Your Clinic's Logo Here

AutoBMD™
Powered by HeartLung Technologies

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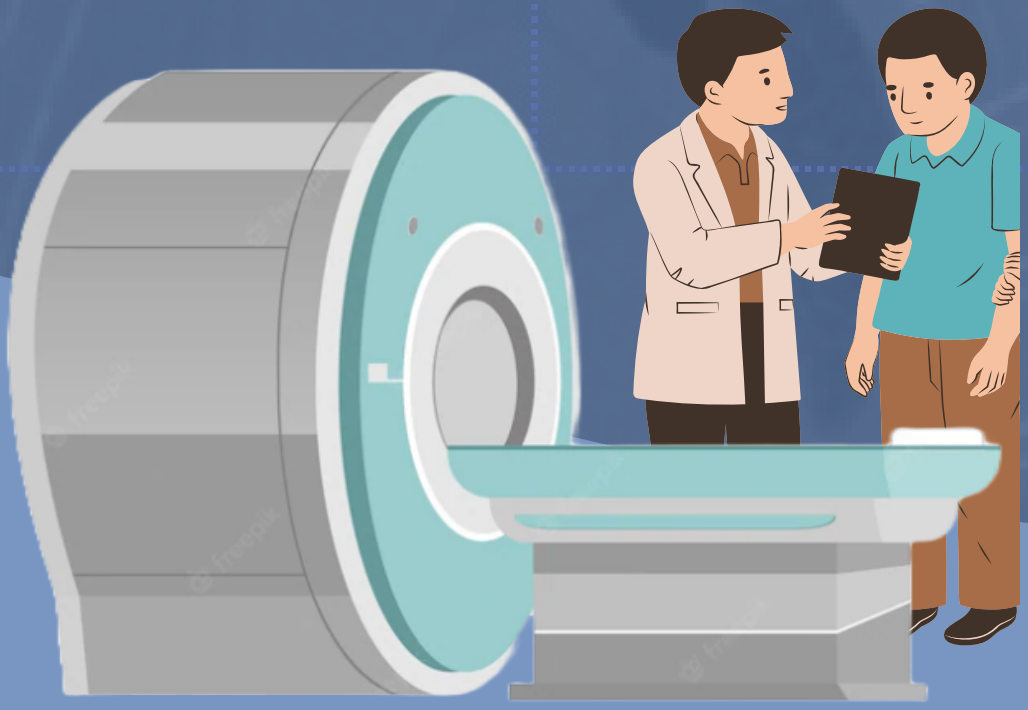

Bone Density Report

Created by FDA Approved AI-Powered AutoBMD™

Approved by Radiologist

Your Bone Mineral Density (BMD) Report

Patient Name: Doe, Jack

ID: 9008
Date of Exam: 2/16/2023
Date of Birth: 1/1/1953
Gender: Male

Your Clinic's Logo Here

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Hounsfield Unit (HU)

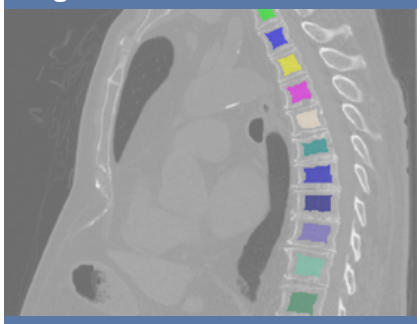
A quantitive scale for describing radiodensity.

Vertebra1	114.6
Vertebra2	100.1
Vertebra3	102.7
Mean HU	105.8

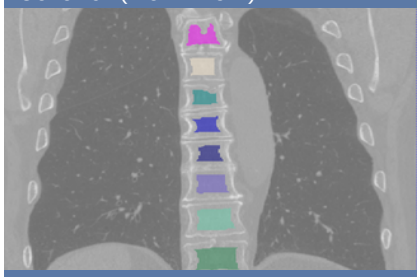
BMD (mg/cc)

Mean BMD	106
Z-score	-2
T-score	-3.2

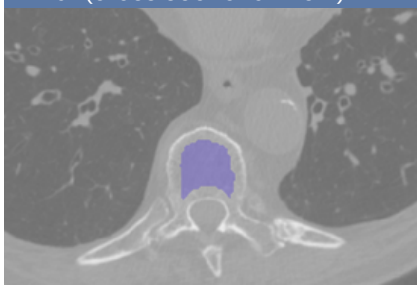
Sagittal (side view)



Coronal (front view)

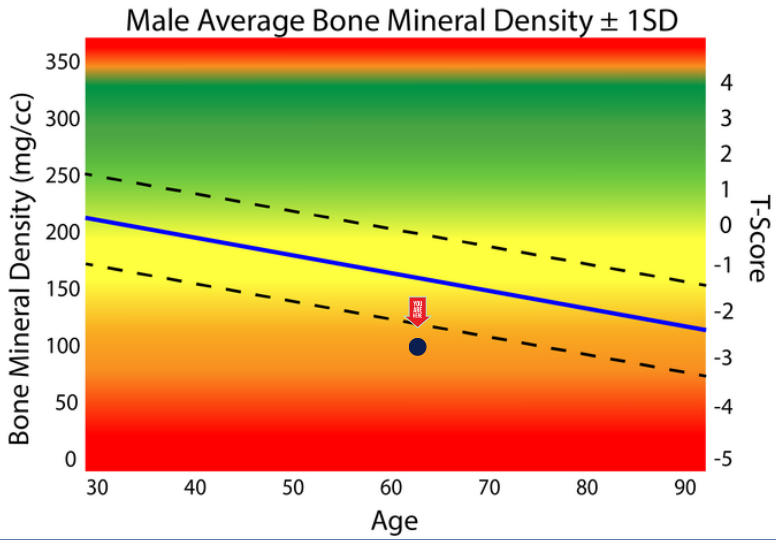


Axial (cross sectional view)



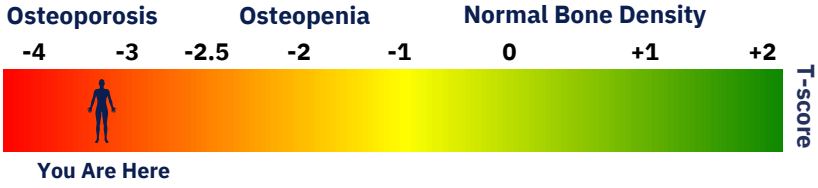
Your Z-score: -2.0

Z-score compares your bone density to average values for a person of your same age and gender.



Your T-score: -3.2

T-score is your bone density compared with what is normally expected in a healthy adult of your sex. *Your T-Score of -3.2 indicates you likely have osteoporosis (severe bone loss).*



Recommendations

All patients should ensure an adequate intake of dietary calcium and vitamin D. The National Osteopororis Foundation recommends adults under age 50 need 1,000 mg of calcium and 400-800 IU of vitamin D daily. Adults 50 and over need 1,200 mg of calcium and 800-1,000 IU of vitamin D daily. **Based on your BMD results, you have osteoporosis and should seek follow up care with your physician.**

Follow up

People with diagnosed cases of osteoporosis or at high risk for fracture should have regular BMD tests. For patients eligible for Medicare, routine testing is allowed once every 2 years. For more information visit www.AutoBMD.ai.

