

# Movement

KRKT:TIDE · KRKT's Type 1 Diabetes Education

**In an emergency.** Someone with type 1 who is confused, very drowsy, can't swallow or is unconscious: call 911.

Education, not medical advice. Every dose, ratio and target belongs with your own diabetes team.

# Movement

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*Why a run and a sprint do opposite things to blood sugar, what the real risk is, and how to train without being afraid of it.*

This section is for people with type 1 diabetes, and for the families, coaches and training partners around them. It explains why the same person can go low on a jog and high after a sprint, what being active is actually worth, and how to manage the lows it brings.

It starts by naming the fear. Fear of hypoglycemia is the single most documented reason people with type 1 stop exercising — and in children, it is often the parent's fear rather than the child's. That is an expected, well-known obstacle, and the pages below are meant to make it smaller.

The pages follow a session from start to finish: why blood sugar moves in two directions, what exercise does and doesn't do for you, where to be before you start, fuelling and checking while you move, the long tail of risk afterwards, game day, gear and conditions, and what coaches need to know.

This is education, not medical advice. Every number here is a published starting point, not your dose. Insulin adjustments belong with your diabetes team.

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Sources: Riddell et al. 2017, exercise consensus statement (Lancet Diabetes & Endocrinology) · ISPAD 2022 exercise guidelines · Diabetes Canada Clinical Practice Guidelines, Chapter 10 · ADA 2016 position statement

## Why exercise can send blood sugar up or down

*A steady jog usually lowers blood sugar; a sprint or heavy lift usually raises it. Here is why, and why so few people with type 1 are taught this.*

If you have ever gone low on a gentle bike ride and then high after a hard gym session, and wondered what you did wrong, this page is for you. Most of the time you did nothing wrong. Different kinds of exercise push blood sugar in opposite directions, and almost nobody explains that.

## Most people with type 1 do no structured exercise

Around **60% of people with type 1 do no structured exercise at all**, and fewer than one in five manage aerobic exercise more than twice a week.

The reasons are consistent across every study that asks:

- fear of going low
- fear of the numbers becoming unpredictable

- simply not having been taught how

In children, the guidelines name **parental hesitancy** outright as a barrier. That is worth saying plainly: it is a documented, expected obstacle, not a personal failing and not "overprotectiveness". Parents rarely hear it described that way, and it helps to.

This section is about removing the third reason — not having been taught — so that the first two stop making the decision for you.

## A jog and a sprint do opposite things

This is the idea that explains most of the confusion people arrive with.

### Steady aerobic exercise → blood sugar usually goes down

Jogging, cycling, swimming laps, a long walk, most running in team sports.

Working muscles pull glucose out of the blood. The insulin you injected doesn't switch off the way a working pancreas would, so there is still plenty of it around. Blood sugar falls, often within about 45 minutes.

### Hard, short efforts → blood sugar usually goes up

Sprints, heavy lifting, intervals, a match, anything near flat-out.

Adrenaline and other stress hormones tell the liver to release glucose faster than the muscles can use it. Blood sugar **rises** — and that is a normal response, not a mistake.

## Real sessions are usually a mix

Few workouts are purely one or the other. A football practice has steady running and flat-out sprints; a gym session might be weights and then a treadmill. So the honest answer to "will this take me up or down?" is often "both, in that order".

What matters most is knowing which kind of effort you are about to do. That tells you whether to expect a fall, a rise, or some of each — and the rest of this section builds on that one distinction.

## Why this matters for the rest of the plan

Once you know which way a session is likely to push you, the other decisions start to make sense:

- how much fast glucose to carry, and when to take it
- whether a pre-exercise insulin reduction is worth discussing with your team
- why a high right after a hard session shouldn't be chased with extra insulin (more on that under after exercise)
- why nerves before a match push blood sugar up (covered on the game-day page)

Being active does bring some extra lows. The next page is honest about how many, and about what you get in return.

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Sources: Riddell et al. 2017, exercise consensus statement · ISPAD 2022 exercise guidelines · T1DEXI study

## What exercise is worth, and how much to do

*The real benefits of activity with type 1, why A1C barely moves, the trade-off in lows, and Diabetes Canada's weekly targets.*

This page answers the honest question: what does being active actually buy a person with type 1, what doesn't it do, and what does it cost? It ends with how much activity Diabetes Canada recommends.

