What Does DXA Measure?

DXA (Dual energy X-ray Absorptiometry) is a gold-standard tool for measuring bone density and body composition. By using low-intensity x-rays, we are able to quantify the amount of fat, bone, and fat-free (or lean) mass throughout the body.

Bone Scans

Included in this report are records of the scan of your spine, hip, and forearm. If you are missing one or more, there is a reason why you haven't received it and your DXA technician(s) will either have discussed why the scan was not acquired at the time of your visit, or the scan was not interpretable.

Variables of Interest

Bone mineral density (BMD) is a measure of the amount of minerals (mainly calcium and phosphorus) contained in a certain volume of bone. This is the key variable because it allows us to estimate how strong your bones are. While bone density/strength may differ somewhat by site (hip, spine, or forearm) you should always use the lowest T or Z score when considering your overall bone health.

Your **Z-Score** is an "age-matched" comparison, in which your BMD is compared to people of the same age, gender, and ethnicity. **If you are not a post-menopausal woman or a man over the age of 50, the Z-score is not a diagnostic test for osteoporosis.** However, it can be used as an early screening tool to see if you are at increased risk for developing osteoporosis in the future. Z-scores within +/- 2.0 are considered normal. However, if your Z-score is lower than -1.0, we recommend you consult with your Primary Care Physician.

In contrast, your **T-Score** is a comparison of your BMD to that of a young (age 20-29) adult reference population in the US. **T-scores are only used for post-menopausal women and men over the age of 50**. Your T-score, along with other factors, helps assess your risk of osteoporotic fracture. A T-score greater than -1.0 is considered normal; a T-score between -1 and -2.5 is considered low bone mass/osteopenia, while a T-scores below -2.5 is considered osteoporosis. If your T-score is below -1.0, we recommend you consult with your Primary Care Physician.

Whole Body Scan

Why DXA is Best

If you only know a person's height, weight, or BMI, you cannot confidently predict levels of muscle/fat or any associated health risks. However, DXA scans can determine the distribution of fat and fat-free/lean tissue (mostly muscle) throughout the body. Additionally, DXA scans are less likely to be influenced by systematic errors than other methods of estimating body fat.

While people say often they want to lose weight, what they really mean is they want to lose fat. If, for example, you were to go on a diet and lose weight, especially without including exercise in your program, most of your weight loss would be lean mass, which is undesirable. You would still possess the same amount of fat in a now-lighter body, and your percentage of body fat will consequently be higher. Remember, not all fat is bad! Some fat is absolutely essential and desirable - this amount will vary with age, gender, and other factors.

Using both the total amount of body fat and the relative distribution in the android (abdominal) and gynoid (hips and thighs) regions, we can make accurate predictions regarding health risk(s). Further, we can make recommendations for an appropriate weight and body fat percentage based on your specific goals regarding health and/or sport performance. Although there is no single ideal body fat percentage, values higher than **30-35% for adult women and 25% for adult men** are associated with increased risk of cardiovascular disease, Type-2 diabetes, metabolic syndrome, and some types of cancer. While there is less agreement among experts as to the *minimum* amount of body fat below which health may be impaired, values of at least 10% for men and 14% for women are believed to be required for overall health. It should be noted that these low values are rarely observed except in young lean athletes.

Results Table for Body Composition Analysis

This table below outlines terms and definitions that are used to understand fat distribution and body composition.

Column	Definition
Region	These are the areas of your body that the DXA scanned. These regions include your arms, legs, and trunk. Also, DXA can distinguish between your right and left limbs. Asymmetries of up to 10% are considered normal. However, if the asymmetry in the specific region is larger than 10%, the risk for biomechanical imbalances (specifically over time) and therefore risk for injury is significantly increased.
Region (%) Fat	This is the percentage of total mass within a specific region that is comprised of fat. See below for more detail regarding what level is considered "healthy".
Centile	The numbers in the Percentile columns compare your results against data from the National Health and Nutrition Examination Survey (NHANES) database, the largest public health database of US citizens matched for age, sex and ethnicity (black, white or Hispanic).
Total Mass (lb)	The absolute amount (in pounds) of fat, lean mass, and bone.
Fat Mass (lb)	The quantity of body fat (in pounds) in each body region.
Lean Mass (lb)	The quantity (in pounds) of your lean mass. In your arms and legs, this is effectively all muscle. In your trunk, this includes organs. However for adults, we can consider all changes in lean mass to be changes in muscles, as organ size doesn't really change after adolescence.
BMC (lb)	Bone Mineral Content (BMC) is the weight of your dry bone mass in lbs. Typical BMC ranges for the whole body are 1.5-2.5kg (3.3-5.5 pounds) for a woman and 2.5-3.5 kg (5.5-7.7 pounds) for a man – much lighter than most people expect! The amount that you have at each site is dependent upon the size of your bones.
Android	Android fat distribution generally describes fat stored around the middle. This is typically considered "bad fat" and is more highly correlated with metabolic and cardiovascular disease. This is where men typically have the highest percentage body fat.
Gynoid	Gynoid fat distribution describes fat stored around the hips, thighs and buttocks. Women typically have a higher body fat percentage in this zone.

