

Specific Question:

In adults with chronic anterior knee pain are Vastus Medialis Oblique (VMO) strengthening exercises alone more effective in reducing pain and improving function than general lower limb strengthening exercises?

Clinical bottom line

A small RCT of poor quality evidence shows that performing Vastus Medialis Oblique (VMO) exercises alone has no benefit over a general lower limb strengthening exercise programme for reducing chronic anterior knee pain and improving function. Physiotherapists should not overly focus on VMO selective activation alone in patients with chronic anterior knee pain.

Why is this important?

Exercises strengthening the VMO muscle are used in Physiotherapy practice to help with patellar tracking, alignment and reduce anterior knee pain. These exercises are sometimes used in isolation or incorporated into a broader lower limb strengthening exercise regime.

Physiotherapy clinicians have asked the question to see if there is any benefit in spending sessions of physiotherapy specifically concentrating on VMO exercises alone or whether a general lower limb strengthening exercise programme is as effective in reducing anterior knee pain in adults.

Search timeframe (e.g. 2006-2016)

Inclusion Criteria

	Description	Search terms
Population and Setting	Adults (18+) Anterior knee pain Chronic (>3 months)	KNEE PAIN OR anterior knee pain" OR "patellofemoral joint pain" PATELLOFEMORAL PAIN SYNDROME. OR patellar maltracking" OR "patellar malalignment"
Intervention or Exposure	VMO strengthening exercises	ISOKINETIC EXERCISES OR ISOMETRIC EXERCISES OR "strengthening exercises" OR VASTUS MEDIALIS MUSCLES OR "vastus medialis oblique

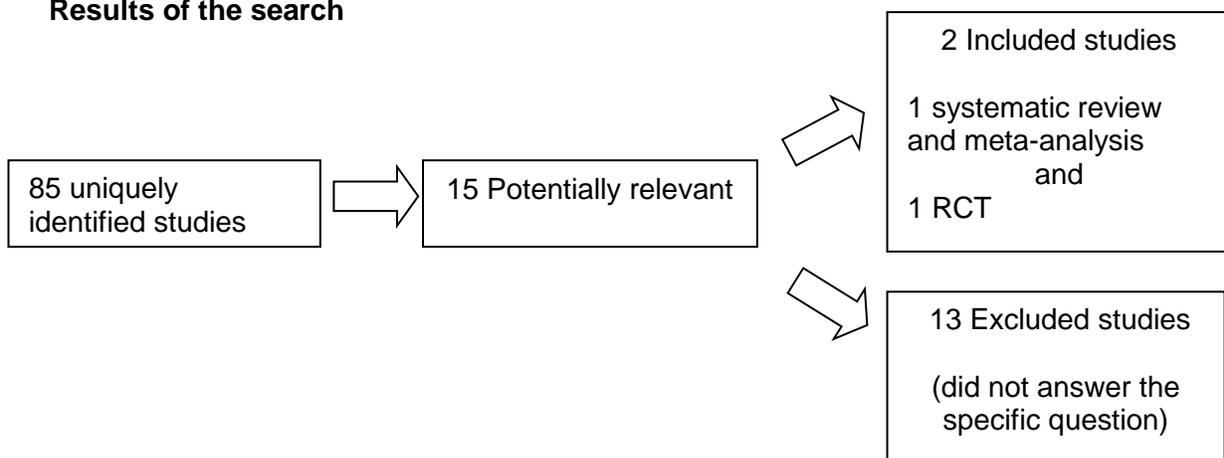
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Comparison, if any	General lower limb strengthening exercises	("quadriceps strengthening exercises" OR Knee exercises" or "gluteal strengthening exercises" or "gym programme") OR exp CYCLING OR exp WALKING.
Outcomes of interest	Primary: Anterior knee pain Function Secondary: Cost effectiveness	PAIN OR (pain adj4 reduc*). OR RECOVERY OR "recovery of function"OR "cost effectiveness"
Types of studies	Systematic Reviews Randomised Controlled Trials	

