



Dietary Regimen in Musculoskeletal Disorders

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ABSTRACT

Aging is the natural progression of changes in human biological, physiological, environmental, psychological, behavioural, and social processes. A key objective for developed and developing countries is to research healthy ageing patterns and reduce the socio-economic impact of age-related diseases, along with a deeper mechanistic understanding of the physiology and pathophysiology of ageing that occurs in a number of age-related musculoskeletal disorders. Musculoskeletal conditions, including arthritis, are a significant global cause of disability and morbidity, resulting in tremendous health and social care costs. Better care can be provided by having a greater understanding of healthy musculoskeletal ageing and the risk factors associated with premature ageing and senescence and the role of the dietary regimen, and new and better dietary regimes can be produced in addition to physical exercise for common musculoskeletal disorders. The authors in the present paper provide a non-metanalytic review to highlight strategies of dietary regimens in common musculoskeletal disorders and their potential therapeutic effect.

Keywords: Musculoskeletal health, Musculoskeletal disorders, Dietary regimen, Global burden.

Introduction

Musculoskeletal disorders are a global problem of fastest-growing disability of public health importance leading to social and economical cost at individual and healthcare level. Between the fifth and nine decades of life, common musculoskeletal disorders include osteoarthritis (OA), psoriatic arthritis (PsA), rheumatoid arthritis (RA), gout, osteoporosis (OP) and lower back pain (LBP). The major contributors to musculoskeletal disability are OA and LBP, and the most common type of arthritis is OA. Age, obesity, metabolic disease and previous joint injury are the main risk factors for OA. RA is an inflammatory joint disorder with a broad genetic and immune base that affects approximately 1% of the total global population. Like LBP, the incidence of OA and RA increases with age [01]. A significant number of individuals suffering from OA also have OP (osteoporosis), which affects approximately 3 million individuals in the UK. However, it was found that if bone mineral density tests were obtained from sites other than the OA affected joints, there was a high risk of osteoporosis diagnosis being missed [02]. Chronic exhaustion, sleep disturbances, irritable bowel syndrome and other medical conditions are often associated with another musculoskeletal disease, fibromyalgia, as well as cardiovascular dysregulation [03]. Chronic musculoskeletal disorders may also aggravate other disease conditions due to their activity-limiting effects. This also indicates that they have limited or painful movement when patients are diagnosed with a musculoskeletal condition. This restriction of movement may then cause other ill health issues, such as obesity or diabetes, or lead to the effects of respiratory disease [01-3].

Healthy diet plays an important role in maintenance of health and prevention and slowing down the progression of diseases in the human body. Deficiency of several dietary factors leads to early inflammation of tissue and cartilage of joints, weakening of bone density and loss of bone architecture. Deficiency of calcium and vitamins D, antioxidant elements and several others mineral might contribute one of the causes to premature ageing of the joints and the bone tissue. Fruits and vegetables, which provide antioxidants, low-fat dairy foods, which contain calcium and vitamin D and healthy oils, such as extra virgin olive oil etc. acts as an anti-inflammatory system to prevent and treat inflammation and tear and wear of bone and tissues around joints [01-03]. The paper will all the aspect of impact of dietary regimen in prevention and treatment of musculoskeletal disorders.

Material and method

Major online libraries such as pubmed, PMC, and mendley including e-databases on google were searched for the article with search name of 'arthritis', 'musculoskeletal disorders', 'osteoarthritis', 'dietary regimen for joints disorders' were performed and collected and reviewed to prepare the manuscript.

