

SUPPLEMENTARY FILE 1: Updated search of the systematic review of non-surgical treatment for people with lateral patellar dislocations by Moiz and colleagues 2018, along with a flow diagram depicting the search and screening process and a table synthesising the non-surgical interventions in retrieved studies

Search strategy

MEDLINE via EBSCOhost, searched on 19 April 2022	
S11	S8 NOT S9 Limiters - Date of Publication: 20170801-20221231
S10	S8 NOT S9
S9	MH "Animals" NOT MH "Humans"
S8	S4 AND S7
S7	S5 OR S6 (MH "Orthotic Devices+" OR MH "Physical and Rehabilitation Medicine+" OR MH "Physical Therapy Modalities+" OR MH "Physical Therapy Specialty" OR MH "Immobilization+") OR MW "Rehabilitation AB ("non-operative*" or nonoperative* or conservative* or physiotherap* or "physical therap*" or rehab* or exercis* or "manual therap*" or mobilis* or mobiliz* or massage or orthotic* or orthosis or orthoses or brace* or bracing or immobilis* or immobiliz* or "electronic stimulation" or "electrical stimulation" or "muscle stimulation" or tape* or
S6	taping or electrotherap* or "electro- therap*" or biofeedback or "bio-feedback" or cast or casts or casting or rest or resting or bandag* or "muscle strengthening" or "leg raise*" or cycling or bicycling or stretches or stretching or training or balance or sport or sports or jogging or running or crutch* or "weight bearing" or weightbearing or ice or elevat* or nonsurgical or "nonsurgical" or ultrasound)
S5	
S4	S1 OR S2 OR S3
S3	MH "Patellar Dislocation"
S2	MH "Patella" AND (MH "Joint Instability" OR MH "Joint Dislocations")
S1	(patell* or kneecap* or "knee cap*") N3 (dislocat* or instability or sublux* or unstable)

Embase via Ovid, searched on 12 April 2022

- ("non-operative*" or nonoperative* or conservative* or physiotherap* or "physical therap*" or rehab* or exercis* or "manual therap*" or mobilis* or mobiliz* or massage or orthotic* or orthosis or orthoses or brace* or bracing or immobilis* or immobiliz* or "electronic stimulation" or "electrical stimulation" or "muscle stimulation" or tape* or taping or
- 1 electrotherap* or "electro-therap*" or biofeedback or "bio-feedback" or cast or casts or casting or rest or resting or bandag* or "muscle strengthening" or "leg raise*" or cycling or bicycling or stretches or stretching or training or balance or sport or sports or jogging or running or crutch* or "weight bearing" or weight-bearing or ice or "nonsurgical non-surgical" or ultrasound).ti,ab.
- 2 exp physiotherapy/
3 exp rehabilitation/
4 rehabilitation medicine/
5 exp orthosis/
6 conservative treatment/
7 exp exercise/
8 1 or 2 or 3 or 4 or 5 or 6 or 7
9 patella/ and (dislocation/ or joint instability/ or subluxation/)
10 patella dislocation/
11 (patell* adj3 (dislocat* or instability or sublux* or unstable)).ti,ab.
12 (kneecap* adj3 (dislocat* or instability or sublux* or unstable)).ti,ab.
13 (knee cap* adj3 (dislocat* or instability or sublux* or unstable)).ti,ab.
14 9 or 10 or 11 or 12 or 13
15 8 and 14
16 limit 15 to yr="2017 -Current"
-

Types of study considered: Only randomised controlled trials (RCTs) and observational studies (except single-patient case reports) of non-surgical treatment or studies that compared surgical versus non-surgical treatment if the non-surgical treatment contained sufficient data that could be extracted. We excluded abstracts and studies that only evaluated immobilisation/bracing or included patients with genetic or connective tissue disorders as these were not the focus of the PRePPeD study. We also excluded our preliminary study.

Screening process: The lead author (CF) uploaded retrieved records to Rayyan systematic review software. After deduplicating retrieved records, CF first screened the titles and abstracts (where necessary) and then the full texts of potentially eligible studies.

