

# The Bone Wellness Centre - Specialists in DEXA Scanning

855 Broadview Avenue Suite # 305

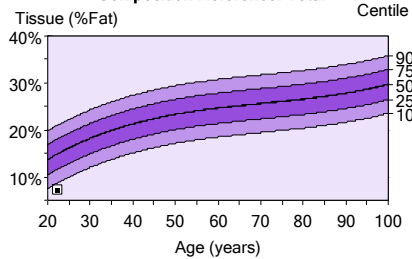
Toronto, Ontario M4K 3Z1

<b>Patient:</b>		<b>Patient ID:</b>	
<b>Birth Date:</b>	22.3 years	<b>Referring Physician:</b>	
<b>Height / Weight:</b>	184.5 cm 74.0 kg	<b>Measured:</b>	17/Jun/2017 9:43:20 AM (14.10)
<b>Sex / Ethnic:</b>	Male	<b>Analyzed:</b>	17/Jun/2017 9:46:49 AM (14.10)

Total Body Tissue Quantitation



Composition Reference: Total



Composition Trend: Total



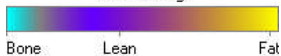
Trend: Total (Basic Analysis)

Measured Date	Age (years)	Tissue <sup>1</sup> (%Fat)	Centile <sup>2,3</sup>	Total Mass (lbs)	Region (%Fat)	Tissue <sup>1</sup> (lbs)	Fat <sup>1</sup> (lbs)	Lean <sup>1</sup> (lbs)	BMC (lbs)	Fat Free (lbs)
17/Jun/2017	22.3	7.3	6	169.5	6.9	161.1	11.7	149.3	8.4	157.8

Trend: Fat Distribution (Basic Analysis)

Measured Date	Age (years)	Android (%Fat)	Gynoid (%Fat)	A/G Ratio	Total Body <sup>1</sup> (%Fat)
17/Jun/2017	22.3	7.2	11.5	0.62	7.3

Color Coding



World Health Organization BMI Classification

BMI = 21.7 (kg/m<sup>2</sup>)

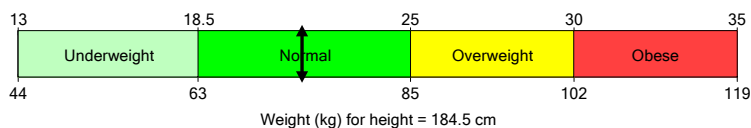


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4.81x13.01 11.5:%Fat=7.3%

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Filename: stuarm\_hv1pro6h23.dfb

Scan Mode: Standard 0.4 µGy

1 -Statistically 68% of repeat scans fall within 1SD ( $\pm 0.8\%$  Fat,  $\pm 0.46$  lbs. Tissue Mass,  $\pm 1.15$  lbs. Fat Mass,  $\pm 1.34$  lbs. Lean Mass for Total Body Total)

2 -USA (Lunar) Total Body Composition Reference Population (v113)

3 -Composition Matched for Age



GE Healthcare

Lunar Prodigy Advance  
PA+302043

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## BODY COMPOSITION (Basic Analysis)

Region	Tissue <sup>1</sup> (%Fat)	Region (%Fat)	Tissue <sup>1</sup> (lbs)	Fat <sup>1</sup> (lbs)	Lean <sup>1</sup> (lbs)	BMC (lbs)	Total Mass (lbs)
Arms	5.3	4.9	19.2	1.0	18.2	1.2	20.4
Arm Right	5.3	4.9	9.7	0.5	9.2	0.6	10.4
Arm Left	5.3	4.9	9.5	0.5	9.0	0.6	10.1
Legs	8.3	7.8	62.3	5.2	57.1	3.6	65.9
Leg Right	8.3	7.9	31.9	2.7	29.3	1.8	33.8
Leg Left	8.3	7.8	30.4	2.5	27.8	1.8	32.2
Trunk	6.9	6.7	69.1	4.8	64.3	2.4	71.5
Trunk Right	6.9	6.7	34.2	2.4	31.8	1.2	35.4
Trunk Left	6.9	6.7	34.9	2.4	32.5	1.2	36.1
Android	7.2	7.1	10.1	0.7	9.4	0.1	10.3
Gynoid	11.5	11.1	24.6	2.8	21.8	0.9	25.5
Total	7.3	6.9	161.1	11.7	149.3	8.4	169.5
Total Right	7.3	6.9	80.8	5.9	74.9	4.2	85.0
Total Left	7.3	6.9	80.3	5.8	74.4	4.2	84.5

