

# Contents

<b>1 Introduction: New Paradigms of Active Ageing</b>	<b>1</b>
Gonçalo Nuno Figueiredo Dias, Micael Santos Couceiro, Polybio Serra e Silva, Maria António Castro, Maria Aurora Branquinho, Rui Mendes and Inês Cláudia Rijo de Carvalho	
1.1 Population Ageing	2
1.2 Active Ageing: Retrospective and Future Trends	7
1.3 Physical Activity in the Active Ageing Process	10
1.4 Disorders and Psychomotor Rehabilitation	11
1.4.1 Cerebrovascular Accidents	12
1.4.2 Heart Disease	13
1.4.3 Pulmonary Disease	14
1.4.4 Osteoporosis	14
1.4.5 Metabolic Disorders (Diabetes)	15
1.5 Conclusions and Practical Implications	15
References	16
<b>2 Physical Activity Benefits in Active Ageing</b>	<b>21</b>
Gonçalo Nuno Figueiredo Dias, Micael Santos Couceiro, Pedro Mendes and Maria de Lurdes Almeida	
2.1 Background	21
2.2 Morphological and Functional Changes of the Elderly	22
2.3 Body Composition	23
2.4 Cardio-respiratory Capacity	23
2.5 Musculoskeletal System	24
2.6 Central Nervous System	24
2.7 Sensory and Perceptive System	25
2.8 Movement Duration and Motor Reaction	26

2.9	Health Benefits of Physical Activity . . . . .	27
2.9.1	Aerobic Capacity . . . . .	27
2.9.2	Muscular Strength . . . . .	28
2.9.3	Flexibility . . . . .	29
2.9.4	Balance . . . . .	29
2.9.5	Biopsychosocial Model . . . . .	30
2.10	Conclusions and Practical Implications . . . . .	31
	References . . . . .	31
<b>3</b>	<b>Activity Programmes for the Elderly . . . . .</b>	<b>35</b>
	Gonalo Nuno Figueiredo Dias, Micael Santos Couceiro and Rui Mendes	
3.1	Regular Physical Activity and Healthy Ageing . . . . .	35
3.2	Physical Fitness Evaluation . . . . .	38
3.3	Physical Activity Prescription . . . . .	39
3.3.1	Structure . . . . .	39
3.3.2	Frequency . . . . .	39
3.3.3	Duration . . . . .	40
3.3.4	Intensity . . . . .	40
3.3.5	Repetitions per Exercise . . . . .	40
3.3.6	Technical Indications . . . . .	40
3.4	General Exercises . . . . .	40
3.4.1	Stick . . . . .	41
3.4.2	Ball . . . . .	45
3.4.3	Hoop . . . . .	50
3.4.4	Resistance Band (Part 1) . . . . .	56
3.4.5	Resistance Band (Part 2) . . . . .	61
3.5	Strength Exercises . . . . .	74
3.5.1	Dumb-bells . . . . .	75
3.5.2	Neoprene Ankle Weights . . . . .	81
3.6	Partner Exercises . . . . .	86
3.6.1	Body Strengthening . . . . .	86
3.6.2	Body Language . . . . .	93
3.7	Return to Resting State . . . . .	98
3.8	Conclusions and Practical Implications . . . . .	102
	References . . . . .	102
<b>4</b>	<b>Technology for the Active Senior . . . . .</b>	<b>105</b>
	Micael Santos Couceiro and Gonalo Nuno Figueiredo Dias	
4.1	Mixed Reality Serious Games and Robotics . . . . .	105
4.2	Mixed Reality Serious Games . . . . .	107
4.2.1	Serious Games . . . . .	109
4.2.2	Mixed Reality . . . . .	109
4.2.3	Wearable Technology . . . . .	110

4.3	Robotics . . . . .	111
4.3.1	Appearance and Physical Characteristics. . . . .	112
4.3.2	Real-Time Assistance and Monitoring Over the Internet. . . . .	113
4.3.3	Autonomous Navigation and Operation Under Dynamic Environments. . . . .	114
4.4	Conclusions and Practical Implications. . . . .	115
	References. . . . .	116
<b>5</b>	<b>Conclusions</b> . . . . .	119
	Gonçalo Nuno Figueiredo Dias and Micael Santos Couceiro	
5.1	Conclusions . . . . .	119
5.2	Practical Implications . . . . .	120
5.3	Recommendations. . . . .	120

Active Ageing and Physical Activity

Guidelines, Functional Exercises and Recommendations

Dias, G.N.F.; Couceiro, M.S.

2017, XIV, 120 p. 95 illus. in color., Softcover

ISBN: 978-3-319-52062-9