*1000 g = 1 kg; 1 kg = 2.2 lb
** (e) or Estimated values are calculated when the DXA's limited scan area is unable to accommodate a part of the body.

Thank you!

We hope you enjoyed the DXA experience at EPARC. If you are interested in measuring progress/changes in your body composition, 12 to 16 weeks is a good interval between scans to see real and perceptible changes after beginning a program targeted at losing body fat and/or gaining lean muscle. However, because bone takes so much longer to change, 1 to 2 years is a more appropriate interval between measurements. For further information, or to schedule a follow up appointment, please contact us at **858-534-9315**.
We look forward to seeing you again soon!

These scans were acquired for research and/or educational purposes and have not been reviewed by a qualified physician. For more information, please contact the EPARC team at 858-534-9315.

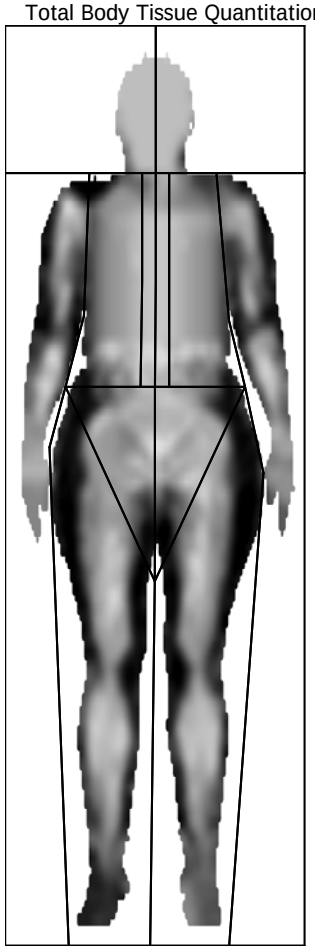
Exercise & Physical Activity Resource Center (EPARC)

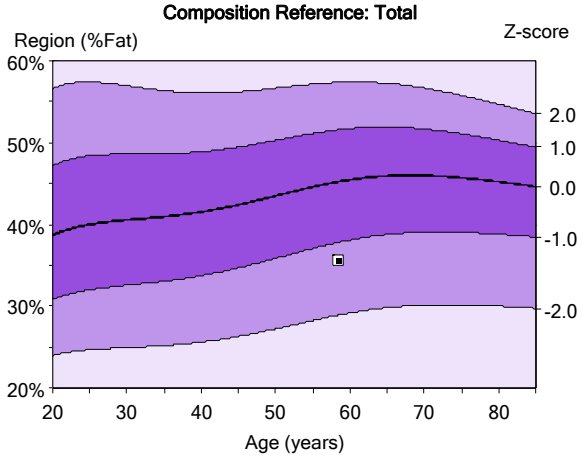
University of California, San Diego

9500 Gilman Drive, La Jolla, CA 92093

Patient:	[redacted]	**Patient ID:**	[redacted]
Birth Date:	[redacted] [redacted] years	**Referring Physician:**	[redacted]
Height / Weight:	[redacted] in. [redacted] .	**Measured:**	[redacted] 10:28:39 AM (14.10)
Sex / Ethnic:	[redacted] [redacted]	**Analyzed:**	[redacted] 3:37:02 PM (14.10)

Total Body Tissue Quantitation





Composition (Enhanced Analysis)

Region	Region (%Fat) [1]	Z-score [2,3]	Total Mass (kg)	Fat (g) [1]	Lean (g) [1]	BMC (g)
Arm Right	37.2	-	3.4	1,263	1,994	139
Arm Left	38.9	-	3.5	1,349	1,975	144
Leg Right	42.8	-	11.9	5,075	6,384	406
Leg Left	42.7	-	12.0	5,128	6,474	399
Trunk Right	32.7	-	14.1	4,627	9,255	260
Trunk Left	30.0	-	14.4	4,317	9,855	241
Android	29.6	-	3.9	1,155	2,715	32
Gynoid	43.2	-	11.0	4,773	6,101	174
Total	35.6	-1.3	63.4	22,552	38,761	2,081

