

# THE COMPLETE GUIDE TO

Morc Coulson

# TEACHING EXERCISE TO SPECIAL POPULATIONS



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**TEACHING  
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SPECIAL  
POPULATIONS**



**Morc Coulson**



¥25.00

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## FOREWORD

Physical activity, in particular sport, has been an important part of my life since I was very young. I have been fortunate in that I have always had a talent for boxing, and I have also had people around me from an early age who have helped to nurture this talent and continue to do so. Being physically fit is an important part of boxing and means that I can continue to make a career out of what I love doing. I also feel that I benefit in terms of psychological and emotional well-being as a result. I would therefore encourage anyone wanting to get involved in supervising physical activity to try to improve their knowledge so that they can help individuals from all walks of life to feel the benefit as I do. *The Complete Guide to Teaching Exercise to Special Populations* is an excellent book that can help either those with experience or those who are just starting out with practical and theoretical information relating to a host of conditions.

### **Tony Jeffries, Professional Boxer**

Bronze medal 2008 Olympics. Professional fights: seven wins and one draw. Amateur fights: 95. England vests: 56. BBC North East Sports Personality of the Year 2008. Silver medal EU Amateur Championship 2008; Bronze medal EU Amateur Championship 2005; Bronze medal EU Amateur Championship 2004.

## ACKNOWLEDGEMENTS

Just a quick thanks to all who helped out on the book, especially to Chris Heron who did the photographs and to my wife Lorretta who pointed out that men have thicker skin than women, which is why she is always cold!

**Morc Coulson**  
**2011**

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# INTRODUCTION

The main purpose of this book is to provide a practical resource for those people involved or wanting to be involved in the delivery of physical activity to those with specific health conditions, referred to as 'special populations'. This book is also useful for those individuals who have been identified as being in a special population category and who are interested in taking up some form of physical activity. This book is also designed to be used as a study guide to complement any training qualification, as the information provided here is based on up-to-date research and information provided by relevant professional bodies. There are some terms that are used throughout the book that might not be familiar to all readers. For example, the term 'physical activity' is used extensively to describe any form of movement, exercise or activity that increases energy expenditure. This can range from gym-type exercise to activities such as gardening and washing the car. Another term that might not be familiar is related to a unit of measurement used in some of the diagnostic tests within. This unit is a 'mmol', which means, in simple terms, a very small amount. For example, when measuring blood cholesterol, the units used are mmol per litre of blood (mmol/l).

## SPECIAL POPULATIONS

There is no universally accepted definition of the term 'special population', but it is often meant as a collective term for a group of people with certain health-related conditions. The term possibly originates from the health and fitness industry and relates to training and qualifications required by fitness instructors for the purpose of delivering physical activity programmes to those that need certain consideration outside of the apparently 'healthy population' – in other words, those people with health-related conditions that are not covered in general fitness qualifications but are covered on specific training courses designed for these conditions. The National Quality Assurance Framework, which was set up by the Department of Health in 2001, states that the minimum level of qualification recommended for exercise professionals who are responsible for designing and delivering physical activity programmes for low-to-medium risk referred patients, is a level 3 advanced instructor award with a recognised exercise referral qualification. Exercise referral is the general term that relates to a scheme that is normally run by a GP's (doctor's) surgery or medical centre whereby people with certain

### Medical approval and qualification recommendations for all conditions

Condition	Medical approval		Specific qualification	
	Essential	Recommended	Essential	Recommended
Obesity		✓ (to identify any related condition)	✓ (L4)	
Diabetes	✓ (type 1)	✓ (type 2)	✓ (L4)	
COPD	✓			✓ (L3)
Asthma		✓		✓ (L3)
Hypertension	✓			✓ (L3)
Hyperlipidaemia		✓		✓ (L3)
Arthritis		✓		✓ (L3)
Osteoporosis		✓		✓ (L3)
Parkinson's		✓		✓ (L3)
Multiple sclerosis	✓			P (L3)
CVD	✓		✓ (BACR)	
Stroke	✓		✓ (BACR)	
Younger age				✓ (L2)
Older age				✓ (L2)
Disability		✓		✓ (L2)
Ante- and postnatal		✓ (if currently inactive)	✓ (L2)	

#### Notes:

L2 = level 2 instructor award

L3 = level 3 advanced instructor award

L4 = level 4 specialist instructor award

BACR = British Association of Cardiac Rehabilitation (see chapter 12)

diagnosed conditions are assessed and given an individual physical activity programme, which is delivered by those who are qualified to do so (typically as part of an NHS-funded team). Those individuals on exercise referral schemes can, however, be referred in different ways. First, a visit to the GP might result in the diagnosis of a condition that requires admission to the scheme.

