



## Supplementary Material

10.1302/2633-1462.29.BJO-2021-0060.R1

### Search strategies

#### MEDLINE

#### Via OVID

Search date=7<sup>th</sup> December 2018

Records identified=1080

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily <1946 to December 06, 2018>

- 1 (frozen adj6 shoulder\$).ti,ab,kw. (1203)
- 2 (stiff\$ adj6 shoulder\$).ti,ab,kw. (830)
- 3 (adhesive adj (capsulitis or capsulitides)).ti,ab,kw. (780)
- 4 ((bursitis or bursitides) adj6 shoulder\$).ti,ab,kw. (173)
- 5 ((capsulitis or capsulitides) adj6 shoulder\$).ti,ab,kw. (416)
- 6 ((periarthritis or peri-arthritis or periarthritides or peri-arthritides or peri-capsulitis or pericapsulitis) adj6 shoulder\$).ti,ab,kw. (447)
- 7 exp bursitis/ (4529)
- 8 shoulder pain/ (4317)
- 9 (shoulder\$ adj3 (pain or pains or painful or complain\$)).ti,ab,kw. (8818)
- 10 Shoulder Impingement Syndrome/ (1643)
- 11 (shoulder\$ adj6 impinge\$).ti,ab,kw. (978)
- 12 subacromial impingement syndrome.ti,ab,kw. (371)
- 13 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (17237)
- 14 Arthrography/ (4898)
- 15 (arthrograph\$ adj6 (distension\$ or distention\$)).ti,ab,kw. (57)

- 16 (arthrogram\$ adj6 (distension\$ or distention\$)).ti,ab,kw. (4)
- 17 (glenohumeral adj6 (distension\$ or distention\$)).ti,ab,kw. (14)
- 18 Dilatation/ (10665)
- 19 (dilatation or hydrodilata\$).ti,ab,kw. (49989)
- 20 or/14-19 (62074)
- 21 13 and 20 (303)
- 22 Arthroscopy/ (21349)
- 23 (arthroscop\$ adj6 (releas\$ or decompress\$ or capsulotom\$)).ti,ab,kw. (1212)
- 24 ((capsular adj2 releas\$) or interventional microadhesiolysis or capsulotomy).ti,ab,kw. (3135)
- 25 or/22-24 (24614)
- 26 exp Musculoskeletal Manipulation/ (15513)
- 27 (manipulat\$ adj3 (anesthesia or anaesthesia or anesthetic\$ or anaesthetic\$)).ti,ab,kw. (691)
- 28 MUA.ti,ab,kw. (3296)
- 29 26 or 27 or 28 (19196)
- 30 25 or 29 (43602)
- 31 13 and 30 (1871)
- 32 Injections, Intra-Articular/ (7136)
- 33 injections/ (40831)
- 34 ((bursa\$ or intrabursa\$ or intra bursa\$ or periartic\$ or peri artic\$ or intraartic\$ or intra artic\$) adj3 inject\$).ti,ab,kw. (6140)
- 35 ((subacromial or acromioclavicular or glenohumeral) adj3 inject\$).ti,ab,kw. (390)
- 36 ((extra articular or extraarticular) adj3 inject\$).ti,ab,kw. (32)
- 37 (IA inject\$ or RI inject\$ or SA inject\$).ti,ab,kw. (602)
- 38 32 or 33 or 34 or 35 or 36 or 37 (51397)
- 39 13 and 38 (860)
- 40 exp Physical Therapy Modalities/ (139739)
- 41 (physiotherapy or physiotherapies or physical therap\$ or manual therap\$).ti,ab,kw. (39931)
- 42 (passive adj (motion or movement)).ti,ab,kw. (2256)
- 43 CPM.ti,ab,kw. (5575)
- 44 muscle stretching exercises/ (1458)
- 45 (stretching or stretches).ti,ab,kw. (32430)

- 46 (mobilisation or mobilization).ti,ab,kw. (53016)
- 47 (exercise\$ adj2 (program\$ or strength\$ or intervention\$ or training or prescription\$ or prescrib\$)).ti,ab,kw. (36905)
- 48 (exercise\$ adj2 (therap\$ or therapeutic)).ti,ab,kw. (6101)
- 49 ((home or supervis\$) adj2 exercis\$).ti,ab,kw. (4512)
- 50 ((pendular or pendulum) adj exercis\$).ti,ab,kw. (29)
- 51 ((isokinetic or resist\$) adj2 exercise\$).ti,ab,kw. (6663)
- 52 or/40-51 (276161)
- 53 13 and 52 (2746)
- 54 21 or 31 or 39 or 53 (4712)
- 55 randomized controlled trial.pt. (472057)
- 56 controlled clinical trial.pt. (92771)
- 57 randomized.ab. (428436)
- 58 placebo.ab. (193714)
- 59 clinical trials as topic.sh. (185394)
- 60 randomly.ab. (301468)
- 61 trial.ti. (190979)
- 62 55 or 56 or 57 or 58 or 59 or 60 or 61 (1185601)
- 63 exp animals/ not humans.sh. (4519948)
- 64 62 not 63 (1090663)
- 65 54 and 64 (1080)