COMMENTS:

Image not for diagnosis

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4.81x13.01 11.1:%Fat=36.8%
0.00:0.00 0.00:0.00
Filename: 90irrp7i6g.dfx
Scan Mode: Standard 0.4 µGy

1 -Statistically 68% of repeat scans fall within 1SD (± 0.8 % Fat, ±210 g Tissue Mass, ±643 g Fat Mass, ±707 g Lean Mass for Total Body Total)
2 -USA (NHANES 1999-2004) Total Body Composition Reference Population (v100)
3 -Composition Matched for Age, Ethnic

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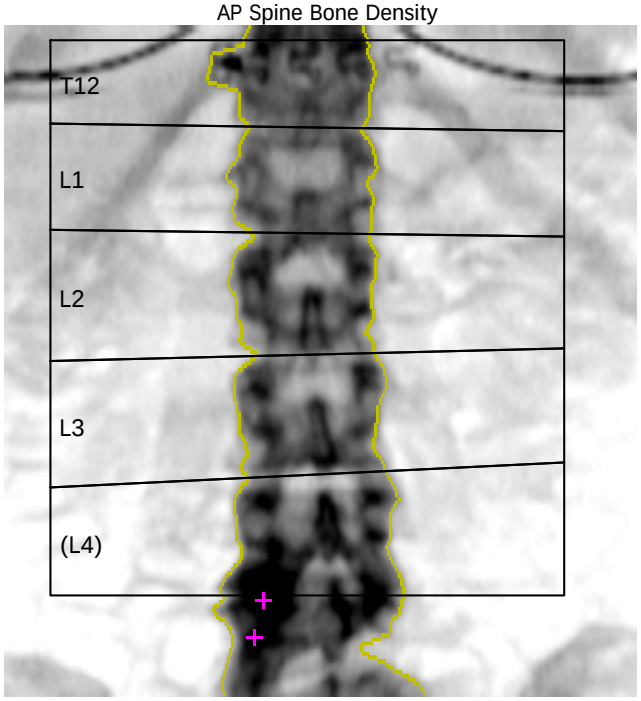
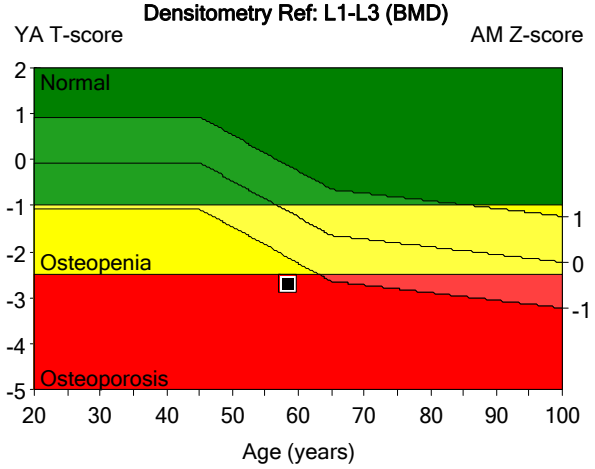
9500 Gilman Drive, La Jolla, CA 92093

Patient:		**Patient ID:**	
Birth Date:	years	**Referring Physician:**	
Height / Weight:	in. lbs.	**Measured:**	10:47:23 AM (14.10)
Sex / Ethnic:		**Analyzed:**	3:37:02 PM (14.10)

AP Spine Bone Density



Densitometry Ref: L1-L3 (BMD)



Region	BMD [1] (g/cm²)	Young-Adult [2] (%)	Young-Adult [2] T-score	Age-Matched [3] (%)	Age-Matched [3] Z-score
L1	0.788	70	-2.9	79	-1.7
L2	0.867	72	-2.8	81	-1.6
L3	0.881	73	-2.7	83	-1.5
L4	1.077	90	-1.0	101	0.1
L1-L3	0.848	72	-2.7	82	-1.5

COMMENTS:

Image not for diagnosis

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Filename: 90irrp7i6g.dfx
Scan Mode: Standard 37.0 µGy

1 - Statistically 68% of repeat scans fall within 1SD (± 0.010 g/cm² for AP Spine L1-L3)
2 - USA (Combined NHANES (ages 20-30) / Lunar (ages 20-40)) AP Spine Reference Population (v113)
3 - Matched for Age, Weight (females 25-100 kg), Ethnic
11 - World Health Organization - Definition of Osteoporosis and Osteopenia for Caucasian Women: Normal = T-score at or above -1.0 SD; Osteopenia = T-score between -1.0 and -2.5 SD; Osteoporosis = T-score at or below -2.5 SD; (WHO definitions only apply when a young healthy Caucasian Women reference database is used to determine T-scores.)

