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Effectiveness of Integrative Approach of Yoga and Naturopathy in Osteomalacia Management: A Case Study Evaluation

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ABSTRACT:

Osteomalacia is a metabolic bone disorder characterized by the softening of bones due to impaired mineralization, primarily caused by deficiencies in vitamin D, calcium, or phosphate. It results in weakened bones and increased fracture risk. The global prevalence varies, with higher rates in areas with significant vitamin D deficiency. Common symptoms include bone pain, muscle weakness, and fatigue, significantly impacting quality of life and healthcare costs. Management typically involves high-dose vitamin D and mineral supplementation. This study evaluates the effects of Integrative Yoga and Naturopathy Management in a 34-year-old female patient with osteomalacia. After a 30-day intervention incorporating heliotherapy, yoga therapy (Surya Namaskar), dietary therapy (germinated ragi milk), and acupuncture, the patient showed marked improvements. Pain levels, measured by the Visual Analog Scale, decreased from 8 to 2, and serum calcium levels increased from 6.5 mg/dl to 8 mg/dl. Additionally, depression severity assessed using the Patient Health Questionnaire-9, significantly improved. This case suggests that Integrative yoga and naturopathy treatments may effectively reduce symptoms and improve bone health in osteomalacia patients, addressing both physical and psychological aspects. Further randomized controlled trials with larger samples are recommended to validate these findings and explore IYN as a potential adjunct therapy in osteomalacia management.

Keywords: Complementary and Alternative Medicine, Osteomalacia, Yoga and Naturopathy.

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INTRODUCTION:

Osteomalacia is a metabolic bone disorder marked by the softening of bones due to impaired mineralization of the bone matrix, primarily caused by deficiencies or abnormalities in vitamin D, calcium, or phosphate. [1] This condition leads to weakened bones and an increased risk of fractures. Globally, the prevalence of osteomalacia varies, being more common in regions with high rates of vitamin D deficiency and limited sunlight exposure, with estimates ranging from 1% to 5% in developed countries and higher in developing regions. [2] Vitamin D deficiency affects approximately 1 billion people worldwide. [3] Symptoms of osteomalacia can include bone pain, muscle weakness, increased fracture risk, and, in severe cases, bone deformities, along with additional symptoms like fatigue and weight loss. The disease significantly burdens individuals and healthcare systems due to physical limitations, pain, and the increased risk of fractures, which contribute to reduced quality of life and elevated healthcare costs. [4] Management primarily involves high-dose vitamin D supplementation, along with calcium and phosphate as needed, dietary modifications, and treatment of underlying conditions contributing to the disorder. [5]

Complementary and Alternative Medicine (CAM) encompasses a broad range of health practices, treatments, and therapies that are not typically part of conventional Western medicine. CAM includes practices such as acupuncture, herbal medicine, chiropractic care, yoga, and naturopathy, which are often used in conjunction with (complementary) or instead of (alternative) standard medical treatments. [6] Naturopathy is a holistic approach to health that emphasizes natural remedies and the body's intrinsic ability to heal itself, using methods such as diet, herbal medicine, and lifestyle changes. [7] Yoga is a mind-body practice that combines physical postures, breathing exercises, and meditation to enhance overall well-being, flexibility, and mental clarity. [8] Integrative Yoga and Naturopathy Management (IYN) aims to support wellness by addressing the root causes of disease, both physical and mental [9] This study aims to evaluate the effect of yoga and naturopathy management in patients with osteomalacia.

CASE REPORT:

A 34-year-old female with a two-year history of osteomalacia presented for follow-up, reporting generalized bone pain and muscle weakness. She indicated that the pain was primarily located in her lower back, hips, and legs. The discomfort was described as a dull ache that worsened with physical activity and tended to improve with rest. She also noted difficulty performing daily activities due to muscle weakness and fatigue. Her vital signs were stable, with a blood pressure of 120/80 mmHg, heart rate of 78 bpm, respiratory rate of 16 breaths/min, and temperature of 98.6°F. Anthropometric measurements showed a height of 165 cm and a weight of 58 kg, reflecting a normal BMI of 21.2. A systemic examination revealed tenderness in the lumbar spine and pelvic regions, muscle weakness in the proximal lower limbs, and limited mobility. Laboratory tests confirmed low serum vitamin D and calcium levels, mildly decreased phosphate, and elevated alkaline phosphatase.

