
dutch®

Cracking the Code: Bone Loss, Hormones & Healthspan

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FAAMM, AOBOS, ABAARM

Date: September 24, 2025
DUTCH Labs

Webinar Overview

- Explore bone loss as an early clinical signal of broader metabolic or hormonal dysfunction.
- Understand how hormone imbalances—especially estrogen, testosterone, and cortisol—can accelerate bone loss.
- Learn how DUTCH testing provides actionable insights into hormone production, metabolism, and detox pathways.
- Review clinical patterns where bone loss has revealed underlying hormone dysregulation.
- Discuss how to integrate DUTCH results into personalized protocols for both hormone and bone optimization.

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DOUG LUCAS, DO, FAAMM

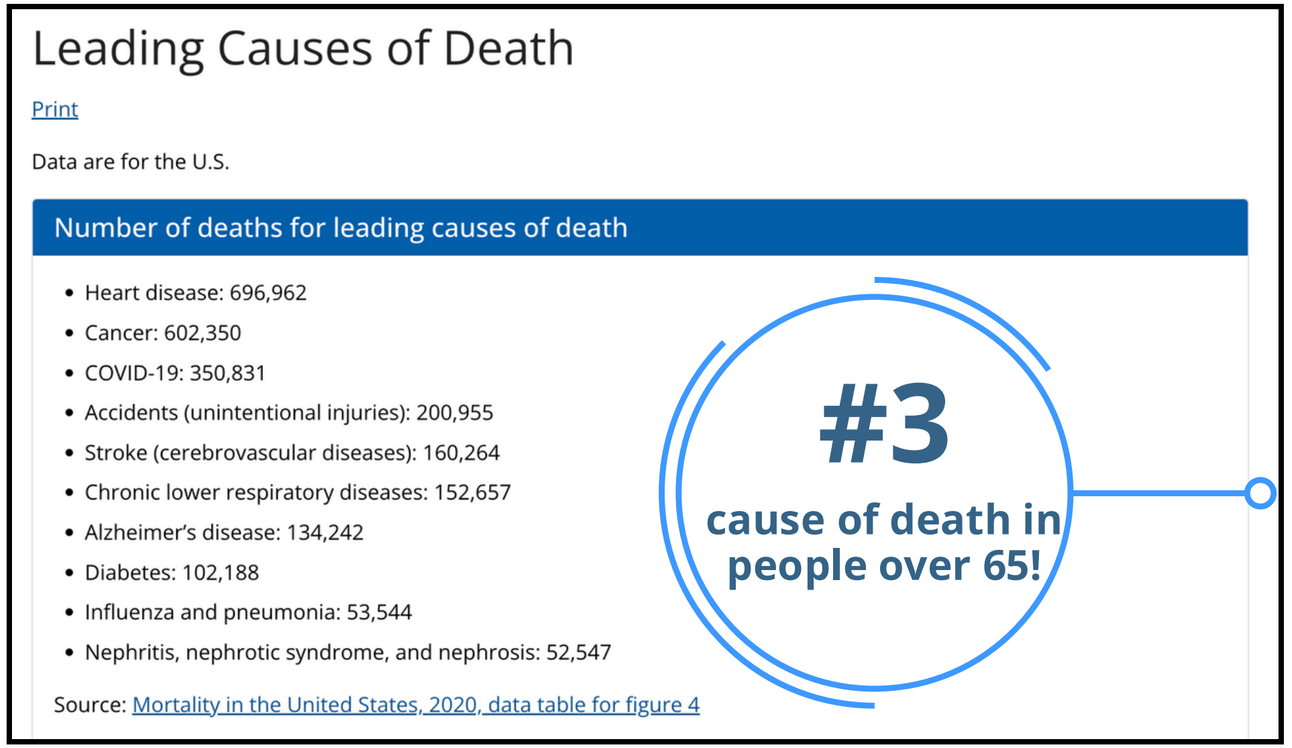
- Board Certified Orthopedic Surgeon
- Board Certified in Anti-Aging and Regenerative Medicine
- Fellow Anti-Aging and Metabolic Medicine

- Founder
  - **The OsteoCollective**
- VP of Women's Health, Hormone and Lifestyle Optimization at **LifeMD**

Why Early Detection Matters

- 20% of women and 30% of men will DIE within 12 months
- 30% will lose independence and require full-time care
- 30% regain independence

Hip Fracture Stats



Falls/Fragility Fractures #3 Cause of Death >65

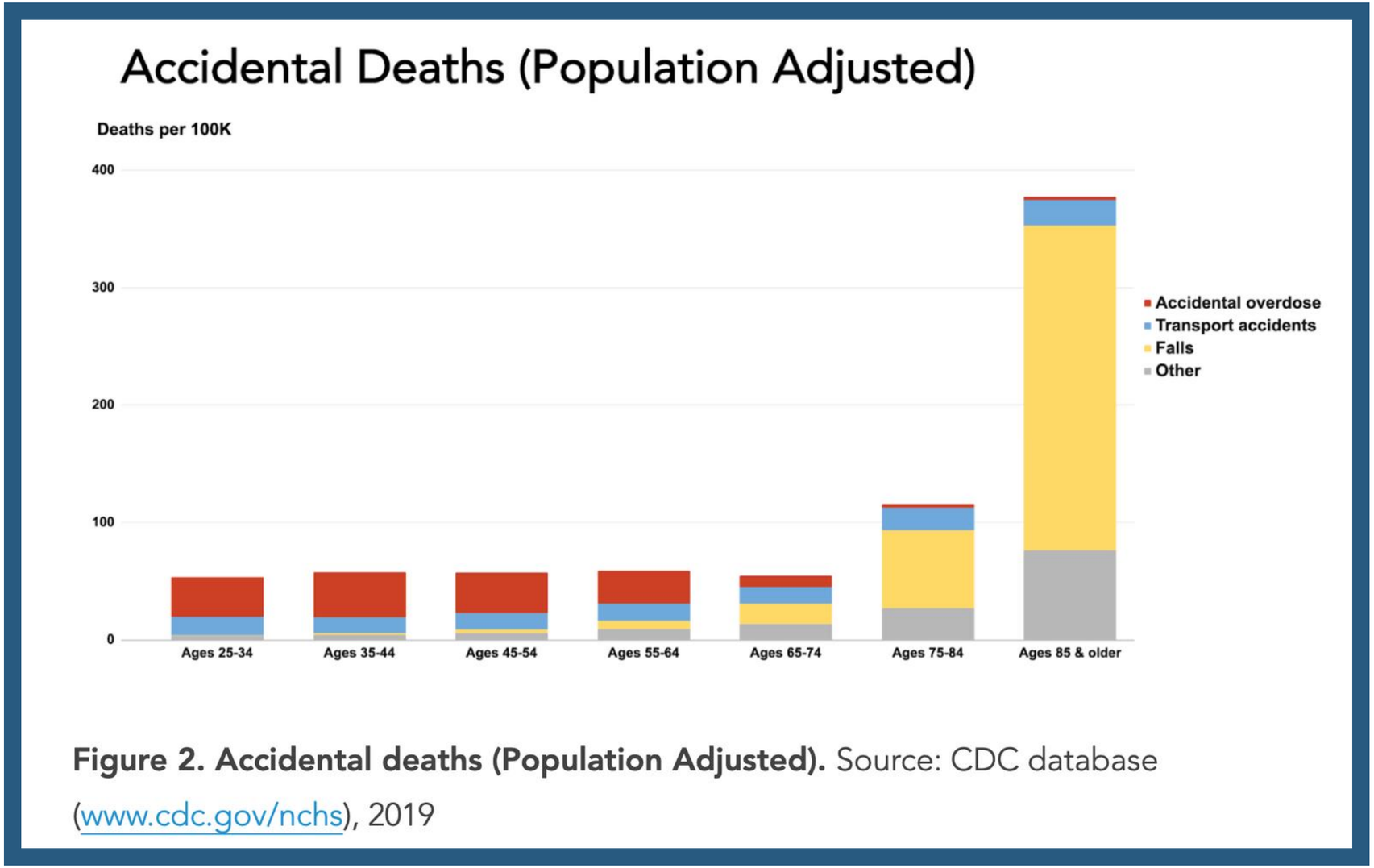
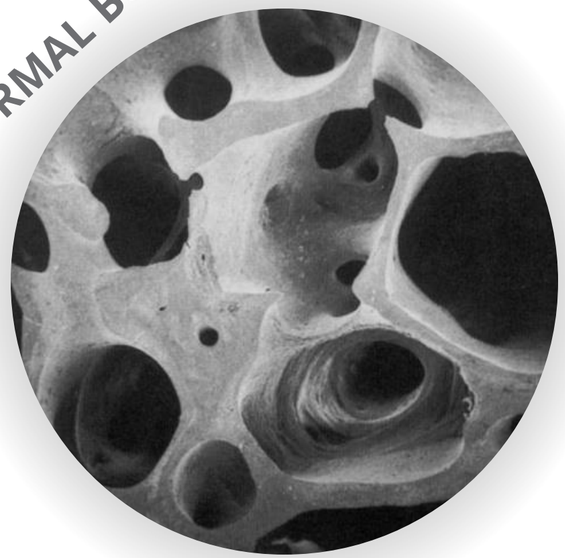


Figure 2. Accidental deaths (Population Adjusted). Source: CDC database (www.cdc.gov/nchs), 2019