Electronically signed by: Thomas Atlas, MD

How This Report Is Created

This report is created using HeartLung's FDA approved AI- powered cloud based AutoBMD™ that helps doctors quickly identify patients who are having an accelerated bone loss and are at risk of cracks, compressions, or fracture in their spinal bones and other parts of the skeletal body but are unaware of their serious condition.

This AI-powered tool automatically extracts valuable information about bone health from any CT scan of a patient's chest or abdomen, done for any reason. Therefore, it saves patients extra radiation and extra screening cost.

U.S. FOOD & DRUG ADMINISTRATION

USPTO No. 9,119,590 - Issued September 1, 2015
USPTO No. 10, 695,022 - Issued June 30, 2020
FDA510K approval K213760

FDA has labeled AutoBMD™ an Opportunistic AI-powered tool that enables: (1) retrospective assessment of bone density from CT scans acquired for other purposes, (2) assessment of bone density in conjunction with another medically appropriate procedure involving CT scans and (3) assessment of bone density without a phantom as an independent measurement procedure.

Did You Know...

Nearly 43 Million Americans

don't know about their severe bone loss and hidden spinal fracture while suffering from body pain?

Are You Among Them?

What Is Low Bone Density & How Is It Detected?

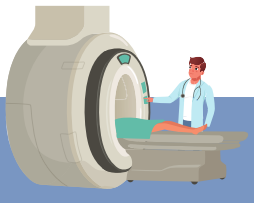
Low Bone Density

is a condition that causes bone mineral density to decline, increasing risk of fractures.

How It's Detected

Bone density is usually measured using a DEXA scan or quantitative CT scan (QCT)

DEXA Scan



CT Scan

AutoBMD™ uses QCT but does not require a new scan. It takes advantage of existing CT scans.

CT has at least three unique advantages: 1) ability to clearly separate cortical and trabecular bone; 2) offer "real" volumetric density in units of mg/cc; 3) high-resolution three-dimensional images of bone morphometry. Notably, compared to the cortical bone, trabecular bone loses quickly and responds first to medical therapies.

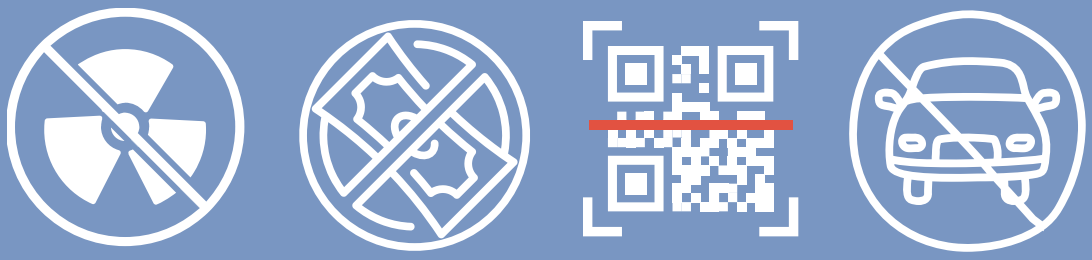
Our Approach Is Opportunistic Bone Mineral Density

It is superior to DEXA and regular QCT scans

No Extra Scan

No Extra Radiation

No Extra Trip To Radiology Clinic

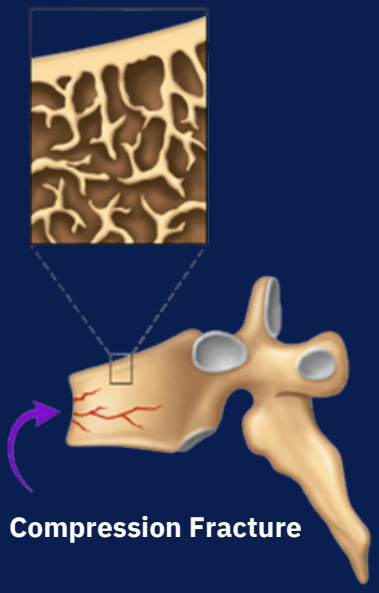


AutoBMD™ enables your doctor to take advantage of CT scans ordered for other purposes and measure your bone density.

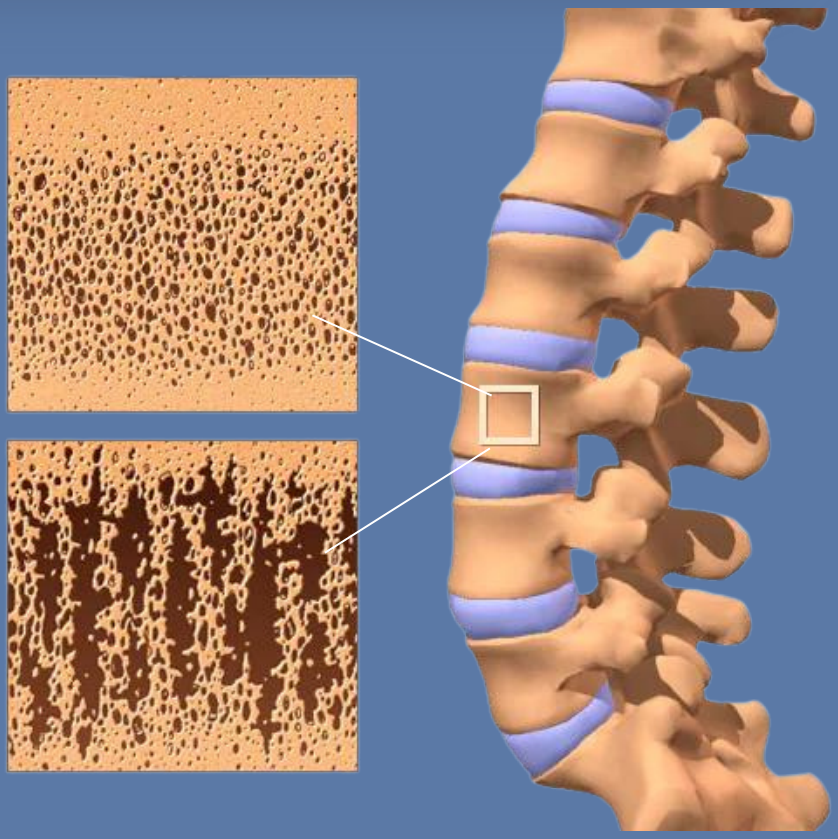
What Is Osteoporosis?

