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The Effect of the Paleo Diet on People Suffering from Osteoporosis (Review Paper)

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Abstract

Osteoporosis is a disease that decreases bone mass and increases bone porosity, weakening bones. The Paleo diet is an eating plan that imitates the dietary patterns of the Stone Age. It excludes grains, dairy, and processed foods and emphasizes feeding on lean meats, fruits, vegetables, and nuts. Consumption of the Paleo diet has many positive sides, such as high protein intake and weight loss. Still, excluding dairy products risks calcium and vitamin D deficiencies, which are crucial for bone health. Statistics and simulations that have explored the relationship between the Paleo diet and bone health (especially for people suffering from low bone density) show mixed outcomes on bone health.). While the consumer does get lots of benefits from fruit and vegetable intake in a large sum due to them containing nutrients like magnesium, potassium, and vitamin K (which are also necessary for bone health), the lack of dairy products (gives the maximum amount of calcium and vitamin D) raises concerns about maintaining adequate bone mineral density (BMD). More information on this topic shows the negative impact of this diet on people suffering from osteoporosis due to a lack of nutrient intake that nourishes the bone. Although the Paleo diet can enhance overall health through nutrient-dense foods and reduced processed intake, it can't be said the same for people suffering from osteoporosis.

Keywords

Osteoporosis, Paleo Diet, Bone Density, Calcium and Vitamin D Deficiency, Bone Health, Nutrient Deficiency, Dietary Patterns, Bone Mineral Density (BMD), Nutritional Imbalance

1. Introduction

Osteoporosis is the deficiency of minerals in bones, which causes the mass of bone to decrease. A person suffering from this disease will have bigger pores in their

bones than a normal person. This disease causes the pores in the bone to be wider, weakening the bone significantly [1]. A dietary regime in which consumers feed on the type of food eaten by the people in the Stone Age is known as the Paleolithic diet. Paleo diet advocates debate that human autonomy has evolved little since the Stone Age, making the food choices of that time better than foods introduced later in history [2]. This diet restricts the intake of grains, peas, refined sugar and salt, dairy products, and potatoes. Another reason for this food pyramid to come into the limelight is its high protein intake and weight loss benefits. While this diet has been a great source for people suffering from obesity and diabetes, it does not fulfill the required amount of calcium and vitamin intake 'necessary for people suffering from bone weakening [3].

Even though the average life expectancy of the Paleolithic era was 33 years and over the third percentile of the deaths occurred due to infection, dehydration, and starvation, the Paleo diet has gained popularity in recent years [4]. Professionals who support this diet debate whether it is a good choice for people who are suffering from obesity or diabetes and people who consume gluten-free and dairy-free diets [5].

Farming has majorly changed the way people consume food in this day and age. Cultivating grains and legumes is easier, and agriculture made dairy products available and changed the type of meat we consume. While the approach of farming and re-designed the way humans eat, research shows that human anatomy has remained the same since that time. This points toward the fact that many diseases linked with heart and obesity have been connected to the consumption of "modern" foods [6].

In a healthy person, the debate regarding the good and bad aftermath of the Paleo diet is still going on. Still, it is deemed to show negative effects on people suffering from osteoporosis [7]. An average person is recommended to consume 15 mcg of vitamin D daily, but a person suffering from osteoporosis requires 25 mcg daily. When a Paleo diet is consumed (without any intake of supplements and in the purest form), a person can only get 10 mcg to 15 mcg of vitamin D. Another nutrition that has come to the highlight is calcium. This nutrition is important in a human's body for various reasons, such as keeping bones strong, helping muscle movement, and allowing nerves to carry out messages between the brain and every part of the body [8]. Re-stating the fact that osteoporosis is a disease that is caused by severe weakness in bones, a person suffering from this disease is already suffering from acute calcium deficiency. A person needs to consume 1200 mg per day, a person suffering from osteoporosis requires 1500 mg per day, while the Paleo diet only provides 1000 mg per day. As calcium mainly comes from dairy products restricted in the Paleo diet, consumers are deprived of necessary calcium intake. This deprivation is primarily caused by restricting dairy products in the following diet [9].

In this diet, people consume animal meat in the highest quantity, more precisely, organic grass-fed or wild animals. Other foods that can be consumed are

vegetables, fruits and berries, eggs, nuts and seeds, fish (especially those rich in omega-3 fatty acids, such as salmon, mackerel, and albacore tuna), oils and fruits and nuts (like olive oil or walnut oil).

