

This book brings together in one volume selected important topics in craniofacial growth. Topics include principles of skeletal growth; osteogenesis and its control; formation of the cranial base and craniofacial joints; prenatal development of the facial skeleton; growth of the mandible, nasomaxillary complex, orbit, cranial base, ear capsule, and cranial vault; bone remodeling; muscles; soft tissues; and blood vessels.

***Fundamentals of Craniofacial Growth*** contains detailed illustrations and extensive reference lists. Independently authored chapters provide comprehensive reviews encompassing both contemporary and historical perspectives. In addition to medicine and dentistry, contributors provide expertise from such diverse backgrounds as anatomy, biology, biomathematics, embryology, orthodontics, physical anthropology, and plastic and reconstructive surgery.

#### **FEATURES**

- Each chapter is a self-contained unit, allowing the text to be studied in any order you desire
- Discusses topics from both historical and contemporary perspectives, providing a comprehensive, definitive resource
- Includes extensive, often exhaustive, reference lists for regions of craniofacial growth and special topics
- Liberally illustrated with close to 300 figures



**CRC Press**  
Taylor & Francis Group  
an informa business  
[www.crcpress.com](http://www.crcpress.com)

6000 Broken Sound Parkway, NW  
Suite 300, Boca Raton, FL 33487  
270 Madison Avenue  
New York, NY 10016  
2 Park Square, Milton Park  
Abingdon, Oxon OX14 4RN, UK

ISBN 978-0-8493-4575-3



9 780849 345753

# Contents

Preface .....	iii
<b>A. D. Dixon, D. A. N. Hoyte, and O. Rønning</b>	
Contributors .....	v
Chapter 1	
Principles of Skeletal Growth .....	1
<b>G.-H. Schumacher</b>	
Chapter 2	
Evolution of Form in the Craniofacial Complex .....	23
<b>O. J. Oyen</b>	
Chapter 3	
Osteogenesis and Its Control .....	45
<b>G. W. Bernard</b>	
Chapter 4	
Prenatal Development of the Facial Skeleton .....	59
<b>A. D. Dixon</b>	
Chapter 5	
Formation of the Cranial Base and Craniofacial Joints .....	99
<b>A. D. Dixon</b>	
Chapter 6	
Postnatal Bone Growth: Some Methods of Assessment .....	137
<b>B. G. Sarnat</b>	
Chapter 7	
Morphometrics of Craniofacial Form .....	155
<b>P. E. Lestrel</b>	
Chapter 8	
Growth Mechanisms of the Mandible .....	189
<b>T. Kantomaa and O. Rønning</b>	
Chapter 9	
Postnatal Growth of the Nasomaxillary Complex .....	205
<b>B. G. Sarnat</b>	



Chapter 10	
Growth of the Orbit .....	225
<b>D. A. N. Hoyte</b>	
Chapter 11	
Growth of the Cranial Base .....	257
<b>D. A. N. Hoyte</b>	
Chapter 12	
Growth of the Ear Capsule .....	335
<b>D. A. N. Hoyte</b>	
Chapter 13	
Growth of the Cranial Vault .....	363
<b>J. Huggare and O. Rönning</b>	
Chapter 14	
Cartilage and Craniofacial Growth .....	389
<b>O. Rönning and H. Vinkka-Puhakka</b>	
Chapter 15	
Bone Remodeling in the Craniofacial Region .....	427
<b>D. A. N. Hoyte</b>	
Chapter 16	
Muscles, Soft Tissues, and Craniofacial Growth .....	443
<b>A. D. Dixon</b>	
Chapter 17	
Muscles, Blood Vessels, and Craniofacial Growth: Some Experimental Approaches .....	463
<b>G.-H. Schumacher</b>	
Index .....	487