## FAT MASS RATIOS

Trunk/ Total	Legs/ Total	(Arms+Legs)/ Trunk
0.41	0.44	1.29

## RMR (Resting Metabolic Rate)

1,823 cal/day Mifflin-St Jeor

## RSMI (Relative Skeletal Muscle Index)

10.03 kg/m² Baumgartner

1 - Statistically 68% of repeat scans fall within 1SD (± 0.8 % Fat, ±0.46 lbs. Tissue Mass, ±1.15 lbs. Fat Mass, ±1.34 lbs. Lean Mass for Total Body Total)  
Filename: stuarm\_hv1pro6h23.dfb

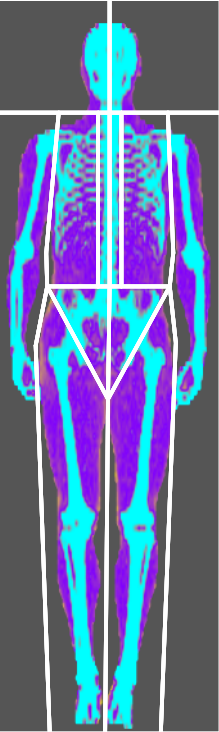
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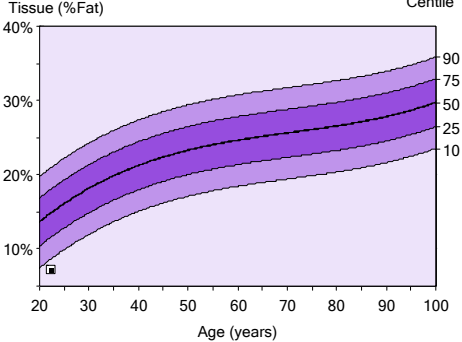
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Total Body Tissue Quantitation



Composition Reference: Total



Composition (Basic Analysis)						
Region	<sup>1</sup> Tissue (%Fat)	<sup>2,3</sup> Centile	Total Mass (lbs)	<sup>1</sup> Fat (lbs)	<sup>1</sup> Lean (lbs)	BMC (lbs)
Arm Right	5.3	-	10.4	0.5	9.2	0.6
Arm Left	5.3	-	10.1	0.5	9.0	0.6
Legs	8.3	-	65.9	5.2	57.1	3.6
Leg Right	8.3	-	33.8	2.7	29.3	1.8
Leg Left	8.3	-	32.2	2.5	27.8	1.8
Trunk	6.9	-	71.5	4.8	64.3	2.4
Total	7.3	6	169.5	11.7	149.3	8.4

