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Improvement of Bone Mineral Density with Menaq7 360 Mcg: a Case Report

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ABSTRACT

Postpartum bone loss is a well-documented phenomenon, particularly in women with multiple pregnancies, as increased calcium demands during pregnancy and lactation can lead to transient reductions in bone mineral density. This case report describes a 35-year-old female with postpartum bone density reduction and degenerative joint changes who achieved significant improvement in bone mineral density (BMD) after 14 months of daily supplementation with MenaQ7 (Vitamin K2 as MK-7, 360 mcg), TruCal (700 mg calcium with essential minerals), and Vitamin D3 (2000 IU). Initially diagnosed with decreased BMD (T-score -1.8 at the left femoral neck, 76% of expected for age) and lumbar spine T-score of -0.9 (90%), the patient showed marked improvement, with scores increasing to -0.7 (90%) and 0.1 (101%), respectively. The observed benefits are likely due to MenaQ7's role in activating osteocalcin, optimizing calcium deposition in bones. Additionally, matrix Gla-protein (MGP) reduces calcifications in soft tissue. This case suggests that targeted supplementation may play a role in enhancing postpartum bone health and mitigating osteoporosis risk.

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Introduction

Postpartum bone loss is a well-documented phenomenon, particularly in women with multiple pregnancies, as increased calcium demands during pregnancy and lactation can lead to transient reductions in BMD (1). While calcium and vitamin D are widely recommended to mitigate bone loss, recent research underscores the crucial role of vitamin K2, particularly menaquinone-7 (MK-7), in bone metabolism. MK-7 activates osteocalcin, which enhances calcium deposition in bones, and matrix Gla-protein (MGP), which prevents calcification in soft tissues, thereby supporting overall bone health and reducing the risk of osteoporosis (2).

A growing body of evidence suggests that MK-7 supplementation can improve bone strength and density, particularly in populations at risk for osteopenia or osteoporosis (3). However, data on the efficacy of MK-7 in younger postpartum women remain limited, highlighting the need for further research into its potential benefits beyond postmenopausal osteoporosis management.

This case report demonstrates a significant improvement in BMD following 14 months of supplementation with MenaQ7 (360 mcg MK-7), TruCal (a calcium and essential mineral complex), and Vitamin D3. MenaQ7 was selected due to its well-documented superior bioavailability and longer half-life compared to other K2 variants (e.g., MK-4), ensuring sustained activation of osteocalcin and MGP (4, 5). Additionally, TruCal was chosen for its unique composition, which includes not only calcium but also essential co-minerals such as magnesium and phosphorus, shown to enhance calcium absorption and bone remodeling more effectively than calcium alone (6). Vitamin D3 was included to optimize calcium metabolism and enhance intestinal calcium absorption, as research consistently supports its synergistic effect with both calcium and vitamin K2 in promoting bone health (7). The selection of these specific formulations was based on their demonstrated efficacy in improving bone quality

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and their superior pharmacokinetic properties compared to alternative supplements.

Patient Information

The patient is a 35-year-old female with no known history of internal medicine conditions. Her surgical history includes three cesarean sections in 2016, 2018, and 2022. Following her third delivery, she experienced a noticeable increase in fatigue compared to her previous postpartum recoveries, along with persistent back pain and intermittent hand numbness. Despite these symptoms, a clinical examination and routine blood tests, including a complete blood count and biochemical panel, revealed no significant abnormalities. Given the absence of underlying systemic disease, her symptoms were initially attributed to postpartum recovery, musculoskeletal strain, and possible nerve compression.

Her family and psychosocial history did not reveal any hereditary conditions related to bone disease or metabolic disorders. She had no prior interventions specifically for bone health before 2023, nor had she received calcium or vitamin D supplementation as part of routine postpartum care. However, due to persistent musculoskeletal symptoms and concerns regarding bone health, she underwent a comprehensive medical evaluation in June 2023, which included a BMD assessment. The results revealed a decreased BMD at the femoral neck (T-score -1.8, equivalent to 76% of expected for her age), indicating early-stage osteopenia.

Results

Clinical Findings

At the initial examination in June 2023, the patient underwent a comprehensive health checkup, including routine laboratory tests and a musculoskeletal evaluation. Her blood tests revealed normal findings, with no systemic disease, metabolic abnormalities, or significant deficiencies in serum calcium, phosphate, alkaline phosphatase, or parathyroid hormone (PTH) levels.

