



Supplementary Material

Table a: Search strategies.

MEDLINE ALL

via Ovid <http://ovidsp.ovid.com/>

1946 to July 08, 2019

Search date: 9th July 2019

Records retrieved: 1787

- 1 exp Fractures, Bone/ (176408)
- 2 Fracture Healing/ (12654)
- 3 fractur\$.ti,ab. (241061)
- 4 (broken adj2 bone\$).ti,ab. (315)
- 5 (bone\$ adj2 (heal or heals or healed or healing)).ti,ab. (10334)
- 6 (bone\$ adj2 (union\$ or nonunion\$ or non union\$)).ti,ab. (2699)
- 7 or/1-6 (292895)
- 8 Stem Cells/ (56849)
- 9 Mesenchymal stem cells/ (32836)
- 10 Stem Cell Research/ (1117)
- 11 stem cell\$.ti,ab. (239920)
- 12 ((progenitor or osteoprogenitor) adj cell\$).ti,ab. (59400)
- 13 (MSC or MSCs).ti,ab. (28485)
- 14 (BMMSC or BMMSCs or hBMMSC or hBMMCs).ti,ab. (644)
- 15 mesenchymal stroma\$ cell\$.ti,ab. (5807)
- 16 multipotent stroma\$ cell\$.ti,ab. (381)

17 or/8-16 (305248)
18 exp Bone Marrow Cells/ (178153)
19 Bone Marrow/ (65529)
20 bone marrow.ti,ab. (204141)
21 (BMAC or BMSC or BMSCs).ti,ab. (5920)
22 (ABMC or cBMA).ti,ab. (97)
23 or/18-22 (345503)
24 exp Adipocytes/ (21118)
25 exp Adipose Tissue/ (92675)
26 (adipose or adipocyte\$.ti,ab. (103152)
27 lipoaspirat\$.ti,ab. (600)
28 (ADSC or ADSCs or ASC or ASCs).ti,ab. (11517)
29 or/24-28 (157709)
30 17 or 23 or 29 (713238)
31 7 and 30 (6455)
32 Stem Cell Transplantation/ (22657)
33 Mesenchymal Stem Cell Transplantation/ (10396)
34 Bone Marrow Transplantation/ (44090)
35 Transplantation, Autologous/ (48549)
36 Injections/ (41471)
37 (inject\$ or implant\$ or transplant\$ or graft\$ or harvest\$.ti,ab. (1721461)
38 (autologous\$ or autogen\$.ti,ab. (96973)
39 or/32-38 (1806363)
40 31 and 39 (2535)
41 "Cell- and Tissue-Based Therapy"/ (6105)
42 ((autologous\$ or autogen\$) adj (cell\$ or cell-based)).ti,ab. (2453)
43 ((cell\$ or cell-based) adj (intervention\$ or therap\$ or treatment\$ or technolog\$)).ti,ab. (34406)
44 41 or 42 or 43 (39658)
45 7 and 44 (297)
46 40 or 45 (2647)
47 exp animals/ not humans/ (4596228)
48 46 not 47 (1787)

EMBASE

via Ovid <http://ovidsp.ovid.com/>

1974 to 2019 July 08

Search date: 9th July 2019

Records retrieved: 2956

- 1 exp fracture/ (270710)
- 2 fractur\$.ti,ab. (283996)
- 3 (broken adj2 bone\$.ti,ab. (429)
- 4 (bone\$ adj2 (heal or heals or healed or healing)).ti,ab. (12424)
- 5 (bone\$ adj2 (union\$ or nonunion\$ or non union\$)).ti,ab. (3308)
- 6 or/1-5 (362325)
- 7 stem cell/ (127638)
- 8 exp mesenchymal stem cell/ (53448)
- 9 stem cell research/ (2277)
- 10 osteoprogenitor cell/ (709)
- 11 exp mesenchymal stroma cell/ (12120)
- 12 stem cell\$.ti,ab. (358544)
- 13 ((progenitor or osteoprogenitor) adj cell\$.ti,ab. (83136)
- 14 (MSC or MSCs).ti,ab. (43688)
- 15 (BMMSC or BMMSCs or hBMMSC or hBMMCs).ti,ab. (1165)
- 16 mesenchymal stroma\$ cell\$.ti,ab. (8951)
- 17 multipotent stroma\$ cell\$.ti,ab. (494)
- 18 or/7-17 (454568)
- 19 exp bone marrow cell/ (111895)
- 20 bone marrow/ (119149)
- 21 bone marrow.ti,ab. (291802)
- 22 (bone marrow adj2 (aspirat\$ or concentrate\$)).dq. (124)
- 23 (BMAC or BMSC or BMSCs).ti,ab. (8956)
- 24 (ABMC or cBMA).ti,ab. (139)
- 25 or/19-24 (366292)
- 26 adipose derived stem cell/ (7207)

