## Contents

1 **Optic Nerve: The Glaucomatous Optic Nerve** ............................. 1  
1.1 Why Is the Optic Nerve Important in the Diagnosis and Management of Glaucoma? .......................... 1  
References .................................................................. 10  

2 **Optic Nerve: Clinical Examination** ............................................. 15  
2.1 How Should I Examine the Optic Nerve? ................................. 15  
2.2 How Does One Establish the Borders of the Nerve and Follow the Neuroretinal Rim Contour? .......... 17  
2.3 How Does One Avoid Misinterpreting Rim Loss? .................. 17  
2.4 How Much Asymmetry Between Neuroretinal Rims and Nerves Is Important? ................................ 18  
2.5 How Can I Estimate Disc Size and Compare Disc Size Between the Two Eyes? .............................. 18  
2.6 How Quickly Can I Expect Optic Nerve Change to Occur? ...... 19  
2.7 If I See a Disc Hemorrhage on Healthy Appearing Neuroretinal Rim, How Soon Can I Expect to See a Change in the Rim? .......... 19  
References .................................................................. 20  

3 **Optic Nerve: Heidelberg Retinal Tomography** ............................... 23  
3.1 What Indices Should I Use to Help Me Interpret the Heidelberg Retinal Tomograph (HRT) Printout? ........ 23  
3.2 How Big a Change Is Meaningful in the Numbers on an HRT Printout? .............................................. 28  
3.3 How Does the HRT Detect Progression? ............................... 29  
3.4 Can I Use the HRT Clinically to Diagnose Glaucoma and Glaucomatous Progression? How Certain Can I Be that the Progression Is Real? .......................... 33  
References .................................................................. 34  

4 **Optic Nerve: Scanning Laser Polarimetry** ...................................... 35  
4.1 What Is the Physical Principle Behind Scanning Laser Polarimetry (SLP)? ........................................... 35  
4.2 How Is Image Quality and Artifact Assessed on the GDxVCC Printout? ............................................. 37  
4.3 Can I Use the Scanning Laser Polarimetry Report to Diagnose Glaucoma? ..................................... 38
4.4 Can I Use Scanning Laser Polarimetry to Assess Progression of Optic Nerve Damage? ................................. 40

References ......................................................... 42

5 Optic Nerve: Optical Coherence Tomography .................. 45
5.1 What Indices Should I Use to Help Me Interpret the OCT Optic Nerve Head Analysis Report? .......................... 45
5.2 What Indices Should I Use to Help Me Interpret the “RNFL Thickness Average Analysis Report” Printout? ............ 48
5.3 Can OCT Detect Progression? How Big a Change Is Meaningful in the Numbers on an OCT Printout? ......................... 49
5.4 Can I Use OCT Clinically to Diagnose Glaucoma? How Certain Can I Be that the Diagnosis Is Real? .................... 51
5.5 Should I Incorporate Spectral Domain-OCT into My Practice? .... 52

References ......................................................... 53

6 Optic Nerve: Comparison of Technologies .................... 55
6.1 Why Image the Optic Nerve? .................................. 55
6.2 Is One Optic Nerve Imaging Technique Better or More Promising than the Others for Helping to Detect Glaucoma and Its Progression? .............................. 60
6.3 Is One Imaging Technique Easier to Use and Interpret than Another? .................................................. 61
6.4 How Often Should I Image the Nerve? .......................... 61

References ......................................................... 61

7 Optic Nerve: Atypical Nerves and Nerve Findings ............ 63
7.1 Should Peripapillary Atrophy (PPA) Concern Me? Should it Be Followed for Enlargement? ............................... 63
7.2 In Examining Tilted Optic Discs, How Do I Distinguish Tilt vs. Glaucoma? ................................................. 64
7.3 With Optic Nerve Head Drusen (OND), How Do I Tell If Visual Field Changes Are due to Drusen vs. Glaucoma? ............. 67
7.4 What Differential Diagnosis Should Be Kept in Mind When Looking at a Case of Questionable Glaucoma? ................. 69

References ......................................................... 69

8 IOP: The Importance of Intraocular Pressure .................. 75
8.1 Why Is Intraocular Pressure Important in Diagnosing and Treating Glaucoma? ........................................... 75

