Recovery
Lizzie Jacobs - GBRT Sport Science Intern
What we will cover

• What is recovery and why is it important

• The 4 Rs of Recovery

• Recovery Strategies

• Summary and key messages
What is recovery?

- mental
- physical
- cold water immersion
- active
- repair
- sleep
- compression garments
- hydration
- massage
- hydrotherapy
- relaxation
- cooldown
- passive
- rest
- nutrition
- physiology

[Image of an umbrella]
What is recovery?

The Drive Phase

The Recovery Phase
What is recovery?

Recovery
Recovery
Recovery
Recovery
… again!
Why is recovery important?

The balance between training (stress) and recovery is essential to achieve continuous high level performance.
Why is recovery important?

The balance between training (stress) and recovery is essential to achieve continuous high level performance.

**TRAINING**

**RECOVERY**
- Increased Fatigue
- Increased Illness
- Increased Injury
- Poor performance
“More is not always more. Whatever type of athlete you are, work hard but then recover hard”
Acute training-recovery cycle

- Training Stimulus
- Fatigue
- Recovery
- Super-Compensation
- Baseline Fitness

Olbrecht (2013) The Science of Winning
Chronic training-recovery cycle

Fitness

Seasonal Adaptations

- World Class Recovery
- Recovery
- Under Recovery

Improving
Maintaining
Declining
Recovery will depend on:

- Training session/type of activity performed

<table>
<thead>
<tr>
<th>Activity Type</th>
<th>Recovery Time (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprint Workouts</td>
<td>30 – 40</td>
</tr>
<tr>
<td>Extensive Anaerobic Work</td>
<td>36 – 48</td>
</tr>
<tr>
<td>Extensive Aerobic Work</td>
<td>24 – 30</td>
</tr>
<tr>
<td>Intensive Anaerobic Work</td>
<td>48 – 64</td>
</tr>
<tr>
<td>Intensive Aerobic Work</td>
<td>40 – 60</td>
</tr>
<tr>
<td>Strength/Competition</td>
<td>8 – 12</td>
</tr>
<tr>
<td>(Weights or Racing)</td>
<td></td>
</tr>
<tr>
<td>(8-30' moderate intensity pieces)</td>
<td></td>
</tr>
<tr>
<td>(3-5' high intensity pieces)</td>
<td></td>
</tr>
<tr>
<td>(1-2' high intensity pieces)</td>
<td></td>
</tr>
<tr>
<td>(70-100' low intensity UT2)</td>
<td></td>
</tr>
</tbody>
</table>

Olbrecht (2013) The Science of Winning
# Recovery will depend on

- Time until next session/race

## Relative importance of recovery strategies during different scenarios.

⭐ = Lower relative importance, ★★★★★ = higher relative importance.

<table>
<thead>
<tr>
<th></th>
<th>1-2 hours i.e. seat racing</th>
<th>12-24 hours i.e. repechage</th>
<th>24-48 hours i.e. international</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nutrition</strong></td>
<td>★★★★★</td>
<td>★★★</td>
<td>★★</td>
</tr>
<tr>
<td><strong>Active Recovery</strong></td>
<td>★★★★★</td>
<td>★★★</td>
<td>★★</td>
</tr>
<tr>
<td><strong>Rest</strong></td>
<td>★★</td>
<td>★★★</td>
<td>★★★★</td>
</tr>
</tbody>
</table>

- Equipment and/or personnel available
Recovery will depend on

- Environmental conditions e.g. heat
  - Increased overall training load/stress
  - Increased sweat rate
  - Training at higher intensities in the heat uses more carbohydrate as a fuel
Poll Question

Which of the following is most important during recovery?

- Nutrition
- Hydration
- Rest/Sleep
- All of the above
The Four Rs of Recovery

**Refuel**

**Repair**

**Rehydrate**

**Rest**
The Four Rs of Recovery - Refuel

Carbohydrates

- **As soon as you can (within 30 mins)**
  - Carbohydrate rich food or drink
  - 1g carbohydrate per kg of body weight
- **Essential to replenish the glycogen stores (muscle can store carbohydrate as glycogen more efficiently in this time)**

- **As soon as is practical you should consume a balanced meal rich in nutrients**
  - Containing at least 2 g carbohydrate per kg of body weight
The Four Rs of Recovery - Refuel

Carbohydrates examples

- Bagel: 50 g, 15 g
- Banana: 25 g
- Bread: 20-25 g

British Rowing
The Four Rs of Recovery - **Repair**

**Protein**

- As soon as you can in the immediate recovery drink/snack
  - 0.3g protein per kg of body weight
  - (e.g. for a 100kg athlete = 30g protein, for a 75kg athlete = 23g protein)

