SUPER AGE

How to Build Muscle Safely: The Ultimate Muscle-Boosting Guide for Men and Women

FEATURE

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Here’s How to Future-Proof Your Body

To live long and thrive, you need to be strong. Full stop. Muscle mass isn’t just about aesthetics; it’s your body’s ultimate insurance policy for aging well.

Without it, your body’s strength, **mobility**, and **resilience** decline. And this isn’t a slow, graceful descent, explains Matthew Laye, Ph.D., Associate Professor at The College of Idaho and chair of the Health and Human Performance Department. “It’s more like a staircase,” Laye says, “where events like illness or inactivity trigger sudden, steep losses in muscle mass or strength.”

These losses translate into a series of “I used to” statements: *I used to play tennis before I tore a ligament. I used to hike regularly before a month-long illness left me sedentary.* Each step down compromises your ability to live actively and independently.

Think of muscle as the currency of health, and a robust “bank account” keeps you moving through life with power. Strong muscles help you react quickly when life demands it, absorb impacts to prevent injuries, and even regulate blood sugar, reducing your risk of metabolic diseases like diabetes.

> **Think of muscle as the currency of health.**

And yet, age challenges this protective tissue. Starting in your 40s, muscle mass declines by up to 1% annually, a process called **sarcopenia**. By your 50s, that loss doubles, and for women specifically, the drop-off can accelerate due to hormonal changes during **perimenopause** and **postmenopause**. As estrogen declines, both muscle preservation and bone density can be compromised, making targeted strategies even more essential for lifelong strength.

"Women need to train differently than men, **especially around menopause**," says women's fitness and health expert Linsly Donnelly, Chief Product Officer of holistic resilience training organization **Prosper**. Her partner, Jennifer Wagner, MD, adds: "Lifting heavier weights, focusing on eccentric load, and building neuromuscular control are key—especially since muscle loss accelerates and bone density drops during menopause."But here's the good news: No matter your age, muscle gain is possible. A 2023 study published in the *International Journal of Sport Nutrition and Exercise Metabolism* found that people over 85 gained an 11% increase in muscle mass and a 46% increase in strength after a 12-week resistance training program. While it may take more time and focused effort to build muscle as you age, the results are worth it—and achievable.

EXPERT ADVISORS

This guide was created with expert insights from: Linsly Donnelly and Jennifer Wagner, MD, of *We Prosper*, Matthew Laye, Ph.D. chair of the Health and Human Performance Department at The College of Idaho, Mike Nelson, Ph.D., adjunct professor at the Carrick Institute and founder of Extreme Human Performance, Dan Ritchie, Ph.D., co-founder of the Functional Aging Institute. In this guide, you'll find science-backed insights and practical tips to keep your "health currency" growing and thriving for the long haul. We'll explore muscle-building strategies for men and women, especially during key hormonal shifts.

Four Science-Backed Benefits of Building Muscle

PHOTOGRAPHY BY DAVID HARRY STEWART

Muscle is your body's **longevity** insurance. Research shows that people with more muscle live longer, and here's why.

1) Protect Your Body: Muscle mass may be harder to keep as we age, but the benefits are worth the work. Building muscle isn't just about aesthetics; it's a cornerstone of vitality and longevity. People with **higher muscle mass experience** a 10–17% lower risk of all-cause mortality, cardiovascular disease, total cancer, diabetes, and lung cancer. Maintaining muscle mass also supports bone density, reducing the risk of osteoporosis and fractures. In essence, muscle is your body's engine, driving you toward a more powerful, resilient, and vibrant life.

2) Build Metabolic Might: Muscle is also your body's best "glucose sink," says Dr. Laye**.** Here's the breakdown: when you eat, your body converts carbohydrates into glucose, a simple sugar that fuels your cells. Muscle helps by soaking up excess glucose, reducing the amount of insulin your body needs to process it. This makes you more insulin-sensitive, which lowers your risk of developing Type 2 diabetes. When there's more glucose than your body can use, you can develop what's called insulin resistance: Cells aren't as responsive to insulin, and glucose levels hit dangerous highs, leading to **Type 2 diabetes**. One study found that people with more muscle beneath belly fat had 45% better insulin sensitivity than those with less.

3) Power Your Cells: Muscle is packed with **mitochondria**, the "powerhouse" of your cells that convert glucose into adenosine triphosphate (ATP), the main currency your cells use for energy. More muscle means more ATP, giving your body the energy it needs to thrive.

