

Exercise and Why it Matters to Transplant/Cell Therapy Recipients

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Educational — not medical advice



What we'll cover



Why movement matters

What cancer treatment does to muscle and the immune system



What the research shows

Five studies, in plain language



Why it's hard

Real barriers — and which ones are not your fault



Medicines being studied

Possible 'bridges' for people who can't exercise yet



What you can do now

No gym. No trainer. No equipment.



Take-home points

Four things to remember

1

Why movement matters

Cancer treatment changes the body in ways that movement can help reverse



START HERE

The big idea



For the first time, a large randomized trial has shown that structured exercise after cancer treatment does not just make people feel better — it helps them live longer, cancer-free.



Exercise is now evidence

It has moved from 'good for you' to a treatment with survival data behind it.



Muscle is an organ

Working muscle sends signals that lower inflammation and support the immune system.



The dose is walkable

The program that improved survival was built around brisk walking — not a gym membership.

THE PROBLEM

What intensive treatment does to the body

Chemotherapy, radiation, and transplant can speed up processes that normally happen slowly with aging.



Muscle loss

Strength and lean mass fall quickly during hospital stays and steroid treatment.



Fatigue and low reserve

Everyday tasks take more effort; energy runs out sooner.



Ongoing inflammation

Inflammatory signals stay switched on long after treatment ends.



An 'older' immune system

Fewer fresh, naïve T cells — the ones that respond to new threats.



The encouraging part: several of these changes appear to be reversible with training — even in people who feel frail.

Frailty is not only about age

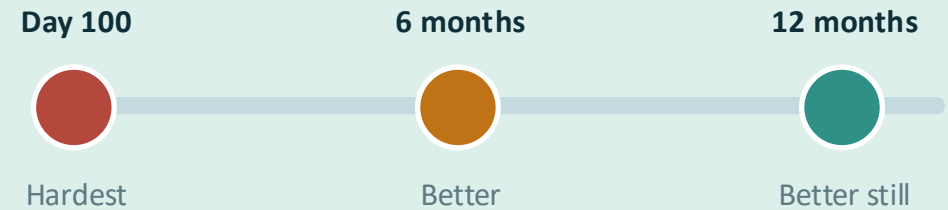


What "frailty" actually means

- Low energy or feeling worn out
- Unintentional weight loss
- Weakness and slow walking speed
- Low physical activity
- Exercise feeling harder than it used to

Younger people meet these criteria too — including transplant recipients in their 30s and 40s.

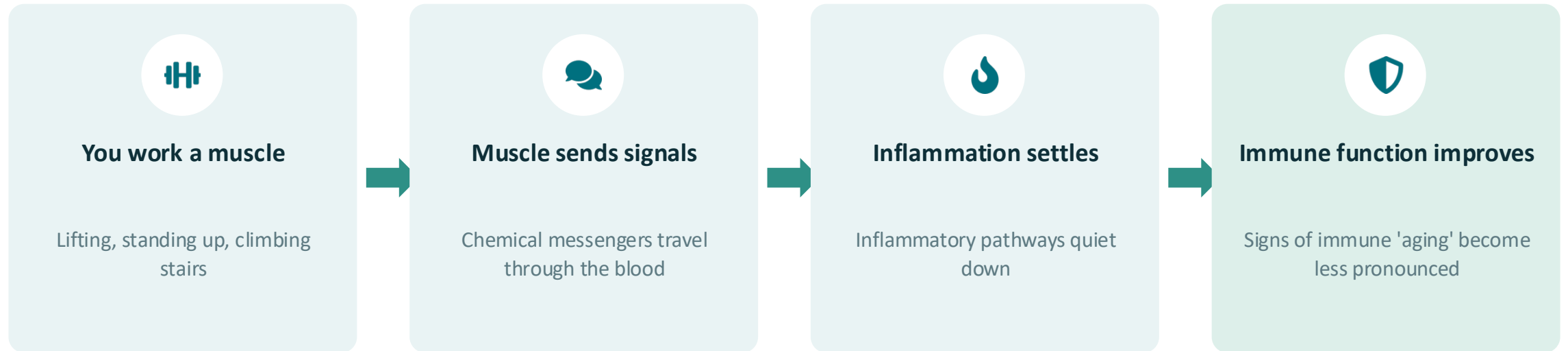
After transplant, difficulty peaks early



Why this matters to you

The hardest weeks are also the weeks when movement helps most. Early on, the goal is small and frequent — not long and hard.