**CENTRAL**

**Via John Wiley's The Cochrane Library**

**Search date=5<sup>th</sup> December 2018**

**Records identified= 1634**

- #1 (frozen NEAR/6 shoulder\*):ti,ab,kw (Word variations have been searched)
- #2 (stiff\* NEAR/6 shoulder\*):ti,ab,kw (Word variations have been searched)
- #3 (adhesive NEAR/6 (capsulitis or capsulitides)):ti,ab,kw (Word variations have been searched)
- #4 ((bursitis or bursitides) NEAR/6 shoulder\*):ti,ab,kw (Word variations have been searched)
- #5 ((capsulitis or capsulitides) NEAR/6 shoulder\*):ti,ab,kw (Word variations have been searched)

- #6 ((periarthritis or peri-arthritis or periarthritides or peri-arthritides or peri-capsulitis or pericapsulitis) NEAR/6 shoulder\*):ti,ab,kw (Word variations have been searched)
- #7 MeSH descriptor: [Bursitis] explode all trees
- #8 MeSH descriptor: [Shoulder Pain] explode all trees
- #9 (shoulder\* NEAR/3 (pain or pains or painful or complain\*)):ti,ab,kw (Word variations have been searched)
- #10 MeSH descriptor: [Shoulder Impingement Syndrome] explode all trees
- #11 (shoulder\* NEAR/6 impinge\*):ti,ab,kw (Word variations have been searched)
- #12 ("subacromial impingement syndrome"):ti,ab,kw (Word variations have been searched)
- #13 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12
- #14 MeSH descriptor: [Arthrography] explode all trees
- #15 (arthrograph\* NEAR/6 (distension\* or distention\*)):ti,ab,kw (Word variations have been searched)
- #16 (arthrogram\* NEAR/6 (distension\* or distention\*)):ti,ab,kw (Word variations have been searched)
- #17 (glenohumeral NEAR/6 (distension\* or distention\*)):ti,ab,kw (Word variations have been searched)
- #18 MeSH descriptor: [Dilatation] explode all trees
- #19 ((dilatation or hydrodilata\*)):ti,ab,kw (Word variations have been searched)
- #20 #14 OR #15 OR #16 OR #17 OR #18 OR #19
- #21 #13 AND #20
- #22 MeSH descriptor: [Arthroscopy] explode all trees
- #23 (arthroscop\* NEAR/6 (releas\* or decompress\* or capsulotom\*)):ti,ab,kw (Word variations have been searched)
- #24 ((capsular NEAR/2 releas\*) or "interventional microadhesiolysis" or capsulotomy):ti,ab,kw (Word variations have been searched)
- #25 MeSH descriptor: [Musculoskeletal Manipulations] explode all trees
- #26 (manipulat\* NEAR/3 (anesthesia or anaesthesia or anesthetic\* or anaesthetic\*)):ti,ab,kw OR (MUA):ti,ab,kw (Word variations have been searched)
- #27 #22 OR #23 OR #24 OR #25 OR #26
- #28 #13 AND #27
- #29 MeSH descriptor: [Injections, Intra-Articular] explode all trees
- #30 MeSH descriptor: [Injections] explode all trees

- #31 ((bursa\* or intrabursa\* or intra bursa\* or periartic\* or peri artic\* or intraartic\* or intra artic\*) NEAR/3 inject\*):ti,ab,kw (Word variations have been searched)
- #32 ((subacromial or acromioclavicular or glenohumeral) NEAR/3 inject\*):ti,ab,kw (Word variations have been searched)
- #33 ((extra articular or extraarticular) NEAR/3 inject\*):ti,ab,kw (Word variations have been searched)
- #34 (("IA inject\*" or "RI inject\*" or "SA inject\*")):ti,ab,kw (Word variations have been searched)
- #35 #29 OR #30 OR #31 OR #32 OR #33 OR #34
- #36 #13 AND #35
- #37 MeSH descriptor: [Physical Therapy Modalities] explode all trees
- #38 (physiotherapy or physiotherapies or "physical therap\*" or "manual therap\*"):ti,ab,kw (Word variations have been searched)
- #39 (passive NEAR/2 (motion or movement)):ti,ab,kw (Word variations have been searched)
- #40 (CPM):ti,ab,kw (Word variations have been searched)
- #41 MeSH descriptor: [Muscle Stretching Exercises] explode all trees
- #42 ((stretching or stretches)):ti,ab,kw (Word variations have been searched)
- #43 ((mobilisation or mobilization)):ti,ab,kw (Word variations have been searched)
- #44 (exercise\* NEAR/2 (program\* or strength\* or intervention\* or training or prescription\* or prescrib\*)):ti,ab,kw (Word variations have been searched)
- #45 (exercise\* NEAR/2 (therap\* or therapeutic)):ti,ab,kw (Word variations have been searched)
- #46 ((home or supervis\*) NEAR/2 exercis\*):ti,ab,kw (Word variations have been searched)
- #47 ((pendular or pendulum) NEAR/ exercis\*):ti,ab,kw (Word variations have been searched)
- #48 ((isokinetic or resist\*) NEAR/2 exercise\*):ti,ab,kw (Word variations have been searched)
- #49 #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48
- #50 #13 AND #49
- #51 #21 OR #28 OR #36 OR #50

## **EMBASE**

### **Via OVID**

**Search date=7<sup>th</sup> December 2018**

**Records identified=1986**

**Database: Embase <1974 to 2018 Week 49>**

1 (frozen adj6 shoulder\$).ti,ab,kw. (1476)