References ......................................................... 78

9 IOP: Instruments to Measure IOP ............................... 79
9.1 What Is the Brief History of IOP Measurement? ............... 79
9.2 What Instrument(s) Most Accurately Measures IOP? .......... 80
9.3 If Goldmann Applanation is not Available During an Exam Under Anesthesia, What Instrument is the Next Most Preferred for IOP Measurement? .................................... 83
9.4 In Cases of Corneal Transplants, Corneal Edema or Scarring, Which Instrument Would Be Best to Use to Obtain Accurate IOP Measurements? ....................................... 84
9.5 In Cases of Prosthetic Corneas How Can I Measure the IOP? .... 84

References ......................................................... 84
9.6 Can I Convert the Readings of One Instrument to Those of Another? ........................................... 84
References ................................................................................... 84

10 IOP: Central Corneal Thickness .............................................. 87
10.1 Why Has Central Corneal Thickness (CCT) Become So Important? 87
10.2 How Does Central Corneal Thickness Vary? .......................... 88
10.3 Does CCT Predict Glaucoma? .............................................. 89
10.4 How Should I Use CCT in Clinical Practice? .......................... 90
References ................................................................................... 92

11 IOP: Corneal Hysteresis ............................................................ 95
11.1 What Is Corneal Hysteresis and How Does it Influence IOP Measurement? ........................................ 95
11.2 What Are Typical Corneal Hysteresis Values? .......................... 96
11.3 What Is the Relationship Between CCT, IOP, and Corneal Hysteresis? ....................................................... 96
11.4 Should I Invest in Newer Devices to Measure IOP that Claim Less Influence of CCT? ................................. 97
References ................................................................................... 98

12 IOP: Target Pressures ............................................................... 99
12.1 Should I Establish a Target IOP on Every Patient? .................... 99
12.2 If I Decide to Set a Target IOP, How Should I Set it – Do I Use a Percent Reduction or Aim Toward an Absolute Number?.......................................................... 99
12.3 How Should I Use Information About Diurnal IOP, Nocturnal Peaks, and Inter-Visit Fluctuation in Establishing a Target IOP? ......................................................... 101
12.4 Are Supine and Nocturnal IOPs Important to Factor into Target Pressure Estimation? ................................. 102
References ................................................................................... 103

13 IOP: Fluctuation ................................................................. 105
13.1 Why is IOP Fluctuation a Topic of Interest? .............................. 105
13.2 What Factors Should Be Considered When Measuring Short-Term IOP Fluctuation? ..................................... 106
13.3 What is the Significance of Short-Term IOP Fluctuation? .............. 106
13.4 What Factors Should Be Considered in Measuring Long-Term IOP Fluctuation? ........................................... 107
13.5 What is the Significance of Measures of Long-Term IOP Fluctuation? ............................................................... 107
13.6 What is the Impact of Medication on Short-Term and Long-Term IOP Fluctuation? ........................................ 108
13.7 What is the Impact of Surgery on Short-Term and Long-Term IOP Fluctuation? .................................................. 109
13.8 How Aggressive Should I Be in Eliminating Long-Term IOP Fluctuation Given the Potential Complications of Medications and Surgery? ...................................... 109
References ................................................................................... 110

14 Gonioscopy: Why Do Indentation? ......................................... 113
14.1 Which Patients Should Have Gonioscopy? .............................. 113
14.2 Of What Use Is the Van Herick Angle Examination? ................. 114
14.3 What Lens Should Be Used for Gonioscopy? ............................ 114
14.4 How Do I Perform Indentation Gonioscopy? ......................... 115
14.5 What Should I Look for in the Angle? ................................. 117
14.6 How Can I Recognize Peripheral Anterior Synechiae? ............. 118
14.7 How Narrow Is too Narrow? What Are the Indications for Laser Iridotomy in a Patient with No Symptoms of Angle-closure? ...... 118
14.8 What Should I Know About Plateau Iris? ............................ 120
14.9 What Racial Differences Exist in Angle Anatomy? .................. 121
14.10 Can Anterior Segment Imaging by Ultrasound Biomicroscopy (UBM) or Anterior Segment OCT Replace Gonioscopy? ........... 121
References ............................................................................. 122

