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全国高等学校教材

供临床医学专业及来华留学生 (MBBS) 双语教学用

Ophthalmology

眼科学

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Neil J. Friedman Peter K. Kaiser

改编教学版
Annotated Edition

● 主 编 杨培增 刘奕志
Chief Editor Peizeng Yang Yizhi Liu

● 副主编 徐国彤 钟 勇 蒋 沁
Vice Chief Editor Guotong Xu Yong Zhong Qin Jiang



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1995年,我国首次招收全英文授课医学留学生,到2015年,接收临床医学专业 MBBS (Bachelor of Medicine & Bachelor of Surgery)留学生的院校达到了40余家,MBBS院校数量、规模不断扩张;同时,医学院校在临床医学专业五年制、长学制教学中陆续开展不同规模和范围的双语或全英文授课,使得对一套符合我国教学实际、成体系、高质量英文教材的需求日益增长。

为了满足教学需求,进一步落实教育部《关于加强高等学校本科教学工作提高教学质量的若干意见(教高[2001]4号)》和《来华留学生医学本科教育(英文授课)质量控制标准暂行规定(教外来[2007]39号)》等相关文件的要求,规范和提高我国高等医学院校临床医学专业五年制、长学制和来华留学生(MBBS)双语教学及全英文教学的质量,推进医学双语教学和留学生教育的健康有序发展,完善和规范临床医学专业英文版教材的体系,人民卫生出版社在充分调研的基础上,于2015年召开了全国高等学校临床医学专业英文版规划教材的编写论证会,经过会上及会后的反复论证,最终确定组织编写一套全国规划的、适合我国高等医学院校教学实际的临床医学专业英文版教材,并计划作为2017年春季和秋季教材在全国出版发行。

本套英文版教材的编写结合国家卫生和计划生育委员会、教育部的总体要求,坚持“三基、五性、三特定”的原则,组织全国各大医学院校、教学医院的专家编写,主要特点如下:

1. 教材编写应教学之需启动,在全国范围进行了广泛、深入调研和论证,借鉴国内外医学人才培养模式和教材建设经验,对主要读者对象、编写模式、编写科目、编者遴选条件等进行了科学设计。

2. 坚持“三基、五性、三特定”和“多级论证”的教材编写原则,组织全国各大医学院校及教学医院有丰富英语教学经验的专家一起编写,以保证高质量出版。

3. 为保证英语表达的准确性和规范性,大部分教材以国外英文原版教科书为蓝本,根据我国教学大纲和人民卫生出版社临床医学专业第八轮规划教材主要内容进行改编,充分体现科学性、权威性、适用性和实用性。

4. 教材内部各环节合理设置,根据读者对象的特点,在英文原版教材的基础上结合需要,增加本章小结、关键术语(英中对照)、思考题、推荐阅读等模块,促进学生自主学习。

本套临床医学专业英文版规划教材共38种,均为国家卫生和计划生育委员会“十三五”规划教材,计划于2017年全部出版发行。

In 1995, China recruited overseas medical students of full English teaching for the first time. Up to 2015, more than 40 institutions enrolled overseas MBBS (Bachelor of Medicine & Bachelor of Surgery) students. The number of MBBS institutions and overseas students are continuously increasing. At the meantime, medical colleges' application for bilingual or full English teaching in different size and range in five-year and long-term professional clinical medicine teaching results to increasingly demand for a set of practical, systematic and high-qualified English teaching material.

In order to meet the teaching needs and to implement the regulations of relevant documents issued by Ministry of Education including "Some Suggestions to Strengthen the Undergraduate Teaching and to Improve the Teaching Quality" and "Interim Provisions on Quality Control Standards of International Medical Undergraduate Education (English teaching)", as well as to standardize and improve the quality of the bilingual teaching and English teaching of the five-year, long-term and international students (MBBS) of clinical medicine in China's higher medical colleges so as to promote the healthy and orderly development of medical bilingual teaching and international students education and to improve and standardize the system of English clinical medicine textbooks, after full investigation, People's Medical Publishing House (PMPH) held the writing discussion meeting of English textbook for clinical medicine department of national colleges and universities in 2015. After the repeated demonstration in and after the meeting, PMPH ultimately determined to organize the compilation of a set of national planning English textbooks which are suitable for China's actual clinical medicine teaching of medical colleges and universities. This set will be published as spring and autumn textbooks of 2017.

This set of English textbooks meets the overall requirements of the Ministry of Education and National Health and Family Planning Commission, the editorial committee includes the experts from major medical colleges and universities as well as teaching hospitals, the main features are as follows:

1. Textbooks compilation is started to meet the teaching needs, extensive and deep research and demonstration are conducted across the country, the main target readers, the model and subject of compilation and selection conditions of authors are scientifically designed in accordance with the reference of domestic and foreign medical personnel training model and experience in teaching materials.

2. Adhere to the teaching materials compiling principles of "three foundations, five characteristics, and three specialties" and "multi-level demonstration", the organization of English teaching experts with rich experience from major medical schools and teaching hospitals ensures the high quality of publication.

3. In order to ensure the accuracy and standardization of English expression, most of the textbooks are modeled on original English textbooks, and adapted based on national syllabus and main content of the eighth round of clinical medicine textbooks which were published by PMPH, fully reflecting the scientificity, authority, applicability and practicality.

