

Fractures

DNA Health Report

REPORT CATEGORIES —



BONE HEALTH



INJURIES

Sample Client

Report date: 15 January 2026

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DISCLAIMER

This report does not diagnose this or any other health conditions. Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

Personal information

NAME

Sample Client

SEX AT BIRTH

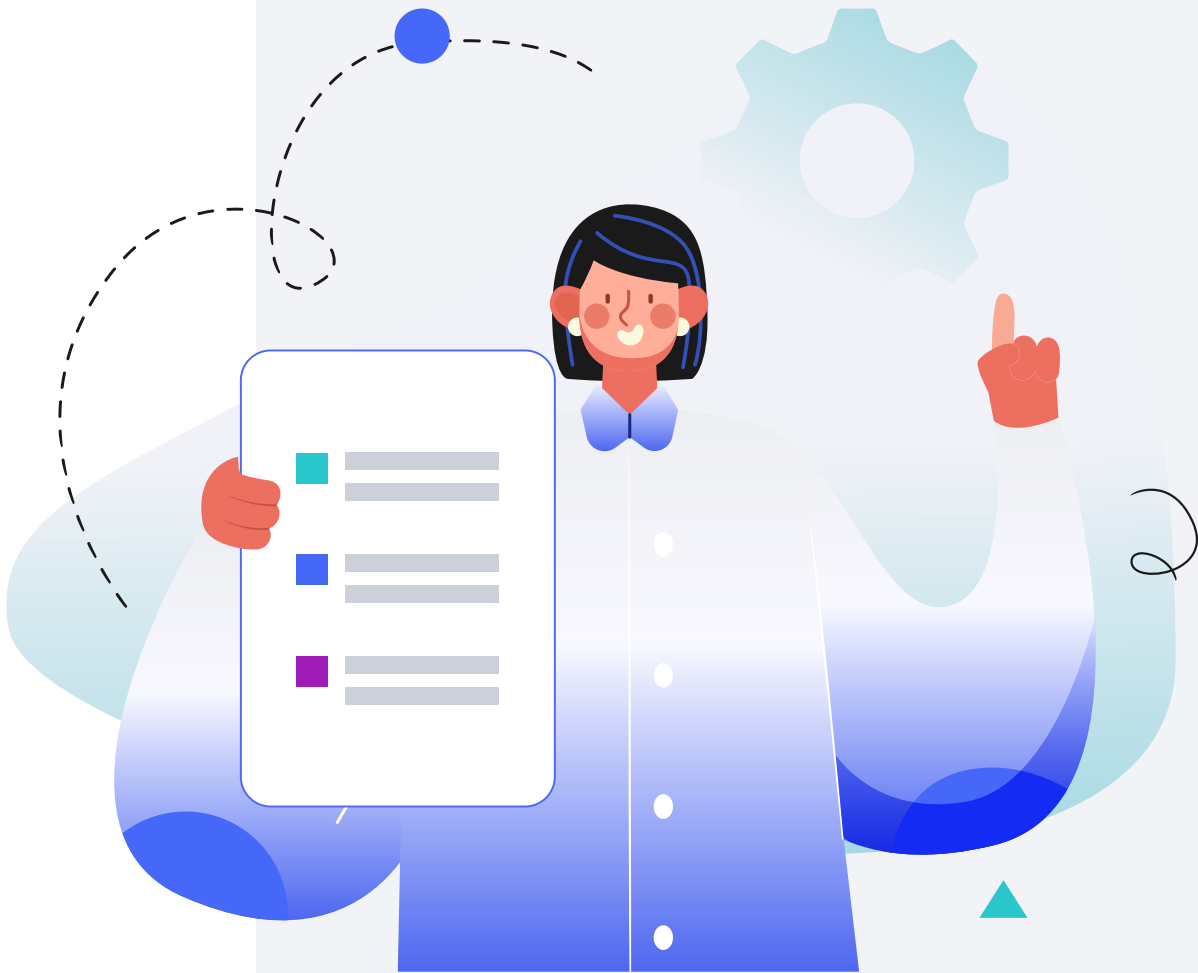
Male

HEIGHT

5ft 5" 165cm

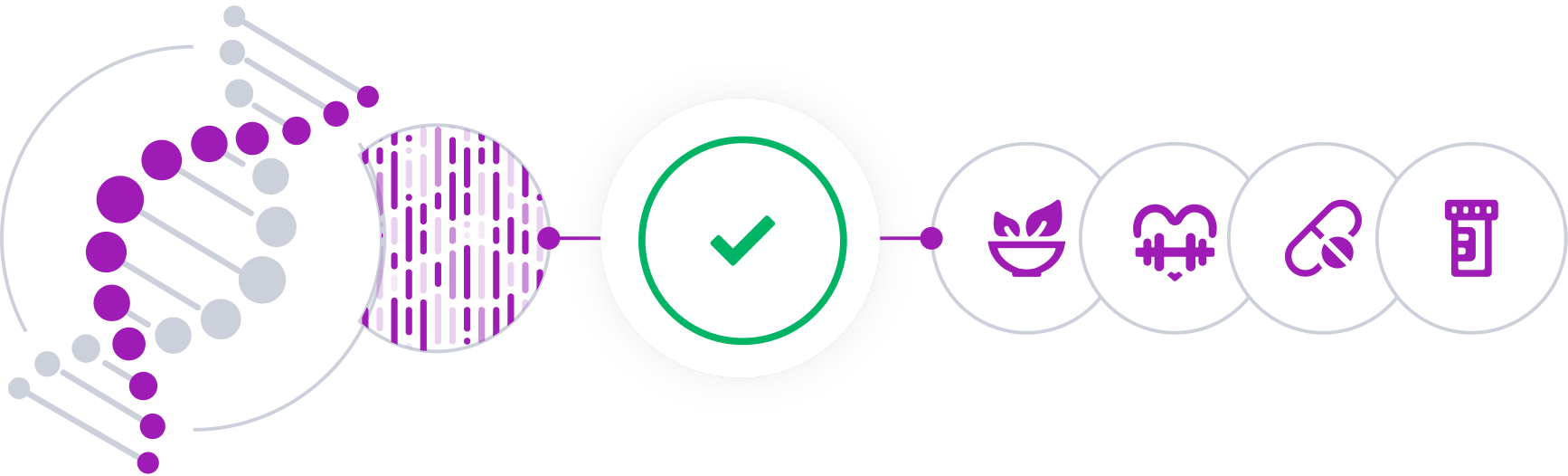
WEIGHT

137lb 62kg



How this works

Our Wellness Reports analyze how your DNA influences your health.
We then use this analysis to give you personalized risk estimates and recommendations.