Despite her reported symptoms of back pain and hand numbness, no biochemical evidence suggested inflammatory arthritis, metabolic bone disorders, or systemic pathology. However, a dual-energy X-ray absorptiometry (DEXA) scan was performed to assess her BMD due to her postpartum status and musculoskeletal complaints. The DEXA results indicated a reduced BMD at the left femoral neck, with a T-score of -1.8, representing 76% of the expected bone mass for her age. This value falls within the category of low bone mass (osteopenia risk), signaling an increased susceptibility to osteoporosis if left unaddressed. Meanwhile, her lumbar spine T-score was -0.9, equivalent to 90% of the expected BMD for her age, which is still within the normal range but at the lower end of the spectrum. These findings confirmed the need for targeted bone health intervention.

Given the absence of significant systemic abnormalities in laboratory tests, the primary diagnostic challenge was determining the cause of her symptoms. Postpartum musculoskeletal discomfort is common, but the presence of reduced BMD and early osteoarthritic changes necessitated a proactive approach to bone health. While standard postpartum evaluations often do not include bone density testing, the patient's reported fatigue, history of multiple cesarean sections, and identified degenerative changes justified further assessment. With no prior interventions for bone health, she was considered at risk for progressive bone loss, making supplementation an appropriate course of action.

The prescribed therapeutic regimen included MenaQ7 at a dose of 360 mcg per day, ensuring the activation of osteocalcin to enhance calcium utilization and matrix Gla-protein (MGP) to prevent calcification in soft tissue. Additionally, the regimen included TruCal, a calcium complex containing phosphorus, magnesium, potassium, zinc, and copper, at 700 mg daily to support bone mineralization and overall skeletal health. Vitamin D3 at a dosage of 2000 IU per day was also included to enhance calcium absorption and bone remodeling. This supplementation plan was maintained consistently for 14 months, with careful monitoring of adherence and response to therapy.

By August 2024, a follow-up DEXA scan demonstrated remarkable improvements in the patient's bone density. Her femoral neck T-score increased from -1.8 to -0.7, reflecting an improvement from 76% to 90% of the expected BMD for her age. This shift brought her bone mass closer to the normal range, significantly reducing the risk of osteoporosis. Additionally, her lumbar spine T-score improved from -0.9 to 0.1, surpassing 100% of the expected BMD for

her age, indicating optimal bone health in the spinal region.

Beyond these numerical improvements, her symptoms of back pain and hand numbness showed significant improvement over the course of supplementation. By the end of the 14-month period, the frequency and intensity of back pain had substantially decreased, and the patient no longer experienced persistent hand numbness. Follow-up X-ray imaging revealed the resolution of previously observed bone spurs, suggesting a reduction in calcifications and an improvement in joint degeneration. She reported increased mobility, reduced stiffness, and improved overall musculoskeletal comfort, enabling her to return to regular daily activities with greater ease.

No adverse events or side effects were reported throughout the 14-month supplementation period. The patient tolerated the regimen well, with no gastrointestinal discomfort, allergic reactions, or other negative effects commonly associated with high-dose vitamin and mineral supplementation. Regular follow-ups confirmed adherence and a positive response to therapy without complications.

These findings underscore the effectiveness of the supplementation regimen in not only reversing postpartum bone loss but also contributing to the alleviation of degenerative joint changes and musculoskeletal discomfort. The observed symptom relief, in conjunction with objective improvements in bone density and imaging results, further supports the role of targeted supplementation in promoting postpartum bone health and overall well-being.

Discussion

This case highlights the effectiveness of a structured bone health supplementation regimen, particularly the role of MenaQ7 in improving BMD. The significant increase in BMD observed over 14 months suggests that MenaQ7, in combination with calcium and Vitamin D3, plays a crucial role in maintaining bone strength and preventing bone loss. One of the key mechanisms involved is the activation of osteocalcin, which enhances calcium utilization in bones, while matrix MGP reduces pathological calcification in soft tissues. This process likely contributed not only to the resorption of calcified deposits, such as bone spurs, but also to the improved mineralization and structural integrity of bone. Additionally, follow-up imaging showed the disappearance of bone spurs and the absence of degenerative changes in the joints, further supporting the role of this supplementation regimen in both preventing and reversing early-stage osteoarthritis (5).