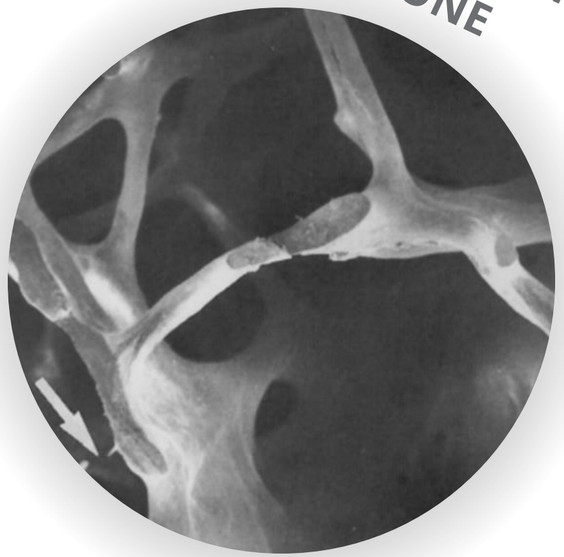
What is Osteoporosis

Imbalance of Bone Metabolism

NORMAL BONE

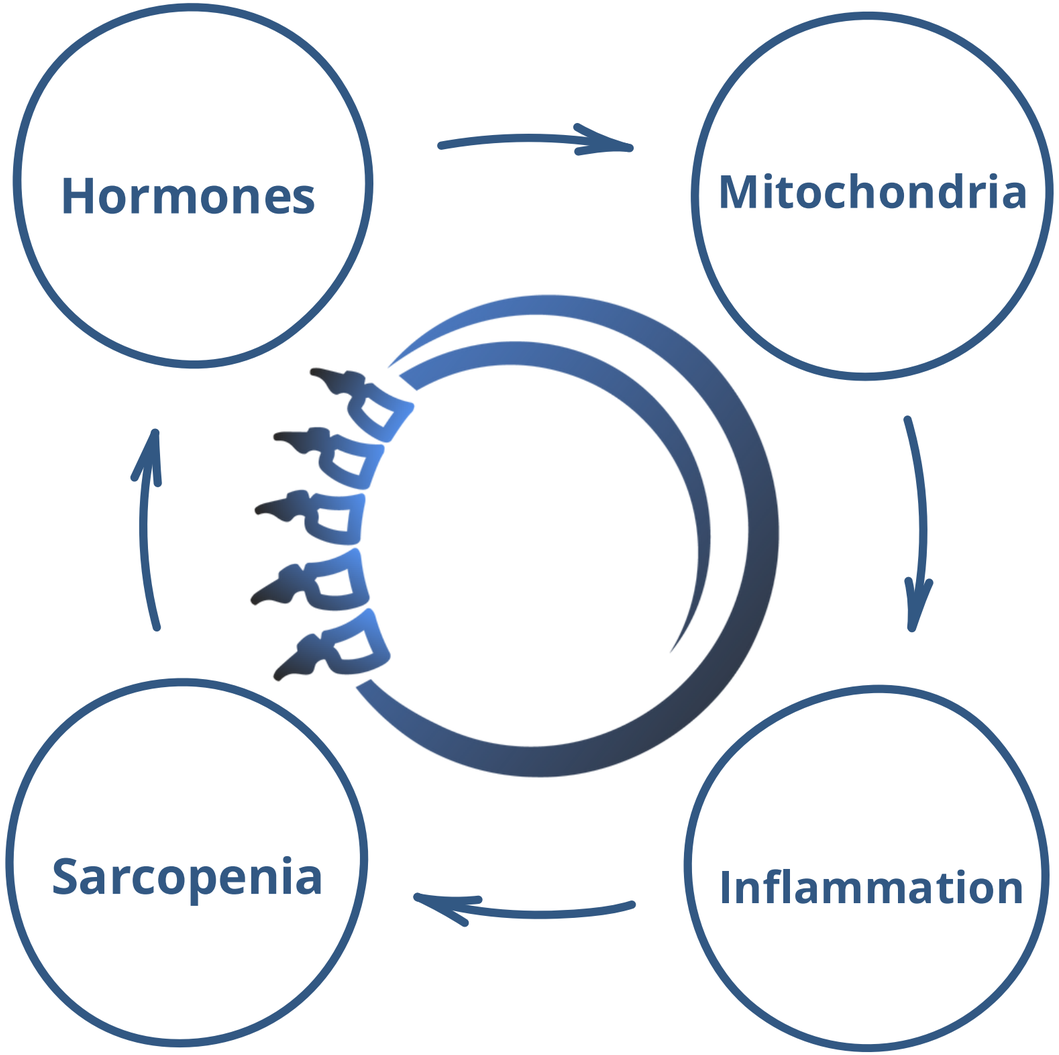


OSTEOPOROTIC BONE



The Big Picture

When your skeleton is suffering,
so is everything else.



Bone Health is a BIOMARKER of HealthSpan

What to Watch for Beyond the DEXA Score

- Persistent fatigue and weight fluctuations
- Slower recovery from exercise
- Sleep disturbances, mood shifts, or cognitive changes
- Reduced muscle mass and strength

Hormonal Links to Early Bone Loss

- ↓ Estrogen
- ↓ Testosterone / DHEA
- Cortisol dysregulation
- Irregular cycles

How Hormones Direct Bone Remodeling

ESTRADIOL

- ↓ Osteoclast Function
- ↓ C-Telopeptide

TESTOSTERONE

- ↑ Osteoblast Function
- ↑ P1NP
- ↑ Muscle Mass
- ↑ Energy

PROGESTERONE

- ↑ Osteoblast Proliferation
- ↑ P1NP
- ↑ Sleep
- ⚖ Estrogen

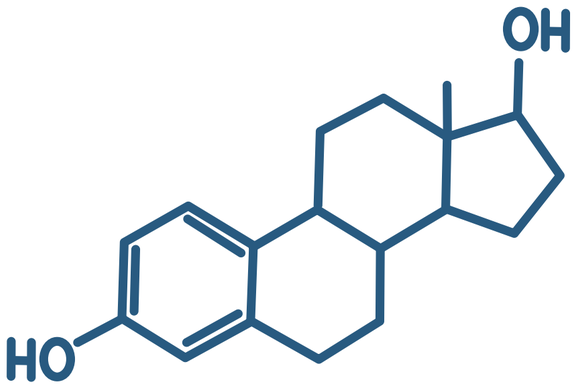
Every 1 SD Drop in BMD = 1.5–2x Increased Mortality Risk

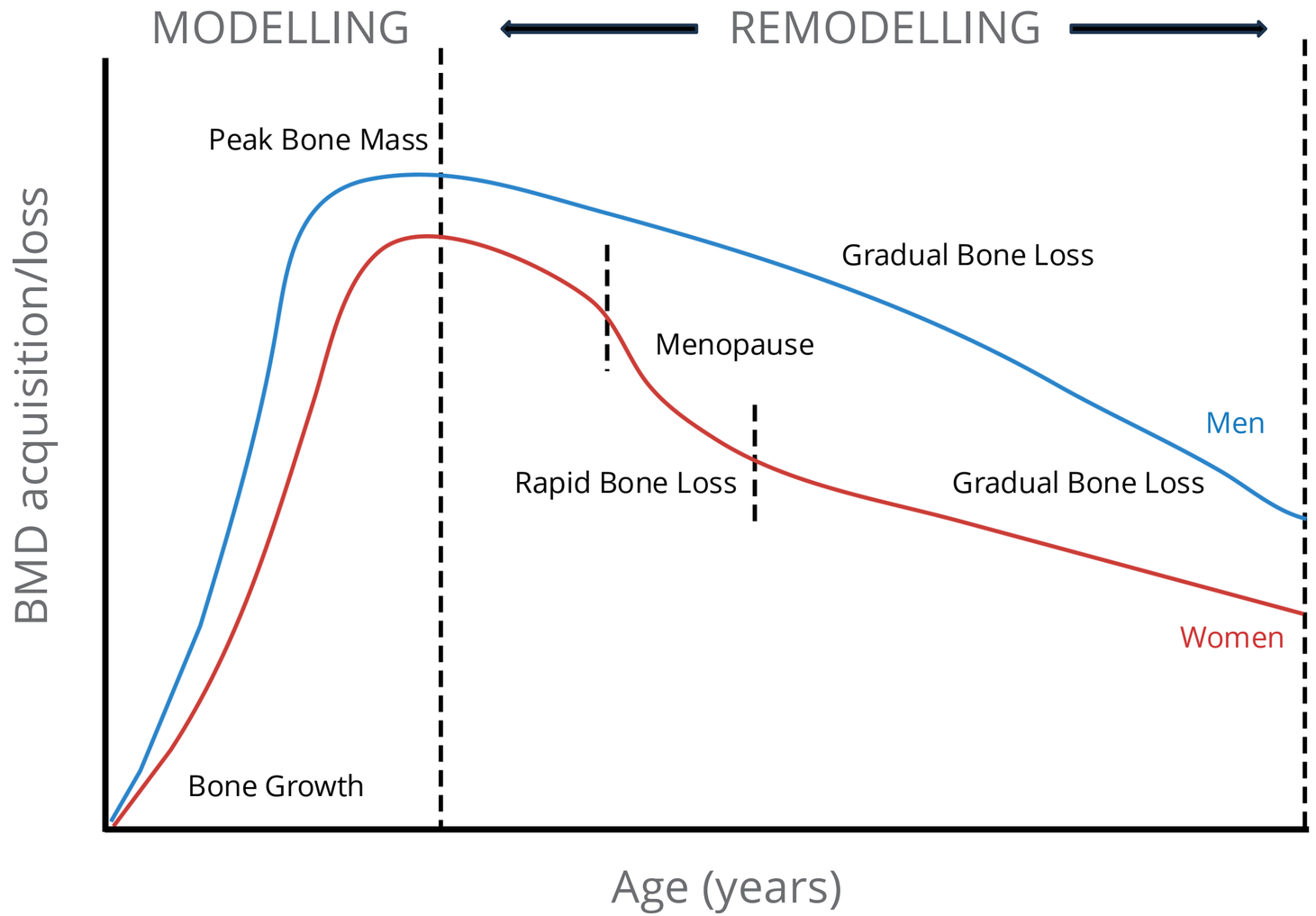
Bone Loss Begins Earlier Than You Think—Age 30–35

Bone loss starts in 30s - 40s in both men and women!