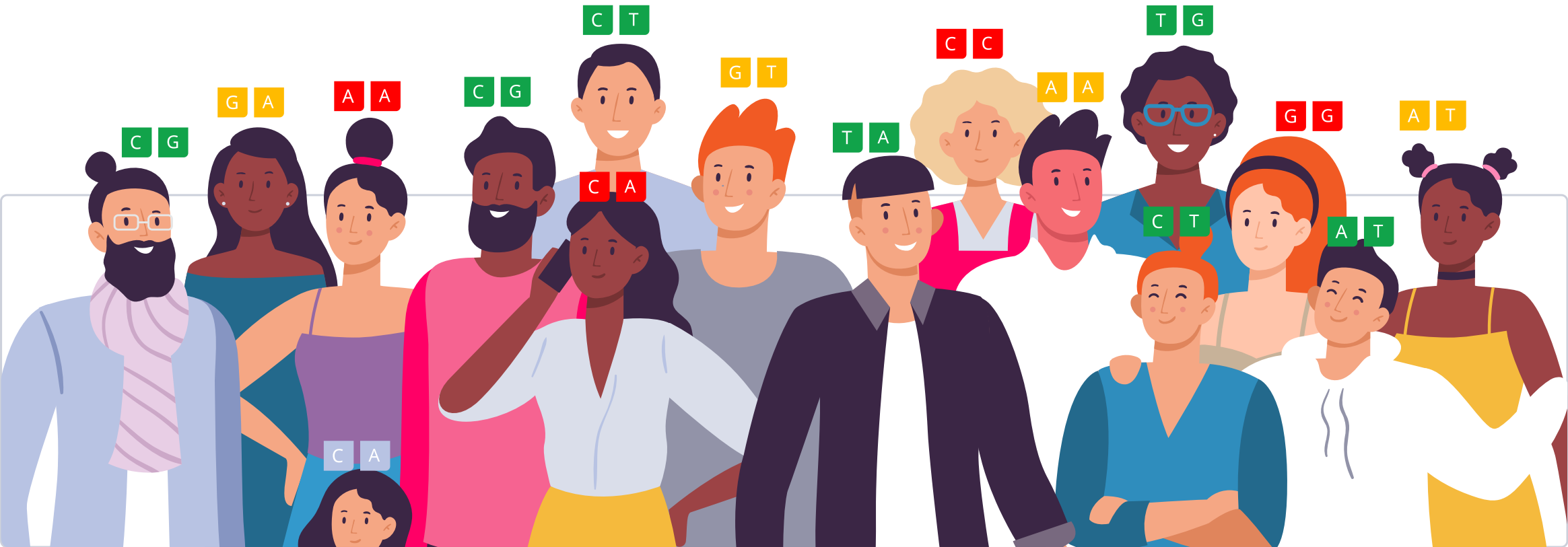


Similarly, our Trait Reports look at how your DNA influences your traits.



Your DNA is like an instruction manual — it contains a lot of information.
You can think of it as a blueprint for your body.

Genetic variants are parts of DNA that differ from person to person. Some can make you more vulnerable to certain health issues, while others may influence traits such as eye color.



We use artificial intelligence and machine learning to analyze all this information.
We then summarize your results as a risk score or display it on a gauge.

In total, we analyze up to 83 million genetic variants.

When we give a risk score, the risk icon tells you if you are at a higher or lower risk compared to other people:



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

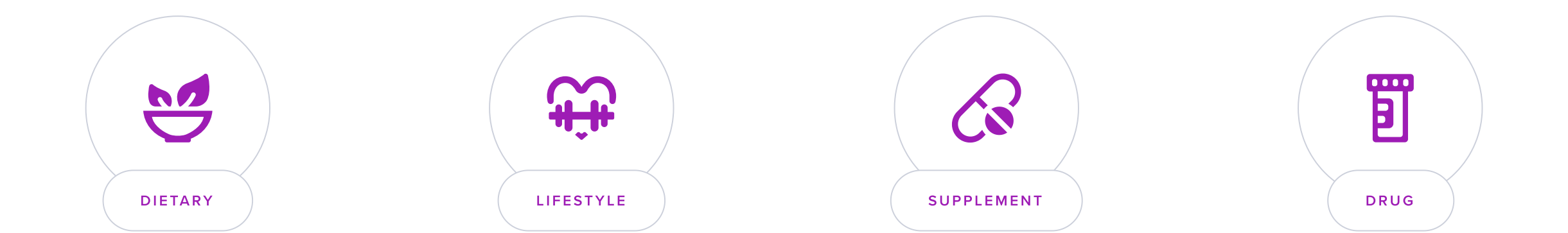
You have 2 risk alleles

Your risk is also displayed as a percentile. This will tell you how your risks compare to our sample population. The lower your percentile number, the lower your risk. The "50th percentile" would be an average risk.

Similarly, the gauge tells you your relative risk score compared to our sample population, or it indicates a specific trait or haplotype you are more likely to have based on your genetic variants.

When applicable, we also list top evidence-based recommendations that may help lower your risk. The focus is on recommendations that may be of benefit to you, based on your genetics.

Our recommendations come in four categories: lifestyle, diet, supplements and drugs. The following icons tell you which category a recommendation falls into:



Our team of scientists also ranks each recommendation.
We rank based on impact and the strength of evidence in the medical literature.

Impact shows how strongly a recommendation will affect your health in a certain area.
Evidence is how much scientific support there is for the recommendation. Rankings are from 1 to 5 (low to high):



Impact

Impact scores range from 1-5. These scores reflect how much of an effect each recommendation can have. An impact score of 5 predicts the biggest effect.

When a recommendation affects something we can measure, we use those measurements to assign the impact score. For example, a recommendation that decreases cholesterol by 20% will have a higher impact score than one that decreases it by 5%.