Osteoporosis

occurs when the bone mass is reduced secondary to microarchitectural changes in bone tissue, leading to enhanced bone fragility and a consequent increased risk of fracture. Osteoporosis is a major public health concern for our elderly population. One out of every two women and one in four men over age 50 will break a bone in their lifetime due to osteoporosis



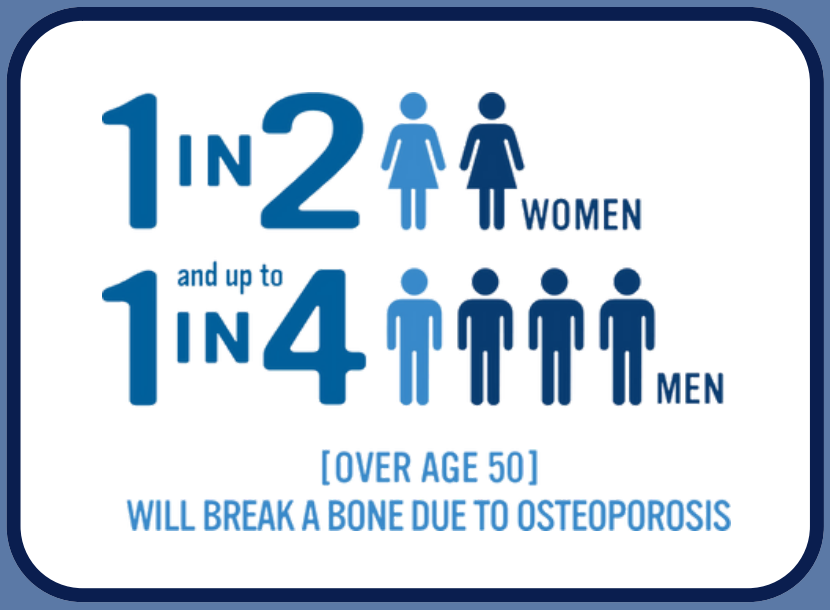
Compression Fracture



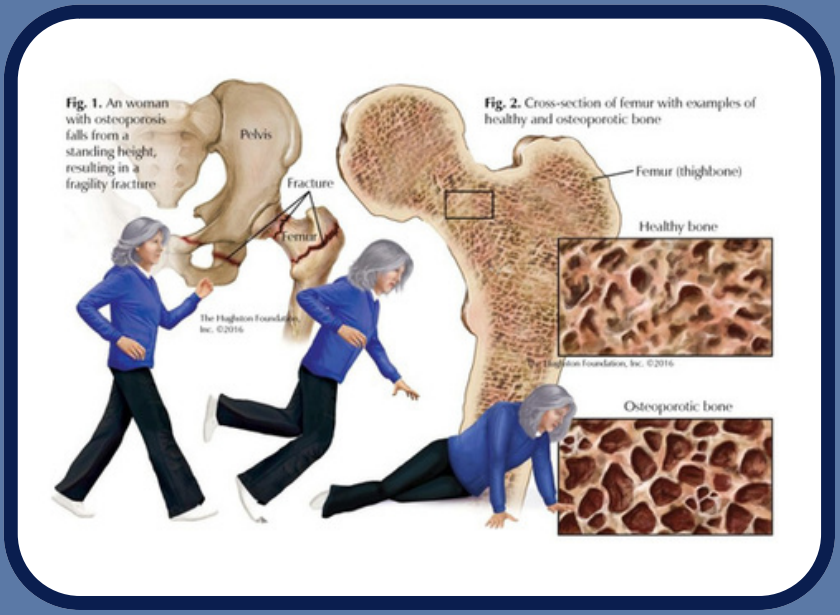
Normal

Osteoporotic
(Severe bone loss)

Osteoporosis is Increasingly Being Recognized As A Public Health Concern in The Aging Population



Osteoporosis occurs when the bone mass is reduced secondary to microarchitectural changes in bone tissue, leading to enhanced bone fragility and a consequent increased risk of fracture. BMD measurement is a direct method of estimating human bone mass and predicting future fracture risk.



The Global Burden of Osteoporosis

Low Bone Density and Related Fractures in 204 Countries and Territories, 1990-2019

Total Number: 5,790,146 Low BMD related fractures

In 2019, the five countries with the highest disease burden of DALYs number in Low Bone Mineral Density (LBMD)-related fractures were:

India (2,510,288)

China (1,839,375)

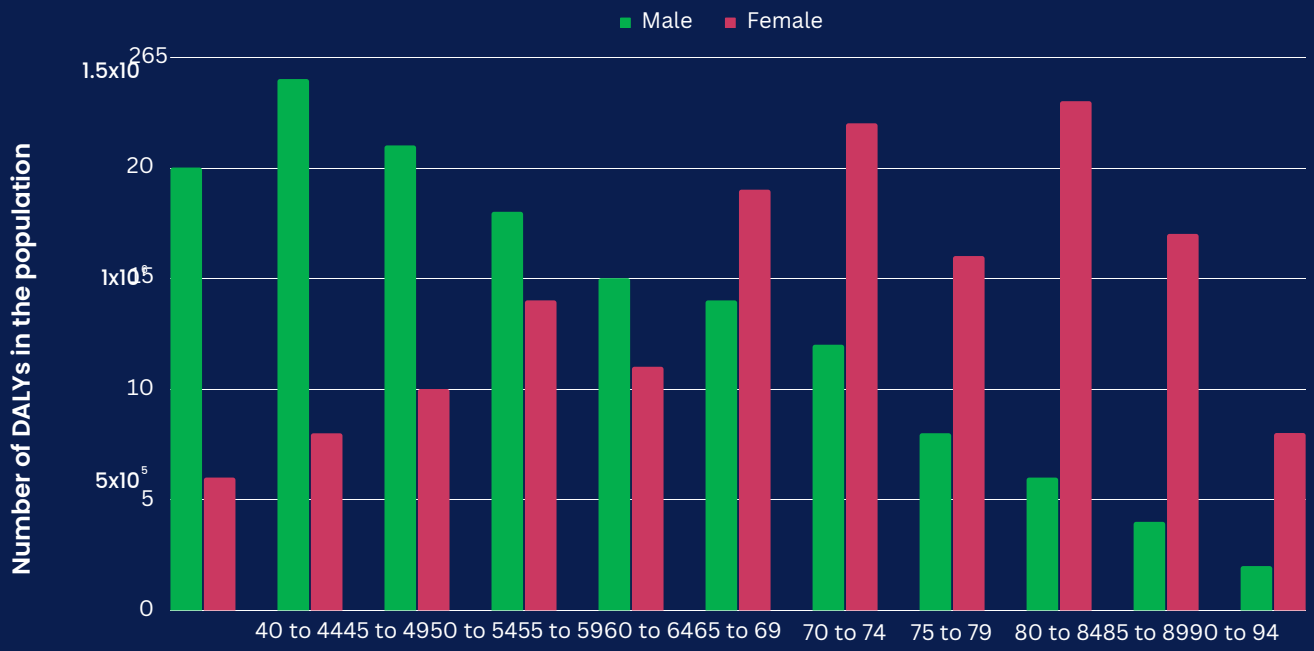
USA (819,445)

Japan (323,094)