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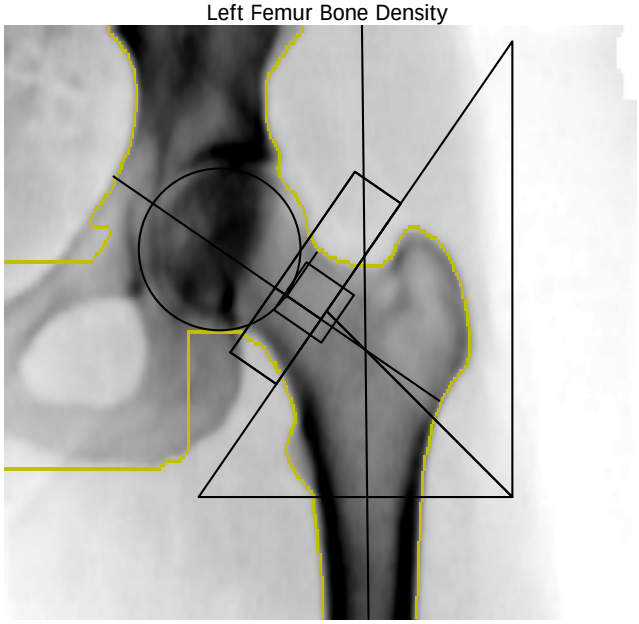
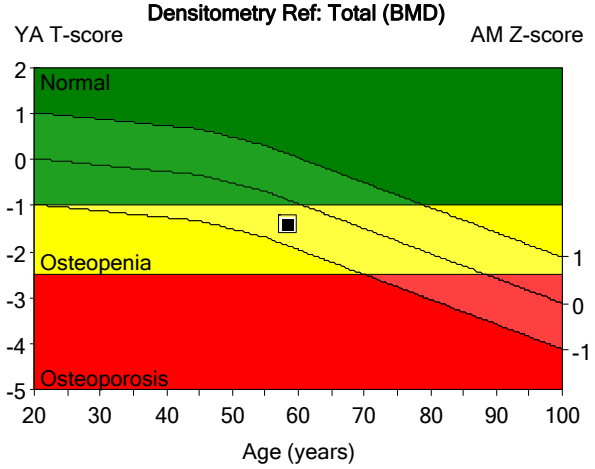
Patient:	[redacted]	**Patient ID:**	[redacted]
Birth Date:	[redacted] [redacted] years	**Referring Physician:**	[redacted]
Height / Weight:	[redacted] in. [redacted] lbs.	**Measured:**	[redacted] 10:37:39 AM (14.10)
Sex / Ethnic:	[redacted] [redacted]	**Analyzed:**	[redacted] 3:37:01 PM (14.10)

Left Femur Bone Density

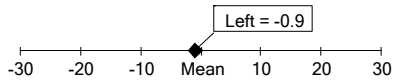


Densitometry Ref: Total (BMD)



Region	BMD[1,6] (g/cm²)	Young-Adult[2] (%)	Young-Adult[2] T-score	Age-Matched[3] (%)	Age-Matched[3] Z-score
Neck	0.758	73	-2.0	87	-0.8
Total	0.834	83	-1.4	93	-0.5

Hip Axis Length Comparison (mm)



(Left = 106.4 mm) (Mean = 107.3 mm)

COMMENTS:

Image not for diagnosis

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0.00:0.00 0.00:0.00
Neck Angle (deg)= 55
Filename: 90irrp7i6g.dfx
Scan Mode: Standard 37.0 µGy

1 - Statistically 68% of repeat scans fall within 1SD (± 0.021 g/cm² for Left Femur Total)
2 - USA (Combined NHANES (ages 20-30) / Lunar (ages 20-40)) Femur Reference Population (v113)
3 - Matched for Age, Weight (females 25-100 kg), Ethnic
6 - Standardized BMD for Total is 786 mg/cm².
11 - World Health Organization - Definition of Osteoporosis and Osteopenia for Caucasian Women: Normal = T-score at or above -1.0 SD; Osteopenia = T-score between -1.0 and -2.5 SD; Osteoporosis = T-score at or below -2.5 SD; (WHO definitions only apply when a young healthy Caucasian Women reference database is used to determine T-scores.)