## What it actually buys you

~2×

the risk of dying from any cause in adults with type 1 who did the least leisure-time activity, compared with those who did the most — 2,369 people followed for eleven years

That figure needs care. It comes from an observational cohort (FinnDiane), so it shows a strong association, not proof of cause. Reverse causation is plausible: people who are already sicker tend to move less. It is a striking number, but it should be read as "active people did much better", not "exercise halves your risk".

The benefits with the best support:

- **Cardiovascular fitness.** This is the most reliably proven benefit. Heart disease is the leading cause of death in type 1, and fitness is the lever with the best evidence behind it.
- **Less insulin, better cholesterol.** Total daily insulin needs fall consistently across studies. Total cholesterol improves; the individual fractions are less consistent.
- **Fewer complications.** Active adults with type 1 have less retinopathy and less protein in the urine. Regular aerobic exercise may delay nerve damage.

- **Muscle, bone and mood.** Strength, bone density and reported wellbeing are on the benefit list in every guideline.

## Exercise is not an A1C drug. Do it anyway.

It is worth being straight about this, because people who are told exercise will fix their A1C — and then watch it not move — often conclude the whole thing was a lie.

- In **children and teenagers**, most evidence points to a modest A1C drop of roughly **0.3 to 0.5%**.
- In **adults**, the effect is small and inconsistent. The best-known meta-analysis found none at all. Newer pooled analyses do find around half a percentage point, and more when the exercise prescription was properly followed.

Diabetes Canada says it plainly: unlike in type 2, most trials in adults with type 1 have **not** shown a glycemic benefit.

### Why that's fine

Part of the reason the number barely moves is that exercise lowers glucose, so people eat more carbohydrate and take less insulin to compensate. The benefit gets spent rather than banked.

The case for moving was never the A1C. It's your heart, your blood vessels, your nerves, your kidneys and how long you live.

## Better numbers and more lows — both are true

In the T1DEXI study of 497 adults with type 1, days with exercise had **76% time in range**, against 70% on sedentary days, and less time running high.

The same exercise days also had more time below range: a low on **47%** of exercise days, against **40%** of rest days.

So nobody should promise you that exercise is free. It costs some lows. Those lows are manageable, and the rest of this section is about how. The benefit is real, and it is worth the management.

One reassuring detail: across the whole study there were three severe low events — none of them on an exercise day or the day after.

## How much, according to Diabetes Canada

## 150 minutes a week

Moderate to vigorous aerobic activity, spread over at least three days, with **no more than two days in a row off**.

90 to 140 minutes still helps, just less.

The two-days-in-a-row rule is the one people miss. It exists because the boost in insulin sensitivity from exercise fades within roughly 48 hours.

**Resistance training, twice a week.** Three times is better, and it comes **in addition to** the aerobic work, not instead of it. Start with one set of 15 to 20 repetitions at a moderate weight and build from there.

**Break up sitting.** Get up briefly every 20 to 30 minutes. This is a separate recommendation from the 150 minutes, and it is an easier place to start.

**Children: 60 minutes a day.** Mostly aerobic, with vigorous activity and muscle- and bone-strengthening activity on at least three days a week.

## If you're starting from nothing

Only about 30% of adults with type 1 reach 150 minutes a week. If that feels far away, keep this in mind: the gap between zero and something is worth more than the gap between 100 and 150. Start where you are.

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Sources: FinnDiane cohort (Tikkanen-Dolenc 2017) · Riddell et al. 2017, exercise consensus statement · ISPAD 2022 exercise guidelines · ADA 2016 position statement · Kennedy 2013 · Wu 2019 · Diabetes Canada Clinical Practice Guidelines, Chapter 10 · T1DEXI study

## Before you start: glucose, ketones and insulin

*Where your glucose should be before exercise, when not to train today, and the published starting points for reducing insulin.*

This page covers the decisions you make before you move: whether your glucose is in a good place to start, whether today is a day to skip, and how insulin is usually adjusted for planned exercise. The numbers are published starting points — the ones your diabetes team will work from — not personal doses.