Germany (297,944)

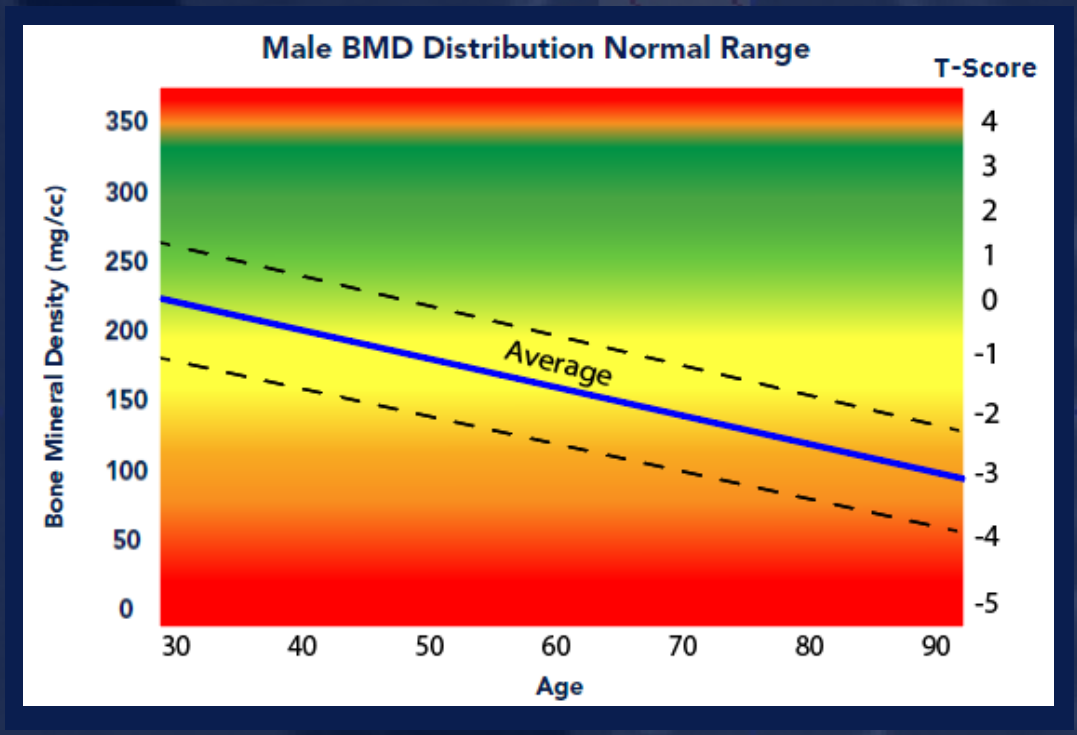
Accounting for 25.59%, 18.75%, **8.35%,** 3.29%, and 3.04%.

Results: Global deaths and disability-adjusted life-years (DALYs) attributable to Low BMD increased from 207,367 and 8,588,936 in 1990 to 437,884 and 16,647,466 in 2019, **a raise of 111.16% and 93.82%, respectively.**



Here's A Deeper Look

AutoBMD™ software is an opportunistic tool that automatically reports BMD with Z-score and T-score, and accurately detects osteoporosis and osteopenia in CAC scans.



Osteoporosis **Osteopenia** **Normal Bone Density**

-4 -3 -2.5 -2 -1 0 +1 +2

T-Score **T-Score**

You Are Here

According to World Health Organization guidelines*, your T-Score of -3.9 indicates you likely have osteoporosis (severe bone loss).

Your T-Score -3.0 Your Z-Score -1.2

What is Z-Score & T-Score?

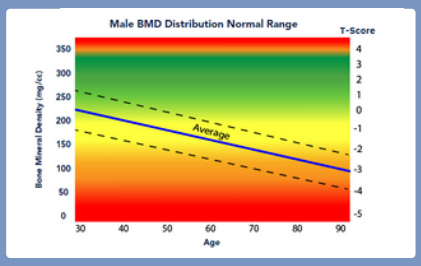
BMD

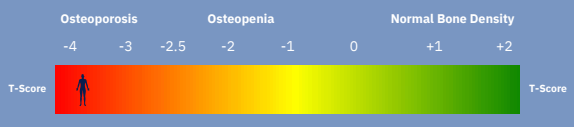
is the amount of minerals (mostly calcium and phosphorous) contained in a certain volume of bone.

Z-Score

is your bone density compared to a healthy person of the same age and gender. This represents how far off your score is (measured in the number of standard deviations) from the average score of healthy people of similar age.

Z-scores of – 2.0 or lower are classified as low BMD for chronological age and those above – 2.0 classified as within the expected range.

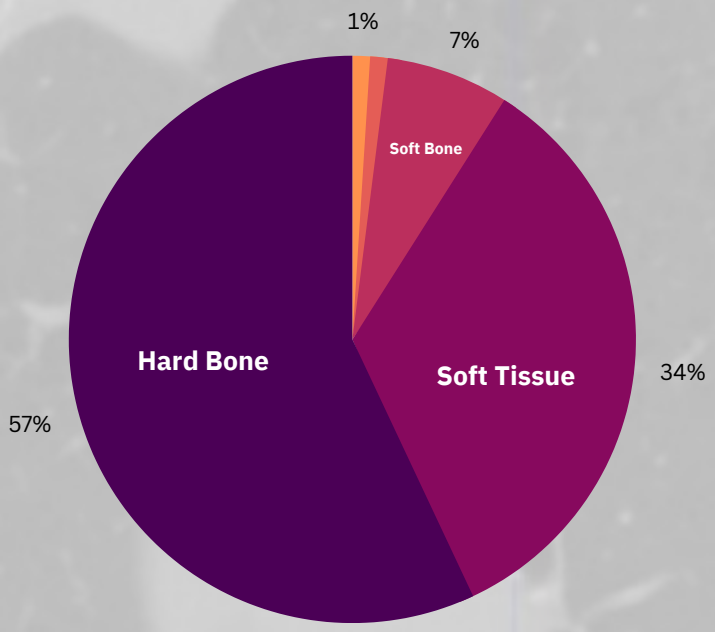




T-score

is your bone density compared with what is normally expected in a healthy young adult of your sex. People with normal bone density have a T-score between +1 and -1.