Some recommendations affect things that we cannot directly measure, like stress or mood. For these, the impact score is based on how well they work relative to other recommendations and standard treatments. The best ones get the highest scores.

If there is a lot of research that shows a recommendation works especially well for your genotype, the impact score gets increased.

Recommendation Evidence

- 5 / 5
- Recommendations that are considered effective and generally recommended by experts and medical bodies.
-
- 4 / 5
- Recommendations that are considered likely effective and that have multiple independent meta-analyses and a great many studies supporting them.
-
- 3 / 5
- Recommendations that are considered possibly effective and have many studies supporting them
-
- 2 / 5
- Recommendations that have insufficient evidence, with two or several clinical trials supporting them, or many studies but with ambiguous results.
-
- 1 / 5
- Recommendations that have insufficient evidence, with a single clinical trial, or with many studies most of which didn't find support for the recommendation.
-
- 0 / 5
- No evidence in humans.

Genotype-specific Evidence

- High-quality
- Direct evidence that a recommendation helps more in people with your gene variant (many clinical trials, a few large clinical trials, or a meta-analysis).
-
- Medium-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a few clinical trials or one large clinical trial).
-
- Low-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a single clinical trial or more trials with inconsistent results).
-
- Indirect
- A recommendation may help more in people with your gene variant because it targets a specific gene or protein affected by your variant (e.g., MTHFR, dopamine).
-
- In theory
- A recommendation may help more in people with your gene variant because it targets a specific mechanism affected by your variant (e.g., inflammation, oxidative stress).

Some things to keep in mind:

- Genetics doesn’t play a considerable role in a condition or a trait.
- There is not enough research available to estimate a genetic predisposition.
- There are technical limitations to estimating or presenting a genetic predisposition.
- The topic is sensitive, and a genetic predisposition should only be estimated and presented by a healthcare professional.

Introduction

A fracture refers to a break in one or more of the bones in the body. Fractures can range from minor cracks in the bones to more severe bone breaks that pierce the skin. They can result from a variety of incidents, including falls, trauma, and sports injuries.

In people with weakened bones, especially older women, even minor bumps or twists may lead to a fracture. This usually points to advanced osteoporosis.

Symptoms of fractures can vary depending on the affected bone and the severity of the break. They commonly include:

- Pain or tenderness
- Swelling and bruising
- Inability to move the affected limb or joint normally
- Deformity or angulation at the fracture site
- Open fractures: where the bone may pierce the skin

Treatment for fractures generally involves immobilizing the bone with a cast, splint, or brace to allow it to heal. More severe fractures may require surgical intervention to align the broken bones and possibly insert plates, pins, or screws.

Risk Factors and Genetics

Factors that might increase the risk of fractures include:

- Osteoporosis or decreased bone density
- Older age
- Participation in high-risk sports or activities
- Previous fractures
- Falling or repeated trauma
- Low body weight or malnutrition
- Conditions that affect bone quality, such as cancer or certain endocrine disorders
- Genetics

Genetics can play a role in bone health and, consequently, susceptibility to fractures. Genes are involved in determining bone density, bone structure, and the rate at which bone is broken down and rebuilt. Having a family history of osteoporosis or frequent fractures may indicate a genetic predisposition.

Moreover, genetically high testosterone (in women) and alpha-linolenic acid may be causally associated with a lower risk of fractures [\[R, R\]](#).



TYPICAL LIKELIHOOD

Typical likelihood of breaking a bone based on 909,144 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
MARCO	rs115242848	CC
HLA-DQA1	rs2071805	CC
VAR2	rs9262558	CC
SP7	rs144680237	CC
CPED1	rs3779381	AA
ZBTB40	rs34414754	AA
WLS	rs2566755	TT
NTNG1	rs76259395	AA
CTNNBL1	rs6063547	GG
CPED1	rs10242100	AA
MRPL20	rs12408050	GA
INKA2	rs6658723	TT
FKBP11	rs3741619	GA
ETS2	rs11088458	AG
HBZ	rs10794639	GA
SMOC1	rs3742909	AG
/	rs2431108	CT
TSHZ3	rs2111530	AG
LGR4	rs11030084	TC
TSPAN4	rs28672671	GA
RPL10L	rs12884871	CT
HOXC6	rs7308105	TC
/	rs67174662	AG
DRD1	rs2471020	TC

GENE	SNP	GENOTYPE
ARL14EP	rs494221	GA
MN1	rs139959245	CC
TRERF1	rs72857666	CC
FHIT	rs7616516	GG
SPP1	rs33983260	DEL(AG)DEL(AG)
GAL	rs880610	GG
GAL	rs56154705	CC
CTNNB1	rs389264	CC
RSPO3	rs9482772	CC
ZNF536	rs28633123	CC
/	rs2709062	GG
CCDC170	rs4869744	TT
BCL11A	rs974135	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Your Recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your genetics, along with the amount of scientific evidence supporting the recommendation.

You’ll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

DOSAGE		DOSAGE	
1	Avoid Cadmium Exposure	2	Lactobacillus Casei10 billion CFU
3	Probiotics30 billion CFU	4	Zinc Sulfate220 mg
5	Avoid Air Pollution	6	Whey Protein25 g
7	Shilajit500 mg	8	Strontium Citrate125 mg
9	Dietary Calcium	10	Mobility Training10 minutes
11	Dietary Vitamin K	12	Balance And Mobility Training30 minutes
13	Cissus Quadrangularis500 mg	14	Dietary Magnesium
15	Stability Training30 minutes	16	Dietary Protein
17	Strength Training1 hour	18	Avoid Strenuous Activity
19	Exercise Therapy1 hour	20	Zinc15 mg
21	Vitamin K90 mcg	22	Physical Therapy30 minutes
23	Dietary Vitamin C	24	Avoid High-Impact Exercise
25	Vitamin D and Calcium	26	Avoid Lifting Heavy Objects
27	Calcium Supplements1000 mg	28	Low-Intensity Exercise1 hour
29	Aquatic Exercise1 hour	30	Dietary Copper
31	Collagen Peptides10 g	32	Vitamin K2100 mcg

1



Avoid Cadmium Exposure

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

To avoid cadmium exposure, refrain from smoking or exposure to secondhand smoke, reduce consumption of foods high in cadmium like shellfish, liver, kidney meats, and certain leafy vegetables, and use ceramic or glass containers instead of plastic when microwaving food. Limit intake of cadmium-contaminated workplace air by using protective gear if you work in battery manufacturing, welding, or metal refining industries.

