

Contents

1 Basics of Wound Healing	1
Clinical Anatomy of the Skin	1
Epidermis	2
Dermis	5
Subcutaneous Tissue	6
Wound Overview	6
Definition	6
Classification	7
Wound Documentation	7
Wound Healing Process	11
Phases of Wound Healing	15
Conventional Wound Healing Methods	28
Repair vs. Regeneration	28
Types of Wound Healing	28
Skin Graft	29
Flap Coverage	30
Replantation	31
Further Reading	36
2 Interactive Wound Dressings	39
Overview	39
Functions of Wound Dressings	40
Requisite Conditions for Dressing Materials	40
Interactive Dressing Materials	41
Gauze and Impregnated Gauze Dressings	42
Films	42
Hydrogels	43
Foams	43
Hydrocolloids	45
Alginates and Hydrofibers	46
Biologic Dressings	46
Composite Dressings and Adjunctives	51
Silver Dressings	52
Iodine Dressings	54
Dressing Selection	56
Infected Wound	59
Uninfected Wound	60
Further Reading	60

3	Biologic Dermis Graft	63
	Autogenous Dermis Graft	64
	Surgical Technique	65
	Indication	65
	Controlled Clinical Study	66
	Coverage of Deep Wounds on the Face	66
	Advantages and Disadvantages	67
	Allogenic Dermis Graft	70
	Artificial Dermis Graft	71
	Collagen	72
	Hyaluronic Acid	73
	Advantages and Applications	74
	Further Reading	80
4	Tissue-Engineered Dermis Graft	83
	Artificial Dermis vs. Tissue-Engineered Dermis	84
	Animal Study	85
	Fibroblast-Seeded Artificial Dermis	87
	Application Methods	87
	Clinical Study	88
	Adipose-Derived SVF Cell-Seeded Artificial Dermis	91
	Clinical Study	94
	Advantages and Disadvantages	99
	Matrix-Synthesizing Abilities of SVF Cells	102
	Further Reading	105
5	Atypical Island Flaps	107
	Arterial Island Flap	107
	Surgical Technique	108
	Clinical Study	109
	Venous Island Flap	109
	Surgical Technique	111
	Clinical Study	112
	Further Reading	117
6	Management of Chronic Wounds:	
	With Focus on Diabetic Ulcers	119
	Why Is Diabetic Ulcer Focused On?	119
	Why Does Diabetic Ulcer Get into Trouble?	120
	Factors Contributing Delayed Healing	121
	Vascularity	121
	Infection	121
	Pressure	123
	Source of Healing (Cell Function)	126
	Risk Factors for Major Amputation	128
	Management of Ischemia	130
	Diagnosis of Arterial Insufficiency	131
	Macrocirculation vs. Tissue Oxygenation	138
	Treatment of Ischemia	140

Necessity of Collaboration	144
Present and Future.	145
Further Reading	147
7 Infection, Debridement, and Biofilm	151
Diagnosis.	152
Signs and Symptoms	152
Tissue Biopsy	154
Swab Culture	154
Fluid Aspiration	155
Blood Tests	156
Imaging Tests	159
Treatment	161
Antimicrobial Therapy	161
Debridement	163
NPWT	164
Hyperbaric Oxygen, Photodynamic Therapy, and Ultraviolet Light	164
Debridements	164
Autolytic Debridement	164
Enzymatic (Chemical) Debridement	165
Biological Debridement	165
Mechanical Debridement	165
Sharp Debridement.	170
Surgical Debridement.	171
Biofilm	172
Formation of Biofilm	173
Diagnosis	175
Treatment Option	176
Author's Treatment.	177
Further Reading	181
8 Negative-Pressure Wound Therapy	183
Composition of NPWT Device.	184
Mechanism of Action	184
Wound Shrinkage or Macrodeformation	184
Microdeformation.	184
Exudate/Fluid Removal	184
Creation of the Favorable Wound Environment	185
Secondary Effects.	185
Clinical Application	185
Application Method	185
Benefits	186
Indications	186
Contraindications	187
Adverse Effects.	187
Innovation.	187
NPWT in Diabetic Foot Ulcers.	188
Influence of NPWT on Tissue Oxygenation in the Foot	188
NPWT for Diabetic Foot Ulcers.	191
Further Reading	200

9 Growth Factor Therapy	201
Overview	201
Growth Factors and Wound Healing	202
Mechanism of Action	202
Background	203
Evaluation of Cell Activity	204
Commercial Growth Factors	204
PDGF	204
Indication	205
Dosage and Administration	205
Clinical Trial Study	205
Precautions	205
FGF	206
Indication	206
Dosage and Administration	206
Clinical Trial Study	206
Precautions	207
EGF	208
Indication	208
Dosage and Administration	208
Clinical Trial Study	208
Precautions	209
Further Reading	212
10 Cell Therapy	215
Fibroblasts	216
Fresh Fibroblast Autograft	216
Fresh Fibroblast Allograft	218
Keratinocytes	222
Keratinocyte Autograft	222
Keratinocyte Allograft	223
Adipose-Derived SVF Cells	226
Autograft of Adipose-Derived SVF Cells	226
Platelet Concentrate	233
Allograft of Blood Bank Platelet Concentrate	234
Mesenchymal Stem Cells	239
Bone Marrow-Derived MSCs	239
Umbilical Cord Blood-Derived MSCs	241
Limitations	244
Further Reading	244
11 Adjunctive Therapy	249
Nutritional Support	250
Main Nutrients	250
Vitamins	252
Minerals	252
Nutrient Deficits of Chronic Diabetic Ulcer Patients	253

Electrical Stimulation	253
Ultrasound	254
Ultrasonic Surgical Debridement	254
Oxygen Therapy	255
Hyperbaric Oxygen (HBO)	255
Normobaric Oxygen (NBO)	256
Monochromatic Infrared Energy (MIRE)	257
Ultraviolet (UV) Light	258
Pain Scrambler Therapy	258
Action Mechanism	258
Precautions	259
Foot Massager Device	259
Further Reading	260
12 Injectable Tissue-Engineered Soft Tissue	263
Injectable Soft Tissue Using Fibroblasts	266
Basic Research	267
Application Method	270
Clinical Experience	272
Advantages and Attention	272
Injectable Soft Tissue Using Adipose-Derived Cells	274
Stromal Vascular Fraction (SVF) Cells	274
In Vitro-Differentiated Adipocytes	280
Further Reading	286