On the other hand, individuals might be referred to the GP by some other mechanism. For example, those wishing to supervise a physical activity programme for an individual should always carry out some kind of screening to identify if the individual doing the activity is 'apparently healthy' or not. One of the most common forms used to do this is the Physical Activity Readiness



Questionnaire (PAR-Q) as can be seen in appendix 1 at the end of this chapter. Developed by the Canadian Society for Exercise Physiology, the PAR-Q is a short questionnaire that can help to identify possible risk factors for cardiovascular, pulmonary and metabolic disease. If no risk factors are identified (all questions answered 'no'), the form then encourages a programme of *low-to-moderate* physical activity to be undertaken relative to the fitness level of the individual. If any factors are identified (by the individual answering 'yes' to one of the questions on the PAR-Q), the form advises that they be referred to a GP prior to undertaking a programme of physical activity. The individual will then be assessed as to their suitability for an exercise referral programme, although the range of conditions that are accepted varies from surgery to surgery. The range of conditions within this book is designed to be comprehensive, in order to cover a wide spectrum of groups – from those who require limited medical intervention, such as the younger age group, to those who require a great deal of medical intervention, such as sufferers of cardiovascular disease. In order to help the reader, the table opposite presents an overview of the conditions for which medical approval is considered by the author to be an essential prerequisite, and those for which it is just a recommendation. The table also gives an overview of those conditions for which specific qualifications are considered by the author to be essential for those supervising activity, or whether these are just recommended. There are many training courses that deliver qualifications relevant to the conditions covered in this book, however the availability of courses for some of the conditions can be limited, and for others do not yet exist.

Information relating to available training courses, and the structure of qualifications and standards (known as National Occupational Standards) for the health and fitness industry is available from Skills Active ([www.skillsactive.com](http://www.skillsactive.com)), which is the sector skills council for active leisure in the UK. There is also a body known as the Register of Exercise Professionals ([www.exerciseregister.org.uk](http://www.exerciseregister.org.uk)), which provides information related to the levels of awards and how to register as part of the professional body.

## ABOUT THIS BOOK

The book is organised into four distinct parts. First, chapter 1 deals with the relationship between physical activity and health, and the risks associated with low levels of physical activity (known as sedentariness or inactivity). It also looks at recommended guidelines and the numbers of people in the UK who follow them. The second part (chapters 2–13) covers those special populations for which there is only a potential risk of developing the particular condition and, in some cases, where physical activity substantially reduces that risk. The 'special populations' covered in these chapters are obesity, diabetes mellitus, chronic obstructive pulmonary disease (COPD), asthma, hypertension, hyperlipidaemia, arthritis, osteoporosis, Parkinson's disease, multiple sclerosis, cardiovascular disease (CVD) and stroke. Each chapter follows a typical layout, with sections as follows.

## WHAT IS IT?

Each chapter starts with a description of the relevant condition. Some of the descriptions are

more in depth than others, but this is not representative of how important each condition is thought to be, as all conditions within this book are considered to be of equal importance.

## **PREVALENCE**

This simply refers to how many people are thought or estimated to have the condition. The author can rely only on research available at the time of this book's publication, and indeed the quality of that research. The very nature of some of the conditions makes it difficult for accurate figures to be acquired. Also, depending on the source of the research, some conditions will have global estimates, while others will have estimates only from the UK.

## **SYMPTOMS**

Chapters 2–13 deal with a range of symptoms that are related to the specific condition. It should be understood, however, that symptoms do not always appear and in some cases there may be multiple symptoms, whereas in others there might be only one or two.

## **RISK FACTORS**

All of the conditions described in chapters 2–13 have a range of factors (these can be related to lifestyle or have a genetic link) that are known as 'risk factors'. These are simply factors that increase the chances of a person developing the specific condition. It must be stressed that even if people have any of these factors, it is considered only a risk and not a guarantee that they will develop the associated condition. For example, those with high cholesterol levels do not always develop heart disease and those with high blood pressure do not always suffer a stroke.

## **DIAGNOSIS**

There is a range of diagnostic tests associated with each condition. Some tests can be carried out only in a clinical environment by suitably qualified people, but some can be done outside of a clinical environment. In some of the chapters there are 'test boxes', which describe tests that can be done outside of a clinical environment as they are not designed as diagnostic tests. They are simply used to establish at what level the individual with the condition may be at in relation to the test so that the test can then be repeated at a later date to see if any improvement has been made. As there are contraindications to testing people with various conditions it is always advisable to consult a GP or specialist before undertaking any testing, and to have the individual complete an 'informed consent' or 'freedom of consent' form prior to any testing (see appendix 2 at the end of this chapter).