Description

Avoiding cadmium exposure is essential to prevent potential health risks associated with this heavy metal, such as kidney damage and increased cancer risk. Reducing exposure to cadmium-containing products and contaminated foods is crucial.

Heavy metals are elements naturally found in the environment. They are also used for agricultural, industrial, and medicinal purposes. Some can even be found in small amounts in your body [\[R\]](#), [\[R\]](#).

Long-term exposure to high amounts of heavy metals can be harmful to your health [\[R\]](#), [\[R\]](#).

Heavy metals that are most often linked to health problems include [\[R\]](#), [\[R\]](#):

- Lead
- Cadmium
- Arsenic
- Chromium
- Mercury

How it helps

Multiple studies suggest a link between cadmium exposure and bone health. A meta-analysis involving 21,941 fracture cases found that high cadmium increases fracture risk by 30%. Environmental cadmium exposure, even at low levels, is associated with osteoporosis risk. Cadmium and lead exposure, especially in older adults and men, raise the risk of osteopenia or osteoporosis. Cadmium exposure is linked to Itai-itai disease symptoms in Japan. Cadmium levels are positively associated with osteoporosis prevalence, especially in women and non-smokers. However, dietary heavy metal intake doesn't significantly affect bone health in postmenopausal women [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

2



Lactobacillus Casei

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take a supplement containing Lactobacillus casei daily, with a dosage recommended by the product's manufacturer or a healthcare professional. The specific amount can vary, but it is commonly found in doses around 10 billion colony-forming units (CFUs). Continue this regimen for at least 4 weeks to observe potential health benefits.

TYPICAL STARTING DOSE
10 billion CFU

Description

Lactobacillus casei is a probiotic bacterium known for its potential to support gut health and immune function. It contributes to a balanced gut microbiome and may help alleviate digestive issues like diarrhea.

[Lactobacillus casei](#) is a [probiotic](#) bacterium found in fermented foods (e.g., cheese), as well as in the reproductive and gastrointestinal tracts of humans and other animals [\[R, R\]](#).

People mainly take *L. casei* to support a healthy gut microbiota [\[R\]](#).

How it helps

In 2 placebo-controlled trials of 710 patients with distal radius fractures, supplementation with *L. casei* Shirota for 3-6 months sped up functional recovery and fracture healing [\[R, R\]](#).

L. casei Shirota reduced pain intensity in a placebo-controlled trial of 283 patients with rib fractures [\[R\]](#).

3



Probiotics

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a probiotic supplement containing 10 billion or more live cultures once daily, preferably with a meal or as directed by the packaging or a healthcare provider.

TYPICAL STARTING DOSE

30 billion CFU

Description

Probiotics are live beneficial bacteria and yeasts that can support gut health and digestive function when consumed as supplements or found in fermented foods like yogurt and sauerkraut. They may be beneficial to gut health, immune function, blood sugar, and mood.

[Probiotic bacteria](#) are “good” bacteria found mainly in the large intestine. They support your body and mind by [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Maintaining gut health
- Supporting a healthy immune system
- Improving your mood
- Helping to maintain healthy blood sugar

Prebiotics are certain types of fiber and other complex carbs that serve as food for gut bacteria. **They support gut health by helping boost the activity and growth of “good” bacteria** [\[R\]](#), [\[R\]](#).

Prebiotics are also added to foods and supplements. Common prebiotic ingredients are [\[R\]](#), [\[R\]](#):

- Oligo-fructose
- Oligo-galactose
- [Inulin](#)

Mixtures of probiotics and prebiotics are known as **synbiotics** [\[R\]](#).

How it helps

In 2 placebo-controlled trials of 710 patients with distal radius fractures, supplementation with *L. casei*/Shirota for 3-6 months sped up functional recovery and fracture healing [\[R\]](#), [\[R\]](#).

L. casei/Shirota reduced pain intensity in a placebo-controlled trial of 283 patients with rib fractures [\[R\]](#).

4



Zinc Sulfate

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Take zinc sulfate as a dietary supplement by swallowing one 220 mg tablet (equivalent to 50 mg elemental zinc) with water, once daily, preferably with a meal to avoid stomach upset. This regimen can be followed for up to 2 weeks unless advised differently by a healthcare professional.

TYPICAL STARTING DOSE

220 mg

Description

Zinc sulfate is a chemical compound containing zinc and sulfur, used in dietary supplements to address zinc deficiencies, boost immune function, and support skin health. It's employed in medical settings to treat conditions like Wilson's disease and zinc deficiency-related disorders.

How it helps

In a placebo-controlled trial of 60 patients with traumatic bone fractures, supplementation with zinc sulfate (50 mg/day) for 60 days stimulated fracture healing [\[R\]](#).

5



Avoid Air Pollution

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Stay indoors on days when air quality indexes (AQI) indicate high pollution levels, which are often reported by weather services or government environmental agencies. **Install air purifiers** in your home, especially in bedrooms, to reduce indoor pollutants. Limit outdoor exercise when air pollution warnings are issued, opting for indoor activities instead.

Description

Avoiding air pollution by reducing exposure to pollutants in the environment is essential for respiratory and overall health. It can help lower the risk of respiratory diseases, cardiovascular conditions, and other health issues associated with poor air quality.

While city life is convenient in a lot of ways, it comes with some health hazards. Cars, factories, and other sources increase air [pollution](#) [R].

Air pollution plays a role in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Lung disease
- Heart disease
- Diabetes
- Asthma
- Skin conditions

How it helps

A systematic review and meta-analysis of 19 studies found that PM10, PM2.5, and nitrogen dioxide are associated with decreased bone mineral density and increased risk of osteoporotic fractures. However, the evidence was generally of low quality [\[R\]](#).

Air pollution may increase the risk of fractures by promoting chronic inflammation and oxidative stress, which can weaken bone structure and reduce bone density.

