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DRIED PLUMS AND OSTEOPOROSIS – NARRATIVE REVIEW OF LITERATURE

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review paper

Summary

Osteoporosis is a major public health concern affecting millions of older adults worldwide and is associated with an increased risk of fragility fractures. Dietary factors and bioactive food components have growing attention as potential strategies for maintaining bone health. Dried plums (prunes) have been recognised as a fruit with a large influence in bone health. Numerous studies in animal models suggest that dried plum consumption may attenuate bone loss and improve bone structure and strength. Clinical studies, in postmenopausal women and men, have also reported the bone-protective effects of dried plum consumption although these effects appear to be relatively limited. In general, dried plums may represent a promising dietary approach for supporting bone health but further well-designed, long term trials in large, diverse populations are needed to establish their potential role in preserving bone mass and reducing the risk of fractures.

Keywords: prunes, dried plum, osteoporosis

Introduction

Osteoporosis is a bone disease characterised by reduced bone mass and deterioration of bone tissue. It is a big public health issue which affects a large number of older people in the world. The population in developed countries is ageing rapidly due to rising life expectancy and lower fertility rates. In the USA alone, approximately 53.6 million older adults over the age of 50 have osteoporosis (10.3%) or osteopenia (43.9%) (Wright et al., 2014). Fragility fractures are a major clinical burden related to many factors, but the most significant causes are reduction in bone mass and increased frequency of falls. It is very important to address the bone health in older adults to prevent the chance of fragility fractures and in the last 25 years there has been a lot of research concerning bone health and bone-protecting properties of food.

Dried plums are considered a promising functional food that can potentially have a role in osteoporosis prevention. Their sweet flavor, mild laxative effect, unique nutrient and dietary bioactive profile (including polyphenols, phytoestrogens, potassium, boron, vitamin K, and dietary fiber) has helped them gain increasing scientific attention. They may modulate inflammation and oxidative stress, potentially alter gut microbiota, enhance bone formation and inhibit bone resorption. To try to summarize the potential bone-protecting effects of dried plums, a review of the scientific literature was conducted.

Materials and methods

This article reviews the literature regarding the role of dried plums in prevention and treatment of osteoporosis. A literature search was conducted in the PubMed database using the following search strategy: plums or prunes or „dried plums“ and osteoporosis. Relevant studies investigating the effects of dried plum consumption or supplementation on bone health were considered and screened by title or abstract. Included in the review were cell, animal and clinical studies in the English language across a 25-year period (2001.-2026.) that assessed the effects of dried plums on bone health.

Results and discussion

Quality, nutrient dense food with the inclusion of bone-protecting compounds including polyphenols, carotenoids and curcumin can have a protective effect on bone health and other tissues (Faienza et al., 2024). Ensuring that such foods are eaten on a regular basis can help to reduce susceptibility to fractures. Most of the focus in reducing fracture risk has been on calcium and vitamin D intakes but it has been found that a spectrum of nutrients and trace elements are needed for bone health. Fruit and vegetables contain many micronutrients and phytochemicals used in bone remodelling (Higgs et al., 2017).

Numerous studies show that phytoestrogens, especially those derived from soy, red clover, hops, fennel, and dried plums may help improve bone health

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and reduce the risk of fragility fractures (Kaczmarski et al., 2025). Gut microbiota is also a big factor in bioavailability of phytochemicals. Intestinal microbes break down the ingested phytochemicals and release metabolites that are often more active and better absorbed than the unaltered phytochemicals (Espín et al., 2017). A more diverse gut microbiota, especially organisms in *Oscillospiraceae* UCG-002 and [*Eubacterium*] *coprostanoligenes* may be helpful in osteoporosis prevention alongside dried plum consumption (Simpson et al., 2024).

