

## Keele Critically Appraised Topic (CAT Form)



### Clinical Question

In an adult population with musculoskeletal pain, does adding a vitamin D supplement to usual care reduce pain and improve function and activity levels?

### Clinical bottom line

There is insufficient high-quality evidence to inform whether treatment of persistent MSK pain can be improved by vitamin D supplementation.

However, due to the risk of developing other health conditions, it is the recommendation that people at risk of vitamin D deficiency (see appendix A) take 400 µg daily throughout the year and all others to take the equivalent amount throughout the autumn/winter months (NICE, 2022). To enhance the 'make every contact count' approach, it is advised that musculoskeletal (MSK) clinicians recommend vitamin D supplementation to our patient groups.

[Please see the NICE Clinical Knowledge Summaries website regarding conditions which supplementation is not advisory Scenario: Management | Management | Vitamin D deficiency in adults | CKS | NICE.](#)

### Why is this important?

There is building information in the literature to suggest a formal link between lack of vitamin D and musculoskeletal pain ([IJMS | Free Full-Text | Vitamin D in Pain Management \(mdpi.com\)](#)). There is also national guidance to suggest that vitamin D supplements should be taken by adults in the UK due to a lack of exposure to sunlight, our bodies natural mechanism of synthesis. With this in mind and as the majority of people who attend our musculoskeletal or First Contact Physiotherapy (FCP) clinics have joint, muscle or persistent pain, we would like to determine whether we, as MSK clinicians, should be recommending vitamin D supplementation to our patient group. To facilitate this process we would like to know the answer to the above CAT question.

Search timeframe 2013-2023  
2015-2023

## Search criteria

<b>Population Intervention Comparison Outcomes (PICO) themes</b>	<b>Description</b>	<b>Search terms</b>
Population and Setting	Adult population with musculoskeletal pain, joint pain, muscle pain, persistent pain	Adults Over 18's Musculoskeletal pain Joint pain Muscle pain Multiple joint pain Persistent pain
Intervention or Exposure	Vitamin D supplementation/supplements	Vitamin D supplements/supplementat ion
Comparison, if any	Not taking supplements Physiotherapy Usual care Analgesia	Not taking vitamin D supplements Physiotherapy Usual care GP care Analgesia
Outcomes of interest	Pain levels Improved function Increased activity levels	Pain Increased activity Improved function
Types of studies	Systematic Reviews RCTs	