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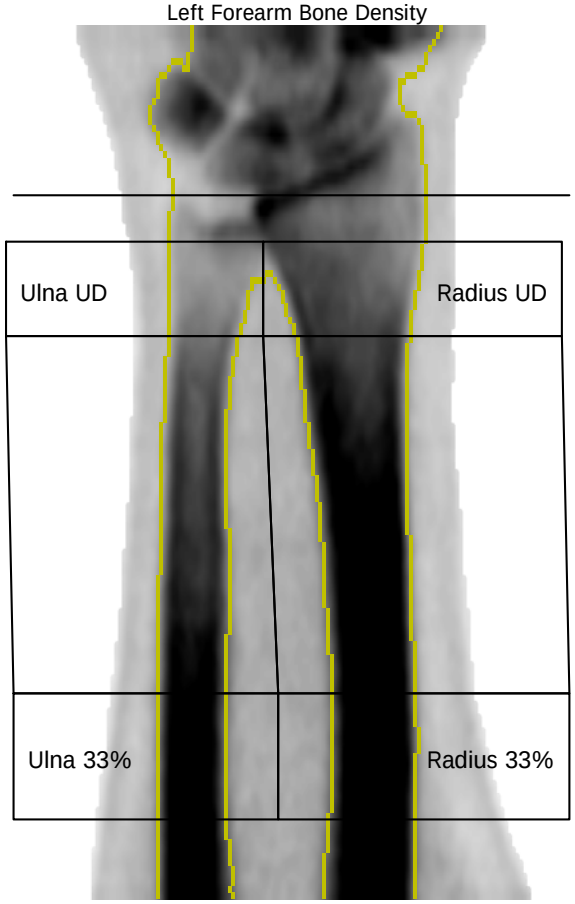
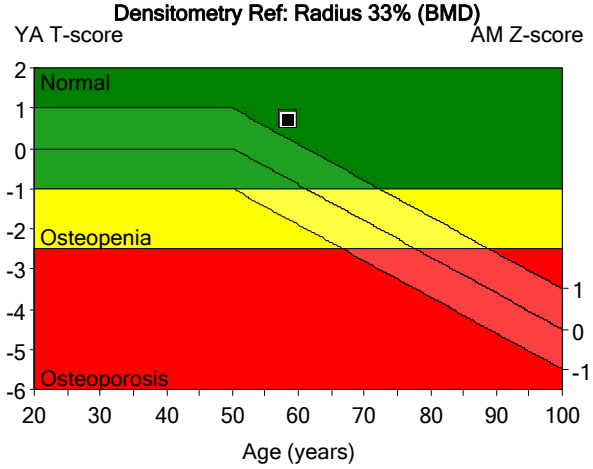
Patient:	[redacted]	**Patient ID:**	[redacted]
Birth Date:	[redacted] years	**Referring Physician:**	[redacted]
Height / Weight:	[redacted] in. [redacted] lbs.	**Measured:**	[redacted] 10:54:13 AM (14.10)
Sex / Ethnic:	[redacted]	**Analyzed:**	[redacted] 3:37:02 PM (14.10)

Left Forearm Bone Density



Densitometry Ref: Radius 33% (BMD)



Region	BMD [1] (g/cm²)	Young-Adult [2] (%)	Young-Adult [2] T-score	Age-Matched [3] (%)	Age-Matched [3] Z-score
Radius UD	0.433	92	-0.8	100	0.0
Radius 33%	0.945	107	0.7	115	1.4

COMMENTS:

Image not for diagnosis

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Forearm Length: 27.0 cm
Filename: 90irrp7i6g.dfx
Scan Mode: Standard 2.0 µGy

1 - Statistically 68% of repeat scans fall within 1SD (± 0.020 g/cm² for Left Forearm Radius 33%)
2 - USA (Combined NHANES (ages 20-30) / Lunar (ages 20-40)) Forearm Reference Population (v113)
3 - Matched for Age, Ethnic
9 - Lunar calibration in use.
11 - World Health Organization - Definition of Osteoporosis and Osteopenia for Caucasian Women: Normal = T-score at or above -1.0 SD; Osteopenia = T-score between -1.0 and -2.5 SD; Osteoporosis = T-score at or below -2.5 SD; (WHO definitions only apply when a young healthy Caucasian Women reference database is used to determine T-scores.)