4) Fight Inflammation: Even in the presence of fat, muscle mass is linked to lower levels of inflammatory compounds like C-reactive protein. These compounds, often released by fat tissue, are tied to higher risks of cardiovascular disease and early death. Simply put, muscle reduces the inflammatory burden on your body, keeping you healthier for longer.

"Muscle mass may be the most important biomarker for healthy aging," says Laye. Mike Nelson, Ph.D., adjunct professor at the Carrick Institute and founder of Extreme Human Performance, adds that VO2 Max, your body's ability to deliver oxygen to your muscles, may rival muscle as a predictor of longevity. But the good news? The same exercises that build muscle can boost VO2 Max, too (more on that later).

The Power of Progressive Overload

If your workout routine feels stagnant, same exercises, same weights, same reps, you might be sabotaging your muscle-building potential. Sticking with the same workload over time is a fast track to muscular decline.

To maintain or build muscle, you need to embrace progressive overload, steadily increasing the amount of work your muscles do. Think of it as a gradual challenge to keep your body adapting. Here's how it works: if you curl 10 pounds for 10 reps, that's 100 pounds of volume. Bump up the weight to 12 pounds or the reps to 12, and you've increased the volume to 120 pounds. That incremental bump is the secret to unlocking growth, and research shows it works for both strength and size.

Sticking with the same workload over time is a fast track to muscular decline.

As we age, however, pushing too hard, like loading a heavy barbell onto your back, comes with increased risk. "The risk of damaging your back or pinching your neck gets higher as we age," says Dan Ritchie, Ph.D., co-founder of the Functional Aging Institute. "That risk/reward ratio is really important."

The good news? You can build strength no matter your age. For men, heavy weights aren't necessarily needed. Weight-bearing calisthenics moves, like pushups, lunges, and bodyweight squats, can provide effective resistance without external loads—especially for beginners. For women, says Dr. Wager, "to replace the loss of estrogen stimulation, heavy weights are needed."

How to Build Muscle … Safely

Heavy weights come with risks if used poorly, but that doesn't mean you should miss out on the rewards of progressive overload. Get someone to show you how to use them! The key is adjusting your approach, say Dan Ritchie, Ph.D., and Mike Nelson, Ph.D. They suggest three safe and effective strategies to build muscle:

- **Train for Real Life:** Focus on movements that mirror daily tasks. "You'll need to squat in daily life," Ritchie says, "but rarely with weight on your back or shoulders." Instead, practice lifting heavy objects from the ground—like a kettlebell or a child. Similarly, swap the bench press for a standing cable press, which mimics real-world pushing actions, like moving furniture.

- **Incorporate Machines Wisely:** Machines require less skill while still providing muscle overload. Use them to target larger muscle groups, like your legs, without risking form breakdown. One caveat: Don't rely solely on machines, says Nelson. You should do movements that mimic how you'll move in real life, like lateral, side-to-side movements, to prepare for life's unpredictable shifts. More on that below, in "Foundations of Stability."
- **Add "Easy Volume":** Instead of increasing weight or adding more reps to exhaustion, tack on an extra set at your usual weight. "Adding a fourth set to three sets of 10 reps boosts volume by almost 25%," Nelson says.

Building muscle safely doesn't mean doing less, it means working smarter. "For women, resistance training takes less time as weights get heavier and reps fewer," says Dr. Wagner. With these strategies, you'll stay strong and injury-free while unlocking the benefits of progressive overload.

TAILORING TRAINING FOR MEN AND WOMEN

For Men: Men often benefit from progressive overload with heavier weights due to higher testosterone levels, which aid in muscle repair and growth. Compound movements like (David's favorite) deadlifts and squats can be particularly effective.
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For Women: Women may gain more from heavy weight and fewer reps, which triggers a stronger neurological signal response in women. Including core-strengthening exercises and lateral movements can protect joint stability, especially in the hips and knees.

Boosting VO2 Max for Longevity

PHOTOGRAPHY BY JACOBLUND

When you exercise, your muscles crave oxygen. Your bloodstream delivers it, and your mitochondria, the

cell's powerhouses, convert it into ATP, the energy that powers every contraction. But there's a limit to how much oxygen your body can deliver, and that ceiling is your **VO2 Max**—your maximal oxygen uptake. It's not just a measure of peak fitness; it's a powerful predictor of longevity.

