
Contents

Part I Introduction

1 History of Rapid Prototyping	3
Carlos A. Gonzalez Lengua	
2 Creation of a 3D Printed Model: From Virtual to Physical	9
Joseph J. Vettukattil, Bennett P. Samuel, Jordan M. Gosnell and Harikrishnan K.N. Kurup	
3 Image Acquisition for Creation of a 3D Model: CT, CMR, and Echocardiography	21
Javier Sanz, Kanwal Majeed Farooqi, James C. Nielsen and Shubhika Srivastava	
4 Postprocessing: Software and Technique Options	31
Juan-Carlos G. Muñiz	
5 Rapid Prototyping Technologies	41
Joseph Borrello and Peter Backeris	

Part II Congenital Heart Disease

6 Imaging Considerations and Challenges in Pediatrics	53
Anjali Chelliah	
7 Septal Defects	63
Laura J. Olivieri	
8 Tetralogy of Fallot with Major Aortopulmonary Collateral Arteries	69
Justin Ryan and Stephen Pophal	
9 Double Outlet Right Ventricle	81
Kanwal Majeed Farooqi and Leo Lopez	
10 Pulmonary Valve Placement	91
Alistair B.M. Phillips and Evan M. Zahn	
11 Adult Congenital Heart Disease	99
Shafkat Anwar, Gautam K. Singh, Orlando Petrucci, Pirooz Eghtesady, Pamela K. Woodard and Joseph J. Billadello	

Part III Structural Heart Disease

- 12 Transcatheter Aortic Valve Replacement. 113**
Marija Vukicevic, Eleonora Avenatti and Stephen H. Little
- 13 Valvular Heart Disease 123**
Mario Montealegre-Gallegos, Jelliffe Jeganathan
and Feroze Mahmood
- 14 Assessment of Ventricular Assist Device Placement
and Function 133**
Omar Saeed, Kanwal Majeed Farooqi and Ulrich P. Jorde
- 15 Cardiac Tumors. 143**
Ryan A. Moore and Michael D. Taylor

Part IV Management Strategies

- 16 Establishing a Cardiovascular Rapid Prototyping
Service 151**
Kevin A. Gralewski, Yoav Dori and Kevin K. Whitehead
- 17 Utility of a 3D File Database 159**
Matthew Bramlet and Meghan Coakley McCarthy
- 18 3D Bioprinting for Cardiovascular Tissue Engineering 167**
Mitchell Kuss and Bin Duan
- 19 Past Developments and Future Directions of 3D Cardiac
Printing: A Surgeon's Perspective 183**
Khanh Nguyen
- Index 191**

Rapid Prototyping in Cardiac Disease

3D Printing the Heart

Farooqi, K.M. (Ed.)

2017, XIII, 198 p. 74 illus., 64 illus. in color., Hardcover

ISBN: 978-3-319-53522-7