Peak bone mass occurs in EARLY Adulthood

Estrogen’s Role in Bone Protection



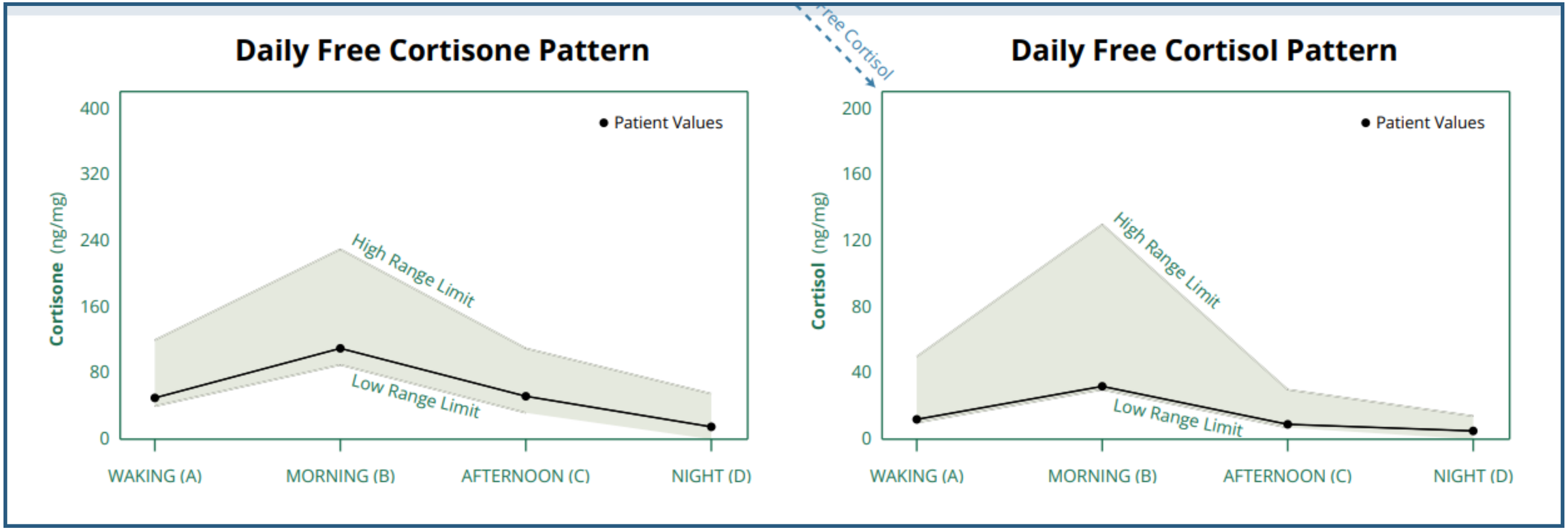


Testosterone’s Role in Strength

- Stimulates osteoblast activity (bone-building cells).
- Maintains muscle mass → reduces fracture risk.
- Low levels increase frailty and impair recovery from bone loss.

Cortisol's Role in Bone Loss

- Chronic excess = suppressed bone formation + increased breakdown.
- Flattens circadian rhythm → poor repair during sleep.
- Linked to stress, inflammation, overtraining, poor recovery.



The Perfect Storm: When Multiple Hormones Are Out of Balance

- Low estrogen → accelerated breakdown.
- Low testosterone → reduced bone rebuilding.
- High cortisol → ongoing damage and poor repair.
- Together, they create rapid, hard-to-reverse bone loss.

ESTRADIOL

- ↓ Osteoclast Function
- ↓ C-Telopeptide

TESTOSTERONE

- ↑ Osteoblast Function
- ↑ P1NP
- ↑ Muscle Mass
- ↑ Energy

PROGESTERONE

- ↑ Osteoblast Proliferation
- ↑ P1NP
- ↑ Sleep
- Estrogen

Why This Matters for Clinical Practice

HORMONE HEALTH = BONE HEALTH

- Identifying these imbalances early changes the trajectory.
- Lab mapping (including **DUTCH**) reveals patterns serum tests miss.
- Optimizing hormones improves bone, muscle, and longevity outcomes.

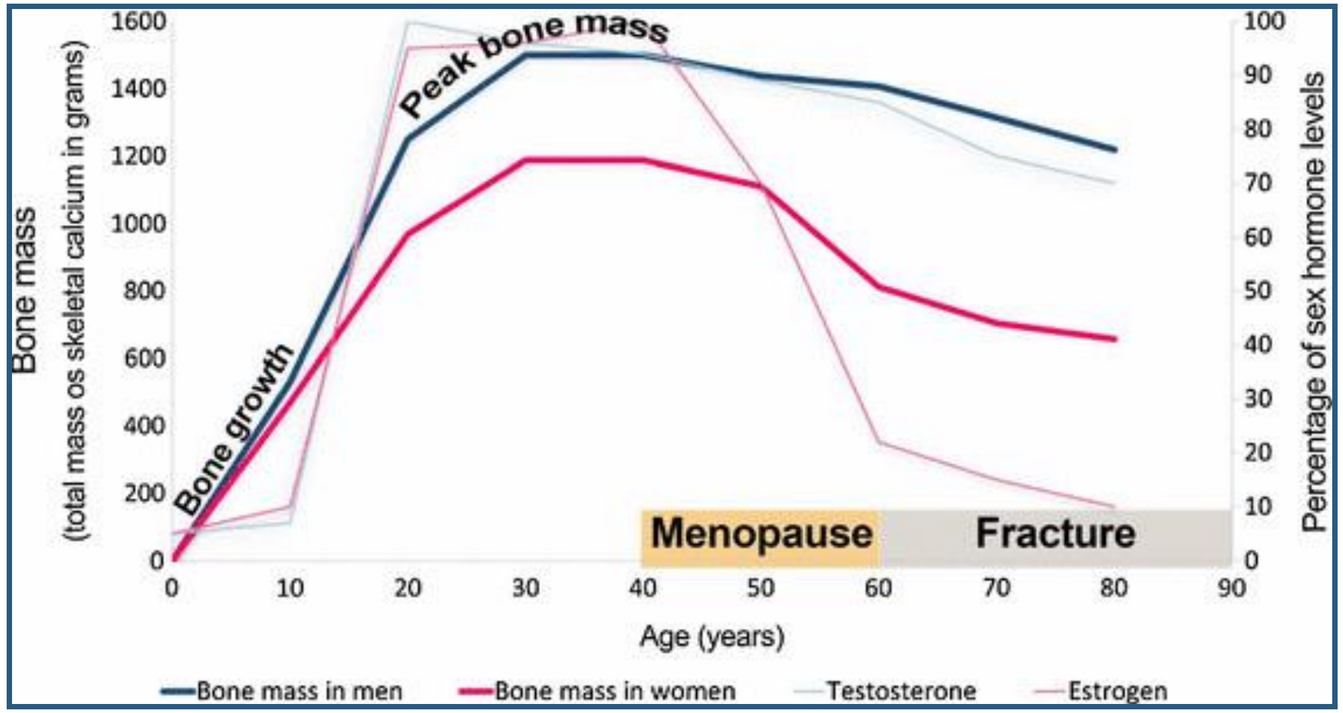
DUTCH Test: Insights into Hormones, Metabolism & Detox

From Bone Loss to Root Cause

- Bone loss = symptom disease
- Hormonal dysregulation = Bone Loss
- Early detection = targeted intervention

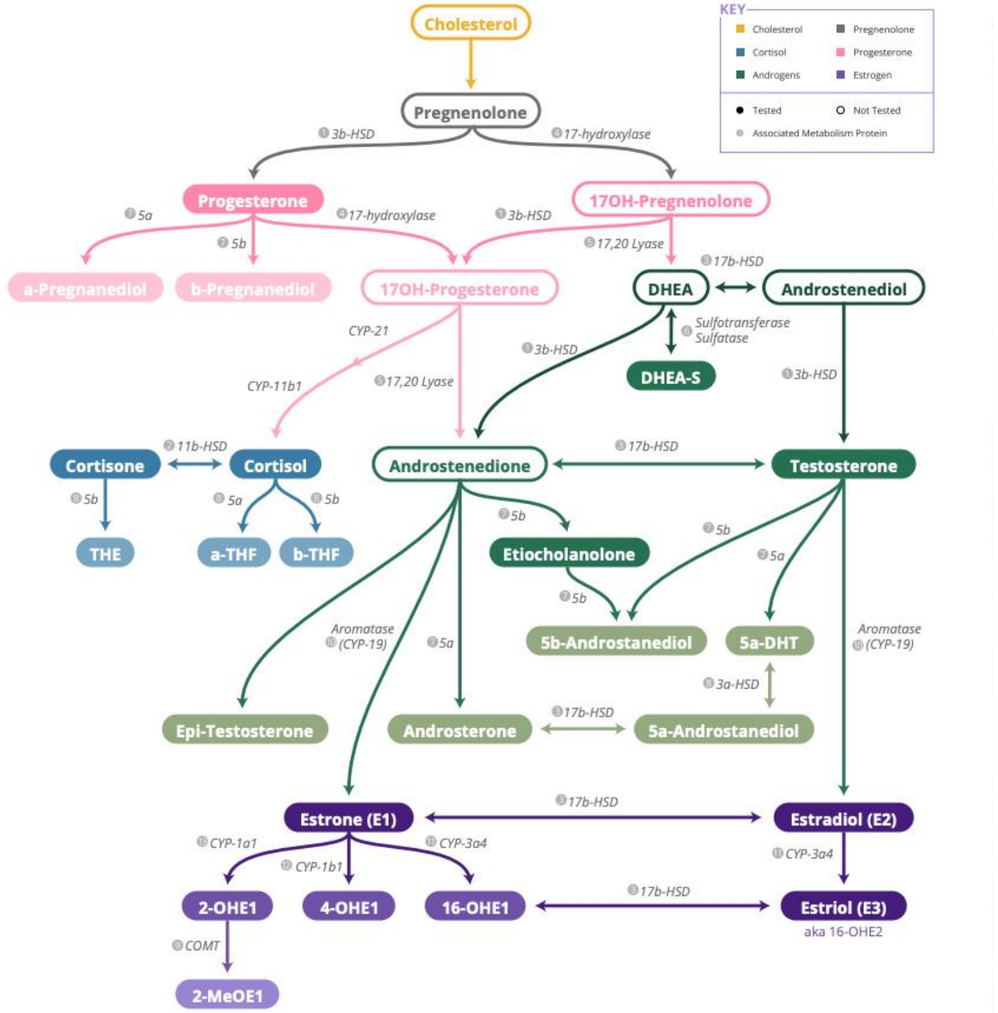
Hormones Most Commonly Involved

- **Estrogen & Progesterone** – protect bone density, regulate turnover.
- **Testosterone** – supports muscle mass, strength, and bone formation.
- **Cortisol** – chronic elevation accelerates bone breakdown.
- **DHEA** – precursor to sex hormones, declines with age.
- **Melatonin** – influences bone formation and sleep quality for recovery.