MenaQ7, when combined with calcium and Vitamin D3, plays a significant role in enhancing bone health, particularly in pregnant women. Vitamin K2 in MenaQ7 is crucial for the carboxylation of osteocalcin and matrix MGP, which are essential for calcium binding and bone mineralization, thereby reducing the risk of osteoporosis (8). The synergistic effect of Vitamin K2 and Vitamin D3 is well-documented, with both vitamins working together to improve BMD and bone quality. Vitamin D3 enhances calcium absorption, while Vitamin K2 ensures that calcium is properly utilized in the bone matrix (8). A meta-analysis of randomized controlled trials has shown that the combination of Vitamin K and calcium significantly increases lumbar spine BMD and decreases undercarboxylated osteocalcin (UcOC), indicating improved bone health (9). Additionally, a medicine composition containing calcium carbonate, Vitamin D3, and MenaQ7 has been developed, highlighting the practical application of this combination in structured bone health supplementation. This combination is particularly beneficial during pregnancy, a period characterized by increased calcium demands for fetal development, thus supporting maternal bone health and reducing the risk of osteoporosis later in life (10). While research on MenaQ7 has demonstrated benefits for bone health in postmenopausal women, limited studies have examined its role in postpartum BMD recovery. Since postpartum bone loss follows distinct physiological mechanisms related to pregnancy and lactation, findings from postmenopausal studies may not directly apply. This gap in the literature highlights the need for further research to evaluate the efficacy of MenaQ7, calcium, and Vitamin D3 in postpartum women to develop targeted bone health strategies (11).

However, this case also has limitations. As a single-patient study, the findings cannot be directly generalized to a broader population without further clinical trials and larger cohort studies. Additionally, while the supplementation regimen was closely monitored, other lifestyle factors that influence bone health, such as diet,

physical activity, and genetic predisposition, were not extensively tracked. Although the patient did not report significant changes in lifestyle habits, it remains possible that external factors may have contributed to the observed improvements in BMD.

This case highlights the efficacy of a higher daily dose of MenaQ7 (360 mcg) combined with calcium and Vitamin D3 in significantly improving bone mineral density (BMD) within 14 months. Previous studies in postmenopausal women have demonstrated that a daily intake of 180 mcg of menaquinone-7 (MK-7) over three years can reduce bone loss and fracture risk. In this younger, premenopausal patient, the administration of a higher MK-7 dose led to a more rapid improvement in BMD, suggesting potential benefits of earlier and more aggressive intervention before menopause (12). The rationale for selecting a 360 mcg daily dose of MK-7 stems from its enhanced bioavailability and prolonged half-life compared to other forms of vitamin K. MK-7 is absorbed more readily and remains in the bloodstream longer, facilitating effective carboxylation of osteocalcin and matrix Gla-protein, which are essential for bone mineralization and inhibiting vascular calcification. While standard doses (150–180 mcg) have shown efficacy in postmenopausal populations, higher doses may be necessary to achieve similar or superior outcomes in younger individuals with distinct physiological conditions, such as postpartum bone loss (13). Safety evaluations have demonstrated that MK-7 is well-tolerated even at high doses. Toxicological studies in animal models reported no adverse effects at doses up to 2000 mg/kg, indicating a wide safety margin. Additionally, human studies have shown that MK-7 supplementation at doses up to 360 mcg per day is associated with significant health benefits without reported adverse effects. These findings support the safety of administering higher MK-7 doses in specific clinical scenarios (14).

In this case, the patient experienced notable postpartum bone loss despite spacing her pregnancies, indicating that dietary deficiencies in MK-7 and essential trace minerals may have contributed to her reduced BMD. This underscores the need for proactive supplementation, particularly in populations at risk for lower peak bone mass. Since MenaQ7, TruCal, and Vitamin D3 have no age restrictions, encouraging supplementation in adolescent girls after puberty could help them achieve optimal peak bone mass, reducing osteoporosis risk later in life. These findings support the integration of MenaQ7 into routine bone health strategies, not only for postpartum recovery but also for long-term skeletal strength, reinforcing the importance of early and continuous supplementation for lifelong bone health.

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