Mechanisms

Dried plums (prunes) have been investigated for their potential role in maintaining bone health. Their beneficial effect on bone health may be in part due to the unique variety of polyphenols, phytoestrogens and nutrients present in the fruit. They can enhance bone formation and inhibit bone resorption as they modulate cell signaling pathways that influence osteoblast and osteoclast differentiation (Wallace, 2017). Dried plums are also an important source of vitamin K, manganese, boron, copper and potassium which could help to support bone health and to prevent osteoporosis (Stacewicz-Sapuntzakis et al., 2001). Dried plum supplementation may improve bone metabolism and modulate bone structural properties and higher quantities of dried plums may prevent bone loss and improve bone strength (Damani et al., 2022). Dried plums have also been ranked as having one of the highest oxygen radical absorbance capacities among the commonly consumed fruits and vegetables. Many bioactive compounds in dried plums have been shown to modulate bone metabolism, most likely by having additive or synergistic effects. Bone-protective effect of dried plums may also be long-lasting (Arjmandi et al., 2002; Arjmandi et al., 2017).
Inflammatory markers may also be important mediators for bone loss. One study identified 7 inflammatory factors strongly associated with fragility fracture risk. Artemin showed a bone-protective effect, while elevated levels of β-NGF, CXCL10, CXCL6, IL-10Rα, IL-10Rβ, and LAP-TGFβ1 were associated with increased risk of fragility fractures (Damani et al., 2023; Wang and Wang, 2025).

Animal models

In animal models, dried plum supplementation has been shown to attenuate bone loss and improve measures of bone strength. Compared to other fruits such as apple, apricot, grape or mango, dried plum supplementation showed that it not only prevented bone loss, but also induced bone recovery (Rendina et al., 2013; Arjmandi et al., 2010). Research strongly suggests that antioxidant-rich fruits have a pronounced effect on bone. This is shown by enhanced bone formation and suppressed bone resorption resulting in higher bone mass and trabecular bone volume. These effects are most likely controlled by antioxidant or anti-inflammatory pathways and their downstream signaling mechanisms leading to increased osteoblastogenesis and reduction of osteoclastogenesis (Shen et al., 2012). Bone-protecting effect of dried plum supplementation in animal models show that they suppress bone turnover and then enhance bone formation, likely by antioxidant mechanisms (Smith et al., 2014). One study in mice showed that mice fed with no dried plums diet lost bone volume, but adult and old mice fed with the 25% dried plum supplemented diet showed increased bone volume and bone recovery (Halloran et al., 2010). In estrogen deficient 5-month-old female rats, low-chlorogenic acid dried plum supplementation enriched with a high-fiber diet and low-chlorogenic acid dried plum juice concentrate prevented the decrease of total femoral bone mineral density, but the beneficial action of dried plum supplementation on bone health was not dependent on its polyphenolic content (Léotoing et al, 2016). In androgen deficient male rats, dried plum supplementation prevented osteopenia by decreasing osteoclastogenesis via down-regulation of RANKL and stimulation of bone formation mediated by IGF-I (Franklin et al., 2006).
MicroCT analysis of trabecular bone structure in intact rats showed that dried plum supplementation reversed the loss of trabecular bone architecture by enhancing bone recovery comparable to parathyroid hormone (Hooshmand and Arjmandi, 2009). Another study on mice that examined fractions of polyphenolic extract from dried plums (DP-F) showed that of the 14 polyphenols assessed in the fractions, DP-FrF appeared to have a more robust effect on reducing osteoclast differentiation, especially under inflammatory conditions (Graef et al., 2017). One study identified fractions of a polyphenolic extract from dried plums which were shown to enhance osteoblast activity and function. Dp-FrA and DP-FrB were most water soluble and most bioactive by upregulating *Runx2,* the main osteoblastogenesis regulator (Graef et al., 2018). In TNF transgenic mice, a month long treatment of 20% dried plum supplemented diet slowed the onset of arthritis and reduced bone erosions in their joints. This data suggests that dried plum diet inhibits TNF signalling which leads to significant protection of articular cartilage and reduction of synovitis (Mirza et al., 2018). In mouse models, both carbohydrate and

polyphenol components of dried plums prevent bone loss by having beneficial effect on mineral absorption, immune modulation and gut microbiota integrity (Smith et al., 2022).

In sciatic-denervated rats, dried plum extract supplementation was shown to significantly suppress the decrease in the mRNA levels of osteoblast-related genes and increasing bone formation but not suppressing osteoclast-related genes and inhibiting bone resorption (Hanzawa et al., 2025). Dried plum supplementation in female mice was shown to shift gut microbiota composition, and those shifts may be linked with bone health. It was observed that dried plum supplementation in rodent models leads to increases in members in *Lachnospiraceae* and *Bacteroides* family and decreases in *Bifidobacteriaceae* family. A near 15% increase in *Bacteroides* family members was observed and showed a very strong positive correlation to distal femur bone volume. These findings show that there may be a correlation between increased *Bacteroides* abundance and improved bone health. (Chargo et al., 2024).