15 Visual Fields: Visual Field Test Strategies ............................... 123
15.1 What Are the Basic Differences Between Different Visual Field Machines and Tests? .................................................. 123
15.2 What Are the Theoretical Advantages of Different Test Strategies (SAP, SITA, FDT SWAP, etc)? ........................................ 125
15.3 Is There a Visual Field Program of Choice at This Point in Time? ...................................................................................... 125
15.4 What Visual Field Program Is Best for Use in a Glaucoma Subspecialty Clinic? .............................................................. 125
15.5 What Program is Best for Use in a General Clinic to Screen for Glaucoma? ................................................................. 126
15.6 How Can I Convert from One Visual Field Strategy to Another to Help Me Interpret and Compare Tests? .......................... 127
15.7 What Can be Done to Obtain Visual Field Information in a Patient Who Consistently Tests Unreliably? ............................ 127
References ............................................................................. 128

16 Visual Fields: Fluctuation and Progression ............................... 129
16.1 How Do I Distinguish Between Fluctuation and True Progressive Change on Visual Field Printouts? ......................... 129
16.2 How Frequently Should Visual Fields Be Tested? ..................... 131
16.3 What Are the Methods Available for Determining Visual Field Progression? ............................................................... 132
16.4 What Automated Progression Analysis Software Is Available to Help with Visual Field Interpretation? ............................ 132
References ............................................................................. 137

17 Visual Fields: Field Interpretation ............................................ 139
17.1 How Is Information on a Single Field Printout of the Humphrey Visual Field Analyzer Interpreted? .............................. 139
17.2 How Is the Information on the Glaucoma Progression Analysis Printout Interpreted? ..................................................... 142
17.3 What Are the Pitfalls to Avoid (or Commonly Made Mistakes) in the Interpretation of Visual Fields? .............................. 146
References ............................................................................. 147

18 Other Tests in Glaucoma: Genetic Testing ............................... 149
18.1 What Genetic Tests Are Currently Available to Test or Screen for Glaucoma? ............................................................ 149
18.2 Are Genetic Tests for Glaucoma of Practical Use in a Clinical Setting Today, or Are They More of Theoretical Use? ............... 151
18.3 How Do I Collect Samples and Where Do I Send Them for Analysis? .................................................. 152
18.4 How Should the Results of Genetic Testing Be Interpreted for the Patient’s Use? ............................... 153
References ......................................................................................................................... 155

19 Other Testing in Glaucoma: Optic Nerve Blood Flow I .......................................................... 157
19.2 Is Abnormal Ocular Blood Flow Causal in Glaucoma and Glaucoma Progression, and Does It Correlate with Disease Severity? .......................................................... 158
19.3 Which Glaucoma Patients May Suffer from Ocular Blood Flow Impairment? .................................... 158
19.4 What Are the Most Common Techniques to Measure Optic Nerve Blood Flow and What Are Their Limitations? ........................................................................ 160
References ......................................................................................................................... 162

20 Other Tests in Glaucoma: Optic Nerve Blood Flow II .......................................................... 165
20.1 What Evidence Is There that Vascular Alterations Play a Role in Open-Angle Glaucoma (OAG)? ............. 165
20.2 What Are the Positives and Negatives of Measuring Optic Nerve Blood Flow? .................................... 166
20.3 What Technologies Are Available to Measure Blood Flow Velocities? ............................................ 166
20.4 Are There Examples of Ocular Hemodynamic Abnormalities Found in OAG Patients? ....................... 168
20.5 How Are the Results of Blood Flow Measuring Devices Interpreted and Are There Limitations to These Blood Flow Imaging Techniques? .................................................. 170
20.6 How Can the Data from Ocular Hemodynamic Studies Be Used in Clinical Practice? ....................... 172
References ......................................................................................................................... 172

21 Other Tests in Glaucoma: Multifocal Visual Evoked Potential .................................................. 175
21.1 What Is a Multifocal Visual Evoked Potential (mfVEP)? ............................................................ 175
21.2 How Do I Interpret the Results of mfVEP Tests? ........................................................................ 177
21.3 Is the mfVEP a Useful Test in Glaucoma? ................................................................................ 179
References ......................................................................................................................... 180

22 Risk Factors ....................................................................................................................... 183
22.1 When I Diagnose a Patient with Glaucoma for the First Time, What Can I Tell Him/Her About the Risk of Going Blind from Glaucoma? .................................................. 183
22.2 What are the Main Risk Factors for Primary Open-Angle Glaucoma? ............................................. 184
22.3 Is the Myopic Population at Higher Risk of Glaucoma? Do Myopic Patients with Glaucoma Progress Differently than Other Patients? ..................................................... 187
References ......................................................................................................................... 187
23 Risk Factors: The Risk Calculator ................................................. 191
23.1 Is a Risk Calculator Useful? .................................................. 191
23.2 How Should I Use a Risk Calculator? ................................. 192
23.3 Can I Screen for Glaucoma with a Risk Calculator? ......... 193
23.4 What Does It Mean to Me and My Patient
    If the Risk Score Is High? .................................................. 193
References ................................................................. 194

