

Canola oil consumption and bone health

The prevalence of osteoporosis, a common skeletal disorder among elderly, is now increasing worldwide.^[1-3] Nationally representative data from Iran has reported a lower peak bone mass among Iranian compared to European and American population.^[4,5] There are several factors which could improve bone health, including genetics and environmental factors such as nutritional adequacy. In a multicenter interview-based study, Keramat *et al.* reported Lower educational level, delayed menarche, early menopause and a poor diet as the risk factors of osteoporosis among Iranian women.^[6]

Several dietary factors may affect bone health. Frequent red meat intake and pure vegetarianism were considered as the risk factors of osteoporosis while consuming soy, fruits, fish and milk were reported as protective factors. The effects of dietary fatty acids on bone health also have been reported previously. Different dietary fatty acids may affect bone health via the status of inflammatory markers production.^[7] In the current issue of journal of research in medical sciences, Azemati, *et al.* have reported the findings of a 3-months parallel-arm randomized clinical trial on 40 osteoporotic post-menopausal Iranian women which aimed to compare the effect of canola oil (as the natural source of omega-3) and sunflower oil (as the natural source of omega-6) on biochemical markers of bone metabolism. They found a non-significant increase in bone alkaline phosphatase (BALP), N telo peptide collagen (NTX) in canola oil group and a non-significant decrease for Osteocalcin in both groups. Additionally, they found increased levels of vitamin D₃ in both groups, but the difference between two groups was not significant. Overall, they found that canola oil did not affect bone formation and resorption significantly after 3 months consumption.

It seems that the non-significant association is related to some critical point which should be noted in this study. First of all, Azemati *et al.* evaluated the adherence of recommended diet using recall and checking empty

bottle while it was better they used more precise method to evaluate fatty acids intake such as measuring serum fatty acids concentration. Second, they did not consider the exact amount of ω -3 and ω -6 and they recommend vegetable oils which included various types of fatty acids in different ratio. Hence, it is probable that these oils could not provide enough amounts of omega-3 and omega-6 to exhibit expected outcomes. Other possible reasons for non-significant findings in this study may be related to its small sample size and short-time intervention which shows the necessity of more studies with larger sample size and longer duration.

Studying the effect of fatty acids is not a novel concept and there are some studies in this field. However, findings are not consistent in this regard. Some studies showed that PUFA intake (both omega-3 and omega-6) were positively associated with BMD.^[8] However, some researchers reported higher fracture rate by higher n-3 fatty acids and lower fracture risk with higher n-6 fatty acids.^[9] In a previous study which was done by Salari Sharif *et al.*,^[10] the effect of omega-3 was assessed, but they prescribed 900 mg n-3 fatty acid capsules for 6-monthes compared with placebo. Their findings supported the beneficial effect of omega-3 on bone biomarkers.

Overall, the exact effect of dietary fatty acids on bone biomarkers and their mechanisms are not clear, exactly. However, some mechanisms have been suggested underlying their effects which mainly explained by the inflammatory roles of fatty acids. For instance, n-3 fatty acids by decreasing PGE2 production, increases the producing of osteoprotegerin and decrease the expression of receptor activator of nuclear transcription factor κ B ligand (RANKL), which leads to increase the ratio of osteoprotegerin: RANKL and improve the resorptive bone disease.^[11] Another notable aspect in these studies is the total amount of EPA + DHA, which should be checked between different groups, since in a well-designed study, they have been considered as confounder factors. However, the worthwhile finding of this study is that showing n-3 fatty acids in a short time does not have any beneficial effects on bone biomarkers. More longitudinal studies are needed to illustrate the exact effects of different fatty acids on bone health.

It should be noted that in present study, Azemati considered two vegetable sources of ω -3 and ω -6

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fatty acids. Most of previous studies which reported the beneficial effects of ω -3 on bone health mainly focused on marine source or both vegetable and marine sources of ω -3^[8,9] or compared ω -6 (in vegetable oils) with fish oil.^[12] This is notable since vegetable and marine sources of ω -3 show different inflammatory effects.^[13] Although previous studies have focused on the effects of omega-3 fatty acids on different metabolic diseases,^[14] few researches have provided extensive information on osteoporosis. Furthermore, considering the type of oils and different cooking methods is also important in interpretation of the results.^[15]

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REFERENCES

1. Cauley JA, Thompson DE, Ensrud KC, Scott JC, Black D. Risk of mortality following clinical fractures. *Osteoporos Int* 2000;11:556-61.
2. Norris RJ. Medical costs of osteoporosis. *Bone* 1992;13:S11-6.
3. Melton LJ 3rd. Adverse outcomes of osteoporotic fractures in the general population. *J Bone Miner Res* 2003;18:1139-41.
4. Larijani B, Hossein-Nezhad A, Mojtahedi A, Pajouhi M, Bastanbakhsh MH, Soltani A, *et al*. Normative data of bone mineral density in healthy population of Tehran, Iran: A cross sectional study. *BMC Musculoskelet Disord* 2005;6:38.
5. Ahmadi-Abhari S, Moayyeri A, Abolhassani F. Burden of hip fracture in Iran. *Calcif Tissue Int* 2007;80:147-53.
6. Keramat A, Patwardhan B, Larijani B, Chopra A, Mithal A, Chakravarty D, *et al*. The assessment of osteoporosis risk factors in Iranian women compared with Indian women. *BMC Musculoskelet Disord* 2008;9:28.
7. Järvinen R, Tuppurainen M, Erkkilä AT, Penttinen P, Kärkkäinen M, Salovaara K, *et al*. Associations of dietary polyunsaturated fatty acids with bone mineral density in elderly women. *Eur J Clin Nutr* 2012;66:496-503.
8. Farina EK, Kiel DP, Roubenoff R, Schaefer EJ, Cupples LA, Tucker KL. Dietary intakes of arachidonic acid and alpha-linolenic acid are associated with reduced risk of hip fracture in older adults. *J Nutr* 2011;141:1146-53.
9. Orchard TS, Cauley JA, Frank GC, Neuhauser ML, Robinson JG, Snetselaar L, *et al*. Fatty acid consumption and risk of fracture in the Women's Health Initiative. *Am J Clin Nutr* 2010;92:1452-60.
10. Salari Sharif P, Asalforoush M, Ameri F, Larijani B, Abdollahi M. The effect of n-3 fatty acids on bone biomarkers in Iranian postmenopausal osteoporotic women: A randomized clinical trial. *Age (Dordr)* 2010;32:179-86.
11. Hofbauer LC, Schoppet M. Clinical implications of the osteoprotegerin/rankl/rank system for bone and vascular diseases. *JAMA* 2004;292:490-5.
12. Iwami-Morimoto Y, Yamaguchi K, Tanne K. Influence of dietary n-3 polyunsaturated fatty acid on experimental tooth movement in rats. *Angle Orthod* 1999;69:365-71.
13. Raymond JL, Couch SC. Medical nutrition therapy for cardiovascular disease. In Krause's food and the nutrition care process. In: Mahan LK, editor. *Escott's dietetics*. 13th ed. Philadelphia: WB Saunders; 2012. p. 742-77.
14. Azadbakht L, Rouhani MH, Surkan PJ. Omega-3 fatty acids, insulin resistance and type 2 diabetes. *J Res Med Sci* 2011;16:1259-60.
15. Shafaeizadeh S, Jamalian J, Owji AA, Azadbakht L, Ramezani R, Karbalaeei N, *et al*. The effect of consuming oxidized oil supplemented with fiber on lipid profiles in rat model. *J Res Med Sci* 2011;16:1541-9.

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