Functional fitness for adults living with Down syndrome

PIETER-HENK BOER

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Published by AOSIS Books, an imprint of AOSIS Publishing.

AOSIS Publishing

15 Oxford Street, Durbanville 7550, Cape Town, South Africa
Postnet Suite #110, Private Bag X19, Durbanville 7551, South Africa
Tel: +27 21 975 2602
Website: <https://www.aosis.co.za>

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Published in 2021
Impression: 1

ISBN: 978-1-928523-91-8 (print)
ISBN: 978-1-928523-92-5 (epub)
ISBN: 978-1-928523-93-2 (pdf)

DOI: <https://doi.org/10.4102/aosis.2021.BK252>

How to cite this work: Boer, P.-H., 2021, *Functional fitness for adults living with Down syndrome*, pp. i-127, AOSIS, Cape Town.

Printed and bound in South Africa.

Listed in OAPEN (<http://www.oapen.org>), DOAB (<http://www.doabooks.org/>) and indexed by Google Scholar.
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Pieter-Henk Boer

The work presented in this text is dedicated to my loving brother, Rory. You define unconditional love and I am very fortunate to have you in my life.

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Research Justification

The work presented in this book is original and represents research which has resulted from the author's post-doctoral investigations and began with his Master's and PhD work. The purpose of this book is to provide a specific group of adults living with intellectual disability (ID), namely Down syndrome (DS), their own unique instrument to assess functional fitness. Previously, individuals living with DS were pooled with individuals living with ID without DS, even though various academics and researchers have demonstrated that the presence of DS negatively affects test performance. The need arose because many adults living with DS have poor functional ability, live sedentary lives and are overweight or obese. Consequently, their quality of life decreases dramatically especially when they reach old age. This finding is evident as reported in the percentile norms (ch. 3).

Functional fitness includes parameters such as flexibility, balance, aerobic capacity, functional capacity, and muscular strength and endurance (ch. 2). The 14 test items presented in this functional fitness test battery were carefully selected after numerous literature studies and consultations with academic scholars and specialists who are experienced in working with adults living with DS. Also, extensive pilot studies were conducted in order to select test items best suited to the needs of adults living with DS. The feasibility, reliability and validity were determined specifically for adults living with DS (ch. 3). This book also provides norm- and criterion-referenced tables (ch. 3) that can be used by the academic scholar or adapted physical activity specialist to provide the adult living with DS a report card and the necessary comments or exercise prescriptions needed to maintain or improve functional fitness. Chapter 4 provides more in-depth information regarding the methodology and procedures of test administration. Chapter 5 presents information on the interpretation of test scores whilst Chapter 6 provides the academic scholar or adapted physical activity specialist with information regarding exercise prescriptions.

This scholarly book provides an economical and field-based list of test items that can be used to assess, evaluate and monitor functional fitness. The target audience is specialists in the disciplines of Sport Science, Psychological Education and Health Sciences. The book aims to contribute to the scientific discourse reflecting on the functional limitations seen in adults living with DS. The author declares that the research presented in this book is original, that the text written in this book represents a scholarly discourse, where the main target audience is research specialists working with a population of adults living with DS. Sections in this book represent a substantial reworking of two dissertations on the functional fitness capacity of adults with DS. Researches for these theses were done at Stellenbosch University and the North-West University, respectively under the supervision of Prof. Elmarie Terblanche and Prof. S.J. Moss. The reworking obtains more than 50% and the publications resulted from the theses are referred to in this book in a similar way than other referencing. These source references yield a substantial production of new knowledge and contribution to the subject matter.

Pieter-Henk Boer, Department of Human Movement Science, Faculty of Education, Cape Peninsula University of Technology, Wellington, South Africa.