Muscle does more than move you



This is not just a theory



In a study of cancer survivors and their care partners, ten weeks of strength training made the survivors' immune-related gene activity look statistically indistinguishable from their healthy partners' — differences that were clearly present before training.

2

What the research shows

Five studies that changed how we think about exercise and cancer



SO THE NEXT SLIDES MAKE SENSE

A quick guide to reading medical evidence



Randomized trial

People are assigned by chance to one approach or another. The strongest kind of evidence, least likelihood of bias.



Pilot study

A small first study to see whether something is safe, doable, and worth testing further. Promising, but not proof.



Laboratory study

Work in cells or animals that explains why something happens. Explains mechanisms; does not yet prove patient benefit.



All three matter. They answer different questions — does it work, is it doable, and why does it work?

The CHALLENGE trial



Who took part

889 adults who had finished chemotherapy for high risk stage II/III colon cancer after surgery and chemotherapy, and who were not very active at the start



What they did

A 3-year walking-based program with coaching — about 45–60 minutes of brisk walking, 3–4 times a week



Compared with

Written health and nutrition information, plus their usual check-ups



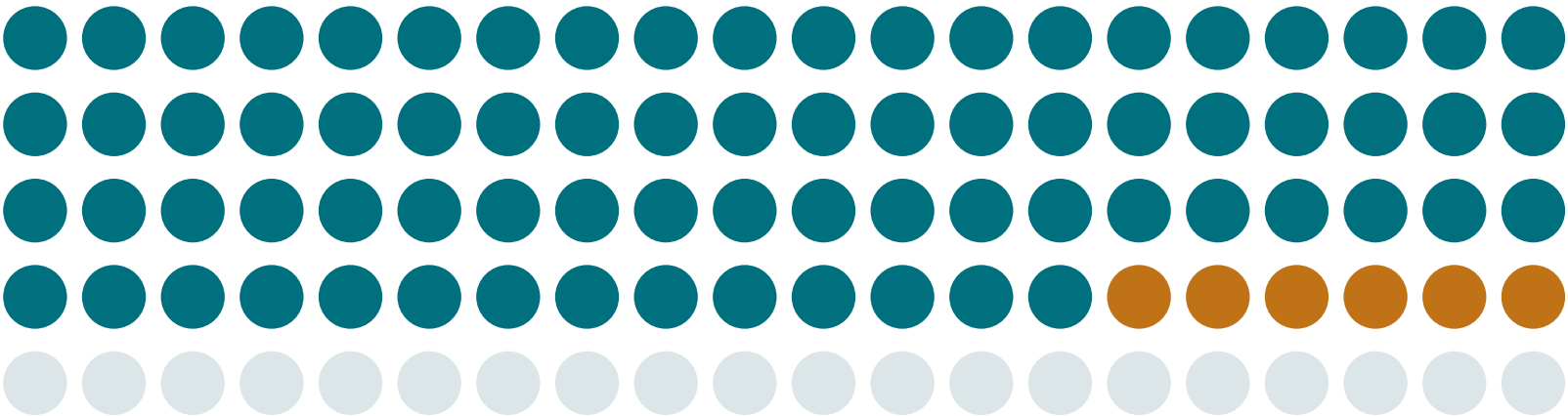
Followed for

Nearly 8 years on average, across 55 medical centers

This trial deliberately enrolled people doing less than 150 minutes of activity per week — people starting from where most patients actually start.

What that meant for 100 people

Imagine 100 people finishing chemotherapy for colon cancer. Five years later, here is how many were still cancer-free.