6



Whey Protein

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Mix one scoop (approximately 25-30 grams) of whey protein powder with 8-12 ounces of water, milk, or your preferred beverage. Consume this drink 1-2 times per day, ideally post-workout or as a meal replacement.

TYPICAL STARTING DOSE

25 g

Description

Whey protein is a complete protein derived from milk during cheese production. It is rich in essential amino acids and is used to support muscle recovery, promote muscle growth, and provide a convenient protein source for athletes and fitness enthusiasts.

Whey is the liquid that separates from milk when cheese is made. [Whey protein](#) is full of amino acids (protein building blocks) that the body needs [\[R\]](#), [\[R\]](#).

Whey protein usually comes in the form of a powder that can be added to soft foods and drinks. People often use it to help with [\[R\]](#), [\[R\]](#):

- Athletic performance
- Nutritional deficiencies

How it helps

In a study involving 40 patients, oral administration of a carbohydrate-whey protein (CHP) solution before hip fracture surgery showed positive outcomes. The CHP group received 400 mL of the solution the day before surgery and 200 mL 3 hours before surgery. Results indicated improved postoperative thirst and hunger, increased albumin levels, and reduced CRP concentrations and blood glucose fluctuations, benefiting the recovery of elderly patients [\[R\]](#).

7



Shilajit

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a pea-sized portion (approximately 500mg) of purified shilajit resin and dissolve it in warm water, tea, or milk. Consume this once daily, ideally in the morning on an empty stomach for best absorption. Continue this routine daily for 6 to 8 weeks to observe benefits.

TYPICAL STARTING DOSE

500 mg

Description

[Shilajit](#), also known as shilaras or bitumen, is a tar-like substance that oozes from sedimentary rocks worldwide, especially in the Himalayas. It is made of rock humus, minerals, and organic substances (e.g., marine organisms) decomposed by microbes and compressed by layers of rock [\[R\]](#).

Shilajit is called a rasayana (rejuvenator) and a maharasa (super-vitalizer) in Ayurveda (indigenous Indian medicine). It is traditionally used to [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Boost energy levels
- Improve memory and focus
- Fight stress
- Manage male reproductive disorders

Shilajit is sold as capsules or powder [\[R\]](#).

How it helps

In a [placebo-controlled trial of 160 people with a tibial fracture](#), supplementation with shilajit (500 mg, 2x/day) for 28 days **decreased the mean time of tibial bone union by 24 days** [\[R\]](#).

8



Strontium Citrate

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take at least 125 mg of strontium citrate daily, preferably on an empty stomach before bedtime to optimize absorption. It is recommended to continue this supplementation for at least 3 months to evaluate its effectiveness.

TYPICAL STARTING DOSE

125 mg

Description

Strontium citrate is a dietary supplement that may support bone health by increasing bone density and reducing the risk of fractures. It is sometimes used as an alternative to calcium supplements for individuals with osteoporosis.

How it helps

Strontium citrate may help increase bone formation and reduce bone breakdown. It has been shown to aid in the healing of fractures by enhancing bone density.

9



Dietary Calcium

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Consume 1,000-1,200 mg of calcium daily through dietary sources such as dairy products (milk, yogurt, cheese), green leafy vegetables (kale, broccoli), and fortified foods (orange juice, plant-based milks). Adults under 50 need 1,000 mg per day, while those over 50 should aim for 1,200 mg per day.

Description

Dietary calcium is a mineral found in dairy products, leafy greens, and fortified foods. It is essential for bone health, muscle function, and nerve transmission.

[Calcium](#) is the most abundant mineral in the human body. It is vital for the bones, heart, muscles, and nervous system [\[R\]](#).

Your body gets calcium from food and needs vitamin D to help absorb it. Calcium can be found in a variety of foods, including [\[R\]](#):

- Dairy products
- Green, leafy vegetables
- Fish with edible soft bones (e.g., sardines)
- Calcium-fortified foods and beverages

How it helps

Calcium is essential for bone health. Consuming adequate amounts of calcium is vital in the healing process of fractures as it is the primary mineral found in bones.

10



Mobility Training

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate mobility exercises into your daily routine, allocating at least 10-15 minutes each morning or evening to perform stretches and mobilizations that target all major joints and muscles in your body. Consistency is key, aim to practice mobility training daily for ongoing improvements in flexibility and joint health.

TYPICAL STARTING DOSE

10 minutes

Description

Mobility training is a form of physical therapy that focuses on improving an individual's range of motion, flexibility, and functional movement patterns. It helps enhance joint mobility, reduce the risk of injuries, and promote better physical performance in daily activities or sports.

How it helps

Mobility training helps to restore function and strength in the muscles around a fracture, aiding recovery.

11



Dietary Vitamin K

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate foods high in Vitamin K into your daily diet, such as green leafy vegetables (kale, spinach, broccoli), fish, liver, meat, and eggs. Aim to include at least one serving of these foods in each meal, amounting to 3 servings per day.

Description

Vitamin K is essential for blood clotting and bone health. It helps prevent excessive bleeding and contributes to the development and maintenance of strong bones.

[Vitamin K](#) is essential for blood clotting and bone formation [\[R\]](#).

Good sources of vitamin K include leafy greens, soy products, and carrots [\[R, R\]](#).

How it helps

Vitamin K plays a critical role in helping the body produce proteins essential for healthy bones and blood clotting. This can aid in the healing process of fractures.

12



Balance And Mobility Training

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate balance and mobility exercises into your routine three to four times per week. Each session should last approximately 30 minutes and include activities such as standing on one foot, walking heel to toe, and tai chi or yoga. Start with simple exercises and gradually increase difficulty as your balance improves.

TYPICAL STARTING DOSE

30 minutes

Description

Balance and mobility training exercises, such as yoga or tai chi, can improve stability and reduce the risk of falls, particularly among older adults. These exercises enhance overall physical function.

How it helps

Balance and mobility training can help regain function and reduce the risk of falls post-fracture.

13



Cissus Quadrangularis

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 500 mg of Cissus Quadrangularis supplement daily. This dosage can be taken in a single dose or divided into smaller doses throughout the day, with or without food, according to your preference or tolerance.

TYPICAL STARTING DOSE
500 mg

Description

Cissus quadrangularis is an herbal supplement known for its potential to support joint health and reduce inflammation. It is sometimes used to alleviate joint pain and promote overall musculoskeletal well-being.

