

Exercise Testing and Interpretation: A Practical Approach. Christopher B Cooper and Thomas W Storer. Cambridge, United Kingdom: Cambridge University Press. 2001. Soft cover, illustrated, 278 pages, \$44.95.

This book is a practical guide to exercise testing, intended for an audience with a basic background in respiratory and cardiac physiology, although the book also contains sections useful to health care professionals who have a more extensive background in exercise physiology. The authors have well-established experience in teaching this topic in a number of academic settings, which supports the value of this book as an introductory text. For a physician, a respiratory therapist, or a pulmonary function technician with no prior exposure to exercise testing, this book is an excellent way to begin to learn about exercise testing.

In comparison with other currently available exercise testing textbooks this book is unusual in that it fully covers many practical issues in the performance of exercise testing and acquisition of appropriate data. A major portion of the book focuses on the equipment available for exercise testing and on a variety of exercise protocols, in a depth not attained by other texts.

The chapter on instrumentation begins with a complete discussion of ergometers, ranging from the simplest friction ergometers to electronically controlled ergometers and treadmills. The next section gives a comprehensive review of devices that measure exercise ventilation, again covering the entire range of instruments that could be used, ranging from simple equipment that might be found in a community exercise facility to instruments in sophisticated research facilities. Finally, a full range of respiratory gas analysis devices are discussed, with explanation of the principles underlying the measurement of gas concentrations, practical points concerning potential errors of measurement, and suggestions for proper maintenance of the instruments.

The chapter on testing methods describes "field test" protocols used for fitness studies of normal subjects and that require minimal equipment. This includes a description of the 12-min run, the 6-min walk, and other protocols for estimating maximum oxygen

consumption. Though these tests are generally most applicable to exercise trainers and health clubs, it is helpful for exercise testing personnel at tertiary care facilities to be aware of these tests as nontechnical options for certain subjects. A number of simple protocols that measure nonmaximal oxygen consumption are discussed, along with cautions concerning the interpretation of the results for diagnostic purposes. The traditional maximal progressive work exercise protocols are covered appropriately, including a perspective on adjusting the protocol to the subject's capacity. The authors discuss the preparation of subjects for exercise testing, including basic laboratory safety, a description of the test for the patient, and an appropriate process to obtain informed consent.

The chapter on interpretation of the response variables obtained in an exercise test is brief relative to the complexity of the information that needs to be evaluated, but may be sufficient for an introductory text. However, the wide range of variation among normal subjects is not adequately covered, especially with respect to the wide normal range of maximum exercise heart rates. Likewise, the effects of fitness and training are only touched on lightly and deserve more coverage in a book that includes fitness program testers as part of its audience. The section on exercise electrocardiogram interpretation is too superficial to be helpful, and other texts need to be consulted for better background on this topic. Likewise, the range of exercise abnormalities observed in many different diseases is not discussed, and again other advanced texts are available to fill this need.

The book provides a relatively brief and simplified set of examples for interpreting the full data sets obtained in a diagnostic exercise test. The 9-panel data display produced by commercial exercise testing systems often overwhelms beginning interpreters, and the brief explanation provided for the example cases may prove inadequate for beginners. The paucity of example cases will not prepare the reader to interpret any but the simplest of diagnostic exercise tests. Because of that brevity, the chapter examples will not be particularly useful for experienced exercise practitioners.

A unique feature that deserves special mention is this book's extensive set of appendices, which include reference values for various exercise tests, a glossary, and useful forms for protocols and supplemental materials. This 60-page section alone justifies purchasing the book, for even the most sophisticated exercise facility.

In summary, this book is intended for beginners who have background knowledge of respiratory and cardiac physiology, and it serves this introductory function as well as any other book on the market. The interpretation of test results receives relatively little attention; this is a complex topic that requires a longer book for full coverage. Certainly the appropriate acquisition of reliable data is the essential first step in the performance of exercise tests, and this book is especially well suited to teaching those who will perform and troubleshoot the tests.

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Clinical Exercise Testing. Idelle M Weisman and R Jorge Zeballos, Editors. (Progress in Respiratory Research, Volume 32. CT Golliber, Editor.) Basel, Switzerland: Karger. 2002. Hard cover, illustrated, 329 pages, \$192.25.

I have spent all of my academic career as a pulmonologist and have a nerdy infatuation with exercise physiology. I have exercised subjects from lung transplant patients to Olympic athletes, and from clinical laboratories to research facilities in bizarre and remote places as high as 21,000 feet altitude. I have loved trying to understand how the body works under all kinds of stresses, the most natural of which is exercise. It is thus with great gusto that I agreed to review **Clinical Exercise Testing**.

I will start out by saying that I was not disappointed and that I learned a great deal from reading this book from cover to cover. It is a valuable addition to the library of any physician who is involved in exercise testing, and for any respiratory therapist or exercise technician who works in a pulmonary function or exercise testing laboratory.

It is also chock-full of great information for pulmonary fellows and graduate students in exercise physiology. It supplements, but in some ways goes beyond, some of the excellent clinical exercise textbooks that are presently available.

Part of the success of the book has to do with the editors' selection of a diverse and capable group of contributing authors. Although there is some heterogeneity in the time and effort put in on some of the chapters, for the most part each chapter is a valuable gem. I will first pick out some highlights and then critique a couple of areas where there might have been some improvement in either content or organization.