## **PHYSICAL ACTIVITY BENEFITS**

Some of the conditions presented in this book are covered by a wealth of information relating to the benefits of physical activity, whereas others have only a limited amount. This is partly due to the problems associated with researching the particular condition. This part of the chapter tries to distinguish between the benefits of cardiovascular-type activity and resistance-type activity.

## **PHYSICAL ACTIVITY GUIDELINES**

This part of the chapter tries to give general guidelines for both cardiovascular- and resistance-type activity in relation to type, frequency, intensity and duration. The section also presents information that has been taken from a variety of sources relating to associated precautions. Some

conditions have very specific guidelines that are commonly agreed upon by professional bodies, whereas for other conditions the guidelines are more general and there are possible differences between sources. The activity guidelines within this part of the chapter recommend at what intensity the person should carry out the cardiovascular and resistance activities. This book refers to two different methods of setting cardiovascular intensity: percentage of maximum heart rate (%HRmax) and rate of perceived exertion (RPE). It also uses repetition maximum (RM) for setting resistance intensity. All methods are explained in appendix 3 and 4 at the end of this chapter.

The next part of the book (chapters 14–17) deals with those special populations for which

physical activity does not reduce the risk as they are considered an actual consequence of life. The special populations covered in these chapters are younger age, older age, ante- and postnatal, and disabled people. The final part of the book is chapter 18, which offers an overview of medications related to the various special populations. This particular section is not meant to be a definitive guide but more of a quick reference, as information relating to conditions and medication changes very regularly. This section does however attempt to provide the reader with an understanding of the side effects related to specific medications that might be useful in relation to physical activity.

# APPENDIX 1: PHYSICAL ACTIVITY READINESS QUESTIONNAIRE (PAR-Q)

Please read the following questions and answer each one honestly.

	Yes	No
Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?	—	—
Do you feel pain in your chest when you do physical activity?	—	—
In the past month, have you had chest pain while you were not doing physical activity?	—	—
Do you lose your balance because of dizziness or do you ever lose consciousness?	—	—
Do you have a bone or joint problem that could be made worse by physical activity?	—	—
Is your doctor currently prescribing drugs for your blood pressure or heart condition?	—	—
Do you know of any other reason why you should <u>not</u> do physical activity?	—	—
<b>If you answered YES to one or more questions</b>		
Talk to your doctor <b>BEFORE</b> you become more physically active or have a fitness appraisal. Discuss with your doctor which kinds of activities you wish to participate in.		
<b>If you answered NO to all questions</b>		
If you answered no to all questions you can be reasonably sure that you can: Start becoming much more physically active – start slow and build up. Take part in a fitness appraisal – this is a good way to determine your basic fitness level. It is recommended that you have your blood pressure evaluated.		
<b>However, delay becoming more active if:</b> You are not feeling well because of temporary illness such as a cold or flu. If you are or may be pregnant – talk to your doctor first.		

**Please note:** If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

'I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction.'

Name \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

Signature of parent \_\_\_\_\_  
or guardian

Witness \_\_\_\_\_

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

Source: Physical Activity Readiness Questionnaire (PAR-Q) 2002. Reprinted with permission from the Canadian Society for Exercise Physiology.



## APPENDIX 2: TYPICAL INFORMED CONSENT FORM

In order to assess cardiovascular function, body composition, and other physical fitness components, the undersigned hereby voluntarily consents to engage in one or more of the following tests (check the appropriate boxes):

- |  |  |
|--|--|
| <input type="checkbox"/> Aerobic capacity test | <input type="checkbox"/> Muscular strength tests |
| <input type="checkbox"/> Underwater weighing   | <input type="checkbox"/> Flexibility tests       |

### EXPLANATION OF THE TESTS

The aerobic capacity test is performed on a bicycle or treadmill. The intensity is increased every few minutes for a period of 15 minutes. We or you may stop the test at any time because of fatigue or discomfort. The underwater weighing procedure involves being completely submerged in a tank or tub while breathing through respiratory equipment. This test provides an accurate assessment of your body composition. For muscular strength testing, you lift weights for a number of repetitions using free weights or exercise machines. These tests assess the strength of the major muscle groups in the body. For evaluation of flexibility, you perform a number of stretching-type exercises during which we measure the range of motion in your joints.

