kw OR 'follow up':ti,ab,kw OR followup:ti,ab,kw OR (outcome* near/3 ('long term' OR 'longterm' OR 'self reported' OR 'patient reported')):ti,ab,kw OR proms:ti,ab,kw OR prom:ti,ab,kw OR score:ti,ab,kw OR scale:ti,ab,kw Or index:ti,ab,kw OR koos:ti,ab,kw or questionnaire:ti,ab,kw OR Lysholm:ti,ab,kw OR tegner:ti,ab,kw OR reoperat*:ti,ab,kw OR womac:ti,ab,kw
3. 1 AND 2

Supplemental table 1: Devices used for all-inside repair.

Category	Paper	Year	Device(s) used
First Generation	Hagmeijer[28]	2019	"Bioabsorbable arrows," brand N.S.
	Lee[10]	2005	Meniscus Arrow (Bionx, Blue Bell, Pa)
	Solheim[38]	2016	RapidLoc implant (Depuy-Mitek, Rayham, MA, USA)
	Siebold[12]	2007	Meniscus Arrow (Bionx Implants, Blue Bell, PA)
	Steenbrugge[24]	2004	Biofix Arrows (Bioscience, Tampere, Finland)
	Tagliero[35]	2018	"Arrows/Darts"
Modern	Alvarez-Diaz[25]	2016	Fast-Fix system (Smith & Nephew, Andover, MA, USA)
	Bogunovic[26]	2014	Fast-Fix system (Smith & Nephew, Andover, MA, USA)
	Pujol[31,32]	2013, 2015	Fast-Fix system (Smith & Nephew, Andover, MA, USA)
	Westermann[36]	2014	"Second generation," brand N.S.
	Zimmerer[37]	2018	Fast-Fix system (Smith & Nephew, Andover, MA, USA)

N.S. = not specified

Supplemental table 2: Complications reported in included studies. If management of the complication was reported then it was also included in the table.

Author	Year	Repair Technique	Number of Patients, n	Complications, n (%) * = requiring reoperation
Siebold[12]	2007	First Gen (All inside)	95	4 (4): 2 medial femoral condyle cartilage damage, 1 device migration*, 1 broken implant*
Tagliero[35]	2018	First Gen (All inside)	47	4 (9): 2 infections*, 1 hemarthrosis, 1 nonhealing wound *
Steenbrugge[24]	2004	First Gen (All inside) / Inside out	45	6 (13): 2 superficial infections, 1 implant irritation*, 1 mild implant irritation spontaneously resolving, 1 saphenous neuropraxia, 1 hemarthrosis
Logan[17]	2009	Inside out	42	0 (0): No complications
Noyes[20]	2011	Inside out	27	1 (4): 1 arthrofibrosis in the setting of ACLR
Pujol[31]	2013	Modern (All inside)	27	3 (11): 2 asymptomatic cysts around implant device, 1 meniscal cyst
Pujol[32]	2015	Modern (All inside)	31	0 (0): No complications
Alvarez-Diaz[25]	2016	Modern (All inside)	29	0 (0): No complications
Sommerlath[23]	1991	Open	25	1 (4): 1 superficial infection
Dehaven[14]	1995	Open	30	2 (7): 1 deep vein thrombosis, 1 arthrofibrosis in the setting of ACLR
Muellner[19]	1999	Open	24	1 (4): 1 arthrofibrosis
Majewski[18]	2006	Outside in	88	3 (3): 2 early postoperative infections, 1 skin nerve lesion
*Westermann [36]	2014	Outside in	235	12 (5) 11 arthrofibrosis in setting of ACLR*, 1 infection*

If study not included in table, then information on complications were not reported.

* Data was unavailable to exclude overlapping patients (n=30) from Bugunovic et al.[26] in this portion of the analysis.

Supplemental table 3: Zone of tear of included studies. If numeric descriptions of the zones were reported then they were also included in the table.

