

Ocean Swim

Harbour swim to marathon crossing. The water is cold, the calf is short, and nobody can stop and stretch on the side of the road.

Small numbers point to the sources on page 2.

1 Where cramps bite

- Across 10,500 Ironman-distance triathletes over three decades, 6% presented to medical for cramp, against self-reported cramping of up to 63%¹.
- Cramping early in a race was the strongest predictor of cramping again later in the same race¹.
- In 210 Ironman triathletes, a previous history of cramp and racing faster than trained predicted cramp. Dehydration and serum sodium changes did not².
- The two biggest data sets disagree on dehydration. The 2024 Ironman series found a link to treatment-seeking cramp¹, the 2011 prospective cohort did not². Treat hydration as worth getting right, not as the answer.
- Cold is the documented open water risk. In a 19.2 km race in 19 to 22 degree water, 26 of 109 swimmers dropped below 35 degrees core, five needed hospital and two needed critical care^{6,7}.

WHAT NOBODY HAS COUNTED

No field study has counted cramp in open water swimmers the way Western States counted it in ultra runners. Everything above is triathlon and general cramp research, applied across. Where this guide reasons from mechanism rather than from a field study, it says so.

2 Cut your risk

- Swim the pace you trained. Going faster than your training pace is the predictor that shows up in both triathlon data sets^{1,2}.
- If you have cramped before, plan for it rather than hope. History is the strongest single signal in the cramp literature^{2,3}.
- Swim in the water temperature you will race in, not just the distance. Hypothermia is the risk open water events actually manage^{6,7}.
- **MECHANISM** A hard-pointed toe holds the calf and foot near their shortest length for hours. Shortened, fatigued muscle is where cramp starts in every model of it³. No field study has tested this in swimmers.
- Nothing prevents cramp reliably for everyone, so stack the small edges³.

3 When it hits

- **Safety before tactics.** A locked calf 2 km offshore is not a 30 km marathon cramp. Roll onto your back, raise an arm, get a kayak or boat to you. Nothing in this guide is worth a rescue.
- Stretch the cramping muscle to length and hold. Dorsiflex, pull the toes to the shin. Still the first-line response in every review³.
- **Early, not late.** Take your GOAT Shot at the twinge. In the lab a small measured shot cut cramp duration to about 85 seconds against 134 for water, through a mouth-to-nerve reflex rather than digestion⁴.
- Do not swallow seawater or chug plain water to fix it. Neither dehydration nor blood sodium separated crampers from non-crampers in the prospective field data².
- Once it releases, rebuild over 3 to 5 minutes. Straight back to race pace re-triggers it.
- The evidence behind this tactic is lab-based and mixed. Miller (2010) found a clear effect, later trials found a small or non-significant one⁵. What it is not: an electrolyte top-up. Test it in training.

4 Fuel

- Carb load 10 to 12 g/kg/day for 36 to 48 hours before a marathon swim¹⁰.
- Pre-race 1 to 4 g/kg carbohydrate, 1 to 4 hours before¹⁰.
- Long swims: 30 to 60 g/h carbohydrate, up to 90 g/h if you are gut-trained and out there beyond about 2.5 hours^{8,10}.
- You feed on someone else's schedule. Plan by feed pontoon or boat window, not by the clock on your watch, and rehearse taking feeds while treading water.
- GI trouble is common in long events and under-fuelling brings fatigue on early. Fatigue is where cramps live⁸.

5 Fluid and salt

- Pre-load 5 to 7 ml/kg about 4 hours out⁹.
- Finish within 2% of your start weight. Over-drinking plain water is the hyponatraemia risk, and it is the one that puts swimmers in hospital⁹.
- Sodium 300 to 600 mg/h in warm water, less in cold. Most commercial products under-deliver⁸.
- **MECHANISM** Immersion blunts thirst and hides sweat, so you cannot read your losses the way you can on land. Weigh yourself before and after long training swims and learn your own number.
- In cold water, drink less, not more. Cold plus over-drinking is the combination that ends days^{6,7,9}.