27 (adipose or adipocyte\$.ti,ab. (137126)
28 lipoaspirat\$.ti,ab. (801)
29 (ADSC or ADSCs or ASC or ASCs).ti,ab. (16961)
30 or/26-29 (148605)
31 18 or 25 or 30 (836702)
32 6 and 31 (10514)
33 stem cell transplantation/ (40563)
34 autologous stem cell transplantation/ (14744)
35 mesenchymal stem cell transplantation/ (10419)
36 bone marrow transplantation/ (48987)
37 autologous bone marrow transplantation/ (5943)
38 autotransplantation/ (22080)
39 injection/ (134835)
40 (inject\$ or implant\$ or transplant\$ or graft\$ or harvest\$.ti,ab. (2287677)
41 (autologous\$ or autogen\$.ti,ab. (134445)
42 or/33-41 (2380765)
43 32 and 42 (4323)
44 cell therapy/ (31180)
45 ((autologous\$ or autogen\$) adj (cell\$ or cell-based)).ti,ab. (3650)
46 ((cell\$ or cell-based) adj (intervention\$ or therap\$ or treatment\$ or technolog\$)).ti,ab. (52419)
47 44 or 45 or 46 (71553)
48 6 and 47 (601)
49 43 or 48 (4536)
50 (animal/ or animal experiment/ or animal model/ or animal tissue/ or nonhuman/) not exp human/ (5786510)
51 49 not 50 (2956)

