

Minimum-Effective Resistance Training: Small Doses, Large Gains!

FIRST HALF OF PRESENTATION

I. Define our Terms and Present the Problem

What are the physical activity guidelines for Americans?

- ≥ 75 min of vigorous or ≥ 150 min of moderate exercise per week.
- ≥ 2 days/week of muscle-strengthening exercise

Do these guidelines confer positive effects anyway?

- People who follow the guidelines experience a 40% risk reduction for all-cause mortality compared to people who do not.

What is resistance training (RT)?

- A style of exercise during which muscular force is applied to overcome a variety of external loads such as barbells, dumbbells, and elastic bands.

How might we define the minimum-effective dose of RT?

- The smallest volume of exercise that stimulates a desired adaptation, such as hypertrophy or strength. Importantly, this should NOT be mistaken with an ideal/optimal volume.

What are the typical, positive adaptations to RT?

- Endurance, hypertrophy, strength, power, acceleration, agility, and change of direction.

II. The Relevance of Training for Hypertrophy and Strength

Skeletal muscle hypertrophy is most commonly defined as the expansion of the cross-sectional area of muscle fibers in addition to increased thickness of the connective tissues that surround them.

- This adaptation has a positive effect on cardiovascular health, metabolic health, athletic performance, and is an effective countermeasure for negative consequences of aging.

Muscular strength is most commonly defined as the amount of force that a muscle can produce and/or the heaviest weight that can be lifted for 1 repetition for a particular exercise.

- This adaptation has a positive effect for all-cause mortality, athletic performance, and execution of activities of daily living.

When performed alone, recent evidence demonstrated that RT has a positive effect on all-cause mortality.

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- However, greater effects were observed when RT + AT were both performed.

III. Three Key Variables for Determining Exercise Dose: Volume, Frequency, and Intensity

Frequency = How many days per week are dedicated to a specific muscle group or exercise.

- Minimum-effective dose → 1 day per week!

Volume = How many sets are dedicated to a specific muscle group or exercise per week.

- Minimum-effective dose → 3-4 sets per week for hypertrophy + strength!

Intensity = How heavy is the external load being used; this is expressed relative to max strength.

- Minimum-effective dose → Muscular failure between 6-12 reps per set.

IV. Other Training Variables to Consider

- Repetition tempos
 - 1-20 sec per repetition is effective; which is most time efficient?
 - 1-2 sec down, 1-2 sec up (2-4 sec per rep)
- Rest intervals
 - Longer is typically better than shorter; but how short is too short?
 - 1-3 minutes between sets may be ideal.
- Proximity to failure (aka the set-end-point)
 - When volume is low, it becomes more necessary to train close to failure.
 - Train to an 8 or 9 out of 10 for each set.
- Exercise selection
 - Multiple joint vs. single joint and bilateral vs. unilateral
 - Multiple joint + bilateral = most time efficient.

V. Practical Examples from the Literature: Single-Set Training

- Outcomes for elderly lifters?
 - Single-set training is effective for hypertrophy, strength, functional-task performance, and sense of well-being.
- Perhaps young people with obesity who are otherwise healthy?
 - Single-set training increased muscle mass, muscle thickness, muscular strength, power, and markers of metabolic health.
- Surely it cannot work for highly-trained, young adults?

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- Single-set training increased endurance, muscle thickness, and strength.

VI. Conclusion + Coffee Break

- Minimum-effective dose for stimulating hypertrophy and strength
- Other time-saving considerations
 - Rep range, movement speed, rest intervals, and exercise selection

****5 minute break****

SECOND HALF OF PRESENTATION

9 Time-Efficient and/or Minimum-dose Resistance Training Programs

1. Traditional Hypertrophy and Strength Training
 - a. Select 8 total-body exercises.
 - b. Train 6-12 reps per set; close to failure.
 - c. 1 set per exercise 3 days per week or 3 sets per exercise 1 day per week.
2. Functional Pattern Training
 - a. Select 8 total-body exercises.
 - b. Train 6-12 reps per set; close to failure.
 - c. 1 set per exercise 3 days per week or 3 sets per exercise 1 day per week.
3. Lower-Push-Pull Tri-Set Training
 - a. Select 3 exercises: lower-body, upper-body push, and upper-body pull
 - b. Perform 4-6 sets; 6-12 reps; close to failure.
 - c. Complete sets in a cyclical manner with 30-60 sec of rest between.
4. High-Intensity Functional Training: As Many Rounds As Possible
 - a. Select 3 exercises and assign rep-ranges for each.
 - b. Set a timer for 8-15 minutes.
 - c. Complete as many rounds as possible within this time frame.
5. Timed Super-Set Training
 - a. Select 4 pairs of exercises (8 total)
 - b. Perform as many sets as possible for each pair in a given window of time (6-8 min).
 - c. Recover for 2-3 minutes before moving on to the next pair of exercises.
6. Escalating Density Training
 - a. Select one upper-body exercise and one lower-body exercise.
 - b. Choose a load that corresponds with their 10-rep maximum.

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- c. Perform as many sets as possible in a cyclical manner in a 15-25 minute window; 5 reps per set for each exercise.
7. Total-Body Tabata and Exercise Snacks
 - a. Pick one total-body exercise: Burpee, squat jump, squat + press, kettlebell swing, etc.
 - b. Perform 8, 20 sec sets with maximal effort.
 - c. Rest for 10 sec between sets.
8. High-Intensity Circuit Resistance Training
 - a. Select 6 total-body exercises.
 - b. Perform 10-20 sec of work; rest for 5-10 sec between sets.
 - c. Complete 6 rounds of the circuit with 1-2 minutes of rest between rounds.
9. Multi-Modal High-Intensity Interval Training
 - a. Set a timer for 60 seconds.
 - b. Perform a lower-body exercise for 4-6 reps; followed immediately by an upper-body exercise for 8-12 reps.
 - c. Complete a body-weight cardio exercise for however long is left in the 60-sec interval.
 - i. Perform 4-6 intervals with 1-3 minutes of rest in-between.

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