Routine Databases Searched

Clinical Knowledge Summaries, PEDro, BMJ Updates, Clinical Evidence, TRIP, Database, NICE, HTA, Bandolier, The, Cochrane Library, Medline, Cinahl, Embase, PsycInfo, Professional websites. Joanna Briggs Institute, Web of science, Sports discus and Pub med

Date of search- October 2015
Results of the search



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Table 1- Detail of included studies

First Author, year and type of study	Population and setting	Intervention or exposure tested	Study results	Assessment of quality and comments
Clijisen, R 2014 SR and Meta-analysis	15 studies 748 participants (adults)	SR included RCTs comparing: <ul style="list-style-type: none"> • Exercise therapy vs no exercise (6 studies) • Exercise vs exercise with additive therapy (EMS or splints) (4 studies) • Knee extension exercises and other forms of exercises (including hip strengthening exercises and lower limb strengthening exercises) (5 studies) 	There is not enough evidence to prefer one specific exercise intervention over another to answer this CAT question Exercise vs no exercise shows Short terms effect < 12 weeks in reducing patellofemoral pain and 'patient reported measures of activity limitations and participation restrictions' (PRMALP)	Moderate quality Systematic review and meta-analysis Studies included were of variable quality and small numbers Literature search performed according to the PRISMA statement 201-2013 Language bias= limited to English and German PEDro rating used
Syme, G 2009 RCT	n= 69 Aged 16-40 Unilateral or bilateral patellofemoral pain > 3 months Recruited from a hospital orthopaedic clinic, Scotland	Randomised into three groups (n=23) 1) VMO selective activation treatment approach <i>'McConnell' approach used- VMO home exercises daily, 6 sessions of Physio over 8 week period,</i>	The study demonstrated that both general quadriceps strengthening exercises and VMO specific training reduced pain and improved activity but no differences between the approaches at 8 weeks.	Small study Underpowered- n=28 needed in each group Otherwise a good quality study with detailed treatments in each group Assessor blind

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	<p>Anterior or retro-patellar knee pain reported on at least two of the following: prolonged sitting, ascending or descending stairs, squatting, running, kneeling, hopping/jumping</p>	<p><i>lower limb muscle stretches included, advice sheet on patellofemoral pain given, taping was allowed</i></p> <p>2) General quads strengthening group</p> <p><i>Supervised training session twice weekly over 8 weeks. Including 3-5 exercises, 1-3 exercise sets of 10 reps at 60-70% or one repetition max less than 5/10 pain, taping was allowed, patellofemoral pain advice sheet given, lower limb stretches given.</i></p> <p>3) Control: a no treatment group</p> <p>Treatment delivered by five Physios with > 5 years of MSK experience</p>		
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Summary

Based on a small, underpowered RCT there is limited evidence which suggests that a generalised lower limb strengthening programme produces comparable outcomes in pain and function when compared to VMO-specific training. A systematic review and meta-analysis showed a lack of good quality evidence to identify which exercise modality is best to reduce patellofemoral knee pain and improve function.

Implications for Practice/research

Exercise-therapy is recommended to reduce patellofemoral pain in the short-term but there is a lack of large high quality clinical trials to identify which type of exercise yields most pain reduction for patients with chronic knee pain.

The lack of detailed description of the exercise therapy interventions limits the translation of the research findings into clinical practice.

Some recent studies point towards the addition of hip strengthening exercises to knee strengthening protocols for the reduction of anterior knee pain. This could form another important CAT question of relevance to current musculoskeletal clinical practice.

What would you tweet? (140 characters)

No need to use VMO exercises in isolation for treating chronic anterior knee pain

Or

Focused VMO exercises no more effective than general lower limb strengthening for improving pain and function in chronic anterior knee pain (139 characters)

References

Clijisen R et al. Effectiveness of exercise therapy in treatment of patients with patellofemoral pain syndrome: A systematic review and meta-analysis. *Physical Therapy* 2014; 94 (12) 1697-17808
<https://doi.org/10.2522/ptj.20130310>

Syme G et al. Disability in patients with chronic patellofemoral pain syndrome: a randomised controlled trial of VMO selective training versus general quadriceps strengthening. *Manual Therapy* 2009; 14: 252-263
<https://doi.org/10.1016/j.math.2008.02.007>