CHAPTER 3: SCARLESS WOUND HEALING (EMBRYO MODEL)

Comparisons - Embryo vs. Adult 35
Distinctive Cellular and Molecular Features of Embryo Wound Healing 35
Differences Between Wound Healing in Embryos and Adults 36
Other Differences and Potential Influences Unique to Embryonic Wound Healing 38
The Adult Wound Healing Process 39
The Phases of Wound Healing 40
Coagulation Phase (If Ablative) 40
Inflammatory Phase (1-3 Days) 40
Lag & Proliferative Phase (3-5 Days) 41
Fibroplastic Phase (5-20 Days) 42
Maturative and Remodelling Phase (28 Days-2 Years) 42
Plausible Explanations for the Differences Between the Embryo and Adult Wound Healing Models 43
Growth Factors 43
The Role of Hyaluronic Acid 45
Why Does Fibrosis Result with IPL, Laser, Fraxel®, Thermage®, Etc? 45
Conclusions and Significance 46

CHAPTER 4: DERMAL NEEDLING

What It Is and What It Can Do 51
Needling Is About Far More Than Collagen Induction 51
Needling Devices/Methods for Collagen Induction 51
Subcision 51
Tattoo Devices 52
Stamps 52
Rollers 52
RF Combined with Microneedling 53
Electronic Devices 54
How to Select a Motorized Needling Device 54
1. PATIENT SAFETY – Cross Contamination 55
2. PERFORMANCE OF THE DEVICE 55
3. QUALITY OF NEEDLE CARTRIDGES 56
4. QUALITY OF NEEDLES 59
Rollers vs. Electronic Devices 61
Studies Done with Rollers Cannot Necessarily be Extrapolated to Pens 61
Advantages of Electronic Devices 62
Advantages of Rollers 62
Myths Propagated by Marketing 63
FDA Reclassification of “Pens” as a Medical Device 64
Cosmetic vs. Medical Needling 66
Differences in Needle Size 67
Cosmetic Needling: How Does It Work? 67
Effects on the Epidermis 68
Effects on the Dermis 68
Dermal-Epidermal Junction – A New Frontier
Medical Needling: How Does It Work?
Pinpoint Accuracy – Taking Skin Rejuvenation to a New Level?
General Observations Opposing Conventional Wisdom
Structure of the Dermal-Epidermal Junction
Which Cells Are Responsible for Production of Basal Membrane Components?
Components of the DEJ and Associated Genes Showing Influence of Microneedling
Hemidesmosomes
Anchoring Filaments
Lamina Densa
Why Cosmetic Needling May Improve Wrinkles
Summary
New Indications/Applications for Microneedling
Active Acne
Atopic Dermatitis
Melanocyte Stem Cell Transplants
Melanin Deposits in Hair Follicles to Enhance Laser Hair Removal
ALA for Treating Actinic Keratoses
ALA for Photodynamic Photorejuvenation
Microneedling vs. Microinjection of Tranexamic Acid for Treating Melasma
Microneedling with Bleomycin for Treatment of Verruca
What Are the Most Effective Uses of Dermal Needling?
How Needling Improves Various Skin Disorders & Conditions
Lax Skin and Wrinkles
What Are Some of the Causes of Lax Skin and Wrinkles?
How Does Needling Correct Lax Skin & Wrinkles?
UV Damage
What Are Some of the Causes for This Failed Repair or Destruction/Removal?
How Does Needling Correct UV Damage?
Hyperpigmentation
What Are Some of the Causes for Hyperpigmentation?
How Does Needling Correct Hyperpigmentation?
Scars
Keloids
Hypertrophic
What Are Some of the Causes for This?
How Does Needling Correct Scars?
Stretch Marks
Histological Findings
What Are Some of the Causes for Stretch Marks?
How Does Needling Correct Stretch Marks?
Rosacea
What Are Some of the Aggravating Factors of This Condition?
How Does Needling Correct Rosacea?
Hair Loss
Androgenetic Alopecia
Alopecia Areata
What Are Some of the Causes for Hair Loss?
How Does Needling Correct Hair Loss?
Synergistic Products for Hair Restoration in Conjunction with Needling
### CHAPTER 5: TREATMENT PARAMETERS AND PROTOCOLS FOR NEEDLING