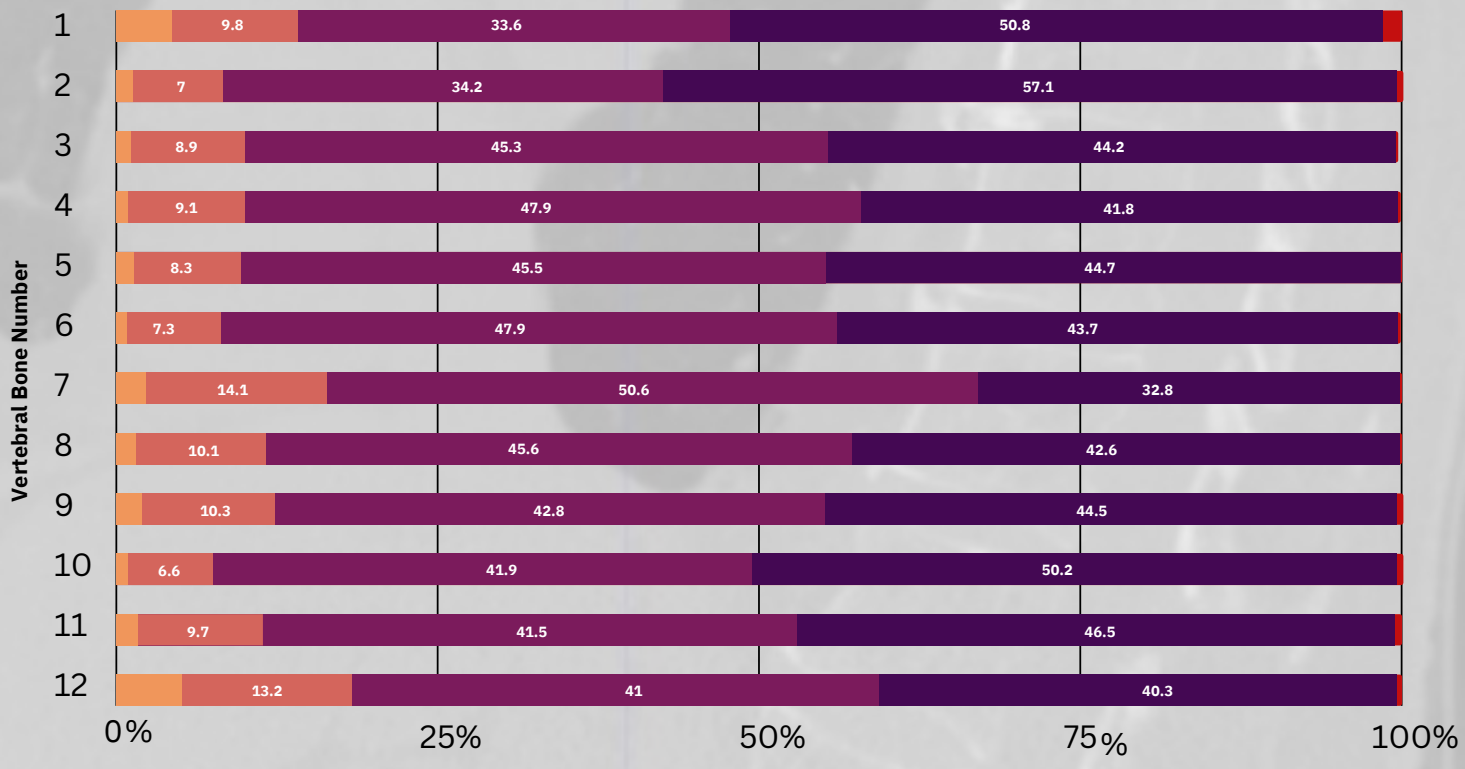
Virtual Histology Of Trabecular Bone By HU Categories



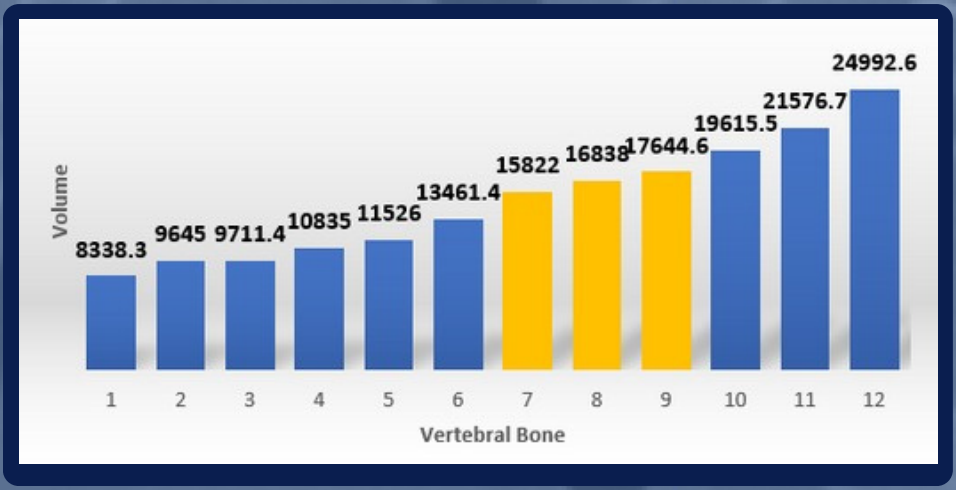
Per Patient

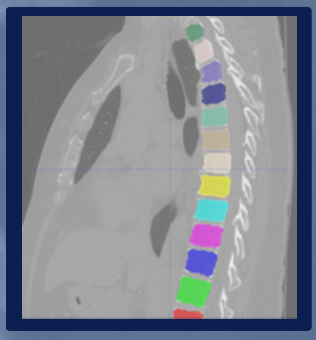
Below 20 HU	**Fat/Blood**
20-69 HU	**Soft Tissue**
70-150 HU	**Soft Bone**
150-350 HU	**Hard Bone**
Over 350 HU	**Hypercalcification**