### 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

April 2023

Results of the search: include the number in each box

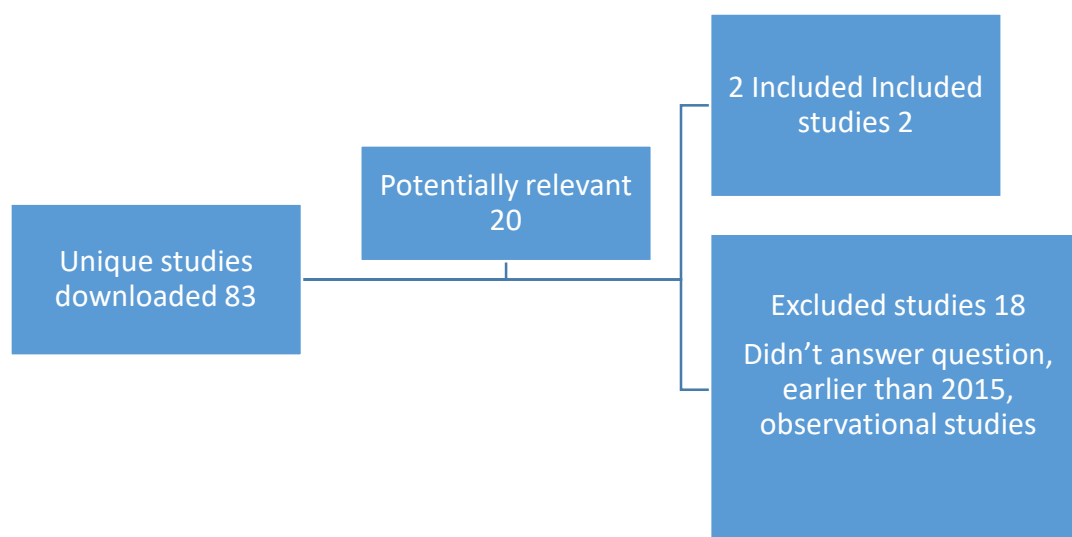


Table 1- Detail of included studies

<b>First author, year and type of study</b>	<b>Population and setting</b>	<b>Intervention or exposure tested</b>	<b>Study results</b>	<b>Assessment of quality and comments</b>
Straube 2015 Systematic review	10 RTC's looking at supplementation of vitamin D vs placebo in	Vitamin D supplementation in adults with chronic painful conditions. Varied	Due to data heterogeneity the data could not be pooled. Only 2 studies reported	The authors suggests interpreting the results with caution. The

<p>Zadro et al, 2018, systematic review and meta-analysis</p>	<p>adults (ages over 15), between 2009-2015.</p> <p>They looked at all types of chronic pain including RA, OA, fibromyalgia, PMR, non-specific MSK pain and diffuse MSK pain.</p> <p>8 clinical trials included (up to March 2017)</p>	<p>doses of vitamin D reported.</p> <p>Systematic review looking at vitamin D supplementation in low back pain population.</p>	<p>responder pain outcomes.</p> <p>There is some suggestion of benefit with fibromyalgia and non-specific MSK pain however evidence quality is low. Overall, there is no consistent pattern that vitamin D treatment was associated with greater efficacy than placebo in any chronic pain condition however evidence quality is again low. Small amount of supporting evidence for the use of vitamin D supplementation in chronic pain</p> <p>Vitamin D supplementation is no more effective than placebo, no intervention, or other conservative/pharmacological interventions for LBP. These results are consistent, regardless of the type of LBP or</p>	<p>evidence quality is low overall, due to methodological shortcomings.</p> <p>The overall quality of evidence was "very low" due to the poor methodological quality and small sample sizes of the included studies</p>
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			vitamin D supplementation.	
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## Summary

A literature review was completed with the above search timeframe and inclusion criteria in an attempt to survey the published literature completed after (and including) the Cochrane review by Straube in 2015. Eighty-three articles were originally retrieved of which seven were appraised. Within these seven articles there was one additional systematic review, the other six were randomised controlled trials. There were wide variation pieces of research, some suggesting a positive response of supplementation with vitamin D and some concluding no benefit with respect to pain.

The systematic review by Zadro in 2018 drew very similar conclusions to Straube who stated that there is weak evidence to support the use the vitamin D supplementation in patients with persistent pain and again highlighted the lack of good quality evidence to enable strong conclusions to be drawn. The CAT review included articles published after both Straube and Zadro but again cannot draw a conclusion to determine the benefits of vitamin D supplementation for people with persistent pain. However, we do recognise that there is literature to support vitamin D supplementation in a range of other health care conditions and national guidance which advises that if a patient is at risk of vitamin D deficiency (see appendix A) they should take year long supplementation and for all other adults in the UK it should be taken in winter months (NICE, 2022) and thus, from a MECC approach, we recommend that MSK clinicians ensure that this recommendation is made to patients attending our services. There are some co-morbidities with which vitamin D supplementation is not suggested, for a list of these please see NICE CKS [Scenario: Management | Management | Vitamin D deficiency in adults | CKS | NICE](#).

## Implications for practice

With respect to practice, we recommend that vitamin D supplementation is recommended as per the NICE Clinical Knowledge Summaries guidance published in 2022. We intend to ensure that patient information is available for distribution as appropriate in our clinical setting.

The two summaries from both the Straube and Zadro systematic reviews highlight the need for good quality research into this area to enable conclusions to be drawn.