24 Medical Treatment: First Line Agents and Monotherapy .......... 195
24.1 Should Beta Blockers Still Be Used as a First-Line Agent? .... 195
24.2 If a Single Agent Does Not Provide Adequate IOP Lowering, Is
    It Better to Switch to Another Medication in the Same Class
    or to Another Class, or Is It Better to Add a Second Medication?.. 198
24.3 When Combining Topical Medications, Do Certain Combinations
    Work Better Together than Others, i.e., What Should I First
    Add to a Prostaglandin Analog or to a Beta Blocker? ............... 199
24.4 Should Miotics Still Be Used? .............................................. 200
References ................................................................. 200

25 Medical Treatment: The Pregnant and Nursing Woman .......... 203
25.1 Which Glaucoma Medications Are Safe to Use in Pregnancy?... 203
25.2 What Medications Are Safe to Use in a Nursing Mother? ....... 204
References ................................................................. 205

26 Medical Treatment: Carbonic Anhydrase Inhibitors .............. 207
26.1 Are Oral Carbonic Anhydrase Inhibitors (CAIs) Still to Be Used
    Now that There Are Numerous Effective Topical Medications? ... 207
26.2 How Should Oral CAIs Be Dosed? ........................................ 207
26.3 What Are the Toxic Effects of Systemic CAIs? .................... 208
26.4 Can CAIs Be Used in Pregnant Women or Pediatric Patients? ... 209
26.5 Can CAIs Be Used in Patients with Sickle Cell Anemia? ......... 210
26.6 How Does Acetazolamide Differ from Methazolamide? ........ 210
26.7 Are Systemic and Topical CAI Effects Additive? ................. 211
References ................................................................. 211

27 Medical Treatment: Osmotic Agents .............................. 213
27.1 When Using Hyperosmotic Agents, What Is a Typical Dose
    for Acutely Elevated Intraocular Pressure (IOP)? .................. 213
27.2 What Systemic History Should I Gather Prior to Administering
    Hyperosmotic Agents? .................................................... 216
27.3 Should Hyperosmotic Agents Be Used to Lower IOP
    Prior to Surgery? ......................................................... 216
References ................................................................. 217

28 Medical Treatment: Neuroprotection ............................ 219
28.1 What Exactly Is Neuroprotection? ...................................... 219
28.2 What Is the Basis of Neuroprotection? ............................... 220
28.3 What Medications Are Neuroprotective? ............................ 221
28.4 Is There a Clinical Role for Systemic Medications
    in the Treatment of Glaucoma? ........................................ 223
References ................................................................. 223
## 29 Medical Treatment: Treated vs. Untreated Glaucoma and Ocular Hypertension

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.1 What Is the Natural History of Treated and Untreated Glaucoma and Ocular Hypertension?</td>
<td>225</td>
</tr>
<tr>
<td>29.2 What Is the Natural History of Treated Glaucoma?</td>
<td>226</td>
</tr>
<tr>
<td>29.3 What Is the Natural History of Untreated vs. Treated Ocular Hypertension?</td>
<td>229</td>
</tr>
</tbody>
</table>

References. 230

## 30 Medical Treatment: Adherence and Persistence

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.1 What Issues Are at Work in Patient Noncompliance?</td>
<td>231</td>
</tr>
<tr>
<td>30.2 How Can One Help Patients to Be More Compliant with Treatment?</td>
<td>233</td>
</tr>
<tr>
<td>30.3 How Can One Educate Patients to Realize the Long-Term Impact of Glaucoma and Encourage Adherence?</td>
<td>234</td>
</tr>
</tbody>
</table>

References. 236

## 31 Medical Treatment: Alternative Medicine and Glaucoma

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.1 Is There Anything the Patient Can Do to Improve the Outcome of Their Disease Besides Using Conventional Treatments (Medications and Surgery)?</td>
<td>237</td>
</tr>
<tr>
<td>31.2 When a Patient Asks About the Effect of Lifestyle on Glaucoma, How Can I Answer this with Regard to Exercise, Smoking, Alcohol, and Diet?</td>
<td>239</td>
</tr>
<tr>
<td>31.3 How Should I Counsel Patients Who Inquire Regarding to Alternative and Complementary Therapy, Specifically Marijuana Use, Gingko Biloba, Bilberry, and Acupuncture?</td>
<td>241</td>
</tr>
</tbody>
</table>