Clinical studies

Studies on postmenopausal women and men have also shown bone-protecting effect of dried plum supplementation. Dried plum consumption was shown to significantly increase bone mineral density of ulna and spine in comparison to consumption of dried apples (Hooshmand et al., 2011). One randomized controlled trial showed that eating 50 g of dried plums (equivalent to 5–6 dried plums) for 6 months may be as effective as eating 100 g of dried plums in preventing bone loss in postmenopausal women (Hooshmand et al., 2016). Another randomized, crossover trial studied markers of bone resorption and vascular function in healthy postmenopausal women over the course of 2 weeks. Short-term consumption of low levels of dried plums showed favorable impact on bone health and no effects on vascular function (Al-Dashti et al., 2019). In men, the effects of short-term dried plum consumption appear to be limited.

Three months of regular consumption of dried plums had minimal effects on inflammatory markers, although modest improvements were observed in some bone-related biomarkers (George et al., 2022). Daily consumption of 100 g of dried plums for 12 months has been shown to have a modest bone-protective effect in men while 50g of dried plums for 12 months has been shown to positively impact bone mineral density, better than calcium and vitamin D_3 supplementation alone, in postmenopausal women with osteopenia (Strock et al., 2021; Hooshmand et al., 2022). In young women using oral contraceptives, consumption of dried plums was shown to inhibit minor adverse effects of oral contraceptives on bone. These results suggest that to a limited degree, dried plums may be therapeutic against OC-induced bone loss (DeMasi et al., 2024). One randomized controlled trial showed that dietary supplement of 50 to 100g of dried plums for 12 months may reduce inflammatory mediators in peripheral blood mononuclear cells that modulate bone-signaling pathways and may attenuate bone loss in postmenopausal women (Damani et al., 2024). The largest and most comprehensive randomized controlled trial designed to evaluate the effectiveness of dried plums as a whole food dietary supplement during 12 months has shown that eating 50 g of dried plums daily alongside calcium and vitamin D_3 supplementation may be a valuable, well-tolerated non-pharmacologic strategy for fragility fracture prevention (De Souza et al., 2022b). It was the first randomized controlled trial with data on the impact of two dosages of daily dried plums consumption on bone density, structure and strength estimates, bone turnover, various biomarkers of immune function, inflammation, and cardiovascular health, as well as phenolic and gut microbiota analyses (De Souza et al., 2022a).

In the most recent systematic review of randomized controlled trials, the results suggest a potential but modest impact of dried plum consumption on lumbar spine bone mineral density with no significant effects on hip, ulna or whole body. Skeletal effects of dried plum supplementation are probably modest and require longer exposure to become detectable. Authors suggest that the high heterogeneity, small sample sizes and short follow-up periods limit confidence in the clinical relevance of the observed effects (Treister-Goltzman and Peleg, 2026).

Conclusions

Dried plums contain a combination of nutrients and bioactive compounds that may support bone health. Their effects may involve bone formation and resorption as well as inflammation, oxidative stress and gut microbiota. Evidence from animal models consistently suggest potential bone-protective effects of dried plum supplementation, while clinical studies in postmenopausal women and men indicate beneficial, although modest, effects on selected measures of bone health. Recent evidence suggests that daily regular consumption of approximately 50g of dried plums may have a beneficial effect on bone density, especially at the lumbar spine. Therefore, dried plums may be considered a potentially useful component of a dietary strategy to support bone health. However, current evidence is insufficient to establish them as an

independent treatment for osteoporosis or as a proven means of preventing fragility fractures. Larger, well-designed, long-term randomized controlled trials in diverse populations are needed to determine whether regular dried plum consumption can produce clinically meaningful improvements in bone health.

References

Al-Dashti, Y.A., Holt, R.R., Carson, J.G., Keen, C.L., Hackman, R.M. (2019): Effects of Short-Term Dried Plum (Prune) Intake on Markers of Bone Resorption and Vascular Function in Healthy Postmenopausal Women: A Randomized Crossover Trial, *J. Med. Food* 22(10), 982-992. https://doi.org/10.1089/jmf.2018.0209

Arjmandi, B.H., Johnson, C.D., Campbell, S.C., Hooshmand, S., Chai, S.C., Akhter, M.P. (2010): Combining fructooligosaccharide and dried plum has the greatest effect on restoring bone mineral density among select functional foods and bioactive compounds, *J. Med. Food* 13(2), 312-9. https://doi.org/10.1089/jmf.2009.0068