- 2 (stiff\$ adj6 shoulder\$).ti,ab,kw. (1164)
- 3 (adhesive adj (capsulitis or capsulitides)).ti,ab,kw. (1089)
- 4 ((bursitis or bursitides) adj6 shoulder\$).ti,ab,kw. (170)
- 5 ((capsulitis or capsulitides) adj6 shoulder\$).ti,ab,kw. (587)
- 6 ((periarthritis or peri-arthritis or periarthritides or peri-arthritides or peri-capsulitis or pericapsulitis) adj6 shoulder\$).ti,ab,kw. (307)
- 7 exp bursitis/ (4361)
- 8 shoulder pain/ (14558)
- 9 (shoulder\$ adj3 (pain or pains or painful or complain\$)).ti,ab,kw. (11841)
- 10 Shoulder Impingement Syndrome/ (2544)
- 11 (shoulder\$ adj6 impinge\$).ti,ab,kw. (1359)
- 12 subacromial impingement syndrome.ti,ab,kw. (489)
- 13 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (27058)
- 14 Arthrography/ (5871)
- 15 (arthrograph\$ adj6 (distension\$ or distention\$)).ti,ab,kw. (58)
- 16 (arthrogram\$ adj6 (distension\$ or distention\$)).ti,ab,kw. (7)
- 17 (glenohumeral adj6 (distension\$ or distention\$)).ti,ab,kw. (17)
- 18 Dilatation/ (16639)
- 19 (dilatation or hydrodilata\$).ti,ab,kw. (72836)
- 20 or/14-19 (79870)
- 21 13 and 20 (780)
- 22 Shoulder arthroscopy/ (1771)
- 23 (arthroscop\$ adj6 (releas\$ or decompress\$ or capsulotom\$)).ti,ab,kw. (1394)
- 24 ((capsular adj2 releas\$) or interventional microadhesiolysis or capsulotomy).ti,ab,kw. (3750)
- 25 or/22-24 (6524)
- 26 exp Musculoskeletal Manipulation/ (2815)
- 27 (manipulat\$ adj3 (anesthesia or anaesthesia or anesthetic\$ or anaesthetic\$)).ti,ab,kw. (832)
- 28 MUA.ti,ab,kw. (7069)
- 29 26 or 27 or 28 (10472)
- 30 25 or 29 (16919)
- 31 13 and 30 (1187)

- 32 Intraarticular Drug Administration/ (6097)
- 33 Injections/ (115219)
- 34 ((bursa\$ or intrabursa\$ or intra bursa\$ or periartic\$ or peri artic\$ or intraartic\$ or intra artic\$) adj3 inject\$).ti,ab,kw. (8868)
- 35 ((subacromial or acromioclavicular or glenohumeral) adj3 inject\$).ti,ab,kw. (475)
- 36 ((extra articular or extraarticular) adj3 inject\$).ti,ab,kw. (49)
- 37 (IA inject\$ or RI inject\$ or SA inject\$).ti,ab,kw. (952)
- 38 32 or 33 or 34 or 35 or 36 or 37 (126307)
- 39 13 and 38 (1280)
- 40 Physiotherapy/ (75119)
- 41 Home Physiotherapy/ (272)
- 42 Muscle Stretching/ (5114)
- 43 Stretching Exercise/ (2602)
- 44 Joint mobilization/ (1080)
- 45 Isokinetic exercise/ (2247)
- 46 (physiotherapy or physiotherapies or physical therap\$ or manual therap\$).ti,ab,kw. (60613)
- 47 (passive adj (motion or movement)).ti,ab,kw. (2813)
- 48 CPM.ti,ab,kw. (7488)
- 49 muscle stretching exercises/ (2337)
- 50 (stretching or stretches).ti,ab,kw. (32638)
- 51 (mobilisation or mobilization).ti,ab,kw. (69668)
- 52 (exercise\$ adj2 (program\$ or strength\$ or intervention\$ or training or prescription\$ or prescrib\$)).ti,ab,kw. (51672)
- 53 (exercise\$ adj2 (therap\$ or therapeutic)).ti,ab,kw. (9177)
- 54 ((home or supervis\$) adj2 exercis\$).ti,ab,kw. (6926)
- 55 ((pendular or pendulum) adj exercis\$).ti,ab,kw. (34)
- 56 ((isokinetic or resist\$) adj2 exercise\$).ti,ab,kw. (8262)
- 57 or/40-56 (267428)
- 58 13 and 57 (4164)
- 59 21 or 31 or 39 or 58 (6314)
- 60 randomized controlled trial/ (525863)
- 61 Controlled clinical study/ (459630)

