High Amplitude Vibration and Appropriate Measures to Assess Its Effectiveness on Health, Wellness and Performance of Healthy Aging Individuals

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The Concept

What effect does High Amplitude Vibration Training have on the physical function of an aging population?

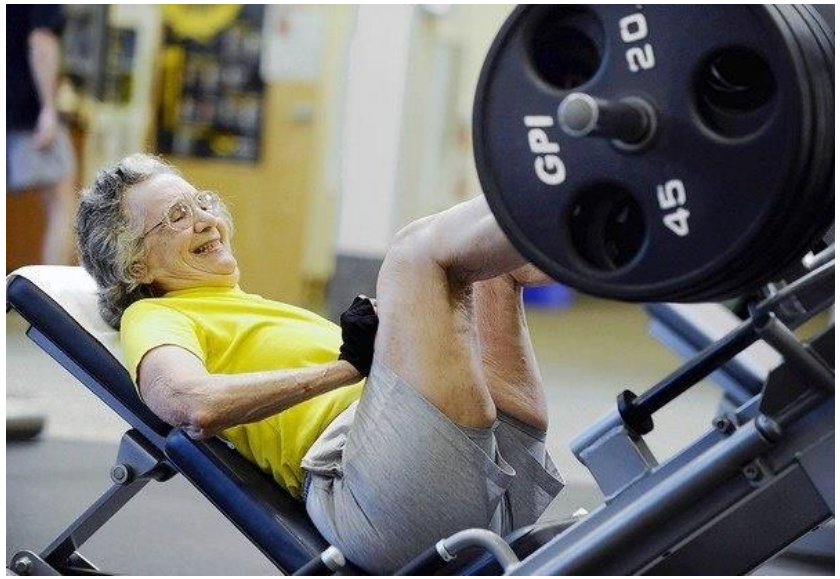
Effect of High Amplitude Vibration on Lower Limb Muscular Strength

Isometric Knee Extension Torque

- Performed on Biodex
- Logical for aging populations
  - Non aggressive
- Biodex Cost 20k
- Measured in max peak torque
- 1-600 Nm of torque

Leg Press Repetition Max Tests

- More aggressiveness
- Lower cost
- Test developed to measure lower body strength
- Dates back to 1955 with early weight lifters



Effect of High Amplitude Vibration on Bone Density

Dexa

- Manufactured by General Electric
- Measures T-Score
  - More than 2.5 SD's below the young adult mean = osteoporosis
  - 1-2.5 SD's = osteopenia
- Most logical and accurate in recording bone density
- Cost ~20k

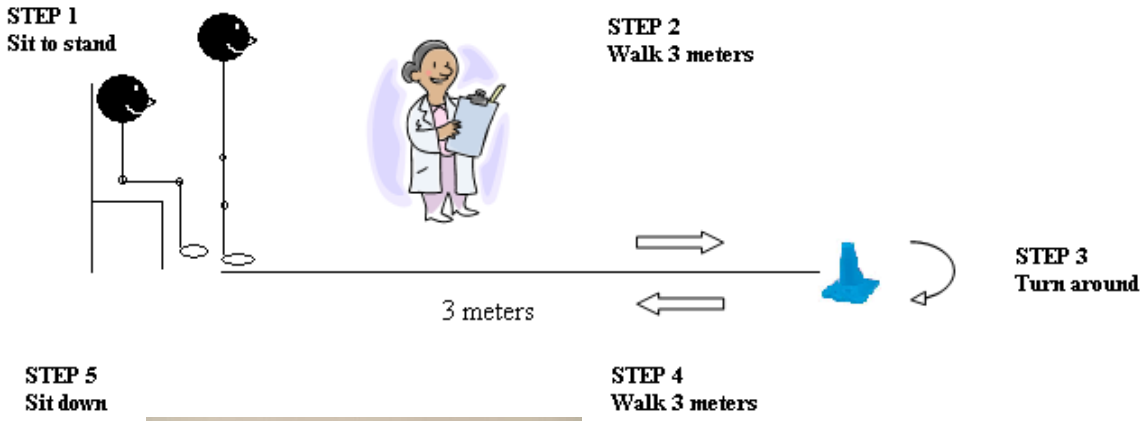
Bod Pod

- Incapable of measuring bone density
- Body fat measures range from 1-50%
- Uses air displacement to estimate fat and fat free mass
- Development began in 1990 by Be-Fit-Test, LLC
- Cost ~50k