The first chapter, by JR Rodman et al, entitled "Cardiovascular and Respiratory System Responses and Limitations to Exercise," is a superb and succinct treatise on gas exchange and lung mechanics. The authors integrated a rather brief but important section on the cardiovascular system, with comments on cardiorespiratory interactions. The authors then discuss respiratory limitations during exercise and finish up with some comments on training.

The second chapter, by HR Gosker et al, addresses important recent observations on the effect of severe chronic obstructive pulmonary disease and heart failure on stride and muscle. This chapter is an excellent resource for what I think will be a very important topic of future research and clinical application.

In the third chapter the volume's editors describe "Modalities of Clinical Exercise Testing." This is an excellent short chapter on the various ways to induce exercise stress in patients, with guidelines on how to choose. My only critique of this section is that there was a disproportionate amount of space dedicated to some of the less commonly used methods. This chapter is appropriately followed by one on further "Methods for Cardiopulmonary Exercise Testing," written by KC Beck and IM Weisman. This chapter provides excellent guidelines for clinicians. It seems to end abruptly, with a discussion on ventilatory limitations.

Deconditioning and principles of training are discussed by T Troosters et al, in an adequate fashion; this chapter deals primarily with the clinical arena. DA Mahler et al then deal with dyspnea in a succinct but valuable chapter, though the end seems a bit truncated with respect to the effects of rehabilitation, medications (such as codeine), oxygen, and surgical intervention on

ameliorating dyspnea. The chapter also aches for a summary that would bring it all together.

Dyspnea is one of the most common diagnoses that exercise laboratory clinicians are asked to address, and SE Gay et al produced excellent guidelines on the differential diagnosis as elucidated by exercise testing. Excellent chapters follow on aging and exercise, heart failure and cardiac transplantation, cardiac ischemia (this section would have been greatly improved if sample electrocardiograms had been included), cardiac rehabilitation, a superb treatise on exercise and chronic obstructive pulmonary disease, pulmonary rehabilitation, and a number of other specific pulmonary diseases. There is an unfortunately very brief chapter on pulmonary vascular disease, which should have provided a rich source of material for the understanding of gas exchange, pulmonary vascular response, lung mechanics, and cardiac limitation. DY Sue's discussion of impairment and disability is outstanding, as is J Fahey et al's chapter on exercise testing of children. The final chapter, written by the editors, describes an integrative approach to interpretation of exercise tests and provides some case studies. This is an appropriate ending to this volume.

I do have 2 further comments about how I think the book could have been better. First, the organization of the chapters seems a bit random. Although they cover many topics, some of them seem a bit out of order. For instance, I think the chapter entitled "Muscular Alterations in Chronic Obstructive Pulmonary Disease and Chronic Heart Failure at Rest and During Exercise" should have come much later in the book, after the 2 chapters on exercise methods. Some of the chapters on basic physiology, such as the chapters on deconditioning and aging, should provide natural lead-ins to groups of organ dysfunction, particularly pulmonary, cardiac, and muscle.

My second disappointment was that there was essentially no information on extraordinary exercise physiology. There is no information on the elite aerobic or strength athlete nor any information on the limits of human performance in extraordinary environments (at altitude, underwater, in cold, or in heat). Furthermore, I think we as humans understand our place and adaptation in this world if we can understand how our physiologic adaptations compare to other creatures. There is no hint of comparative physiology in this volume, which I think

would help the reader understand human physiology and pathophysiology.

Despite these latter reservations I still will cherish this volume as both a resource book on my shelf and a very helpful volume for pulmonary fellows and students.

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Handbook for Respiratory Care Research. Robert L Chatburn RRT FAARC. Cleveland Heights OH: Mandu Press. 2002. Soft cover, illustrated, 291 pages, with appendices, PDF format available free online for AARC members (<http://www.aarc.org/>); soft cover for members \$50; soft cover for nonmembers \$60 (available via the AARC online store).

One of the perennial voids in the respiratory care literature has been a text introducing our relatively young profession to the tenets of research methodology. This has now been addressed by Robert Chatburn's text **Handbook for Respiratory Care Research**. This new text was actually predated by an earlier book on research methods in respiratory care, which is now out of print, entitled **Fundamentals of Respiratory Care Research**, edited by Robert Chatburn and Kenneth Craig (Norwalk, Connecticut: Appleton & Lange, 1988). Though there was excellent material in that earlier text, the current work is far better organized and the topics are nicely synchronized to applications in respiratory care. The contents are divided into 5 major sections plus appendices. The sections are: "Introduction" (which includes chapters on ethics in research and outcomes research), "Planning the Study," "Conducting the Study," "Analyzing the Data," and "Publishing the Findings."

The Introduction gives practical, down-to-earth reasons for studying and doing research in respiratory care. Chatburn notes how scientific evidence has shaped our field of respiratory care, such as in the demise of intermittent positive-pressure breathing, a vastly over-used and probably overly expensive therapy to encourage postoperative deep breathing and to administer nebulized drug solutions. He also cites a reason that should be close to all of us: if we are to be current, well-informed clinical practitioners, we must be able "to read and critically evaluate the published reports presented by other investigators" (page 3). The Introduction