- 62 random\$.ti,ab. (1356792)
- 63 randomization/ (80264)
- 64 intermethod comparison/ (242546)
- 65 placebo.ti,ab. (279891)
- 66 (compare or compared or comparison).ti. (466002)
- 67 ((evaluated or evaluate or evaluating or assessed or assess) and (compare or compared or comparing or comparison)).ab. (1832417)
- 68 (open adj label).ti,ab. (67434)
- 69 ((double or single or doubly or singly) adj (blind or blinded or blindly)).ti,ab. (212868)
- 70 double blind procedure/ (155888)
- 71 parallel group\$1.ti,ab. (22585)
- 72 (crossover or cross over).ti,ab. (95303)
- 73 ((assign\$ or match or matched or allocation) adj5 (alternate or group\$1 or intervention\$1 or patient\$1 or subject\$1 or participant\$1)).ti,ab. (293234)
- 74 (assigned or allocated).ti,ab. (344449)
- 75 (controlled adj7 (study or design or trial)).ti,ab. (306257)
- 76 (volunteer or volunteers).ti,ab. (228780)
- 77 human experiment/ (427572)
- 78 trial.ti. (257503)
- 79 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 (4444632)
- 80 (animal/ or animal experiment/ or animal model/ or animal tissue/ or nonhuman/) not exp human/ (5612936)
- 81 editorial.pt. or case report.ti. (850343)
- 82 79 not (80 or 81) (3900081)
- 83 59 and 82 (1986)

**PEDro**

**Via <https://www.pedro.org.au/>**

**Search date=7<sup>th</sup> December 2018**

**Records identified=52**

Three separate searches were conducted, the results were downloaded and combined in one Endnote library to give 52 unique records

The first search:



“adhesive capsulitis” and clinical trials and 2009 onwards. This identified 41 records

The second search:

“frozen shoulder” and clinical trials and 2009 onwards. This identified 30 records

The third search:

“stiff shoulder” and clinical trials and 2009 onwards. This identified 1 record

## Science Citation Index

### Via Web of Science

Search date=7<sup>th</sup> December 2018

Records identified=1420

# 22 1,420

#20 OR #16 OR #14 OR #12

Refined by: PUBLICATION YEARS: ( 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013 OR 2012 OR 2011 OR 2010 )

Indexes=SCI-EXPANDED Timespan=All years

# 21 2,358

#20 OR #16 OR #14 OR #12

Indexes=SCI-EXPANDED Timespan=All years

# 20 1,831

#19 AND #10

Indexes=SCI-EXPANDED Timespan=All years

# 19 296,861

#18 OR #17

Indexes=SCI-EXPANDED Timespan=All years

# 18 271,166

TOPIC: (passive NEAR/2 (motion or movement)) OR TOPIC: (CPM) OR TOPIC: (stretching or stretches) OR TOPIC: (mobilisation or mobilization) OR TOPIC: (exercise\* NEAR/2 (program\* or strength\* or intervention\* or training or prescription\* or prescrib\*)) OR TOPIC: (exercise\* NEAR/2 (therap\* or therapeutic)) OR TOPIC: ((home or supervis\*) NEAR/2 exercis\*) OR TOPIC: ((pendular or pendulum) NEAR/2 exercis\*) OR TOPIC: ((isokinetic or resist\*) NEAR/2 exercise\*)

Indexes=SCI-EXPANDED Timespan=All years

# 17 31,720

TOPIC: (physiotherapy or physiotherapies or "physical therap\*" or "manual therap\*")

Indexes=SCI-EXPANDED Timespan=All years

# 16 389

#15 AND #10

Indexes=SCI-EXPANDED Timespan=All years

# 15 6,535

TOPIC: ((bursa\* or intrabursa\* or "intra bursa\*" or periartic\* or "peri artic\*" or intraartic\* or "intra artic\*") NEAR/3 inject\*) OR TOPIC: ((subacromial or acromioclavicular or glenohumeral) NEAR/3 inject\*) OR TOPIC: (extraarticular NEAR/3 inject) OR TOPIC: ("extra articular" NEAR/3 inject\*) OR TOPIC: ("IA inject\*" or "RI inject\*" or "SA inject\*")

Indexes=SCI-EXPANDED Timespan=All years

# 14 452

#13 AND #10

Indexes=SCI-EXPANDED Timespan=All years

# 13 7,632

TOPIC: (arthroscop\* NEAR/6 (releas\* or decompress\* or capsulotom\*)) OR TOPIC: (capsular NEAR/2 releas\*) OR TOPIC: ("Musculoskeletal Manipulat\*") OR TOPIC: (manipulat\* NEAR/3 (anesthesia or anaesthesia or anesthetic\* or anaesthetic\*)) OR TOPIC: (MUA) OR TOPIC: ("interventional microadhesiolysis") OR TOPIC: (capsulotomy)

Indexes=SCI-EXPANDED Timespan=All years

# 12 68

#11 AND #10

Indexes=SCI-EXPANDED Timespan=All years

# 11 45,556

TOPIC: (arthrograph\* NEAR/6 (distension\* or distention\*)) OR TOPIC: (arthrogram\* NEAR/6 (distension\* or distention\*)) OR TOPIC: (glenohumeral NEAR/6 (distension\* or distention\*)) OR TOPIC: (dilatation or hydrodilat\*)

Indexes=SCI-EXPANDED Timespan=All years

# 10 11,243

#9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1

Indexes=SCI-EXPANDED Timespan=All years

# 9 536

TOPIC: ("subacromial impingement syndrome")

Indexes=SCI-EXPANDED Timespan=All years

# 8 1,226

TOPIC: (shoulder\* NEAR/6 impinge\*)

Indexes=SCI-EXPANDED Timespan=All years

# 7 8,484

TOPIC: (shoulder\* NEAR/3 (pain or pains or painful or complain\*))

Indexes=SCI-EXPANDED Timespan=All years

# 6 114

TOPIC: ((periarthritis or peri-arthritis or periarthritides or peri-arthritides or peri-capsulitis or pericapsulitis) NEAR/6 shoulder\*)

