

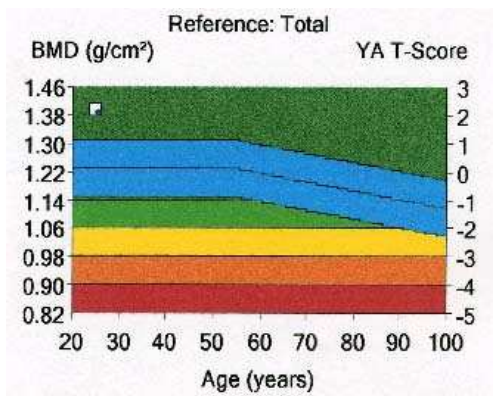
Innovative Body Composition Assessment

A couple of months ago an article was published in the newsletter outlining the possibility of introducing innovative body composition assessments into the sport science programmes of SINI athletes. Two female athletes recently attended the Centre for Molecular Biosciences (CMB), which is located on the Coleraine campus of the University of Ulster, to undergo Dual Energy X-ray Absorptiometry scans (DEXA). The athletes were accompanied by David Reid (High Performance Manager) and Declan Gamble (Sports Scientist).

As mentioned previously the DEXA scanner can be used to measure bone mineral density and to provide accurate assessments of the relative proportions of fat and lean tissue within different regions of the body. Why are these assessments important and how can they be used?

Bone mineral density (BMD) refers to the amount of calcium located in the bones and this can be used to estimate an athlete's risk of fracture. Female athletes, in particular, tend to be susceptible to stress fractures and other injuries due to weakened bones. This is because a combination of low oestrogen (female hormone) levels and poor nutrition can lead to insufficient calcium absorption and invariably, osteoporosis. This condition results in a weakening of the bones due to the loss of bone density and improper bone formation. The DEXA compares the numerical density of the bone (calculated from the image), with empirical (historical) databases of bone density to determine whether an athlete has osteoporosis, and often, to what degree. The skeletal scan can also provide a preliminary assessment of any postural abnormalities.

The BMD score of 1.39 on the left hand side of the coloured chart represents a value above average for this particular individual's age, ethnic origin and sex. Values above the average population are desirable for athletes. Scores of -1.0 to -2.5 (blue-yellow area) on the young adult (YA) reference range (on the right hand side) indicate osteopenia (low bone mass) and scores < -2.5 (orange-red area) indicate osteoporosis.



The DEXA also provides a very accurate assessment of body composition. Athletes often associate body composition with only fat mass, and fail to recognise that body composition also refers to the proportion of lean (muscle) mass and bone content. The example above illustrates the body composition results that are provided by the DEXA.

Region	Tissue (%Fat)	Centile ^{2,3}	T.Mass (kg)	Fat (g)	Lean (g)	BMC (g)
Total	18.6	70	81.5	14,487	63,274	3,710

In addition, the scan also provides a detailed assessment of the relative percentages of fat, muscle and bone within different regions of the body.

BODY COMPOSITION

Region	Tissue (%Fat)	Region (%Fat)	Tissue (g)	Fat (g)	Lean (g)	BMC (g)	Total Mass (kg)
Left Arm							
Left Leg							
Left Trunk							
Left Total							
Right Arm							
Right Leg							
Right Trunk							
Right Total							
Arms							
Legs							
Trunk							
Total							

This can be used to determine whether any significant imbalances exist in relation to an athlete's physical make up (i.e. differences between right and left legs). If evident, these imbalances have the potential to affect performance and may also predispose the athlete to potential injuries. Fortunately, the support structure at SINI allows intervention programmes to be developed with the assistance of the relevant support staff, to address body composition issues and/or to correct structural problems. These interventions can then contribute to enhancing overall athletic performance.

The initial pilot experience with the DEXA proved to be a success. Following discussions with Allen Clarke (rugby HPM), and Rodney Kennedy (strength and conditioning coach), it was decided that the first SINI squad screening would take place on Friday 4th June when the rugby players attend the CMB. These results should compliment the baseline fitness and strength and conditioning assessments that have taken place during the week, prior to the recommencement of the player's strength and conditioning programme. It is envisaged that the remaining SINI athletes will be screened over the summer period. This new service is also likely to be made available to new athlete coming into the Institute, and this will compliment the musculo-skeletal screening that is conducted.