Contents

Part I  Tools and Techniques in Anthropometry: General Methods

1 Calculating Sample Size in Anthropometry ........................................... 3
   Carine A. Bellera, Bethany J. Foster, and James A. Hanley

2 Use of Percentiles and Z-Scores in Anthropometry ............................. 29
   Youfa Wang and Hsin-Jen Chen

3 Use of Bioelectrical Impedance: General Principles and Overview .......................................................... 49
   Alexander Stahn, Elmarie Terblanche, and Hanns-Christian Gunga

4 An Anthropometric Analysis of Seated and Standing People.............. 91
   Antonino Nucara, Matilde Pietrafesa, Gianfranco Rizzo,
   and Gianluca Scaccianoce

5 Optical and Electromagnetic Shape-Capturing Systems for Limb Anthropometrics ........................................... 115
   Mark D. Geil

6 The Composite Index of Anthropometric Failure (CIAF): An Alternative Indicator for Malnutrition in Young Children......... 127
   Shailen Nandy and Peter Svedberg

7 The Human Body Shape Index (HBSI): An Anthropometric Measure Based on an Age-Related Model of Human Growth.......... 139
   Maria K. Lebiedowska and Steven J. Stanhope

8 Reproducibility of DXA Measurements of Bone Mineral and Body Composition: Application to Routine Clinical Measurements ......................................................... 151
   Colin E. Webber
9 Self-Reported Anthropometry: Body Mass Index and Body Composition ................................................................. 167
Savvas P. Tokmakidis, Antonios D. Christodoulos, and Helen T. Douda

10 Body Composition Analysis Using Radionuclides .............................................................. 185
Themistoklis Tzotzas, Georgios Karanikas, and Gerasimos E. Krassas

11 Three-Dimensional (3-D) Photonic Scanning: A New Approach to Anthropometry ........................................................ 205
Jonathan C.K. Wells

12 3D Craniofacial Anthropometry, Simplified and Accelerated by Semi-Automatic Calliper .......................................................... 219
Constantin A. Landes, Michael Trolle, and Robert Sader

13 Issues in Measurement of Pubertal Development ............................................................ 237
Frank M. Biro and Lorah D. Dorn

14 New Anthropometric History: An Analysis of the Secular Trend in Height ................................................................. 253
Laurent Heyberger

Part II Tools and Techniques in Anthropometry: Water, Hydration and Surface Area

15 Total Body Water in Health and Disease: A Look at End-Stage Renal Disease ............................................................... 273
Luigi Vernaglione, Carlo Lomonte, and Carlo Basile

16 Bioelectrical Impedance Vector Analysis for Assessment of Hydration in Physiological States and Clinical Conditions ........................................... 287
Henry C. Lukaski and Antonio Piccoli

17 The Uses and Misuses of Body Surface Area in Medicine ....................................... 307
James Heaf

Part III Tools and Techniques in Anthropometry: Muscle

Paolo Gargiulo, Ugo Carraro, Thomas Mandl, Helmut Kern, Sandra Zampieri, Winfried Mayr, and Thordur Helgason

19 Upper Limb Muscle Volumes in Adults ................................................................. 355
Katherine R. Saul, Scott L. Delp, Garry E. Gold, and Wendy M. Murray
20 **Bioelectrical Impedance to Predict Muscle Mass in the Elderly**
   Lars Ellegård and Marja Tengvall

**Part IV** **Tools and Techniques in Anthropometry:**
   **Adipose Tissue, Other Compartments and Relationships**

21 **Anthropometry of Body Fat: How Anthropometric Measures Predict Mortality and Especially Cardiovascular Mortality**
   Eddy Mizrahi-Lehrer, Beatriz Cepeda-Valery, and Abel Romero-Corral

22 **Body Fat Measurement by Air Displacement Plethysmography: Theory, Practice, Procedures, and Applications**
   Mauro E. Valencia and Rosa C. Villegas-Valle

23 **Selected Applications of Bioelectrical Impedance Analysis: Body Fluids, Blood Volume, Body Cell Mass and Fat Mass**
   Alexander Stahn, Elmarie Terblanche, and Hanns-Christian Gunga

24 **Physiological Basis of Regression Relationship Between Body Mass Index (BMI) and Body Fat Fraction**
   David G. Levitt, Dympna Gallagher, and Steven B. Heymsfield

25 **Relationship Between Physical Measures of Anthropometry and Bioimpedance Measures**
   María Dolores Marrodán Serrano, Marisa González-Montero de Espinosa, and Estefanía Morales Zamorano