References. 243

## 32 Procedural Treatments: Laser Trabeculoplasty

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.1 Should Laser Trabeculoplasty or Medication Be Used as First-Line Treatment? How Can Trabeculoplasty Be Used as Adjunctive or Replacement Treatment?</td>
<td>247</td>
</tr>
<tr>
<td>32.2 Is There Still a Place for ALT Given the Availability of SLT? (In Other Words, as a Practitioner Should One Invest in Buying an SLT Laser?)</td>
<td>249</td>
</tr>
<tr>
<td>32.3 When Should SLT or ALT Not Be Performed?</td>
<td>251</td>
</tr>
<tr>
<td>32.4 What Are the Laser Settings and Techniques for ALT and SLT?</td>
<td>251</td>
</tr>
<tr>
<td>32.5 What Pearls Are There for Performing ALT and SLT?</td>
<td>252</td>
</tr>
<tr>
<td>32.6 What Complications Can I Expect and How Do I Deal with Them? How Frequently Should a Patient Be Seen in Follow-Up After Trabeculoplasty?</td>
<td>253</td>
</tr>
<tr>
<td>32.7 What Is the Mechanism of Action of ALT and SLT?</td>
<td>254</td>
</tr>
<tr>
<td>32.8 What Newer Laser Trabeculoplasty Modalities Are on the Treatment Horizon?</td>
<td>254</td>
</tr>
</tbody>
</table>

References. 255

## 33 Procedural Treatments: Endoscopic Cyclophotocoagulation

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.1 When Can or Should Endoscopic Cyclophotocoagulation (ECP) Be Used?</td>
<td>257</td>
</tr>
<tr>
<td>33.2 Should ECP Be Used as a Primary Surgery for Glaucoma?</td>
<td>258</td>
</tr>
</tbody>
</table>
37 Procedural Treatments: Bleb Needling  ................................................. 285
  37.1 What Are the Different Techniques to Needle a Bleb? ................. 285
  37.2 Is It Ever Too Early or Too Late to Needle a Bleb? ................. 289
  37.3 Are There Any Limits on How Often I Can Perform Needling and Injection of Antimetabolite? Should Antimetabolite Always Be Injected with Needling Procedures? .......... 290
  37.4 What Complications Should I Anticipate After Needling? ........ 290
  37.5 Is It Better to Needle or Reoperate on a Failing Bleb? ............. 290
References ................................................................. 291

38 Procedural Treatments: Glaucoma Drainage Devices ................. 293
  38.1 Is One Tube Shunt Design Better than Another at Lowering IOP? 293
  38.2 Are There Certain Circumstances/Diagnoses Where One Type of Shunt May Be Preferred Over Another? ......... 296
  38.3 What Kind of IOP Results Can I Expect with a Tube Implant? .... 297
  38.4 What Are the Differences in Postoperative Course Between a Valved and Nonvalved Tube Shunt? ................... 297
  38.5 What Can I Do If the Conjunctiva Will Not Close and Cover the Tube-Shunt as I am Finishing the Surgery? ....... 298
  38.6 Should My Surgical Technique Change If the Eye Is Aphakic? .... 299
  38.7 Should Technique Change If the Patient Has a Great Deal of PAS? 299
References ................................................................. 300

39 Procedural Treatments: New Surgical Options .......................... 301
References ................................................................. 306

40 Procedural Treatments: Ex-PRESS Mini Glaucoma Shunt .......... 307
  40.1 How Often Is the Ex-PRESS Mini-Shunt Being Used in Place of More Traditional Glaucoma Surgery? Have Glaucoma Specialists Adopted this Surgery? .................. 307
  40.2 What Is the Ex-PRESS Mini-Shunt and How Does It Work? ....... 307
  40.3 What Are the Ex-PRESS Mini-Shunt’s Dimensions? How Is It Implanted? ............................................. 309
  40.4 Should An Ex-PRESS Mini-Shunt Procedure Be Performed in Place of a Trabeculectomy? ......................... 311
  40.5 How Does Surgical Technique Differ Between an Ex-PRESS Shunt Procedure and a Trabeculectomy, and What Can Be Done to Obtain Better Outcomes with the Procedure? ........ 313
  40.6 What Complications Are Specific to the Ex-PRESS Shunt Procedure? ............................................. 314
References ................................................................. 314