## What would you post on X (previously Twitter)?

There is insufficient evidence that vitamin D reduces persistent MSK pain however national guidelines promote 400µg supplementation daily for adults at high risk of deficiency and between autumn/winter months for all other adults. NICE CKS lists those at high risk and

when vitamin D is not suggested ([Scenario: Management | Management | Vitamin D deficiency in adults | CKS | NICE](#)).

## References

Hussain et al, Vitamin D supplementation for the management of knee osteoarthritis: a systematic review of randomized controlled trials, *Rheumatol Int*, 2017, 37:1489–1498

Gendelman O, Itzhaki D, Makarov S, Bennun M, Amital H. A randomized double-blind placebo-controlled study adding high dose vitamin D to analgesic regimens in patients with musculoskeletal pain. *Lupus*. 2015 Apr;24(4-5):483-9.

Gao XR, Chen YS, Deng W. The effect of vitamin D supplementation on knee osteoarthritis: A meta-analysis of randomized controlled trials. *Int J Surg*. 2017 Oct;46:14-20.

Mottaghi. Effects of vit D supplementation on nonspecific MSK pain, QoL, self-related health and sexual satisfaction. A Randomised control trial. *Current topics in nutraceutical research* Vol. 17, No. 1, pp. 17–22, 2019

NHS Vitamin D, 2020 ([Vitamin D - NHS \(www.nhs.uk\)](http://www.nhs.uk))

NICE, Scenario: Management of vitamin D deficiency or insufficiency, 2022 (Scenario: Management | Management | Vitamin D deficiency in adults | CKS | NICE)

NICE, vitamin D supplements, 2022 ([Vitamin D supplements | Prescribing information | Vitamin D deficiency in adults | CKS | NICE](#))

Schlögl M, Chocano-Bedoya P, Dawson-Hughes B, Orav EJ, Freystaetter G, Theiler R, Kressig RW, Egli A, Bischoff-Ferrari HA. Effect of Monthly Vitamin D on Chronic Pain Among Community-Dwelling Seniors: A Randomized, Double-Blind Controlled Trial. *J Am Med Dir Assoc*. 2019 Mar;20(3):356-361.




Straube S, Andrew Moore R, Derry S, McQuay HJ. Vitamin D and chronic pain. *Pain*. 2009 Jan;141(1-2):10-3. doi: 10.1016/j.pain.2008.11.010. Epub 2008 Dec 11.

Zadro JR, Shirley D, Ferreira M, Carvalho Silva AP, Lamb SE, Cooper C, Ferreira PH. Is Vitamin D Supplementation Effective for Low Back Pain? A Systematic Review and Meta-Analysis. *Pain Physician*. 2018 Mar;21(2):121-145.

According to NICE, 2020, adults who are at higher risk of vitamin D deficiency include people:

- o Aged 65 years and over.

- o Who have low or no exposure to the sun, for example those who cover their skin for cultural, religious, or health reasons; who are housebound; or who are confined indoors for long periods.
- o Who have darker skin pigmentation, for example people of African, African-Caribbean, or South Asian origin
- o With a gastrointestinal or malabsorption disorder, or following weight loss surgery, resulting in a reduced ability to absorb fat-soluble vitamin D
- o With severe liver disease or end-stage chronic kidney disease (CKD)
- o Taking certain drugs that increase the risk of vitamin D deficiency.
- o Are pregnant or breastfeeding, due to the risk of foetal neonatal hypovitaminosis.
- o Are obese (body mass index greater than 30 kg/m<sup>2</sup>) — vitamin D may be sequestered into adipose tissue reducing bioavailability.

CAT image	Evidence quality	Checkbox
	Good quality evidence to support use....	<input type="checkbox"/>
	Insufficient or poor quality evidence OR substantial harms suggest intervention used with caution after discussion with patient...	<input checked="" type="checkbox"/>
	No good quality evidence, do not use until further research is conducted OR Good quality evidence to indicate that harms outweigh the benefits....	<input type="checkbox"/>

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