**Part V** **Regions and Anatomical Areas of the Body: Head and Face**

26 **Fetal Head Circumference as an Anthropometric Index**
   Emmanuel Stephen Mador, Josiah Turi Mutihir, and John Oluwole Ogunranti

27 **Anthropometry of the Intracranial Volume**
   Bunyamin Sahin

28 **Anthropometry and Numerical Simulations of a Child Head Model**
   Sébastien Roth, Jean-Sébastien Raul, and Rémy Willinger

29 **The Farkas System of Craniofacial Anthropometry: Methodology and Normative Databases**
   Curtis K. Deutsch, Alison R. Shell, Roberta W. Francis, and Barbara Dixon Bird
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Anthropometry of Soft Facial Tissues</td>
<td>575</td>
</tr>
<tr>
<td></td>
<td>John S. Bamforth</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Anthropometry of Facial Beauty</td>
<td>593</td>
</tr>
<tr>
<td></td>
<td>Chiarella Sforza, Alberto Laino, Gaia Grandi, Gianluca M. Tartaglia, and Virgilio F. Ferrario</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Three-Dimensional Facial Morphometry: From Anthropometry to Digital Morphology</td>
<td>611</td>
</tr>
<tr>
<td></td>
<td>Chiarella Sforza, Claudia Dellavia, Marcio De Menezes, Riccardo Rosati, and Virgilio F. Ferrario</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>The Concept of Anthropometric Facial Asymmetry</td>
<td>625</td>
</tr>
<tr>
<td></td>
<td>Senem Turan Ozdemir</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Periorbital Anthropometric Measurements</td>
<td>641</td>
</tr>
<tr>
<td></td>
<td>Ümit Beden and Matej Beltram</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Anthropometry of Eyelids</td>
<td>655</td>
</tr>
<tr>
<td></td>
<td>Dae Hwan Park and Chang Hyun Oh</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Neck Circumference: Its Usage in Medicine and Biology</td>
<td>665</td>
</tr>
<tr>
<td></td>
<td>Bernhard Fink</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Part VI  Regions and Anatomical Areas of the Body:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Limbs, Extremities and Bones</strong></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Prediction of Upper and Lower Extremity Tissue Masses Using Surface Anthropometric Measures and DXA</td>
<td>679</td>
</tr>
<tr>
<td></td>
<td>David M. Andrews and Timothy A. Burkhart</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Demographic Trends in Mid-Arm Circumference in Children and Adults over a 35-Year Period</td>
<td>697</td>
</tr>
<tr>
<td></td>
<td>R.J. Prineas, Y. Ostchega, and D.S. Reed-Gillette</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Anthropometric Wrist and Arm Circumference and Their Derivations: Application to Amyotrophic Lateral Sclerosis</td>
<td>717</td>
</tr>
<tr>
<td></td>
<td>Luciano Bruno de Carvalho-Silva</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Mid-Upper Arm Anthropometric Measurements as a Mortality Predictor for Community-Dwelling Dependent Elderly</td>
<td>727</td>
</tr>
<tr>
<td></td>
<td>Masafumi Kuzuya and Hiromi Enoki</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>The Arm Span to Height Relationship and Its Health Implications</td>
<td>741</td>
</tr>
<tr>
<td></td>
<td>Maw Pin Tan and Sushil K. Bansal</td>
<td></td>
</tr>
</tbody>
</table>
42 Proximal Femoral Anthropometry by Computed Tomography ......................................................... 755
   Thomas F. Lang

43 Leg Length and Anthropometric Applications: Effects on Health and Disease ................................................. 769
   Maria Inês Varela-Silva and Barry Bogin

44 Measures and Application of Lower Leg Length: Fracture Risk Assessment ......................................................... 785
   Jian Sheng Chen

Part VII Regions and Anatomical Areas of the Body: Joints and Digits

45 Anthropometry and the Knee Joint ............................................................... 801
   A.J. Teichtahl, A.E. Wluka, Y. Wang, and M. Flavia Cicuttini

46 Knee Anthropometry and Total Knee Arthroplasty: Relationship Between Anthropometry, Surgical Difficulty, and Outcomes ................................................................. 815
   Luis Ma. Lozano, Montserrat Núñez, Ester Nuñez, Josep Ma. Segur, and Francisco Maculé

47 Standardization of Sizes of Knee–Ankle–Foot Orthoses (KAFO) Through Anthropometry ......................................................... 827
   L. Narendra Nath

48 Sex Differences and Age Changes in Digit Ratios: Implications for the Use of Digit Ratios in Medicine and Biology ................................................................. 841
   John T. Manning