41 Procedural Treatments: Phacotrabeculectomy ....................... 317
  41.1 Under What Circumstances Should a Combined Phacotrabeculectomy Be Performed? ......................... 317
  41.2 Under What Circumstances Should a Phacotrabeculectomy Not Be Performed? ................................ 319
41.3 How Is the Postoperative Course of a Phacotrabeculectomy Different than that After the Individual Surgeries? 319
References 320

42 Procedural Treatments: Surgery in End-Stage Glaucoma 323
42.1 What Is End-Stage Glaucoma? 323
42.2 Should I Operate on a Patient with End-Stage Glaucoma? 324
42.3 What Is the Risk of Losing Remaining Vision from a Surgical Procedure in End-Stage Glaucoma Eyes? 325
42.4 How Do Specific Complications of Surgery in End-Stage Glaucoma Lead to Vision Loss? 326
42.5 What Can Be Done to Minimize Potential Vision Loss Due to Surgery in End-Stage Glaucoma? 327
References 327

43 Glaucomas: Managing Normal-Tension Glaucoma 331
43.1 How Low an Intraocular Pressure Do I Need to Target in Normal-Tension Glaucoma? 331
43.2 If a Patient with Normal Tension Glaucoma Is Started on Topical Medication and the Intraocular Pressure Is Lowered 1–2 mmHg, Can I Consider that to Be Adequate Treatment? 332
43.3 What Is the Treatment of Choice in Normal-Tension Glaucoma – Medication, Laser, or Surgery? 334
43.4 What Time Course of Progression Can I Expect in Normal-Tension Glaucoma Patients and Can I Predict Who May Progress Over the Short Term? 334
References 336

44 Glaucomas: Pseudoexfoliation Glaucoma 337
44.1 Is There a Gene for Pseudoexfoliation Syndrome? 337
44.2 Is Pseudoexfoliation Associated with Systemic Disease? 337
44.3 What Is the Risk of Developing Glaucoma Once PXF Material Is Observed in the Eye? 338
44.4 What Are Surgical Considerations and Management Issues in Cataract Surgery Associated with Pseudoexfoliation? 339
References 341

45 Glaucomas: Pigment Dispersion Glaucoma and Angle Recession Glaucoma 345
45.1 How Does Glaucoma in Pigment Dispersion Syndrome Differ Clinically from Other Glaucomas? 345
45.2 Is PDG Managed Differently than Primary Open Angle Glaucoma? 347
45.3 Is Laser Iridotomy Recommended in PDS/PDG Patients? 348
45.4 What Problems Should Be Anticipated in PDS/PDG? What Kind of Outcomes Can Be Expected in These Patients? 348
45.5 How Does Glaucoma in Angle Recession Differ from Other Glaucomas? 349
45.6 What Are the Expected Medical, Laser, and Surgical Treatment Outcomes in Angle Recession Glaucoma? 351
45.7 What Problems Should Be Anticipated in Patients with Angle Recession? 352
References 352
46 **Glaucomas: Sturge Weber Syndrome** ........................................... 355
   46.1 How Does Glaucoma in Sturge-Weber Syndrome (SWS) Differ Clinically from Other Glaucomas? .......... 355
   46.2 Is Management of Glaucoma in SWS Different from the Typical Management of Primary Open Angle Glaucoma (POAG)? .......... 357
   46.3 What Problems Should Be Anticipated in the Management of SWS Glaucoma? .............................................. 359
   46.4 What Kind of Outcomes Can Be Expected in this Type of Glaucoma? .................................................. 360
   References ............................................................................ 360

47 **Glaucomas: Glaucoma and the Cornea** ........................................ 363
   47.1 How Do Glaucoma and IOP Affect the Cornea? .......... 363
   47.2 What Effect Do Topical Medications Have on the Corneal Endothelium and Epithelium? ................. 364
   47.3 What Effect Does Laser Glaucoma Surgery Have on the Cornea? ............................................................. 365
   47.4 What Effect Does Incisional Glaucoma Surgery Have on the Cornea? .................................................. 366
   47.5 How Do Corneal Diseases Affect Glaucoma? .......................................................... 367
   References ............................................................................ 368