Flow diagram of the updated search and screening process

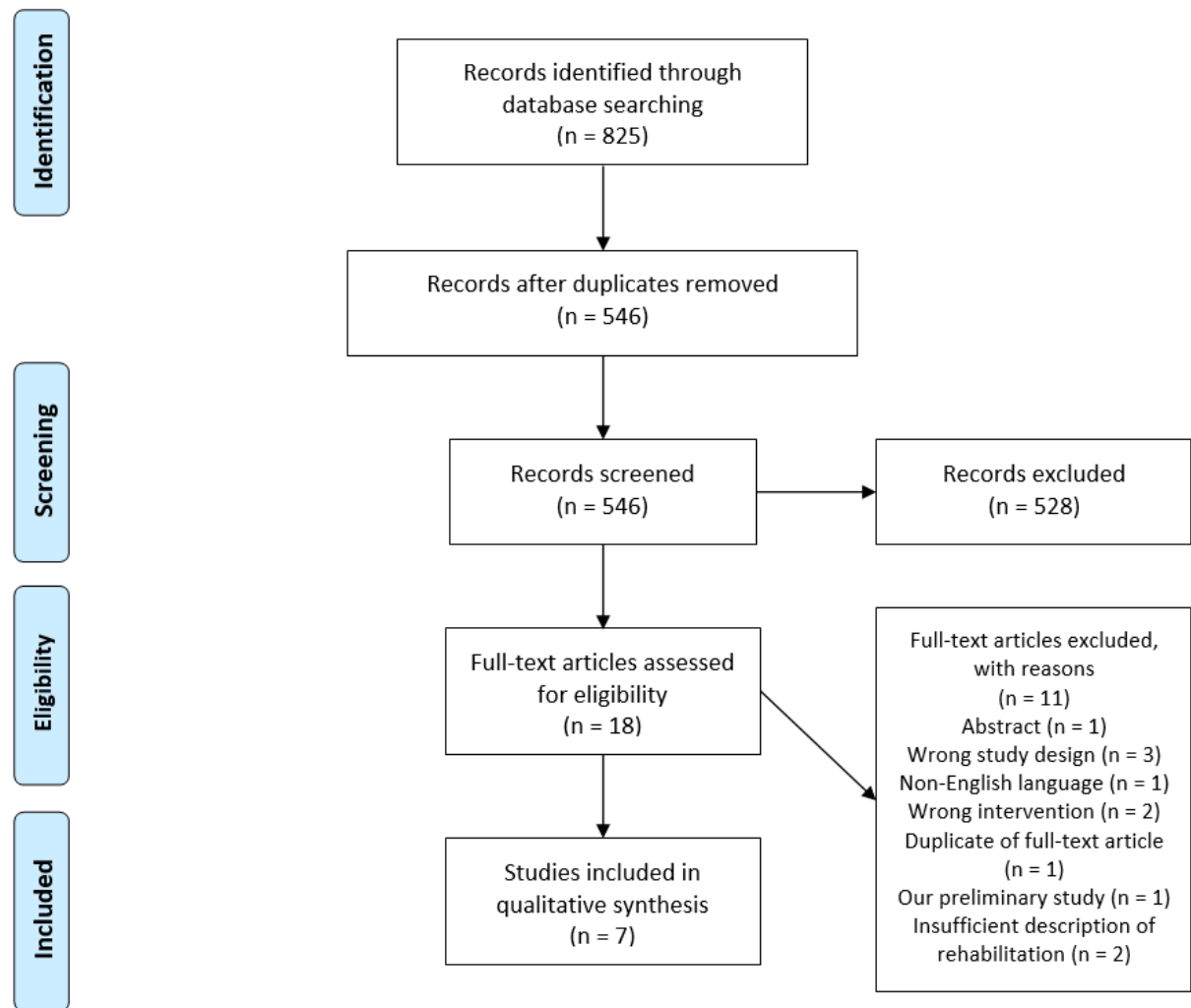


Table Synthesis of non-surgical interventions in retrieved studies

Authors (publication year); country	Study design	Sample size	Age; injury characteristics	Non-surgical intervention
Askenberger et al (2018), ¹⁹ Sweden	RCT	Total: 74 Non-surg: 37	13.03 (1.14) years; first- time acute LPD	FWB in laterally stabilising soft knee brace for 4 weeks and physical therapy. Therapists had specialised paediatric patellofemoral rehabilitation knowledge Education/advice: NR Exercise: focussed on strength and functional training including gluteal and core muscle training
Brightwell et al (2022), ¹⁴ USA	RCT protocol	Total target: 78	Eligible ages 14-40 years; first-time or recurrent traumatic patellar dislocation ≤3 months before enrolment	BFRT and standard physical therapy Standard care: 3 sessions/week face-to-face for 8 weeks. Sessions about 40 mins and address pain modulation, ROM, neuromuscular re-education, balance, and gait. Tailored to participants' injury severity and goal of return to sport. Education/advice: NR BFRT: performed at end of standard care sessions. Cuff placed on proximal thigh and inflated for quadriceps exercises. Limb arterial occlusion pressure set to manufacturer's instructions. Participants perform 4-5 hip and quadriceps strengthening exercises (single leg press, seated single leg knee extension, single leg forward step-ups progressed to forward step downs when tolerated, and resisted double leg squats) each lasting 5 mins, and 20 mins in total. Exercise intensity monitored and progressed by therapist. Criteria for exercise progression and return to sport provided. Sham BFRT and standard physical therapy Standard care: as above Education/advice: NR Sham BFRT: as above with cuff pressure set at a sub-clinical level
Lee and Yau (2017), ²⁰ Hong Kong	Cohort	Total: 41 Non-surg: 16	23.6 (range 13-44) years; first time and recurrent patellar dislocation	First-time sub-acute (>3 weeks from injury) dislocators Patellar stabilising brace for 6 weeks and supervised physiotherapy for 6 weeks to 3 months focussed on quadriceps strengthening and ROM exercises. Education/advice: avoid pivoting sports for 6 months Exercise: see above First-time acute (≤3 weeks from injury) dislocators who refuse surgery As above with rehabilitation normally lasting 4 to 6 months before returning to full activity is permitted Education/advice: as per sub-acute dislocators Exercise: as per sub-acute dislocators Recurrent dislocators who refuse surgery Education/advice: conservative treatment consisting of 3-6 months of supervised physiotherapy advised Exercise: NR
Liebensteiner et al (2021), ¹⁸ country unclear	RCT protocol	Total target: 128 Non-surg: 64	Eligible ages ≤45 years; acute first- time dislocation	Joint aspiration performed if there is a haemarthrosis and danger of soft-tissue or skin exposure. Motion restricting knee brace with lateral support used: Phase 1 (week 1-2): brace ROM limited 0-20-40° PWB Phase 2 (week 3-4): brace ROM 0-10-60°, progress to FWB, focus on quadriceps recruitment (especially vastus medialis) Phase 3 (week 5-8): brace ROM 0-0-90°, restore ADL's, core stability and sensorimotor and strength training Phase 4 (weeks NR): gradually return to sports, depending on the type and previous level of sports activity Education/advice: NR