## Where your glucose should be when you start

| Reading before you start | Steady aerobic                                | Hard or interval work              |
|--------------------------|-----------------------------------------------|------------------------------------|
| Below 5.0 mmol/L         | Take 10–20 g of glucose, wait until above 5.0 | Same — treat first, then start     |
| 5.0 to 6.9               | Take 10 g of glucose, then go                 | Fine to start as you are           |
| 7.0 to 10.0              | The sweet spot. Go.                           | Go, but expect it to climb         |
| 10.1 to 15.0             | Go                                            | Go, but expect it to climb further |
| Above 15.0               | If unexplained, check ketones first           | Check ketones first (see below)    |

Source: Riddell et al. 2017, Panel 1.

The direction your glucose is already moving matters as much as the number. Falling fast at 7.0 is not the same as steady at 7.0. If you use a CGM, look at the trend arrow, not just the reading: an arrow pointing down at 7 mmol/L means treat before starting.

## When not to train today

### Skip or postpone exercise if

- **Blood ketones are 1.5 or above.** Exercise is off, full stop. At 3.0 or above, this is a trip to the emergency department, not a rest day.
- **Ketones are 0.6 to 1.4.** Postpone. Find out why, and take a correction dose as your plan sets out before considering anything else.
- **You had a severe low in the last 24 hours** — one where you needed someone else's help. Your hormonal defences are blunted, so the next low comes more easily and hits harder.
- **You are ill, have an infection or are injured.** Vigorous exercise is out. Illness and injury both push glucose up and change what your insulin does.

## A myth worth dropping: "don't exercise above 14"

That rule is wrong as usually stated. Every guideline ties the decision to **ketones**, not to the glucose number by itself.

Mildly high glucose does not measurably hurt exercise capacity. What makes exercise dangerous is a shortage of insulin with ketones building up — and that is a different thing from a high number on its own. That is why the table above says "check ketones first" rather than "don't go".

## Taking less insulin for planned exercise

These are the published starting points for exercise within about 90 minutes of a meal dose. Bring them to your team as the basis for a plan; don't apply them on your own.

| Reduce the meal dose before exercise lasting | 30 min       | 60 min |
|----------------------------------------------|--------------|--------|
| Easy aerobic                                 | -25%         | -50%   |
| Moderate aerobic                             | -50%         | -75%   |
| Hard aerobic                                 | -75%         | —      |
| Flat out or anaerobic                        | No reduction | —      |

*Source: Riddell et al. 2017, Tables 2 and 3.*

Cutting the meal dose by as much as 75% does not appear to raise ketones during exercise.

## Background (basal) insulin

**On a pump:** reducing the basal rate 60 to 90 minutes beforehand works better than switching the pump off. If you do suspend it, keep it short — Diabetes Canada says only for activity of 45 minutes or less, and never leave it off beyond about two hours.

**On injections:** cutting long-acting insulin is not routine advice, because it affects the whole day. It is an option for a tournament, a camp, or a week of much heavier activity than usual — something to plan with your team.

## Where you inject matters

Don't inject into a muscle you are about to work: insulin leaves a working limb faster. In practice: not the thighs before a run, and the abdomen rather than the legs before leg day. It is a small, practical change that people rarely hear about, and it can make a difference straight away.

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Sources: Riddell et al. 2017, exercise consensus statement (Panel 1, Tables 2 and 3) · Diabetes Canada Clinical Practice Guidelines, Recommendation 7 · ISPAD 2022 exercise guidelines

## During exercise: fuelling and checking

*How much fast carbohydrate to take by session length, how often to check, why sensors run late, and when to stop for the day.*

Once you're moving, two things keep a session on track: taking in enough fast carbohydrate for how long you're out, and checking often enough to catch a drop early. This page covers both, plus the one rule that ends a session.

## Fuelling by how long you're out

These are published starting points for carbohydrate during activity. How much you need also depends on how much insulin is on board — more insulin means more carbohydrate.

**Under 30 minutes.** Usually nothing is needed. If you start under 5.0 mmol/L, take 10–20 g of glucose — more if you have a lot of insulin on board.

**30 to 60 minutes.** Around 10–15 g an hour for steady aerobic work. Up to 15–30 g every half hour if insulin levels are high.

**1 to 2.5 hours.** 30–60 g an hour, and up to 75 g an hour if insulin is high. This is where drinks start to work better than solid food.

### Over 2.5 hours

60–90 g an hour, spread out — for example, 20–30 g every 20 minutes. Mixing glucose and fructose absorbs faster than glucose alone.

Very high carbohydrate rates upset some stomachs. Endurance athletes train their gut to handle them; if you are new to longer sessions, build up gradually.

