# Analysis of the Effects of Fermented Dairy Consumption on Adult Bone Health

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## Introduction
- Worldwide estimates suggest that osteoporosis prevalence is increasing. Approximately 1 in 3 women and 1 in 10 men older than 55 years develop the condition later in life.  
- Dairy products are rich in calcium, protein, potassium, and phosphorus. These nutrients are important for bone health across the lifespan.  
- Research suggests fermented dairy products (FDP) may display an increased protective effect against osteoporosis.  
- FDP includes fermented milk, kefir, ripened cheese, and yogurt.

## Objective
- Examine the effects of FDP consumption on bone health markers.  
- Analyze markers for bone mineral density and calcium absorption.

## Methods
- Articles were selected following the protocol developed by the Academy of Nutrition and Dietetics’ Evidence Analysis Library.  
- The protocol includes formulating an analysis question, gathering and classifying evidence, critically evaluating, summarizing and grading articles, and compiling conclusions.  
- Databases searched: PubMed, Cochrane Library, Google Scholar and Clinical Trials  
- Inclusion criteria: Defined baseline period and reported statistical analysis for adherence and serum parathyroid hormone variation.  
- The search resulted in twelve articles; five met criteria.

## Author Study Design Conclusions

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| Biver, 2018 | Prospective Cohort | FDP consumers displayed a slower post-menopausal decline in bone mineral density (BMD) compared to milk and ripened cheese consumers.  
- FDP consumers displayed fewer bone turnover markers and lower serum PTH. |
| Adolphi, 2009 | Controlled, parallel, double-blind intervention study | Bedtime consumption of fermented milk with and without supplemented calcium reduced the nocturnal excretion of the bone resorption marker deoxypyridinoline and the bone formation marker alkaline phosphatase.  
- Supplementing fermented milk with calcium had no further effect; however, intestinal calcium absorption increased with the addition of inulin-type fructans and casein phosphopeptides. |
| Tu, 2015 | Controlled, parallel, double-blind intervention study | After one month, serum PTH levels increased in both the kefir group and non-fermented dairy control group.  
- After 6 months serum PTH and therefore serum calcium remained high only in the kefir group.  
- Both kefir supplemented and control groups experienced an increase in average BMD, though the increase was higher in the kefir group.  
- Markers of bone turnover also decreased in both groups compared to their baseline values. |
| Narva, 2004 | Double-blind randomized crossover | Consumption of FDP containing probiotic strain L. helveticus was shown to decrease serum PTH and increase serum calcium levels, while L. helveticus derived peptides had no significant effect.  
- Juice containing these peptides had the opposite effect. |
| Laird, 2017 | Cohort study | Total hip and femoral neck BMD in females was 3.1 - 3.9% higher in individuals who consumed more yogurt. These individuals also displayed better measures of physical function.  
- For females, yogurt intake was positively associated with higher BMD in all regions (hip, neck vertebral).  
- Yogurt intake was associated with decreased risk of osteopenia with a 39% and 52% lower risk of osteoporosis in females and males, respectively. |

## Conclusion
- Fermented dairy products do not demonstrate a direct influence on calcium absorption or bone density, above that traditional dairy products.  
- There appears to be an unclear relationship between the consumption of fermented dairy and bone health, indicating a possible protective effect.  
- Consumption of fermented dairy may stimulate positive effects on bone density by altering serum levels of PTH, inhibiting bone resorption, and/or decelerating bone turnover.

## Clinical Implications
- The evidence does not illustrate a clear mechanism between the consumption of fermented dairy products and decreased risk for osteoporosis.  
- However, consumption of these products may result in positive bone health outcomes for at risk individuals.