The patient was previously treated with high-dose vitamin D3, calcium, and phosphate supplements to address her osteomalacia. This treatment was supplemented with dietary modifications aimed at increasing her intake of vitamin D

and calcium-rich foods, as well as lifestyle changes to improve bone health. However, the patient's follow-up appointments were irregular, and she expressed reluctance to continue with vitamin D and calcium tablets due to personal preferences and difficulties with adherence.

THERAPEUTIC INTERVENTION:

Interventions included yoga and naturopathy interventions for a period of 30 days. The patient received heliotherapy, diet therapy, and acupuncture therapy during her course of treatment. A sunbath was taken in a terrace. The individual, dressed minimally, exposed her body to the ambient sunlight. She was free to position herself comfortably, whether sitting or lying down [10]. Exposing the face, arms, hands, and legs to the sun for about 5-30 minutes, especially between 10 a.m. and 4 p.m., either daily or at least twice a week without sunscreen, typically results in adequate vitamin D synthesis [11]. Surya namaskar was taught by the yoga and naturopathy physician on first day of intervention and the patient practised regularly under supervision of that expert through telecommunication. She practised Surya namaskar at 5-5.30 AM. The ragi seeds brought from local market were cleaned and soaked in RO water for 12 hours at 28°C (room temperature), ensuring they were not exposed to direct sunlight. After 12 hours of soaking, the seeds were withdrawn for 24 hours of germination. Subsequently, they were ground with 150 ml of water to obtain ragi milk. [12] Acupuncture was performed by a Yoga and naturopathy physician. 0.25×13mm size stainless steel sterile needles were used for the intervention without any stimulation. The details of intervention given to the patient mentioned in table -1 and the location of the acupuncture points given was mentioned in table-2.

Assessment criteria:

The Visual Analog Scale (VAS) is a widely used tool for measuring pain intensity, consisting of a straight line, typically 10 cm long, with endpoints that represent extreme levels of pain, marked as "no pain" (0) and "worst possible pain" (10).[14] The Patient Health Questionnaire (PHQ-9) includes nine questions that align with the diagnostic criteria for major depressive disorder as defined in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition). Participants assess each item based on their experiences over the past two weeks, using a scale from 0 (not at all) to 3 (nearly every day). The total scores, which can range from 0 to 27, reflect the severity of depression. [15]

Table 1: Intervention Details:

Name of intervention	Duration	No. of sessions
HELIOTHERAPY Generalised sunbath	20 mins [10.30 am to 10.50 am]	30
YOGA THERAPY Surya Namaskar	12 rounds	30
DIET THERAPY Ragi milk	400ml [obtained from 250 grams of germinated ragi]	20
ACUPUNCTURE	GB-39, BL-11, KI-3, BL-23, LI-4, and ST-44 [5 days a week for 30 mins duration of each session, all points punctured bilaterally]	20

Note: GB-Gall bladder, BL-Bladder, KI- Kidney, LI- Large intestine, ST-Stomach

Table -2: Location of acupuncture points

Name of the acupuncture points	Location
GB-39	3 cun proximal to the highest prominence of the lateral malleolus, on the anterior border of the fibula. [13]
KI-3	In the depression between the highest prominence of the medial malleolus and the Achilles tendon.
BL-11	1.5 cun lateral to the posterior midline, on the level of the lower border of the spinous process of the 1st thoracic vertebra.
BL-23	1.5 cun lateral to the posterior midline, on the level of the lower border of the spinous process of the 2nd lumbar vertebra
LI-4	On the radial aspect of the hand, between the 1st and 2nd metacarpal bones, closer to the 2nd metacarpal bone and approximately at its midpoint.
St-44	Between the 2nd and the 3rd toes, proximal to the interdigital fold.

Table- 3: Assessment details

Variable	Baseline Assessment	Post -Assessment
VAS	8	2
Serum calcium level	6.5mg/dl	8 mg/dl
PHQ-9	16	4

RESULTS:

The results of the study showed that 30 IYN intervention in patient with osteomalacia showed improvements in pain intensity which was assessed by vas score, and it was reduced from 8 to 2 after intervention. Her serum calcium level improved from 6.5 mg/dl to 8 mg/dl. PHQ- reflects improvements or worsening of depression in response to treatment. Her depression assessed by PHQ-9 showed improvements from 16 to 4 after intervention.