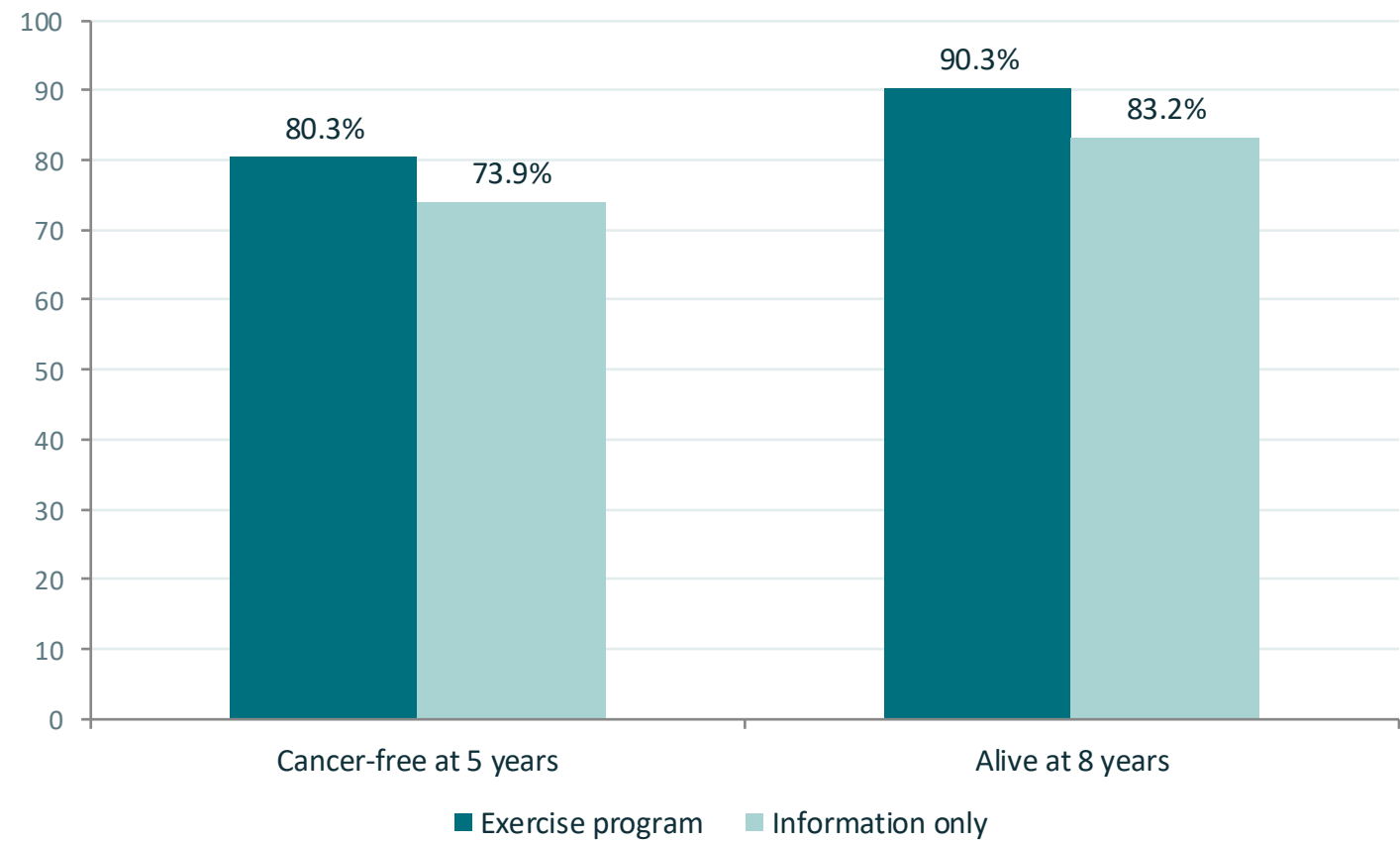


- 74 were cancer-free with information alone
- 6 MORE were cancer-free because of the exercise program
- 20 had the cancer return or died

6 in 100

is the size of the benefit — from walking, at 5 years

CHALLENGE: the numbers



28%

lower risk

of the cancer coming back, a new cancer, or death



In everyday terms

About 6 more people out of every 100 were still cancer-free at 5 years, and about 7 more out of every 100 were still alive at 8 years.

Why this trial changed the conversation



It was the missing proof

We already knew active people did better. This trial assigned activity by chance, so the benefit can be credited to the exercise itself.



The benefit is comparable to some drugs

Few added treatments in this setting produce a survival difference of this size.



The 'equipment' was a pair of shoes

The prescription was brisk walking. What the trial paid for was coaching and support — not machines.



It was reasonably safe

Muscle and joint aches were more common in the exercise group, and about 1 in 10 of those were linked to the program itself.

PREFERABLE-EFFECT



The question

Can exercise help people living with cancer that has spread — where the goal is living well, not cure?

The study

- 357 adults with metastatic breast cancer
- 9-month supervised program: strength, aerobic, balance
- Two 1-hour sessions per week
- Six countries; most had cancer in the bone

What improved



Physical fatigue



Overall quality of life



Fitness and physical function



Everyday activities and social life



Pain



Shortness of breath

Still present at 9 months — the benefits did not fade.

