Photo by Alexandre Loureiro

HOW TO STAY COOL IN THE HEAT OF THE PARIS PARALYMPIC GAMES?

AN ATHLETE GUIDE

DR MARK HAYES, DR NEIL MAXWELL & PROFESSOR NICK WEBBORN

INTERNATIONAL PARALYMPIC COMMITTEE

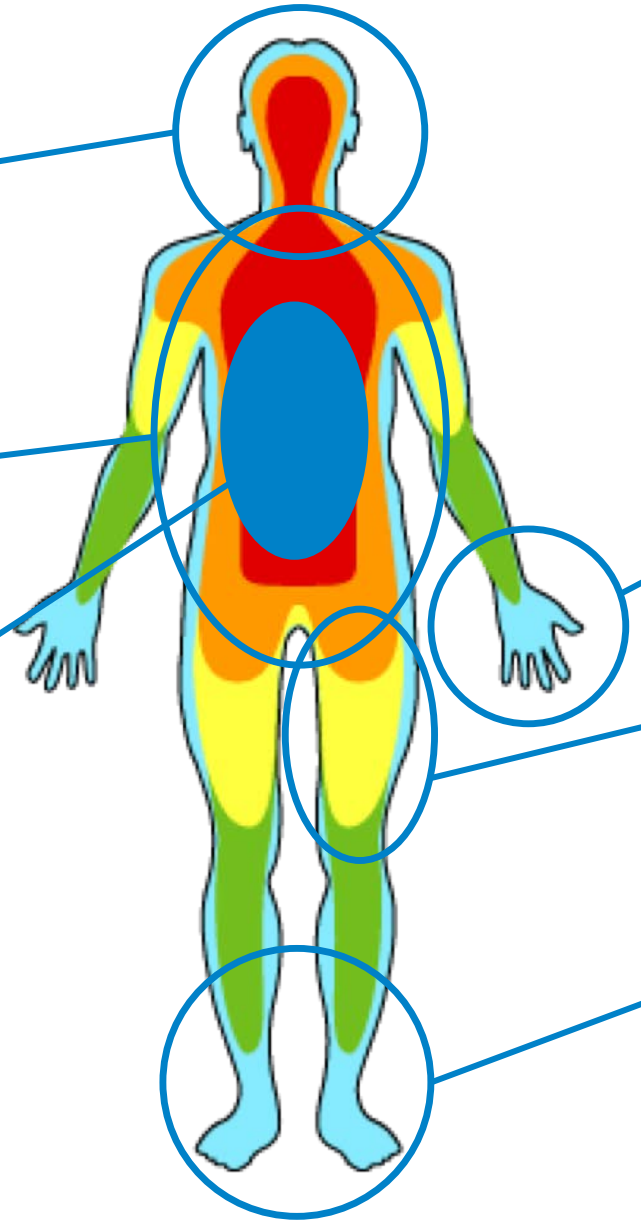
WHY SHOULD I CONSIDER COOLING BEFORE (PRE) OR DURING (PER) EXERCISE?

1. Cooling has been shown to **improve sports performance** in the heat
2. Cooling can **improve how comfortable you feel** eat for **improved decision making**
3. Cooling is **beneficial to athletes with a disability** but different methods may be required
4. Cooling can **reduce the risk of heat illness**

WHAT ARE THE COOLING ESSENTIALS I NEED TO CONSIDER?

- Decide by trial **which cooling method/s** work best for you
- Decide on **what sites on the body you can easily target**
- Decide on whether you plan to use **internal (fluids/slushies)** or **external cooling** or ideally a **combination of both**
- **Think practical –** what works in your sport environment, and with your equipment

WHERE CAN I COOL? POSSIBLE TARGET SITES



Head and neck cooling

Chest/Trunk - external

Internal

Hands and forearms

Thigh

Feet

WHAT PRACTICAL METHODS CAN I USE TO COOL?