49 Correlations Between Digit Ratio and Foetal Origins of Adult Diseases in a Chinese Population: A Focus on Coronary Heart Disease and Breast Cancer ......................................................... 853
   Huo Zhenghao, Lu Hong, Dang Jie, and Francis L. Martin

Part VIII Regions and Anatomical Areas of the Body: Abdominal and Trunk Regions

50 Anthropometry of Abdominal Subcutaneous and Visceral Adipose Tissue with Computed Tomography ................................................................. 869
   Amir Abbas Mahabadi, Pál Maurovich-Horvat, and Udo Hoffmann

51 Measures of Waist Circumference ................................................................. 881
   Paul B. Higgins and Anthony G. Comuzzie
52 Trunk: Periphery Fat Ratio ................................................................. 893
   Rachel Novotny

Part IX Regions and Anatomical Areas of the Body:
   Sensory Organs

53 Anthropometry of Normal Human Auricle ......................................... 903
   Ruma Purkait

54 Anthropometric Analysis of the Nose ............................................... 919
   Abdullah Etöz and İlker Ercan

55 Three-Dimensional Computerized Anthropometry
   of the Nose ...................................................................................... 927
   Chiarella Sforza, Riccardo Rosati, Marcio De Menezes,
   Claudia Dolci, and Virgilio F. Ferrario

Part X Regions and Anatomical Areas of the Body:
   Internal Organs, Other Tissues and Regions

56 Imaging Techniques for the Measurement of Liver Volume .............. 945
   Ferruccio Santini, Monica Giannetti, and Aldo Pinchera

57 Epicardial Adipose Tissue Measured by Multidetector
   Computed Tomography: Practical Tips
   and Clinical Implications .................................................................. 955
   Tzung-Dau Wang and Wen-Jeng Lee

58 Breast Volume Determination in Breast Hypertrophy ....................... 973
   Laszlo Kovacs and Maximilian Eder

59 Numerical Modelling of Human Breast Deformation ....................... 985
   A. Pérez del Palomar, B. Calvo, and A. Lapuebla-Ferri

Part XI Anthropometry of Pregnancy:
   Prenatal and Postnatal Aspects

60 Reference Charts for Anthropometric
   Changes During Pregnancy .................................................................. 999
   Elvira Beatriz Calvo and Laura Beatriz López

61 Prenatal Famine Exposure and Long-Term
   Consequences for Anthropometry and Adult Health ......................... 1021
   Tessa Roseboom, Rebecca Painter, and Susanne de Rooij

62 Parental Determinants of Neonatal Anthropometry ......................... 1033
   Gareth Hynes, Cyrus Cooper, and Elaine Dennison
63 Use of Computerized Anthropometry and Morphometrics to Identify Fetal Alcohol Syndrome ................................................................. 1049
Elizabeth S. Moore and Richard E. Ward

64 Correlating Maternal and Infant Anthropometric Variables and Micronutrients at Birth in the Pakistani Population ................................................................. 1067
Shahzad K. Akram and Christine Carlsson-Skwirut

65 Neonatal Anthropometry: A Tool to Evaluate the Nutritional Status and Predict Early and Late Risks ................................................................. 1079
Luis Pereira-da-Silva

66 Anthropometric Measurements in Sudanese Newborns: Value in Measuring Weight at Birth and Its Relationship with Maternal Characteristics ................................................................. 1105
Eltahir M. Elshibly and Gerd Schmalisch

67 Total Body Water in Newborns ................................................................. 1121
Maria Dalva Barbosa Baker Méio and Maria Elizabeth Lopes Moreira

Part XII Anthropometry of Infants and Children

68 Failure to Thrive in Infancy: Anthropometric Definitions ................................................................. 1139
Else Marie Olsen and Charlotte M. Wright

69 Estimation of Children’s Weight in Medical Emergencies ................................................................. 1151
Anne-Maree Kelly

70 Anthropometry and HIV-Infected Children in Africa ................................................................. 1163
Herculina Salome Kruger

71 Waist Circumference Measures and Application to Thai Children and Adolescents ................................................................. 1179
Uruwan Yamborisut and Kallaya Kijboonchoo

72 Secular Changes in Craniofacial Dimensions of Indigenous Children in Southern Mexico ................................................................. 1197
Bertis B. Little and Robert M. Malina

73 Anthropometric Indexes of Low-Income Brazilian Children ................................................................. 1211
Sylvia do Carmo Castro Franceschini, Silvia Eloiza Priore, Fabiana de Cássia Carvalho Oliveira, Cláudia Aparecida Marlière de Lima, and Silvia Nascimento de Freitas