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Abbreviations, Appendices, Boxes, Figures and Tables Appearing in the Text and Notes

List of Abbreviations

ACSM	American College of Sports Medicine
ADL	Activities of Daily Living
ANOVA	Analysis of Variance
BMI	Body Mass Index
BOTMP	Bruininks-Oseretsky Test of Motor Proficiency
BPFT	Brockport Physical Fitness Test
DS	Down Syndrome
FFTb	Functional Fitness Test Battery
ICC	Intraclass Correlation Coefficient
ID	Intellectual Disability
MDC	Minimal Detectable Change
S&R	Chair Sit-and-Reach Test
SEM	Standard Error of Measurement
SFT	Senior Fitness Test
SMART	Specific, Measurable, Authentic, Realistic, Time
SOOL	Standing On One Leg
WOBB	Walking on Balance Beam

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Biographical Note

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Declaration

The book, entitled *Functional fitness for adults living with Down syndrome*, presents Dr Pieter-Henk Boer Masters and PhD research findings. The Masters' thesis, 'The functional fitness capacity of adults with Down syndrome in South Africa' (2010) submitted to the Department of Sport Science, Stellenbosch University. The PhD thesis, 'Effect of continuous aerobic vs interval training on selected functional fitness parameters of adults with intellectual disability and Down syndrome' (2015), was submitted to Physical Activity, Sport and Recreation, North-West University. The book represents a reworking of more than 55% of the original theses to meet the standards of the publisher and the Department of Higher Education and Training (DHET). It is his work in conception and execution, and all the relevant sources that he has used or quoted have been indicated and acknowledged by means of complete references.

Acknowledgement

Thank you to the Almighty God for providing me with the necessary skills and social support to complete the research presented herein. Thank you to my family, Chandré, Lienke-Mari, Mieke-Louise and extended family for the motivation provided during the writing of this text. I would also like to thank Luiba for providing all the pictures illustrated in this book. Lastly, I would like to thank Stellenbosch University, North-West University, Cape Peninsula University of Technology as well as my two study leaders (Prof. Terblanche and Prof. Moss) during my Master's, PhD and post PhD studies (2009-2021).

Introduction

The work presented in this book represents research which has resulted from the author's post-doctoral investigations and began with his Master's and PhD work. The purpose of this book is to provide a specific group of adults living with intellectual disability (ID), namely Down syndrome (DS), their own unique instrument to assess functional fitness. Previously, individuals living with DS were pooled with individuals living with ID without DS, even though various academics and researchers have demonstrated that the presence of DS negatively affects test performance. The need arose because many adults living with DS have poor functional ability, live sedentary lives and are overweight or obese. Consequently, their quality of life decreases dramatically especially when they reach old age. This finding is evident as reported in the percentile norms (ch. 3). Also, because of the advancements of medical technology, the life expectancy of individuals living with DS has increased vastly but is concerning because many adults living with DS age prematurely and become dependent on others at the age of 45 years. In many cases, this age-related dependency accrues at a much younger age, especially when obesity and other frequently occurring conditions such as cardiovascular or musculoskeletal problems arise.

Consequently, the goal was to develop a holistic functional fitness instrument of test items adapted to the needs of adults living with DS (18 years and older). The use of the word 'holistic' refers to all of the physical parameters indicative of functional fitness such as body mass index, balance, flexibility, musculoskeletal strength, aerobic capacity and functional ability. The 14 test items presented in this functional fitness test battery were carefully selected after numerous literature studies and consultations with academic scholars and specialists who are experienced in working with adults living with DS. Also, extensive pilot studies were conducted in order to select test items best suited to the needs of adults living with DS. Because of their poor functional fitness, it is not surprising that test items suited to the needs of other functionally impaired populations (the elderly in the general population and individuals with ID) were selected. Therefore, test items with well-established feasibility, reliability and validity were included. Furthermore, the feasibility, reliability and validity were once again determined specifically for adults living with DS (ch. 3). This book also provides norm- and criterion-referenced tables (ch. 3) that can be used by the academic scholar or adapted physical activity specialist to provide the adult living with DS a report card

How to cite: Boer, P.-H., 2021, 'Introduction', in *Functional fitness for adults living with Down syndrome*, pp. 1-2, AOSIS, Cape Town. <https://doi.org/10.4102/aosis.2021.BK252.00>