Considerations

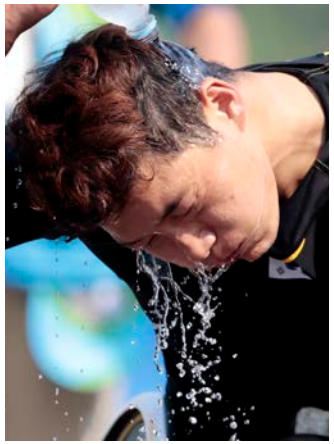
1. Your level of **disability/impairment**
2. Constraints of your **sport –** rules, timing, breaks
3. Will it work with my **equipment** – e.g. push gloves, prosthetic
4. How **effective** is the cooling method for you
5. What is **available** at your competition venue e.g. ice, freezer

Lots of methods - what will work for you?

Test and Practice - Test and Practice - Test and Practice

HOW TO COOL (EXTERNAL): HEAD/NECK PRE-COOLING

Method	Dose	Duration	Time	Considerations
Ice-Hood Neck Collar Cold, Wet Towels Water douse	Frozen Ice pack (0°C)	10-20 min	Before, During &/or After Warm up & Event	• Cold-induced Freezing Injury e.g. ice burn • Dry clothes and towel required • Potential to mask heat illness symptoms.
Alternate Methods	External: Forearm & Hand Cooling, Fan-Mist Spray Internal: Ice-Slurry			



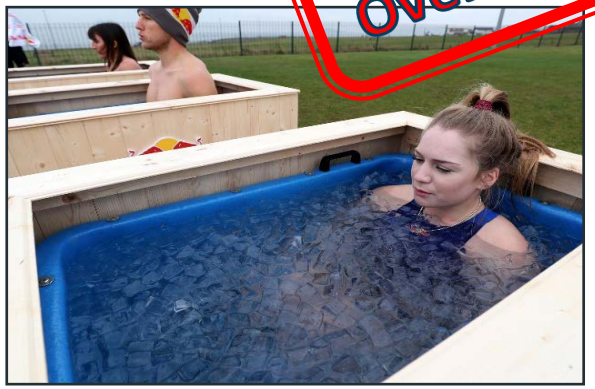
HOW TO COOL (EXTERNAL): FACE PRE-COOLING

Method	Dose	Duration	Time	Considerations
Fan &/or Mist Spray	10-20°C Water 500mL	Free-Use	Before, During &/or After Warm up & Event	• Dry clothes and towel required • Clean, drinkable water
Alternate Methods	External: Forearm & Hand Cooling, Fan-Mist Spray Internal: Ice-Slurry			

HOW TO COOL: WHOLE- & PARTIAL-BODY PRE-COOLING

Method	Dose	Duration	Time	Considerations
Whole- Body	15-25°C	10-20 min	Before or After Warm up & Event	• Possibly no visible reduction in T_{CORE} until after the cooling has finished (i.e. an 'afterdrop'). • The guide should be the duration of cooling rather than for a specific decline in T_{CORE} due to the likelihood of an afterdrop. • Watch for 'overshoot' in SCI athlete • Change of clothes/dry towel required
Partial-Body (Lower-Leg) (Whole-Leg)	15-25°C	15-30 min		
Alternate Methods	External: Ice-Vest & Cold, Wet Towels Internal: Ice-Slurry			

Caution in SCI
Over-cooling



HOW TO COOL (EXTERNAL): HEAD/NECK PRE-COOLING

Method	Dose	Duration	Time	Considerations
Hand-Cooler Ice-Packs Ice-Pops RTX Body Cooler	Frozen Ice pack (0°C)	10-20 min	Before, During &/or After Warm up & Event	• No direct skin contact to avoid cold-induced Freezing Injury e.g. ice burn • Reduction in manual dexterity
Alternate Methods	External: Forearm & Hand Cooling, Fan-Mist Spray Internal: Ice-Slurry			

HOW TO COOL (EXTERNAL): TORSO PRE-COOLING

Method	Dose	Duration	Time	Considerations
Ice-Vest Cold, Wet Towels Ice packs	Frozen Ice pack (0°C)	10-20 min	Before, During &/or After Warm up & Event	• Cold-induced Freezing Injury e.g. ice burn • Vests need to be tight fitting so that they maximise surface contact area and cooling impulse
Alternate Methods	External: Forearm & Hand Cooling, Fan-Mist Spray Internal: Ice-Slurry			