Arjmandi, B.H., Johnson, S.A., Pourafshar, S., Navaei, N., George, K.S., Hooshmand, S., Chai, S.C., Akhavan, N.S. (2017): Bone-Protective Effects of Dried Plum in Postmenopausal Women: Efficacy and Possible Mechanisms, *Nutrients* 9(5), 496. https://doi.org/10.3390/nu9050496

Arjmandi, B.H., Khalil, D.A., Lucas, E.A., Georgis, A., Stoecker, B.J., Hardin, C., Payton, M.E., Wild, R.A. (2002): Dried plums improve indices of bone formation in postmenopausal women, *J. Womens Health Gend. Based Med* 11(1), 61-8. https://doi.org/10.1089/152460902753473471

Chargo, N.J., Neugebauer, K., Guzior, D.V., Quinn, R.A., Parameswaran, N., McCabe, L.R. (2024): Glucocorticoid-induced osteoporosis is prevented by dietary prune in female mice, *Front Cell Dev Biol* 11, 1324649. https://doi.org/10.3389/fcell.2023.1324649

Damani, J.J., De Souza, M.J., Strock, N.C.A., Koltun, K.J., Williams, N.I., Weaver, C., Rogers, C.J. (2023): Associations Between Inflammatory Mediators and Bone Outcomes in Postmenopausal Women: A Cross-Sectional Analysis of Baseline Data from the Prune Study, *J. Inflamm. Res* 16, 639-663. https://doi.org/10.2147/JIR.S397837

Damani, J.J., De Souza, M.J., VanEvery, H.L., Strock, N.C.A., Rogers, C.J. (2022): The Role of Prunes in Modulating Inflammatory Pathways to Improve Bone Health in Postmenopausal Women, *Adv. Nutr* 13(5), 1476-1492. https://doi.org/10.1093/advances/nmab162

Damani, J.J., Oh, E.S., De Souza, M.J., Strock, N.C., Williams, N.I., Nakatsu, C.H., Lee, H., Weaver, C., Rogers, C.J. (2024): Prune Consumption Attenuates Proinflammatory Cytokine Secretion and Alters Monocyte Activation in Postmenopausal Women: Secondary Outcome Analysis of a 12-Mo Randomized Controlled Trial: The Prune Study, *J. Nutr* 154(5), 1699-1710. https://doi.org/10.1016/j.tjnut.2023.11.014

De Souza, M.J., Strock, N.C.A., Rogers, C.J., Williams, N.I., Ferruzzi, M.G., Nakatsu, C.H., Simpson, A.M.R., Weaver, C. (2022a): Rationale and study design of Randomized Controlled Trial of Dietary Supplementation with prune (dried plums) on bone density, geometry, and estimated bone strength in postmenopausal women: The Prune study, *Contemp. Clin. Trials Commun* 28, 100941. https://doi.org/10.1016/j.conctc.2022.100941

De Souza, M.J., Strock, N.C.A., Williams N.I., Lee, H., Koltun, K.J., Rogers, C., Ferruzzi, M.G., Nakatsu, C.H., Weaver, C. (2022b): Prunes preserve hip bone mineral density in a 12-month randomized controlled trial in postmenopausal women: the Prune Study, *Am. J. Clin. Nutr* 116(4), 897-910. https://doi.org/10.1093/ajcn/nqac189

DeMasi, T., Tsang, M., Mueller, J., Giltvedt, K., Nguyen, T.N., Kern, M., Hooshmand, S.(2024): Prunes May Blunt Adverse Effects of Oral Contraceptives on Bone Health in Young Adult Women: A Randomized Clinical Trial, *Curr. Dev. Nutr* 8(9), 104417. https://doi.org/10.1016/j.cdnut.2024.104417

Espín, J.C., González-Sarrías, A., Tomás-Barberán, F.A. (2017): The gut microbiota: A key factor in the therapeutic effects of (poly)phenols, *Biochem. Pharmacol* 139, 82-93. https://doi.org/10.1016/j.bcp.2017.04.033

Faienza, M.F., Giardinelli, S., Annicchiarico, A., Chiarito, M., Barile, B., Corbo, F., Brunetti, G. (2024): Nutraceuticals and Functional Foods: A Comprehensive Review of Their Role in Bone Health, *Int. J. Mol. Sci* 25(11), 5873. https://doi.org/10.3390/ijms25115873

