The relationship between pre-defined Mediterranean dietary patterns and musculoskeletal health in all age groups: a systematic review

J. Craig, D. Bunn, R. Hayhoe, W. Appleyard, E. Lenaghan and A. Welch

Norwich Medical School, University of East Anglia, Norwich Research Park, Norwich, NR47TJ

Bone fractures in the elderly are a major public health problem. Their consequences can be devastating and associated health and social care costs are considerable(1) . Moreover, this is an increasing issue, with the annual incidence of fractures in the European Union predicted to rise by 28 % from an estimated 3·5 million in 2010 to 4·5 million in 2025(2) .

Bone accretion in childhood and adolescence, and loss of bone occurring with ageing, are major determinants of fracture risk in later life(3) . Skeletal muscle mass is closely inter-related with bone mass throughout the lifespan(4) , and sarcopenia, defined as the presence of low skeletal muscle mass and low muscle strength or physical function(5) is significantly associated with fracture occurrence(6) . Both bone and skeletal muscle health are potentially modifiable through nutrition. The Mediterranean diet, characterised by high intake of plant foods (fruits, vegetables, legumes, nuts and cereals); moderate-high intake of fish, low-to-moderate intake of dairy products; low intake of meat, poultry, and saturated lipids; high intake of olive oil; and a moderate intake of ethanol(7) , is rich in nutrients that may be important for optimal musculoskeletal health.

The aim of our study was to undertake a systematic review using established Cochrane methodology to address the question: 'what is the relationship between a traditionally-defined Mediterranean dietary pattern and musculoskeletal outcomes?' Studies were eligible for inclusion if they were randomised controlled trials (RCTs) or prospective cohort studies, in people of any age in any setting, where the Mediterranean diet and/or diet adherence assessment index fulfilled our pre-defined eligibility criteria, and where outcomes comprised any of fracture incidence (primary outcome), fracture risk score, osteopenia or osteoporosis incidence, bone turnover markers, sarcopenia incidence or the combined outcomes of skeletal muscle mass and either skeletal muscle strength or physical function (secondary outcomes). A key methodological step entailed defining the Mediterranean diet. Initial literature review indicated wide variations in both the way in which Mediterranean diet has been characterised, and the methods used to assess adherence. We therefore examined 23 Mediterranean diet adherence scores in order to inform the dietary criteria by which studies would be judged as to their eligibility for inclusion in the systematic review.

A secondary aim of our study was to map the nature and volume of the broader research evidence reporting on the relationship between a Mediterranean-style diet (by any definition) and musculoskeletal outcomes, in studies using any design.

The review was registered with PROSPERO. The systematic search of 11 databases yielded 1720 references, with 14 additional references identified through cross referencing. The review is nearing completion and it is apparent that there is limited research into the relationship between a Mediterranean diet and musculoskeletal outcomes. To date, we have identified only two studies that are fully compliant with the systematic review inclusion criteria. These are prospective cohort studies reporting on fracture incidence in adults, one of which identified an apparent beneficial effect of Mediterranean diet. A further 12 studies, have been included in the broader evidence map so far. Three of these investigated muscle outcomes using a cross sectional study design, and nine investigated various bone outcomes, four of which used a cross sectional design.

In conclusion, there is limited research to understand the relationship between a traditionally defined Mediterranean dietary pattern and musculoskeletal outcomes in adults. Research in children and adolescents is even more limited.

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