- Patient History and Exam 91
- Consultation and Treatment Records 91
- Contra-Indications/Special Precautions 92
- Atopy, Asthma, Hay Fever and Allergies 93
- Rosacea 93
- Anticoagulated Patients 93
- Drugs and Supplements Associated with Photosensitivity 93
- Considerations with Fitzpatrick III and Above 94
- Ingredients to Avoid with Dermal Needling 94
  - Preservatives 95
    - Parabens 96
    - Citrus-Derived Preservatives 96
    - Formaldehyde-Releasing Preservatives 97
    - Other Preservatives 98
- Fragrance 99
- High Risk with Needling 99
- Surfactants 101
- Emulsifiers 101
- Humectants 102
- Emollients 104
- Acids 105
  - Alpha Hydroxy Acids or AHAs 105
  - Beta Hydroxy Acids or BHAs 105
  - Other Acids 106
- Dyes and Colouring Agents 106
- UV Filters 107
- The Collagenase Story (Another Precaution) 107
- Avoiding the Inflammatory Response 108
  - Back to Basics - Normal Maintenance and Repair in Unwounded Skin 108
  - What Makes a Fibroblast Tick? 110
  - Back to Basics – Collagen 110
  - Back to Basics – Elastin 112
  - Back to Basics – Repair in Wounded Skin 112
    - Which Wound Healing Phases Are Necessary in Non-Ablative Rejuvenation Treatments? 113
  - Fibroblasts – Good or Bad? 114
  - Myofibroblasts – The Bad Guys 114
  - What Are the Four Possibilities of Response to Injury? 115
  - A Brief Review of Collagen During Acute Wound Healing 115
  - A Brief Review of Elastin During Acute Wound Healing 116
  - Why the Fuss? Things Look Great! 116
  - Back to Basics – Keratinocyte-Fibroblast Interaction 117
  - Combating Inflammation as Part of the Inevitable Rejuvenation Process 118
- Platelet Rich Plasma 121
- Safety with Neuromodulators and Fillers 121
- IPL, Laser, Fraxel®, Etc. 121
- Risk of Secondary Infection with Cosmetic Needling 122
- Pregnancy 122
- Keloid 122
- Immune-Suppressed Patients 122
- Diabetes 122
- Parabens 122
Skin Preparation – Home (Cosmetic Needling) 123
Home Care Products 123
Cosmetic Needling (Rolling) at Home 123
Cosmetic Roller Instructions 123
  Step 1: Cleansing 123
  Step 2: Roller 124
  Step 3: Active Ingredients Application 125
  Step 4: Protection 125
  Step 5: Roller Maintenance at Home 125
Skin Preparation – Clinic (Medical Needling) 126
Topical Anaesthesia vs. Dental Blocks 126
What Size Needle? 127
Clinical Techniques 128
  Medical Needling Protocol 128
  Preparation 128
  Best Practice Needling Technique and Procedures Using a Roller 129
  Best Practice Needling Technique and Procedures Using a Pen 130
    1. Technique for Even Endpoint (Erythema) 130
    2. Below the Eyes 130
    3. Perioral Lip Lines 131
    4. Nasolabial and Mental Folds 131
    5. Nose 131
    6. Forehead 132
    7. Upper Lids 132
    8. Wrinkles in Front of Ears 132
    9. Neck 132
   10. Scars 132
End Point with Microneedling Treatments 133
  Number of Passes 133
  Visible Endpoint 133
Adjuncts: Platelet Therapy 134
How to Clean the Medical Needling Device 134
Post Treatment Considerations 135
  Immediate Post Treatment Care 135
  Home Care Considerations 135
  Predicted Appearance After Medical Needling 136
Post Treatment Plan Guideline 137
New Post-Microneedling Protocols 137
  Immediately after Microneedling – Collagen Induction and Scars 138
  Inflammatory Phase 1-5 Days 138
  Fibroplastic Phase 5-14 Days 139
  Maturative Phase 14-28 Days to 2 Years 139
  Immediately after Microneedling – Hyperpigmentation 140
Bringing It All Together to Avoid Failure in Microneedling Treatments 140
  1. PATIENT SELECTION – Picking the Fights you can Win 141
     Is This the Appropriate Patient to Treat? 141
Exam and Diagnosis (Depth of Pathology) 146
Diagnostic Equipment 147
  Magnifying Lamp 147
  Wood’s Light 147
  Photographic Equipment 148
  2. Appropriate Product (Ingredient) Selection 150
  3. Appropriate Pen Selection 150
The Platelet-Rich Plasma Story 182
  What is PRP?  182
  The Upside of PRP 182
  PRP and the FDA  183
  How Does PRP Work?  183
  How is PRP Prepared and Does It Really Matter? 183
  History of PRP 184
  PRP Uses 184
    PRP Use in Veterinary Medicine 184
    PRP Use in Orthopedics and Sport Medicine 186
    PRP Use in Dental Surgery  189
    PRP Use in Dermatology — General 189
    PRP Use in Dermatology — Alopecia 190
  General Discussion 191
    1. Impossible to standardize – Too many variables 191
    2. Disrupting the balance (Homeostasis) of nature – Agonists and Antagonists 192
    3. “Shotgun Therapy” vs. “Cruise Missiles” 193
    4. Flawed evidence – When is a “study” not a study?  193
  The Downside of PRP 194
  PRP Studies – Past and Future 195
  PRP – Fact or Fiction? 197
  PRP – What Does the Future Hold? 198