74 Adipokines and Anthropometry: Childhood and Adolescent Obesity or Adipocytokines and Anthropometry in Childhood and Adolescence ................................................................. 1221
Panagiota Pervanidou, Makarios Eleftheriades, and Ioannis Papassotiriou
<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>Anthropometric Measures in Children with Renal Failure</td>
<td>1237</td>
</tr>
<tr>
<td></td>
<td>Andreas Nydegger and Julie E. Bines</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>Measures of Body Surface Area in Children</td>
<td>1249</td>
</tr>
<tr>
<td></td>
<td>Janusz Feber and Hana Krásničanová</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>Skinfold Thickness in Sri Lankan Children</td>
<td>1257</td>
</tr>
<tr>
<td></td>
<td>V.P. Wickramasinghe</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>Use of Segmental Lengths for the Assessment of Growth in Children with Cerebral Palsy</td>
<td>1279</td>
</tr>
<tr>
<td></td>
<td>Kristie L. Bell, Peter S.W. Davies, Roslyn N. Boyd, and Richard D. Stevenson</td>
<td></td>
</tr>
<tr>
<td>79</td>
<td>Anthropometric Indices and Cardiovascular Disease Risk in Children and Adolescents: CASPIAN Study</td>
<td>1301</td>
</tr>
<tr>
<td></td>
<td>Roya Kelishadi</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>Secular Trends in the Anthropometry of Adolescents and College Students: Polish Perspective</td>
<td>1319</td>
</tr>
<tr>
<td></td>
<td>Boguslaw Antoszewski and Aneta Sitek</td>
<td></td>
</tr>
<tr>
<td>81</td>
<td>Vitamin D, Exercise, and Body Composition in Young Children and Adolescents</td>
<td>1337</td>
</tr>
<tr>
<td></td>
<td>Leng Huat Foo</td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>Anthropometry of Adolescents: Brazilian Perspectives</td>
<td>1357</td>
</tr>
<tr>
<td></td>
<td>Silvia Eloiça Priore, Renata Maria Souza Oliveira, Sylvia do Carmo Castro Franceschini, Silva Nascimento de Freitas, and Cláudia Aparecida Marlière de Lima</td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>Anthropometric Indices for Obesity and Hypertension in Indian Affluent Adolescents</td>
<td>1371</td>
</tr>
<tr>
<td></td>
<td>Shobha Rao</td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>Anthropometry in Relation to Sexual Maturation</td>
<td>1385</td>
</tr>
<tr>
<td></td>
<td>Silvia Diez Castilho and Antonio de Azevedo Barros-Filho</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>Reference Curves of Waist Circumference in Children and Adolescents</td>
<td>1405</td>
</tr>
<tr>
<td></td>
<td>Peter Schwandt and Gerda-Maria Haas</td>
<td></td>
</tr>
</tbody>
</table>
Part XIV  Anthropometry of Middle-Aged and Aged in Health and Disease

86 Anthropometric Aspects and Common Health Problems in Older Adults ................................................................. 1415
Prasert Assantachai

87 Anthropometrical Changes in Older Taiwanese and Diet and Exercise ................................................................. 1435
Alan C. Tsai

88 Anthropometry and Mortality in Older Women: Potential Survival Benefit of Overweight and Obesity .................. 1449
Chantal Matkin Dolan, Michelle Hansen, and Kathryn Fisher

89 Postmenopausal Anthropometric Relationship Between Arm Span and Height in Osteoporosis ................................. 1467
Demet Ofluoglu

90 Relationship Between Plasma Hormones and Anthropometric Measures of Muscle Mass in Postmenopausal Women ................................................................. 1481
Fábio Lera Orsatti, Erick Prado de Oliveira, and Roberto Carlos Burini

91 Anthropometric Measurements in Adults and Elderly: Cuban Perspectives ................................................................. 1491
Aline Rodrigues Barbosa and Raildo da Silva Coqueiro

92 Anthropometric Indices and Nutritional Assessments in the Elderly: Brazilian Perspectives .................................................. 1509
Aline Rodrigues Barbosa, Lúcia Andrelita Zanette Ramos Zeni, and Ileana Arminda Mourão Kazapi

93 Assessment of Sarcopenia ................................................................................................................................. 1527
Daniel Bunout, Gladys Barrera RN, Pia de la Maza, Laura Leiva RT, and Sandra Hirsch