[Cissus quadrangularis](#) is a plant in the grape family [\[R\]](#).

It has long been prized as a medicinal plant. In South Asia, it’s a popular remedy for broken bones [\[R\]](#), [\[R\]](#).

According to some studies, *C. quadrangularis* may help with weight loss [\[R\]](#), [\[R\]](#).

How it helps

Cissus Quadrangularis is known to promote bone health and accelerate the healing process of fractures by enhancing bone formation and reducing bone loss. Studies have shown its effectiveness in improving bone mineral density.

14



Dietary Magnesium

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Increase your intake of magnesium-rich foods such as leafy green vegetables, nuts, seeds, and whole grains. Aim to include these foods in your diet daily, following the recommended dietary allowance of 320 mg per day for women and 420 mg per day for men.

Description

Magnesium is a vital mineral involved in over 300 biochemical reactions in the body. It supports various functions, including muscle and nerve function, bone health, and blood sugar regulation.

Magnesium is an essential mineral. Your body needs it for [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Muscle, nerve, and bone function
- Blood sugar and blood pressure control
- DNA and protein production
- Strong immunity

Women need **310-320 mg** of magnesium per day, while men need **400-420 mg** [\[R\]](#).

Foods rich in magnesium include **nuts, seeds, and leafy greens**. Magnesium is also available as a supplement [\[R\]](#).

How it helps

Magnesium helps in the formation of bone mineral and improves bone density. This can lead to stronger bones, reducing the risk of fractures.

15



Stability Training

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Integrate stability exercises into your workout routine 2-3 times per week. These exercises include activities such as using a stability ball, performing balance exercises on a balance board, or doing body-weight exercises that focus on balance and core strength, such as planks and single-leg stands. Spend approximately 20-30 minutes per session focusing on these exercises.

TYPICAL STARTING DOSE

30 minutes

Description

Stability training is a form of exercise that focuses on enhancing core strength and balance through targeted movements and exercises, often incorporating equipment like stability balls, balance boards, or resistance bands. It helps improve overall stability and posture while reducing the risk of falls and injury.

How it helps

Stability training can help prevent falls by improving balance, particularly following lower extremity fractures.

16



Dietary Protein

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Include a variety of protein sources such as meat, fish, eggs, dairy, beans, and nuts in your diet every day, aiming for at least 0.8 grams of protein per kilogram of body weight. For more active individuals or those looking to build muscle, increase intake to 1.2 to 2.0 grams per kilogram of body weight daily, spread out over all meals to maximize absorption.

Description

Protein is essential for building and repairing tissues, supporting muscle growth, and maintaining overall bodily functions. Adequate protein intake is crucial for overall health and well-being.

Foods that are high in protein include:

- Eggs
- Nuts
- Beef
- Chicken
- Fish
- Yogurt
- Tofu
- Pork
- Cottage cheese

How it helps

Protein is essential for the repair and rebuilding of tissues, including bone. A sufficient intake of dietary protein can support the healing process of fractures.

17



Strength Training

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Engage in strength training exercises, such as weight lifting or bodyweight exercises, for 60 minutes per session, 2 to 3 times per week. Ensure you work all major muscle groups and rest each muscle group for at least 48 hours before exercising it again.

TYPICAL STARTING DOSE

1 hour

Description

Strength training, also called resistance or *anaerobic* training, contracts the muscles against an external resistance for short periods of time. This helps gain muscle strength, tone, and mass. This can include activities like weight lifting, pushups, and crunches.

Strength training, also known as resistance training, is a type of physical exercise that uses resistance to build strength, anaerobic endurance, and size [\[R\]](#). Some of the most common strength training methods include [\[R\]](#):

- Weight lifting
- Bodyweight exercises like push-ups, pull-ups, squats, and lunges.
- Resistance bands
- Plyometrics or explosive force exercises

The benefits of strength training are numerous, and include [\[R\]](#):

- Increased muscle strength
- Improved bone health
- Reduced risk of injury
- Improved balance and coordination
- Enhanced mood
- Boost metabolism

Consult with a doctor before starting any new exercise program, especially if you have any health conditions.

How it helps

Carefully monitored strength training can help rebuild muscle and support around the fracture site, aiding recovery.

18



Avoid Strenuous Activity

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Refrain from participating in high-intensity physical activities such as running, heavy weightlifting, and high-impact sports. Opt instead for low-impact exercises like walking, swimming, or yoga. It's important to listen to your body's signals and rest as needed, avoiding these strenuous activities until advised otherwise by a health professional.

Description

Avoiding strenuous physical activity in certain medical conditions or during illness can help prevent injury and promote better recovery. It allows the body to conserve energy and supports the healing process.

Strenuous activity is physical activity that requires a lot of effort. Exercise done at 70-85% of a person’s heart rate is considered strenuous. Examples include [\[R\]](#):

- Running, cycling, or swimming at high speed
- Running or hiking uphill
- Jumping rope
- Single tennis
- Sports that involve a lot of running (soccer, basketball, hockey, etc.)

On the other hand, strenuous daily activities include [\[R\]](#):

- Lifting and carrying heavy objects
- Gardening with heavy digging
- Shoveling snow
- Fast dancing

How it helps

Refraining from strenuous activities helps to minimize the risk of worsening the fracture or delaying healing.

19



Exercise Therapy

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Begin by consulting with a physical therapist to assess your condition and create a personalized exercise plan. Follow the prescribed exercises consistently, focusing on areas needing improvement, such as strength, flexibility, or mobility. Start with gentle exercises, gradually increasing the intensity as you build strength. Ensure you perform the exercises correctly to avoid injury. Regularly check in with your therapist to adjust the plan based on your progress and feedback. Stay committed to the routine for the best results.

TYPICAL STARTING DOSE

1 hour

Description

Exercise therapy is a tailored approach to physical activity designed to improve mobility, strength, and overall health. It is often used to rehabilitate injuries, manage chronic conditions, and promote cardiovascular fitness.

How it helps

Exercise therapy can help restore movement and strength in areas affected by a fracture.

20



Zinc

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take a 15 mg zinc supplement daily, ideally with a meal to enhance absorption.

