



Relationships between Isometric and Dynamic Strength in Resistance-Trained Individuals

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Introduction

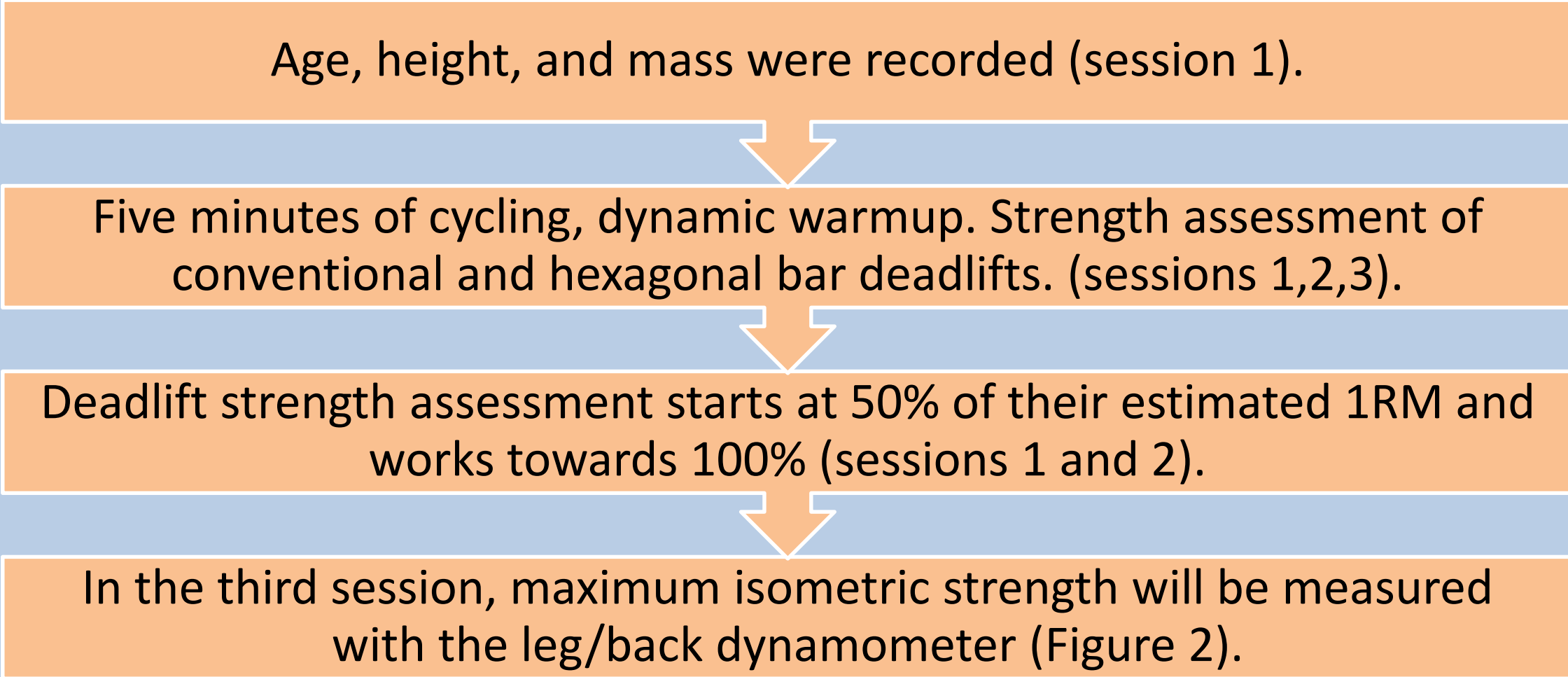
- A previous study found a positive correlation between the leg back dynamometer and one-repetition maximum (1 rm) for squats and deadlifts. (32)
- Given current population changes (decreased physical activity, increased obesity), Many people may not have experience with strength training or be capable of safely performing one-repetition maximum (1RM) deadlifts. (16,20,22)
- First responder and military organizations often use lifts (e.g., conventional and hexagonal bar deadlifts) to test their recruits' maximum strength. (1,43)
- Isometric strength tests, (e.g., leg/back dynamometer) could be safely performed by lesser- and well-trained individuals.

Purpose and Hypothesis

- This study will evaluate the relationships and predictive ability of the leg/back dynamometer (isometric strength) with the 1RM conventional and hexagonal bar deadlifts (dynamic strength).
- By using isometric measurements to predict dynamic strength, individuals could avoid injury and limit 1RM testing.
- We hypothesized that performance in the LBD would significantly relate to and predict 1RM CD and HBD.

