programming for strength and conditioning

# what principles drive the desired strength adaptation?

## Overload: a stimulus of sufficient strength, duration, and frequency as such that it forces change.

## Variation: manipulating training variables that alter the overload stimulus.

### Variables: exercise type, order performed, intensity (% of rep max), sets, reps, and rest periods.

## Specificity: the competition/sport you are training for impacts what needs to be optimized for training (mechanical, metabolically).

### I.e. football players experience 7-10 seconds of max effort followed by 20-60 seconds of recovery. The training should seek to optimize that effort window.

# Load:

## What will look to drive adaptation.

## In the physical therapy/performance world, a method of modification based on relevant feedback is important.

### A popular method is Daily Adjusted Progressive Resistive Exercise (DAPRE). This allows for more flexibility than the more traditional approaches.

#### This approach is a zone-based approach and focuses on strength/power, strength/hypertrophy, and hypertrophy.

#### This approach uses Rate of Perceived Exertion (RPE) as a measure of session intensity as well as specific exercise intensity.

#### RPE is particularly useful in rehab, since it allows for monitoring intensity w/o having to establish a 1 Rep Maximum (1 RM).

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# strength:

## Should be considered fundamental to all other aspects of training and forms the FOUNDATION of most successful Return to Play (RTP) approaches.

## Defined as the ability to produce force. Typically measured by a 1 RM or by taking a % of RM to failure.

## Strength and the ability to rapidly produce high levels of force are closely correlated, thus the initial emphasis when training should be on maximal force development.

### Force development improves because of an increase in cross-sectional area of muscle tissue (CSA) and changes in neural drive (how fast the muscles can respond from the stimulus).

### Loads approximately >80% of RM in trained individuals should build the foundation of most programming for strength.

### Also, 3-4 sets of approximately 8 sets/muscle group.

#### If multiple sets aren’t an option, single set training taken to failure is still a sufficient stimulus to elicit significant changes in strength and hypertrophy.

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# Power:

## Blue and white text with letters Description automatically generatedMany aspects of sports and daily life require the ability to produce high magnitudes of force in short periods of time.

## Defined as the rate at which work is performed and is the product of force and velocity.

## In rehab, power is important because it can decrease a person’s fall risk, and it is what allows athletes to return to sport post injury/surgery.

### In athletes the ability to produce high power outputs w/ a high rate of force development is a critical aspect of success in sport.

## Power can be divided into 3 different subcategories:

### Muscular strength

### Rate of force development

### Maximal force at high velocities of movement

## A mixed methods approach for load appears to be the most beneficial for power (50-70% of 1 RM and <50% of 1 RM).

### Considered optimal because it combines heavy resistance training w/ higher velocity work so that power is developed across the entirety of the force/velocity spectrum.

### For the novice strength development alone is sufficient for power improvements.

#### Maximal strength levels will always constrain the upper limits of maximal power output. The ability to generate force rapidly is less useful if the level of force generated is below a threshold.

## Optimal load training indicates that training loads should be chosen to allow for maximal power output.

### It is imperative that you do not neglect higher load work, because that is what will lead to higher power outputs.

### All exercises should be performed as rapidly as possible regardless of the actual speed of exercise.

### A table of power load Description automatically generatedAn example of some recommendations for power training intensity zones based on a variety of exercises commonly used to improve power:

# Sources: this is a synthesized document, all concepts are from the citation below

# Blue and white text with letters Description automatically generated Lorenz D, Morrison S. CURRENT CONCEPTS IN PERIODIZATION OF STRENGTH AND CONDITIONING FOR THE SPORTS PHYSICAL THERAPIST. Int J Sports Phys Ther. 2015 Nov;10(6):734-47. PMID: 26618056; PMCID: PMC4637911.