94 Body Mass Index and Cardiac Events in Elderly Patients .......................................................................................... 1537
John A. Batsis and Silvio Buscemi

Part XV  Anthropometry in Genetic Disease and Polymorphisms

95 Anthropometry of Twins ................................................................................................................................. 1561
Sergio Demarini

96 Anthropometry in Children with Cystic Fibrosis .................................................................................................. 1571
Alexia J. Murphy and Peter S.W. Davies
97 Facial Anthropometry in Hypohidrotic Ectodermal Dysplasia (HED) .............................................................. 1585
Clauuda Dellavia, Francesca Catti, Michela Turci, Chiarella Sforza, and Virgilio F. Ferrario

98 Anthropometric Indices of Facial Features in Down’s Syndrome Subjects ............................................................. 1603
Chiarella Sforza, Claudia Dellavia, Cristina Allievi, Davide G. Tommasi, and Virgilio F. Ferrario

99 Sex Chromosome Aneuploidy and Anthropometry ............................................................ 1619
Lise Aksøgaard, Niels Erik Skakkebæk, and Anders Juul

100 Anthropometric Indices in Turner Syndrome ........................................ 1635
Anna M. Kucharska

101 Polymorphisms in the Serotonin (5-Hydroxytryptamine (5-HT)) Type 2A Receptor (5-HTR2A) Gene, Other Related Genes and Anthropometry ............................................................. 1649
Dolores Corella and Mercedes Sotos-Prieto

Part XVI Anthropometry in Cancer

102 Anthropometry and Thyroid Cancer Risk ........................................... 1671
Cari Meinhold Kitahara and Amy Berrington de González

103 Anthropometry and Ovarian Cancer: The Inflammation Connection ............................................................. 1685
Julia B. Greer

104 Anthropometry and Breast Cancer Risk ........................................... 1703
Amanda I. Phipps

105 Anthropometric Parameters in Hospitalized Elderly Patients with Cancer ............................................................. 1725
E. Paillaud, B. Campillo, E. Alonso, and P.N. Bories

106 Body Weight and Body Surface Area in Chemotherapy ........................................ 1735
Dominique Levêque

Part XVII Anthropometry in Exercise and Sport Activities

107 The Meaning of Muscle Mass for Health, Disease, and Strength Exercises ............................................................. 1747
Roberto Carlos Burini and Nailza Maestá

108 Exercise, Nutrition, and Anthropometry of Bone Development in Term and Preterm Infants ........................................... 1761
Ita Litmanovitz and Alon Eliakim
109 Anthropometry and Race Performance in Endurance Athletes ................................................................. 1777
Beat Knechtle

110 Anthropometry and the Response to Dietary Supplementation in Exercise......................................................... 1785
Melissa Crowe

111 Anthropometry in Premenarcheal Female Esthetic Sports Athletes and Ballerinas............................................................. 1817
Marjeta Misigoj-Durakovic

112 Fitness and Anthropometric Testing in Basketball Players .......... 1837
Eric J. Drinkwater

113 Anthropometric Digit Ratio 2D:4D and Athletic Performance ...... 1857
Johannes Hönekopp

114 Anthropometric Variables and Its Usage to Characterise Elite Youth Athletes ....................................................... 1865
Cristóbal Sánchez-Muñoz, Mikel Zabala, and Karen Williams

115 Anthropometry in Athletes with Spinal Cord Injury ................. 1889
Mina C. Mojtahedi and Ellen M. Evans

116 Anthropometry in 55–75-Year Olds in Response to Exercise ........ 1903
Melanie I. Stuckey, Anna M. Chudyk, and Robert J. Petrella

117 Anthropometry and Exercise in Obesity ........................................ 1919
Fusun ARDIC

118 Anthropometry and Exercise in Down Syndrome ........................ 1937
Manuel Rosety-Rodriguez, Francisco Javier Ordoñez, Gabriel Fornies-Gonzalez, Miguel Angel Rosety, Natalia Garcia Gomez, Antonio Diaz-Ordonez, Jesus Rosety, Alejandra Camacho Molina, and Ignacio Rosety

Part XVIII Anthropometry in Metabolic Disease and Obesity

119 Value of Waist Circumference in Metabolic Diseases .................. 1947
V. Saroja Voruganti and Anthony G. Comuzzie

120 Waist Circumference for the Clinical Diagnosis of Metabolic Syndrome in the Japanese Population: Optimal Cut-Point to Predict Early Arteriosclerosis ......................... 1959
Yuka Matoba, Toyoshi Inoguchi, Atsushi Ogo, and Ryoichi Takayanagi
121 BMI, Waist Circumference, and Metabolic Syndrome: Lessons from Japanese Perspectives .................................................. 1973
Masaru Sakurai, Tsuguhito Ota, Katsuyuki Miura, Hideaki Nakagawa, Shuichi Kaneko, and Toshinari Takamura