CENTRAL

via Wiley Cochrane Library <https://www.cochranelibrary.com/>

Issue 7 of 12, July 2019

Search date: 9th July 2019

Records retrieved: 180

#1 MeSH descriptor: [Fractures, Bone] explode all trees 5423

#2 MeSH descriptor: [Fracture Healing] this term only 504

#3 fractur*:ti,ab,kw 20518

#4 (broken near/2 bone*):ti,ab,kw 55

#5 (bone* near/2 (heal or heals or healed or healing)):ti,ab,kw 610

#6 (bone* near/2 (union* or nonunion* or non next union*)):ti,ab,kw 179

#7 #1 or #2 or #3 or #4 or #5 or #6 20883

#8 MeSH descriptor: [Stem Cells] this term only 252

#9 MeSH descriptor: [Mesenchymal Stem Cells] this term only 94

#10 MeSH descriptor: [Stem Cell Research] this term only 0

#11 stem next cell*:ti,ab,kw 11829

#12 ((progenitor or osteoprogenitor) next cell*):ti,ab,kw 1771

#13 (MSC or MSCs):ti,ab,kw 954

#14 (BMMSC or BMMSCs or hBMMSC or hBMMCs):ti,ab,kw 74

#15 mesenchymal next stroma* next cell*:ti,ab,kw 226

#16 multipotent next stroma* next cell*:ti,ab,kw 1

#17 {OR #8-#16} 13026

#18 MeSH descriptor: [Bone Marrow Cells] explode all trees 1648

#19 MeSH descriptor: [Bone Marrow] this term only 604

#20 bone next marrow:ti,ab,kw 13023

#21 (BMAC or BMSC or BMSCs):ti,ab,kw 133

#22 (ABMC or cBMA):ti,ab,kw 28

#23 {OR #18-#22} 14311

#24 MeSH descriptor: [Adipocytes] explode all trees 121

#25 MeSH descriptor: [Adipose Tissue] explode all trees 2357

#26 (adipose or adipocyte*):ti,ab,kw 5122

#27 lipoaspirat*:ti,ab,kw 45

#28 (ADSC or ADSCs or ASC or ASCs):ti,ab,kw 640

#29 {OR #24-#28} 5930

#30 #17 or #23 or #29 29362

#31 #7 and #30 366

#32 MeSH descriptor: [Stem Cell Transplantation] this term only 410

#33 MeSH descriptor: [Mesenchymal Stem Cell Transplantation] this term only 178

#34 MeSH descriptor: [Bone Marrow Transplantation] this term only 1365

#35 MeSH descriptor: [Transplantation, Autologous] this term only 1525

#36 MeSH descriptor: [Injections] this term only 2527

#37 (inject* or implant* or transplant* or graft* or harvest*):ti,ab,kw 167932

#38 (autologous* or autogen*):ti,ab,kw 11773

#39 {OR #32-#38} 171018

#40 #31 and #39 181

#41 MeSH descriptor: [Cell- and Tissue-Based Therapy] this term only 58

#42 ((autologous* or autogen*) next cell*):ti,ab,kw 199

#43 ((autologous* or autogen*) next cell next based):ti,ab,kw 4

#44 (cell* next (intervention* or therap* or treatment* or technolog*)):ti,ab,kw 2304

#45 (cell next based next (intervention* or therap* or treatment* or technolog*)):ti,ab,kw 147

#46 {OR #41-#45} 2480

#47 #7 and #46 26

#48 #40 or #47 185

#49 #40 or #47 in Trials 180

Cochrane Database of Systematic Reviews

via Wiley Cochrane Library <https://www.cochranelibrary.com/>

Issue 7 of 12, July 2019

Search date: 9th July 2019

Records retrieved: 5

See under CENTRAL for search strategy.

ClinicalTrials.gov

<https://clinicaltrials.gov/>

Search date: 9th July 2019

Records retrieved: 175

1. 77 Studies found for: stem cells OR mesenchymal OR stromal OR bone marrow OR adipose OR BMMSC OR BMMSCs OR hBMMSC OR hBMMCs OR BMAC OR BMSC OR BMSCs OR ABMC OR cBMA OR ADSC OR ADSCs OR ASC OR ASCs | Fractures, Bone

2. 79 Studies found for: stem cells OR mesenchymal OR stromal OR bone marrow OR adipose OR BMMSC OR BMMSCs OR hBMMSC OR hBMMCs OR BMAC OR BMSC OR BMSCs OR ABMC OR cBMA OR ADSC OR ADSCs OR ASC OR ASCs | bone healing OR bone heal OR bone heals OR bone healed

3. 19 Studies found for: stem cells OR mesenchymal OR stromal OR bone marrow OR adipose OR BMMSC OR BMMSCs OR hBMMSC OR hBMMCs OR BMAC OR BMSC OR BMSCs OR ABMC OR cBMA OR ADSC OR ADSCs OR ASC OR ASCs | union OR non-union

WHO International Clinical Trials Registry Platform (ICTRP)

<https://www.who.int/ictcp/en/>

Search date: 9th July 2019

Records retrieved: 21

1. Condition: fracture OR fractured OR fractures

Intervention: stem cell OR stem cells OR mesenchymal OR stromal OR bone marrow OR adipose

22 records for 16 trials

2. Condition: bone healing OR bone heal OR bone heals OR bone healed

Intervention: stem cell OR stem cells OR mesenchymal OR stromal OR bone marrow OR adipose

0 records

3. Condition: union OR nonunion OR non-union

Intervention: stem cell OR stem cells OR mesenchymal OR stromal OR bone marrow OR adipose

10 records for 5 trials

NB: abbreviations taken out of search as did not retrieve relevant studies.

Table b: Table of included study characteristics.

| Author/study name | Year of publication | Study design | Number of participants | Type of fracture | Cell source | Concentration method |
|-------------------|---------------------|------------------------------|------------------------|--------------------------|-------------|----------------------|
| Toro | 2019 | Case-series (retrospective) | 6 | nonunion/pseudoarthroses | Bone | Not reported |
| Thua | 2015 | Case-series (prospective) | 10 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Thua | 2015 | Observational/Non-randomized | 27 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Zhuang | 2017 | Case-series (prospective) | 42 | combination | Bone | SECCS |
| Zhang | 2018 | Randomized controlled trial | 25 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Zhai | 2016 | Randomized controlled trial | 63 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Yuan | 2010 | Randomized controlled trial | 140 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Wittig | 2016 | Case-series (prospective) | 3 | nonunion/pseudoarthroses | Bone | Culture |
| Weel* | 2015 | Randomized controlled trial | 50 | acute | Bone | Centrifuge |
| Wang | 2019 | Observational/Non-randomized | 50 | nonunion/pseudoarthroses | Bone | SECCS |
| Seebach | 2016 | Case-series (prospective) | 10 | acute | Bone | Centrifuge |