How DUTCH Testing Bridges the Gap

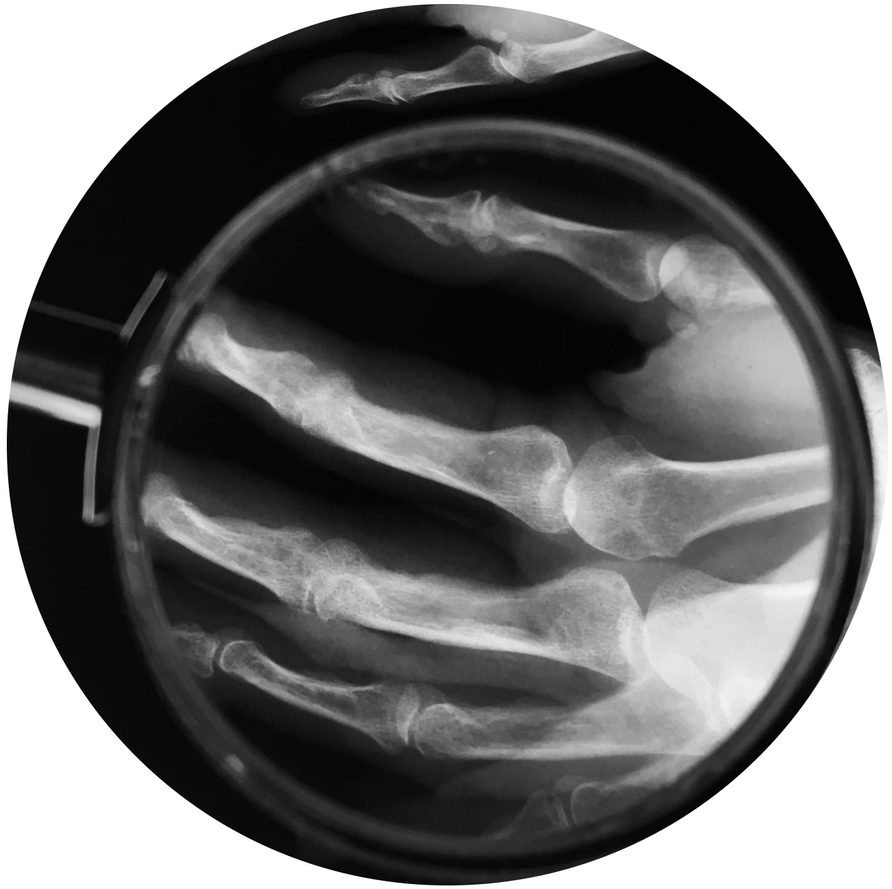
- Comprehensive view of hormones & metabolites
- Insights missed by single serum tests
- Estrogen detox & bone-health pathways
- Cortisol rhythm mapping for stress-related bone loss



Clinical patterns where bone loss has revealed underlying hormone dysregulation.

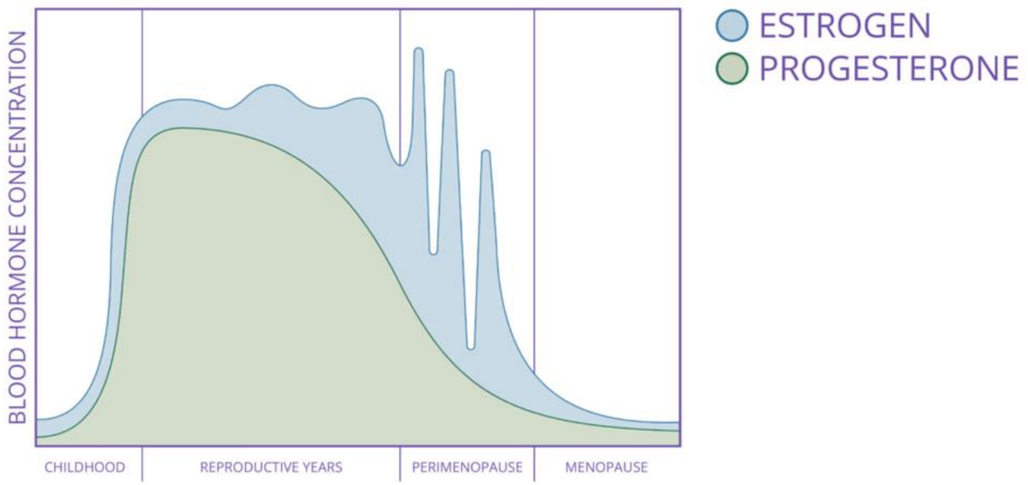
Bone Loss as a Clue

- Bone loss is rarely just about calcium or vitamin D.
- Often the first visible clue of an endocrine imbalance.
- Recognizing patterns helps uncover the root cause faster.

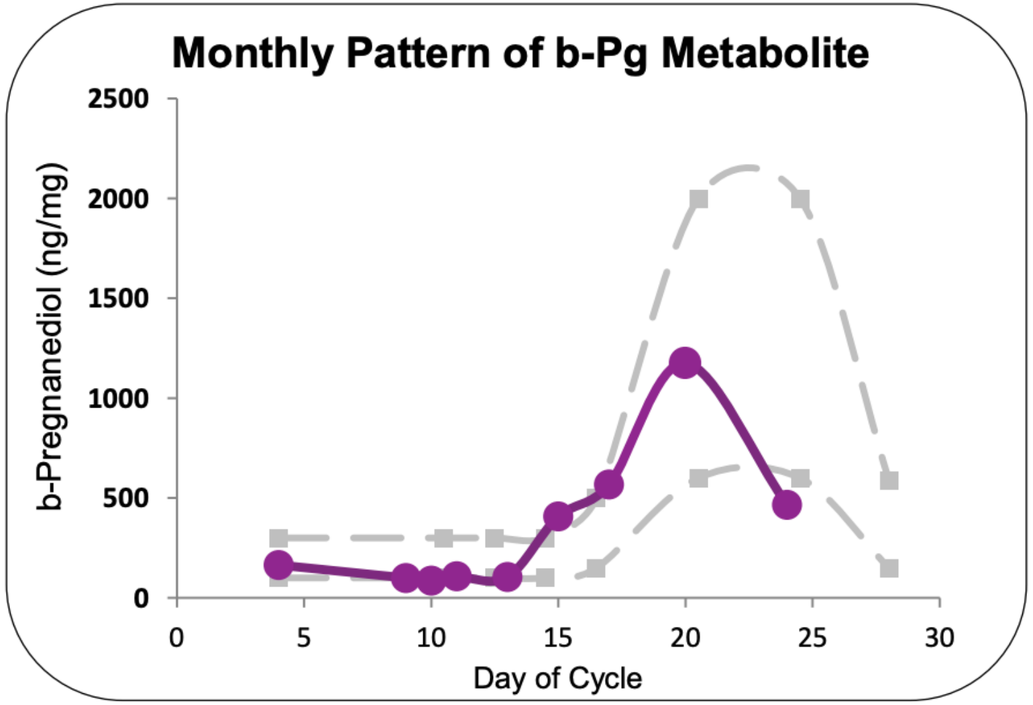


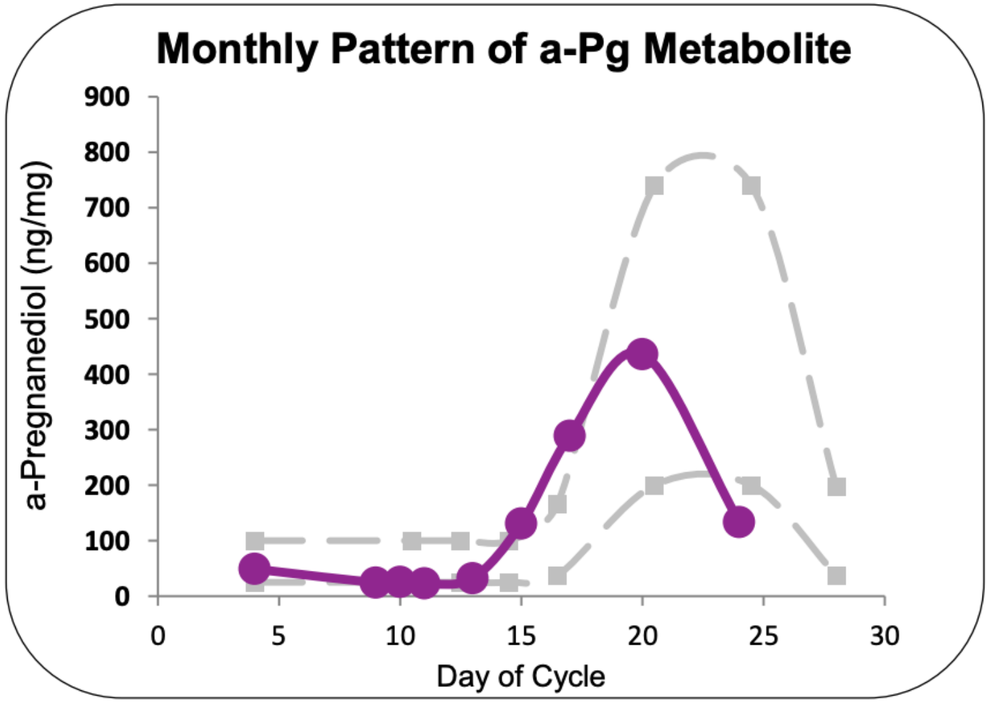
Pattern #1: Estrogen Deficiency

- Rapid BMD decline (1–5 years post-menopause)
- Often with hot flashes, poor sleep, and mood shifts
- Earlier onset with hysterectomy or ovarian removal