### RISKS AND DISCOMFORTS

During the aerobic capacity test, certain changes may occur. These changes include abnormal blood pressure responses, fainting, irregularities in heartbeat and heart attack. Every effort is made to minimise these occurrences. Emergency equipment and trained personnel are available to deal with these situations if they occur. You may experience some discomfort during the underwater weighing, especially if you are fearful of being submerged. Breathing through respiratory equipment while underwater should minimise this discomfort. If necessary, alternative tests can be used to estimate body composition. There is a slight possibility of muscle strain or spraining a ligament during the muscular strength and flexibility testing. In addition, you may experience muscle soreness 24 to 48 hours after testing. These risks can be minimised by performing warm-up exercises prior to taking the tests. If muscle soreness occurs, appropriate stretching exercises to relieve this will be demonstrated.

## EXPECTED BENEFITS FROM TESTING

These tests allow us to assess your physical working capacity and to appraise your physical fitness status. The results are used to help prescribe a safe and individualised exercise programme for you. Records of the tests are kept strictly confidential.

## INQUIRIES

Questions about the procedures used in the physical fitness tests are encouraged. If you have any questions or need additional information, please ask us to explain further.

## FREEDOM OF CONSENT

Your permission to perform these physical fitness tests is strictly voluntary. You are free to deny consent if you so desire.

I have read this form carefully and I fully understand the test procedures. I consent to participate in these tests.

Signature of participant ..... Date .....

## APPENDIX 3: PERCENTAGE OF MAXIMUM HEART RATE (%HRMAX)

One of the most common methods used to measure cardiovascular intensity is percentage of maximum heart rate (%HRmax). For example, if the individual has a goal of developing aerobic fitness, it would be recommended that they exercise at a heart rate level of between 70 and 80% of their maximum (the aerobic zone). This can be written as 70–80%HRmax. To use this method the maximum heart rate of the person is needed. As an actual maximum heart rate test is not recommended for the majority of the population, this needs to be estimated. There are many ways to estimate maximum heart rate but one of the easiest is to use the following formula:

**Estimated maximum heart rate = 220 – age**

The unit that heart rate is measured in is beats per minute (which is written as bpm). Once maximum heart rate has been estimated by using the '220 – age' formula, you then need to work out the recommended percentage for the particular individual. For example, in the chapter on obesity, cardiovascular activity is recommended to be performed at between 40 and 85% of maximum heart rate. If the individual who is to do the activity is 20 years old then the following steps should be used to work out their heart rate range.

### Example

**20 year old exercising between 40 and 85%HRmax**

#### Step 1

**Estimated maximum heart rate is 220 – age  
(20 years) = 200 bpm**

#### Step 2

**40% of maximum heart rate =**

$$(200 \div 100 \text{ then } \times 40) = 80 \text{ bpm}$$

**85% of maximum heart rate =**

$$(200 \div 100 \text{ then } \times 85) = 170 \text{ bpm}$$

From this example it can be seen that the heart rate of a 20-year-old individual exercising at between 40 and 85% of maximum heart rate should be 80–170 bpm. This obviously has its problems as not everyone has access to or knows how to use heart rate monitors. Also, most people find it difficult to check their own heart rate, especially when exercising. For this reason an alternative method for setting intensity is that of rate of perceived exertion (RPE) (see appendix 4).

## APPENDIX 4: RATE OF PERCEIVED EXERTION (RPE)

This particular method was designed many years ago by Dr Gunnar Borg and is essentially a scale relating to how people feel during activity. As can be seen in the accompanying table, there are two scales: the 6–20 and the 0–10 versions. Both are

still used, even though the 0–10 scale is the later version. For the purposes of this book, the 6–20 scale will be used as it is often easier to use with lower intensities of activity.

Borg RPE scales		
6–20 scale	0–10 scale	Estimate of %HRmax
6	0 Nothing at all	
7 Very, very light	0.3 Practically nothing	
8	0.5 Extremely weak	50%
9 Very light	0.7	55%
10	1 Very weak	60%
11 Fairly light	1.5	65%
12	2 Weak	70%
13 Somewhat hard	2.5	75%
14	3 Moderate	80%
15 Hard	4	85%
16	5 Strong	88%
17 Very hard	6	92%
18	7 Very strong	96%
19 Very, very hard	8	98%
20	9	100%
	10 Extremely strong	
	11	
	Absolute maximum	

Source: Adapted from American College of Sports Medicine (2009) *ACSM Guidelines for Exercise Testing and Prescription* (8<sup>th</sup> edition), London: Lippincott Williams & Wilkins.