ADVANCED PERSONAL TRAINING

Science to practice

Edited by
Paul Hough and
Simon Penn

ROUTLEDGE

Advanced Personal Training

Effective fitness instruction and training programme design require an exercise specialist trainer to combine professional experience with strategies underpinned by scientific evidence. This is the first comprehensive fitness instruction and training programme design resource to explore the evidence-base of effective programme design, drawing on cutting-edge scientific research to identify optimum training methods and dispel some common myths around fitness training.

Putting clients' training goals at the centre of the process by focusing on their most common objectives – such as improving general health, enhancing cardiorespiratory fitness, decreasing body fat and increasing muscle mass – this book helps the reader develop a better understanding of the physiological principles at the core of successful programme design. Simple to navigate and full of helpful features – including applied case studies, example training programmes and guides to further reading – it covers a variety of key topics such as:

- pre-exercise health screening
- lifestyle and fitness assessment
- nutrition
- cardiorespiratory (endurance), resistance and core training
- recovery from exercise.

An essential text for fitness instructors, personal trainers and sport and exercise students, this book provides an invaluable resource for fitness courses, exercise science degree programmes and continued professional development for exercise professionals.

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Routledge
Taylor & Francis Group
LONDON AND NEW YORK

First published 2017
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging in Publication Data
Names: Hough, Paul, 1974- editor, author. | Penn, Simon, editor, author.
Title: Advanced personal training : science to practice / edited by Paul Hough and Simon Penn.
Description: Abingdon, Oxon ; New York : Routledge is an imprint of the Taylor & Francis Group, an Informa Business, [2017] | Includes bibliographical references and index.
Identifiers: LCCN 2016022890| ISBN 9781138924482 (hardback) | ISBN 9781138924499 (pbk.) | ISBN 9781315684291 (ebook)
Subjects: LCSH: Personal trainers--Handbooks, manuals, etc. | Physical education and training--Handbooks, manuals, etc. | Physical fitness--Handbooks, manuals, etc.
Classification: LCC GV428.7 .A48 2017 | DDC 613.7/11--dc23
LC record available at https://lccn.loc.gov/2016022890

ISBN: 978-1-138-92448-2 (hbk)
ISBN: 978-1-138-92449-9 (pbk)
ISBN: 978-1-315-68429-1 (ebk)

Typeset in Berling and Futura
by Saxon Graphics Ltd, Derby

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CHAPTER 1

Introduction

Paul Hough

The profession of fitness instruction and personal training has evolved dramatically since the introduction of mandatory qualifications and set codes of practice outlined by national governing bodies. These measures have improved the quality of fitness practitioners as well as providing assurance to clients and employers that trainers are appropriately qualified and have the knowledge and skills to perform their role effectively. The Internet and social media provide an infinite source of health and fitness information, enabling trainers to broaden their knowledge in a number of fields. However, the majority of mass media sources of information (websites, social media and magazines) are not subjected to a peer review process, whereby the accuracy of the information is checked. This can lead to ineffective and possibly unsafe exercise and nutrition recommendations being applied. Furthermore, inaccurate information can easily become widespread amongst clients and trainers leading to a number of exercise and nutrition misconceptions, some of which will be addressed throughout this book.

Effective fitness instruction and training programme design require the trainer to develop an exercise philosophy, applying professional experience with exercise strategies that are underpinned by scientific evidence. Although anecdotal evidence and experience can be useful in formulating ideas and creating effective training programmes, exclusively using this approach lacks objectivity and often yields inconsistent results. Conversely, objective information generated from scientific studies are unclouded by opinion or bias. Developing a solid understanding of exercise science empowers the trainer to evaluate and create effective exercise programmes instead of merely copying them. The objective of this book is to provide a framework for fitness professionals to design, deliver and evaluate exercise programmes, which are underpinned by scientific evidence. 'Real world' case studies and guidelines to achieve common goals (e.g. improving health and body composition) are included and explained.

PHYSICAL ACTIVITY AND EXERCISE

The terms 'physical activity' and 'exercise' are often used interchangeably, but they are not the same and this inconsistency in terminology can cause confusion amongst clients. Physical activity (PA) has been defined as 'any bodily movement produced by skeletal muscles that results in energy expenditure' (Caspersen et al., 1985). Therefore, PA encompasses a wide

range of daily activities such as walking, stair-climbing, lifting objects, etc. Exercise is a sub-set of PA; the distinguishing factor is that exercise is planned and structured, and has the objective to maintain or improve a component of fitness (see Chapter 2). This is an important distinction given that clients sometimes associate PA with a structured exercise programme and/or a gym-based environment. Although the purpose of this book is to provide a scientific framework for designing effective exercise programmes, trainers should also promote the benefits of daily PA outside the gym environment.