Indexes=SCI-EXPANDED Timespan=All years

# 5 325

TOPIC: ((capsulitis or capsulitides) NEAR/6 shoulder\*)

Indexes=SCI-EXPANDED Timespan=All years

# 4 104

TOPIC: ((bursitis or bursitides) NEAR/6 shoulder\*)

Indexes=SCI-EXPANDED Timespan=All years

# 3 928

TOPIC: (adhesive NEAR/6 (capsulitis or capsulitides))

Indexes=SCI-EXPANDED Timespan=All years

# 2 666

TOPIC: (stiff\* NEAR/6 shoulder\*)

Indexes=SCI-EXPANDED Timespan=All years

# 1 1,415

TOPIC: (frozen NEAR/6 shoulder\*)

Indexes=SCI-EXPANDED Timespan=All years

## **Clinicaltrials.gov**

**Search date=7<sup>th</sup> December 2018**

**Records retrieved = 67**

Three separate searches were conducted, the results were downloaded and combined in one Endnote library to give 67 unique records

The first search “adhesive capsulitis” identified 50 records

The second search “frozen shoulder” identified 47 records

The third search “stiff shoulder” identified 9 records

## WHO International Clinical Trials Registry Platform

Search date=11<sup>th</sup> December 2018

Records retrieved = 54

Three separate searches were conducted, the results were downloaded and combined in one Endnote library to give 54 unique records

The first search “adhesive capsulitis” identified 37 records

The second search “frozen shoulder” identified 27 records

The third search “stiff shoulder” identified 4 records

### Additional tables

**Table i.** Treatment description and eligibility criteria.

Study details	Trial treatments	Eligibility criteria
UK FROST Three arm RCT  n = 503 ACR: n = 203 MUA: n = 201 Steroid + Physio: n = 99	<b>ACR with MUA:</b> - Arthroscopic release under GA of contracted rotator interval and anterior capsule followed by MUA. Postoperative analgesia including nerve blocks allowed  - A programme of physiotherapy of up to 12 weeks  - Information leaflet about advice on pain management and home exercise programme  - Steroid injection avoided during physiotherapy  - Pain meds allowed  <b>MUA:</b> - Shoulder manipulated to stretch and tear the tight capsule and to improve range of movement. intra-articular corticosteroid injection to the glenohumeral joint unless contraindicated. Postoperative analgesia including nerve blocks allowed  - A programme of physiotherapy of up to 12 weeks  - Information leaflet about advice on pain management and home exercise programme	<b>Inclusion criteria:</b>  - Aged 18 years or older  - Present with a clinical diagnosis of frozen shoulder characterised by restriction of passive external rotation in the affected shoulder to less than 50% of the contralateral shoulder  - Have radiographs that exclude glenohumeral arthritis and other pathology  <b>Exclusion criteria:</b>  - Have a bilateral concurrent frozen shoulder  - Have a frozen shoulder secondary to trauma  - Have a frozen shoulder secondary to other causes

Study details	Trial treatments	Eligibility criteria
	<ul style="list-style-type: none"> <li>- Steroid injection avoided during physiotherapy</li> <li>- Pain meds allowed</li> </ul> <p><b>Steroid + Physio:</b></p> <ul style="list-style-type: none"> <li>- Up to 12 sessions of structured physiotherapy over 12 weeks comprised of essential 'focussed physiotherapy' and optional 'supplementary physiotherapy'</li> <li>- 'Focussed physiotherapy' include an information leaflet containing education, advice on pain management and function; an intra-articular steroid injection and 'hands-on' mobilisation techniques and instruction on a graduated home exercise programme</li> <li>- Pain meds allowed</li> </ul>	<ul style="list-style-type: none"> <li>- Trial treatments are contraindicated</li> <li>- Not resident in a catchment area of a trial site</li> <li>- Lack mental capacity to understand the trial or instructions for treatment</li> </ul>
<p>De Carli et al. 2012</p> <p>Two arm RCT</p> <p>n = 46 ACR: n = 25 Steroid + Physio: n = 21</p>	<p><b>ACR with MUA:</b></p> <ul style="list-style-type: none"> <li>- Included shoulder manipulation</li> <li>- Glenohumeral circumferential capsular release</li> <li>- Passive exercises from first postoperative day</li> <li>- Active strengthening from fifth postoperative week</li> </ul> <p><b>Steroid and Physio:</b></p> <ul style="list-style-type: none"> <li>- Peri-capsular injection of local anaesthetic (2 to 3 cc of 2% lidocaine) followed by Glenohumeral Steroid injection (4 cc of 2% lidocaine and 1 cc of methylprednisolone acetate (Depo-medrol) under ultrasound guidance</li> <li>- A cycle of three steroid infiltrations-one each for 3 weeks</li> <li>- Intensive physical therapy protocol started day after first injection</li> <li>- Included manual schedule led by physiotherapist along with self-exercises</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- A clinical history of pain and restriction of passive and active ROM of the shoulder for at least three months</li> <li>- A diagnosis of stage II adhesive capsulitis according to Reeves et al</li> <li>- Unsatisfactory outcome after conservative protocol (e.g. physical therapy, oral nonsteroidal anti-inflammatory medications)</li> </ul> <p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Presence of calcific tendonitis or severe glenohumeral arthritis on radiograph</li> </ul>