Why does VO2 Max matter? A 2018 study of more than 100,000 people published in the *Journal of the American Medical Association* found that higher VO2 Max levels were tightly linked to longer lives. Another long-term study of 5,000 men tracked over 46 years concluded that for every one-unit increase in VO2 Max, participants added 45 days to their lives.

VO2 Max is not just a measure of peak fitness; it's a powerful predictor of longevity.

So, how do you boost this critical fitness marker? According to Mike Nelson, Ph.D., the answer is interval training. "VO2 Max-effort intervals push your body to the red line," he explains. This involves alternating short bursts of intense exercise with periods of easier movement or complete rest. Aim for sessions twice a week to keep your fitness engine running at peak performance.

How to Build VO2 Max… Safely

The main safety issue with VO2 Max-building exercise is dosage. Until one is extremely fit, doing 4×4 or sprints more than once a week will probably be more than the body can recover from. We want enough signal to cause adaption, but not so much that we diminish the immune system. "You want an effort that's hard but sustainable for two to eight minutes," says **Mike Nelson, Ph.D.** The goal is to maintain high output during each interval without compromising form. "I'd rather have someone who's not in peak condition go all out for 2-3 minutes to start, instead of pacing themselves for an arbitrary eight minutes," he explains.

Want to give it a try? The Norwegian 4×4 method, is a research-backed interval protocol that's effective for boosting VO2 Max:

1. Warm up for 10 minutes to prepare your muscles and cardiovascular system.
2. Choose a cardio apparatus like a rowing machine or fan bike (both use your arms and legs for maximum effort). Use an exercise machine with a power meter, which measures the amount of work you're applying each second.
3. Go as hard as you can for 2 minutes, pushing to your limit.

4 Rest completely or perform light movement for recovery.

5 Repeat this effort four times. What seems easy on round one will feel like a beast on round 4.

Over time, gradually extend the duration of your high-intensity intervals. Consistency is key, commit to this twice a week to see results.

TAILORING VO2 MAX TRAINING FOR MEN AND WOMEN

For Men: With a naturally higher VO2 Max baseline, men can optimize performance with high-intensity intervals like the Norwegian 4×4 method.
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For Women: Women benefit from doing the 4×4 once a week (or even sprint training). Then, walk the rest of the week (10,000 steps) or balance with Zone 2 cardio to improve oxygen efficiency. Including iron-rich foods, like spinach or lentils, helps combat potential anemia, which can impact endurance.

Zone 2 Cardio: A Sweet Spot for Longevity

PHOTOGRAPHY BY BOGDAN MALIZKIY

?Building your cardio fitness is like constructing a pyramid. The peak, your VO2 Max, can only rise as high as the base supporting it. That's where **Zone 2 cardio** comes in: the foundation of sustained endurance and metabolic health.

Zone 2 refers to a heart rate zone at 60-70% of your maximum heart rate, a sweet spot where your body primarily burns fat for fuel instead of glycogen (the carbohydrate stored in your muscles). This type of exercise challenges your body just below the ventilatory threshold (VT1)—the point where your body starts producing more lactate than it can clear. Unlike higher-intensity efforts, Zone 2 keeps you comfortably

moving for longer, allowing your body to reap serious benefits without hitting the wall.

Why does Zone 2 matter for longevity? It:

- **Clears away unhealthy cells:** Zone 2 increases the number and efficiency of your mitochondria, those "cellular powerhouses," that clear out old, malfunctioning organelles. Better mitochondria mean lower insulin resistance and reduced risks for Type 2 diabetes and cardiovascular disease.
- **Improves glucose disposal:** A 2021 study found that an hour of Zone 2 cardio improves glucose clearance by 67-97% in people without diabetes and 66-82% in Type 1 diabetics. This is key for increased metabolic flexibility, the ability to burn fat and glucose as fuel.

And here's the magic: unlike high-intensity intervals, Zone 2 is easy to recover from. You can do it often, today, tomorrow, and beyond, without burning out. Plus, by strengthening the foundation of your fitness pyramid, Zone 2 can also help increase your VO2 Max, creating a virtuous cycle of endurance and performance gains.

The best part? Zone 2 doesn't have to feel like work. A brisk walk, steady cycling, or even light jogging can hit the mark. It's important to be in Zone 2, not Zone 1, mall walking doesn't get the job done. But Zone 2 exercise is simple, sustainable, and one of the best-kept secrets for long-term health and fitness.

