

# Grip Strength as a Marker of Vitality in Mid-Life Women

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Loss of muscle mass and strength with age is related to many factors including the overall physiological changes with aging, reduced activity levels, changing nutrition - among other factors. Excessive loss of muscle mass (sarcopenia) and strength (dynapenia) are a major cause of mortality and loss of independence and quality of life in the aging population.

Hand grip strength (HGS) is an accepted measure that reflects overall muscle strength and is widely used as a central marker for the onset of sarcopenia. Poor grip strength has been shown to correlate with low bone mineral density (BMD), depression, anxiety, sleep quality, fractures, diabetes, falls, and malnutrition. HGS is measured with a

dynamometer and has come to be accepted as a simple, noninvasive, and inexpensive test to measure strength in older adults.

Greater attention is being paid to HGS as a predictor of decline in the female menopausal population with the goal of identifying risk factors early with the potential to intervene and mitigate the risk. Since December 2021 there have been 2 original articles and 2 editorials in the journal, *Menopause* speaking to this very issue.

In December 2021 issue, Hong et al examined the association between HGS and health related quality of life in over 6000 post-menopausal Korean women. Quality of life was measured over 5 parameters: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.

The author's concluded that greater HGS was associated with a lower prevalence of moderate/severe problems within these 5 parameters and that these associations were more apparent in individuals who were older, had higher body mass index, or had a chronic disease.

In January 2022, Garcia-Alfara et al evaluated the prevalence of dynapenia and factors related to low (HGS) in postmenopausal women. Of the 249 women ages 50-84 studied, 31% had an HGS of <20kg (dynapenia) with the greatest decline in HGS seen in women > age 65. They also found that earlier age of menopause onset, greater adiposity (40% total body fat) adjusted by age and osteopenia/osteoporosis were associated with low HGS. There was no significant association between HGS and smoking status, body mass index (BMI) or vitamin D levels.

One caution that must be considered in review of these studies is the phenomenon of "reverse causation". Is the decline in muscle strength leading to the decline in health - or is the decline in health resulting in reduced muscle strength? In either case, the applicability of these studies falls in identifying decline in muscle strength at a point where intervention is possible that may mitigate further decline and improve overall health and quality of life.

A burning question that emerges from these studies is whether the onset of menopause itself causes a decline in muscle mass and strength that is independent of the expected decline that occurs due to age alone. Multiple studies (including the study by Garcia-Alfara above) have suggested that menopausal onset independently exacerbates age-related decline, however the studies were small and should therefore be interpreted with caution.

However, it makes sense that the menopausal transition has an independent effect on muscle decline when we consider the physiologic relationship between estrogen decline and muscle function.

It is well-known that the number of estrogen “receptors” (cell surface proteins that receive estrogen signals) found on the surface of muscle cells declines as menopause approaches. This is likely related, in part, to the lower levels of estrogen circulating in the body. These circulating hormone and receptor changes are associated with:

- A shift in the proportion of type 2 muscle fibers responsible for short, powerful movement of heavy loads fueled by anaerobic metabolism toward the slow, sustained, more aerobic Type 1 muscle fibers.
- Reduced speed and efficiency of signals from nerves to muscles.
- A reduction of protein synthesis within the muscles necessary for muscle repair and adaptation.
- Reduced overall muscle health, metabolism and ability to manage oxidative “stress” from cellular damage accumulated with age.
- Insulin resistance: Reflected in a reduced ability of the muscle to utilize glucose from the bloodstream likely related to the changes noted above.

So how do we use this information as women and as wellness/health providers to help mitigate the risk of decline in our overall health and function? Does this mean that all we need to do is sit on the couch squeezing a hand strengthening ball while watching Netflix? Not quite.

The reason why grip strength is a good correlate of overall muscle strength is because the movements that require a strong grip are movements that involve a wide range of muscle groups.

A great every-day example is yard work - pruning bushes, mulching your flower beds, raking leaves, moving heavy objects all require some level of grip strength and overall muscle strength. In the gym, functional “pulling” movements such as farmer’s carries, pull-ups, dead-lifts, dumbbell or barbell rows and curls - even jumping rope - all task grip strength in addition to upper and lower body strength and cardiovascular conditioning.

Below are two sample functional fitness workouts that, when combined with an appropriate warm-up and cool-down, can safely strengthen upper and lower body as well as grip strength. Both workouts add a cardiovascular conditioning element which generates fatigue. Strengthening under conditions of fatigue is an effective way of building strength under resting conditions.

## Workout 1

5 Rounds for time

- 10 Pull-ups (modifications: barbell curls, assisted pull ups, ring rows)

- 10 Bent-over barbell/dumbbell rows
- 10 Burpees (or other cardio activity for 45 sec - 1 min)

## Workout 2

EMOM 10 minutes (every minute on the minute for 10 minutes)

- Even minutes (0:00, 2:00, 4:00...etc) - 60 single under jump rope (or 30 double under jump rope)
- (rest for any time remaining in the minute interval)
- Odd minutes (1:00, 3:00, 5:00...etc) - 12 dead-lifts then stand and hold the weight for the remainder of the minute. If you are not proficient with deadlifts, then a 100 ft farmers's carry is an option.

It is well-accepted that regular exercise is associated with improved conditioning, strength, flexibility, and overall physical fitness in older adults. Long-term (12 mo+) exercise programs in postmenopausal women have been associated with positive changes in basal metabolic rate, skeletal muscle mass, body fat percentage, and other functional and body composition variables.

The studies reviewed here underscore the need to integrate overall muscle strength and conditioning work into our own training routines as mid-life women as well as those of our peri-menopausal and menopausal coaching clients. Because the health status and fitness/nutrition level in this population is so diverse - from the sedentary to the triathlete - a "one-size-fits-all" approach is woefully insufficient. Each program should be individualized to her baseline level of health and fitness so she can live this next stage of life to her own full potential.

## References

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