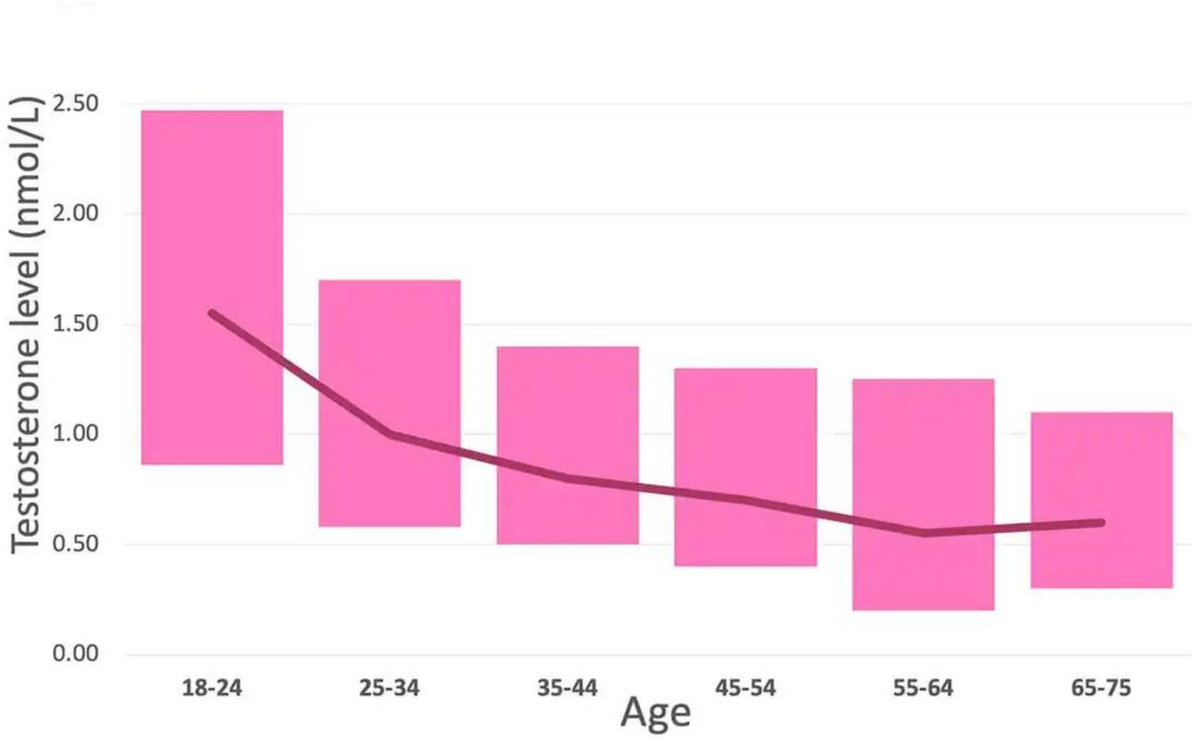
Pattern #2: Progesterone Decline





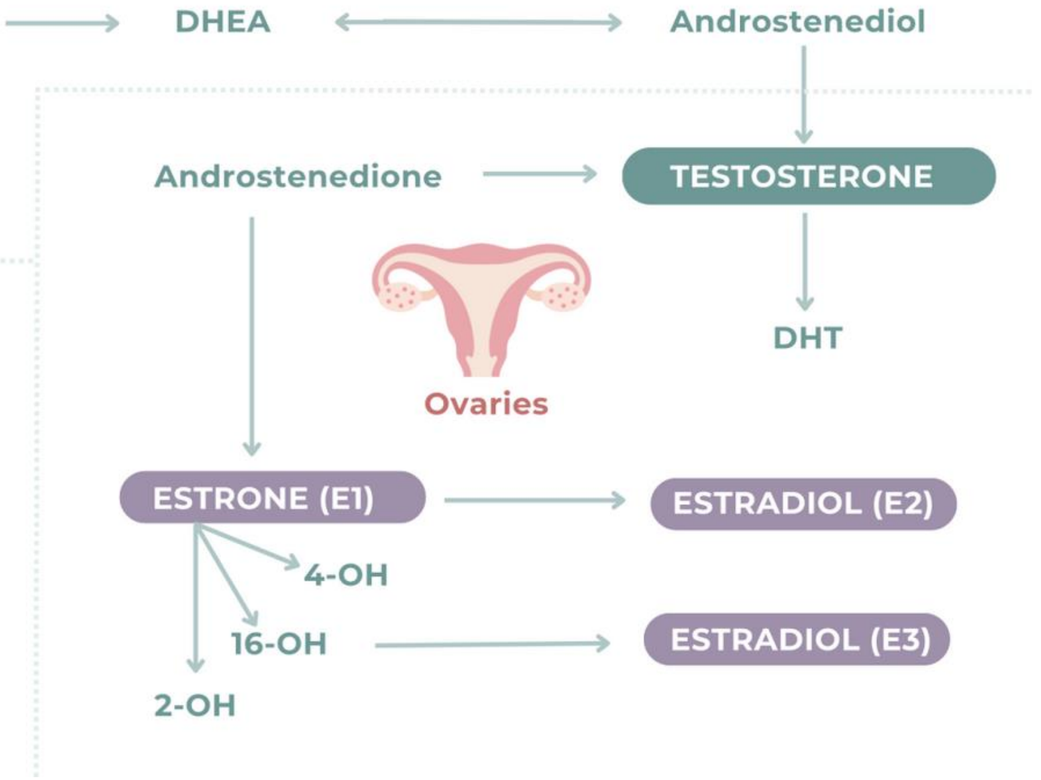
Pattern #3: Low Testosterone / DHEA

- Reduced anabolic stimulus → weaker muscles and bones.
- Seen in both men & women with adrenal fatigue, aging, or chronic illness.
- Linked to fatigue, low motivation, and reduced exercise tolerance.



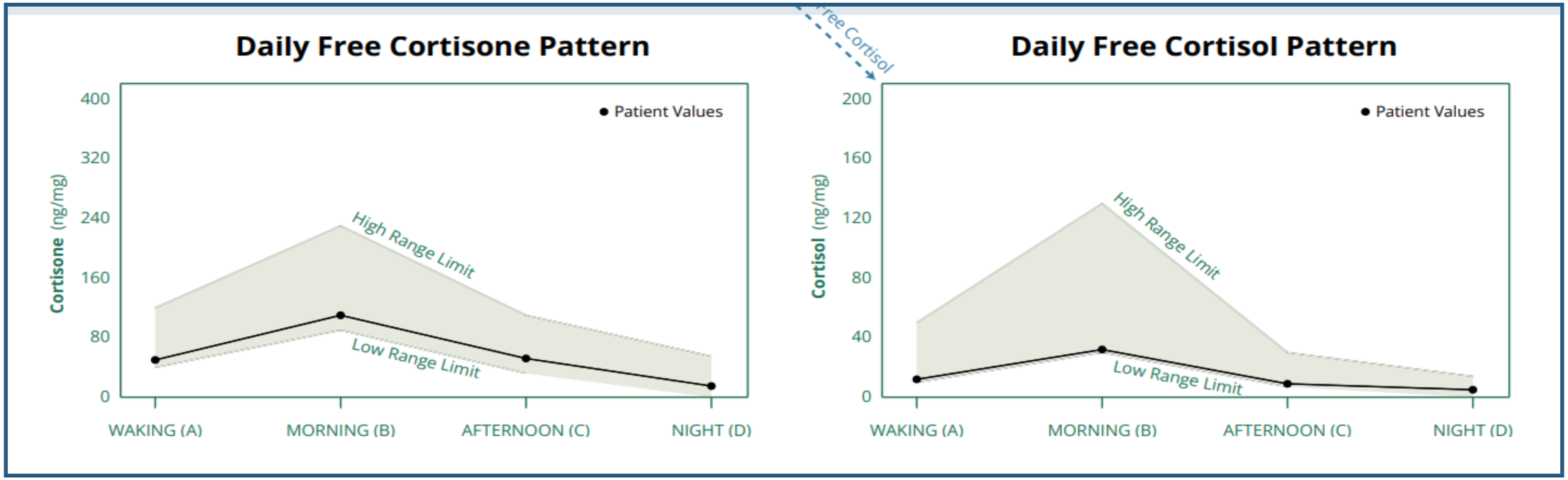
Using DUTCH for Testosterone in Non-Treated Women

- Serum may look “normal,” but symptoms remain
- DUTCH shows free & metabolized testosterone patterns
- Guides non-HRT strategies: training, DHEA, nutrition



Pattern #4: Cortisol Dysregulation

- Chronic high cortisol → accelerates bone resorption.
- Flattened curve → poor repair during sleep.
- Signs: abdominal fat gain, poor recovery, frequent illness.