"But is it safe if cancer is in my bones?"



This is the most common worry patients raise — and the trial allowed tailoring for this.

2

serious exercise-related events

among 178 people in the exercise group — a wrist fracture and a stress fracture in the pelvis

0

occurred at a cancer site

none of those events happened at a place where cancer was present in the bone

2

kept going afterward

both participants continued the program, with adjustments to their exercises



The exercises were adjusted based on exactly where the cancer was — that tailoring is what made it safe.

Exercise delivered by video call, after transplant



Who and what

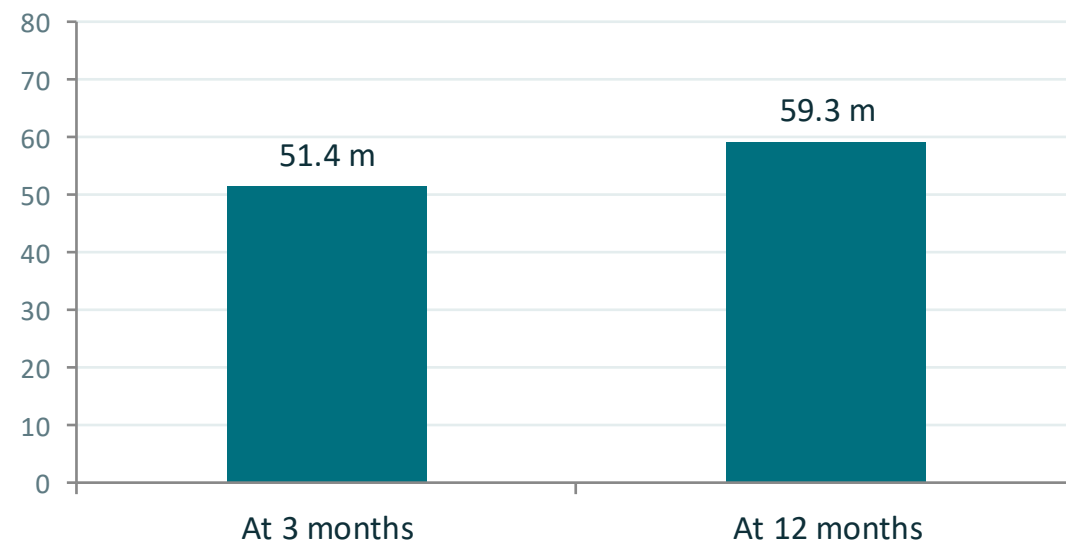
139 adults more than 6 months after stem cell transplant — both donor (allogeneic) and self (autologous). Six weeks of personalized exercise plus stress-management training, delivered entirely online.



Why it matters

No travel. No gym. No infection risk from a crowded space. This is the model that works when you live far away or your immune system is still recovering.

How much farther they could walk than the comparison group



Gains appeared by 3 months and were still there a year later.

Strength training with your care partner



Who

8 long-term survivors (mostly donor stem cell transplant) who met criteria for frailty — plus 8 healthy care partners who trained alongside them



Where

A regular community gym, not a hospital



What

10 weeks of personalized strength training with a certified trainer — at least one group session a week



Measured

Strength, body composition, blood tests of immune activity, and gut bacteria



This was a small first study — encouraging, but not yet proof. Larger studies are the next step.

Survivors got stronger just as fast as their partners



2x+

More than doubled

Both survivors and their healthy care partners more than doubled how much work they could do



25

Sessions, on average

Over 10 weeks — roughly two to three workouts per week



0

Serious problems

No serious training-related adverse events occurred during the study



The myth this puts to rest

Many people assume that chemotherapy permanently blunts the body's ability to build strength. In this study, the percentage improvement in survivors was not meaningfully different from their healthy partners'. Your muscles can still respond.

What changed on the inside

Researchers compared blood and gut samples before and after the 10 weeks of training.