CHAPTER 6: CASE STUDIES

Expectations and Outcomes 199
  Wrinkles 199
  UV Damage 199
  Lax Skin 200
  Actinic Keratosis 200
  Hyperpigmentation 201
  Rosacea 201
  Scars 201
  Stretch Marks 202
  Hair Loss 203

Adverse Reactions 204
  Review of Complications with Microneedling 204
    Cross Contamination 204
    Allergic Reactions 205
    Post-Inflammatory Hyperpigmentation 207
    Scarring 209
    Granulomas 210
    Glycation 212
    Nerve Injuries 212
    Photocontact Dermatitis 213
      Case Study (In the Patient’s Own Words) 213

CHAPTER 7: OVERVIEW OF SYNERGISTIC TREATMENT MODALITIES

The How’s, When’s & Why’s of Combination Therapy 215
  The Concept of Corneotherapy – Back to the Future 215
  Treatment Outline 216
Non-Ablative Treatments
Light-Emitting Diode (LED) 216
Sonophoresis/Iontophoresis 218
Microcurrent 218
Lymph Drainage 219
Intense Pulsed Light (IPL) 220
Mid-Infrared Lasers 220
Nd:YAG 220
Fraxel® 220
Ablative Treatments 221
Chemical Peels 221
Alpha Hydroxy Acids (AHA) 221
Glycolic 221
Lactic Acid 222
Mandelic Acid (Alpha-Hydroxybenzeneacetic Acid) 222
Beta Hydroxy Acids (BHA) 222
Salicylic Acid 222
Beta-Lipohydroxy Acid (C8-Lipohydroxy Acid) (LHA) 223
Other Acids 223
Trichloroacetic Acid (TCA) 223
Enzymes 223
Bromelain or Papaine 223
Desquamation Due to Epidermal Cell Turnover vs. Exfoliation Due to Ablation 223
Ablative Treatments (Continued) 225
Microdermabrasion (MDA) 225
Laser Resurfacing (Ablative) 225
Pulsed Dye Laser 226
Infrared Lasers 226
Other Modalities 226
Hyperbaric Oxygen Therapy 226
Radio Frequency (RF) 226
Summary of Appropriate Combination Therapy 227

CHAPTER 8: ADVANTAGES & DISADVANTAGES OF NEEDLING
Why Consider Microneedling in Your Practice? 228
Advantages 228
Disadvantages 228
Conclusion 229
The Role of Keratinocytes in Collagen Induction 231
Frequently Asked Questions 232
Q&A: Interesting Question and Answer 247
Author’s Response 247
Patient’s Response 249
Abbreviations 250
References 256