122 Anthropometry of Local Fat Reduction ............................................. 1989
Frank L. Greenway and Susan Pekarovics

123 Waist-to-Height Ratio and Obesity in Chinese ................................. 2007
Che-Yi Chou and Zhiguo Mao

124 Diagnosis of Obesity Using Anthropometric Indices in Urban Populations: Brazilian Perspectives ...................... 2017
Cláudia Aparecida Marlière, Silvia Nascimento de Freitas, Silvia Eloíza Priore, and Sylvia do Carmo Castro Franceschini

125 Presurgical Assessment of Intra-abdominal Visceral Fat in Obese Patients............................................................. 2031
Angela Falbo and Stefano Palomba

Part XIX Anthropometry in Diabetes

126 Maternal Anthropometric Indices and Gestational Diabetes .......... 2047
Edwina Yeung, Yiqing Song, and Cuilin Zhang

127 Body Size at Birth and Risk of Type 2 Diabetes in Adult Life................................................................................ 2073
Yiqing Song, Lu Wang, Edwina Yeung, and Cuilin Zhang

128 Waist-Circumference Phenotype and Risk of Type 2 Diabetes .......................................................... 2091
Ike S. Okosun and Tandeih A. Ghogomu

129 The Use of Skinfolds in Anthropometric Measures and Their Applications to Diabetes ........................................ 2107
Marie-Eve Mathieu and Louise Béliveau

Part XX Anthropometry in Cardiovascular Disease

130 Altered Bone Geometry of the Radius and Tibia Among Stroke Survivors ......................................................... 2123
Marco Y.C. Pang and Ricky W.K. Lau

131 Waist Circumference and Cardiovascular Risk........................................ 2137
Heribert Schunkert, Marcello Ricardo Paulista Markus, and Jan Stritzke
132 **Anthropometry, Body Surface Area and Cardiopulmonary Bypass: Determining the Pump Flow Rate of the Heart–Lung Machine Using Body Size** .................................................. 2155
R. Peter Alston

133 **Anthropometric Measurements, Adipokines and Abdominal Aortic Calcification** ................................................... 2171
Adam Franklin Parr and Jonathan Golledge

Part XXI  **Anthropometry in Organ Disease**

134 **Body Composition in Liver Cirrhosis** .............................................. 2187
Lindsay D. Plank and John L. McCall

135 **Liver Damage Severity Evaluated by Liver Function Tests and the Nutritional Status Estimated by Anthropometric Indicators** ............................................................ 2201
Alfredo Larrosa-Haro, Erika F. Hurtado-López, Rocío Macías-Rosales, and Edgar M. Vásquez-Garibay

136 **Waist Circumference Correlates and Hepatic Fat Accumulation** ........................................................... 2213
Yuichiro Eguchi, Toshihiko Mizuta, Iwata Ozaki, Dita Salova, Masato Yoneda, Koji Fujita, Hideyuki Hyogo, Hideki Fujii, Masafumi Ono, Yasuaki Suzuki, Takaaki Ohtake, Yoshio Sumida, and Kazuma Fujimoto

137 **Ultrasonographic Anthropometry: An Application to the Measurement of Liver and Abdominal Fat** ....................................... 2227
Marisa Chiloiro and Giovanni Misciagna

138 **Dissecting the Architecture of Bone Strength-Related Phenotypes for Studying Osteoporosis** ............................................... 2243
Xiaojing Wang and Candace M. Kammerer

139 **Body Composition and Lung Function** .............................................. 2259
Mauro Zamboni, Andrea Rossi, Alessandra Zivelonghi, Giulia Zamboni, and Francesco Fantin

Part XXII  **Anthropometry in Special Conditions and Circumstances**

140 **Psychosocial Correlates in the Context of Body Mass Index and Overweight** ...................................................... 2273
Helena Fonseca and Margarida Gaspar de Matos

141 **Body Composition Studies in Critical Illness** .................................... 2285
Lindsay D. Plank
142 Anthropometry and Infectious and Parasitic Diseases
Pedro R.T. Romão, Francisco Martins Teixeira, Taysa Ribeiro Schalcher, and Marta Chagas Monteiro