The potential health benefits of daily PA were noted over 2,500 years ago by the Greek physician Hippocrates. Over the past six decades a large amount of scientific evidence has amassed which supports this notion. Regular PA has consistently been associated with lower rates of all-cause mortality and chronic disease (Booth et al., 2008). Furthermore, regular PA has been shown to improve numerous components of health, examples of which are presented in Figure 1.1. These benefits can be achieved outside conventional gym-based programmes through adopting an active lifestyle (see page 3).

Adherence

Despite the widely promoted benefits of PA and exercise, one of the biggest issues that trainers encounter is poor client engagement and exercise adherence. Clients are prone to abandoning an exercise programme for a number of reasons, for example if exercise does not meet their expectations and/or they lose motivation (Whaley & Schrider, 2005). Most adults who engage in a diet/exercise intervention experience improvements in health, fitness and body composition. The problem, which has yet to be solved, is improving long-term adherence of positive behaviours (e.g. regular exercise, good quality diet). A potential reason for poor adherence/lack of engagement with PA and healthy living advice is because the relationship between the fitness professional and client can be too didactic, whereby the professional provides specific advice in the hope that the client will adhere to this guidance, i.e. 'you need to do this, to achieve … '. Providing accurate and relevant advice is obviously a fundamental role of the fitness professional. However, clients must be empowered to take an active role in their own health/fitness rather than passively following advice, which

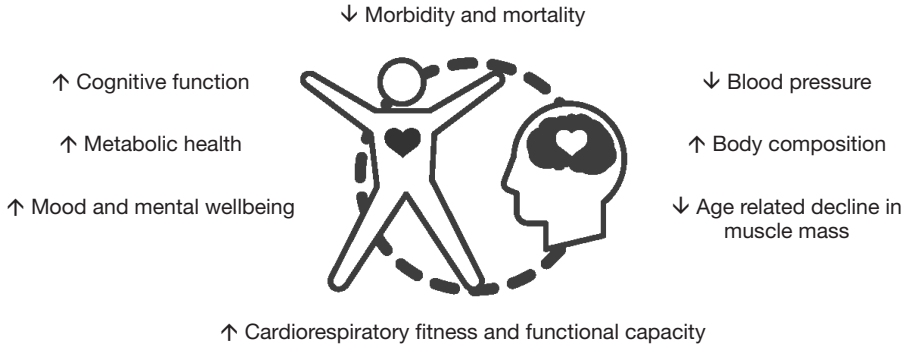

FIGURE 1.1 Example health benefits of regular physical activity.

is unlikely to be an effective long-term strategy. Thus, the exercise programme is only 'part of the puzzle' in improving health, fitness and performance (see Chapter 4).

The majority of guidelines presented within this book are based on evidence gathered from scientific studies. However, the exercise professional must consider that the strategies only work if the client engages with the exercise programme, i.e. exercise programmes do not work if they are not done! This seemingly obvious point is often overlooked when trainers devise exercise programmes which have a strong rationale, but fail to gauge the practicality of the approach or the client's feedback. For example, perceived enjoyment of exercise is an important determinant of exercise adherence (Hagberg et al., 2009). Continuous cardiorespiratory training (e.g. cycling for 30 minutes, five days per week) is an effective strategy for improving cardiorespiratory fitness, but it is unlikely to be an effective long-term strategy for a client who dislikes the training method. Health and fitness interventions have to include strategies that encourage a permanent change in positive self-selected and self-motivated behaviours to be truly effective (see Chapter 4). An example of one of these strategies is to promote an active lifestyle.

