LEEDS BECKETT UNIVERSITY
CARNEGIE SCHOOL OF SPORT

Ethics Guidance Document	**Effective Date: 026/01/2023**
	Version: 1.3
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	Approved by: **Research Ethics Advisory Group of the Carnegie School**

Guidelines for strength assessments and training within teaching and research activities in the Carnegie School of Sport

Note: this guide can be a reference point for both staff and students

1.0. Membership of the Guidelines Development Group

Dr Theocharis Ispoglou, Dr Kevin Till, Dr Alexander Dinsdale, Dr Antonios Stavropoulos and Emma Payne.

- Dr Theocharis Ispoglou, Dr Kevin Till, Dr Alexander Dinsdale and Ben Nicholson are accredited members of the UK Strength and Conditioning Association and they have extensive coaching experience.
- Emma Payne is a L3 Personal Trainer and a L2 British Weightlifting Instructor.

2.0. Objectives

- To develop best practice guidelines for strength assessment and training for research or teaching purposes.
- To outline the categories of testing using different forms of dynamometry.
- To specify when there is a requirement for holding relevant professional qualifications depending on the category of testing.
- To outline the cases where there is no need for holding relevant professional qualifications.
- To specify levels of support for students and staff who do not hold relevant professional qualifications.
- To outline the key risks and controls associated with strength testing that can be integrated within risk assessments and provide an example of a repetition maximum strength testing protocol.

3.0. Example Acceptable Qualifications

- UK Strength and Conditioning Association (UKSCA)
- National Strength Conditioning Association (NSCA)
- British Weightlifting (BWL)
- Level 3 Personal Trainer
- Level 2 Gym Instructor
- Any other relevant international qualifications

4.0. Categories of Testing

- Maximal or submaximal testing involving Olympic Weightlifting (i.e., snatch, clean and jerk). There is a requirement for applicants or assistants to hold at least one of the following qualifications: UKSCA, NSCA, or at least L2 BWL. The Strength and Conditioning LREC will review any other international qualifications and assess competency as required.
- Maximal or submaximal testing involving free weights (other than Olympic Weightlifting i.e., bench press, squats, deadlifts etc.). If applicants or assistants hold any of the qualifications outlined in 3.0 above, testing can go ahead. Certain low-risk training protocols (e.g., at submaximal efforts, which are not performed to failure, using fixed machines) can be overseen by applicants or assistants that do not hold any relevant

qualifications, on demonstration of competency to carry out the protocol with relevant qualified University staff. However, if applicants do not hold relevant qualifications, high-risk training procedures, which may involve free weights and attempts at near maximum or sets to failure, should not be undertaken.

- Maximal or submaximal testing involving fixed resistance machines. If applicants or assistants hold any of the qualifications outlined in 3.0 above, testing can go ahead. If applicants or assistants do not hold any relevant qualifications, they will need to carry out an induction with relevant qualified University staff and demonstrate competency to carry out the protocol.

- ***NOTE**: A valid copy of the relevant qualification will need to be submitted alongside the remaining ethics documentation. Applicants who do not hold relevant qualifications will need to submit written confirmation that they have been inducted.

5.0. Dynamometry

Testing involving the use of dynamometry (e.g., CYBEX or BIODEX) requires applicants or assistants to be inducted by relevant University staff and demonstrate competency to carry out the protocol.

6.0. Training Sessions

For all the strength-testing categories outlined above, and in the case whereby participants have to complete a training programme, training sessions can be either supervised or unsupervised. This will depend upon the research questions of each project. Regardless of the types of machines used during a potential training programme, applicants are expected to address any associated risks within the risk assessment forms; However, due to the higher risk of injury (e.g., crush injuries- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5005555/) associated with Olympic Weightlifting and use of Free Weights compared to fixed machines, applicants are advised to pay particular attention in such scenario, and expand further on how they will minimise the risk of injuries especially in cases of unsupervised training sessions (i.e., extended familiarisation, technique competency, frequent monitoring, etc.).