2299

143 Body Composition in Spinal Cord Injured–Paraplegic Men
Yannis Dionyssiotis

2317

144 Anthropometry of Head Circumference, Limb Length and Dementia
Jae-Min Kim, Robert Stewart, Il-Seon Shin, and Jin-Sang Yoon

2341

145 Anthropometry in Special and Selective Conditions and Circumstances: Anthropometry as Measure of Risk in COPD Patients
Ernesto Crisafulli, Stefania Costi, and Enrico M. Clini

2357

146 Anthropometry in Congenital Adrenal Hyperplasia
Henrik Falhammar, Anna Nordenström, and Marja Thorén

2373

147 Changes in Anthropometric Measures in Systemic Lupus Erythematosus
Chi Chiu Mok

2391

148 Anthropometric Measurement-Based Estimates of Body Water in Children on Peritoneal Dialysis
B.Z. Morgenstern

2403

149 Anthropometry and Body Composition in Chronic Kidney Disease Patients not on Dialysis
Vincenzo Bellizzi, Biagio Di Iorio, and Luca Scalfi

2413

150 Obesity, Leptins, Hypogonadism and Waist–Hip Ratio in men: An Interplay
J. Elizabeth, C. Rakshita, and S. Ramkumar

2429

151 Usage of Anthropometry to Determine Etiological and Risk Factors in Deep-Tissue Injury
Amit Gefen

2443

152 Anthropometry in the Assessment of HIV-Related Lipodystrophy
Giovanni Guaraldi, Stentarelli Chiara, Stefano Zona, and Bruno Bagni

2459

153 Use of Anthropometry in Monitoring the Nutritional and Health Status of Persons Living with HIV/AIDS
Selby Nichols, Nequesha Dalrymple, and Marlon Francis

2473
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>154</td>
<td>Antropometry in HIV Patients: Effects of Recombinant Human Growth Hormone</td>
<td>Livio Luzi, Ileana Terruzzi, and Stefano Benedini</td>
<td>2495</td>
</tr>
<tr>
<td>155</td>
<td>Digital Three-Dimensional Photogrammetry: Craniofacial Applications to Facial Growth, Orthognathic and Reconstructive Surgery, and Morphometrics</td>
<td>Nada M. Souccar, Chung How Kau, and Seth M. Weinberg</td>
<td>2511</td>
</tr>
<tr>
<td></td>
<td>Part XXIII Anthropometry in Ethnic Groups and Cultural and Geographical Diversity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>156</td>
<td>Anthropometry in Ethnic Groups and Cultural and Geographical Diversity</td>
<td>Wee Bin Lian</td>
<td>2523</td>
</tr>
<tr>
<td>157</td>
<td>Ethnicity and Facial Anthropometry</td>
<td>Mehrdad Jahanshahi</td>
<td>2535</td>
</tr>
<tr>
<td>158</td>
<td>Anthropometry in the Circumpolar Inuit</td>
<td>Tracey Galloway, T. Kue Young, and Peter Bjerregaard</td>
<td>2543</td>
</tr>
<tr>
<td>159</td>
<td>Anthropometric Measures of Birth and Stature: Perspectives on Russian Mothers and Newborns</td>
<td>Boris N. Mironov</td>
<td>2561</td>
</tr>
<tr>
<td>160</td>
<td>Body Composition in a Multiethnic Community in New Zealand</td>
<td>Elaine Rush</td>
<td>2581</td>
</tr>
<tr>
<td>161</td>
<td>Anthropometric Measurements in Australian Aborigines</td>
<td>Srinivas Kondalsamy-Chennakesavan, Leonard S. Piers, Sidya Raghavan, and Kerin O’Dea</td>
<td>2593</td>
</tr>
<tr>
<td>162</td>
<td>Secular Changes in Anthropometric Indices of Children and Adolescents: Studies from Korea</td>
<td>Joong-Myung Choi and Ji-Yeong Kim</td>
<td>2615</td>
</tr>
<tr>
<td>163</td>
<td>Determinants of Central Adiposity: An Iranian Perspective</td>
<td>Leila Azadbakht, Ahmad Esmailzadeh, and Pamela J. Surkan</td>
<td>2629</td>
</tr>
<tr>
<td>164</td>
<td>Anthropometry and the Prevalence of Child Obesity in China and Japan</td>
<td>Liubai Li, Hui Li, and Hiroshi Ushijima</td>
<td>2641</td>
</tr>
<tr>
<td>165</td>
<td>Optimal Waist Circumference Cutoffs for Abdominal Obesity in Chinese</td>
<td>Weiping Jia and Jiemin Pan</td>
<td>2657</td>
</tr>
<tr>
<td>166</td>
<td>Usefulness of Skinfold Thickness Measurements for Determining Body Fat Distribution and Disease Risk for Japanese Men and Women</td>
<td>2667</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hironori Imano, Akihiko Kitamura, Masahiko Kiyama, Tetsuya Ohira, Renzhe Cui, Isao Muraki, Yuji Shimizu, Mitsumasa Umesawa, Kenji Maeda, Masatoshi Ido, Takeo Okada, Masakazu Nakamura, Hiroyuki Noda, Kazumasa Yamagishi, Shinich Sato, Takeshi Tanigawa, Yoshinori Ishikawa, and Hiroyasu Iso</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 167 | Socioeconomic Status, Anthropometric Status and Developmental Outcomes of East-African Children | 2679 |
|     | Amina Abubakar and Fons van de Vijver |