Result and discussion

Dietary factors

A healthy weight helps to improve musculoskeletal health and prevent degenerative diseases, but recent studies have also explored whether dietary factors can influence and delay the progression of the disease. Many healthcare organisations advise the consumption of a rich diet of fresh fruit and vegetables. A combined fitness routine and improved fruit and vegetable intake improves women's life expectancy; In their 70s, those with the highest level of operation and vegetable intake were eight times more likely to sustain a follow-up period of five years [04]. However, few direct correlations between fruit and vegetable intake and improved musculoskeletal health have been shown, but a three-year follow-up study of almost 400 adults found that diets rich in potassium (from fruit and vegetable intake) decreased the amount of muscle loss in adults > 65 years [05]. The consumption of antioxidant dietary flavonoids present in many fruits and vegetables was positively associated with better bone health in a population of perimenopausal women (measured by bone mineral density and bone resorption) [06]. OA patients may benefit from the opportunity to self-manage their condition by enhancing their balanced diet and lifestyle, as existing OA care options are very limited [07]. In older people, vitamin D, calcium and protein (especially protein) optimise muscle, bone and functional outcomes to minimise falls and fractures [08]. Calcium and protein intake work together to optimise bone health [09]. It was previously proposed that, due to the adverse impact on the kidneys, diets that are too high in protein in older people should be avoided. However, growing research now suggests that protein levels should not be reduced, as increased fruit and vegetable intake will mitigate the effects of metabolic acidosis on the kidneys (as these foods decrease renal acid load) [10,11]. The benefits of supplementing the diet with "nutraceuticals" are recommended by many studies. In view of the poor quality of the published studies, including *Boswellia serrata* extract and pycnogenol, curcumin and methylsulfonylmethane, a recent systematic review found promising but still minimal scientific evidence to support the oral use of many herbal supplements in people with OA [12]. Long-chain fatty acid intake and vitamins D and K [13,14] and reduced blood cholesterol [15] can be included in dietary strategies to enhance musculoskeletal health. The evidence available for the role of supplementation with vitamin D in OA is not convincing [16]. A diet rich in antioxidants can provide athletes with a valuable therapeutic method, enhancing tissue repair, although the optimal dose is not known [17]. The combination of exercise with a vitamin D-fortified whey protein dietary supplement is beneficial in strengthening and developing muscle mass in elderly person with sarcopenia [18]. An effective chondroprotective agent [19] has been shown to be green-lipped mussel extract. Curcumin is a well-known compound derived from plants with anti-oxidant and anti-inflammatory properties. In various chronic diseases in humans, including diabetes, allergies and arthritis, its effects have been identified. Development factors, transcription factors and inflammatory cytokines [20] are modulated by it. Interestingly, the efficacy and safety of OA human dietary supplements has been studied in a recent systematic review and found that lesser-known supplements such as *Curcuma longa* curcumin and *Boswellia serrata*. Boswellic acid were more successful than glucosamine and chondroitine [21]. In order to promote safe joint function, glucosamine and chondroitin are common supplements that have been suggested. There is little evidence, however, of their beneficial impact [21]. There is some evidence that the combined effects of glucosamine and chondroitin sulphate on nitric oxide and prostaglandin synthesis inhibition and cartilage structure protection are greater than when administered alone [22,23]. As seen in patients with knee OA [24], this combination can also be successful with the addition of manganese ascorbate. Another area of growing importance for health research is the gut microbiome. The maintenance of a balanced gut flora may require potential future dietary treatments for OA. Since the pathogenesis of many metabolic and inflammatory diseases is closely correlated with intestinal microbiota dysbiosis, it is concluded that it may also be related to OA pathogenesis. The mechanisms and contribution of intestinal microbiota metabolites to OA pathogenesis are not yet clear [25,26].

Several clinical trials have concluded that the gluten-free vegan diet induces reduced LDL and oxidised LDL levels and increased natural atheroprotective antibodies to phosphorylcholine in patients with rheumatoid arthritis. Some studies suggest that the elimination of essential nutrients that may compete with the absorption of L-tryptophan (Trp) and precursor of 5HT [27] in fibromyalgia syndrome may be regulated by the exclusion of certain dietary carbohydrates. In fibromyalgia syndrome, low serotonin levels are involved, and serotonin is synthesized from the amino acid tryptophan. In the last five years, further research on the efficacy of more plant-based diets with less meat, fish and milk products has been released. Examples that justify the usage of vegetables, fruits, legumes, nuts, olive oil, and whole grains are the Mediterranean diet and the Nutritional Strategy to Stop Hypertension (DASH). Moderate wine, dairy and meat consumption and low consumption of creams, red meat, sweet beverages and pastries are suggested [28]. Lifestyle variables such as obesity, physical inactivity, inadequate nutrition and smoking are related to the chronicity and impairment of low back pain [29], while healthy eating behaviour and weight reduction play important role in relieving low back pain. Despite the advancement of biological therapy that has revolutionised the treatment of ankylosing spondylitis, complementary therapies such as dietary therapy are being explored in many patients [30]. It has been proposed that a low starch diet contributes to lower activity of the AS disease and that *Klebsiella pneumoniae* is a triggering factor involved in the initiation and development of AS [31,32], which can be affected by starch intake.

Conclusion

Unhealthy dietary habits, sedentary lifestyle and physical inactivity are a triage to increase the burden of musculoskeletal disorders worldwide. Adopting healthy diet pattern, inclusion of fruits and vegetables, milk, protein rich and anti-oxidant diet, sunlight exposure, and supplementation of vitamin D & C, other dietary compounds and nutraceuticals may improve bone and joint condition due to aging. Behaviour change to diet and activity level and patient participation is absolutely crucial to achieve healthcare aims in regard to ever-increasing musculoskeletal disorders. Need of efficient newer diagnostic tools and upgradation of past-one might be required that enable the earlier identification of MSK disease and to find out mechanism of disease progression so that preventive measures could be carried out through holistic treatment programmes and dietary regimen.

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