Study details	Trial treatments	Eligibility criteria
<p>Gallacher et al. 2018 Two-arm RCT</p> <p>n = 50 ACR: n = 25 Hydro: n = 25</p>	<p><b>ACR:</b></p> <ul style="list-style-type: none"> <li>- Under interscalene blockade and light GA</li> <li>- Included anterior release, superior and posterosuperior capsular release</li> <li>- Posterior release for patients with poor internal rotation</li> <li>- Performed using radiofrequency</li> <li>- Included gentle shoulder manipulation to affect the inferior release and steroid injection (80 mg of methylprednisolone, and 10 ml of 0.5% bupivacaine)</li> <li>- Instructed on Codman exercises along with a standardized physiotherapy regimen</li> </ul> <p><b>Hydrodilatation:</b></p> <ul style="list-style-type: none"> <li>- Performed by consultant musculoskeletal radiologist under fluoroscopic guidance</li> <li>- A mixture of 1 ml of triamcinone (80 mg), 4 ml of local anaesthetic (2% lidocaine), and 40 ml of normal saline was injected into the GH joint slowly and with pressure. Same volume used for all patients</li> <li>- Injection was continued until the capsule ruptured</li> <li>- Instructed on Codman exercises along with a standardized physiotherapy regimen</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Aged 18 years and older</li> <li>- Diagnosis of idiopathic frozen shoulder and with normal anteroposterior and axillary radiographs</li> <li>- Had at least 3 months duration of symptoms</li> <li>- Course of physiotherapy had failed</li> </ul> <p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Medical contraindication to surgery</li> <li>- Perioperatively determined secondary cause of frozen shoulder</li> <li>- Rotator cuff tears found at the time of surgery or hydrodilatation</li> <li>- Evidence that the patient would be unable to adhere to trial procedures or complete questionnaires</li> </ul>
<p>Jacobs 2009 Two arm RCT</p> <p>n = 53 MUA: n = 28 Hydro: n = 25</p>	<p><b>MUA:</b></p> <ul style="list-style-type: none"> <li>- Patient's arm was manipulated into full adduction and forward flexion, full external rotation, full internal rotation, and finally, full abduction</li> <li>- Exercises shown by a physiotherapist</li> <li>- Home exercises</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Aged 40 to 75 years</li> <li>- Have primary frozen shoulder</li> <li>- Every patient was assessed by the senior author</li> </ul>

Study details	Trial treatments	Eligibility criteria
	<p><b>Hydrodilatation:</b></p> <ul style="list-style-type: none"> <li>- Received 3 GH injection treatments with a steroid and distension at 6-week intervals</li> <li>- Local anaesthetic (40 mg of triamcinolone (in 1 ml), 5 ml of 2% lignocaine, 10 ml of 0.25% bupivacaine) and 5 ml of air (to check capsular rupture) used. Same volume for all patients</li> <li>- Instruction leaflet detailing the same exercises as MUA</li> <li>- Home exercises</li> </ul>	<p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Additional or alternative pathologies</li> <li>- Patients with medical conditions such as diabetes type 1 or 2</li> <li>- Have received a steroid injection into the affected shoulder previously</li> </ul>
<p>Kivimaki 2007</p> <p>Two arm RCT</p> <p>n = 125</p> <p>MUA: n = 65</p> <p>Supportive care: n = 60</p>	<p><b>MUA:</b></p> <ul style="list-style-type: none"> <li>- The upper arm manipulated in flexion and abduction while supporting the scapula against the thoracic cage</li> <li>- The shoulder stretched into flexion, then elbow flexed to a right angle, and the upper arm gently rotated into internal and external rotation</li> <li>- Physiotherapy advice in 2 sessions</li> <li>- Written instructions (included pendulum exercises and stretching techniques)</li> <li>- Home exercises</li> </ul> <p><b>Supportive care:</b></p> <ul style="list-style-type: none"> <li>- Physiotherapy advice in 2 sessions</li> <li>- Written instructions (included pendulum exercises and stretching techniques)</li> <li>- Home exercises</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Adult patients with gradually increasing shoulder pain and stiffness were included in the study.</li> <li>- Shoulder mobility of no more than 140° in elevation and 30° in external rotation was allowed</li> </ul> <p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Arthritis, osteoarthritis, or traumatic bone or tendon changes in the affected shoulder</li> <li>- A rotator cuff rupture</li> </ul>
<p>Mukherjee et al 2017</p> <p>Two arm RCT</p> <p>n = 60</p> <p>ACR: n = 30</p> <p>Steroid +</p>	<p><b>ACR:</b></p> <ul style="list-style-type: none"> <li>- 360° ACR under GA involving excising the tissues in the rotator interval up to the coracoids process, division of the superior, middle and inferior glenohumeral ligaments and release of the anterior, posterior, superior, and inferior capsule</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Idiopathic stiffness of the shoulder with global restriction of movements for min six months</li> <li>- Normal findings on plain radiograph</li> </ul>

