How to estimate a one repetition maximum to inform resistance training

Resistance training is an important part of a comprehensive exercise program for individuals with Parkinson's disease (PD). Physical therapists are uniquely positioned to create and progress personalized exercise programs. A key component of resistance training is selecting the appropriate amount of weight to lift, which is typically selected based off an estimated one repetition maximum (1RM).

There are numerous methods to estimate 1RM that are used in the general population and individuals with PD. Several of the common estimation methods are listed below.

Example

Samuel is a 58 year-old male with a 5-year history of PD. He is working with a physical therapist to develop a strength training program. Samuel and the physical therapist aim to estimate his 1RM during a shoulder press exercise. Samuel performs 11 repetitions using 20lbs on the shoulder press.

1. Epley Equation

$$\text{Est. 1RM} = (0.033 \times \text{number of reps})(\text{weight lifted} + \text{weight lifted})$$

Ex $(0.033 \times 11 \text{ reps})(20\text{lb}) + 20\text{lb} = \mathbf{27lb}$

2. Brzycki Equation

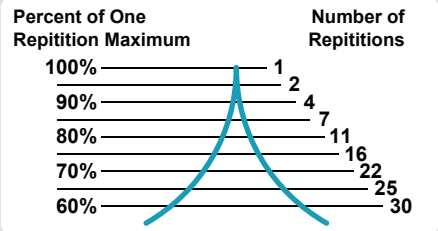
$$\text{Est. 1RM} = \text{weight lifted} \times \left(\frac{36}{37 - \text{number or reps}}\right)$$

Ex $20\text{lb} \times \left(\frac{36}{37 - 11\text{reps}}\right) = \mathbf{28lb}$

3. Oddvar Holten Diagram

$$\text{Est. 1RM} = \frac{\text{weight lifted} \times 100}{\text{Oddvar Holten Percent}}$$

Ex $\frac{20\text{ lb} \times 100}{80} = \mathbf{25lb}$



Determining the Oddvar Holten Percent

Use the diagram to the left to determine the appropriate Oddvar Holten Percent based on the number of reps performed.

In the example, Samuel performs 11 reps. So, 1RM is calculated with 80 as the Oddvar Holten Percent.

1. *Brzycki, Matt (1998). A Practical Approach To Strength Training. McGraw-Hill. ISBN 978-1-57028-018-4*
2. *Epley, Boyd (1985). "Poundage Chart". Boyd Epley Workout. Lincoln, NE: Body Enterprises. p. 86*
3. *Holten O, Grimsby O. Medical Exercise Therapy: A Course Workbook. The Holten Institute for Medisinsk Treningsterapi, 1986*

This tool was developed by Parkinson Disease Knowledge Translation Task Force

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