- Essential for muscle recovery and repair

- As soon as is practical you should consume a balanced meal rich in nutrients
The Four Rs of Recovery - Repair

Protein examples

- Greek-style yogurt: 17 g (+6 g carbs)
- Ham: 6 g (20 g + 28 g carbs)
- Egg: 6 g
The Four Rs of Recovery - Refuel and Repair

Meal examples

Bagel with Scrambled Eggs, Tomatoes & Spinach

Porridge with Berries & Yoghurt

Salmon with Noodles & Veg

Chicken with Rice & Veg

Spaghetti Bolognese & Salad
The Four Rs of Recovery - Rehydrate

- As soon as you can
- Aim to replace 150% of fluid lost during exercise
  - E.g. if you lost 1 kg you would need to drink 1.5 L
- May consider including electrolytes (salts) if there have been high sweat rates
- Monitoring hydration
  - Ideally use pre- and post-training weigh-ins to monitor sweat loss
  - Monitor urine colour/concentration
The Four Rs of Recovery - Rehydrate

Factors influencing hydration
- Environment (temperature, humidity, wind)
- Exercise intensity and duration
- Prior fluid consumption

Effects of dehydration
- 2% body mass loss can impair performance
- Altered perception of effort
- Altered muscle protein and glycogen usage
The Four Rs of Recovery - **Rehydrate**

*Hydration examples*

- 32g carbs + electrolytes
- 50g carbs + 17-20g protein
- 28g carbs + 20g protein
The Four Rs of Recovery - Rest

Sleep

- Aim is to minimise daytime fatigue and maximise feelings of alertness and concentration
- Between 7-9 hours per night is recommended

Factors influencing sleep schedules
- Travel  - Academic Studies  - Stress  - Training and competition times

Daytime Napping
- Can reduce feelings of sleepiness and fatigue & improve daytime performance
- <30 minutes between 1-4pm
The Four Rs of Recovery - **Rest**

**Sleep**

**DO**
- Keep a routine
- Make your sleeping environment cool (18-22 °C), dark and quiet
- Wind down before bed to help you relax

**DONT**
- Drink caffeine and alcohol
- Use your phone for 45 min before bedtime
- Clock watch – it reinforces stress and anxiety
The Four Rs of Recovery - **Rest**

**Mental/Psychological**

- **Mindfulness activities**
  - Meditation, breathing etc.
  - Apps such as Headspace, Calm etc.
- **Chatting, reading, listening to music**
- **Relaxation techniques**
  - E.g. visualization, breathing
- **Social/personal life**
Example of 4Rs

75kg athlete - 22.5g protein + 75g carbs

95kg Athlete - 28.5g protein + 95g carbs
The Four Rs of Recovery

**Refuel**
- Carbohydrate
  - 1 g per kg body mass

**Repair**
- Protein
  - 0.3 g per kg body mass

**Rehydrate**
- Replace 150%
  - Include electrolytes

**Rest**
- Sleep
- Mindfulness
- Social/Personal life
Other Recovery Strategies

**Active Recovery**

- Low intensity exercise
- Accelerates the removal of any by-products/metabolites
- Maintain increased blood flow for nutrient delivery

**Passive Recovery**

- E.g. massage, stretching
- Can help to combat neuromuscular stress
- Can ease soreness and minimize muscle tightness
Other Recovery Strategies

**Compression garments**
- Limited evidence supporting its effectiveness
- Lots of anecdotal use
- Increase blood flow and decrease muscle soreness

**Cold Water Immersion and Contrast Therapy**
- Believed to lessen muscle fatigue and soreness
- Reduce inflammation and pain by reducing blood flow
How to choose the best recovery strategies for YOU

- Science vs Practicality
- Limited research/evidence around recovery strategies
- Do what works for you – trial and error
- Be realistic
Poll Question

How often do you plan your recovery?

- Always
- Often
- Sometimes
- Never
Plan and Prepare

Before anything else, **preparation is the key to success.**

*Alexander Graham Bell*
Poll Question

What are the 4Rs of recovery?

- Refuel, Recover, Rest, Repeat
- Refuel, Repair, Rehydrate, Rest
- Recover, Recharge, Refuel, Repair
- Refuel, Rehydrate, Rest, Refresh
Sir Chris Hoy - Six time Olympic Champion

“Recovery was my secret weapon”
Thanks for watching

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