

Contents

<i>List of Contributors</i>	xiii
<i>Preface to Second Edition</i>	xvii
<i>Preface to First Edition</i>	xviii

Part I	Diagnosis, Psychology, and Genetics	1
Chapter 1	The Increased Stature of Orthodontics	3
	Vinod Krishnan, Ze'ev Davidovitch, and Anne Marie Kuijpers-Jagtman	
	<i>The broadening scope of orthodontics</i>	6
	<i>The orthodontic patient as a human being</i>	7
	<i>The patient's biological status: does it influence orthodontic treatment?</i>	8
	<i>Conclusions</i>	16
	<i>References</i>	17
Chapter 2	Orthodontic Diagnosis and Treatment Planning: Collaborating with Medical and Other Dental Specialists	18
	Om P. Kharbanda, Neeraj Wadhawan, and Karthik Sennimalai	
	<i>The other side of the story</i>	19
	<i>Orthodontic diagnosis from a broad perspective</i>	19
	<i>The first interaction with the patient</i>	19
	<i>The importance of the medical history in orthodontic diagnosis and treatment planning</i>	21
	<i>Overview of systemic disturbances in relation to orthodontic treatment planning</i>	27
	<i>Identifying local dental abnormalities before attempting orthodontic treatment</i>	32
	<i>Evaluation of the occlusion and the temporomandibular joint</i>	42
	<i>Radiographic examination of the craniofacial region</i>	43
	<i>Conclusion</i>	46
	<i>References</i>	47
Chapter 3	Psychosocial Factors in Orthodontics: Patient Perceptions, Motivation, and Expectations	52
	Leslie A. Will	
	<i>Motivation for orthodontic treatment</i>	52
	<i>Treatment expectations</i>	53
	<i>Perception of malocclusion</i>	53
	<i>Patients with psychological disorders</i>	55
	<i>Orthognathic patients</i>	57
	<i>Patients with orofacial clefts and craniofacial anomalies</i>	59
	<i>Patients with acquired deformities</i>	60
	<i>Conclusions</i>	61
	<i>References</i>	61
Chapter 4	Integrated Clinical Genetics/Syndromology for the Orthodontist	63
	James K. Hartsfield, Jr., Lorri Ann Morford, and Aqib Muhammad Shafi	
	<i>Interaction with the clinical geneticist</i>	64
	<i>Evolution of the clinical geneticist specialist</i>	64

	<i>When to refer</i>	65
	<i>Artificial intelligence and facial analysis</i>	66
	<i>Selected syndromes and conditions</i>	66
	<i>Radiographic signs</i>	71
	<i>History of premature tooth exfoliation</i>	73
	<i>Conditions in which premature tooth exfoliation may occur occasionally</i>	74
	<i>Supernumerary teeth and hypodontia (oligodontia)</i>	77
	<i>Syndromic hypodontia</i>	80
	<i>Supernumerary teeth or hypodontia (oligodontia) and cancer</i>	81
	<i>Failure of dental eruption</i>	82
	<i>Soft and hard tissue asymmetry</i>	83
	<i>Maxillary hypoplasia</i>	84
	<i>Functional (neoromuscular) asymmetry</i>	86
	<i>Mandibular retrognathism</i>	86
	<i>Connective tissue dysplasia</i>	87
	<i>Cleft lip and cleft palate</i>	90
	<i>Additional resources</i>	91
	<i>References</i>	91
Part II	The Growing Patient	97
Chapter 5	Endocrinological Conditions and Orthodontic Treatment	99
	Athina Chatzigianni	
	<i>Growth hormone disorders</i>	99
	<i>Thyroid disease</i>	101
	<i>Parathyroid gland disorders</i>	103
	<i>Primary adrenal insufficiency</i>	104
	<i>Fibrous dysplasia</i>	104
	<i>Diabetes mellitus</i>	105
	<i>Sex-specific endocrine disorders</i>	106
	<i>Exogenous hormone administration</i>	107
	<i>Conclusions</i>	108
	<i>References</i>	108
Chapter 6	Nutrition in Orthodontic Practice	111
	Nadine Tassabehji and Jillian Kaye	
	<i>The importance of diet and nutrition in oral health</i>	111
	<i>Dietary habits</i>	113
	<i>Nutrition and oral health</i>	119
	<i>Orthodontic guide to performing nutrition risk assessments</i>	124
	<i>Conclusion</i>	126
	<i>References</i>	127
Chapter 7	Cleft Lip and Palate: Role of the Orthodontist in the Interdisciplinary Management Team	128
	Anne Marie Kuijpers-Jagtman and Mette A.R. Kuijpers	
	<i>Interdisciplinary team care</i>	129
	<i>Members of the cleft lip and palate team and their roles</i>	129
	<i>Orthodontic management</i>	133
	<i>Conclusion</i>	146
	<i>References</i>	146
Chapter 8	Multidisciplinary Management of Craniofacial Malformations	150
	Latha P. Rao, Maria J. Kuriakose, and Sherry Peter	
	<i>General principles in the diagnosis and management of craniofacial malformations</i>	151
	<i>Otofacial malformations</i>	157

