Contents

SECTION 1: History and Healing

1. Evolution of Wound Care 3
Savita Arora

• Ancient Medical Practice (460–136 BC) 3 • Middle Ages (476 AD–1453) 6 • Modern Ages 7
• Recent Advances in Wound Coverage 9

2. Pathology of Wound Healing 11
Harsh Mohan, Irneet Mundi

• Wound Healing 11 • Phases of Wound Healing 11 • Types of Wound Healing 16
• Factors Influencing Healing 16 • Complications of Wound Healing 17 • New Horizons 17

3. Recent Advances in Wound Healing 19
Mary Babu, Ranjith James Babu, S Shanmuganathan

• Hemostatic Phase 19 • Inflammatory Phase 20 • Proliferative Phase 20 • Remodeling Phase 21
• Fibrotic/Chronic Wounds 21 • Management of Fibrotic Wounds 21 • Chronic Ulcers and its Implications 21
• Wound Dressing and its Characteristics 22 • Skin Substitutes 23 • Tissue Engineering 23 • Stem Cells 23

4. Scars Following Wound Healing 27
Sujata Sarabahi, Pratap Duggirala

• Classification 27 • Hypertrophic Scars versus Keloids 29 • Scar Assessment 31 • Management 34

5. Classification of Wounds 42
RS Mohil

• Contused and Lacerated Wounds 43 • Bruise, Contusion and Hematoma 43 • Puncture Wounds 44
• Bite Wounds 44 • Traction and Avulsion Injuries 46 • Crush Injuries and Compartment Syndrome 46
• Ulcer 47 • Healing of Wounds 48

SECTION 2: General Principles for Wound Management

6. Wound Bed Preparation (Guidelines of International Advisory Board for WBP) 53
RK Chittoria

• Definition 53 • Origin 53 • Importance 53 • Principles 53

7. Initial Management of Life-threatening Wounds 59
Sushma Sagar, Krishna Asuri, Maneesh Singhal

• Definition 59 • Classification 59 • Etiopathogenesis 61 • Clinical Features 61 • Management 62

8. Debridement—Preparing the Wound Bed for Cover 68
S Raja Sabapathy

• Evolution of Concepts—Serial Debridement vs Radical Debridement 68 • Technique of Debridement 69
• Role of Wound Swabs 73 • Role of Antibiotics and Tetanus Prophylaxis 74 • Pitfalls in Debridement 74
• Other Methods of Debridement 75

9. Dressings and Topical Agents in Wound Care 79
Mohit Sharma, Deepak Balasubramanian

• Wound Healing 79 • Classification of Wounds in Relation to Wound Closure 80 • Rationale behind Wound Dressings 80 • Classification of Wound Dressings 81 • Topical Agents in Wound Healing 82

10. Surgical Closure of Wounds 86
VK Tiwari, Anshumali Mishra
• Techniques of Wound Closure **86** • Suturing Technique **87** • Suturing Needles **90** • Sutures **91**
• Newer Wound Closure Techniques **91** • Skin Grafting **92**

11. Surgical Site Infection: Preventive Strategies 98
Vinod K Malik, Ashish Dey
• Classification of Surgical Wounds **98** • Definition of SSI **98** • Epidemiology and Microbiology **99**
• Reducing the Risk of Surgical Site Infections **99**

12. Fungal Wound Infections: Diagnosis and Management 102
Malini Capoor
• Epidemiology **102** • Pathogenesis including Risk Factors **103** • Clinical Features of Fungal Surgical Site Infections (SSIs) **104** • Diagnosis **104** • Management **107**

SECTION 3: Types of Wounds and their Management

13. Crush Injuries of Limbs 113
S Raja Sabapathy, Praveen Bhardwaj
• Crush Syndrome in Limb Injuries **113** • Wound Management in Crush Injuries of the Limbs **120**

14. Skin Avulsion Injuries 122
Arun Goel
• Types of Avulsion Injuries **123** • Mechanism of Production of Avulsion Injury **124** • Clinical Features **126**
• Management **127** • Avulsion Injury of Specialized Structures **135** • Some Other Avulsions **150**
• Outcome of Avulsion Injuries: Early and Late **150**

15. Medical Management of Diabetic Ulcer 154
PG Raman
• Genesis of Diabetic Foot Ulcer **154** • Impaired Wound Healing and Infection in Diabetes Mellitus **155**
• Laboratory Investigation **156** • Economics of Treatment of Diabetic Foot **156** • Management **156**
• Charcot Foot **158**

16. Diabetic Foot Infections 160
TD Chugh, Ashish Kumar Duggal, Shalini Duggal
• Pathophysiology of Infection **160** • Microbiology **161** • Assessing Severity of Infection **163**
• Bone Infection Associated with Diabetic Foot **164** • Treatment **164**

17. Surgical Management of Diabetic Foot 169
Imran Ahmed
• Classification of Diabetic Foot Ulcer **169** • Anatomic Location of Foot Ulcers **170** • Causes of Foot Ulcers in Diabetics **170** • Assessment **171** • Investigation **171** • Management **171** • Rehabilitations **180**

18. Recent Advances in Management of Chronic Non-healing Diabetic Foot Ulcers 183
Ashok Damir
• Management of DFU **183** • Microbiological Control **183** • Wound Control **184** • Bioengineered Alternative Tissues **189** • Metabolic Control **189** • Vascular Control **189** • Mechanical Control—Offloading **189**

19. Vascular Ulcers 192
Rajiv Parakh, Anurag Agarwal
• Definition **192** • Classification of Leg Ulcers **192** • Clinical Presentation **193** • Diagnosis **194**
• Management of Chronic Leg Ulcers **194** • Surgery **196**