BEFORE TRAINING

- Higher inflammatory signalling than their healthy partners
- Fewer signs of fresh, naïve immune cells
- Differences in gut bacteria activity



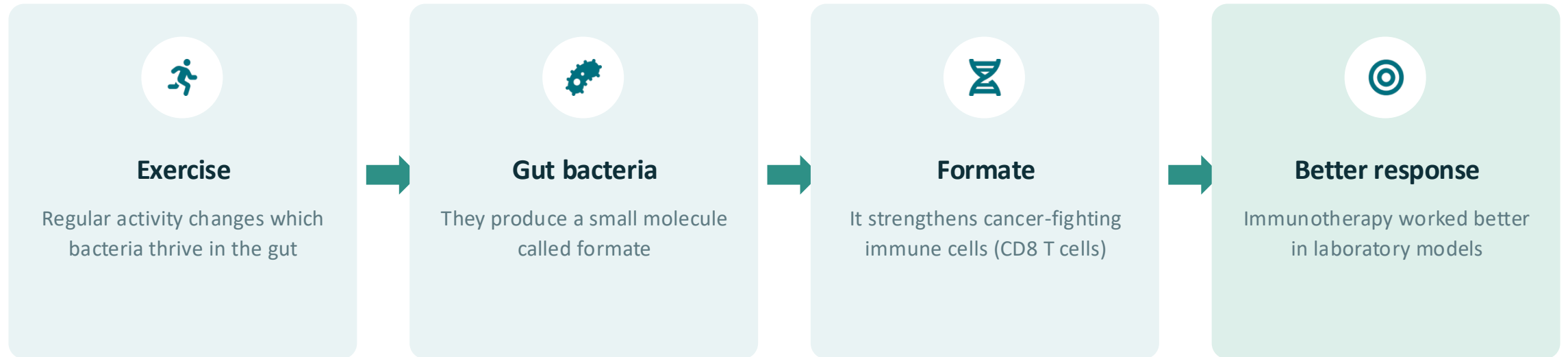
AFTER 10 WEEKS

- No statistically significant differences in immune gene activity remained
- The naïve immune-cell differences resolved
- Gut bacteria differences were no longer significant



The healthy care partners showed almost no change — suggesting survivors had the most to gain.

How exercise may help immune treatments work



Why it's exciting

It begins to explain HOW exercise fights cancer — and points to a possible pill for people who cannot exercise.

What it is not, yet

This work was done mostly in laboratory models. Do not buy supplements based on it — it has not been in patients yet.

The evidence at a glance

Study	Who it studied	What it found	Type
CHALLENGE	Colon cancer	Longer survival, less recurrence	Randomized
PREFERABLE-EFFECT	Metastatic breast cancer	Less fatigue, better quality of life	Randomized
Telehealth after transplant	Stem cell transplant	Walked farther; lasted 12 months	Randomized
Strength & immune pilot	Transplant survivors	Stronger; immune signs normalized	Pilot
Exercise & gut bacteria	Laboratory models	Explains how exercise may work	Laboratory

3

Why this is hard

The barriers are real — and most of them are not your fault



How active are people actually?

These numbers come from studies that measured activity with step counters and questionnaires — not from guessing.



83%

did not meet guidelines

Among transplant survivors at least a year out
from transplant



~3,700

steps per day

Average around day 100 after transplant —
well below recommended levels



16 min

of active time daily

Median among motivated long-term survivors
AND their care partners



The point is not to shame anyone

Almost everyone starts low. If you feel like you're behind, you're actually typical — and the studies that showed benefit enrolled people starting from exactly here.

Barriers that are truly physical



Timing

Difficulty peaks around day 100 after transplant — exactly when exercise would help most.



Steroids

Steroid treatment causes muscle weakness, especially in the thighs and shoulders.



Blood counts

Low platelets or low red cells can limit what's safe on a given day.



Graft-versus-host disease

Skin tightening and joint stiffness can limit motion and require modified exercises.



Infection risk

A crowded public gym is a genuine exposure concern while the immune system recovers.



Nerve and heart effects

Numbness, balance changes, and reduced heart and lung reserve are common.



These are reasons to modify the plan with your team — not reasons to do nothing.