Study details	Trial treatments	Eligibility criteria
Physio: n = 30	<ul style="list-style-type: none"> <li>- Subacromial bursa was not viewed</li> <li>- Physio with active and passive range of motion exercises</li> <li>- Pain killers (NSAID with tramadol)</li> </ul> <p><b>Steroid and Physio:</b></p> <ul style="list-style-type: none"> <li>- Single dose of steroid injection (40 mg methylprednisolone acetate) along with local anaesthetic (3 ml of 2% lignocaine) injected into the affected shoulder without image guidance through the posterior approach</li> <li>- Physio with active and passive range of motion exercises</li> <li>- Pain killers (NSAID with tramadol)</li> </ul>	<ul style="list-style-type: none"> <li>- Global restrictions would imply decrease in active and passive movements in all directions</li> </ul> <p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Prior history of trauma</li> <li>- Surgery or injections to the shoulder</li> <li>- Received treatment to the affected shoulder other than physiotherapy</li> </ul>
Mun and Baek 2016 Two arm RCT  n = 136 Hydro: n = 67 Steroid + Physio: n = 69	<p><b>Hydrodilatation:</b></p> <ul style="list-style-type: none"> <li>- By interventional radiologist following ultrasound-guided interscalene block (20 ml of 1% lidocaine)</li> <li>- A mixture of steroid (1 ml triamcinolone (40 mg)), local anaesthetic (10 ml 1% lidocaine), and 30 ml saline solution was injected GHJ to expand the capsule.</li> <li>- Outflow of injection solution to the subscapular bursa confirmed on US</li> <li>- Painkillers (oral NSAIDs) for 2 weeks</li> <li>- Rehabilitation exercise guided by a professional physical therapist twice a week for a month</li> <li>- Home exercises based on self-exercise program booklet</li> </ul> <p><b>Steroid and Physio:</b></p> <ul style="list-style-type: none"> <li>- GH joint injection under ultrasonographic guidance by orthopaedic specialist</li> <li>- A mixture of steroid (1 ml triamcinolone (40 mg)) and local anaesthetic (5 ml 1% lidocaine) used</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Continuous pain in the shoulder joint not responding to medication and physical therapy</li> <li>- Limitation of shoulder motion in at least 2 directions; forward flexion limited to 120° or less; &lt; 50% range of external rotation and internal rotation compared to opp. shoulder</li> <li>- No abnormal findings on radiologic examination and ultrasonography</li> <li>- Symptom duration minimum 3 months</li> <li>- Availability for follow-up for a minimum of 1 year</li> </ul>



Study details	Trial treatments	Eligibility criteria
	<ul style="list-style-type: none"> <li>- Painkillers (oral NSAIDs) for 2 weeks</li> <li>- Rehabilitation exercise guided by a professional physical therapist twice a week for a month after 2 weeks of injection</li> <li>- Home exercises based on self-exercise programme booklet</li> </ul>	<p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Patients with abnormal findings on radiological examination</li> <li>- Secondary frozen shoulder</li> <li>- History of surgery for rotator cuff tears, shoulder dislocations, or fractures</li> </ul>
<p>Quraishi 2007 Two arm RCT</p> <p>n = 36 MUA: n = 17 Hydro: n = 19</p>	<p><b>MUA:</b></p> <ul style="list-style-type: none"> <li>- MUA consisted of restoration of shoulder movement following a specific protocol to ensure safe breakage of adhesions by using a short lever arm</li> <li>- A mixture of local anaesthetic (2 ml of 2% lignocaine) and steroid (30 mg (0.75 ml) of triamcinolone acetonide) injected anteriorly into GH joint</li> <li>- Permitted to resume normal activities with self-exercise programme</li> </ul> <p><b>Hydrodilatation:</b></p> <ul style="list-style-type: none"> <li>- Performed by consultant radiologist through an anterior approach into GH joint</li> <li>- Saline solution injected until the capsule ruptured (between 10 ml and 55 ml used, usually 30 ml to 40 ml to cause rupture)</li> <li>- Position checked by image intensifier</li> <li>- Permitted to resume normal activities as soon as possible with self-exercise programme</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Aged over 18 years</li> <li>- Stage II primary adhesive capsulitis</li> <li>- Global loss of shoulder movement; restriction of external rotation to less than 50% of normal</li> <li>- Normal anteroposterior and axillary lateral radiographs of the glenohumeral joint</li> </ul> <p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Post-traumatic or other extrinsic cause;</li> <li>- Suspected osteoporosis</li> <li>- Unfit for general anaesthesia</li> </ul>
<p>Smitherman 2015 Two arm RCT</p>	<p><b>ACR:</b></p> <ul style="list-style-type: none"> <li>- Included release of the rotator interval, anterior capsule, inferior capsule, and posterior capsule with radiofrequency and under regional nerve block</li> </ul>	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>- Diagnosis of adhesive capsulitis</li> <li>- Progressive loss of 40° ER of GH joint with</li> </ul>



Description		UK FROST	De Carli, 2012	Gallacher et al, 2018	Jacobs, 2009	Kivimaki, 2007	Mukherjee et al, 2017	Mun and Baek, 2016	Quraishi, 2007	Smitherman, 2015
	6 weeks		✓	✓	✓	✓		✓		✓
	8 weeks						✓			
	12 weeks / 3 months	✓	✓	✓	✓	✓	✓	✓		✓
	16 weeks				✓ <sup>†</sup>		✓			
	20 weeks						✓			
	24 weeks							✓		
	6 months	✓	✓	✓ <sup>‡</sup>	✓	✓			✓	
	48 weeks							✓		
	12 months	✓ <sup>‡</sup>	✓		✓	✓				✓
	18 months				✓					
	24 months				✓					
<b>Number randomized</b>	MUA	201			28	65			17	
	ACR	203	25	25			30			13
	Steroid and Physio	99	21				30	69		
	Hydrodilatation			25	25			67	19	
	Supportive care					60				13
<b>Number dropped out (%)</b>	MUA	18 (8.96)			9 (32.14)	28 (43.08)			2 (11.76)	
	ACR	28 (13.79)	2 (8)	6 (24)			2 (6.67)			3 (23.08)
	Steroid + Physio	11 (11.11)	0 (0)				2 (6.67)	8 (11.59)		