	<i>Craniosynostosis</i>	169
	<i>Conclusion</i>	175
	<i>References</i>	175
Part III	Enhancing the Envelope of Orthodontic Care: The Medical Collaboration	179
Chapter 9	What Can Orthodontists Learn from Orthopedists Engaged in Basic Research?	181
	Carlalberta Verna and Birte Melsen	
	<i>A common language</i>	181
	<i>Bone adaptation to mechanical deformation and orthodontic tooth movement</i>	189
	<i>Bone reaction to skeletal anchorage</i>	190
	<i>Conclusion</i>	192
	<i>References</i>	193
Chapter 10	Acute and Chronic Infections Affecting the Oral Cavity: Orthodontic Implications	195
	Vinod Krishnan, Gunnar Dahlén, Ambili Renjithkumar, and Ze'ev Davidovitch	
	<i>Bacterial infections</i>	196
	<i>Viral infections</i>	206
	<i>Fungal infections</i>	213
	<i>Parasitic infections</i>	218
	<i>The oral cavity as a source for focal infections</i>	219
	<i>Conclusions</i>	221
	<i>References</i>	221
Chapter 11	Unveiling and Managing Upper Airway Problems in the Orthodontic Patient	225
	Mimi Yow, Huiting Lynn Koh, and Shaun Loh	
	<i>The spectrum of sleep-disordered breathing</i>	225
	<i>Decoding obstructive sleep apnea</i>	226
	<i>Respiration: Effect of anatomy and sleep</i>	228
	<i>The child with sleep-disordered breathing</i>	229
	<i>The adult with sleep-disordered breathing</i>	233
	<i>Cephalometrics and imaging</i>	236
	<i>Orthodontic management</i>	236
	<i>Surgical management</i>	238
	<i>Conclusion</i>	239
	<i>Acknowledgments</i>	243
	<i>References</i>	243
Chapter 12	Interaction between the Orthodontist and Medical Airway Specialists on Respiratory and Nonrespiratory Disturbances	248
	Joseph G. Ghafari and Anthony T. Macari	
	<i>The mouth in relation to the nasopharyngeal airway: Anatomy overview</i>	248
	<i>Common sources of airway dysfunction</i>	250
	<i>Nonrespiratory areas of interaction with ENT specialists</i>	261
	<i>State of interaction between orthodontists and medical airway specialists</i>	269
	<i>References</i>	269
Chapter 13	Neuromuscular Diseases and the Orthodontist	272
	Gregory S. Antonarakis and Stavros Kiliaridis	
	<i>Myotonic dystrophy</i>	273
	<i>Duchenne muscular dystrophy</i>	281
	<i>Other neuromuscular diseases</i>	285
	<i>Conclusions</i>	288
	<i>References</i>	289

