

## The Role of Machine and Free Weight Training for Older Adults: A Systematic Review

**BACKGROUND:** Resistance training is a key aspect of rehabilitation for the geriatric population. With aging, strength levels decrease often leading to a functional decline. Restoring strength may restore function and prevent future decline. Methods of resistance training include but are not limited to body weight, resistance bands, free weights, and machines. When choosing the type of resistance during rehabilitation, the therapist should consider the pros and cons of each method of training and apply them to the individual patient. Two methods most associated with resistance training are free weights and machine-based exercises.

**PURPOSE:** The aim of this study was to compare the benefits of resistance training with free weights and machine weights as to provide guidance when utilizing resistance training with older adults.

**METHODS:** A literature review was conducted using the keywords listed below. Searches were conducted on various databases and comprised randomized controlled trials, randomized parallel trials, and systematic reviews. The inclusion criteria included training with both machine weights and free weights and compared the effects on an older adult experimental group. Studies that tested only one of the two interventions and studies that involved younger experimental groups as comparable information were also reviewed.

**RESULTS:** 26 articles were included. 16 of those studies directly compared free weights to machine weights in either young healthy populations or older adults. Out of the total, 3 studies only observed changes caused by one of the treatment interventions (either free weights or machine weights) in a randomized controlled trial or a systematic review conducted specifically on older adults. The remaining 7 articles looked at the general effects of resistance training on older adults.

**DISCUSSION:** Limitations of this review include the relative paucity of articles specifically comparing the effect of training with free weights versus machine weights in the older adult population. Conclusions drawn from studies in younger populations may not transfer to older adults due to the biological variations as well as altered responses to exercise. Nonetheless, important variances in training methods that can be adjusted to maximize functionality for older adults through gains in strength, balance, and endurance.

**KEYWORDS:** free weights, weights, barbell, kettlebell, machines, dumbbells, open kinetic chain, closed kinetic chain, strength, power, hormones, testosterone, geriatrics, elderly