Methods

- **Participants:** Actively recruiting approximately 50 participants from California State University, Fullerton
- **Inclusion Criteria:**
 - Between the ages of 18 – 50
 - Resistance training for 2+ days a week for 2 years
 - Are experienced with maximal lifts
 - Are experienced with deadlift exercises
 - No current musculoskeletal injuries that would compromise participation
- **Procedures:** Testing occurred over three sessions (Figure 1) approximately 48-72 hours apart.



- **Measures:**
 - Age and height were measured using a portable stadiometer, and mass recorded by electronic digital scales,
 - One repetition maximum conventional deadlift (1 RM CD),
 - One-repetition maximum hexagonal bar deadlift (1RM HBD),
 - Isometric strength leg/back dynamometer (LBD)
- **Approved by California State University Institutional Review Board Protocol Number: (HSR-23-24-228)**

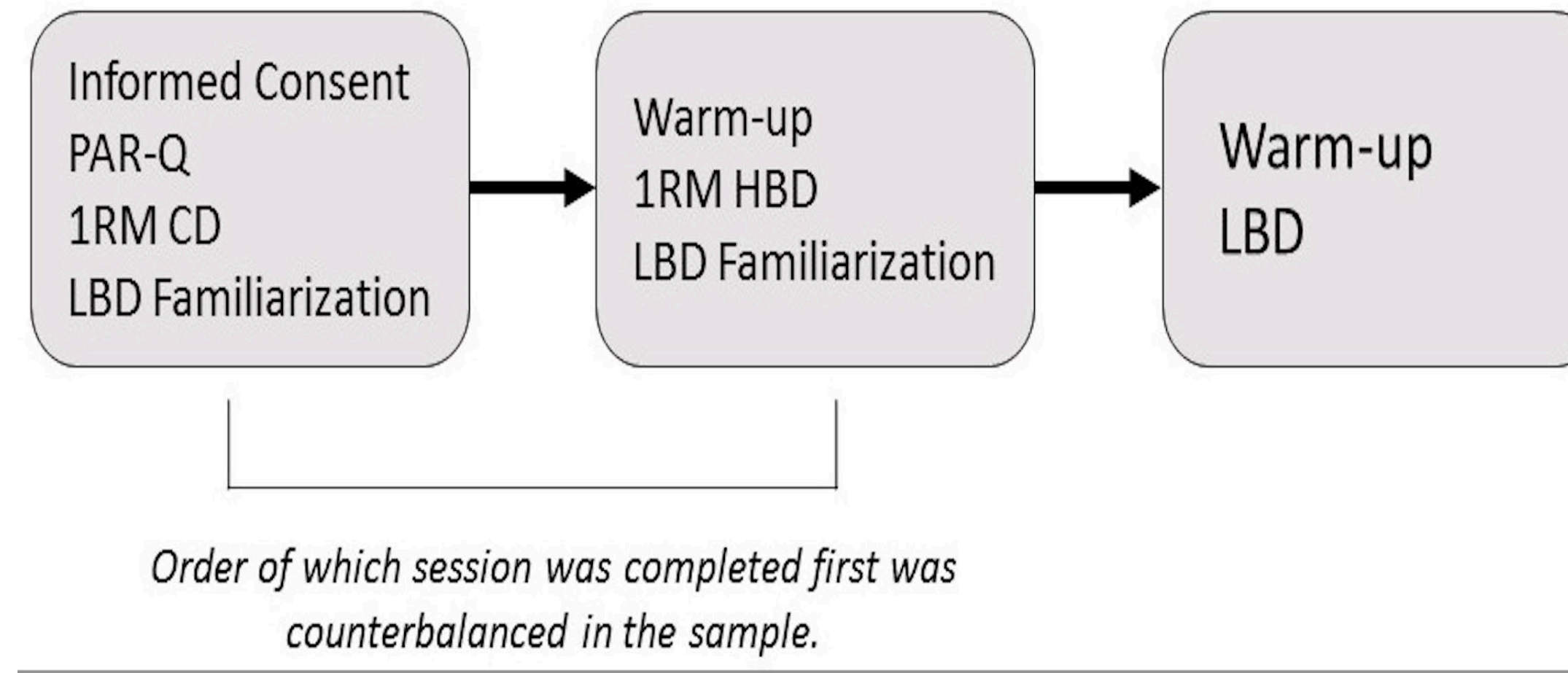


Figure 1: Organization of testing sessions

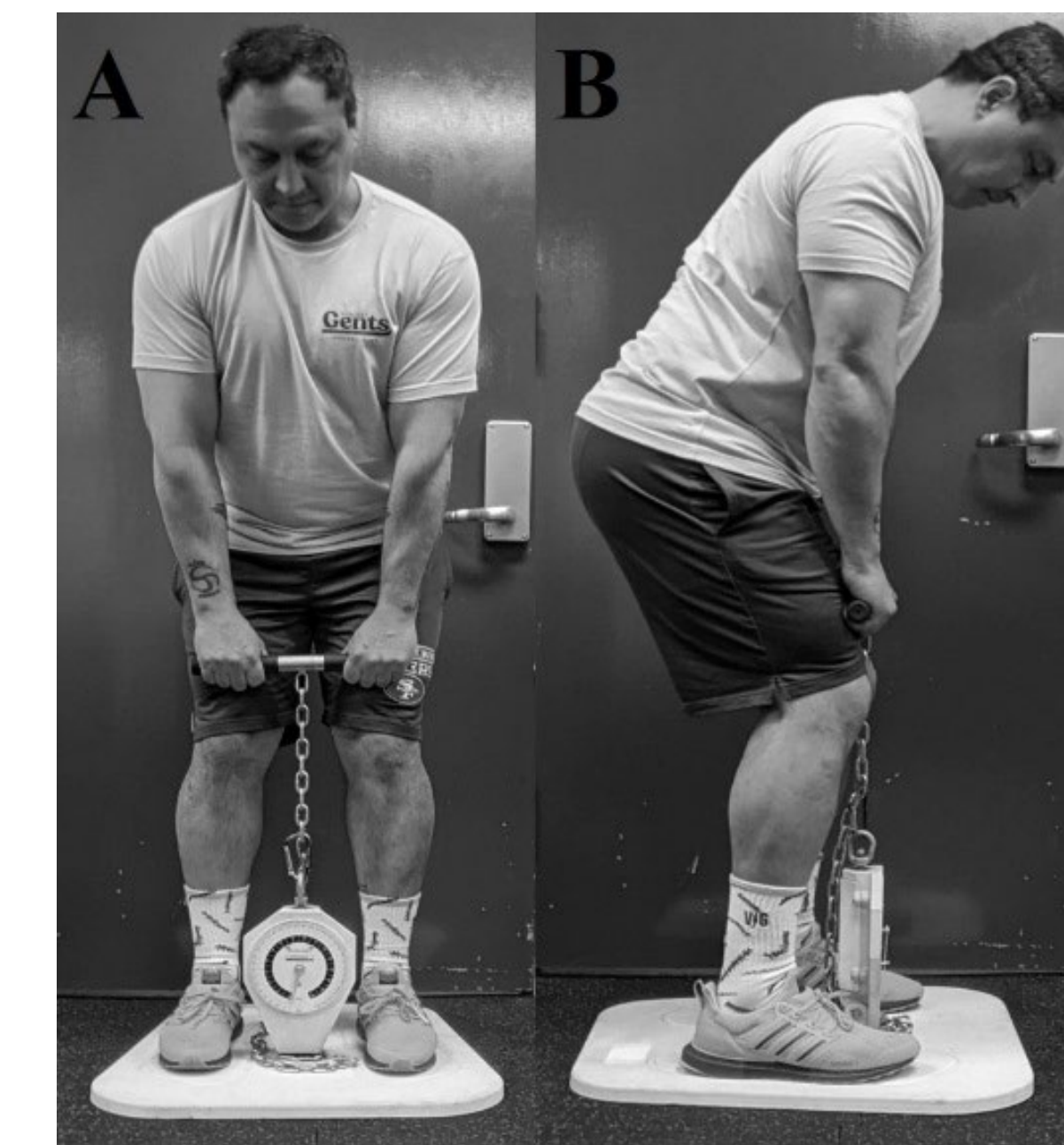


Figure 2: Front and side view of leg back dynamometer

Results

- This study is in the early testing stages ; results will be discussed further once data collection has been completed.

Next Steps

- Recruitment and testing will continue until sufficient data is collected.
- The data will be evaluated to see if there is a positive correlation between isometric strength and resistance-trained individuals.
- The results from this study could prove useful in demonstrating whether the LBD could monitor strength training progress without the need for constant, physically taxing 1RM testing.

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References