Virtual Histology of Trabecular Bone Tissue for Full Chest

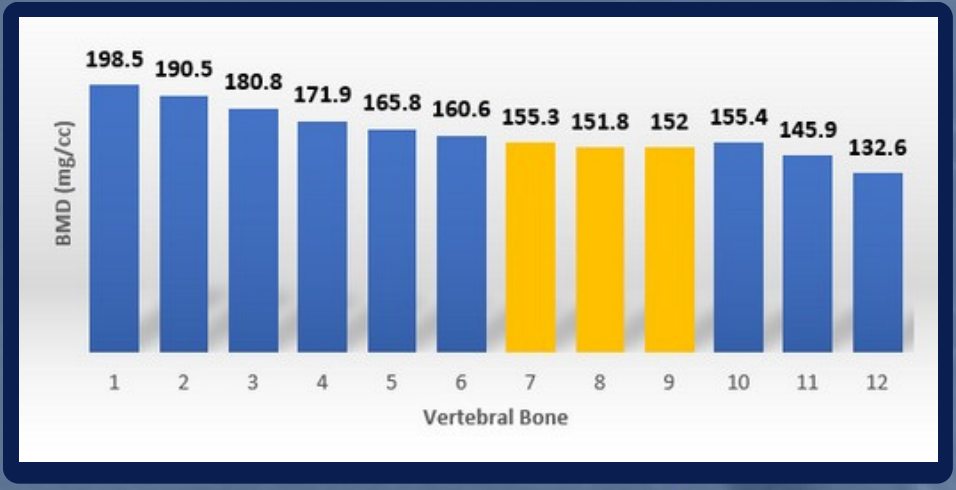


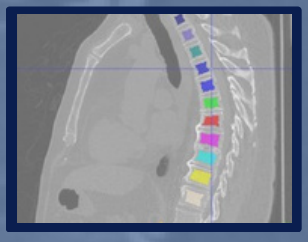
Full Volume Per Vertebral Body





Average BMD Per Trabecular Component of Vertebral Body

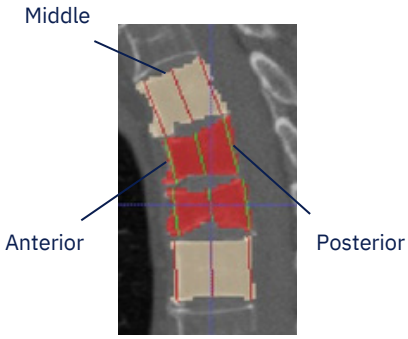




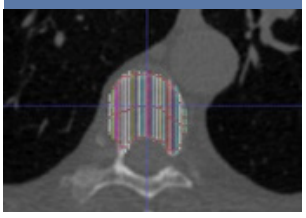
Fracture Report

A compression fracture is a type of break in your spinal bones when they become weak and gradually collapse making them shorter in height. This collapse can also cause pieces of bone to press on the spinal cord and nerves causing pain and decreasing the amount of blood and oxygen that gets to the spinal cord.

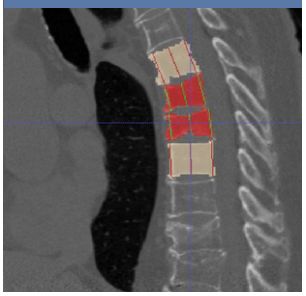
Fractures are related to the anterior (ANT), middle (MID) and posterior (POS) height.



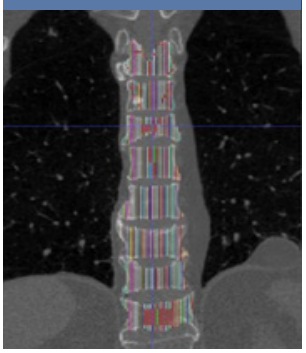
Axial (cross sectional view)

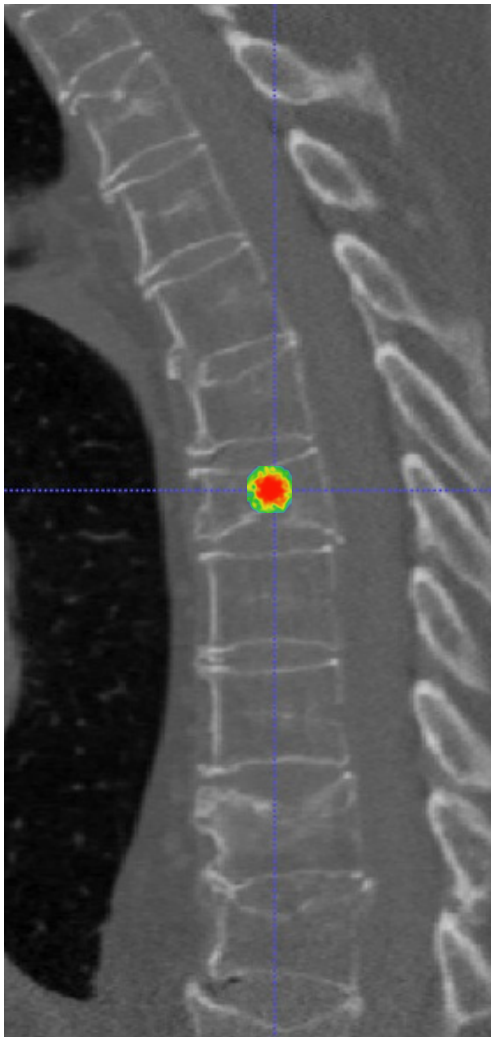


Sagittal (side view)



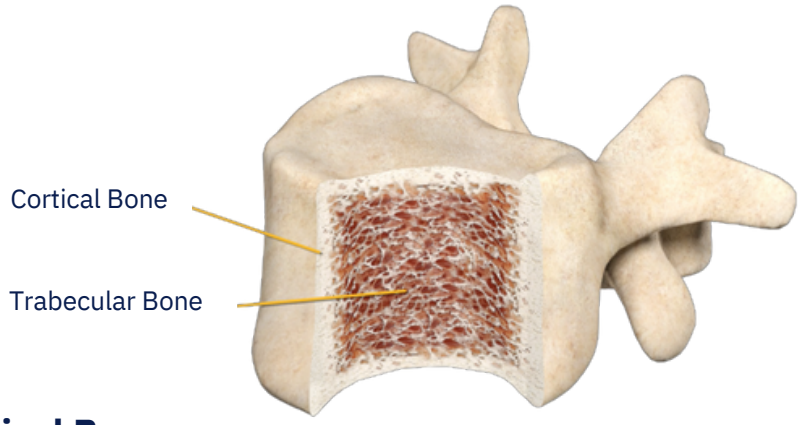
Coronal (front view)





BONE HEIGHT	ANT (mm)	MID	POS
T1	15.6	15.2	18
T2	17.6	17.2	18
T3	16.9	16.5	20.1
T4	19.5	17.6	19.5
T5	20.4	20.4	21.5
T6	15.5	14.9	19.6
T7	16.6	11.6	17.7
T8	20.5	19	22
T9	22	20.5	22
T10	21.5	16	20.5
T11	16	13	20.5
T12	25	11.5	14.6

Coefficient of Variation (CV) for Vertebral Body



Trabecular Bone

is the spongy-looking porous interior part of the bones (mainly vertebra and at the end of long bones)

Cortical Bone

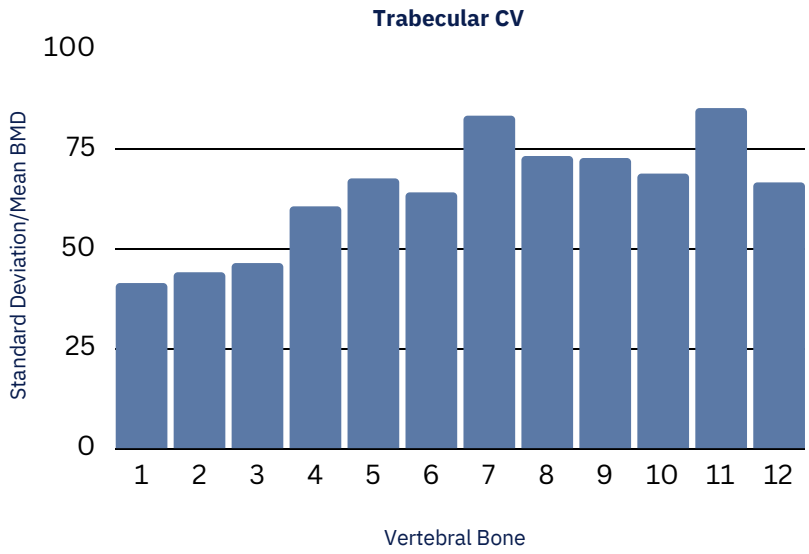
is a dense, low-porosity and less metabolically active tissue

- **High Trabecular CV (Std/mean BMD)**

  indicates a high range of HU, and an increased presence of bone abnormalities

- **Low CV (Std/mean BMD)**

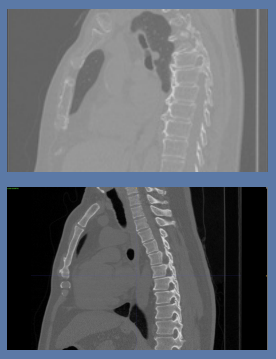
  indicates a low range of HU or decreased presence of bone abnormalities



High CV case with Bone Island

High trabecular CV (Std/mean) indicates a high range of HU, leading to detection of bone islands, streaks, and sclerosis. High CV of full bone to detect osteophytes.