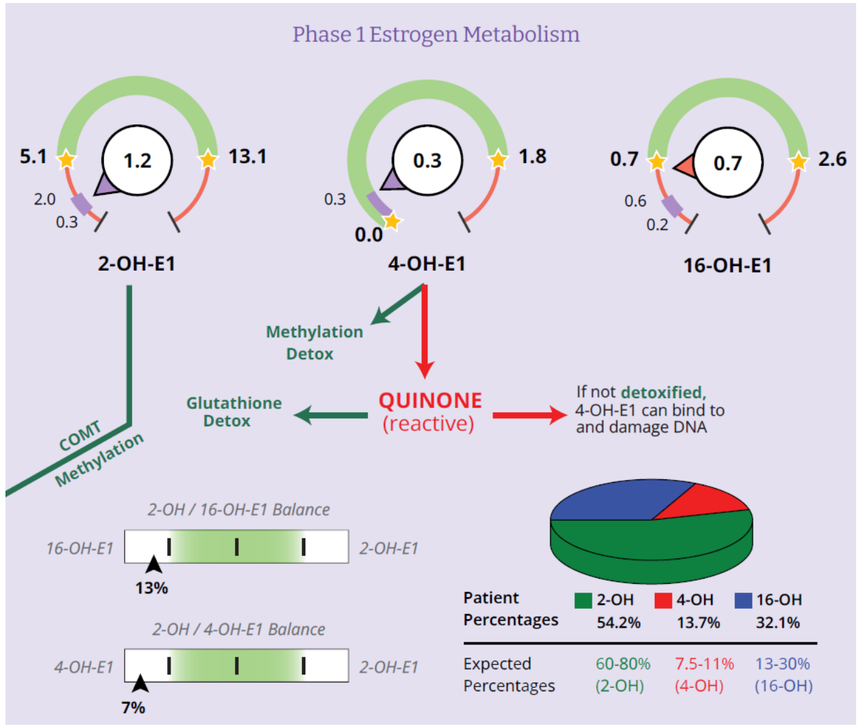


Treatment Considerations for Cortisol Dysregulation

- **High cortisol**: Stress management, adaptogens (ashwagandha, rhodiola, L-theanine), sleep optimization.
- **Low cortisol**: Support with licorice root, morning light, stable blood sugar.
- Always pair with lifestyle & recovery strategies.

Pattern #5: Estrogen Detox Pathway Imbalance

- Unfavorable estrogen metabolites may impair bone benefits.
- Possible higher inflammatory load, oxidative stress.
- Often invisible in serum — revealed by DUTCH.

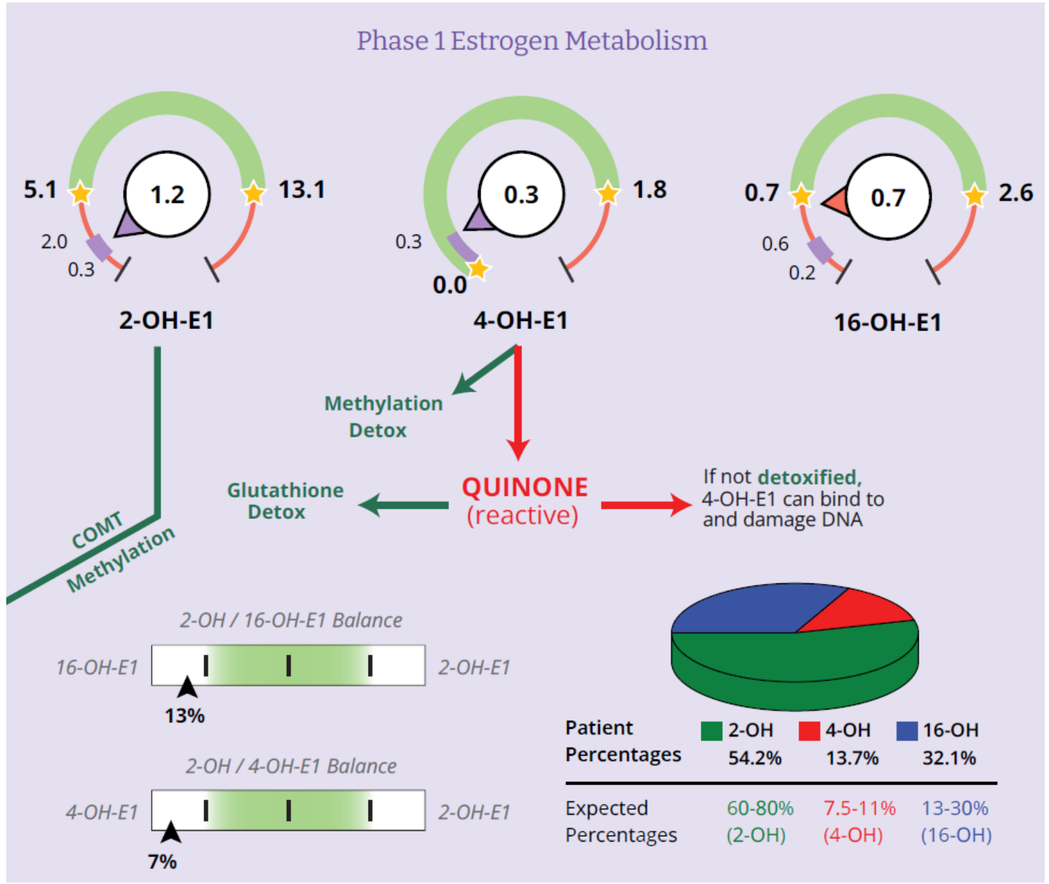


Why These Patterns Matter for Bone Health

- Guides targeted hormone testing
- Distinguishes primary vs. secondary bone loss
- Directs treatment for bone & overall longevity
- Focus: promote 2-OH estrogen metabolism + safe Phase 2 clearance

What We Do When Phase 1 Detox Is Overloaded

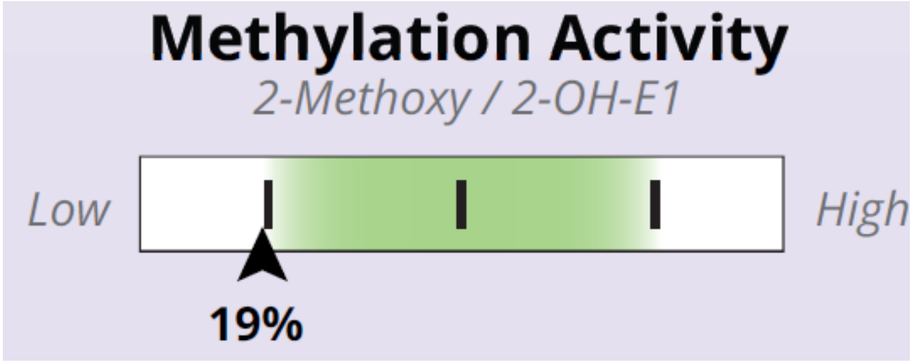
- **Signs of overload:**
  - High 4-OH, 16-OH estrogen metabolites, oxidative stress symptoms.
- **Strategy:**
  - Support antioxidants (e.g., glutathione, NAC, sulforaphane), reduce toxin load, and balance iron/copper.



What We Do When Phase 2 Detox Is Overloaded

Signs: Methylation issues, COMT/SAMe deficiency, sluggish glucuronidation.

Strategy: Support with methyl donors (B12, folate, betaine), magnesium, calcium-D-glucarate.



What Do We Look For

- Maps Phase 1 balance: 2-OH, 4-OH, 16-OH
- Methylation/adduct markers assess Phase 2
- Serum labs confirm oxidative stress & methylation status

BHRT for Bone Health

- Topical Estrogen
  - Increased BMD 3-4% (1)
- Oral Estrogen
  - Reduced Fracture Risk 41% (2)
- Oral Progesterone (3)
  - Increases Osteoblast Differentiation
- Topical Testosterone
  - Increases strength/mass and BMD

1. Abdi F, Mobedi H, Bayat F, Mosaffa N, Dolatian M, Ramezani Tehrani F. The Effects of Transdermal Estrogen Delivery on Bone Mineral Density in Postmenopausal Women: A Meta-analysis. Iran J Pharm Res. 2017 Winter;16(1):380-389. PMID: 28496491; PMCID: PMC5423263.
2. (2004). Effects of Conjugated Equine Estrogen in Postmenopausal Women With Hysterectomy. JAMA, 291(14), 1701-1712.
3. Seifert-Klauss V, Prior JC. Progesterone and bone: actions promoting bone health in women. J Osteoporos. 2010 Oct 31;2010:845180. doi: 10.4061/2010/845180. PMID: 21052538; PMCID: PMC2968416.

How to integrate DUTCH results into personalized protocols for both hormone and bone optimization.

A CASE STUDY REVIEW

Success Story – 52 Year Old Female- 3-year data

	Region	Exam Date	Age	BMD (g/cm^3)	T-score	BMD Change vs. Base	BMD Change vs. Pre
1	AP Spine (L1-L4)	08/15/2025	54	0.84	-1.9	17.0%	2.5%
2	AP Spine (L1-L4)	08/13/2024	53	0.82	-2.1	14.1%	18.7%
3	AP Spine (L1-L4)	08/07/2023	52	0.69	-3.2	-3.9%	-3.9%
4	AP Spine (L1-L4)	07/29/2022	51	0.718	-3.0		
5	Total Hip (Left)	08/15/2025	54	0.842	-0.8	11.7%	1.5%
6	Total Hip (Left)	08/13/2024	53	0.829	-0.9	10.0%	3.6%
7	Total Hip (Left)	08/07/2023	52	0.799	-1.2	6.0%	6.0%
8	Total Hip (Left)	07/29/2022	51	0.753	-1.5		
9	Femoral Neck (Left)	08/15/2025	54	0.701	-1.3	11.8%	6.0%
10	Femoral Neck (Left)	08/13/2024	53	0.681	-1.7	5.5%	-1.7%

Turning Results Into Action

Patient Background

- 62-year-old postmenopausal woman with osteoporosis (REMS scan confirming low bone quality).
- Initiated on BHRT but experienced difficult side effects (symptoms suggestive of poor estrogen/progesterone balance and detox pathway overload).
- Goal: Optimize hormones for symptom relief and long-term bone protection.