Barriers built into the health system



15%

of patients are referred to an exercise program



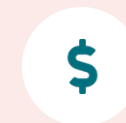
24%

of community cancer practices offer exercise or rehab services



2%

of hospitalized transplant patients were referred to physical therapy



Rarely

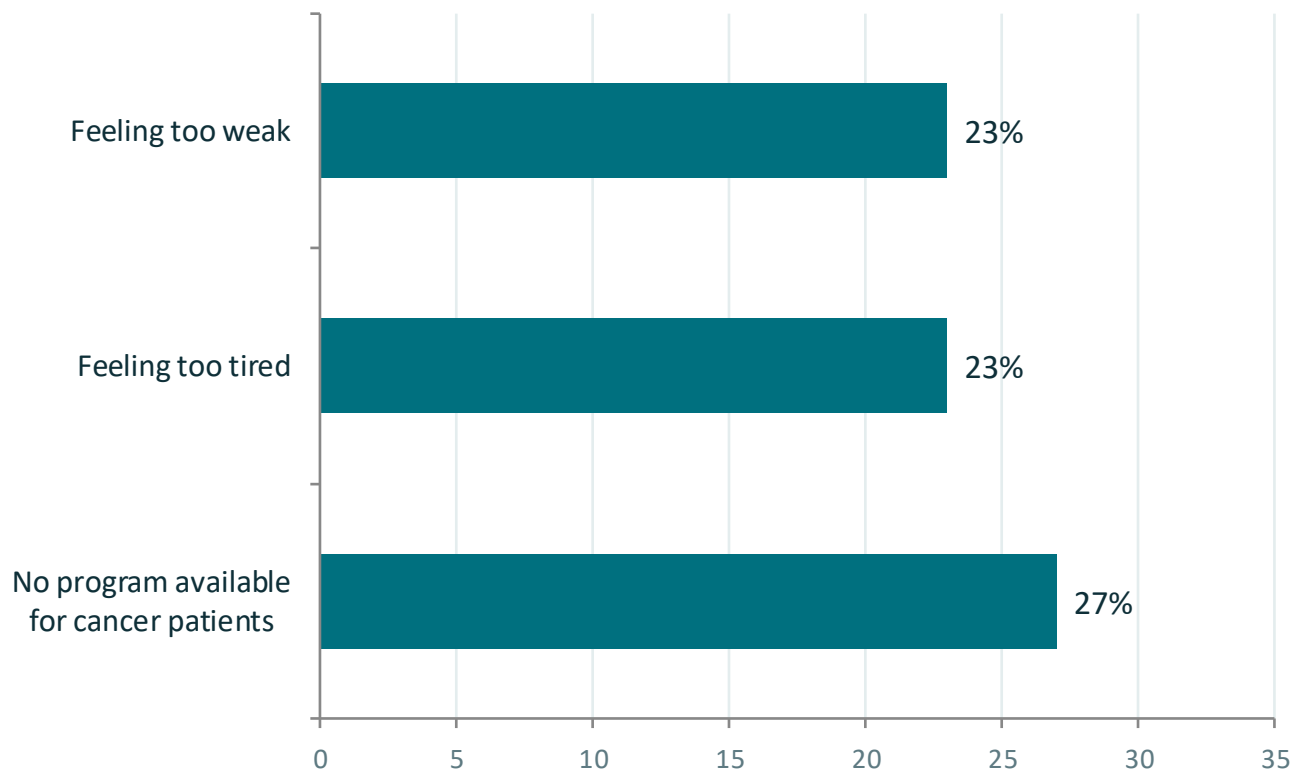
is an exercise professional covered by insurance

What this means for you



If nobody has talked to you about exercise, that is a gap in the system — not a sign that it doesn't apply to you. It is completely reasonable to raise it yourself at your next visit and ask whether a referral is available.

Barriers for people who already want to exercise



The biggest barrier wasn't willpower

The most common answer was that no suitable program existed — a problem of access, not motivation.



A confidence gap in strength work

68% felt they had the skills for walking or aerobic exercise — but only 35% felt that way about strength training.

4

Medicines being studied

Possible 'bridges' for people who cannot exercise yet



What scientists mean by a "bridge"



A bridge is a treatment that holds ground during the weeks when exercise is impossible — so that when you can move again, you are starting from a better place.



Protect muscle

Slow or prevent the muscle loss that happens during hospital stays and steroid treatment



Preserve the ability to respond

Keep the body able to gain strength once training becomes possible



Copy some immune benefits

Reduce inflammation without requiring physical activity



None of these is approved for this purpose today. All are still being studied. None replaces exercise.

Blocking a signal called GDF-15



Example drug: ponsegromab (investigational)

How it works

GDF-15 is a protein that rises in some cancers and tells the brain to reduce appetite and activity. An antibody can block it.

Where it stands

Randomized phase 2 complete; larger trials underway

Important caveat

Studied so far in advanced solid tumors, not in transplant.