48 **Glaucomas: Uveitic Glaucoma** .................................................. 371
   48.1 How Often Does One See Glaucoma as a Consequence of Uveitis? ..................................................... 371
   48.2 Is There a Way to Distinguish Between Elevated IOP Due to a Steroid Response vs. Uveitis? .................. 372
   48.3 How Do Inflammation and Steroids Cause an Increase in IOP? .......................................................... 373
   48.4 When Should I Operate on Uveitic Glaucoma? ................................................................................. 374
   48.5 Is There a Preferred Surgery for Uveitic Glaucoma (Trabeculectomy vs. Tube vs. Laser)? .................. 374
   48.6 Is One Tube Preferred over Another in Uveitic Glaucoma? ............................................................. 375
   48.7 Do Prostaglandin Analogues Worsen Uveitic Inflammation? ........................................................... 376
   48.8 Can One Expect a Greater Inflammatory Response in Uveitics After Glaucoma Surgery? ................. 377
   References ............................................................................ 377

49 **Glaucomas: Neovascular Glaucoma** .......................................... 379
   49.1 What Medications Can Be Used to Control Neovascular Glaucoma? .................................................. 379
   49.2 What Is the Surgical Treatment of Choice for Neovascular Glaucoma? Should Everyone Always Get a Tube Shunt to Control IOP, i.e., Can a Trabeculectomy Be Useful? .......... 381
   49.3 How Should PRP and Glaucoma Surgery Be Timed? .......................................................... 384
   49.4 Is Bevacizumab Useful in Neovascular Glaucoma? What Kind of Results and Time-Course Can I Expect from Its Use? For NV of the Iris, Should It Be Injected into the Anterior Chamber or Vitreal Cavity? .................................................. 384
   References ............................................................................ 386

50 **Pediatric Glaucoma: IOP, Axial Length, and Surgery Indications** ..... 389
   50.1 What Is the Best Way to Measure IOP in the Pediatric Patient? ..................................................... 389
   50.2 Is One Instrument Better than Another for Measuring IOP in the Pediatric Age Group? .................. 391
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.3</td>
<td>How Is Axial Length Measurement Used in Pediatric Glaucoma?</td>
<td>391</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td>395</td>
</tr>
<tr>
<td>51</td>
<td>Pediatric Glaucoma: Glaucoma Medications and Steroids</td>
<td>397</td>
</tr>
<tr>
<td>51.1</td>
<td>Which Glaucoma Medications Can Be Used Safely in the Pediatric Population and How Are Medication Side Effects in the Pediatric Population Different than in Adults?</td>
<td>397</td>
</tr>
<tr>
<td>51.2</td>
<td>Do Topical Steroids Induce a Different Steroid Response in Children?</td>
<td>400</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td>401</td>
</tr>
<tr>
<td>52</td>
<td>Pediatric Glaucoma: Angle Surgery and Glaucoma Drainage Devices</td>
<td>403</td>
</tr>
<tr>
<td>52.1</td>
<td>How Do I Perform Goniosurgery?</td>
<td>403</td>
</tr>
<tr>
<td>52.2</td>
<td>How Do I Perform Glaucoma Drainage Devices (GDD) in Children?</td>
<td>406</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td>408</td>
</tr>
<tr>
<td>53</td>
<td>Pediatric Glaucoma: Trabeculectomy and Glaucoma Drainage Devices</td>
<td>409</td>
</tr>
<tr>
<td>53.1</td>
<td>Is Trabeculectomy the Preferred Surgery in Children Following Angle Surgery (Goniotomy and Trabeculotomy)?</td>
<td>409</td>
</tr>
<tr>
<td>53.2</td>
<td>Is Trabeculectomy Preferred over Tube Shunt Surgery in Children?</td>
<td>410</td>
</tr>
<tr>
<td>53.3</td>
<td>Is There an Age Cut-Off for Performing Trabeculectomy in the Pediatric Age Group?</td>
<td>410</td>
</tr>
<tr>
<td>53.4</td>
<td>What Factors Help One Decide for or Against One Surgery over the Other?</td>
<td>411</td>
</tr>
<tr>
<td>53.5</td>
<td>What Complications and Issues Should Be Anticipated in the Intraoperative and Postoperative Periods?</td>
<td>411</td>
</tr>
<tr>
<td>53.6</td>
<td>What Can Be Done Technically to Perform a Better Trabeculectomy in Kids?</td>
<td>412</td>
</tr>
<tr>
<td>53.7</td>
<td>What Can Be Done Technically to Perform a Better Glaucoma Drainage Device Surgery in Kids?</td>
<td>413</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td>414</td>
</tr>
<tr>
<td>54</td>
<td>Angle-Closure Glaucoma: Risk Factors</td>
<td>415</td>
</tr>
<tr>
<td>54.1</td>
<td>Who Is at Risk for Acute Angle-Closure?</td>
<td>415</td>
</tr>
<tr>
<td>54.2</td>
<td>Can I Predict Who Will Have an Angle-Closure Attack?</td>
<td>416</td>
</tr>
<tr>
<td>54.3</td>
<td>What Systemic Medications Must Narrow Angle Patients Be Counseled Against Using? Is It Safe to Use These Medications If There Is a Patent LPI?</td>
<td>417</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td>418</td>
</tr>
<tr>
<td>55</td>
<td>Angle-Closure Glaucoma: Iridotomy</td>
<td>421</td>
</tr>
<tr>
<td>55.1</td>
<td>What Settings Should Be Used to Perform Laser Peripheral Iridotomy (LPI)?</td>
<td>421</td>
</tr>
</tbody>
</table>
55.2 How Does Iris Color Affect the Laser Settings? .......... 422
55.3 If It Is Difficult to Penetrate the Iris, What Adjustments
  Can Be Made to the Laser Settings? .................. 422
55.4 What Potential Complications Should Be Anticipated with Laser
  Peripheral Iridotomy and How Should Each One Be Managed?... 423
55.5 Under What Circumstances Is Surgical Iridectomy Indicated?
  How Should a Surgical Iridectomy Be Performed? .......... 424
References ............................................. 425

