

CONTENTS

Contributors

1. Introduction

1.1	Some Initial Remarks	1
1.2	A Short Introduction to Growth.....	2

2. Basics

2.1	Growth References and Growth Charts.....	4
2.2	Tempo and Amplitude	8
2.3	Short Term Growth and Mini Growth Spurts.....	10
2.4	Periodicity in Growth	12
2.5	Growth Tracking.....	14
2.6	Catch-up Growth	16
2.7	Rapid Growth	18
2.8	The Growth Plate	20
2.9	Growth Hormone	24
2.10	Negative Growth	26

3. Body Shape, Composition and Proportions

3.1	Types of Body Shape.....	28
3.2	Body Composition	30
3.3	Determining Body Composition in Field Studies.....	32
3.4	Body Size, Somatotype and Sports	34
3.5	Fluctuating Asymmetry	36

4. From Birth to Maturity

4.1	Comparative Biology and Human Life History	38
4.2	Foetal Programming and Epigenetics.....	42
4.3	Biological Age	44
4.4	Variation in Tempo	48
4.5	Twins	50
4.6	Very Low Birth Weight Children	52
4.7	Failure to Thrive during the First 2 Years	54
4.8	Signs of Sexual Maturation	56
4.9	Timing Puberty by Stage Line Diagrams	60
4.10	Menarcheal Age in Egypt	62
4.11	Adolescent Growth Spurt	64
4.12	Body Image and Body Size during Puberty	66
4.13	The Community Effect on Growth	68
4.14	The Community Effect in Swiss Conscripts	72

5. Height Predictions

5.1	Final Height	74
5.2	A Flow Chart to Final Height Prediction	76
5.3	Target Height	78
5.4	Final Height Prediction	82
5.5	Factors that Influence Bone Ageing	88

6. Prevention and Health

6.1	Breast Feeding	90
6.2	Infant, Toddler and Child Nutrition	92
6.3	Short and Tall Stature	98
6.4	Primary Growth Failure.	102
6.5	Secondary Growth Failure	104
6.6	SGA and IUGR	106
6.7	The Shortest People: Pericentrin mutations	108
6.8	Growth in Diabetic Patients	110
6.9	Body Proportions in Relation to Health	112
6.10	Social Determinants of Health	114
6.11	Migrants	116
6.12	Childhood Obesity in Developing Countries	118
6.13	Childhood Obesity: The Impact of Migration	120
6.14	PEM in Children: Anthropometric Evaluation	122
6.15	Nutrition Transition in Developing Countries	124
6.16	How Good is the BMI for Detecting Obesity?	126
6.17	Comments on Obesity	128
6.18	Growth and Pollutants	130

7. Auxology of the Past

7.1	A Short History of the Study of Human Growth	132
7.2	Secular Trends	138
7.3	Trends in Amplitude and Tempo.	140
7.4	How to Plot Secular Growth Changes.	142
7.5	The History of Menarcheal Age.	144
7.6	Impact and Pitfalls of Conscription Data	146
7.7	Conscript Height.	150
7.8	Long Term Changes in Head Dimensions	152
7.9	Harris Lines.	154
7.10	Growth and Death in the Past.	156

8. Auxological Methods

8.1	Requirements for Anthropometric References	158
8.2	Measurement Error in Anthropometry	160
8.3	Standardised Measurements	162
8.4	Daily Home-made Measurements.	164
8.5	Automated Bone Age Determination.	166
8.6	Kinemetry	168
8.7	Testing for Hormone Deficiency	174

9. Statistical Approaches

9.1	Statistics for Bunnies	176
9.2	Growth Velocity	178
9.3	SDS and LMS	182
9.4	Synthetic Growth Charts	184
9.5	Harmonising National Growth Charts	186
9.6	Stability and Instability in hSDS Changes	188
9.7	Jump Preserving Smoothing Technique	190
9.8	Rounding-Off and Heaping	192

CONTENTS

9.9	Parametric and Non-Parametric Regression Models	194
9.10	Landmark based Statistical Shape Analysis	200
9.11	A Bayesian Approach towards Modelling Growth.	204
9.12	Methods that still Lack Adequate Recognition.	206
10. Miscellaneous		
10.1	Geometry and Auxology	208
10.2	Finger Length Ratios	210
10.3	Patents in Auxology	212
10.4	Myths, Tales and Beliefs	214
11. Reference Values		
11.1	National Growth References	218
11.2	References for Preterm Infants and Twins	234
11.3	Syndrome Specific Growth Charts	244
11.4	References for Growth Velocity	248
11.5	References for SD Score Changes	256
11.6	References for Tempo, Timing and Puberty	258
11.7	References for Sitting Height	262
11.8	Body Proportion Chart	264
11.9	References for MUAC, BF and Skinfold Thickness	266
11.10	References for WC and WHR	270
11.11	References and Equations for Body Composition	272
11.12	Body Surface and Ambiguous Genitalia	276
11.13	References for IGF1 and IGFBP3	278
12. Glossary		
13. Literature and Internet Resources		
14. Index		