What researchers have found

- In a 187-person randomized trial in people with cancer-related weight loss and high GDF-15 levels, blocking it increased body weight
- Appetite, muscle mass, and daily physical activity also improved
- Larger studies to support approval began in 2025



Blocking the brakes on muscle growth

Example drugs: bimagrumab, apitegromab (investigational)

How it works

The body makes proteins (myostatin, activin) that limit muscle growth. Blocking their receptor lets muscle grow — no lifting required.

Where it stands

Randomized phase 2 in obesity; not yet tested after transplant



Important caveat

Bigger muscles have not yet reliably meant stronger or more capable patients. This is the field's key unsolved problem.

What researchers have found

- In a trial combining one of these with a weight-loss drug (semaglutide, a GLP1 receptor agonist), participants on the weight-loss drug alone lost 7.4% of their lean mass
- Those who also received the muscle-protecting drug gained 2.5% lean mass instead
- The combination reduced lean mass by 2.9%. A second drug preserved about half of the muscle that would otherwise have been lost



Clearing worn-out senescent “zombie” cells

Example: dasatinib plus quercetin, or fisetin (senolytics)

How it works

Treatment leaves behind damaged cells that stop dividing but keep releasing inflammatory signals. Short drug pulses can clear them.

Where it stands

Phase 2 trials underway in cancer survivors



Important caveat

Given as brief pulses, often just 2–3 days. Do not try this with over-the-counter supplements — dosing and safety are unresolved.

What researchers have found

- A trial in adult survivors of childhood cancer is testing short courses of these drugs
- It measures walking speed AND the amount of these worn-out cells in blood
- An earlier trial in lung scarring showed improved physical function

Electrical muscle stimulation



A device, not a drug

How it works

Sticky pads on the thigh deliver a gentle electrical current that makes the muscle contract — even if you're in bed and cannot exercise.

Where it stands

Randomized trial in autologous transplant, completed but results are not yet published

Important caveat

The most practical option for people who genuinely cannot get out of bed — but results are not in yet.

What researchers have found

- A randomized trial in transplant patients is testing it against a sham (inactive) device
- It measures how far patients can walk in six minutes, before transplant and about a month after
- The trial exists precisely because most patients stay sedentary during transplant



Gut-derived molecules in a capsule

Example: urolithin A; also formate (research stage)

How it works

Some benefits of exercise appear to come from molecules made by gut bacteria. Researchers are testing whether taking them directly helps.

Where it stands

Randomized trials in healthy adults; not yet in cancer patients

Important caveat

Results are mixed and none of this has been tested after transplant. Talk to your team before taking any supplement.

What researchers have found

- In a randomized trial in untrained middle-aged adults, four months improved leg muscle strength by roughly 10–12%
- Markers of mitochondrial health and inflammation also improved
- A separate trial in older adults did not meet its main goals, though muscle endurance improved

The honest bottom line on medications



Real reasons for optimism

- Several approaches now have positive randomized results
- One device trial is running in transplant patients specifically
- Larger, approval-focused studies are underway



Reasons for caution

- None is approved for this purpose today
- Almost none has been tested after transplant
- Adding muscle has not yet reliably meant added strength

The most useful way to think about this



These treatments are being designed to buy you enough muscle and enough reserve to reach the point where you can do the real thing. They are bridges TO exercise — not replacements for it. If any interests you, the right next step is asking your team whether a clinical trial is open.

5

What you can do now

No gym. No trainer. No equipment.



Five things within your control

1



Walk with intent

The intervention with survival data behind it needed only shoes

2



Stand up from a chair

Bodyweight strength work you can do anywhere

3



Train as a pair

The most consistent thing that helps people keep going

4



Measure something

Make your activity visible — to yourself and your team

5



Protein and sleep

Give your body what it needs to use the work you did



Every one of these is free, and every one is a decision you can make today.

Walk with intent



What to do

- Brisk walking — enough that talking takes a little effort
- Build toward 45–60 minutes, 3–4 times per week
- Ten-minute pieces count; the weekly total matters
- Indoors, hallways, and shopping malls all count



What's in your control

The dose. This is the part patients most often assume required something expensive. It did not — the trial paid for coaching, not for equipment.

The weekly dose that was studied



45–60
min



45–60
min



45–60
min



45–60
min

80.3% vs 73.9%

Cancer-free at 5 years — walking program vs. information alone

A realistic first goal: if you're at about 16 active minutes a day, aim for 25. That alone moves you meaningfully toward the level studied.