56 Angle-Closure Glaucoma: Imaging .......................... 427
  56.1 Is New Imaging Technology Useful in Angle Examination?.. 427
  56.2 What Imaging Devices Are Currently Available to Examine
    the Anterior Chamber Angle? .......................... 428
  56.3 When Should UBM and AS-OCT Be Ordered: Is One Device
    Considered Better than the Other? .................... 430
  56.4 How Should Test Results Be Interpreted and Used
    to Help Treat the Patient? ............................ 430
References ............................................. 433

57 Angle-Closure Glaucoma: Medical Therapy .................. 435
  57.1 During an Acute Angle-Closure Attack, What Medications
    Are Indicated? ......................................... 435
  57.2 Should Pilocarpine Be Avoided in Angle-Closure Patients?... 436
References ............................................. 437

58 Angle-Closure Glaucoma: Surgical Management
  of Acute Angle-Closure Glaucoma .......................... 439
  58.1 What Is the Role of Paracentesis in the Management
    of Acute Angle-Closure Glaucoma? Technically, How Should
    this Be Performed If the Anterior Chamber Is Very Shallow?.. 439
  58.2 Is There a Role for Cataract Extraction in Acute Angle-Closure?
    If Cataract Surgery Must Be Performed Under Conditions
    of Acute Angle-Closure, What Can Be Done to Ensure
    the Best Possible Outcome for the Patient? ............... 440
  58.3 How Should Angle-Closure Due to Phacomorphic Glaucoma
    or Loose Zonules Be Managed? .......................... 441
  58.4 In Routine Cataract Surgery Where the Patient Has an Occludable
    Angle, Should LPI Be Performed Before Cataract Extraction
    or Can One Proceed Directly to Cataract Surgery? .......... 442
References ............................................. 443

59 Complications: Hypotony .................................. 445
  59.1 What Are the Options in the Treatment of Early
    Postoperative Hypotony? ............................... 445
  59.2 If There Is Hypotony Maculopathy, What Should Be
    Done to Manage It? ..................................... 447
  59.3 How Can I Manage Late Hypotony Due to a Scleral Melt? .... 448
  59.4 Which Patients Are at Risk for Hypotony? ................. 448
References ............................................. 448
## 60 Complications: Bleb Leaks

60.1 Does an Early Bleb Leak Need to Be Fixed?  
60.2 How Should I Treat a Late-Onset Bleb Leak?  
60.3 What Can I Do to Decrease the Chances of a Future Bleb Leak?  

References

## 61 Complications: Blebitis

61.1 What Topical Antibiotics Should I Use in Blebitis?  
61.2 When Should I Move on to Intravitreal Injections?  
61.3 How Do I Manage a Patient After the Blebitis Is Resolved?  

References