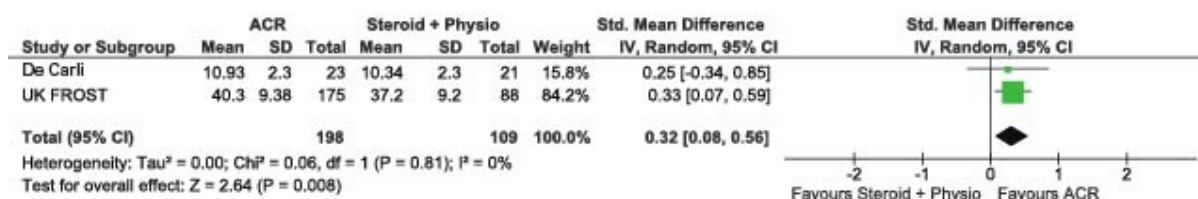
Description		UK FROST	De Carli, 2012	Gallacher et al, 2018	Jacobs, 2009	Kivimaki, 2007	Mukherjee et al, 2017	Mun and Baek, 2016	Quraishi, 2007	Smitherman, 2015
	Hydrodilatation			5 (20)	1 (4)			7 (10.45)	1 (5.26)	
	Supportive care					18 (30)				6 (46.15)

ACR, arthroscopic capsular release; MUA, manipulation under anaesthesia.

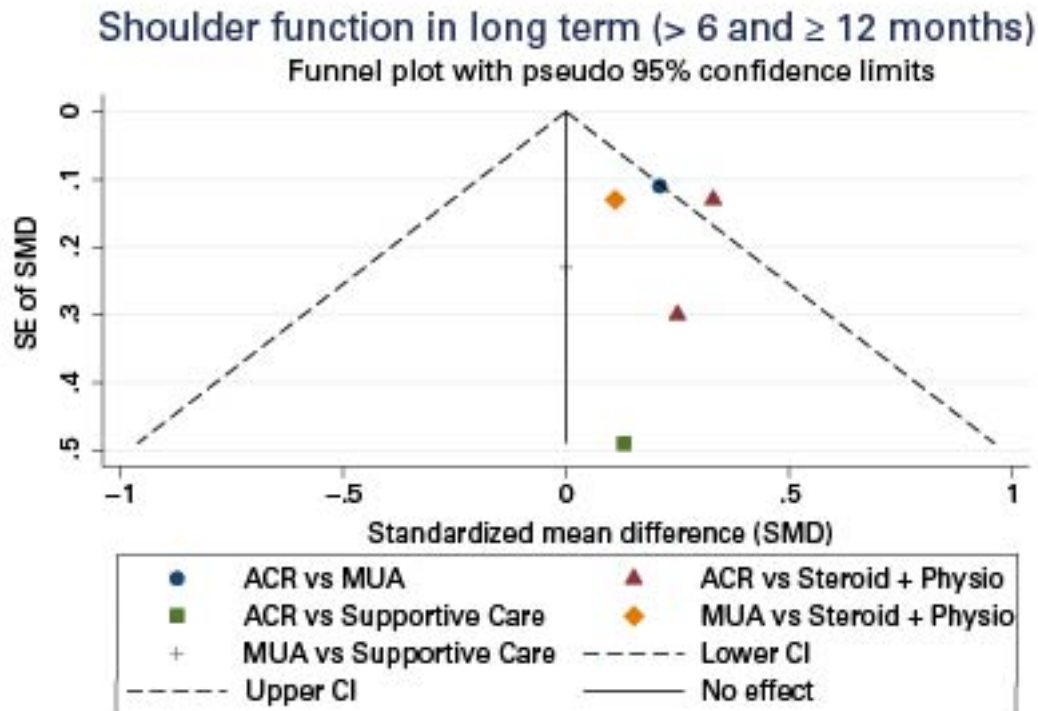
\* De Carli follow-up timepoints were from the date of intervention (not baseline).

† Jacobs reported results for 16 weeks but it was unclear whether data was collected at an unscheduled follow-up or whether this was an analytic adjustment.

‡ Primary endpoint.



**Figure a.** Shoulder function in the long term (12 months): arthroscopic capsular release (ACR) versus Steroid + Physiotherapy. CI, confidence interval; IV, inverse variance; SD, standard deviation.



**Figure b.** Shoulder function scores\* in the long term (> 6 and ≤ 12 months). Shoulder Disability Questionnaire and Shoulder Pain Disability Index Scores were reversed so that positive result implies better outcome. This was done to be consistent with other shoulder scores (e.g. OSS and SST). ACR, arthroscopic capsular release; CI, confidence interval; MUA, manipulation under anaesthesia; OSS, Oxford Shoulder Score; SE, standard error; SST, Simple Shoulder Test.