Bone island is a small area of compact bone within the vertebrae.



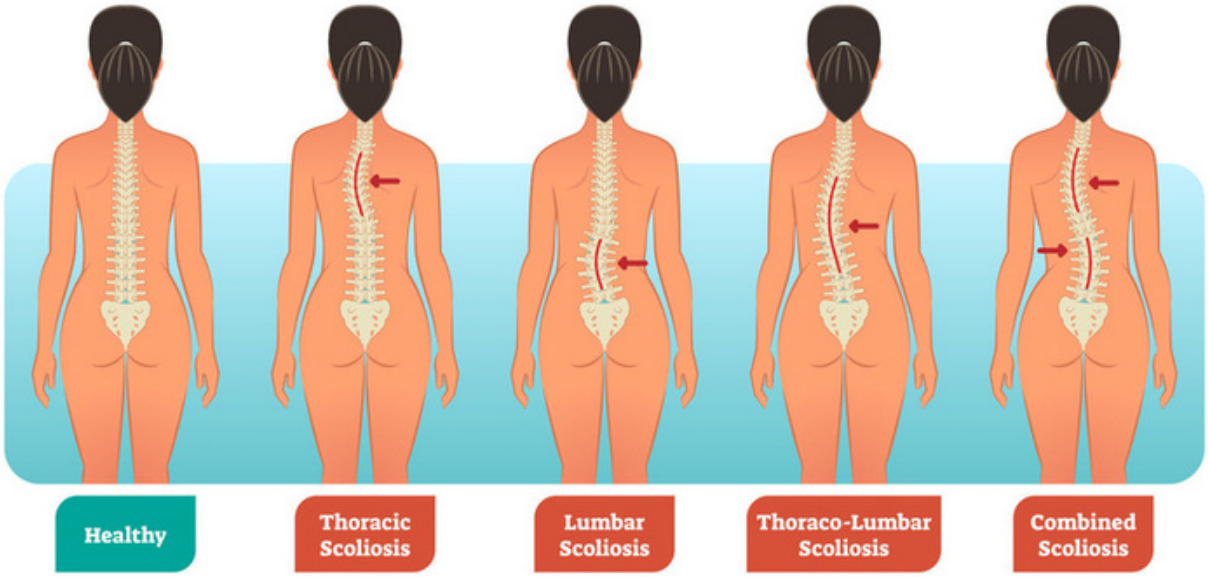
High CV

Low CV

*Check for Osteophyte and Sclerotic

Scoliosis

is a sideways curvature of the spine that most often is diagnosed in adolescents. It can affect people of any age, from babies to adults but most often starts in children aged 10 to 15.

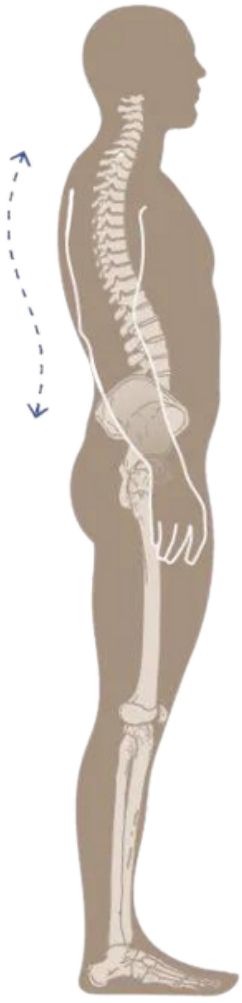


The curve can happen on either side of the spine and in different places in the spine. It is measured by spinal column deviation angles.

Based on your CT scan we do not see evidence of serious Scoliosis.

Kyphosis

is a spinal disorder in which an excessive curve of the spine results in an abnormal rounding of the upper back.



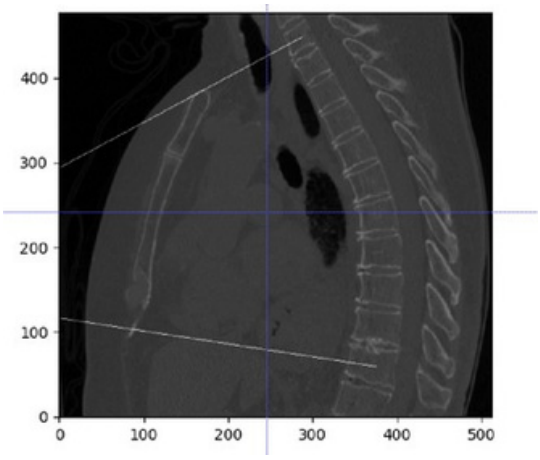
Healthy

Kyphosis

This condition is sometimes known as roundback, or in the case of a severe curve, as hunchback.

Kyphosis can occur at any age but is common during adolescence.

Based on your CT scan we do not see evidence of serious Kyphosis.



Recommendations

Pharmaceutical

All patients should ensure an adequate intake of dietary calcium and vitamin D. The NOF recommends adults under age 50 need 1,000 mg of calcium and 400-800 IU of vitamin D daily. Adults 50 and over need 1,200 mg of calcium and 800-1,000 IU of vitamin D daily. Effective therapies for the prevention of osteoporosis include bisphosphonates (Fosamax and Actonel) and Evista. Hormone therapy may be an option based on review of risks and benefits of treatment. You have osteoporosis and should seek follow up care with your physician.

List of Osteoporosis Treatments

- Bisphosphonates
- Calcitonin
- Estrogen agonist/antagonist
- Estrogen and hormone therapy
- Parathyroid hormone (PTH) analong and parathyroid hormone related-protein (PTHrP) analog
- RANK ligand (RANKL) inhibitor
- Sclerostin inhibitor

Recommendations

Lifestyle

If you have osteoporosis, it's essential that you follow an alkaline diet, get regular exercise, and take high-quality multivitamin/mineral. For extra support, there are a few key nutrients that are especially important for treating osteoporosis naturally, as well as preventing it.

