



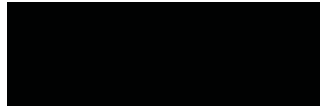
**EMPOWAR Skin fold Measurements (Anthropometry)
Working Practice Document (WPD)**

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1. PURPOSE

The purpose of this WPD is to describe the process for measuring height, waist, hip, Mid arm and mid thigh measurements along with the skin folds of adult participants in the EMPOWaR study and to ensure that all participating sites are consistent in their methods of gathering measurements. This document should be retained in the ISF section 7

2. DEFINITIONS

ISF Investigator Site File

PI Principle investigator at the site

WPD Working Practice Documents

3. WHY

The specific guidelines for taking anthropometric measurements are created as it helps ensure accuracy and repeatability for future testing across the participating sites

4. WHO

All staff delegated by the PI for the task of taking the measurements will receive training, if required, in how to collect the measurements.

5. PROCEDURE

Equipment required:

- A height meter
- A tape measure.
- A Harpenden skinfold calipers
- A pen with water soluble ink for marking the participants' skin

Technique for height measurement:

Participant should be instructed to remove shoes and hair ornaments. The following position is necessary:

- Feet together
- Feet flat on the ground
- Heels touching the back plate of the measuring instrument
- Legs must be straight
- Buttocks against the backboard
- Scapula, wherever possible, against the backboard
- Arms loosely at side

The head must be positioned with the lower margins of the orbit in the same horizontal plane as the external auditory meati, i.e. the corner of the eyes horizontal to the middle of the ear. The participant is asked to look straight ahead.

The head piece of the measuring tape should be lowered so that the hair is pressed flat. If the participant is taller than the measurer, the measurer should stand on a platform so that he/she can properly read the height rule. Note: self reported height is not acceptable. The result is recorded in cm, to the nearest 0.5 cm.

Technique for waist measurement

Ideally a metal or paper measuring tape should be used, as they will not stretch.

Position of waist circumference measurement: Waist circumference should be measured at a level midway between the lower rib margin and iliac crest with the tape all around the body in a horizontal position.

- Participants are asked to remove their clothes, except for light underwear. If this is not possible, for example due to cultural reasons, the alternative is to measure the circumference on the subject without heavy outer garments and record this fact in the study database.
- The measurer should stand at the side of the participant in order to have a clear view of the tape.
- Participants should be standing with their feet fairly close together (about 12-15 cm) with their weight equally distributed to each leg. Participants are asked to breathe normally; the reading of the measurement should be taken at the end of gentle exhaling. This will prevent subjects from contracting their abdominal muscles or from holding their breath.
- The measuring tape is held firmly, ensuring its horizontal position. Verify that the tape position is horizontal all around the waist. The tape should be loose enough to allow the observer to place one finger between the tape and the subject's body. The result is recorded in cm, to the nearest 0.5 cm.

Technique for hip circumference measurement

- Position of hip circumference measurement: Hip circumference should be measured as the maximal circumference over the buttocks. The tape position should be horizontal around the body.
- The same technique as for waist circumference, except for tape position, is followed. The result is recorded in cm, to the nearest 0.5 cm.

Technique for left mid-arm circumference measurement

- The arm is relaxed and hanging by the side, and the circumference is taken at the level of the mid-point between the acromial (bony point of shoulder) and the olecranon (bony point of elbow) processes.
- When recording, you need to make sure the tape is not too tight or too loose, is lying flat on the skin, and is horizontal. The result is recorded in cm, to the nearest 0.5 cm.

Technique for left mid-thigh circumference measurement

- First mark the site to be measured. The subject stands erect with their weight evenly distributed on both feet and legs slightly parted.

- The circumference measure is taken at the level of the mid-point on the lateral (outer side) surface of the thigh, midway between trochanterion (top of the thigh bone, femur) and tibiale laterale (top of the tibia bone).
- When recording, you need to make sure the tape is not too tight or too loose, is lying flat on the skin, and with the tape horizontal. The result is recorded in cm, to the nearest 0.5 cm.

Technique for skin fold measurements:

- Measurement should be taken on healthy, undamaged and uninfected dry skin. Moist skin is harder to grasp and can influence the measurement. Do not use the Caliper on broken or infected skin.
- Mark the skinfold location using a pen with water soluble ink. Use a tape measure to accurately find the mid-points.
- The final value recorded should be the average of the two that seems best to represent the skinfold fat site.
- Experience is necessary to grasp the same size skinfold in the same location consistently. Practice these techniques until you get consistent results.
- Keep the Caliper clean using a lint free cloth and ensure that they are stored in dry conditions to prevent corrosion.
- Do not use any spirit based cleaner on the Caliper as this may cause damage to the plastic materials.

6. RELATED DOCUMENTS AND REFERENCES

SKIN FOLD MEASUREMENT PROCESS IN ADULT PARTICIPANTS

General Notes

1. Instruct the test subject to keep the muscles relaxed during the test.
2. Take all measurements on the **left** side of the body.
3. Consider use of tape measure to accurately find the mid-points at the four sites (see below).
4. Grasp skinfold between thumb and index finger. Gently pull the skinfold away from the body. (In practice it may be helpful to ask the subject to tense up the muscle first then grip skinfold to ensure that no muscle is grasped and then ask them to relax).
5. The Caliper should be placed perpendicular to the fold, approximately 1cm below the finger and thumb. While maintaining the grasp of the skinfold, allow the Caliper to be released so that full tension is placed on the skinfold. The dial should be read to the nearest 0.50mm, 1 to 2 seconds after.

6. Measure at least 2 times at each site.

7. Record the average of the two folds that best represent the skinfold site.

Landmarks of Sites:

Site 1 – Biceps: The anterior surface of the biceps midway between the anterior axillary fold and the antecubital fossa.

Site 2 – Triceps: A vertical fold on the posterior midline of the upper arm, over the triceps muscle, halfway between the acromion process and olecranon process. The elbow should be extended and the arm relaxed.

Site 3 – Subscapular: The fold is taken at 45 degrees (to the vertebrae) to 1-2cm below the inferior angle of the scapulae and 1-2cm toward the arm.