DHEA-Sulfate

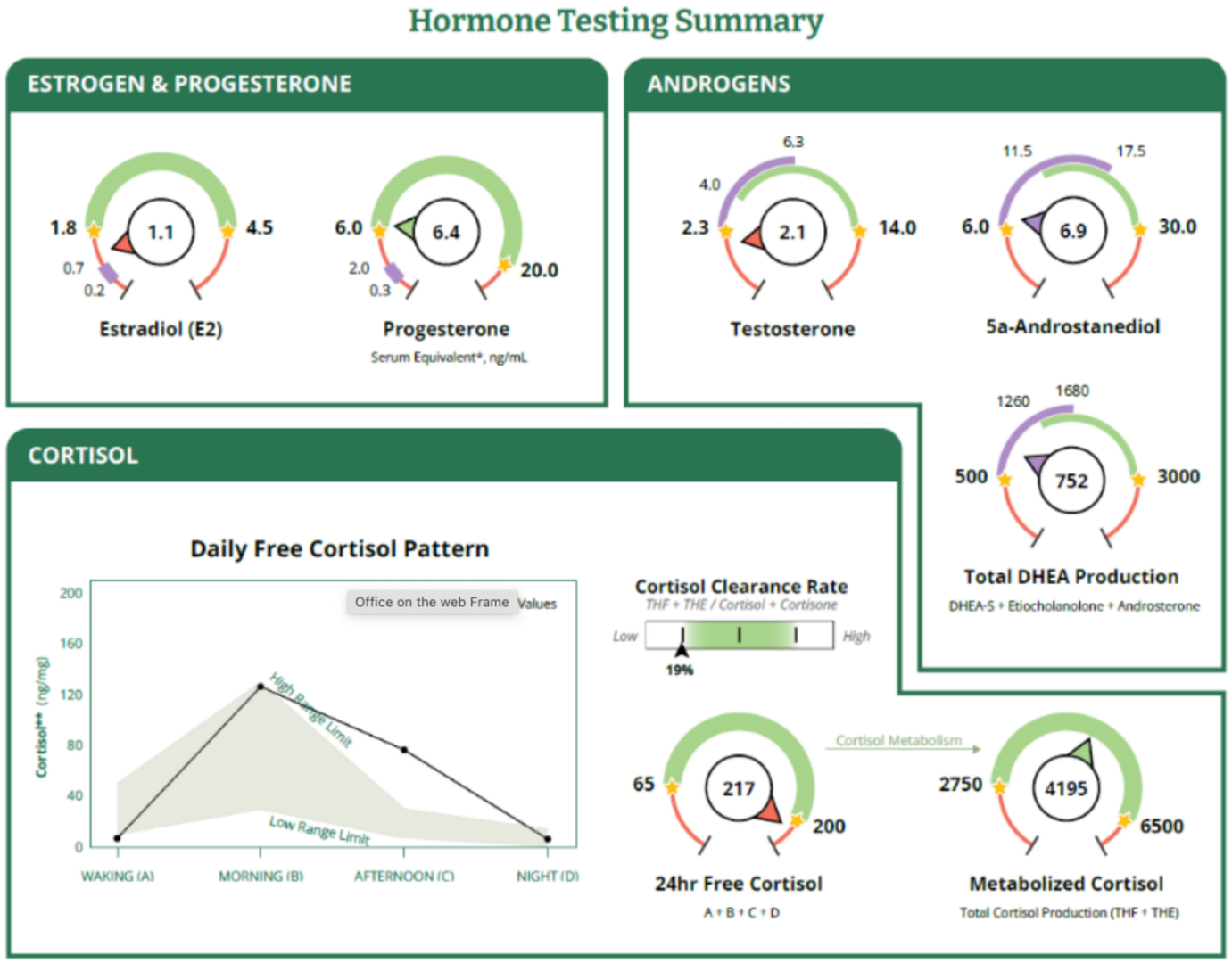
Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
DHEA-Sulfate [01]	102.0		ug/dL	29.4-220.5

Estradiol

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Estradiol [01]	<5.0		pg/mL	0.0-54.7
		Adult Female	Range	
		Follicular phase	12.5 - 166.0	
		Ovulation phase	85.8 - 498.0	
		Luteal phase	43.8 - 211.0	
		Postmenopausal	<6.0 - 54.7	
		Pregnancy		
		1st trimester	215.0 - >4300.0	
	Roche ECLIA methodology			

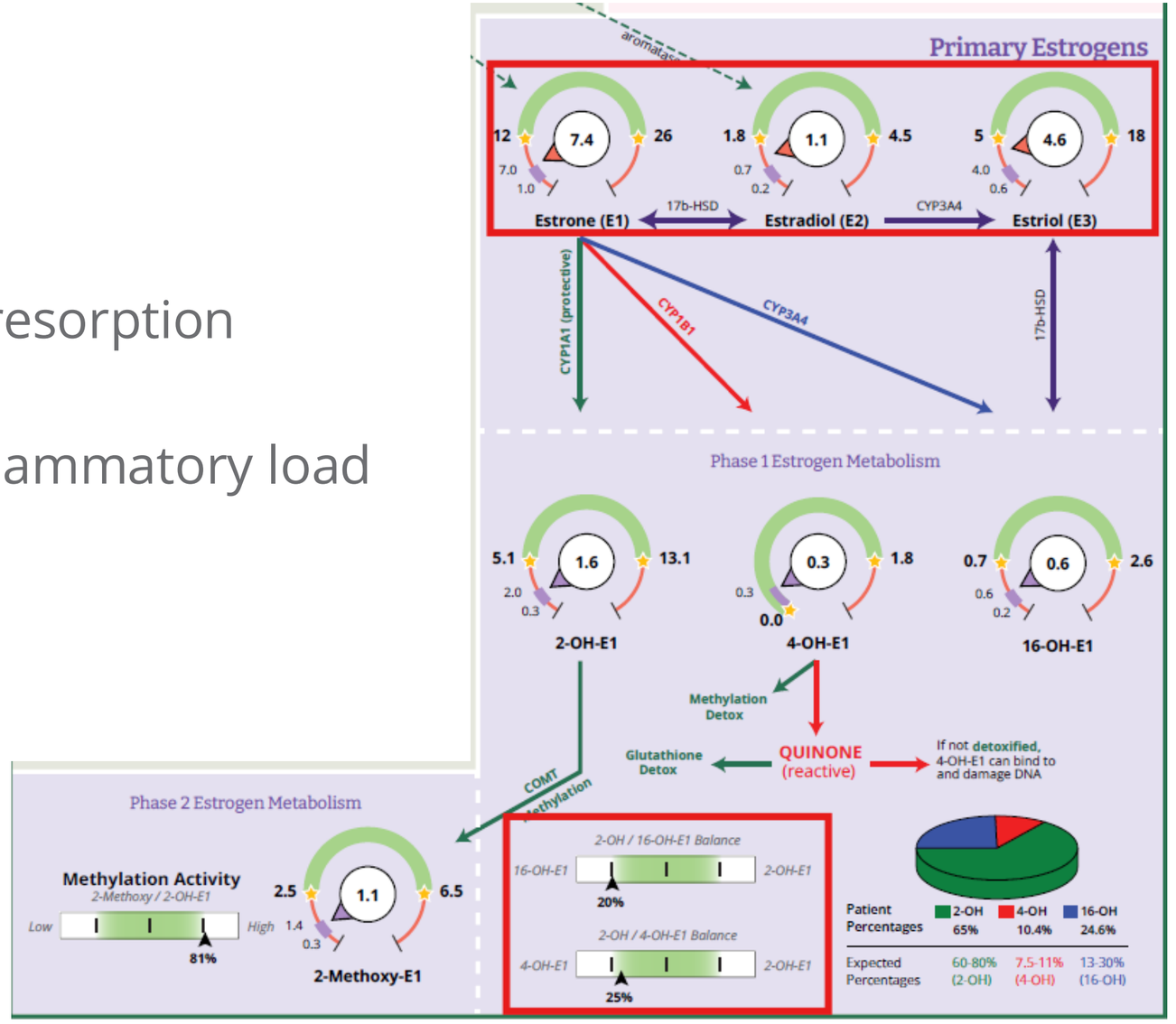
Step 1: Map Hormonal Status

- Sex hormones: estrogen, progesterone, testosterone, DHEA
- Cortisol rhythm: daily energy & stress response
- Metabolites: estrogen detox & androgen metabolism
- Melatonin: sleep recovery & bone formation signal



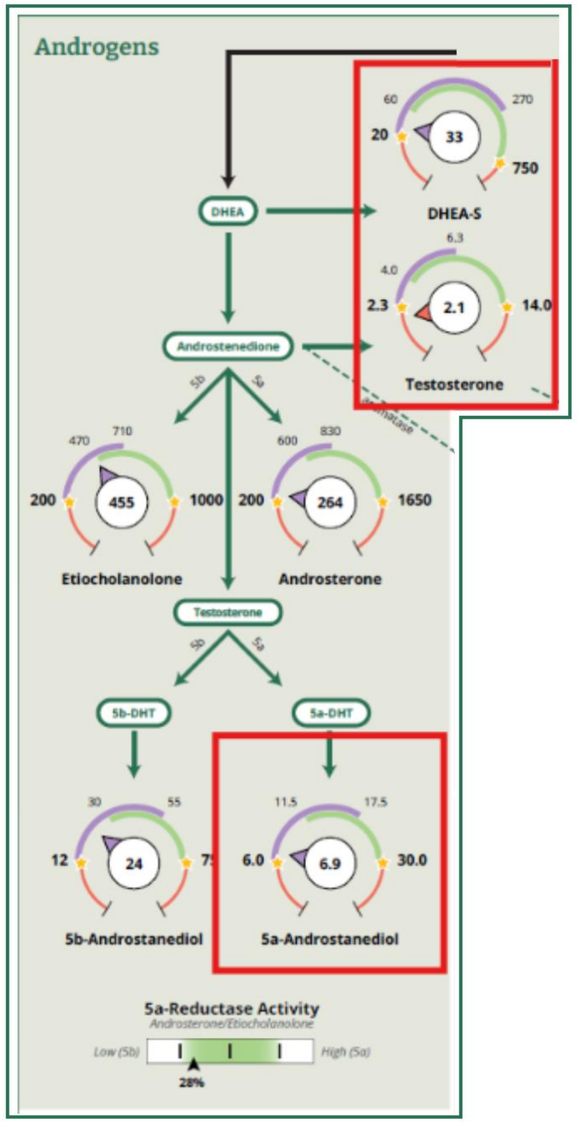
Step 2: Match Findings to Bone Health Drivers