## What to eat while you move

Fast carbohydrate works best during exercise: glucose tablets, sports drinks, gels. Chocolate and biscuits are too slow and tend to leave you high afterwards.

Carry fast glucose **on your body**, not in a bag on the sideline. A low doesn't wait for you to walk back to your kit.

*Source: Riddell et al. 2017, Table 1.*

## While you're moving

## Check often

Every 30 minutes if you use finger pricks, every 20 minutes if you use a sensor. A bench, a water break or the rest between sets is the moment to look.

### Your sensor runs late

Sensors read the fluid under the skin, not blood, and lag behind by roughly 12 to 24 minutes. When glucose is dropping fast, the screen still shows the number from ten minutes ago — which is too high.

## Trust the symptoms

If you feel low and the sensor disagrees, do a finger prick. That habit is worth more during sport than at any other time.

## Pressure can fake a low

Tight compression clothing, or pressure on the sensor, can give falsely low readings. This is worth knowing for cyclists and anyone in tight kit. (More on sensors and gear on the kit and conditions page.)

## Below 3.0, you're done

### Below 3.0 mmol/L during exercise

Stop and treat the low. Do not restart the session afterwards.

Going again after a real low is how one difficult afternoon turns into a dangerous one. The session will still be there tomorrow.

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Sources: Riddell et al. 2017, exercise consensus statement (Table 1) · EASD/ISPAD CGM position statement · ISPAD 2022 exercise guidelines

## After exercise: the overnight risk and the high that tempts you

*Why the risk of going low lasts for hours after a session, how people usually lower it overnight, and why a post-workout high shouldn't be chased.*

The session ends, but its effect on blood sugar doesn't. This page explains how long the risk of going low lasts after exercise, the adjustments with the best evidence for the night that follows, and the single most dangerous moment in the whole picture: the high right after a hard workout.

## The session ends. The risk doesn't.

**7–11 h**

of raised risk of going low after just 45 minutes of activity

**Up to 24 h**

of raised insulin sensitivity, sometimes longer

This is why exercise after 4 p.m. so often becomes a problem at 2 a.m. The adjustments below are the published starting points; the exact amounts are for you and your team to set.

### Drop the overnight basal by about 20%

The best-evidenced single move is a temporary 20% reduction in basal insulin for around six hours, starting at bedtime.

### Cut the next meal's dose by about half

Pair it with a decent refuel — roughly 1 to 1.2 g of carbohydrate per kg of body weight, plus 20 to 30 g of protein.

### A bedtime snack, if you're under 10

If your glucose is under 10 mmol/L at bedtime, have a snack with slow carbohydrate and no bolus. Add protein if you're under 7. But a snack alone does **not** cover the night — it needs the basal change too.

#### Or just train earlier

Forty-five minutes of activity at midday does not carry the same overnight risk. Lunchtime sport generally needs no overnight adjustment at all — genuinely reassuring news for school sport, parents and physical education teachers.

If you sleep alone, or have a history of difficult nights, set sensor alarms, or add a follower who can see your numbers remotely.

## The most dangerous moment is the high after a hard session

Here is how it usually happens. You finish a tough workout, the number is up, and it feels wrong. So you correct. It's still up, so you correct again. Meanwhile your muscles are about to start pulling glucose out of the blood for the next several hours, and the insulin is stacking up.

Remember from the start of this section: hard, short efforts push blood sugar **up** through adrenaline and stress hormones. That rise is expected. What follows it — hours of increased insulin sensitivity — is what makes a stack of corrections risky.

### **Correct conservatively, or wait**

The international consensus statement says it without softening: over-correcting with insulin after exercise can cause severe night-time hypoglycemia, and can be life-threatening.

This is as much for coaches and parents as it is for the person with type 1. The urge to "fix" a post-game number often comes from the people around them.

### **Where experts disagree**

There is an active research debate about the right correction size after interval training. For general use, this site stays with the conservative guideline position. If you want to fine-tune corrections after hard sessions, take the question — and your own data — to your diabetes team.

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Sources: Riddell et al. 2017, exercise consensus statement · ISPAD 2022 exercise guidelines

## **Game day, and tricks worth trying**

*Why blood sugar rises before a match, what helps instead of correcting it, and three exercise tricks with their evidence grades stated honestly.*

Competition brings its own pattern: a high before the start that has nothing to do with food or insulin. This page explains where that high comes from and what to do about it, then looks at three popular tricks for holding glucose steady — with the strength of the evidence behind each one.

