

Body Composition Analysis with the InBody 230

Contra – Indications to testing with InBody

Anyone who has an implantable electrical device such as Pacemaker, Defibrillator, Nerve Stimulator, or women within the first twelve weeks of pregnancy are recommended not to use the device.

Things to keep in mind for the accurate measurement with InBody 230

1. Preferably the test should be carried out on an empty stomach & bladder
2. Testing should be carried out before exercise.
3. Testing should not be carried out after a shower or using a sauna as sweat & heat causes a temporary change in conductivity within the body
4. Subsequent testing should be carried out under similar conditions. (i.e. similar clothing, testing time , before eating or exercising etc.)
5. **Height needs to be inputted accurately as it will effect the measurement.**
6. Arms need to be away from the side of the body. Not touching body

Age Range 3 years to 99 years

Weight Range 10 to 250 kg (max 39.5 stone)

Body Composition Analysis

Weight

Skeletal Muscle Mass(kg)

100% normal Skeletal Muscle Mass refers to the ideal quantity of Skeletal Muscle Mass for a persons standard weight. There are three types of muscle - cardiac muscle, visceral muscle and skeletal muscle. However, it is the quantity of skeletal muscle that is the most changed through exercise. As such, InBody 230 displays Skeletal Muscle Mass separately from Fat Free Mass.

Body Fat Mass

Body Fat Mass = Body Weight - Fat Free Mass(FFM)

Body Fat Mass is stored under the skin, as well as between the abdomen and muscles. When an examinee's body fat mass is outside of the standard range, he/she is diagnosed as being obese.

Total Body Water(TBW)

Total Body Water = All the water in the body and is approx 60% of total weight.

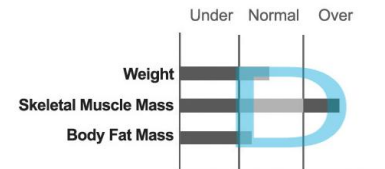
HOW TO APPLY THIS RESULT TO YOUR CLIENTS

Muscle - Fat Analysis		Under	Normal	Over	UNIT: %	Normal Range
Weight (kg)	55 70 85 100 115 130 145 160 175 190 205	46.0				44.6 ~ 60.3
S M M (kg) Skeletal Muscle Mass	70 80 90 100 110 120 130 140 150 160 170	19.3				19.8 ~ 24.2
Body Fat Mass (kg)	40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520	9.6				10.5 ~ 16.8

Draw a line joining the end of each bar graph line.

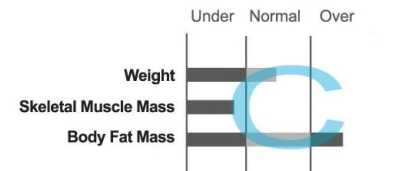
Different body types, based on a balanced body composition

In the case of this body type, the body composition graphs form a slightly curved 'D'. This is the ideal body composition state.



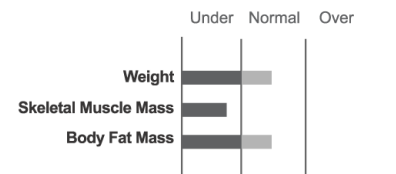
At the opposite end of the health spectrum, we find the following graph shape, a 'C' shape. In this case, the examinee's weight is within the normal range. However their Muscle mass is low and body fat mass is high.

The instructor may recommend that the person achieves a 'D' shape by losing Body Fat Mass while gaining SMM.



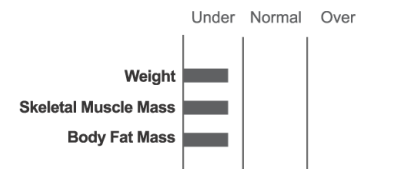
This type is exemplified by a person whose weight is within the standard range, but yet cannot be regarded as being in ideal health. For this type, the length of the SMM graph is shorter than the standard range, while the Body Fat Mass is within the standard range. An examinee of this type will also exhibit a 'C' shape.

However, this type should be identified as a weak body type, and not as an obesity type. People who belong to this type usually lack exercise and / or proper nutrition. The instructor may recommend that the person achieves a 'D' shape by gaining SMM and examining the person dietary habits.



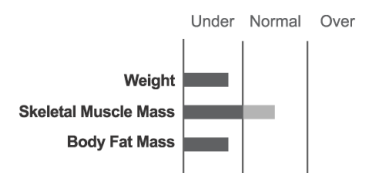
This person displays a straight line below the normal range.

They would be underweight, weak body type. Poor nutrition like this, continuing for a long period of time, may result in health problems.



Here we have a D shape but whilst the weight is below the normal range, the skeletal muscle mass is within normal, but body fat mass is lower than normal.