Image not for diagnosis

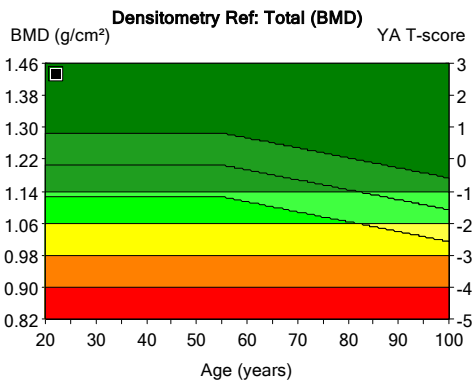
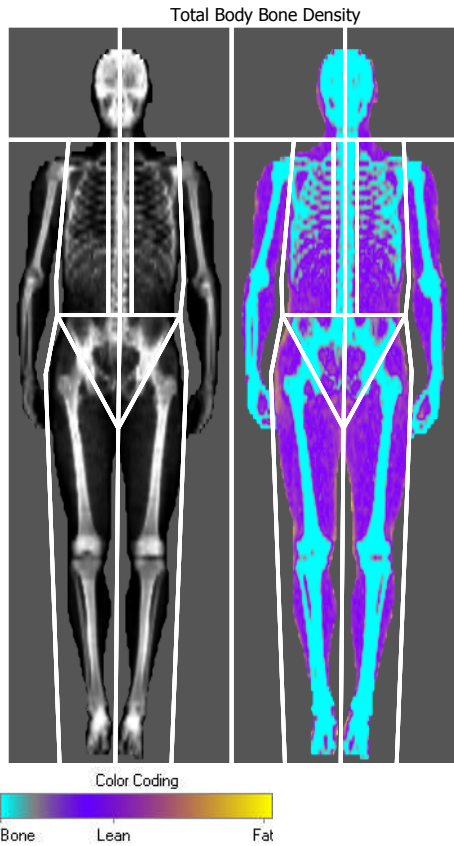
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4.81x13.01 11.5:%Fat=7.3%  
0.00:0.00 0.00:0.00  
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2 -USA (Lunar) Total Body Composition Reference Population (v113)  
3 -Composition Matched for Age



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Densitometry (Basic Analysis)					
Region	BMD <sup>1</sup> (g/cm²)	Young-Adult <sup>2</sup>		Age-Matched <sup>3</sup>	
		(%)	T-score	(%)	Z-score
Total	1.433	117	2.7	119	2.8

Image not for diagnosis

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4.81x13.01 11.5:%Fat=7.3%  
0.00:0.00 0.00:0.00  
Filename: stuarm\_hv1pro6h23.dfb  
Scan Mode: Standard 0.4 µGy

- 1 -Statistically 68% of repeat scans fall within 1SD ( $\pm 0.010$  g/cm<sup>2</sup> for Total Body Total)
- 2 -USA (Lunar) (ages 20-40) Total Body Reference Population (v113)
- 3 -Matched for Age, Weight (males 25-100 kg), Ethnic

**Body Composition Assessment: Monday, June 18, 2018**

**CLIENT**



Patient:

Age: 22.3 Birth Date: Height: 184.5 cm Patient ID: TBC-1706-036  
Gender: Male Scale Weight: 74.0 kg Exam Date: 17/Jun/2017  
Tech: (not specified)

**LEAN**

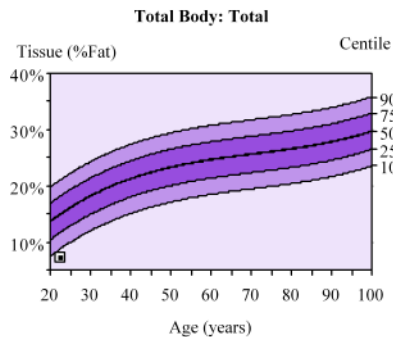


Lean mass includes all parts of the body [organs, muscle, ligaments, connective tissue and fluids] but excludes body fat.

LEAN(g): Sum of all muscle and soft organ tissue  
The higher the Tissue %Lean, the more muscular the body.  
Increase in muscle mass will increase one's metabolism & burn more calories!

