



Recovery strategies in sport and exercise



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Introduction

Recovery should be an important part of every sport and exercise participant's training programme. All participants need to rest and recover after an intensive training session, but have you considered *why* this period of recovery is so important? The obvious answer to this is so that the individual is ready to take on their next training session and train to the best of their ability, but is there more to it than that?

In this free course, *Recovery strategies in sport and exercise*, you will examine the purpose of recovery and consider the range of recovery strategies that individuals may employ to aid their recovery from training. In doing this we will critically evaluate research evidence and media perceptions of recovery from sport and exercise, and reflect on future directions for the topic.

This OpenLearn course is an adapted extract from the Open University course [E314 Exploring contemporary issues in sport and exercise](#).

Learning outcomes

!Warning! Calibri not supportedAfter studying this course, you should be able to:

- recognise the importance of recovery in an exercise programme
- evaluate the role of recovery strategies in sport and exercise
- identify the challenges of investigating recovery strategies.

1 Why is recovery important?

In order to understand why recovery is so important we need to understand how the body responds and adapts to training. The next activity will help you to do this.

Activity 1 Adaptations to training and the role of recovery

 Allow 20 minutes

In the following video, Nick Grantham, a Performance Enhancement Specialist who works with a range of sports governing bodies and professional athletes, talks about the importance of sports recovery. Watch the video and consider the role recovery plays in a training programme.

Video content is not available in this format.



Video 1 Role of recovery

Conduct an online search to help you answer the following questions:

- What is the overload principle and why do you think it is so important to training and recovery?
- What types of exercise-induced adaptations occur in response to training?
- Why do training and recovery need to be balanced?

Comment

Overload is a principle of training that suggests that fitness can only be improved by increasing the training load. The overload principle is central to our understanding of training and recovery. The video provides a nice summary of this and states that training provides a stimulus which overloads the body, and through recovery the body adapts and makes training gains (e.g. gets stronger). Recovery can therefore be seen to be an essential part of the process of adaptation to training.

Training sessions can be viewed as a form of physiological stress which cause both short-term (acute stimulus) and long-term adaptations (training stimulus). Short-term adaptations to a training session are temporary physiological changes, such as an increased heart rate, which return to normal after exercise. Long term adaptations are the physiological changes that become more permanent in response a training programme such as an increase in muscle strength. These adaptations can be split into three categories – morphological changes, metabolic changes and neuromuscular changes (Lambert and Mujika 2013). Obviously the type and extent of change will depend upon the nature of the exercise training programme.

Given the knowledge that training sessions lead to long term physiological adaptations (training gains) that occur during recovery it makes intuitive sense that training and recovery need to be balanced appropriately in order to maximise training adaptations. Inadequate recovery can lead to maladaptation, fatigue and reduced performance.

Activity 1 indicates that recovery is an essential part of the training process. It is a normal response for the physiological stress placed on the body during exercise to cause what is termed 'exercise-induced muscle damage' (EIMD). The delayed onset muscle soreness (DOMS) commonly experienced following intensive exercise is a symptom of EIMD.

Other symptoms of EIMD include reduced muscle strength, reduced range of motion, swelling and intracellular protein in the blood (Hill et al. 2014). These symptoms are temporary, but require a period of recovery to repair. If an individual moves into their next training session without being fully recovered from the previous one, their ability to perform at their best will be inhibited. Therefore, any strategy aimed at increasing the speed of recovery is potentially advantageous.

As well as being important to making physiological changes in response to training, recovery is also important in limiting negative responses to training overload. Positive responses to overload (i.e., training gains) are an appropriate response to training, but if the body responds negatively to overload (i.e., no gains in performance, or regression) the individual may be suffering from overtraining syndrome or burnout. It is beyond the scope of this course to discuss these conditions in detail, but if you want to know more the article [Overtraining syndrome – a practical guide](#) (Kreher and Schwartz, 2012) is a useful starting point. Overtraining and burnout can occur when an individual repeatedly trains whilst fatigued. Fatigue is therefore entwined with recovery.

This section has demonstrated how important recovery is in adapting to the training loads placed on the body and combating fatigue. Increasingly sport and exercise participants have begun to integrate specific recovery strategies into their training programmes. In the next section we introduce some of these strategies.

2 Recovery strategies: what is the best way to recover?

The process of recovery is no longer simply a matter of resting. Sport and exercise participants now use a wide range of strategies to enhance their recovery. In the next activity you will think about a strategy you used.

Activity 2 How do you recover?

 Allow 30 minutes

Take a few minutes to reflect on your own use of recovery strategies. Think about what recovery strategies you have used in the past to aid your recovery and then select one and consider:

- a. why you used it (e.g. what did you think the potential benefits were, did you see someone else using it?), and
- b. how effective you think it was.

If you haven't used any recovery strategies yourself, think about those that you have seen other sport and exercise participants use, or refer to this [Sports Scotland recovery guide](#) which provides a useful overview.

Comment

There are a broad range of recovery strategies available to sport and exercise participants such as ice baths, cryotherapy chamber, heat, massage, compression clothing, nutrition, hydration, sleep, relaxation techniques, stretching, electromuscular stimulation, and analgesics (e.g. ibuprofen).

There are several reasons why you may have chosen to use a particular recovery strategy. For example, you may have seen it used by other participants, heard about it in the media, or read a journal article about it. It is important to consider why a particular recovery strategy is used and how it made you feel, as at this level of study it is essential to be able to critically evaluate strategies.