Stand up from a chair — and keep count



Sit-to-stand

Rise from a chair without using your hands. The most useful movement to practice.



Counter push-up

Hands on a kitchen counter, body straight, lower and press back up.



Step-up

Step onto the bottom stair and back down. Hold the rail.



Hip hinge

Stand tall, push hips back, feel the back of the legs, return upright.

How to make it count

- 10–15 minutes, 2–3 times per week
- Write down how many repetitions you did
- Add one or two repetitions next week
- Stop a few reps before you can't do another

Why counting reps is the key

The transplant study measured progress as total work done — repetitions multiplied by weight — rather than a single heavy lift. That was chosen deliberately: it is safer for untrained people, and with bodyweight it means adding repetitions IS the progression.

Train as a pair — the care partner too



This is the single most consistent finding about sticking with it across every study reviewed here.



Not supervision — participation

The care partner exercises too, at their own level. Same session, same schedule.



Care partners benefit too

Partners in these studies were often out of shape themselves. This is not charity.



It shows up in the numbers

In one transplant program, patients who completed all sessions roughly doubled their daily steps.



If you have no partner available: a phone call at a set time, or a walking group, does much of the same work.

Measure something — and hold a floor

1

Week 1

Track a normal week without changing anything. That's your true starting point.

2

Set a floor

A daily number you can hit even on a bad day. Protect the floor above all.

3

Set a target

A number for good days. Aim for it, but never at the cost of the floor.

4

Bring it to clinic

Show your team the numbers. It turns a vague question into a real conversation.



Use what you already have

The step counter in your phone is enough. Every trial in this deck gave people a tracker — because watching the number is itself part of what works.



Also worth watching

Time spent sitting. In one trial, the exercise group cut sedentary time by about 85 minutes a day.

Feed the work, and protect your sleep



Protein

- Spread protein across all your meals rather than saving it for dinner
- Include a protein source at breakfast — the meal most often missing it
- The goal is building muscle, not losing weight
- Ask for a dietitian referral if eating is difficult

Put the scale away. In the transplant study, most participants lost weight while GAINING muscle — the scale would have called that a failure.



Sleep

- Muscle repair and immune recovery happen during sleep
- Same bedtime and wake time, including weekends
- Keep daytime naps short so nights stay solid
- Tell your team if pain, steroids, or worry keep you awake — this is fixable

In one survivor study, median sleep was under 7 hours a night — with some nights far shorter.

PLEASE DO THIS FIRST

Before you start: three questions for your team



Are there any limits on my bones?

Cancer in the bone, thinning bones, or a healing fracture can change which movements are safe.



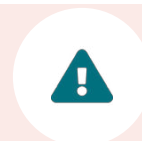
Are my blood counts safe for exercise today?

Low platelets or low red blood cells may mean going gentler for a while.



Do I have any joint or skin restrictions?

Graft-versus-host disease can tighten skin and stiffen joints. Ask which joints need care.



Stop and call your team for chest pain, sudden shortness of breath, dizziness, fever, or a fall.

A STARTING POINT, NOT A PRESCRIPTION

What a first week could look like

Mon



Walk 10 min

Tue



Chair stands
+ push-ups

Wed



Walk 10 min

Thu



Rest or
gentle stretch

Fri



Chair stands
+ step-ups

Sat



Walk 15 min
with partner

Sun



Rest



Next week

Add five minutes to one walk, or one repetition to each strength exercise. Small and repeatable beats ambitious and abandoned.



On a hard day

Do the floor, not the target. Five minutes of walking on a bad day protects the habit better than skipping and restarting.



Take-home points

Four things worth remembering



Four things to remember

1



Movement is treatment, not just self-care

A large randomized trial showed a walking-based program improved survival and lowered the risk of cancer returning.

2



Your body can still respond

Survivors who trained gained strength as fast as their healthy partners — and signs of immune aging improved.

3



The barriers are mostly not yours

No referral, no nearby program, no insurance coverage — these are system failures. Ask anyway.

4



Start smaller than feels impressive

Walk, stand up from a chair, count the repetitions, bring a partner. That is the whole program.



Bring this deck to your next appointment and ask: what's safe for me, and is there a program you can refer me to?

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Start where you are.

Two minutes of exercise is better than zero minutes.



This deck is educational and does not replace individual medical advice.