After overviewing the foods that can be consumed, it is noticed that many types of food should be mentioned. Some notable foods that can't be included in the follower's diet plan are Cereal grains (rice, pasta, bread, etc.), legumes (peanuts, beans, lentils, tofu, etc.), refined sugar, soda and sweetened beverages, starchy vegetables (potato, squash, beets), refined vegetable oils, any sort of dairy product, salt, and artificial sweetener. As none were present in the caveman period and have recently been developed using agriculture and modern technology, consuming these while following a pure Paleo diet is strictly forbidden. While many processed and highly sugary foods should be avoided in any diet, not taking some category of proscribed food causes a nutritional imbalance in one's body [10].

Bones play many important roles in the human body. It provides human anatomy with structural support, protects other important soft organs, and helps with the movement of the body. The mineral content (particularly calcium) in bone tissue is known as bone density. The amount of calcium in the bone is the main source for determining bone health and maintaining bone strength. On the other hand, bone strength depends on factors like bone density, the architect of the bone, and the quality of the tissues. With this, the more strength a bone has, the less it is prone to diseases that weaken the bones, like osteoporosis [11].

Many factors affect bones' strength and density, including nutrition, physical activity, hormonal balance, genetics, and age. While focusing on nutrition (the most important factor for maintaining good bone health), a sufficient amount of calcium, vitamins, and other nutrients are essential for maintaining optimal bone density, which can be obtained by taking calcium through dairy products and vitamin D through various sources (e.g., milk, orange, mushroom, salmon, etc. [12].

Bone metabolism depends on many factors and several key nutrients. Calcium is the most well-known nourishment that is associated with bone health. It is noted to be very important for teeth and bone quality. A maximum of the body's calcium is stored in bones, and a consistent dietary intake is necessary for preventing bone loss and osteoporosis. In the same way, vitamin D works together with calcium to maintain bone health. This vitamin enhances its absorption in the gut and maintains adequate serum calcium and phosphate concentrations to enable normal bone mineralization. Protein is another vital subsistence that is important for the bone. It is about 50% of bone volume and one-third of its mass. Protein intake helps provide the necessary amino acids for the formation of bone. Micronutrients such as magnesium (helps with calcium absorption and influences bone mineral density), Vitamin K (essential for the carboxylation of osteocalcin, which is a protein that helps bind calcium to the bone), and Vitamin C (necessary for collagen formation, which provides a framework for mineralization) [13] [14].

The diet that mostly consumes lean meats, fish, and eggs is known as the Paleo diet. The consumer also consumes fruits, vegetables, nuts, and seeds. This diet

excludes processed food, grains, and dairy. While mentioning its nutrient intake (especially Calcium and Vitamin D), it takes the consumption of leafy greens, nuts, and fish in large volumes to fulfill the minimal daily requirements. Therefore, this would still be a dangerous diet for osteoporosis patients to meet their vitamin D and calcium necessities due to the elimination of dairy products (they are the primary source of these nutrients). Moreover, the large intake of protein and potentially huge intake of sodium content from processed meats in some dietary plans of the Paleo diet could negatively affect calcium balance and bone health if consumed carelessly. Therefore, emphasizing whole food consumption and eliminating processed items in the Paleo diet can positively impact the consumer. While that is noted, planning meals daily and tracking the intake of different food categories is important to ensure the proper nutrient intake necessary for maintaining bone strength [15].

According to some old research, the relationship between the Paleo diet and bone health has been observed to provide both negative and positive results. In some cases, nutritionists point out the potential benefits of following this diet due to the high consumption of fruits, vegetables, and lean proteins. These categories carry essential nutrients like magnesium, potassium, and vitamin K, which are important for bone health. However, excluding dairy, a primary beneficial source of calcium and vitamin D, raises a safety concern, potentially leading to deficiencies that could negatively impact bone mineral density (BMD). Some studies that look into the Paleo diet's effects on bone health (especially in the sector of observing people who suffer from osteoporosis) have shown many negative results. Studies, statistics, and simulations highlight the risk associated with inadequate intake of calcium and vitamin D. Existing research conveys the importance of focusing on diet quality and its impact on health. At the same time, statistical conclusions show that the Paleo diet negatively affects bone health when the consumer suffers from this condition. Therefore, this topic requires more rigorous, long-term studies to determine the diet's impact on fracture risk and overall bone health in vulnerable populations [16].

2. Conclusion

To summarise, people suffering from osteoporosis are highly advised not to follow the Paleo diet as it provides very little calcium and vitamin D, which contrasts with the high requirement of these nutrients to cure osteoporosis. The Paleo diet is a diet that emphasizes a high intake of protein while restricting cereal grains, dairy, and packaged food. Osteoporosis is a disease that lowers bone density, making it weak and porous. While some amount of calcium and vitamin D can be obtained from leafy greens, fish, and fruits, more is needed to fulfill the average requirement for daily intake of those nutrients and the amount necessary for people suffering from low bone density. Any enthusiasts of the Paleo diet who are suffering from this condition need to prepare detailed meal plans under the guidance of doctors and nutritionists.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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