Author	Year	Meniscal Repairs, n	Zone	
			Zone, n (%)	**Failure, n (%)**
Studies Including Failure Rate by Meniscus Vascular Zone				
Johnson[16]	1999	38	Rim Width: 0-1mm: 10 (26) 2mm: 19 (50) ≥3mm: 9 (24)	Rim Width: 0-1mm: 2 (20) 2mm: 4 (21) ≥3mm: 5 (56)
Steenbrugge[24]	2004	45	RR (≤ 3mm): 15 (33) RW (3-5 mm): 28 (62) WW (>5 mm): 2 (44)	RR: 0 (0) RW: 3 (11.1) WW: 0 (0)
			Zone, n (%)	
Studies Not Including Failure Rates by Meniscus Vascular Zone				
Eggli[15]	1995	52	Within a 1 to 5 mm distance from the peripheral rim	
Rockborn[21]	2000	32	Peripheral vascular third	
Lee[10]	2005	28	RR or RW	
Siebold[12]	2007	95	RR or RW	
Noyes[20]	2011	29	RW (< 4 mm from the peripheral rim)	
Pujol[31]	2013	27	RR	
Bogunovic[26]	2014	75	RR or RW	
*Westermann[36]	2014	235	Peripheral third: 160 (68), Middle third: 22 (9), Middle + Peripheral third: 45 (19), Central third: 6 (3), Central + Middle: 10 (4), Central + Middle + Peripheral third: 1 (0)	
Pujol[32]	2015	31	RR or RW	
Rochcongar[33] - 10 yr	2015	39	RR: 23 (59), RW: 16 (41)	
Rochcongar[33] - 5 yr	2015	76	RR: 47 (62), RW: 29 (38)	
Solheim[38]	2016	82	RR or RW	
Perkins[30]	2018	157	RR or RW	
Tagliero[35]	2018	47	Within 6 mm of meniscosynovial junction	
Zimmerer[37]	2018	63	RR or RW	
Hagmeijer[28]	2019	36	Rim Width; 0mm: 1 (3), 1mm: 2 (6), 2mm: 9 (25), 3mm: 7 (19), 4mm: 9 (25), 5mm: 4 (11), 6mm: 1 (3)	

RR = Red Red, RW = Red White, WW = White White, mm = millimeter

If study not included in table, then information on zone of tear was not reported.

* Data was unavailable to exclude overlapping patients (n=30) from Bugunovic et al.[26] in this portion of the analysis.

Supplemental table 4: Tear morphology of included studies.

Author	Year	Meniscal Repairs, n	Tear Morphology	
			Tear Type, n (%)	**Failure Rate %**
Studies Including Failure Rates by Tear Type				
Tagliero[35]	2018	47	Simple: 28 (60) Bucket-handle: 9 (19) Complex: 10 (21)	Simple: 25% Bucket-handle: 33% Complex: 30%
Hagmeijer[28]	2019	33	Simple: 11 (33) Bucket-handle: 17 (52) Complex: 5 (15)	Simple: 18.2% Bucket-handle: 47% Complex: 80%
			Tear Type, n (%)	
Studies Not Including Failure Rates by Tear Type				
Sommerlath[22]	1989	32	Longitudinal	
Sommerlath[23]	1991	25	Longitudinal: 25 (100), Bucket-handle: 3 (12)	
Eggli[15]	1995	52	Vertical or Vertical oblique	
Johnson[16]	1999	38	Longitudinal: 33 (87), Double longitudinal: 2 (5), Flap: 3 (8)	
Rockborn[21]	2000	31	Longitudinal: 31 (100), Bucket-handle: 5 (16)	
Lee[10]	2005	28	Vertical or Longitudinal	
Majewski[18]	2006	88	Vertical or Longitudinal	
Logan[17]	2009	45	Longitudinal: 37 (82), Partial: 3 (*7*), Complex: 5 (11)	
Melton[29]	2011	24	Bucket-handle	
Noyes[20]	2011	29	Longitudinal	
Pujol[31]	2013	27	Vertical or Longitudinal	
Bogunovic[26]	2014	75	Longitudinal or Bucket-handle	
*Westermann[36]	2014	235	Longitudinal: 204 (87), Bucket-handle: 24 (10), Oblique: 9 (4), Complex: 3 (1), Horizontal: 2 (1), Radial: 2 (1)	
Pujol[32]	2015	31	Vertical	
Rochcongar[33]	2015	115	Vertical: 74 (64), Unknown: 41 (36)	
Alvarez-Diaz[25]	2016	29	Longitudinal	
Solheim[38]	2016	82	Vertical, Longitudinal or Bucket-handle	
Perkins[30]	2018	157	Vertical, Longitudinal or Bucket-handle	

If study not included in table, then information on tear morphology was not reported.

* Data was unavailable to exclude overlapping patients (n=30) from Bugunovic et al.[26] in this portion of the analysis.