ACTIVE LIFESTYLE PROMOTION

A common reason people give for not exercising on a regular basis is 'lack of time' (Trost et al., 2002). This is possibly because of misconceptions associated with exercise. For example, some clients may believe that exercise must be performed in a gym and each session must last around an hour. One of the issues of promoting exercise instead of PA is that exercise can be more difficult to incorporate within a client's lifestyle based on the 'time barrier'. This is not an issue for 'fitness enthusiast' clients who are engaged with their fitness programmes, as these clients will typically modify other areas of their life, such as social or leisure activities, to maintain their fitness routine. However, a large majority of the clients a trainer will work with will not fall into this category. This is evident in the high attrition rates within exercise programmes (Wilson & Brookfield, 2009). Therefore, trainers should provide 'active lifestyle' guidance alongside their exercise programme to enable the client to work towards their health/fitness goals outside the gym environment. Active lifestyle guidance is a simple and effective means of increasing regular PA within a daily routine (Barr-Anderson et al., 2011). There are a number of methods to achieve this, such as using stairs instead of escalators, active commuting, standing desks and walking meetings. Unlike exercise within a gym, monitoring PA levels has historically proved difficult for trainers and clients. However, the development of technological devices, such as activity trackers, enables the client and trainer to objectively monitor daily PA levels, which can improve adherence to PA-based interventions (Lyons et al., 2014).

Sedentary time

The term sedentary is derived from the Latin 'sedere' meaning 'to sit' and is used to describe periods of inactivity outside sleep. The majority of people in non-physical

occupations (e.g. office workers) spend most of their waking day doing seated activities, for instance using the computer and watching television (Matthews et al., 2008). This sedentary lifestyle trend is concerning, as long periods of sedentary behaviour are associated with a number of negative health consequences, such as poor metabolic health (Healy et al., 2008). Therefore, the promotion of regular PA may be a feasible approach in reducing the negative health consequences of excessive sedentary time. An active lifestyle approach is recommended for clients with sedentary occupations regardless of how active they are outside their occupation. This is because long periods of sitting can have deleterious health effects, even amongst adults who engage in regular exercise (Biswas et al., 2015).

EXERCISE FOR WEIGHT LOSS

One of the most common motives for clients to engage with an exercise programme and/or dietary intervention is to reduce body mass. This is more commonly known as 'weight loss'. Therefore, a number of chapters within this book will address this subject. Before reading these chapters it is important to establish some basic concepts regarding exercise and body mass weight. Clients wishing to reduce body mass intuitively focus on changes in their body mass (regular weigh-ins) to monitor their progress. This approach implies that all body mass is equal and any reduction in body mass is a positive outcome. However, all body mass is not equal in the context of health and performance. Body composition can broadly be defined as the proportion of fat and fat-free mass (muscle, tendon, bone, etc.) in the body. A healthy body composition is one that includes a lower proportion of body fat and a higher proportion of fat-free mass. Muscle mass serves a number of important functions within the body, which are essential for health and longevity (see Chapter 13). As conventional body mass scales measure body mass alone, a decrease in muscle mass (and subsequent total body mass) could be perceived as a positive outcome when this is clearly not the case.

Body fat has a number of essential roles, such as providing insulation and protection to internal organs. However, excess body fat (i.e. overweight/obesity) has a negative impact on health and mortality (McGee, 2005), and is associated with a number of conditions that contribute directly and indirectly to the development and progression of cardiovascular disease (Dorresteijn et al., 2012; Krauss et al., 1998; Todd Miller et al., 2008). When working with overweight and obese clients a reduction in body mass can provide a crude indication of fat loss. However, based on the health benefits of maintaining/increasing muscle mass (see Chapter 13) and reducing body fat, the emphasis of conventional 'weight loss' orientated programmes should be shifted towards fat loss, not total body mass (i.e. body composition). Consequently, throughout this book the term 'fat loss' will be used instead of the conventional 'weight loss'.

Is exercise effective for decreasing body fat?

Energy balance is the relationship between energy consumed (calories from food and drink) and energy expended (calories used by the body). Energy balance is often cited as the main determinant of body composition, whereby a positive energy balance (more

calories consumed than expended) leads to an increase in body/fat mass. Conversely, a negative energy balance (more calories expended than consumed) results in a decrease in body/fat mass (Hall et al., 2012). However, this simple concept is difficult to accurately apply in practice, as there are numerous physiological and psychological factors, as well as health issues, that interact to influence body composition (Morton et al., 2006).