Total Weight:	169.5 lbs
Lean Weight:	149.3 lbs
Tissue %Lean:	88.1%

**FAT**



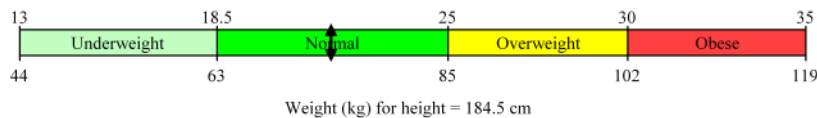
Fat Weight:	11.7 lbs
Tissue %Fat:	7.3%

It is very important to know your body fat. It is not the amount of weight but the amount of fat that one has in the body that is potentially dangerous to one's health. Fat mass includes all the fatty tissue in the body including around the organs and subcutaneous fat. The Y-axis displays the percentage of fat in tissue. The x-axis displays the age range from 20 to 100. Your result, the square is plotted in the graph based on your age and your percentage fat result. The middle line passing through the graph shows the average percentage of tissue fat for ages 20 to 100 which corresponds to a centile of 50%. The upper line corresponds to the 90th centile and the lower line to the 10th centile. The graph allows your tissue fat % to be put into context for this reference population.

**BMI (Body Mass Index):** Measurement of body fat based on height and weight only that applies to adult men and women. It can overestimate body fat in athletes and others who have a muscular build. It can underestimate body fat in older persons and others who have lost muscle.

**World Health Organization BMI Classification**

BMI = 21.7 (kg/m<sup>2</sup>)



**ANDROID / GYNOID (waist / hip)**



Knowing your body's fat distribution is critical in monitoring your health risks and avoiding disease later in life. A DEXA scan will directly measure the different types of fat: Subcutaneous fat which is the fat under the skin, visceral fat which is the fat around your organs — i.e. android fat, and the essential fat which is the fat that is necessary for normal body functions i.e. hormonal production, secretion, transport, and reproduction.

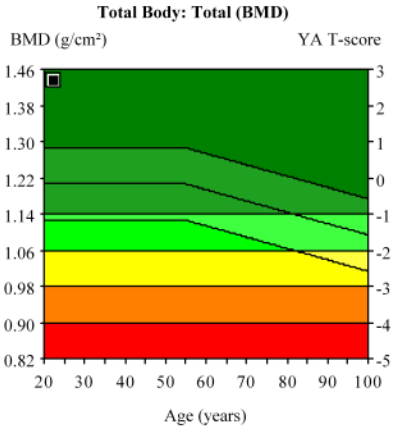
Region	Tissue %Fat
Android: LESS	7.2%
Gynoid: MORE	11.5%
A/G Ratio:	0.62

**ANDROID:** Apple shaped body (excess fat around abdomen, chest and inside the abdominal cavity (around our organs, liver, intestines, pancreas) can increase one's risk for heart disease, & stroke. (Men <1 & Women <0.8)

**GYNOID:** Pear shaped body types (excess fat around hips, thigh & buttocks) are less prone to harmful illness but may be prone to joint issues around the hip and knees

**Android (waist) to Gynoid (hip) Ratio** - Carrying too much fat in the wrong areas can increase your chance of serious health problems. Men with waist to hip ratio of > 1 & women with ratio > 0.8 have increased risk of cardiovascular illness, diabetes, stroke, cancer etc. Fat distribution is controlled by genetics, lifestyle, hormones, diet, medications, medical conditions, & stress. Some may be egg shaped called Ovoid, this means general fat distribution throughout the body.

**BONE**



Age	BMD (g/cm <sup>2</sup> )	T-score	Z-score	Centile
22.3	1.433	2.7	2.8	100

The Y-axis displays the BMD results. Your result is plotted in the graph based on your age & BMD result. The middle line passing through the graph shows the average BMD for ages 20 to 100. 68% of the population will fall within the upper line and lower line display (+/- 1 standard deviation). The remaining 32% fall either above the upper line (16%) or below the lower line (16%). The reference graph allows your BMD result to be put into context. The test compares your Bone Mineral Density (BMD) to that of a "young adult" at peak bone strength, displayed as your T-score. It also compares your results to people of your same age, called "age-matched" displayed as your Z-score. This information, along with other factors help assess secondary reasons for bone loss. Bone is slow changing; weight bearing & resistance exercise, optimal calcium & vitamin D intake will help preserve preserve your bone mass. Low scores can indicate a secondary reason of bone loss which need to be assessed by your physician.