Franklin, M., Bu, S.Y., Lerner, M.R., Lancaster, E.A., Bellmer, D., Marlow, D., Lightfoot, S.A., Arjmandi, B.H., Brackett, D.J., Lucas, E.A., Smith, B.J. (2006): Dried plum prevents bone loss in a male osteoporosis model via IGF-I and the RANK pathway, *Bone* 39(6), 1331-42. https://doi.org/10.1016/j.bone.2006.05.024

George, K.S., Munoz, J., Ormsbee, L.T., Akhavan, N.S., Foley, E.M., Siebert, S.C., Kim, J.S., Hickner, R.C., Arjmandi, B.H. (2022): The Short-Term Effect of Prunes in Improving Bone in Men, *Nutrients* 14(2), 276. https://doi.org/10.3390/nu14020276

Graef, J.L., Rendina-Ruedy, E., Crockett, E.K., Ouyang, P., King, J.B., Cichewicz, R.H., Lucas, E.A., Smith, B.J. (2018): Select polyphenolic fractions from dried plum enhance osteoblast activity through BMP-2 signaling, *J. Nutr. Biochem* 55, 59-67. https://doi.org/10.1016/j.jnutbio.2017.09.014

Graef, J.L., Rendina-Ruedy, E., Crockett, E.K., Ouyang, P., Wu, L., King, J.B., Cichewicz, R.H., Lin, D., Lucas, E.A., Smith, B.J. (2017): Osteoclast Differentiation is Downregulated by Select Polyphenolic Fractions from Dried Plum via Suppression of MAPKs and Nfatc1 in Mouse C57BL/6 Primary Bone Marrow Cells, *Curr. Dev. Nutr* 1(10), e000406. https://doi.org/10.3945/cdn.117.000406

Halloran, B.P., Wronski, T.J., VonHerzen, D.C., Chu, V., Xia, X., Pingel, J.E., Williams, A.A., Smith, B.J. (2010): Dietary dried plum increases bone mass in adult and aged male mice, *J. Nutr* 140(10), 1781-7. https://doi.org/10.3945/jn.110.124198

Hanzawa, F., Kiriyama, K., Nakashima, A., Iwami, A., Yamamoto, H. (2025): Prune extract prevents disuse osteoporosis by inhibiting the decrease in osteoblast-related gene expression in sciatic-denervated rats, *J. Clin. Biochem. Nutr* 76(1), 42-49. https://doi.org/10.3164/jcbn.24-139

Higgs, J., Derbyshire, E., Styles, K. (2017): Nutrition and osteoporosis prevention for the orthopaedic surgeon, *EFORT Open Rev* 2(6), 300-308. https://doi.org/10.1302/2058-5241.2.160079

Hooshmand, S., Arjmandi, B.H. (2009): Viewpoint: dried plum, an emerging functional food that may effectively improve bone Health, *Ageing Res. Rev* 8(2), 122-7. https://doi.org/10.1016/j.arr.2009.01.002

Hooshmand, S., Chai, S.C., Saadat, R.L., Payton, M.E., Brummel-Smith, K., Arjmandi, B.H. (2011): Comparative effects of dried plum and dried apple on bone in postmenopausal women, *Br. J. Nutr* 106(6), 923-30. https://doi.org/10.1017/S000711451100119X

Hooshmand, S., Gaffen, D., Eisner, A., Fajardo, J., Payton, M., Kern, M. (2022): Effects of 12 Months Consumption of 100 g Dried Plum (Prunes) on Bone Biomarkers, Density, and Strength in Men, *J. Med. Food* 25(1), 40-47. https://doi.org/10.1089/jmf.2021.0080

Hooshmand, S., Kern, M., Metti, D., Shamloufard, P., Chai, S.C., Johnson, S.A., Payton, M.E., Arjmandi, B.H. (2016): The effect of two doses of dried plum on bone density and bone biomarkers in osteopenic postmenopausal women: a randomized, controlled trial, *Osteoporos. Int* 27(7), 2271-2279. https://doi.org/10.1007/s00198-016-3524-8

Kaczmarski, M., Trubalski, M., Kamiński, P., Żerebiec, M., Bełżek, A., Saj, N., Rupeć, Z., Niezbecka-Zając, J., Fedorenko, N., Kłapeć, W. (2025): Phytoestrogens in osteoporosis, *Wiad Lek* 78(3), 602-608. https://doi.org/10.36740/WLek/202326