| | | | | | | |
|-----------------------|------|----------------------------------|----|--------------------------|---------|----------------------|
| Rampoldi | 2013 | Case-series (retrospective) | 44 | nonunion/pseudoarthroses | Bone | No |
| Qu | 2015 | Case-series (retrospective) | 9 | nonunion/pseudoarthroses | Bone | Centrifuge & Culture |
| Sugaya | 2013 | Case-series (retrospective) | 17 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Pozza | 2018 | Case-series (retrospective) | 25 | nonunion/pseudoarthroses | Bone | Centrifuge |
| O'Malley | 2016 | Case-series (retrospective) | 10 | acute | Bone | Centrifuge |
| Scaglione | 2013 | Case-series (prospective) | 24 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Rush | 2009 | Case-series (retrospective) | 23 | nonunion/pseudoarthroses | Bone | No |
| Rodriguez- Collazo | 2015 | Observational/Non- randomized | 20 | acute | Bone | Centrifuge |
| Giannoudis* | 2017 | Randomized controlled trial | 45 | acute | No | No |
| Royan-Bone- 013* | 2015 | Randomized controlled trial | 60 | nonunion/pseudoarthroses | Bone | No |
| Gourabi* | 2014 | Randomized controlled trial | 40 | acute | Adipose | No |
| Granell* | 2019 | Randomized controlled trial | 19 | nonunion/pseudoarthroses | Bone | No |

| | | | | | | |
|-------------|------|--------------------------------|-----|--------------------------|---------|----------------------|
| Richardson* | 2014 | Randomized controlled trial | 35 | nonunion/pseudoarthroses | Bone | Culture |
| Saxer* | 2012 | Randomized controlled trial | 290 | acute | Adipose | Centrifuge |
| Hauzeur* | 2011 | Randomized controlled trial | 40 | nonunion/pseudoarthroses | Bone | Culture |
| Rosset* | 2007 | Randomized controlled trial | 85 | acute | Bone | Centrifuge |
| Machi | 2011 | Case-series (retrospective) | 12 | nonunion/pseudoarthroses | Bone | No |
| Lovy | 2017 | Observational/Non-randomized | 33 | acute | Bone | Centrifuge |
| Liebergall | 2013 | Randomized controlled trial CT | 24 | acute | Bone | Culture |
| Labibzadeh | 2016 | Case-series (prospective) | 7 | nonunion/pseudoarthroses | Bone | Centrifuge & Culture |
| Gonzalez* | 2016 | Randomized controlled trial | 20 | acute | Adipose | No |
| Muthian | 2018 | Randomized controlled trial | 55 | combination | Bone | Centrifuge |
| Murawski | 2011 | Case-series (retrospective) | 26 | acute | Bone | Centrifuge |
| Mondanelli | 2011 | Observational/Non-randomized | 74 | nonunion/pseudoarthroses | Bone | Not reported |

| | | | | | | |
|----------|------|----------------------------------|----|--------------------------|------|----------------------|
| Mishima | 2016 | Case-series (retrospective) | | nonunion/pseudoarthroses | Bone | No |
| Memeo | 2013 | Case-series (retrospective) | 15 | nonunion/pseudoarthroses | Bone | No |
| Mannelli | 2017 | Randomized controlled trial | 36 | acute | Bone | Centrifuge |
| Kim | 2009 | Randomized controlled trial | 64 | acute | Bone | Centrifuge & Culture |
| Jager | 2009 | Case-series (prospective) | 10 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Jager | 2010 | Observational/Non- randomized | 39 | acute | Bone | Centrifuge |
| Marsh* | 2009 | Randomized controlled trial | 60 | nonunion/pseudoarthroses | Bone | No |
| Ismail | 2016 | Observational/Non- randomized | 10 | nonunion/pseudoarthroses | Bone | Centrifuge & Culture |
| Mojaver* | 2016 | Randomized controlled trial | 30 | nonunion/pseudoarthroses | Bone | No |
| Aghdami* | 2015 | Randomized controlled trial | 60 | nonunion/pseudoarthroses | Bone | No |
| Le Nail | 2014 | Case-series (retrospective) | 42 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Lareau | 2016 | Case-series (retrospective) | 25 | acute | Bone | Centrifuge |