## RESTING METABOLIC RATE (RMR)



**Resting Metabolic Rate (RMR)** is synonymous with Resting Energy Expenditure (REE). It is an estimate of how many calories you would burn if you were to do nothing but rest. It represents the minimum amount of energy needed to maintain body temperature, heartbeat, circulation & sleep. To calculate daily calorie needs, the RMR value is multiplied by a factor with a value between 1.2 (sedentary) & 1.9 (extremely active), depending on the person's physical activity level. To maintain your current weight, your daily calorie consumption should equal 1.55 (average) x your RMR. To lose weight at a healthy rate, (i.e. lose fat mass instead of muscle mass & water weight) you need to be between your minimum calories (i.e., RMR) and your maintenance calories (i.e. 1.55x RMR). Increase in muscle mass will increase one's metabolism & burn more calories

The best way to reach your ideal weight is to add some physical activity into each day and make healthier food choices. To gain weight at a healthy rate, consume more daily calories than needed for maintenance and respiratory rate. Increase in muscle mass will increase one's metabolism & burn more calories

<b>YOUR RMR VALUE:</b>	<b>1,823 cal/day</b>
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*RMR (Resting Metabolic Rate) based on Mifflin-St Jeor equation.*

*RMR = 19.7 x FFM(fat free mass) + 413*

*Mifflin MD, St Jeor ST, Hill LA, Scott BJ, Daugherty SA, Koh YO. A new predictive equation for resting energy expenditure in healthy individuals., Am J Clin Nutr., 1990 Feb;51(2):241-7. PMID: 2305711*

**RMR min your body burns at rest =** **min**

**RMR X 1.55 maintenance=** **maint**  
*calories needed to maintain weight for someone who works out moderately*

*To lose weight at a healthy rate, one should be between RMR and their maintenance weight:* **LW**

How active are you?

RMR		Example
<b>Sedentary RMR</b>	X 1.2	Desk job and little to no exercise
<b>Lightly Active RMR</b>	X 1.375	20 mins light exercise /sports 1-3 days/wk
<b>Moderately Active RMR</b>	X 1.55	30 mins moderate exercise/sports 3-5 days/wk
<b>Very Active RMR</b>	X 1.725	60 mins hard exercise/sports 5-7 days/wk
<b>Extremely Active RMR</b>	X 1.9	Athlete; hard daily exercise/sports and physical job or training

## RELATIVE SKELETAL MUSCLE INDEX (RSMI)



RSMI represents the relative amount of muscle in the arms and legs. Sarcopenia is the is the degenerative loss of skeletal mass (0.5-1% loss per year after the age of 25), quality, and strength associated with aging. Consensus for a clinical definition of a person with established sarcopenia was produced by Baumgartner and defines it as 2 standard deviations below the mean of lean mass for gender specific healthy young adults.

Based on the results as long as the results are not below the cutoffs (>7.26 for men and >5.45 for women), then they do not have a clinical diagnosis of sarcopenia.

<b>YOUR RSMI VALUE:</b>	<b>10.03 kg/m<sup>2</sup></b>
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*RSMI (Relative Skeletal Muscle Index) based on Baumgartner equation.*

*RSMI = (lean mass of arms[kg] + lean mass of legs[kg]) / (height[m])<sup>2</sup>*

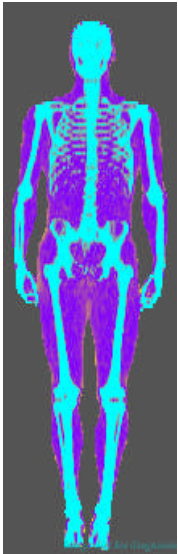
*Baumgartner RN, Koehler KM, Gallagher D, Romero L, Heymsfield SB, Ross RR, Garry PJ, Lindeman RD (1998) Epidemiology of sarcopenia among the elderly in New Mexico. Am J Epidemiol 147(8):755-763.*