| 168 | Body Mass Index and Mortality in India | 2695 |
|     | Catherine Sauvaget |

### Part XXIV Anthropometry and Nutrition: General Aspects

| 169 | Anthropometric Measurements and Nutritional Status in the Healthy Elderly Population | 2709 |
|     | Lilia Castillo-Martínez, Carmen García-Peña, Teresa Juárez-Cedillo, Óscar Rosas-Carrasco, Claudia Rabay-Gánem, and Sergio Sánchez-García |

| 170 | Anthropometry of Leg Lean Volume: Application to Nutrition in Systemic Disorders | 2731 |
|     | Débora Villaça and J. Alberto Neder |

| 171 | Nutritional Anthropometry for Amputees: Challenges for Clinicians | 2745 |
|     | Elaine Bannerman, Jolene Thomas, and Michelle Miller |

| 172 | Anthropometry of Malnutrition in End Stage Liver Disease | 2755 |
|     | E.T. Tsiaousi and A.I. Hatzitolios |

| 173 | Anthropometry in Anorexia Nervosa | 2767 |
|     | Antonella Diamanti and Fabio Panetta |

| 174 | Clinical Practice of Body Composition Assessment in Female Subjects with Anorexia Nervosa | 2783 |
|     | Michel Probst and Marina Goris |

| 175 | Perceived Body Image and Actual Anthropometric Indices in Eating Disorders | 2795 |
|     | Dieter Benninghoven |
176 Anthropometry and Nutritional Rehabilitation in Underweight Eating Disorders ....................................................... 2807
Giulio Marchesini, Laura Maria Ricciardi, Nicola Villanova, and Riccardo Dalle Grave

177 Anthropometric Nutritional Assessment in Children with Severe Neurological Impairment and Intellectual Disability ............................................................... 2821
Corine Penning and Heleen M. Evenhuis

178 Eating Frequency and Anthropometry .............................................. 2837
Karine Duval and Éric Doucet

Part XXV Anthropometry and Nutrition: Micro- and Macro-Nutrients

179 Relationship Between Calcium Intake and Anthropometric Indices ............................................................... 2875
Herculina Salome Kruger

180 Dietary Protein Intake and Anthropometric Indices of Muscle Mass in Elderly ...................................................... 2893
Karine Perreault and Isabelle J. Dionne

181 Anthropometry and the Prevalence of Child Protein–Energy Malnutrition in China and Japan........................... 2909
Liubai Li, Hui Li, and Hiroshi Ushijima

Part XXVI Biomechanical and Ergonomic Aspects

182 Anthropometry in Bipedal Locomotion: The Link Between Anatomy and Gait ............................................... 2927
Franck Multon, Guillaume Nicolas, Robin Huw Crompton, Kristiaan D’Août, and Gilles Berillon

183 Use of Anthropometry for the Measurement of Lower Extremity Alignment ..................................................... 2951
Annegret Mündermann

184 Anatomical Reference Frames for Long Bones: Biomechanical Applications ........................................................... 2971
Luca Cristofolini

185 Using Three-Dimensional (3D) Anthropometric Data in Design ................................................................. 3001
Jianwei Niu and Zhizhong Li
186  Use of Anthropometric Measures and Digital Human Modelling Tools for Product and Workplace Design................. 3015
    Lars Hanson and Dan Högberg

187  Anthropometric Indices in the Philippines for Manufacturing Workers................................................................. 3035
    Jinky Leilanie DP Lu

Index................................................................................................................................................................................. 3055
Handbook of Anthropometry
Physical Measures of Human Form in Health and Disease
Preedy, V.R. (Ed.)
2012, L, 3107 p. In 4 volumes, not available separately., Hardcover
ISBN: 978-1-4419-1787-4