Léotoing, L., Wauquier, F., Davicco, M.J., Lebecque, P., Gaudout, D., Rey, S., Vitrac, X., Massenat, L., Rashidi, S., Wittrant, Y., Coxam, V. (2016): The phenolic acids of Agen prunes (dried plums) or Agen prune juice concentrates do not account for the protective action on bone in a rat model of postmenopausal osteoporosis, *Nutr. Res* 36(2), 161-73. https://doi.org/10.1016/j.nutres.2015.10.002

Mirza, F., Lorenzo, J., Drissi, H., Lee, F.Y., Soung, D.Y. (2018): Dried plum alleviates symptoms of inflammatory arthritis in TNF transgenic mice, *J. Nutr. Biochem* 52, 54-61. https://doi.org/10.1016/j.jnutbio.2017.10.002

Rendina, E., Hembree, K.D., Davis, M.R., Marlow, D., Clarke, S.L., Halloran, B.P., Lucas, E.A., Smith, B.J. (2013): Dried plum's unique capacity to reverse bone loss and alter bone metabolism in postmenopausal osteoporosis model, *PLoS One* 8(3), e60569. https://doi.org/10.1371/journal.pone.0060569

Shen, C.L., von Bergen, V., Chyu, M.C., Jenkins, M.R., Mo, H., Chen, C.H., Kwun, I.S. (2012): Fruits and dietary phytochemicals in bone protection, *Nutr. Res* 32(12), 897-910. https://doi.org/10.1016/j.nutres.2012.09.018

Simpson, A.M.R., De Souza, M.J., Damani, J., Rogers, C.J., Williams, N.I., Weaver, C.M., Ferruzzi, M.G., Nakatsu, C.H. (2024): Gut microbes differ in postmenopausal women responding to prunes to maintain hip bone mineral density, *Front Nutr* 11, 1389638. https://doi.org/10.3389/fnut.2024.1389638

Smith, B.J., Graef, J.L., Wronski, T.J., Rendina, E., Williams, A.A., Clark, K.A., Clarke, S.L., Lucas, E.A., Halloran, B.P. (2014): Effects of dried plum supplementation on bone metabolism in adult C57BL/6 male mice, *Calcif. Tissue Int* 94(4), 442-53. https://doi.org/10.1007/s00223-013-9819-2

Smith, B.J., Hatter, B., Washburn, K., Graef-Downard, J., Ojo, B.A., El-Rassi, G.D., Cichewicz, R.H., Payton, M., Lucas, E.A. (2022): Dried Plum's Polyphenolic Compounds and Carbohydrates Contribute to Its Osteoprotective Effects and Exhibit Prebiotic Activity in Estrogen Deficient C57BL/6 Mice, *Nutrients* 14(9), 1685. https://doi.org/10.3390/nu14091685

Stacewicz-Sapuntzakis, M., Bowen, P.E., Hussain, E.A., Damayanti-Wood, B.I., Farnsworth, N.R. (2001): Chemical composition and potential health effects of prunes: a functional food?, *Crit. Rev. Food Sci. Nutr* 41(4), 251-86. https://doi.org/10.1080/20014091091814

Strock, N.C.A., Koltun, K.J., Weaver, C., De Souza, M.J. (2021): Dried plum consumption improves bone mineral density in osteopenic postmenopausal woman: A case report, *Bone Rep* 14, 101094. https://doi.org/10.1016/j.bonr.2021.101094

Treister-Goltzman, Y., Peleg, R. (2026): Effects of Prunes on Bone Density in Humans: A Systematic Review and Meta-Analysis of Randomized Controlled Trials, *Nutrients* 18(9), 1338. https://doi.org/10.3390/nu18091338

Wallace, T.C. (2017): Dried Plums, Prunes and Bone Health: A Comprehensive Review, *Nutrients* 9(4), 401. https://doi.org/10.3390/nu9040401

Wang, H., Wang, D. (2025): Causal effect between systemic inflammatory cytokines and osteoporotic pathological fractures: A bidirectional Mendelian randomization study, *Medicine (Baltimore)* 104(44), e44636. https://doi.org/10.1097/MD.0000000000044636

Wright, N.C., Looker, A.C., Saag, K.G., Curtis, J.R., Delzell, E.S., Randall, S., Dawson-Hughes, B. (2014): The recent prevalence of osteoporosis and low bone mass in the United States based on bone mineral density at the femoral neck or lumbar spine, *J. Bone Miner. Res* 29(11), 2520-6. https://doi.org/10.1002/jbmr.2269