

Calibration No: 017D

1. Introduction

Calibration of equipment plays an essential part in ensuring that the equipment is functioning correctly. It is essential that all equipment is calibrated at the specified time, in order that potential calibration drifts can be addressed. Equipment that has not been calibrated may give rise to inaccurate results, leading to inaccurate research findings.

2. Responsibilities

Research nurses trained in the method are responsible for calibrating all study equipment.

3. Equipment

- Marsden digital scales
- Marsden ultrasonic height measure
- Wessex tapes
- Holtain/Tanner-Whitehouse skinfold calipers
- Omrom HEM 705CP blood pressure machine
- Stethoscope
- Siemens ECG machine
- Spacelabs ABP machines

4. Method

All calibration details should be dated and recorded in the designated calibration record book. Any major calibration drifts or any problems with the equipment should be discussed with either Janine Pembroke or Dr Mark Caulfield. All equipment used for the phenotypic measurements of subjects should be calibrated using the following guidelines;

Marsden digital scales

- Make or buy 4 weights of 20kgs each (plastic boxes filled with dry sand can be made up to 20kgs). Use these weights for all the calibration measurements.
- Place the standing platform on a flat uncarpeted floor. Switch the scales on as before.
- Using the 4 weights, test 3 separate weight measurements. Document any calibration drifts, so subject results can be amended as necessary.
- Using the calibration format in the manufacturing manual, Press SLOW and hold down. Then press UNITS and hold down (while still holding slow).
- Press ZERO 6 times (while still holding SLOW and UNITS). The scales should now enter calibration mode. When CAL appears in the viewfinder, release SLOW, UNITS and ZERO.
- Press NEXT to set ZERO.

- Having selected the calibration weight, load this weight onto the scale, wait a second or two and then press NEXT. After the weight has been recorded, DONE will appear in the viewfinder, alternating with the weight. Ensure the scales have recorded the correct weight. Should there be any drift, calibrate the scale to the correct weight by pressing the HOLD key as required. When the correct weight is displayed in the viewfinder, press NEXT.
- Check 3 separate weight measurements on each scale. Record all the results in the calibration record book. Each scale should be calibrated every month.

Ultrasonic height measure

- The height measure has no inbuilt calibration mode. However, it should be calibrated every month so calibration drifts can be addressed.
- Like the weights, have 3 specially made height measuring tools for calibration. For example 3 rods: 1 x 2 foot, 1 x 3 foot and 1 x 5 foot. The same rods should be used for all calibration.
- Every month check the height measure with all 3 calibration rods. Subjects heights should be corrected according to any calibration drifts (if any). All calibration drifts should be recorded in the calibration record book and phenotypic measurements should be correctly recorded. Any major calibration drifts should be discussed with the study co-ordinators.
- According to the manufacturer the height measure battery should last for 10 years. Any major problems with the machine should be discussed with the study co-ordinators.

Wessex tapes

- Each tape has an inbuilt tension mechanism which needs to be calibrated on a monthly basis.
- To calibrate the tape a wooden metre rule is needed. Using the ruler, take 3 separate measurements. The reading on the ruler should be the same as the reading on the tape. If the three measurements are not the same, replace the tape. New tapes can be acquired from the Nurse Co-ordinator.
- According to the manufacturer, the tape should be suitable for approximately 600 measurements.
- Record all calibration results in the calibration record book.

Holtain/Tanner-Whitehouse skinfold calipers

- Have three solid blocks made of three separate thicknesses, for example 10, 20 and 30mm. Use these blocks for all the calibration tests using the skinfold calipers.
- Apply the calipers to the blocks and ensure the correct reading is displayed on the caliper dial.

- Alterations in the caliper reading can be achieved by turning the knob on the right hand side of the dial. Adjust the dial, so the correct reading appears in the dial.
- Use all three blocks and ensure the readings are correctly displayed.
- Ensure the caliper reading always rests on zero, when not in use.
- Record all calibration readings in the calibration record book on a monthly basis.

Omrom HEM 705CP blood pressure machine

- The blood pressure machines should be calibrated every 3 months. Two people are required to calibrate one machine.
- Attach a three way valve on the blood pressure machine at the junction where the blood pressure cuff is attached. Attach the cuff on one side of the three way valve. On the other connection attach a standard sphygmomanometer. Attach the cuff onto the left arm of one of the observers.
- The observer with the cuff on the arm should press the start button, on the Omron machine. The other observer should listen to the blood pressure by using the stethoscope and observing the pressures in the sphygmomanometer.
- Take 3 separate readings and record the findings in the calibration record book.
- Any calibration drifts should be reported to the Nurse Co-ordinator, who will replace the Omron machine.

Siemens ECG machine and Spacelabs ABP machines

- These two machines do not need to be calibrated at each centre. The Nurse Co-ordinator will inform the relevant centre if their machines need to be serviced and will arrange how best this can be achieved with that centre. Any problems with these two machines should be directed at the Nurse or Medical Co-ordinators.

5. Additional Information

- Ensure that all equipment is calibrated at the correct time and the relevant details are recorded in the calibration record book.

6. Reference Documents

Marsden equipment manual.