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Authors (publication year); country	Study design	Sample size	Age; injury characteristics	Non-surgical intervention
				Exercise: see above
Rahman et al (2020), ¹⁵ UK	Feasibility RCT	Total: 19 Non-surg: 9	Median 24 (IQR 16-48) years; first time or recurrent LPD with ≥6 months of subjective patellar instability	Minimum 6 one-to-one face-to-face physiotherapy sessions over minimum 3 months (more sessions permitted if needed). Session 1 recommended to last 30-60 mins. Education/advice: individualised and explained factors influencing patellar instability and how these are modifiable with rehabilitation. Physiotherapists' assessment aimed to elicit participant's fears, perceived threats, barriers to treatment adherence, and expectations. At the end of treatment, physiotherapists advised participants to perform a functional test monthly to monitor physical performance. Individualised goal setting based on participant's fears and functional requirements also used. Exercise: prescribing 3 exercises at a time recommended. Physiotherapy principles were to reduce pain and swelling, optimise ROM, quadriceps strength, and proximal and distal alignment, and ensure minimal pain with exercise. Guidance provided to physiotherapists on progression through rehabilitation phases.
Straume- Næsheim et al (2022), ¹⁷ Norway	RCT	Total: 61 Non-surg: 31	19.9 (5.5) years; non- acute recurrent patellar dislocation	Education/advice: patellar bracing or McConnell taping recommended for first year in high-risk situations Exercise: physiotherapist at study site provided instructions and a home exercise programme: inner range quadriceps extension, forward step downs, forward step up, forward lunge, sideward lunge, squat on unstable surface, single leg stand on unstable surface with band around both legs and moving contralateral leg, and forward lunge onto unstable surface. Patient referred to an external physiotherapist for follow up.
Zheng et al (2019), ¹⁶ China	Non- randomised controlled trial	Total: 69 Non-surg: 39	17.9 (15-26) ¹ years; acute first-time LPD	1 or more aspirations performed for pain relief. Week 0-3: NWB in a hinged knee brace allowing 0-30° passive motion Week 3-6: PWB as tolerated, flexion progressed to 90° Week 6: removal of brace and performance of active knee ROM and FWB exercises allowed Education/advice: return to sport activities encouraged at about 6 months Exercise: quadriceps strengthening exercises started as soon as tolerable for the participant

Values are mean (standard deviation) unless otherwise stated; ¹Measure of dispersion not reported; ADL's: activities of daily living; BFRT: blood flow restriction training; FWB: full weight bearing; IQR: interquartile range; LPD: lateral patellar dislocation; Mins: minutes; Non-surg: Non-surgical; NR: not reported; PWB: partial weight bearing; RCT: randomised controlled trial; ROM: range of movement