| | | | | | | |
|----------------|------|------------------------------|------|--------------------------|------|----------------------|
| Hernigou | 2016 | Observational/Non-randomized | 30 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Hernigou | 2005 | Case-series (prospective) | 60 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Hernigou | 2015 | Observational/Non-randomized | 172 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Hernigou | 2014 | Observational/Non-randomized | 1067 | nonunion/pseudoarthroses | Bone | No |
| Guimarães | 2014 | Case-series (prospective) | 19 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Gross | 2015 | Case-series (retrospective) | 41 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Zheng-kang | 2009 | Case-series (retrospective) | 26 | nonunion/pseudoarthroses | Bone | Centrifuge & Culture |
| Gomez-Barrena* | 2019 | Observational/Non-randomized | 28 | nonunion/pseudoarthroses | Bone | Culture |
| Gomez-Barrena | 2018 | Randomized controlled trial | 108 | nonunion/pseudoarthroses | Bone | Culture |
| Giannoudis | 2015 | Case-series (prospective) | 64 | nonunion/pseudoarthroses | Bone | No |
| Giannoudis | 2013 | Case-series (retrospective) | 14 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Giannotti | 2013 | Case-series (retrospective) | 8 | nonunion/pseudoarthroses | Bone | Culture |

| | | | | | | |
|----------|------|----------------------------------|-----|--------------------------|------|------------|
| Gasbarra | 2013 | Case-series (retrospective) | 7 | nonunion/pseudoarthroses | Bone | No |
| Ganarvos | 2010 | Case-series (retrospective) | 5 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Garnavos | 2017 | Case-series (retrospective) | 17 | acute | Bone | No |
| Ebraheim | 2016 | Case-series (retrospective) | 14 | nonunion/pseudoarthroses | Bone | No |
| Donati | 2012 | Observational/Non- randomized | 14 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Desai | 2015 | Observational/Non- randomized | 49 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Denaro | 2011 | Case-series (retrospective) | | combination | Bone | Centrifuge |
| Delclos | 2010 | Observational/Non- randomized | 11 | nonunion/pseudoarthroses | No | Culture |
| Dallari | 2016 | Observational/Non- randomized | 113 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Dallari | 2011 | Observational/Non- randomized | 82 | nonunion/pseudoarthroses | Bone | No |
| Gouse* | 2011 | Randomized controlled trial | 80 | acute | Bone | Centrifuge |
| Colombo | 2014 | Observational/Non- randomized | 28 | nonunion/pseudoarthroses | No | No |

| | | | | | | |
|---------------------|------|------------------------------|-----|--------------------------|-------------|----------------------|
| Chu | 2019 | Observational/Non-randomized | 39 | acute | Bone | Culture |
| Gan | 2016 | Randomized controlled trial | 164 | nonunion/pseudoarthroses | Bone | SECCS |
| Flouzat-Lachaniette | 2015 | Observational/Non-randomized | 108 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Fernandez-Bances | 2013 | Case-series (prospective) | 7 | nonunion/pseudoarthroses | Bone | Centrifuge |
| PACINO* | 2010 | Randomized controlled trial | 60 | nonunion/pseudoarthroses | No response | No response |
| STEMQUIRI* | 2013 | Observational/Non-randomized | 10 | nonunion/pseudoarthroses | Adipose | No |
| Fundacion Teknon* | 2005 | Observational/Non-randomized | | nonunion/pseudoarthroses | Bone | No |
| Emadedin | 2017 | Case-series (prospective) | 5 | nonunion/pseudoarthroses | Bone | Centrifuge & Culture |
| Castillo-Cardiel | 2017 | Randomized controlled trial | 20 | acute | Adipose | Centrifuge |
| Carney | 2018 | Case-series (prospective) | 41 | acute | Bone | No response |
| Calori | 2013 | Case-series (retrospective) | 52 | nonunion/pseudoarthroses | Bone | No |
| Bhattacharjee | 2018 | Observational/Non-randomized | 35 | nonunion/pseudoarthroses | Bone | Culture |

