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Figure 5. Best practice protocol for the acquisition and reporting of DXA scans in athletes. Modified from Nana et al 2015.

Acquisition

- Scans are performed by the same skilled technician on the same scanner, using the same software and reference database
- Near nude body mass (lightweight clothing with no metal artefacts) should also be measured on a calibrated scale for a quick and simple reliability cross-check against DXA-derived estimate of total body mass.
- Ensure consistent preparation with clear advice provided in the 24 hours prior to scanning:
 - Glycogen replete and euhydrated with appropriate dietary and training advice, including avoidance of alcohol and intense exercise in the 24 hours prior to scanning.
 - Overnight fasted and rested state, including abstaining from fluid intake upon waking.
 - Bladder voided, with a urine sample collected to confirm hydration status.
 - In women athletes, record the day of the menstrual cycle.
- Positioning should ensure that the athlete is lying centrally in the scanning area with their head positioned in the Frankfort plain and consideration given to the use of customised styro-foam positioning aids to standardise the positioning of arms and legs. This will also ensure a clear separation of different body regions and to help ensure that the total body is within scan boundaries of the absorptiometer.
- Conduct an in-vivo cross calibration study if a DXA system is upgraded.
- Quality control procedures in accordance with manufacturer guidance, should be undertaken prior to scanning each day. This should include the routine scanning of a phantom.
- The frequency of measurement of total body composition in an individual should be determined according to the likelihood that any change exceeds the measurement error, as well as local limitations of radiation exposure.
- As a general guide, a minimum 8 week interval should occur between scans.

Reporting

- Report the manufacturer, model and software of the DXA system used at baseline and follow-up.
- Include information on which scan mode was utilised (if applicable).
- Provide details on the reference population used (if applicable).
- Detail in full, athlete pre-scan preparation, positioning (including if the athlete was/was not able to fit within the scan boundaries), and use of positioning aids.
- If regional composition is reported, the analysis technique should be described (e.g., fully automatic by the software, automatic by the software and confirmed by the technician, or manual analysis by the technician).

- Provide a detailed description of any customised region of interest.
- Include specific techniques used to scan sub-populations (e.g. for tall and/or broad athletes, athletes with disability).
- Include which methods were used to derive the precision error of measurements (e.g. sample size, demographics, scanning protocol and scan mode).
- State the precision error (RMS-SD and %CV) for each outcome of interest.
- Where possible, include a statement regarding 'meaningful' individual changes in body composition, with least significant change ($LSC = 2.77 \times \text{precision error}$).