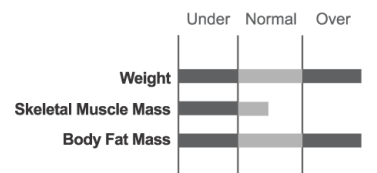
However, body fat not only has an energy-storing function in our body but also assists the absorption of fat soluble vitamins, and maintains healthy skin and hair. In addition, it is an essential building block for cell membranes. Therefore this person needs to be careful not to lose more body fat.



Here we have a deep C shape.

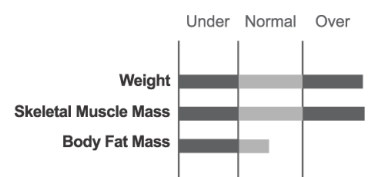
Obesity causes many diseases. People diagnosed as being obese run a higher risk of myocardial infarction, congestion, cardiac failure, and hypertension. In addition, there exists a correlation between obesity and diabetes. Other potential problems have been identified, such as a decrease in tolerance to exercise, osteoarthritis, as well as a decrease in lung function. Moreover, obese people also run a higher risk of contracting large intestine cancer, rectal cancer, and in the case of males, prostatic carcinoma.

This person should be encouraged to lose weight / body fat mass through exercise and dietary changes



Athletes are usually included in the overweight muscle type. As such, such people can easily be included in the obese category when BMI alone is used.

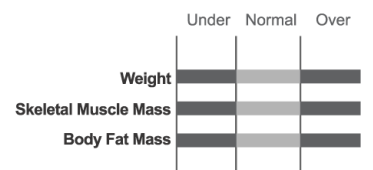
This person does not need to undertake weight control measures.



This straight line however does need to change.

The reason why SMM is over the normal range is not that SMM has been developed through exercise but because a person is excessively overweight compared with the standard weight.

This person should follow a weight reduction program that is designed to decrease their Body Fat Mass.



Obesity Diagnosis

InBody 230's obesity diagnosis uses BMI (Body Mass Index) and PBF(Percent Body Fat) to determine obesity levels.

Obesity Diagnosis

	Under	Normal	Over	Normal Range
B M I Body Mass Index (kg/m ²)	10 15 18.5 21.5 25	30	35 40 45 50 55	18.5 ~ 25.0
P B F Percent Body Fat (%)	8 13 18 23 28	33	38 43 48 53 58	18.0 ~ 28.0
W H R Waist-Hip Ratio	0.65 0.70 0.75 0.80 0.85	0.90	0.95 1.00 1.05 1.10 1.15	0.75 ~ 0.85

BMI(Body Mass Index, kg/m²)

The formula is $BMI = \text{Weight (kg)} / \text{Height}^2 (\text{m}^2)$. BMI has been widely applied in the general medicine, dietary, and sports medicine fields as the main means of diagnosing obesity. However, this method is flawed in that it cannot be applied to adults with high levels of SMM, children, those over the age of 65, or pregnant females. Nevertheless, as BMI has been the most commonly used index - this is why InBody 230 also includes BMI information.

Classification	BMI (kg/ m ²)	Danger of onset of accompanying diseases
Underweight	<18.5	Low
Normal	18.5~24.9	Moderate
Overweight	>25	
Dangerous weight level	25~29.9	Increased
1st level obesity	30~34.9	Dangerous
2nd level obesity	35~39.9	Advanced
3rd level obesity	>40	Very advanced

Percent Body Fat (%)

Percent Body Fat indicates the percentage of body fat to body weight.

$$\text{Percent Body Fat (\%)} = \text{Body Fat Mass(kg)} / \text{Body Weight(kg)} \times 100$$

The standard Percent Body Fat is 15% for males and 23% for females^{4,5} while the standard range of Percent Body Fat for males is 10-20%, and 18-28% for females.

Waist-Hip Ratio

Waist-Hip ratio (WHR) is determined by dividing the waist circumference at the line of the navel by the maximum hip circumference. It is a useful indicator for looking at the distribution of body fat. However inaccuracies can occur if different people are taking the measurement and it is also invasive.

InBody 230 uses its impedance index to provide a scientific estimation of the examinee's WHR. Males and Females found to have 0.95 and 0.90 respectively in WHR are considered to suffer from abdominal obesity.

Adults who have abdominal obesity tend to have excessive visceral fat (increased fat stored around the abdominal organs internally) and this has been linked with an increase risk of developing Cardiovascular disease, High Blood Pressure and Diabetes in later life. This storage of visceral fat can be reversed by exercise and the levels reduced, so it is well worth promoting exercise for the long term health benefits in later life.