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1 Can the paleolithic diet meet the nutritional needs of older people?

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11 The paleolithic diet aims to emulate the dietary pattern of people of the "Old

12 Stone Age" and is currently one of the most fashionable diets in the world.

Although a few short-term studies have shown beneficial effects of this diet on

biomarkers for diabetes (see [1]) and cardiovascular disease [2, 3], studies using

disease endpoints are scarce. In the absence of these studies, one way to help

predict potential long term health outcomes in people following this diet,

including the elderly, is to determine if it is likely to meet their nutritional needs.

18 The paleo diet basically advocates lean meat, fish and shellfish, fruit, vegetables,

19 eggs, nuts and seeds. It excludes grains and cereals, dairy, processed foods,

refined sugars and added salt. A number of nutrient analyses of people following

a paleo diet have been carried out, albeit mainly on younger subjects (< 65

years). Protein intake on a paleo diet is generally found to be similar to or

slightly higher than on a normal diet. This high protein intake would be

particularly beneficial for the elderly because their protein requirements for

maintaining muscle mass and preventing sarcopenia may be higher than those

recommended for the general population [4]. Advice for the elderly on

consuming meat as the main source of protein - as is the case in the paleo diet - is,

28 however, controversial [5]. In the general population, there is evidence of an

association between consumption of red meat (though possibly not of white meat such as chicken) and an increased risk of developing colorectal cancer, though the evidence is probably confounded by factors like the type of red meat (eg beef versus pork) [6] and the way the meat is cooked [7]. Subjects on a paleo diet should however benefit from not consuming processed meat since the

evidence that processed meat increases the risk for colorectal cancer is strong.

As might be predicted from the high intake of fruit and vegetables in the paleo diet, some micronutrients, including vitamins C and E and β -carotene, are consumed in high quantities, while sodium intake has been found to be substantially lower than in control diets [8, 9]. However, several short term clinical studies have found that calcium intake in subjects following a paleo diet is low, ranging from 355 - 395 mg/day [2, 8, 9]. Although, the optimal level of calcium intake required specifically to reduce the risk of osteoporotic fractures is currently the subject of considerable debate [10], these values are nevertheless well below current recommended daily intake levels for healthy adults (700 mg in the UK and 1200 mg in the US).

The paleo diet's low calcium content is probably attributable to the absence of dairy and cereals, which the UK National Diet and Nutrition Survey found contributed 42 % and 29 % respectively to the intake of calcium in the over 65's [11]. It has been estimated that, for the US, adequate intake for calcium is not possible with dairy-free diets while also meeting other nutrient recommendations [12]. Modeling studies on the paleo diet have also confirmed its difficulties in meeting current recommended intakes of calcium [13]. Although calcium supplements are an option, these are at odds with the basic philosophy of the paleo diet as one reflecting a Stone Age diet.

Dairy is also the main dietary source of iodine - essential for thyroid hormone production. In the one study that has examined this, iodine intake on the paleo diet was only about half the UK recommended requirement of 140 μ g/day [8]. Some types of fish and shellfish are also good sources of iodine but - at least in this study - these did not compensate for the shortfalls. Iodised salt is available, but its iodine content is low, availability of this product is poor in some countries

- 60 like the UK [14], and the paleo diet discourages added salt. Increased salt
- 61 consumption is not advisable, in any case.
- 62 Dairy and cereals are also important sources of other micronutrients, including
- 63 some (thiamine, riboflavin and iron) that have been reported to be reduced in
- 64 some studies of the paleo diet. Most of these nutritional assessments of the paleo
- 65 diet are based on young or middle aged subjects, but they do nevertheless raise
- 66 concerns that the absence of dairy products and cereals will prevent adequate
- 67 intake of some key micronutrients for the elderly. Although micronutrient
- 68 deficiencies frequently occur in the elderly who do not follow a paleo diet, it does
- 69 seem likely that the absence of dairy and cereals in this diet will exacerbate the
- 70 risk of deficiencies. Dairy also provides protein in the omnivore diet without the
- 71 need to trade off against cancer risks, as is the case with red meat.
- 72 The paleo diet has been reported to induce a feeling of satiety. This may be a
- 73 useful short term strategy to lose weight [15], but for many elderly people poor
- 74 appetite is a significant concern, so the benefit of a diet with high satiety is
- 75 questionable. In addition, the acceptability of any diet is key to compliance, and
- 76 there are anecdotal comments on the difficulty of adhering to a paleo diet as it
- 77 lacks many of the sources of carbohydrates (bread, pasta, etc) that form a major
- 78 part of many western meals [16].
- 79 Long term studies on the health consequences of adhering to a paleo diet may
- 80 currently be lacking, but to quote Austin Bradford Hill "that does not confer upon
- 81 us a freedom to ignore the knowledge we already have, or to postpone the action
- 82 that it appears to demand at a given time". The knowledge we have is that the
- 83 healthiest diet is one based on minimally processed foods, mostly coming from
- 84 plant foods [17]. Currently the diet with the strongest evidence for preventing
- 85 nutrient deficiencies and protecting long term health, including in the elderly, is
- 86 the plant-based Mediterranean diet [18].
- 87
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