

Impact exercises create ground reaction forces that put mechanical stress on bones and stimulate them to remodel and add density. Strong muscle contractions put additional stress on the attached bone. There is good evidence that **pre menopause**, jumping can significantly increase bone density at the hip (2). The effects post menopause are less clear.

Realistically, older joints and fragile bones cannot take the impact of running and jumping. For older adults who cannot tolerate high impact exercise, a program of brisk walking combined with progressive resistive strengthening exercises may suffice in preventing or slowing bone loss.

Ultimately, fractures are primarily results of falls, so exercise programs need to address risk factors for falls such as, balance deficits and lower extremity strength in older adults. Such exercise programs have shown to be effective in individuals with low bone density. (3)

Here is what research supports regarding exercise for improving bone density and preventing fractures:

- Exercise programs intended to improve bone density at the hip and spine should continue for **at least 6 months**. Effective exercise frequency is **2-3/ week** (1).
- For those with osteoporosis of the spine, forward flexion exercises (forward Yoga poses, or flexion machines) should be avoided. If tolerated **back extension exercises** (on stomach using body weight as resistance, or weight machines) appear to be beneficial (4).
- If high impact is tolerated, a program of jumping on and off boxes of various heights and **multidirectional jumps** (side to side, front/ back) may be beneficial. (5)
- If high impact is tolerated, 20 jumps twice/ day have shown significant effects in improving bone density at the hip in **pre-menopausal** women. (6)
- If high impact is not tolerated, a **brisk walk** of 4 hours/ week appears to reduce hip fracture risk significantly compared to less intense and shorter duration walking in postmenopausal women. (7)
- For progressive resistive strengthening exercises, **2 sets of 8-12 repetition maximum** with weights, for each major muscle group is recommended.(8) To address bone density of the spine **upper body strength training** should be included.
- Older adults with osteoporosis should additionally engage in a **balance training program**. Such exercises include: semi tandem or tandem stance, feet together eyes closed, single leg stance, forward/backward weight shifting, standing on soft surface. **Tai chi and dance** are also effective in improving balance.

Whether it is prescribing exercises to prevent bone loss or exercises to improve balance and prevent falls, Physical Therapists are in an ideal position to evaluate and treat bone health problems and to prescribe safe, individualized exercise programs. If you are concerned about your bone health, after seeing your doctor, consult a physical therapist who has experience in this area.

References:

1. <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD000333.pub2/abstract>
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