### CLINICAL DIAGNOSIS OF SARCOPENIA

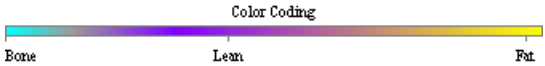
<b>RSMI VALUE FOR MALES:</b>	<b>&lt; 7.26</b>
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<b>RSMI VALUE FOR FEMALES</b>	<b>&lt; 5.45</b>
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SHAPE TREND: Understanding your body composition is valuable tool in assessing your overall health



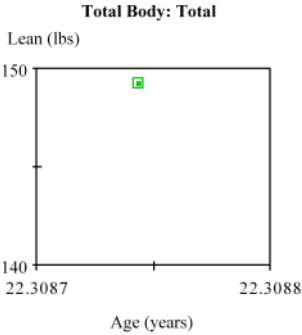
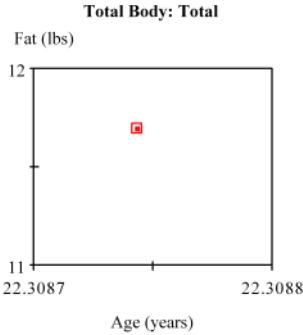
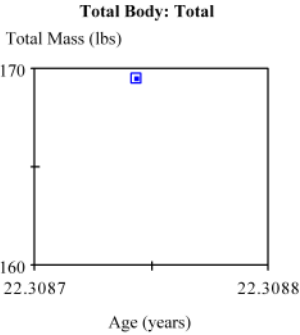
17/Jun/2017



BODY COMPOSITION HISTORY

Measured Date	Total Mass (lbs)	Change vs. Baseline ( )	Previous ( )	Fat Mass (lbs)	Change vs. Baseline ( )	Previous ( )	Lean Mass (lbs)	Change vs. Baseline ( )	Previous ( )	%Fat (%)	BMC (lbs)
17/Jun/2017	169.5	baseline	N/A	11.7	baseline	N/A	149.3	baseline	N/A	7.3	8.4

BMC = Bone Mineral Content





LEAN MASS BALANCE



Lean mass balance is a comparison of your body's right to left lean mass symmetry. A lean mass difference close to zero indicates a balance of muscle. An injury, non-symmetrical training, or a health condition may cause disproportionate lean mass differences, but only your physician can determine if a health condition is the related cause.

Region	Measured Date	Age	Lean Mass Right (lbs)	Lean Mass Left (lbs)	Lean Mass Difference (lbs)
Arms:	17/Jun/2017	22.3	9.2	9.0	0.3
Legs:	17/Jun/2017	22.3	29.3	27.8	1.4
Trunk:	17/Jun/2017	22.3	31.8	32.5	-0.6
Total:	17/Jun/2017	22.3	74.9	74.4	0.5

FAT DISTRIBUTION

Region	Measured Date	Age	Region %Fat	%Change vs. Previous	%Change vs. Baseline
Arms:	17/Jun/2017	22.3	4.9	N/A	baseline
Legs:	17/Jun/2017	22.3	7.8	N/A	baseline
Trunk:	17/Jun/2017	22.3	6.7	N/A	baseline
Android:	17/Jun/2017	22.3	7.1	N/A	baseline
Gynoid:	17/Jun/2017	22.3	11.1	N/A	baseline
Total:	17/Jun/2017	22.3	6.9	N/A	baseline

## DEXA TERMINOLOGY

**Dual Energy X-Ray Absorptiometry:** A technology that uses both high and low energy x-rays to determine the areal mass of tissue which is comprised of bone, fat & lean mass

**R Value:** The attenuation ratio of high-energy and low-energy photons in soft tissue and bone. The ratio is used to distinguish soft tissue from bone, to determine bone density, and to distinguish fat from lean soft tissue.