DISCUSSION:

This case study demonstrates that IYN may play an effective role in managing osteomalacia. Along with improvements in physical parameters VAS and serum calcium levels, her depression also decreased after the treatment. Yoga and naturopathy management is a holistic approach that enhances overall health by addressing both physical and psychological aspects of patient pathology. Some studies have demonstrated that regular yoga practice, including Surya Namaskar, can significantly improve bone mineral density (BMD). [16] Sun exposure aids in boosting bone mineral density by enhancing calcium absorption and facilitating bone remodelling. [17] Along with a normal diet, the patient was given germinated ragi milk. Phytate is a significant antinutrient in plant-based diets, as the digestive systems of monogastric animals and humans are unable to metabolize it. The presence of phytate in the diet can form insoluble complexes, primarily with cations such as calcium (Ca), magnesium (Mg), zinc (Zn), copper (Cu), and iron (Fe), thereby

reducing the bioavailability of these essential minerals. [18] Germination of ragi helps reduce phytate content and improves mineral absorption. [19] Ragi is a good source of calcium and phosphorus, containing approximately 344 mg of calcium and 280 mg of phosphorus per 100 grams. [20-21] As per ICMR Indian Council for Medical Research (ICMR) Recommended Dietary Allowance (RDA) of calcium for an adult woman is 600 mg/day. [22] Consumption of 250mg of Ragi milk is sufficient to meet the RDA for an adult women.

According to Traditional Chinese Medicine (TCM), osteomalacia is caused by deficiency of kidney yin and qi. [23] Acupuncture points KI-3 and BL-23 help treat kidney and yin qi deficiency. GB-39 and BL-11 serve as influential points for bone and marrow, while LI-4 and ST-44 act as analgesic points to reduce pain.[13] Acupuncture modulates neurotransmissions in the central nervous system (CNS), including those involving opioids, serotonin, norepinephrine, orexin, and endocannabinoids, to induce analgesia. Additionally, acupuncture reduces the levels of cyclooxygenase-2 (COX-2) and prostaglandin E2 (PGE-2) at the peripheral level by acting on the hypothalamic-pituitary-adrenal (HPA) axis, which mediates the release of peripheral opioids. [24] Acupuncture enhances the Wingless-related integration site (Wnt)/β-Catenin and Receptor Activator of Nuclear Factor ϰ B (RANK)/ Receptor Activator of Nuclear Factor ϰB Ligand (RANKL)/ Osteoprotegerin (OPG) pathways [25&26]. These pathways support cartilage regeneration, regulate bone metabolism, and reduce osteoclastic activity, thus improving bone density. Strength and limitation: This is the first case reported using IYN for osteomalacia. Future randomized controlled trials are recommended with larger sample sizes.

CONCLUSION:

The IYN treatment had chosen reduced pain, and muscle stiffness, and improved bone health in patients with osteomalacia. Therefore, yoga and naturopathy it would be worth testing the IYN treatment used here more generally as an alternative or adjunct therapy for the management of osteomalacia.

Consent of patient:
The consent of the patient has been taken for publication and procedure without disclosing the identity of the patient.

Conflict of interest: The author declares that there is no conflict of interest.

Guarantor*:* The corresponding author is the guarantor of this article and its contents.

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REFERENCE:

1. Sizar, O., et al. "Osteomalacia: A Comprehensive Review." Journal of the American Academy of Physician Assistants, 2023; 36(4): 21-29.
2. Harrison, S. R., et al. "Prevalence of Osteomalacia and Its Risk Factors: A