Chapter 14	Orthodontics for Children with Disabilities	291
	Stella Chaushu, Yossi Shapira, and Adrian Becker	
	<i>Therapeutic access</i>	291
	<i>Pretreatment visits, patient assessment, and future management</i>	292
	<i>Orthodontic records</i>	294
	<i>Overall treatment plan</i>	294
	<i>Relapse and retention</i>	297
	<i>Case descriptions</i>	298
	<i>Conclusion</i>	308
	<i>References</i>	308
Chapter 15	Orthodontic Care in the Adult Medically Compromised Patient	310
	Ashok Kumar Jena and Jitendra Sharan	
	<i>Cardiovascular disorders</i>	311
	<i>Endocrine disorders</i>	312
	<i>Infectious diseases</i>	313
	<i>Skeletal system problems</i>	315
	<i>Gastrointestinal disorders</i>	316
	<i>Respiratory system problems</i>	316
	<i>Nervous system disorders</i>	317
	<i>Renal disorders</i>	318
	<i>Allergy reactions</i>	319
	<i>Conclusion</i>	320
	<i>References</i>	321
Part IV	Orthodontics and Other Dental Specialties	323
Chapter 16	Comprehensive Periodontal Evaluation of the Orthodontic Patient: The Role of a Periodontist in Orthodontic Practice	325
	Giovanni E. Salvi, Andrea Rocuzzo, and Dimitrios Kloukos	
	<i>Pathological tooth migration</i>	325
	<i>Treatment plan</i>	326
	<i>Goals of periodontal therapy</i>	327
	<i>Comprehensive periodontal examination</i>	327
	<i>Case presentations</i>	328
	<i>Acknowledgments</i>	342
	<i>References</i>	344
Chapter 17	The Restorative Dentist and Orthodontist: Orthodontic Implications of Dental Caries, Tooth Fracture, Exposed Dental Pulp, and Esthetic Improvements	345
	Neslihan Arhun, Ayca Arman-Özçırpıcı, Sevi Burçak Çehreli, Kamran Gülşahi, and Ömur Polat Özsoy	
	<i>Pretreatment evaluation and early stages of the orthodontic treatment</i>	346
	<i>Interactive collaboration during orthodontic treatment</i>	356
	<i>Emergency orthodontic treatment in trauma cases</i>	370
	<i>Immediate postorthodontic period</i>	382
	<i>Esthetic improvements</i>	384
	<i>Conclusion</i>	396
	<i>References</i>	398
Chapter 18	Orthodontics and Pediatric Dentistry: Two Specialties, One Goal	411
	Elliott M. Moskowitz, George J. Cisneros, and Mark S. Hochberg	
	<i>Coordinating orthodontic and pediatric dental appointments in a group or solo practitioner setting</i>	412
	<i>Identifying orthodontic and pediatric dental problems earlier rather than later</i>	414