Critically evaluating a strategy is an important skill. The first stage of the critical analysis process is to understand the science and theory behind a particular strategy and its impact. The next stage of critical analysis would be to analyse the supporting research.

In the next section we will look at some examples of recovery strategies used by elite athletes and will begin to critically examine how effective these strategies are.

3 The role of recovery strategies

So far we have seen that there are a range of recovery strategies available. In the next activity we will see some of these recovery strategies being used and consider the potential role of recovery strategies in the athlete's training and competition schedule.

Activity 3 Recovery: the next frontier in sporting progress?

 Allow 20 minutes

Watch the video clip below and answer the questions that follow. The clip was filmed in 2015 as part of the Channel 4 TV series *Chasing Perfection*, co-produced by The Open University, and features sport scientists and coaches from the UK and USA describing their use of recovery strategies with elite athletes.

- What recovery strategies do we see being used in the clip?
- What is the purpose of recovery strategies?
- Are recovery strategies always beneficial?

Video content is not available in this format.



Video 2 Chasing perfection

Comment

We see various recovery strategies used in the video. For example, in the section with Lindsey Anderson we see members of the Brazilian Paralympic Team using contrast baths and compression boots, and in the section with Tyler Jewell we see cryotherapy being used. Various other strategies are also mentioned.

According to those interviewed in the clip, the purpose of recovery strategies is to modulate the stress response to exercise, allowing individuals to recover more quickly and consequently train harder. Interestingly, Phillip Bell and Tyler Jewell both suggest the recovery strategies are not always beneficial and may actually inhibit the adaptation that occurs in response to hard training.

This demonstrates the need for specificity in the use of recovery strategies. For example, you may consider it inappropriate to use recovery strategies during a period of training when you want to maximise adaptation, however, you might consider it appropriate to use recovery strategies during competition (e.g. where you have several rounds or matches in a small time period) when you want the athlete to feel refreshed and recovered.

Hopefully you are beginning to recognise the need for evidence to support and underpin the use of recovery strategies both in general and at specific times. There is a wealth of research that has been undertaken to examine the impact of recovery strategies and we will begin to examine some of this in the next section.

4 Recovery strategies: what's the evidence?

Examining the research evidence is a vital step in investigating and evaluating any topic. In relation to recovery, research evidence helps us to critically evaluate how effective and appropriate recovery strategies are.

Research examining the impact of recovery on sports performance has been around for many years. A literature search on the topic indicates that articles have been published on the topic for several decades. Interest in different recovery strategies has evolved over the years. Interest in cryotherapy as a recovery strategy began around the 1970s, whilst research on both massage and compression garments as recovery strategies did not emerge until around the 1980s.

An article written by Barnett (2006), which reviewed the research examining the effectiveness of various recovery strategies, concluded that there was no substantial evidence to support the use of the recovery strategies, however, some research has suggested benefits. For example, Hill et al. (2014) after analysing 12 studies, concluded that compression clothing can enhance recovery.

Having looked at some of the research examining recovery we now move on to considering what we want or need to know about recovery.

5 Investigating recovery

Having gained knowledge of why recovery is so important and having examined some of the research looking at recovery, we will now consider factors important to investigating recovery.

Most research stems from a question that needs an answer. You may have already started to think about questions related to recovery strategies that you would like to know the answer to. Obviously at this stage your knowledge of recovery is relatively limited and there may already be research out there to answer your question that you haven't had the chance to discover yet, but equally that research may not exist and may therefore be a 'future direction' for research in that area.

Undertaking research to investigate the effectiveness of recovery strategies can be challenging as there are potentially lots of different variables that need to be accounted for. In the next activity we will look at some of these challenges and some of the limitations of research examining recovery.

Activity 4 The challenges of investigating recovery

 Allow 25 minutes

Imagine you have developed a new recovery strategy that you would like to test (e.g. a piece of equipment that you believe speeds up recovery between sessions). What challenges might you face in trying to measure the effectiveness of your recovery strategy?

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Comment

This is quite a difficult question to answer when you have no experience of having conducted research before, but hopefully you were able to think of some of the potential pitfalls.

One of the challenges is being able to attribute any improvement in recovery time to your recovery strategy and nothing else. Recovery time can be influenced by a multitude of factors and it can therefore be challenging to assess the impact of your recovery strategy alone. For example, if you measured the impact of the recovery strategy on 100 athletes, their rate of recovery might be influenced by, for example, what they've eaten as well as by the recovery strategy.

Therefore, good research studies are designed to account for this type of influence as much as possible by, for example, controlling for other factors, known as *extraneous variables* (e.g. making all participants eat the same food), or by having a control group that does not use the recovery strategy. When you critically review research articles you should be checking for this type of thing in the method section.

Conclusion

In this free course, *Recovery strategies in sport and exercise*, you have been introduced to the role of recovery and recovery strategies in sport and exercise. Some of the key points covered are summarised below.

- recovery is an essential component of the training-adaptation process
- intensive exercise can cause exercise induced muscle damage, a symptom of which is delayed onset muscle soreness
- failure to recover adequately from exercise can lead to performance decrements
- the aim of recovery strategies is to speed up the recovery process
- the research evidence to support recovery strategies is inconclusive and there are challenges in conducting recovery-related research
- there is some debate as to whether recovery strategies help or hinder the process of physiological adaptation to training, and it may be appropriate to use recovery strategies in some circumstances but not others
- it is important to keep up to date on recovery research and to consider future research directions.

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