TYPICAL STARTING DOSE

15 mg

Description

Zinc is an essential mineral found in various foods, including meat, dairy, and nuts. It is crucial for immune function, wound healing, DNA synthesis, and maintaining healthy skin and nails. Zinc supplements are sometimes used to support immune health and manage zinc deficiencies.

[Zinc](#) is an essential mineral. Your body needs it to [\[R\]](#), [\[R\]](#):

- Defend against disease
- Protect DNA from damage
- Heal wounds
- Control blood sugar

Some of the best sources of zinc include **shellfish, pork, beef, and beans**. It is also available as a supplement [\[R\]](#).

Adults should get **8-11 mg of zinc** per day [\[R\]](#).

How it helps

Zinc plays a role in bone tissue renewal and collagen synthesis, which are important processes in the healing of fractures.

21



Vitamin K

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take a vitamin K supplement of around 90-120 micrograms daily with a meal that contains fat for optimal absorption. This dosage is appropriate for adult maintenance of health and should be adjusted based on individual healthcare provider advice.

TYPICAL STARTING DOSE

90 mcg

Description

Vitamin K encompasses two main forms: vitamin K1 (phylloquinone) and vitamin K2 (menaquinone). Vitamin K1 is primarily found in leafy green vegetables and plays a crucial role in blood clotting. Vitamin K2, sourced from animal products and fermented foods, is known for its potential to promote bone health and cardiovascular wellness.

Vitamin K is essential for blood clotting and bone formation [\[R\]](#).

Good sources of vitamin K include [\[R\]](#), [\[R\]](#):

- Green leafy vegetables, such as kale, spinach, and collards
- Soy products, such as natto, roasted soybeans, and edamame
- Carrot juice
- Pumpkin

Healthy adults should get **120 micrograms** of vitamin K per day [\[R\]](#).

How it helps

Vitamin K is involved in bone mineralization and is important for the proper healing of bone fractures by aiding the bone-building process.

Please note: *Vitamin K can interact with blood thinners (e.g., Coumadin). Make sure to consult your doctor before supplementing with vitamin K or drastically changing your dietary intake.*

22

Physical Therapy

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Attend physical therapy sessions 2-3 times per week for a duration of 4-6 weeks, depending on your specific condition and the advice of your healthcare provider. Each session typically lasts about 30-60 minutes, where a licensed therapist will guide you through targeted exercises, stretches, and possibly other treatments like electrical stimulation or ultrasound therapy.

TYPICAL STARTING DOSE

30 minutes

Description

Physical therapy is a therapeutic practice focused on optimizing physical function and mobility through specialized exercises, manual techniques, and therapeutic modalities. It helps individuals recover from injuries, manage chronic conditions, and improve overall physical well-being by enhancing strength, flexibility, and pain management.

Physical therapy (physiotherapy) helps people regain or maintain their ability to move [\[R\]](#).

Physical therapy can involve [\[R\]](#):

- Joint or muscle exercises
- Corrective movements
- Massage
- Education and advice

People mainly use physical therapy to help with [\[R\]](#), [\[R\]](#):

- Pain and injury
- Stroke recovery
- Chronic health conditions
- Headaches

Mirror therapy uses a mirror placed between the arms or legs. The image of a moving arm or leg gives the illusion of normal movement in the affected one. This therapy stimulates different brain regions and aims to improve mobility [\[R\]](#).

Constraint-induced movement therapy is another type of physical therapy. It consists of restraining the healthy leg or arm to increase the use of the affected one [\[R\]](#).

How it helps

Physical therapy provides targeted exercises to help rehabilitate the area affected by the fracture.

23



Dietary Vitamin C

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate foods rich in Vitamin C into your daily diet, such as oranges, strawberries, red peppers, kale, and broccoli. Aim to consume 5 servings of fruits and vegetables per day to meet the recommended dietary allowance of Vitamin C, which is 90 mg for adult men and 75 mg for adult women.

Description

Vitamin C is an antioxidant that supports the immune system, collagen production, and wound healing. It also enhances iron absorption from plant-based foods and contributes to overall health.

[Vitamin C](#) is an essential nutrient. This means that our bodies can’t produce it on their own, so we have to get it from food or supplements [\[R\]](#).

Vitamin C has antioxidant properties. It supports immunity, heart health, and wound healing [\[R\]](#), [\[R\]](#).

Vitamin C deficiency is called *scurvy*. In the past, many sailors suffered from it [\[R\]](#).

How it helps

Vitamin C is necessary for collagen production, an important component of bone tissue, and may assist in the repair of fractures.

24



Avoid High-Impact Exercise

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Opt for low-impact activities such as swimming, cycling, or walking instead of running or jumping exercises. Engage in these alternative exercises for at least 150 minutes per week, spread out over several days to ensure rest periods between sessions.

Description

For individuals with certain medical conditions or joint issues, avoiding high-impact exercise can help prevent injuries and joint strain. Choosing lower-impact activities like swimming or cycling can provide similar cardiovascular benefits while minimizing the risk of overuse injuries.

How it helps

Avoiding high-impact exercises protects the fractured area from additional stress and can prevent further injury.

25



Vitamin D and Calcium

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 600 IU of vitamin D and 1000 mg of calcium daily. For adults over 70 years, the vitamin D intake should be increased to 800 IU daily. These supplements can be taken together or separately, usually with a meal to enhance absorption, and it is advisable to continue this regimen as part of your daily routine indefinitely unless advised otherwise by a healthcare provider.

Description

Vitamin D plus calcium supplements typically combine vitamin D, often sourced from sunlight exposure or dietary sources, with calcium, primarily found in dairy products and leafy greens. This combination is used to promote bone health, reduce the risk of osteoporosis, and support overall musculoskeletal well-being.

How it helps

Vitamin D and calcium are essential for bone health. They help to increase bone density and improve bone strength, which can aid in the healing of fractures.

26



Avoid Lifting Heavy Objects

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Refrain from picking up items that require significant strain or exertion, typically defined as those weighing more than 25 pounds (11 kilograms), to avoid unnecessary pressure on your body. This restriction should be adhered to as long as your healthcare provider advises, which may be indefinitely for chronic conditions or for a specific recovery period following surgery or injury.