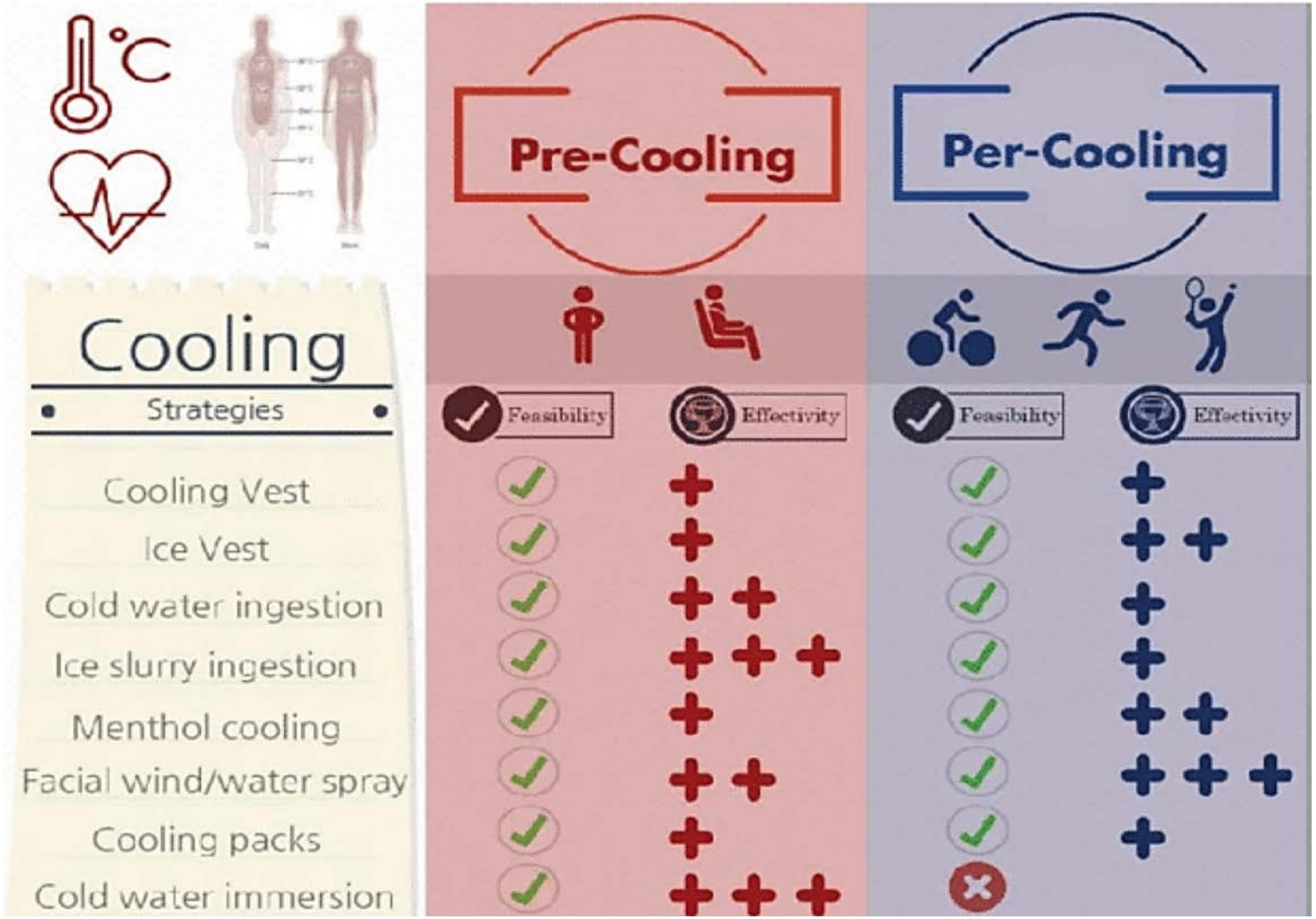
HOW TO COOL (EXTERNAL): FOREARM/FEET PRE-COOLING