Natural Supplements for Treatments

- Calcium - fermented milk products provide calcium along with lactic acid
- Vitamin D - direct sunlight is one of the best sources
- Strontium - a trace mineral generally found along with calcium in foods
- X-Factor - this nutrient helps bones to absorb all the helpful dietary vitamins and minerals

Natural Treatments for Osteoporosis

- Nutrition - important part of eating healthy, balanced, diet
- Lifestyle Changes - important for optimizing bone health
- Exercise - strength or resistance training is recommended

Exercise

The BHOF strongly endorses physical activity at all ages, both for fracture prevention and overall fitness. In childhood and adolescence, consistent weight-bearing and high-impact activities contribute to acquisition of optimal peak bone mass. Weight-bearing exercises (in which bones and muscles work against gravity with feet and legs bearing body weight) include walking, jogging, tai chi, stair climbing, dancing, and tennis. Muscle-strengthening exercises include weight training and resistive exercises, such as yoga, Pilates, and boot camp calisthenics.

Follow-up

People with diagnosed cases of osteoporosis or at high risk for fracture should have regular bone mineral density tests. For patients eligible for Medicare, routine testing is allowed once every 2 years. The testing frequency can be increased to one year for patients who have rapidly progressing disease, those who are receiving or discontinuing medical therapy to restore bone mass, or have additional risk factors.

Table of Measurements Reported Per Vertebral Body

CaseID	ID of case
Vertebra Count	12
Has Fusion	True
Age	65
Sex	Male
Calibration Factor	0.985
Scanner	GE medical systems discovery
Kyphosis Cobb Angle Mao	69.5
Kyphosis Cobb Angle Atlas	78.6
MaxKhyCobbAtlas	78.6
Kyphosis Angle Offset	12.9
Scoliosis Cobb Angles Atlas	23.6
Max Scoliosis Cobb Atlas	23.6
Fracture type	Anterior-Wedge, Biconcave
Fracture ID	T1, T3
Fracture count	2

Table of Measurements Reported Per Vertebral Body (Cont'd)

CaseID	
TScore	-3.0
ZScore	-1.2
AvgBMD	100.6
AvgBMD_Category	3
AvgMean HU	74.3
AvgStd HU	70.3
Full CV	103.5
Trabecular CV	95.1
Full AvgStd HU	71.3
HU<20 Fat	3.6
70>HU>=20 Soft tissue	11.4
150>HU>=70 Soft bone	49.8
350>HU>=150 Hard bone	39.8
HU>=350 Hypercalcified bone	43.8

Table of Measurements and Data Reported Per Patient

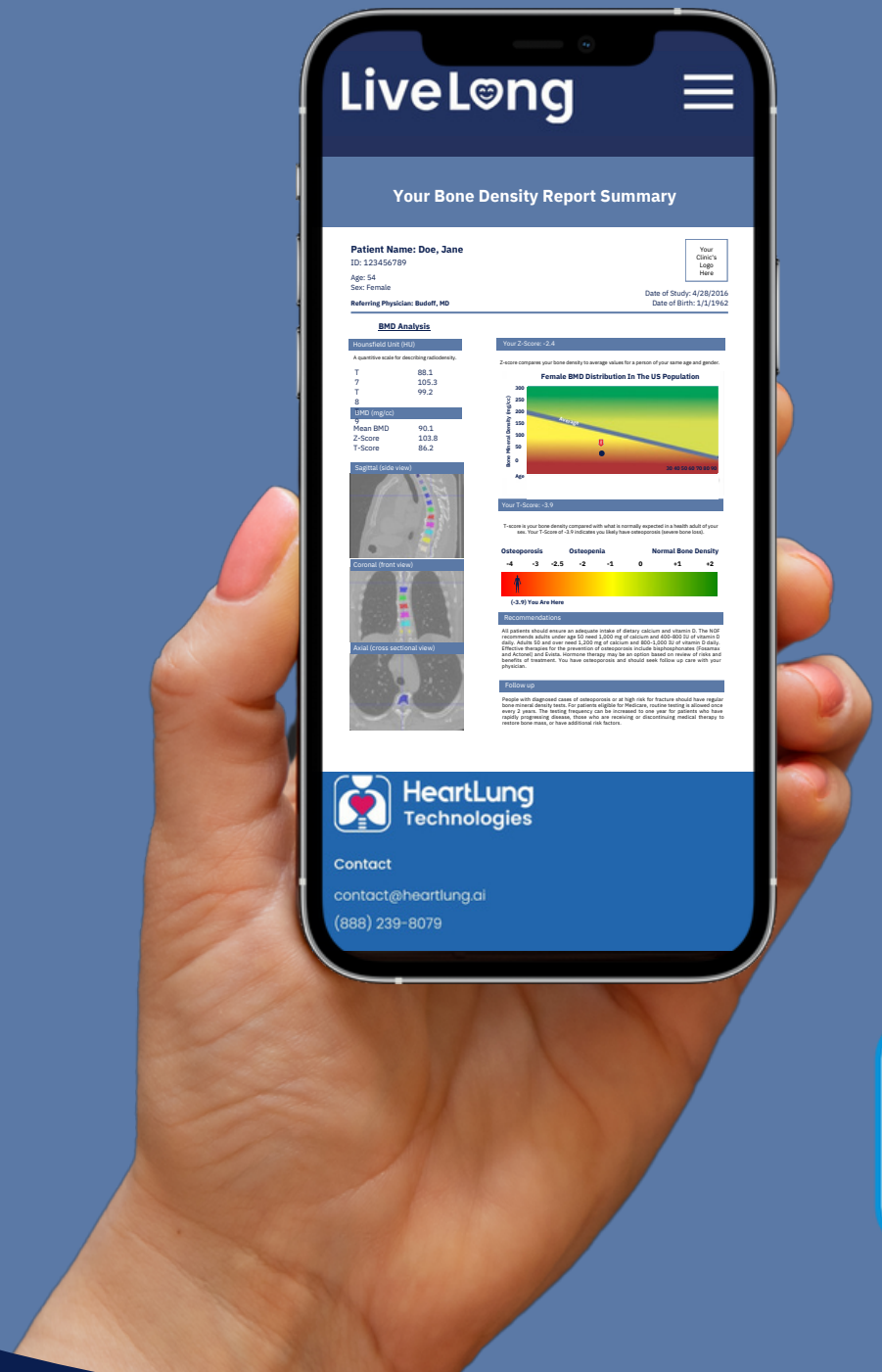
Measurements	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
BMD												
Mean HU												
Std HU												
CV (Std/Mean)												
HU<20(%)												
70>HU>20(%)												
150>HU>=70(%)												
350>HU>=150(%)												
HU>=350(%)												
Median HU												
Min HU												
Max HU												
Trabecular Volume												
Full Volume												
Height Anterior												
Height Midline												
Height Posterior												
Height Minimum												
Height Maximum												
Ant Height Loss												
Post Height Loss												

How HeartLung™ App Works

Step 1: Download Our App

Step 2: Register To Complete Profile

Step 3: View Your Patient Report



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