





Contents

1 Physics and Instrumentation, 1

History, 1 Physics, 1 Instrumentation, 8

THE GLOBE, 13

Introduction, 13 Indications, 13

2 Examination Techniques for the Eye, 15

Positioning the Patient, 15
B-scan Examination Techniques, 15
Basic Screening Examination, 22
Special Examination Techniques, 24
Anterior Segment Evaluation: Immersion Technique, 37
Evaluation of the Lens, 40
Evaluation of the Pupil, 43
Pediatric Examination, 43
Documentation of Findings, 44

3 Vitreoretinal Disease, 45

Vitreous Body, 45 Retina, 51 Retinal Pigment Epithelium, 66 Macula, 67 Choroid, 74 Ciliary Body, 77 Sclera, 77

4 Trauma and Postsurgical Findings, 87

Blunt Trauma, 87 Penetrating Trauma, 93 Surgical Trauma (Complications), 104 Postsurgical Findings, 108

5 Intraocular Tumors, 115

Detection of Lesions, 115
Ocular Melanoma, 115
Other Tumors of the Uvea, Retina, and Retinal
Pigment Epithelium, and Sclera, 142
Other Lesions Simulating Melanoma, 159
Anterior Segment Tumors, 169
Retinoblastoma, 180
Other Lesions Associated with Leukokoria, 184

6 Inflammatory Diseases of the Eye, 191

Endophthalmitis, 191
Noninfectious Uveitis and Vitritis, 194
Scleritis, 195
Inflammatory Conditions of the Choroid, 199
Miscellaneous Conditions Associated with Inflammation of the Choroid, Retina, and Retinal
Pigment Epithelium, 202

7 Glaucoma, 209

Optic Disc, 209 Congenital Glaucoma, 209 Angle Closure Glaucoma, 210 Secondary Glaucoma, 211 Normal-Tension Glaucoma, 215 Complications of Glaucoma Surgery, 216 Glaucoma-Filtering Implant Devices (Shunts), 218

8 Ultrasound Biomicroscopy of the Eye, 223

Theoretical Considerations and Development of the Ultrasound Biomicroscope, 223 Clinical Use of Ultrasound Biomicroscopy, 225 Ultrasound Biomicroscopy in Ocular Disease, 229 Summary and Future Directions, 234

--

xiv CONTENTS

9 Three-Dimensional Ultrasound of the Eye, 236

Instrumentation, 236
Intraocular Tumors, 236
Vitreoretinal Disease, 242
Advantages and Limitations of Ophthalmic 3D
Ultrasound, 242
Future Directions and the Internet, 243

10 Axial Eye Length Measurements (A-Scan Biometry), 244

Standard Axial Eye Length Dimensions, 244
Instrumentation, 244
Instrument Settings, 246
Examination Procedures for A-Scan Biometry, 249
Troubleshooting, 261
Minimizing Errors, 268
IOL Calculations, 269
Unanticipated Postoperative Refractive
Errors, 270
Diagnostic Uses of Axial Eye Length
Measurements, 270
Cleaning and Calibration of Biometry
Instruments, 270

THE ORBIT, 273

Introduction, 273 Indications, 273

11 Examination Techniques for the Orbit, 275

Positioning the Patient, 275
B-Scan Techniques, 275
Basic Examination for Lesion Detection, 284
Special Examination Techniques for Lesion
Differentiation, 289

12 Orbital Tumors, 310

Pseudotumor and Lymphoma (Lymphoproliferative Diseases), 310 Primary Orbital Tumors, 310 Metastatic and Secondary Tumors, 315 Lacrimal System Disorders, 319 Cystic Lesions, 334

13 Vascular Lesions, 347

Vascular Neoplasms, 347 Vascular Malformations, 355

14 Color Doppler Imaging of the Eye and Orbit, 367

Physical Background and Imaging Devices, 367 Clinical Applications of Color Doppler Imaging, 369

Ophthalmic Examination Technique, 369 Vascular Topography of the Normal Eye and Orbit, 371

Retinal, Retinal Vascular, and Other Vascular Diseases of the Eye, 372 Intraocular Tumors, 373 Orbital Disorders, 373 Safety Considerations, 374

Color Plates, after 378

15 Extraocular Muscles, 380

Examination Techniques for Rectus Muscles, 380 Evaluation of Individual Muscles, 384 Extraocular Muscle Disorders, 396

16 Optic Nerve, 412

Retrobulbar Optic Nerve, 412 Retrobulbar Optic Nerve Disorders, 419 Optic Disc, 431

17 Orbital Trauma and Periorbital Disease, 439

Trauma, 439 Periorbital Disease, 451

18 Artifacts, 466

Multiple Signals (Reverberations), 466 Shadowing, 466 Enhancement, 467 Perpendicular Sound Beam Incidence, 467 Baum's Bumps, 467

Glossary, 469

Appendices, 471