Method	Dose	Duration	Time	Considerations
Forearm-Cooler Forearm/ Foot Immersion Liquid-gel insoles	Frozen pack (0°C) 15-25°C	10-20 min	Before, During &/or After Warm up & Event	• Cold-induced Freezing Injury e.g. ice burn • Dry clothes and towel required
Alternate Methods	External: Forearm & Hand Cooling, Fan-Mist Spray Internal: Ice-Slurry			

HOW TO COOL (EXTERNAL): FOREARM/FEET PRE-COOLING

Method	Dose	Duration	Time	Considerations
Ice-slurry	~7g/kg of body mass 0°C	10-20 min (*ad libitum*)	Before, During &/or After Warm up & Event	• T_{CORE} reduced by 0.2-0.6°C • Individual responses • Mild Gastrointestinal issues • Elevated urination issues • Ice ingestion alone increases likelihood of sphenopalatine ganglioneuralgia (‘*brain freeze*’) & choking risk • Mixing liquid and crushed ice (i.e. slurry/slushy) is more suitable.
Cold Drinks	500mL 5-15°C			
Alternate Methods	External: Ice-Vest & Cold, Wet Towels Internal: Ice-Pop			

WHICH COOLING METHODS ARE BEST?



The most feasible may not be the most effective and vice versa, so plan your cooling strategy ahead of your competition.

(Bongers et al., 2013; 2017)

POTENCY OF PRE-COOLING

+7.3%
Most effective

+6.5%

+6.3%

+4.3%

+3.4%
Least effective

Mixture of methods appear to be the most effective strategy to enhance performance

(Bongers et al., 2013; 2017)

DOES PRE & PER-COOLING HELP PARALYMPIC ATHLETES?

8 males with SCI
28 min intermittent sprint arm cranking protocol
Three heat stress trials in 32°C 50% RH
(a) No cooling control
(b) 20 min precooling with ice vest
(c) Cooling during exercise (ice vest worn in exercise)

Pre & per-cooling can:

- reduce core body temperature
- reduce heart rate
- reduce how hard exercise feels
- reducer how hot athletes feel
- improve exercise performance

J Appl Physiol 98: 2101–2107, 2005.
First published January 27, 2005; doi:10.1152/japplphysiol.00784.2004.

Effects of two cooling strategies on thermoregulatory responses of tetraplegic athletes during repeated intermittent exercise in the heat

N. Webborn.[1,2] M. J. Price.[3] P. C. Castle.[1] and V. L. Goosev-Tolfrev[2,4]

WHEN TO COOL

Before	During (if possible)	During breaks (sport specific)
Internal	Internal	Internal
External	External	External
20 min	Maximum duration possible	Maximum duration possible
Until end of w/up		

Internal – Ice Slurry / Cold Drinks
External – Chosen method - tested and available

Don’t forget recovery afterwards!

AN EXAMPLE STRATEGY FOR A TEAM-BASED SPORT

PRE game

20 min with cooling /ice vest

500 ml ice slurry consumed at 10, 20 and 30 min (160 ml x 3)