## **The pre-game high is nerves, not a mistake**

Young athletes routinely run high before a match, even when the same activity in training sends them low. Adrenaline tells the liver to release glucose and makes insulin work less well — and standing on the sideline waiting is exactly when adrenaline peaks.

It usually settles on its own once play starts.

Correcting it aggressively is what produces the crash later. The nerves wear off; the insulin doesn't.

Mild highs do not measurably hurt performance. A low very much does. That is why the guidance leans toward patience before the whistle.

## What helps instead

- Arrive early, so there is time to see it coming.
- Check earlier than you think you need to.
- Don't over-fuel before the start.
- A gentle warm-up jog helps burn off the hormone response.
- On a pump, a small temporary basal increase can help — returned to normal *before* kickoff.

### For coaches

Coaches who understand this stop pushing for a correction on the sideline, which is where the harm usually begins. A pre-game high is expected; it is not a reason to reach for insulin.

## Tricks worth trying, honestly graded

Diabetes Canada grades its recommendations by the strength of the evidence. We show the grades here because a low-grade recommendation is worth trying but not worth trusting. Seeing the grade openly tends to build trust rather than undermine it.

### Weights before cardio

Doing the resistance work first blunts the fall in blood sugar during the aerobic part that follows.

**Weak evidence.** Diabetes Canada grades this at its lowest level — it rests on essentially one small study. Free to try, not a rule.

### A ten-second sprint

An all-out sprint for ten seconds at the start, during, or at the end of a session may help hold glucose up.

**Weak evidence,** at the same lowest grade. And after exercise that was already intense, it may push you higher instead.

## Interval training

Short bursts of hard work mixed into easier stretches. Diabetes Canada recommends it specifically to reduce the risk of going low during exercise.

**Better evidence** than the other two — though some studies link it to more lows overnight.

If you try any of these, note what you did and what happened afterwards. A few sessions of your own data will tell you more than any general rule, and it gives your diabetes team something concrete to work with.

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Sources: ISPAD 2022 exercise guidelines (competition day guidance) · Diabetes Canada Clinical Practice Guidelines, Recommendations 2 and 7

## Gear, weather, water and existing complications

*Keeping sensors and pumps working through sport, how heat, cold, altitude and water change the picture, and the few real limits if you have complications.*

This page covers the practical side of staying active: keeping your devices on and reading correctly, how the environment changes your glucose, and what — if anything — changes when you already live with complications. The short version on complications: very little.

## Gear that has to survive the session

### Where the sensor goes

At least an inch (about 2.5 cm) from an infusion site. Away from impact zones in contact sport, and off the lower back for anyone rolling or tumbling — wrestling, judo, gymnastics.

### Keeping it stuck on

Sweat, heat and water all defeat adhesive. Clean and fully dry the skin, then use a barrier wipe or an overlay patch.

### False lows from pressure

Tight compression clothing, or lying on the sensor, can produce readings that are simply wrong. Odd overnight dips after training are often this.

### Taking the pump off

Disconnecting is fine for swimming, water sports or contact sports. But past about 90 minutes off, you need a plan to replace the missed insulin, or you may come back high with ketones climbing.

In young children, the named hazard is simply forgetting to reconnect afterwards. Set a phone alarm.

Some competitions don't allow devices to be worn. Check the rules in advance rather than at the start line.

## Heat, cold, altitude and water

### Heat speeds insulin up

Warm skin absorbs insulin faster, and the heat itself burns more energy. Glucose can fall quicker than you expect. Dehydration also makes sensor readings less reliable, so drink steadily.

**Cold slows insulin down — and it breaks meters.** A glucose meter kept below freezing may refuse to read, or read wrongly. A sensor is the better choice for winter sport, which matters in a Québec winter: think skating, skiing and snowshoeing.

**Altitude.** Meters can read inaccurately high up, appetite drops, and energy use rises. Thin air also makes for poor decisions, so make your plan on the ground.

### Water

You cannot treat a low underwater, and nobody can see you having one. Never swim alone, never after any recent low, and never without someone on the side who knows about your diabetes.

Diving with type 1 needs its own specialist protocol and is not something to improvise.