Effect of High Amplitude Vibration on Mobility and Physical Quickness

Timed Up and Go Test (TUG)

- Interrater (intraclass correlation[ICC] = .99)
- Intrarater reliability (ICC = .99).
- (r = -.55) correlation with gait speed scores
- Great test-restest reliability in specific populations such as community-dwelling older adults and people with Parkinson's disease



High Degree per second Biodex

- Biodex Knee Extension
  - 180 or 300 degrees / sec
- Measure max effort at higher velocities
- Typical speed for measuring power of limb

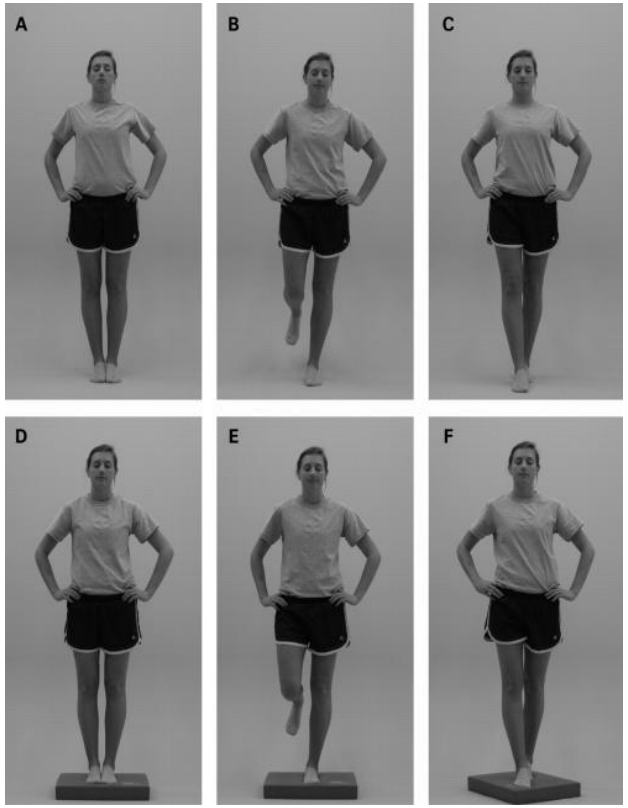
Effect of High Amplitude Vibration on Balance

Y- Balance

- Developed as a simplified version of Star Excursion Balance.
- Measure dynamic balance
- Designed to test for asymmetries
- Interrater test–retest reliability (ICC = 0.80 – 0.91)
- Scores are sum of distance reached in 3 directions
- Compare left to right and pre-post

BESS

- Balance Error Scoring System
- Intertester reliability - (intraclass correlations [ICC], 0.78-0.96); standard error of the mean for all stances ranged from 0.04 to 0.56 errors
- Minimal equipment
- Errors
  - Moving the hands off the hips
  - Opening the eyes
  - Step, stumble or fall
  - Abduction or flexion of the hip beyond 30˚
  - Lifting the forefoot or heel off of the testing surface
  - Remaining out of the proper testing position for greater than 5 seconds



Effect of High Amplitude Vibration on Cardiovascular Function

Metabolic Tests

- Costly metabolic costs
- Lab needed
- Scores: 10 – 42 ml/kg/min
- Reason for development: to test maximal aerobic function and capacity

Rockport Walking Test

- 1 mile walk test
- Walk mile as fast as possible and take heart rate
- May be too far of a distance for some older folks
- Minimal cost
- Easily administered