How to Do Zone 2

Zone 2 cardio doesn't require fancy equipment or exact calculations. While knowing your maximum heart rate can help pinpoint the 60-70% range, you can easily find and maintain Zone 2 using the talk test, a simple, no-tech method.

Take the Zone 2 Talk Test:

1. **Choose a 15-word sentence.** For example: "I'm doing Zone 2 cardio to boost my longevity, cardio health, and cellular health."
2. **Start your cardio of choice.** Whether you're walking briskly, cycling, or using an elliptical, begin at a comfortable pace.
3. **Say the sentence aloud.** Gradually increase your intensity until speaking the sentence requires a breath or slight pause. This is your **ventilatory threshold (VT1)**—the top of Zone 2.
4. **Adjust your pace.** Stay just below this level to maximize fat-burning and endurance benefits.

Aim for 30 minutes per session (as little as 20 can be effective), gradually increasing duration as you get comfortable. Try to fit in Zone 2 cardio 3-5 times a week. It's low-impact, sustainable, and incredibly effective for building a solid base of fitness while supporting longevity.

Pro Tip: Try Rucking. Rucking (walking while carrying a weighted backpack or wearing a weighted vest) is great Zone 2 for men and women, says Dr. Wagner. "Not only does it increase cardiovascular intensity, but it also helps with eccentric load (requires more neuromuscular control to slow down movements or move down hill)."

Two Keys to Longevity: Stability and Mobility

Longevity isn't just about how long you live (**lifespan**) but how well you live (**healthspan**). A key to thriving is staying dynamic and resilient, says **Dan Ritchie, Ph.D.** Stability is your ability to stay balanced when stationary, think holding your ground during a competitive tennis rally or staying centered while maneuvering through a crowded airport. Mobility, on the other hand, powers fluid movements, keeping you agile, quick, and ready for action.

Mobility is more complex than you might think. Consider stairs: climbing isn't just about leg strength, it's a coordinated symphony of shifting weight, engaging your core, stabilizing your hips and ankles, and reacting quickly to maintain balance. Whether it's hiking uneven trails, mastering that perfect golf swing, or tackling a new sport, these skills are the foundation for an active, adventurous life.

How to Build and Maintain Stability and Mobility

PHOTOGRAPHY BY DAVID HARRY STEWART

Incorporate these daily practices to boost stability and mobility:

- **Core Strength and Balance:** Exercises like forearm planks build a rigid core to resist movement, while balance drills, such as standing on one foot in a yoga tree pose, enhance stability.

- **Joint Mobility with Dynamic Stretches:** Use the “world’s greatest stretch” to improve flexibility across multiple joints:some text
    - Start in a pushup position, body straight from head to heels.
    - Bring your right foot forward, flat near your hand.
    - Drop your left elbow toward the ground to stretch your thigh.
    - Straighten your arm and twist your torso, raising your right arm toward the ceiling. Hold briefly, then return to the start. Repeat on the other side for 6-8 reps each.
- **Side-to-Side Movement:** Most exercises are forward-back (sagittal plane), but life requires lateral motion. Add lateral lunges or shuffles to your warmup to improve agility.
- **Quick Reaction Drills:** Practice quick steps and bug stomps to refine reaction time and strengthen bone density.some text
    - **Quick Steps:** Take a short step forward, return, then step to the side or diagonally. Repeat quickly for one minute.
    - **Bug Stomps:** Imagine a bug a foot away in any direction. Stomp it quickly, then return to the start position. Alternate feet to build speed and coordination.

Building stability and mobility isn’t just about preventing falls, it’s about thriving in everyday life, from climbing stairs to crossing a crowded room with confidence.

TAILORING MOBILITY AND STABILITY FOR MEN AND WOMEN

For Men: Greater muscle mass can lead to reduced flexibility, so mobility-focused exercises like dynamic stretches and lateral movements should be prioritized alongside strength training.
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For Women: Women are generally more flexible but may experience joint instability (e.g., knee issues). Core-strengthening and lateral movements, such as side planks or lateral lunges, can enhance joint stability and reduce injury risk.

Nutrition for Muscle Longevity

PHOTOGRAPHY BY ALVAREZ

Protein is the cornerstone of muscle health. During strength training, your muscles break down. Afterward, they rebuild through a process called muscle protein synthesis (MPS), where protein molecules repair and grow muscle tissue. When MPS outpaces the breakdown caused by exercise, you're in a protein surplus, allowing muscle growth to happen.