The consensus statement singles out four settings as unsafe after any recent low: alpine skiing, climbing, trekking alone and open water.

## If you already have complications

The consensus position comes first: **the benefits of being active outweigh the risks of being sedentary**, and people with complications still gain plenty from gentle activity at very little risk. Few real restrictions exist. These are the ones that do.

- **Eyes.** With advanced retinopathy, very heavy lifting, straining and head-down positions need clearing with an eye specialist first.
- **Feet and nerves.** Numb feet don't report blisters. Wear proper footwear, and look at your feet after every session — not just when something hurts.
- **Kidneys.** Exercise does not make kidney disease worse, despite a temporary rise in protein in the urine afterwards. Activity may actually slow it down.

### **Not feeling lows any more**

Exercise blunts your early-warning system for hours afterwards, and past lows blunt it during exercise. If you have lost your warning signs, make a plan with your team before starting a training programme.

**Over 40 and planning something very hard or very long?** Diabetes Canada suggests a check-up first, including eyes, feet and heart.

### **Don't over-medicalise a walk**

The American Diabetes Association pushes back on over-screening. For people with type 1 at any age, the only common exercise-related adverse event is hypoglycemia. Screening makes sense before something very demanding; it shouldn't stand between anyone and a decision to go for a walk.

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Sources: Riddell et al. 2017, exercise consensus statement · ISPAD 2022 exercise guidelines · ADA 2016 position statement · Diabetes Canada Clinical Practice Guidelines, Recommendation 8

## **What coaches need to know**

*For coaches, teachers and training partners: why type 1 is no reason to sit out, what to have on hand, how to spot a low, and eight things not to do.*

This page is for the adults on the sideline: coaches, physical education teachers, club volunteers and training partners. You don't need to manage anyone's diabetes. You do need to know enough to keep them playing safely, and to recognise the few moments when your reaction matters.

## **Start here**

### Type 1 is not a reason to sit out

Type 1 diabetes is **not** a reason to keep a child out of physical education, training or competition. Every guideline says so explicitly.

A newly diagnosed athlete needs help getting back to normal training as soon as possible — not a season off.

## What you need to have

- **A written plan from their diabetes team, shared with you.** Ask whether you have actually been given one. Often the answer is no — and fixing that is the most useful thing you can do.
- **Fast glucose at the side** — glucose tablets, gel or a sports drink.
- **A way to check glucose, and permission to pause for it.** A pause to check is not a player being difficult.
- **Their emergency contact.**
- **The knowledge that they may not feel a low coming.**

## Spot a low

Watch for someone who is shaky, pale, sweating oddly, confused, clumsy, suddenly irritable, or has just gone quiet.

In a child, these signs are harder to read and easy to mistake for effort or a bad mood.

### Sugar first, questions after. Always.

If you think someone might be low, give fast glucose first — tablets, gel or a sports drink — and sort out the details afterwards. Follow their written plan. If they are unconscious, having a seizure, or won't wake up, call 911.

## Two moments where your reaction matters most

Most of what follows is common sense. Two situations, though, are where genuine emergencies tend to start — and in both, the pressure to act often comes from the sideline.

**The pre-game high.** Young athletes often run high before a match because of nerves and adrenaline. It usually settles once play starts. Pushing for an insulin correction on the sideline is what leads to a crash

later.

**The high after a hard session.** Hard efforts push blood sugar up, but the hours afterwards bring increased insulin sensitivity. Stacking corrections on that high can lead to a severe low overnight. The guidance is to correct conservatively, or wait.

## Eight things not to do

1. Don't bench someone because of their diagnosis.
2. Don't chase a pre-game high with insulin — it's adrenaline, and it settles.
3. Don't stack corrections after a hard session. This one can be life-threatening.
4. Don't trust a sensor number while glucose is dropping fast. Do a finger prick.
5. Don't restart the session after a real low.
6. Don't rely on a bedtime snack alone after afternoon sport.
7. Don't let anyone train alone anywhere risky after a recent low.
8. Don't forget to reconnect the pump.

If you remember only two lines from this page, make it numbers two and three.

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Sources: ISPAD 2022 exercise guidelines, sections 10 and 11 · Riddell et al. 2017, exercise consensus statement

**KRKT's Type 1 Diabetes Education** (KRKT:T1DE), from the KRKT Library.

Education, not medical advice. Every dose, ratio and target belongs with your own diabetes team.