	<i>Restoring form and function: Revisiting the unilateral posterior crossbite with a functional mandibular shift</i>	416
	<i>Congenitally missing maxillary lateral incisors: Who does what, when, and how?</i>	419
	<i>Retention considerations and beyond</i>	423
	<i>Enamel demineralization during orthodontic treatment: Who takes responsibility for prevention?</i>	425
	<i>Conclusions</i>	426
	<i>References</i>	426
Chapter 19	Optimizing Prosthodontic Care with Orthodontic Mechanotherapeutics	427
	Hayam Alfallaj, Ruba Alkadhi, Samah Alfuriji, Fathima F. Farook, and Abdulaziz Alzaid	
	<i>Pre-prosthodontic management of intraarch spaces</i>	428
	<i>Pre-prosthodontic management of interarch spaces</i>	435
	<i>Correction of ridge deformity through orthodontic tooth movement</i>	443
	<i>Restorative treatment before orthodontics (means for tooth movement)</i>	444
	<i>Conclusion</i>	445
	<i>References</i>	445
Chapter 20	Integrated Management of the Orthognathic Patient	447
	Noura M. AlOtaibi, Philip C.M. Benington, and Ashraf F. Ayoub	
	<i>Multidisciplinary Team</i>	447
	<i>Systematic approach</i>	448
	<i>Orthognathic surgery</i>	488
	<i>Stability and relapse</i>	489
	<i>Follow-up</i>	490
	<i>Digital innovations in orthognathic surgery</i>	490
	<i>Conclusion</i>	490
	<i>References</i>	491
Chapter 21	The Role of the Orthodontist in Managing Disorders of the Temporomandibular Joint	493
	Ambra Michelotti, Mauro Farella, and Roberto Rongo	
	<i>Why should orthodontists deal with the temporomandibular joint?</i>	493
	<i>Anatomy of the temporomandibular joint</i>	494
	<i>Should orthodontists care about condylar position?</i>	494
	<i>Temporomandibular joint disorders</i>	496
	<i>Joint pain: Arthralgia</i>	496
	<i>Disc disorders</i>	502
	<i>Occlusal changes due to temporomandibular disorders</i>	504
	<i>Congenital/developmental disorders</i>	506
	<i>Conclusion</i>	510
	<i>References</i>	510
Part V	The Biomedical Orthodontist	515
Chapter 22	The Role of Biomedical Engineers in the Design and Manufacture of Orthodontic Appliances	517
	William A. Brantley and Theodore Eliades	
	<i>Past research activities</i>	517
	<i>Current research activities and potential future applications</i>	524
	<i>Conclusions</i>	528
	<i>References</i>	528
Chapter 23	Designing and Manufacturing Customized Orthodontic Appliances	531
	Nearchos C. Panayi	
	<i>Orthodontic imaging and analysis software</i>	532
	<i>Surface and volume scanning</i>	532

	<i>Orthodontic computer-aided design software</i>	532
	<i>Three-dimensional manufacturing</i>	533
	<i>Customized orthodontic appliances</i>	533
	<i>Clear aligners</i>	534
	<i>Selective laser sintering and metallic orthodontic appliances</i>	536
	<i>Customized orthodontic brackets</i>	536
	<i>Conclusion</i>	539
	<i>References</i>	540
Chapter 24	Regenerative Medicine in Orthodontic Therapy	541
	Nina Kaukua, Kaj Fried, and Jeremy J. Mao	
	<i>Principles of tissue regeneration</i>	543
	<i>Stem cell basics</i>	543
	<i>Impact of regenerative medicine in dentistry and orthodontics</i>	556
	<i>Orthodontics and dentofacial orthopedics as clinical motivation for tissue engineering</i>	560
	<i>Conclusion</i>	561
	<i>Acknowledgments</i>	561
	<i>References</i>	561
Chapter 25	Artificial Intelligence and Orthodontic Practice: The Future Unveiled	565
	Mohammed H. Elnagar, Praveen Gajendrareddy, Min Kyeong Lee, and Veerasathpurush Allareddy	
	<i>Applications of artificial intelligence technology in orthodontics</i>	566
	<i>Artificial intelligence-driven remote monitoring</i>	570
	<i>Blockchain technology in healthcare</i>	571
	<i>Ethical considerations in artificial intelligence</i>	573
	<i>References</i>	573
Chapter 26	The Seven Pillars of Professionalism	576
	Peter M. Greco	
	<i>The Seven Wonders of the World</i>	576
	<i>The concept of professionalism</i>	577
	<i>The seven pillars of professionalism</i>	577
	<i>Our public image of professionalism</i>	582
	<i>Now, what about those Seven Wonders of the World: Where are they now?</i>	583
	<i>References</i>	583
	<i>Index</i>	584