

Contents

<i>Foreword</i>	ix
<i>Preface</i>	xi
1. The developing child and visual system	1
Introduction	1
The developing child	1
Vision in development	10
Anatomy of the eye and visual system	10
Development of the eye and visual pathway	16
Atypical development	22
Visual impairment and development	27
Conclusion	33
References	33
2. The importance of early visual assessment	37
Introduction	37
Life- and sight-threatening diseases	38
Threats to the development of binocular vision	40
High refractive errors	40
Threats to the development of visual acuity	40
Untreatable visual impairment	43
Screening	49
Visual impairment	55
Conclusion	60
References	60
3. Opening the consultation	63
Introduction	63
Risk factors	64
Child abuse	71
Signs and symptoms	76
Communicating with parents	81
Communicating with children	88
Conclusion	95
References	95
Appendix: history form	97
4. Ocular health	101
Introduction	101
The problem solving approach	101
External eye examination	102
Internal eye examination	105
Intraocular pressure	109

vi Contents

Disorders of the anterior eye, lids and lashes	112
Disorders of the internal eye and retina	118
Conclusion	122
References	122
5. Refraction	124
Introduction	124
Refractive error types	124
Development of refractive error	129
Measurement of refractive error	138
Accommodation	148
Conclusion	154
References	155
6. Psychophysical testing of infants and children	159
Introduction	159
Special considerations in testing children	159
Psychophysical testing	161
Preferential looking	163
Psychophysics with preschoolers	164
Children with special needs	166
Conclusion	168
References	169
7. Visual acuity (Kathryn Saunders)	171
Introduction	171
Types of visual acuity	171
Snellen acuity	173
The Bailey-Lovie acuity chart	174
Letter matching tests	174
Picture naming and matching	178
Preferential looking	180
Optokinetic nystagmus	184
Equipment for acuity testing	186
Expected norms for age	186
Repeatability of acuity tests	189
Interocular acuity differences	190
Near vision testing	191
Conclusion	192
References	192
8. Contrast sensitivity	194
Introduction	194
What is contrast sensitivity?	194
Research studies	197
The functional significance of contrast sensitivity	197
The clinical importance of contrast sensitivity	199
Development of contrast sensitivity	200
Clinical measurement of CS	203
Conclusion and recommendations	212
References	212
Appendix: CS test suppliers	214

9. Binocular vision	216
Introduction	216
Binocularity and the visual pathway	216
Binocular single vision	219
Visual alignment and ocular deviations	220
Strabismus	222
Development of binocular single vision and stereopsis	224
Interactions between binocular sensory and ocular alignment systems	228
Clinical assessment of ocular alignment	228
Clinical assessment of sensory adaptations	232
Tests for stereopsis	234
Conclusion	242
References	242
Appendix: suppliers of stereotests	244
10. Visual fields	245
Introduction	245
What are visual fields?	245
Why measure visual fields?	246
Development of the peripheral retina	248
Normal visual fields in infants and young children	250
Detection of visual field defects	254
Clinical testing of fields in infants and young children	257
Conclusion	260
References	260
11. Colour vision	263
Introduction	263
Normal colour vision and its development	263
Colour deficiency	266
Effects of colour deficiency	270
Testing children's colour vision	273
Conclusions: hints on testing children's colour vision	282
References	284
12. Eye movements	287
Introduction	287
Voluntary and involuntary eye movements	287
Conjugate and disjunctive eye movements	288
Pursuit (voluntary following) eye movements	290
Optokinetic (involuntary following) eye movements	292
The vestibulo-ocular reflex	294
Saccadic eye movements	296
Vergence eye movements	297
Clinical measurement of eye movements	300
Abnormal eye movements in infants and young children	303
Laboratory assessment of eye movements	305
Conclusion	308
References	308
Appendix: Equipment suppliers	310

viii Contents

13. Electrophysiological testing	311
Introduction	311
Visual evoked potentials	312
The electroretinogram	329
ERG and VEP recording	334
The electro-oculogram	336
Infection control	339
Conclusion	340
References	340
Appendix: equipment suppliers (electrophysiology)	342
14. Taking action	344
Introduction	344
Prescribing refractive corrections when there is no strabismus	344
Ocular deviations	350
Reading difficulties	356
Accommodation anomalies	357
Children with low vision	359
Decisions – involving child and parents	369
Co-operation with other professionals	373
Providing written information to parents and other professionals	374
Legal and ethical issues	376
Conclusion	381
References	382
Appendix: sample report form	386
<i>Index</i>	389