**Bone Mineral Density:** Measurement of bone mineral found in the region of interest. BMD is measured in grams per centimeter squared. BMD is derived using BMC divided by area, where BMC is measured in grams and area is measured in centimeters squared.

**Body composition** is used to describe the percentages of fat, muscle & bone. Two people of who are the same height and weight may look totally different from each other because they have a different body compositions. Healthy body composition = Higher Fat Free Mass & Lower Body Fat

**T-score:** number of standard deviations above (+) or below (-) the mean peak density in a healthy young adult of the same gender. i.e. The T-score is a comparison of a person's bone density with what is normally expected in a healthy young adult of the same gender. Your bones are compared to the bones of an average young adult

**Z-score:** the number of standard deviations above (+) or below (-) the mean density for an individual of that age & gender i.e. The Z-score is a comparison of a person's bone density with that of an average person of the same age & gender. Your bones are compared to the bones of someone of your age & gender. Low Z-scores can sometimes lead to a secondary cause of osteoporosis or bone loss

**Visceral Fat:** Fat located in the abdominal area which surrounds the body's internal organs. Also known as organ fat. i.e. "apple" body shape have an excess of visceral fat.

**Fat Free Mass:** Any body tissue that does not contain fat e.g. skeletal bone, muscle & water.

TISSUE % FAT:  $\text{fat(g)} / \text{fat(g)} + \text{lean(g)} \times 100$

REGION % FAT:  $\text{fat(g)} / \text{tissue(g)} + \text{BMC} \times 100$

FAT(g): Includes all the fatty tissue in the body i.e. fatty tissue found within the organs of the body & also the subcutaneous fat found under the skin.

BMC: Bone Mineral Content: Sum of all skeletal tissue within the body measured by the densitometer, its the dry bone mass

Total Mass(kg): Sum of Fat + Lean + BMC (Bone Mineral Content)

## ASSESSMENT



Body Mass Index (BMI)	
Weight Status	BMI
Underweight	Below 18.5
Normal	18.5-24.9
Overweight	25.0-29.9
Obese	30.0 and above

### World Health Organization Recommendations for Body Fat Percentages

#### WOMEN

Age	Low Underfat	Average Healthy	High Overweight	Obese
20-40 yrs	Under 21%	21-33%	33-39%	Over 39%
41-60 yrs	Under 23%	23-35%	35-40%	Over 40%
61-79 yrs	Under 24%	24-36%	36-42%	Over 42%

#### MEN

Age	Low Underfat	Average Healthy	High Overweight	Obese
20-40 yrs	Under 8%	8-19%	19-25%	Over 25%
41-60 yrs	Under 11%	11-22%	22-27%	Over 27%
61-79 yrs	Under 13%	13-25%	25-30%	Over 30%

Table 13.2B **Body fat percentage for the athletic population from humankinetics.com**

Sport	Male	Female	Sport	Male	Female
Baseball	12-15%	12-18%	Rowing	6-14%	12-18%
Basketball	6-12%	20-27%	Shot Putters	16-20%	20-28%
Body building	5-8%	10-15%	Skiing (X country)	7-12%	16-22%
Cycling	5-15%	15-20%	Sprinters	8-10%	12-20%
Football (Backs)	9-12%	No data	Soccer	10-18%	13-18%
Football (Linemen)	15-19%	No data	Swimming	9-12%	14-24%
Gymnastics	5-12%	10-16%	Tennis	12-16%	16-24%
High/long Jumpers	7-12%	10-18%	Triathlon	5-12%	10-15%
Ice/field Hockey	8-15%	12-18%	Volleyball	11-14%	16-25%
Marathon running	5-11%	10-15%	Weightlifters	9-16%	No data
Racquetball	8-13%	15-22%	Wrestlers	5-16%	No data

**The most important assessment are the ones you do after your baseline.**

**Please email us to schedule your follow up DEXA Scan: [totalbodydexa@gmail.com](mailto:totalbodydexa@gmail.com)**