Here's the good news: this protein doesn't have to come from animal sources. While animal protein is better at helping build muscle because it's easier to utilize, a 2021 review of 16 studies found that plant-based protein can deliver comparable gains in lean mass and strength. So whether you're eating lentils and chickpeas or beef and chicken, you can build muscle effectively.

Muscle-building nutrients go beyond protein. **Zinc**, found in beans and red meat, supports muscle cell formation. Magnesium, abundant in leafy greens and whole grains, is essential for muscle contraction and performance. Omega-3 fatty acids, found in salmon and walnuts, may reduce skeletal muscle loss.

And don't forget carbohydrates. "Insulin is a primary stimulator of muscle protein synthesis," says Matthew Laye, Ph.D., "and carbohydrates trigger insulin release." Pair protein with healthy carbs like brown rice, sweet potatoes, or fruit to maximize MPS and fuel your recovery.

How Much to Eat

The amount of protein you need depends on your goals (and can also vary from person to person):

- For general health, the National Institutes of Health (NIH) recommends **0.8 grams of protein** per kilogram of body weight daily (about 0.36 grams per pound). For a 200-pound person, that's 72.6 grams per day.
- For muscle growth, the International Society of Sports Nutrition (ISSN) suggests 0.736 grams per pound of body weight per day (1.62 grams per kilogram). For that same 200-pound person, that's about 147.2 grams daily.

Certain goals require even more:

- **1.04-1.4 grams per pound** for experienced lifters trying to lose fat.
- **0.7-1 gram per pound** for high-intensity athletes.
- **0.54-0.9 grams per pound** for moderate-intensity training.

Prioritize consistent, nutrient-dense meals that combine protein with healthy fats and carbs. It's not just about building muscle—it's about giving your body the fuel it needs to thrive.

TAILORING NUTRITION FOR MEN AND WOMEN

For Men: Higher muscle mass means higher protein needs. Aim for 0.8-1 gram of protein per pound of body weight, focusing on whole food sources like lean beef, chicken, or fish.
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For Women: During menopause, estrogen levels drop significantly. This hormonal shift slows down

the body’s ability to efficiently build and repair muscle, leading to a decline in muscle mass and strength over time. Prioritize leucine-rich proteins like eggs, yogurt, and soy-based products to enhance protein utilization. Combining protein with healthy carbs boosts recovery and energy levels. The biggest mistake women can make is not eating enough.

?Recovery: Rest is the New Rep

PHOTOGRAPHY BY FRESH SPLASH

Sleep is your body’s ultimate muscle-building hack. Studies show that getting fewer than seven hours of sleep per night can blunt muscle protein synthesis (MPS) by 18%, lower testosterone levels (essential for muscle growth) by nearly 25%, and spike cortisone, a muscle-wasting stress hormone, by 21%.

Here’s the challenge: as we age, sleep quality often declines, leaving us less restored. Dan Ritchie, Ph.D., suggests taking a page from teenagers: prioritize sleep like it’s your secret weapon.

Another pro tip? Stay hydrated. “Many people don’t drink enough water,” Ritchie notes. But dehydration slows recovery, increases joint soreness, and makes it harder for your body to repair post-workout stress. A simple water bottle can make all the difference.

How to Recover Better

Sleep and hydration are non-negotiables, but so is giving your body enough **time to recover** between workouts.

- **Pace Your Workouts:** As we age, heavy strength training may require **more rest** between intense sessions. And that’s perfectly fine. Research shows that spreading the same weekly workload across

fewer sessions can yield similar gains in muscle and strength. Quality over quantity wins.

- **Listen to Your Body:** Recovery isn't just about rest days, it's about tuning into what your body needs. Get a wearable heart rate variability and resting heart rate monitor, which will give you valuable insights into your body's recovery process, help you optimize your training intensity, and prevent overtraining

TAILORING RECOVERY FOR MEN AND WOMEN

For Men: Sleep supports testosterone production, which aids in muscle repair and growth. Ensure 7-9 hours of quality sleep and stay consistent with hydration to optimize recovery.
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For Women: Sleep disturbances due to hormonal changes, especially during menopause, can impact recovery. Focus on sleep hygiene—create a calming bedtime routine, include magnesium-rich foods like nuts or dark chocolate, and try pre-bedtime yoga to support better rest.
Prioritize recovery as much as your workouts. Your body builds muscle during rest, not while you're training, so sleep well, hydrate often, and take the time you need to come back stronger.

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