- Low estrogen → ↑ bone resorption
- Detox imbalance → ↑ inflammatory load



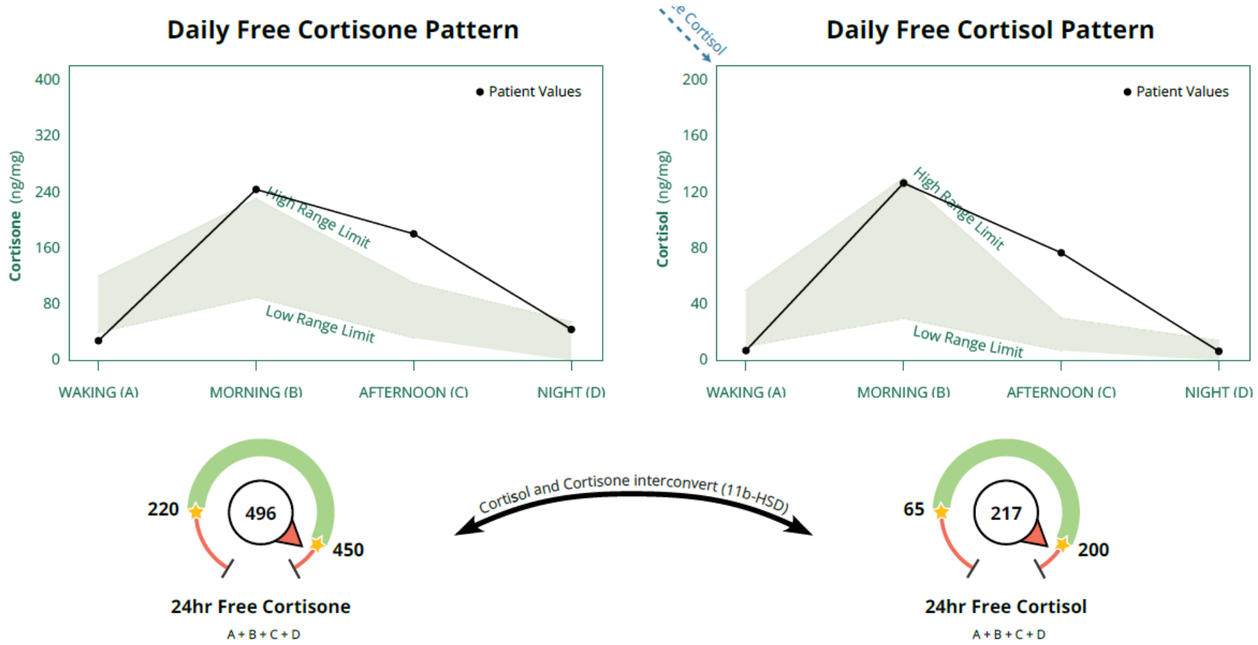
Step 2: Match Findings to Bone Health Drivers

- Low androgens → ↓ muscle support for bone



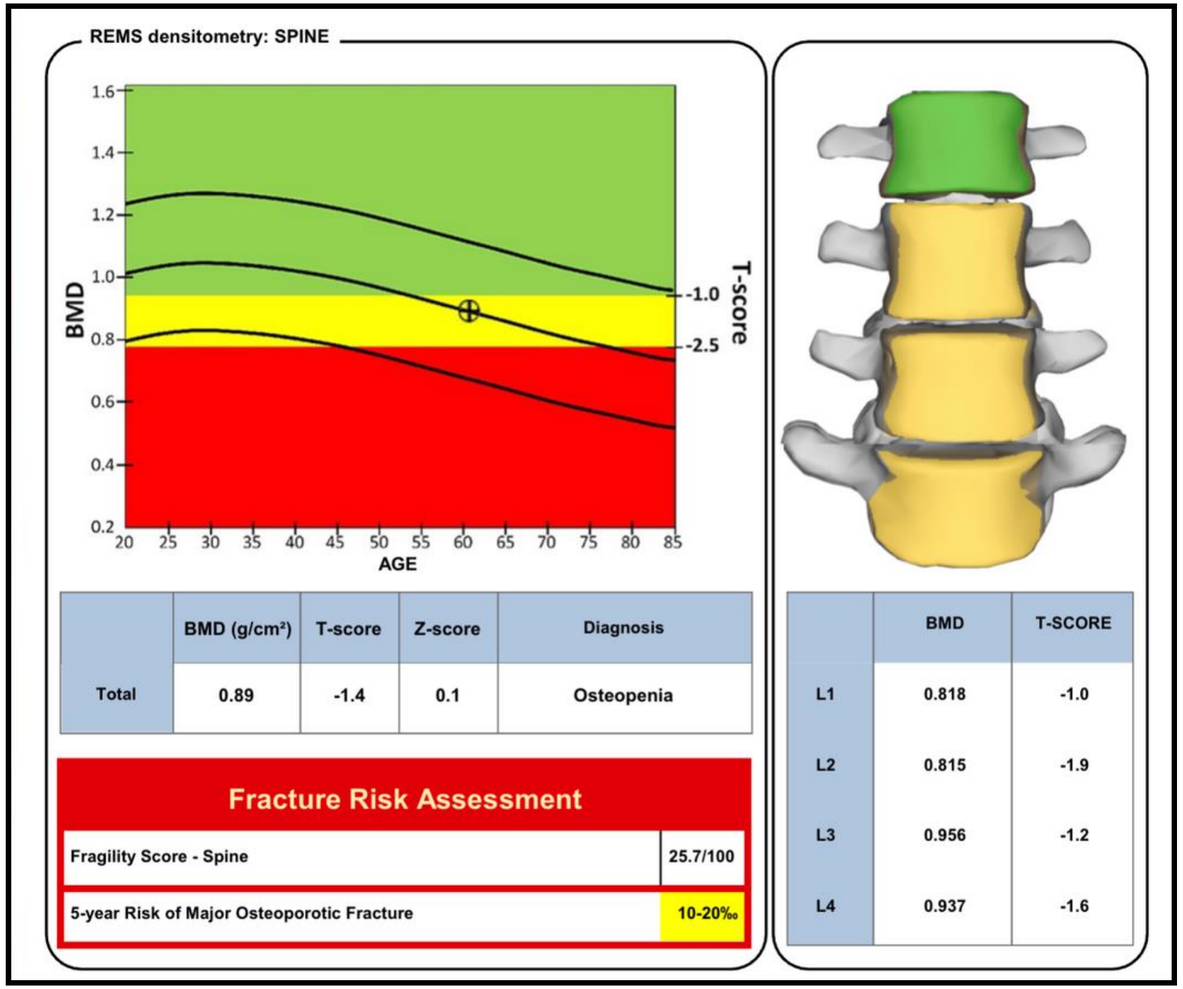
Step 2: Match Findings to Bone Health Drivers

- Robust cortisol → suppressed osteoblast activity



Step 2: Match Findings to Bone Health Drivers

- Low estrogen/progesterone → ↑ bone resorption
- Low androgens → ↓ muscle support for bone
- High cortisol → suppressed osteoblast activity
- Detox imbalance → ↑ inflammatory load



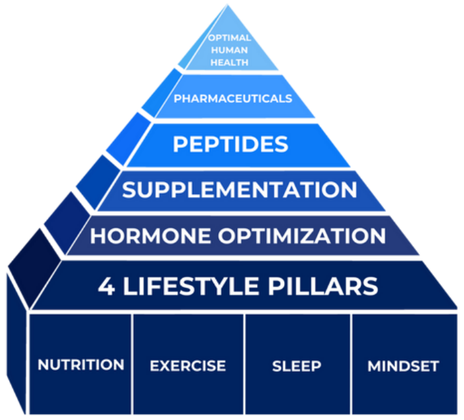
	BMD (g/cm²)	T-score	Z-score	Diagnosis
Total	0.89	-1.4	0.1	Osteopenia

Fracture Risk Assessment	
Fragility Score - Spine	25.7/100
5-year Risk of Major Osteoporotic Fracture	10-20‰

	BMD	T-SCORE
L1	0.818	-1.0
L2	0.815	-1.9
L3	0.956	-1.2
L4	0.937	-1.6

Step 3: Build the Personalized Protocol

- **Targeted HRT** or Support – dose, form, timing based on DUTCH profile.
- **Nutrition** – protein targets, micronutrients (Ca, Mg, Vit D/K, boron).
- **Exercise** – resistance, impact, and muscle-strengthening.
- **Lifestyle** – stress modulation, sleep, circadian rhythm support.



Step 4: Monitor & Adjust

- Retest DUTCH at 6–12 months to assess hormone changes.
- Pair with bone turnover markers for faster feedback.
- Adjust HRT, supplements, or training load accordingly.

DHEA-Sulfate

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
DHEA-Sulfate [01]	154.0	140.0 11/05/2024	ug/dL	29.4-220.5

Estradiol

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
▲ **Estradiol** [01]	**64.2** **High**	18.9 11/05/2024	pg/mL	0.0-54.7
		Adult Female	Range	
		Follicular phase	12.5 - 166.0	
		Ovulation phase	85.8 - 498.0	
		Luteal phase	43.8 - 211.0	
		Postmenopausal	<6.0 - 54.7	
		Pregnancy		
		1st trimester	215.0 - >4300.0	
	Roche ECLIA methodology			

4R method for bone Optimization

Recognize

- Why are you losing bone?
- What is the underlying condition?
- Genetics
- Blood labs (>300 Markers)
- Functional testing

Reverse

- Lifestyle Plans:
- Nutrition
- Movement
- Sleep
- Stress
- Supplementation
- Hormone Optimization
- Peptide Protocols
- Medication Review

Retest

Track bone health improvement using evidence-based testing

Revive

Optimization of bone health, lifespan and health-span

Thank You!

Doug Lucas
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