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Nutrients and food supplements for the prevention of musculoskeletal disorders: an umbrella review

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Background: Musculoskeletal disorders (MSDs) affect the active and passive components of the locomotor system, causing pain and movement limitations that impair autonomy and quality of life. Therefore, preventing MSDs is a crucial public health goal. This umbrella review aims to identify the specific dietary nutrients that most effectively contribute to the primary prevention of MSDs. **Methods:** This review, conducted following PRISMA and JBI guidelines, was pre-registered on PROSPERO (CRD42024544780). We systematically searched PubMed, Web of Science, Embase, and

Cochrane databases. A mixed-methods approach was used to synthesize quantitative and qualitative data.

Results: Our analysis included 9 review papers out of 466 records initially identified, aggregating data from 128 primary studies, involving a total of 661,705 participants. The most frequently studied exposures were milk and dairy products, along with mineral salts. Dietary supplements containing officinal plant extracts or other plants, fruits, vegetables, meat, prebiotics, and probiotics were also evaluated, with dosages ranging from 2.5 mg/kg/day for epicatechin to over 3 months for calcium. The outcomes considered encompassed fractures, frailty, sarcopenia, muscle mass and strength, walking speed, inflammation, bone mineral density, and bone turnover markers. High quantities of cheese and yogurt reduced risk of fractures at any site by 8-11%. Dairy products had a strong preventive effect on grip strength. For mineral salts, low preventive effects of calcium doses were observed on bone mineral content and density. Notably, fruit and vegetable intake showed a strong association with improved gait speed (HR = 0.60, 95%CI = 0.42, 0.84); nut intake was strongly associated with a reduced risk of sarcopenia (HR = 0.72, 95%CI = 0.53, 0.99).

Conclusions: This umbrella review confirms the preventive potential of specific nutrients against MSDs, though optimal dosages of such nutrients require further investigation.

Key messages:

- Specific dietary components, such as dairy products, fruits, vegetables, and nuts, show promising potential in the primary prevention of musculoskeletal disorders, including fractures and sarcopenia.
- While certain nutrients and dietary patterns appear beneficial for musculoskeletal health, further research is needed to establish optimal dosages and fully elucidate the underlying mechanisms.