20. Vasculitic Ulcer 199
Rakesh Kain
• Pathogenesis **199** • Histopathology **200** • Classification **201** • Clinical Manifestation **201**
• Management **205**

21. Healing and Management of Burn Wound 208
Sujata Sarabahi, VK Tiwari

• Burn Wound Classification **208** • Pathology of Burn Wound Healing **212** • Aims of Burn Wound Care **214** • Management **215**

22. Management of Radiation Wounds 235
Sandeep Mehta

• History **235** • What is Radiotherapy? **236** • Methods of Delivery **237** • Radiation Injury—Biological Effects **238** • Pathophysiology of the Response to Radiation Injury **240** • Treatment of Radiation-induced Wounds **245** • Radiation Ulcers **246** • Osteoradionecrosis **257** • Current Treatment Strategies **264** • Future Treatment Modalities **265**

23. Management of Trophic Ulcer on Feet 274
Atul Shah

• Pathogenesis and Risk Factors **274** • Clinical Features **275** • Clinical Evaluation **276** • Management **276** • Surgical Management **277**

24. Pressure Sores 283
Arun Goel

• History **284** • Etiopathogenesis **284** • Prevention **288** • Laboratory Studies **291** • Treatment **291**

25. Orthopedic Device Related Infections 299
Sumit Batra, Sumit Arora

• Microbiology of Implant Infection **299** • Pathophysiology of Implant Infections **300** • Presentation **301** • Prevention and Management **301**

26. Necrotizing Fasciitis: An Overview 304
Chintamani, Rohan Khandelwal, Megha Tandon

• Classification **305** • Microbiology **305** • Pathology **305** • Clinical Features **306** • Diagnosis **308** • Management **309** • Supportive Treatment **310** • Prognosis **311** • Fournier's Gangrene **311** • Clostridial Cellulitis and Myonecrosis **312** • Non-clostridial Anaerobic Cellulitis **312**

27. Bite Wounds 315
Deepak Nanda, Thakur Thussu

• Epidemiology **315** • Pathophysiology **315** • Clinical Manifestations **316** • Management **316** • Complications **319** • Human Bites **319**

28. Malignant Wounds 322
Chintamani, Megha Tandon, Rohan Khandelwal

• Incidence **322** • Impact on Quality of Life **322** • Etiopathogenesis **323** • Wound Malodors **324** • Symptoms **327** • Diagnosis of Malignant Wounds **328** • Management of Malignant Wounds **328**

29. Chemo-Extravasation: Medical and Surgical Management 336
Sandeep Mehta, Himesh Gupta

• Vesicants **337** • Irritants **338** • Risk Factors **338** • General Considerations in Chemotherapy Extravasation—Initial Management **339** • Surgical Management Considerations **342**

30. Gunshot Wounds 348
Deepak Nanda, Thakur Thussu

• History of Ballistic Injury **348** • Pathophysiology **348** • Wounding Mechanism **349** • Management **350**

31. Reconstructive Modalities of Non-healing Wounds of Lower Limb 352
V Bhattacharya, PS Barooah, S Bhattacharya, NK Agrawal

• Vascular Basis of Reconstruction **352** • Surgical Modalities **353** • Flap Selection **353** • Preoperative Evaluation **353** • Flap Planning **354** • Postoperative Care **360**

32. Foot Defects 364
Sameek Bhattacharya, Ashish Rai
• Surgical Anatomy **364** • Reconstruction of Foot Defects **365** • Sensory Recovery of Sole after Reconstruction **372**

33. Management of Upper Extremity Wounds 374
Durga Karki
• Etiology **374** • Management **376** • Reconstruction of the Wound **377** • Postoperative Care **383**

34. Issues in Neonatal Wound Management 387
Harish Chellani, Pratima Anand
• Types of Wounds **388** • Guidance and Recommendations for Prevention of Neonatal Wounds **393** • Best Practice at Dressing Changes **395** • Pain Assessment and Management **396** • Communication with Parents **397** • Documentation **397**

SECTION 4: Miscellaneous

35. Role of Regulated Negative Pressure Therapy in Wound Healing 401
Moris Topaz
• The Physical Basis of RNPT **402** • Clinical Applications of RNPT and RO-NPT **408** • Suction Forces and Acute Bleeding **409** • Clinical Applications of RNPT and RO-NPT—Case Presentations **412**

36. Role of Nutrition in Wound Healing 432
Karoon Agrawal
• Normal Nutritional Requirements **432** • Nutritional Assessment **433** • Pathophysiology of Wound Healing **435** • Role of Nutrients in Wound Healing **436**

37. Role of Physiotherapy in Wound Healing 447
Ram Shanmugam
• An Overview on Role of Physiotherapist in Wound Healing **448** • Role of Exercise Therapy in Wound Healing **448** • Role of Electrical Stimulation in Wound Healing **448** • Role of Ultrasonic Therapy in Wound Healing **452** • Ultraviolet Therapy in Wound Healing **453** • Laser Therapy in Wound Healing **454** • Role of Hydrotherapy in Wound Healing **455**

38. Hyperbaric Oxygen Therapy in Management of Wounds 457
Ashish Rai, Sameek Bhattacharya
• Introduction and Definition of Hyperbaric Oxygen **457** • History **457** • Mechanism of Oxygen Transport in Hyperbaric Oxygen Therapy **457** • Role of Oxygen in Wound Healing **458** • Therapeutic Effects of Hyperbaric Oxygen **458** • Hyperbaric Oxygen Therapy Protocol **459** • Hyperbaric Oxygen Therapy in Wounds **459** • Side Effect and Complications **461**

Index 463