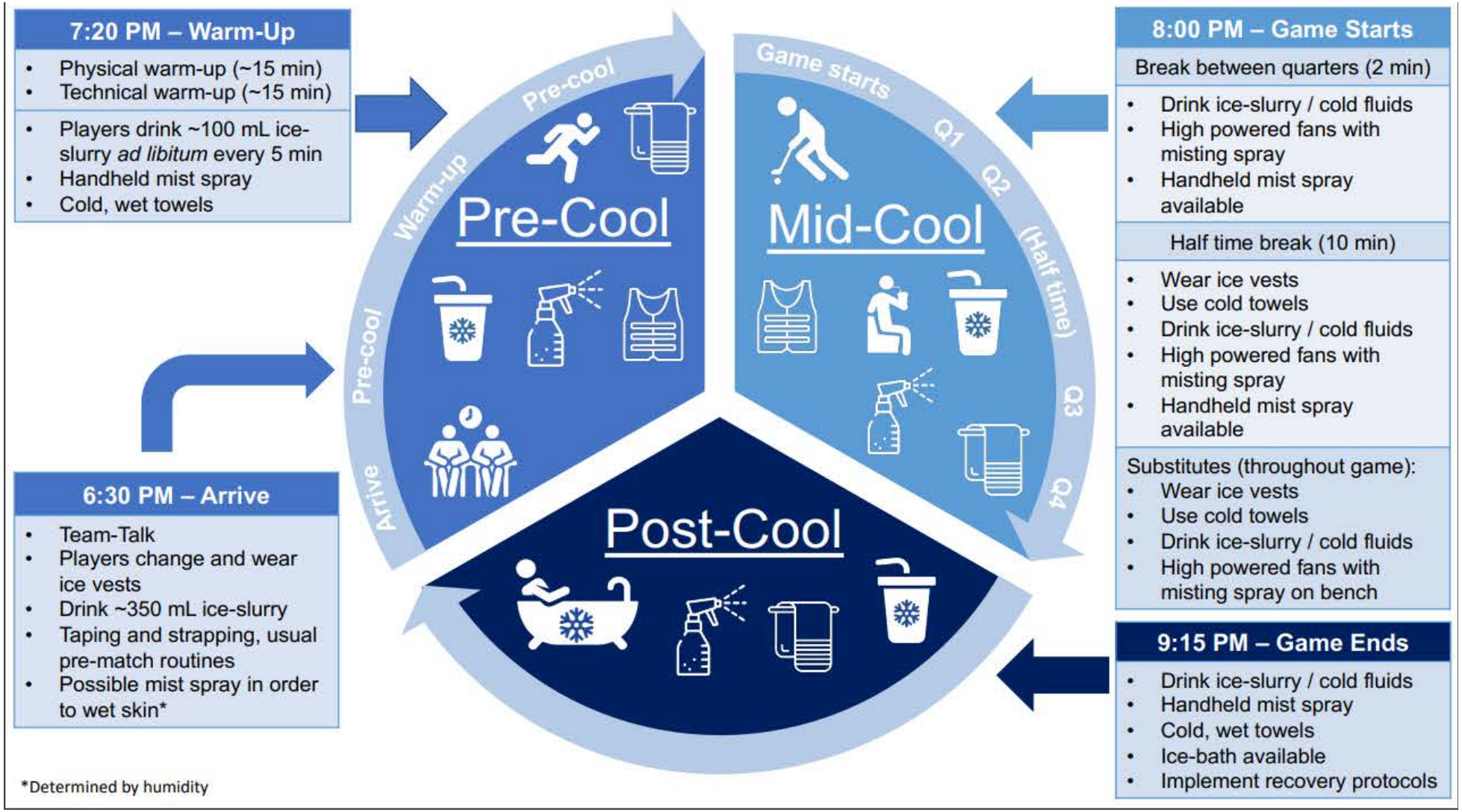
During

During breaks

Immediate Cooling:
ice towel / ice vest / hand cooling

250 ml ice slurry consumed at 0 and 5 min (2 x 125 ml)

AN APPLIED EXAMPLE OF HOW TO COOL



Gibson et al (2020)

SPECIFIC COOLING CONSIDERATIONS FOR PARALYMPIC ATHLETES

1. **External cooling methods** (e.g. ice vests) - rely on direct contact with a large skin surface area – might be difficult with equipment or use in a sports wheelchair. Consider different options e.g. misting and fanning, ice towels etc.

2. **Ice slurries** can reduce sweat rate and slow heat loss but can be effective in humid conditions like Paris

3. **Too much fluid too quickly** can cause gut discomfort or a need for frequent visits to the toilet. Keep a steady pace of drinking that you have practiced.

4. **Hand Cooling**, while effective at reducing heat, can reduce function and grip, or be difficult for glove wearers. Focus on cooling non-active body parts.

Griggs et al (2020). Forsyth et al (2016)

RESOURCES THAT SUPPORTED THIS PRESENTATION

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IT SHOULD NOT BE A MATTER OF IF I WILL USE COOLING, BUT MORE WHAT COOLING WILL I USE IN PARIS!

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THANK YOU

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