6 Race day

- Taper 8 to 14 days, volume down 41 to 60%, keep intensity and frequency¹¹.
- Check the water temperature call and the wetsuit rule the night before, and again on the morning. It changes your whole plan^{6,7}.
- Warm up in the water, not on the sand. Get your face wet and your breathing settled before the gun.
- GOAT Shot where you can reach it: wetsuit sleeve, swim belt, or with your feed crew. Practise taking it treading water before you need it.
- Sight early and often. Swimming off line is extra distance you did not train for, and extra distance is extra fatigue.
- Start the first quarter conservatively. Cramps live in the back half.

Sources and the fine print

Every numbered claim on page 1 traces to one of these. Peer-reviewed studies and consensus statements only, no influencer opinion.

1. Nilssen PK, Johnson KB, Hiller WDB, Miller TK, Connolly CP. Exercise-associated muscle cramps in Ironman-distance triathletes over 3 decades. Clin J Sport Med 2024. doi:10.1097/JSM.0000000000001276

2. Schwellnus MP et al. Increased running speed and previous cramps rather than dehydration or serum sodium changes predict EAMC: 210 Ironman triathletes. Br J Sports Med 2011;45:650-656.

3. Maughan RJ, Shirreffs SM. Muscle cramping during exercise: causes, solutions and questions remaining. Sports Med 2019;49(S2):115-124.

4. Miller KC et al. Reflex inhibition of electrically induced muscle cramps in hypohydrated humans. Med Sci Sports Exerc 2010;42(5):953-961.

5. Behringer M et al. Effects of TRPV1 and TRPA1 activators on the cramp threshold frequency: randomised placebo-controlled trial. Eur J Appl Physiol 2017;117:1641-1647; Lavender AP et al. Mouth rinsing vs ingesting pickle juice. Appl Sci 2021;11:12096.

6. Brannigan D, Rogers IR, Jacobs I, Montgomery A, Williams A, Khangure N. Hypothermia is a significant medical risk of mass participation long-distance open water swimming. Wilderness Environ Med 2009;20(1):14-18.

7. de Castro RRT, da Nobrega ACL. Hypothermia in open-water swimming events: a medical risk that deserves more attention. Wilderness Environ Med 2009;20(4):394-395.

8. Tiller NB et al. International Society of Sports Nutrition position stand: nutritional considerations for single-stage ultra-marathon training and racing. J Int Soc Sports Nutr 2019;16:50.

9. Thomas DT, Erdman KA, Burke LM. Nutrition and athletic performance: ACSM / Academy of Nutrition and Dietetics / Dietitians of Canada position. Med Sci Sports Exerc 2016;48:543-568; Sawka MN et al. ACSM exercise and fluid replacement, 2007.

10. Burke LM et al. Carbohydrates for training and competition (IOC consensus). J Sports Sci 2011;29(S1):S17-27.

11. Wang Z et al. Effects of tapering on performance in endurance athletes: systematic review and meta-analysis. PLOS ONE 2023;18(3):e0282838.

GOAT Shot, plainly

A 10 mL single-serve shot of Australian organic apple cider vinegar with the mother, saltbush brine and native botanicals, in a small thin sachet that opens easily. A food, not a medicine.

The research above (Miller 2010; Behringer 2017; Lavender 2021) is what the twinge tactic on page 1 is built on. Read it and make your own call.

Test any race-day tactic in training first. That includes this one.

Pickled GOAT is a food under the Food Standards Australia New Zealand code. It is not a therapeutic good and is not intended to diagnose, treat, cure or prevent any condition. This guide is general information for healthy adults, not medical advice. If cramps are frequent, severe or happen at rest, see a sports doctor. Open water swimming carries risks this guide does not cover. Swim patrolled events, swim with support, and follow the event's safety rules over anything written here. Informed Sport and HASTA certification are stated goals and are not currently held.

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