Description

Avoiding improper lifting techniques when handling heavy objects can help prevent back injuries and musculoskeletal strain. Practicing safe lifting methods and using proper equipment promotes spine and musculoskeletal health.

How it helps

Not lifting heavy objects prevents undue strain on the skeletal structure during fracture healing.

27



Calcium Supplements

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 500-600 mg of calcium supplement twice daily with food. For best absorption, do not exceed 600 mg at one time and ensure a total daily intake of 1000-1200 mg from all sources, including diet. Continue indefinitely for ongoing support of bone health.

TYPICAL STARTING DOSE

1000 mg

Description

Calcium supplements are commonly used to support bone health and prevent conditions like osteoporosis. Adequate calcium intake is essential for maintaining strong bones and teeth.

[Calcium](#) is the most abundant mineral in the human body. It is vital for the bones, heart, muscles, and nervous system [\[R\]](#).

Your body gets calcium from food and needs vitamin D to help absorb it. Calcium can be found in a variety of foods, including [\[R\]](#):

- Dairy products
- Green, leafy vegetables
- Fish with edible soft bones (e.g., sardines)
- Calcium-fortified foods and beverages

How it helps

Calcium is essential for bone health and plays a critical role in bone repair. It provides the necessary mineral for new bone tissue to form during the fracture healing process.

28



Low-Intensity Exercise

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate 60 minutes of low-intensity activities, such as walking or gentle yoga, into your daily routine. Aim to do this 5 days a week to achieve the best results.

TYPICAL STARTING DOSE

1 hour

Description

Low-intensity exercise, such as walking or gentle yoga, provides numerous health benefits, including improved cardiovascular health, stress reduction, and enhanced overall fitness without the strain of high-intensity workouts.

How it helps

Gentle, low-intensity exercises can promote recovery by increasing blood flow without overloading the fracture site.

29



Aquatic Exercise

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Participate in aquatic exercise sessions, such as swimming or water aerobics, for 60 minutes, 3 to 5 times per week. Ensure the exercise intensity is moderate, allowing you to talk but not sing during the activity. Consistency over time is key, so aim to incorporate this into your weekly routine for at least 3 to 6 months to observe benefits.

TYPICAL STARTING DOSE

1 hour

Description

Aquatic exercise involves physical activity performed in water, such as swimming, water aerobics, or aquatic therapy. It is gentle on the joints, making it suitable for individuals with mobility issues, and can help improve cardiovascular fitness and muscle strength.

Aquatic exercise is any type of low-impact physical activity performed in a pool. In this type of cardio exercise, water helps the body float, which reduces gravity and makes the practice more comfortable and tolerable [\[R\]](#), [\[R\]](#).

Compared to land-based exercise, aquatic exercise may be better by [\[R\]](#):

- Reducing the stress and impact on joints
- Lowering fracture risk

Hence, it is usually **recommended for the elderly**. Aquatic exercise is also suitable for people who don't know how to swim [\[R\]](#).

How it helps

Aquatic exercises reduce the load on the fracture site due to water's buoyancy, aiding in safe rehabilitation.

30

Dietary Copper

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate foods rich in copper into your daily diet. Include servings of shellfish, whole grains, nuts, seeds, potatoes, and dark leafy greens. Aim for an intake of 900 micrograms of copper per day for adults, adjusting slightly based on age and gender.

Description

Dietary copper is the copper you get from the food you eat. Your body needs it for various functions, including maintaining healthy nerves, bones, blood, and immune system. Not getting enough copper can lead to health problems, so it's important to consume it in recommended amounts.

How it helps

Genetically higher copper levels may be causally associated with a reduced risk of fractures [\[R\]](#).

31

Collagen Peptides

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take 10-20 grams of collagen peptides daily, mixing the powder into a glass of water, juice, or a smoothie. It is recommended to consume this supplement on an empty stomach to improve absorption, ideally first thing in the morning or right before bedtime for a period of at least 8-12 weeks to observe beneficial effects.

TYPICAL STARTING DOSE

10 g

Description

Collagen peptides are a form of collagen that is broken down into smaller, more easily absorbed molecules. They are commonly used in supplements and skincare products for their potential to promote skin elasticity, hair strength, and nail health.

[Collagen](#) is a protein that helps build skin, bones, and joints [\[R\]](#), [\[R\]](#).

People use collagen supplements for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Joint pain
- Skin health
- Hair growth

How it helps

Collagen peptides support bone health by providing essential proteins that are crucial for the structure and strength of bones. They help in improving bone mineral density and may aid in fracture healing.

32



Vitamin K2

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Take a vitamin K2 supplement once daily with a meal that contains fat, as fat increases its absorption. The recommended dosage can vary depending on the specific supplement but typically ranges from 100 to 300 micrograms per day. It is important to continue this supplementation daily for ongoing benefits to bone and cardiovascular health.

TYPICAL STARTING DOSE

100 mcg

Description

Vitamin K2 is a beneficial nutrient we often lack. It's like a traffic cop for your body, directing calcium to your bones and teeth where it's needed, rather than letting it clog up your arteries and organs. Ensuring you get enough Vitamin K2 boosts your bone and heart health.

How it helps

Vitamin K2 helps in the utilization of calcium in the body, directing it to bones, which supports bone healing and prevents fractures.

Next Steps

Remember, your genes only tell one important part of your health story!

Now that you've seen your DNA-based results for this health topic, let's take a look at other contributing factors.

Your lab results

Your lab results are impacted by the combined effect of your genes, environment and lifestyle.

Lab tests will give you the best picture of your current health status, while your genes provide insight into your health predispositions and which recommendations are best for you.

	TSH	2.76 mIU/mL		9 Nov 2025
	Phosphorus	2 mg/dL		9 Nov 2025
	SHBG	39.3 nmol/L		9 Nov 2025
	GGT	9 IU/L		9 Nov 2025
	Calcium, Ionized	1.1 mmol/L		9 Nov 2025
	Vitamin D, 25-Hydroxy, Total	58.59 ng/mL		9 Nov 2025
	Estradiol	101.46 pg/mL		9 Nov 2025
	Testosterone, Total	1500 ng/dL		9 Nov 2025
	Calcium	9.2 mg/dL		9 Nov 2025