Comprehensive Review." Bone Reports, 2021.15, 100725.
3. Holick, M. F. "Vitamin D Deficiency." New England Journal of Medicine, 2021; 384 (….): 371-378.
4. Zimmerman L, Anastasopoulou C, McKeon B. Osteomalacia. [Updated 2024 Sep 2]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from:
5. Pludowski, P., et al. "Vitamin D and Bone Health: A Review of Clinical Guidelines." Journal of Clinical Endocrinology & Metabolism, 2022;107(6):1846-1860.
6. Liu L, Tang Y, Baxter GD, Yin H, Tumilty S. Complementary and alternative medicine - practice, attitudes, and knowledge among healthcare professionals in New Zealand: an integrative review. BMC Complement Med Ther. 2021;21(1):63-67.
7. Fleming SA, Gutknecht NC. Naturopathy and the primary care practice. Prim Care. 2010 Mar;37(1):119-36.
8. Brems C. Yoga as a mind-body practice. Nutrition, Fitness, and Mindfulness: An Evidence-Based Guide for Clinicians. 2020:137-55.
9. Gowda S, Mohanty S, Saoji A, Nagarathna R. Integrated Yoga and Naturopathy module in management of Metabolic Syndrome: A case report. J Ayurveda Integr Med. 2017;8(1):45-48.
10. Deeksha, Shenoy & Ganesh, Dr & Shetty, Prashanth & Prabhu, Ananth & Sujatha, Kj. Effect of Sunbath On Autonomic Variables In Hypertensive Individuals.2025.10.5281/zenodo.14752496
11. Religi A, Backes C, Chatelan A, Bulliard JL, Vuilleumier L, Moccozet L, Bochud M, Vernez D. Estimation of exposure durations for vitamin D production and sunburn risk in Switzerland. J Expo Sci Environ Epidemiol. 2019;29(6):742-752.
12. Chaudhary N, Vyas S. Effect of germi nati on on proximate composition and antinutritional factor of millet (ragi) based premi xes.
13. Claudia Focks C, März U, Hosbach I, editors. Atlas of acupuncture. 1st ed. Elsevier,Philadelphia,USA; 2008.
14. Begum MR, Hossain MA. Validity and reliability of visual analogue scale (VAS) for pain measurement. Journal of Medical Case Reports and Reviews. 2019;2(11): 23-26.
15. Williams N. PHQ-9. Occupational medicine. 2014;64(2):139-40.
16. Motorwala ZS, Kolke S, Panchal PY, Bedekar NS, Sancheti PK, Shyam A. Effects of Yogasanas on osteoporosis in postmenopausal women. International journal of yoga. 2016;9(1):44-8.
17. Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease. The American journal of clinical nutrition. 2004;80(6):1678S-88S.
18. Kumar V, Sinha AK, Makkar HP, Becker K. Dietary roles of phytate and phytase in human nutrition: A review. Food chemistry. 2010;120(4):945-59.
19. Chauhan E. S, Sarita. Effects of Processing (Germination and Popping) on the Nutritional and Anti-Nutritional Properties of Finger Millet (Eleusine Coracana). Curr Res Nutr Food Sci 2018;6(2): 1-10.
20. Charoenngam N, Shirvani A, Holick MF. Vitamin D for skeletal and non-skeletal health: What we should know. Journal of clinical orthopaedics and trauma. 2019;10(6):1082-93.

21. Babu SK, Selvaraj D. Nutritional and health benefits of millets. *J Food Sci Technol*. 2015;52(7):4228-38.
22. Allowances RD. Nutrient requirements and recommended dietary allowances for Indians. ICMR-National Institute of Nutrition: Hyderabad, India. 2009.
23. Sun W, Shao Z, Yuan Q, Li H. Traditional Chinese Medicine Offers New Ideas for the Treatment of Osteoporosis Through Multi-Method Interventions in Ferroptosis. Pharmacognosy Magazine. 2024 Feb 7:09731296231221610.
24. Ning Z, Lao L. Acupuncture for pain management in evidence-based medicine. Journal of Acupuncture and Meridian Studies. 2015;8(5):270-3.
25. Wang M, Liu L, Zhang CS, Liao Z, Jing X, Fishers M, Zhao L, Xu X, Li B. Mechanism of traditional Chinese medicine in treating knee osteoarthritis. Journal of pain research. 2020;15:1421-9.
26. Wang J, Xue JS, Huang SM. Recent advancements in prevention and treatment of osteoporosis with traditional Chinese medicine: a long way from lab bench to bedside. Current molecular pharmacology. 2023; 16(3): 321-30.