7.0. Potential Hazards and Controls

As with any forms of exercise, strength testing and prescription comes with inherent risks of musculoskeletal injury. However, the nature of testing and training which takes place in a controlled environment allows for a significant reduction in the likelihood of these events happening. Taking also into account the beneficial responses and adaptations associated with strength training, it comes as no surprise that the risk of injuries is reduced in sports where strength training is a key training component (https://www.ncbi.nlm.nih.gov/pubmed/27328853). Incorrect technique and inability to safely risk assess the environment of testing are key factors for increasing the likelihood of injury. Thus, one of the key priorities of the personnel dealing with strength testing and prescription will be to ensure that the training environment is safe and that participants perform the exercises with an appropriate technique.
Typical key risks and controls that can be put in place to reduce the risk of injuries are highlighted in the following table (relevant risks assessments are expected to be more comprehensive and suitably developed to address the risks of each individual project):

Hazards	Controls
Risk of musculoskeletal injury	• Screening and warm-up. • 48-72 hours of recovery between training sessions. • During maximum testing, ensure that participants rest for at least 3-5 minutes. • Ensure participants are familiarised with technique and can perform exercise with an appropriate technique and for the full range of motion. • Chose the appropriate mode of testing (i.e., free weights/machines) based on training experience/technique of participants. • Monitor training and diet of participants in advance and during testing. • Testers hold relevant qualifications or have received an appropriate level of induction. • Athletes/participants who return from injury or have medical issues (i.e., epilepsy, diabetes, hypertension) will need medical clearance (i.e. GP letter). • During isokinetic dynamometry testing incorporating eccentric muscular actions, especially at high velocities, ensure that participants are constantly supervised and are aware of how to use the red button in the case of injury.
Valsalva manoeuvre: some risk for cardiac strain in those with high blood pressure.	• Screening to exclude those with high blood pressure. • Forced exhalation during maximum force production when testing rather than holding breath throughout the lifts.
Faulty equipment	• Check equipment in advance of testing.
Dirty surfaces and risk of contamination	• Ensure surfaces are cleaned. Do not step with feet on barbells. Clean equipment with antibacterial agents.
Accidents (i.e. drop weights, which increases risk of suffocation and fractures).	• Use of straps, spotting, use of locks /collars on the ends of barbells. Returns weights to the racks. When appropriate, the use of power racks and correctly positioned safety bars. Olympic and Powerlifting exercises only: participants are able to demonstrate that they can safely drop the bar.

8.0. Typical Repetition Maximum Strength Testing Protocol

1RM TESTING PROTOCOL

1. Instruct the athlete to warm up with a light resistance that easily allows 5 to 10 repetitions.
2. Provide a 1-minute rest period.
3. Estimate a warm-up load that will allow the athlete to complete three to five repetitions by adding
   - 10 to 20 pounds (4-9 kg) or 5% to 10% for upper body exercise or
   - 30 to 40 pounds (14-18 kg) or 10% to 20% for lower body exercise.
4. Provide a 2-minute rest period.
5. Estimate a conservative, near-maximal load that will allow the athlete to complete two to three repetitions by adding
   - 10 to 20 pounds (4-9 kg) or 5% to 10% for upper body exercise or
   - 30 to 40 pounds (14-18 kg) or 10% to 20% for lower body exercise.
6. Provide a 2- to 4-minute rest period.
7. Make a load increase:
   - 10 to 20 pounds (4-9 kg) or 5% to 10% for upper body exercise or
   - 30 to 40 pounds (14-18 kg) or 10% to 20% for lower body exercise.
8. Instruct the athlete to attempt a 1RM.
9. If the athlete was successful, provide a 2- to 4-minute rest period and go back to step 7.

If the athlete failed, provide a 2- to 4-minute rest period, then decrease the load by subtracting

- 5 to 10 pounds (2-4 kg) or 2.5% to 5% for upper body exercise or
- 15 to 20 pounds (7-9 kg) or 5% to 10% for lower body exercise

AND then go back to step 8.

Continue increasing or decreasing the load until the athlete can complete one repetition with proper exercise technique. Ideally, the athlete's 1RM will be measured within three to five testing sets.

Beachle T. & Earle R. (2008) Essentials of Strength Training and Conditioning, Third Edition. Human Kinetics, Champaign, IL.