| | | | | | | |
|--------------------------------|------|------------------------------|----|--------------------------|-----------------------------|-------------|
| Filho | 2012 | Observational/Non-randomized | 6 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Berger* | 2009 | Observational/Non-randomized | 0 | nonunion/pseudoarthroses | Bone | No response |
| Rozen* | 2017 | Observational/Non-randomized | 10 | combination | Adipose | Culture |
| Hauzeur* | 2009 | Observational/Non-randomized | 30 | nonunion/pseudoarthroses | Bone | Culture |
| Hadassah Medical Organisation* | 2011 | Case-series (prospective) | | nonunion/pseudoarthroses | Bone | Centrifuge |
| Vericel Corp* | 2017 | Observational/Non-randomized | 36 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Pei* | 2016 | Randomized controlled trial | 40 | combination | Umbilical | No |
| Razi* | 2013 | Observational/Non-randomized | 18 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Dilogo* | 2014 | Case-series (prospective) | 15 | nonunion/pseudoarthroses | Bone, adipose and umbilical | Culture |
| Segur* | 2017 | Randomized controlled trial | 32 | acute | Bone | No |
| Peivandi* | 2013 | Observational/Non-randomized | 19 | nonunion/pseudoarthroses | Bone | Centrifuge |
| Lee* | 2019 | Observational/Non-randomized | 60 | acute | Bone | No |

Table c: Joanna Briggs Institute case series assessments.

| Authors (Year) | Item 1 | Item 2 | Item 3 | Item 4 | Item 5 | Item 6 | Item 7 | Item 8 | Item 9 | Item 10 |
|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Wang (2019) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes |
| Lovy (2017) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Flouzat-Lachaniette (2015) | Yes | Yes | Yes | Yes | Unclear | Yes | Yes | Yes | Yes | Yes |
| Lee (2019) | Yes | Yes | Unclear | Unclear | Unclear | No | No | No | No | No |
| Thua (2015) | Yes | Yes | Yes | Yes | Unclear | Yes | Yes | Yes | No | Yes |
| Zhuang (2017) | Yes | Unclear | No | Yes | Unclear | Yes | Yes | Yes | No | Yes |
| Witting (2016) | No | Unclear | No | No | No | No | Yes | Yes | No | Yes |
| Seebach (2016) | Yes | Yes | Yes | Yes | Unclear | Yes | Yes | Yes | No | Yes |
| Scaglione (2013) | No | Unclear | No | Unclear | Unclear | No | No | Yes | No | Unclear |
| Labibzad (2016) | Yes | Unclear | No | No | No | Yes | Yes | Yes | No | N/A |
| Jager (2009) | No | Unclear | Unclear | No | No | Yes | Yes | Yes | No | Yes |
| Hernigou (2005) | No | Yes | Yes | Yes | Unclear | Yes | Yes | Yes | No | Yes |
| Guimaraes (2014) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Emadedin (2017) | Yes | Unclear | No | Yes | No | Yes | Yes | Yes | No | N/A |
| Carney (2018) | No | Unclear | Yes | Unclear | Unclear | Yes | No | Yes | No | Unclear |
| Hadassah (2011) | Yes | Yes | Unclear | Unclear | Unclear | No | No | Yes | No | Unclear |
| Dilogo (2014) | Yes | Unclear | Unclear | Yes | Unclear | No | No | Yes | No | Unclear |
| Toro (2019) | Yes | Yes | Yes | No | No | Yes | Yes | Yes | No | Yes |
| Rampoldi (2013) | No | Unclear | Unclear | Unclear | Unclear | Yes | Yes | No | No | Unclear |
| Qu (2015) | Yes | Unclear | Yes | Yes | Unclear | Yes | Yes | Yes | Yes | Yes |
| Sugaya (2013) | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes |

Table d: Table of included study characteristics.

| Author | Year | DOMAIN 1 | DOMAIN 2 | DOMAIN 3 | DOMAIN 4 | DOMAIN 5 | Overall Judgement |
|------------------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------------------|
| Zhang | 2018 | Some concerns | High | Low | Low | Some concerns | High |
| Zhai | 2016 | High | High | Low | Low | Some concerns | High |
| Yuan | 2010 | Some concerns | High | Low | Some concerns | Some concerns | High |
| Liebergall | 2013 | Low | Some concerns | Low | Some concerns | Some concerns | Some concerns |
| Muthian | 2018 | Some concerns | High | High | High | Some concerns | High |
| Mannelli | 2017 | Some concerns | Some concerns | Low | Some concerns | Some concerns | Some concerns |
| Kim | 2009 | Some concerns | Low | Low | Low | Some concerns | Some concerns |
| Castillo-Cardiel | 2017 | Some concerns | Some concerns | High | Low | Some concerns | High |