Many clients engage in an exercise programme in order to reduce body fat with the premise that performing regular exercise will create a negative energy balance and lead to a reduction in body fat. However, a number of studies have demonstrated that exercise and PA interventions alone only have a modest or no effect in reducing body and/or fat mass (Cook & Schoeller, 2011; Rosenkilde et al., 2012; Villareal et al., 2011). A possible explanation for this occurrence is that some individuals experience energy balance compensatory mechanisms following exercise, such as being less active throughout the rest of the day or sub-consciously increasing calorific intake (see Chapter 11). A number of physiological and psychological factors seem to influence these compensatory mechanisms, which is possibly why exercise performed without any dietary modification has inconsistent effects on fat loss between individuals. Therefore, basic nutritional guidance must be presented alongside an exercise programme in order to induce a significant and consistent reduction in body fat. However, it is essential that trainers are aware of their scope of practice when discussing nutrition with clients (see Chapter 5).

The conflicting evidence to support exercise for decreasing body/fat mass has led some authorities to proclaim that exercise is unnecessary or 'does not work' in terms of decreasing body/fat mass (Harcombe, 2011; Malhotra et al., 2015). These statements may attract media and public attention, but are unhelpful from a health promotion perspective given that obese individuals are less likely to engage in regular exercise (Smith et al., 2015). As a result, the message that exercise 'does not work' may discourage individuals from engaging in regular PA or exercise meaning they will not experience the numerous health benefits that regular PA can provide. Whilst it is important that public health messages accurately reflect the current scientific research, the evaluation of a PA intervention or exercise programme must not purely be based on reductions in body/fat mass. Rather, fat loss orientated training programmes should focus on improving health and generating a physiological stress to induce chronic metabolic adaptations (see Chapter 13) instead of focusing solely on energy balance. Moreover, whilst it is technically correct that/fat loss can be achieved without exercise, there are a number of issues with this 'diet only' approach.

The problems with a 'diet only' approach to body composition

All clients must be encouraged to engage in regular PA and exercise regardless of their primary health/fitness goals, as many of the health benefits (see Figure 1.1) are independent of changes in body composition (Pedersen, 2007; Woo et al., 2013). Indeed, the protective effect of cardiorespiratory fitness (CRF) on mortality is independent of age, ethnicity, adiposity, smoking status, alcohol intake and health conditions. This fact has led some authorities to suggest that improving CRF should be emphasised over body composition, as improving CRF will substantially reduce the negative effects of obesity on morbidity

and mortality. This is known as 'the fitness-fatness hypothesis' (Fogelholm, 2010; Hainer et al., 2009). The highest risk of mortality is observed in individuals who are both obese and have poor CRF. Hence, regular PA is essential for clients in this category, irrespective of changes in body fat.

Adopting a calorie restriction diet without any exercise intervention can result in a loss of muscle tissue and a decrease in resting energy expenditure (Ross et al., 1996). Both of these factors can have a negative impact on metabolic health and actually lead to increases in body fat if the calorie restriction diet is not sustainable. This effect is evident in clients who go through cycles of increasing and decreasing body fat following a period of calorie restriction – the so called 'yo-yo dieters'. Therefore, performing exercise, particularly resistance training, alongside a dietary modification strategy is highly recommended in order to preserve muscle mass/strength, and maintain a healthy metabolism (see Chapter 13). Indeed, research indicates that improvements in body composition are best achieved with a combination of diet and exercise interventions (Johns et al., 2014).

THE CLIENT AS AN INDIVIDUAL

Throughout this book scientific evidence is used to formulate recommendations in order to achieve positive outcomes within the context of health, fitness and performance. The majority of exercise and nutrition studies are conducted on a group of participants and the measured responses to the intervention are usually described in general terms as a group average. For example, a hypothetical study investigating the effects of a dance based exercise programme on body fat and cardiorespiratory fitness (CRF) might perform the same dance intervention on 20 participants for 12 weeks. Body fat and CRF would be measured at the start and end of the intervention. The results of the body fat and CRF tests would be expressed as a group average with the assumption that this average represents a typical response for most individuals. However, any experienced exercise professional will recognise that clients do not always respond to an exercise or nutrition intervention in the same way due to a number of influences, such as genetics and lifestyle factors (e.g. psychological stress, sleep). Some clients will achieve greater improvements than others despite engaging in the same intervention; this is the phenomenon of 'high and low responders'. Consequently, although the scientific evidence enables us to form robust exercise recommendations, exercise professionals must always be aware that each client has unique physiological and psychological characteristics which will determine how they respond to PA and exercise. Thus, all exercise programmes must be carefully individualised (see Chapter 7).

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15 Cool-down

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