4. All aspects of teaching materials are arranged reasonably, based on original textbooks, the chapter summary, key terms (English and Chinese), review questions, and recommended readings are added to promote students' independent learning in accordance with teaching needs and the characteristics of the target readers.

This set of English textbooks for clinical medicine includes 38 species which are among "13th Five-Year" planning textbooks of National Health and Family Planning Commission, and will be all published in 2017.

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Preface

With the rapid improvement of medical education and intensive international exchanges, more and more medical students chose to study abroad after receiving their undergraduate education. In order to evaluate the results of standardized training of residents, some residents take the exam of International Basic Science and Clinical Sciences Assessment for Ophthalmologists. However, there is no appropriate textbook of ophthalmology written in English published in China. Furthermore, more and more foreign students come to China for medical education, including ophthalmology. They also need a well-designed ophthalmology textbook. These urgent demands for a high-quality textbook of ophthalmology have been noted by People's Medical Publishing House and experts in ophthalmology are invited to edit this textbook.

The present book is edited according to syllabus and based on Essentials of Ophthalmology published by Saunders. The first four chapters are general description of ocular anatomy, physiology, and embryology, basic optics, ocular pharmacology, and eye exam. These chapters are essential for a better understanding of eye diseases. The other 12 chapters focus

on neuro-ophthalmology, pediatric ophthalmology and strabismus, orbit, lids and adnexa, conjunctiva, sclera, cornea, uveitis, glaucoma, lens, vitreous and retina, respectively. In these chapters, the definition, etiology, symptoms, signs, evaluation, management and prognosis of each common ocular condition are briefly described. The clinical features of some eye diseases with respect to Chinese patients and well-confirmed information have been added to certain chapters. Furthermore, a number of illustrated and colored photographs are added to make them more impressive. Tables are also added to make differential diagnosis, clinical features and drugs' effectiveness easier for understanding and remembering.

At the end of each chapter, summary of the chapter, important terminology, review questions and suggested readings and websites were added. These materials may further help medical students understand the essential topics discussed in the chapter.

We hope that this book will be helpful for both medical teachers and medical students.

Peizeng Yang Yizhi Liu



Contents

CHAPTER ONE Ocular Anatomy, Physiology, and Embryology	1
Introduction	1
Basic Ocular Anatomy and Physiology	1
Embryology	16
CHAPTER TWO Basic Optics	20
Introduction	20
Properties of Light.....	20
Properties of Lenses	22
The Eye as an Optical System	23
CHAPTER THREE Ocular Pharmacology	29
Pharmacologic Principles	29
Common Ophthalmic Medications	30
Toxicology.....	38
CHAPTER FOUR The Eye Exam	43
Introduction	43
History	43
Presenting Symptoms.....	43
Physical Exam.....	44
External Ocular Examination.....	49
CHAPTER FIVE Neuro-Ophthalmology	60
Introduction	60
Visual Pathway.....	60
Pupillary Pathways	65
Eye Movements.....	72
Cranial Nerve Palsies.....	77
Muscle Disorders.....	90
Optic Nerve Problems.....	92
Chiasm and Brain Lesions	101

Headaches.....	102
Visual Loss.....	105
CHAPTER SIX Pediatric Ophthalmology and Strabismus.....	111
Introduction.....	111
Nasolacrimal Duct Obstruction.....	111
Ophthalmia Neonatorum.....	112
Vernal Keratoconjunctivitis.....	113
Childhood Glaucoma.....	114
Congenital Cataracts.....	116
Uveitis.....	118
Retinal Disorders.....	120
Tumors.....	125
Systemic Diseases.....	131
Amblyopia.....	132
Strabismus.....	133
CHAPTER SEVEN Orbit.....	142
Introduction.....	142
Trauma.....	142
Infections.....	145
Inflammation.....	148
Tumors.....	151
Atrophia Bulbi/Phthisis Bulbi.....	154
Anophthalmia.....	155
CHAPTER EIGHT Lids and Adnexa.....	158
EYELIDS.....	158
Introduction.....	158
Trauma.....	158
Infections.....	160
Inflammation.....	163
Malpositions.....	166
Tumors.....	171
ADNEXA.....	178
Introduction.....	178
Canaliculitis.....	178
Dacryocystitis.....	179
Nasolacrimal Duct Obstruction.....	181
Dacryoadenitis.....	182
Lacrimal Gland Tumors.....	183
CHAPTER NINE Conjunctiva.....	186
Introduction.....	186
Trauma.....	186

Inflammation.....	188
Conjunctivitis.....	189
Dry-Eye Syndrome.....	194
Stevens-Johnson Syndrome (Erythema Multiforme Major).....	196
Ocular Cicatricial Pemphigoid.....	198
Degenerations.....	199
Tumors.....	200
CHAPTER TEN Sclera.....	207
Introduction.....	207
Trauma.....	207
Inflammation.....	210
Scleral Discoloration.....	213
CHAPTER ELEVEN Cornea.....	215
Introduction.....	215
Trauma.....	215
Contact Lens Disorders.....	219
Exposure Keratopathy.....	223
Corneal Edema.....	224
Corneal Ulcer.....	225
Degenerations and Dystrophy.....	232
Keratoconus.....	234
Corneal Tumor.....	235
CHAPTER TWELVE Uvea.....	238
Introduction.....	238
Hypotony.....	238
Anterior-Chamber Cell and Flare.....	239
Hyphema.....	240
Hypopyon.....	242
Anterior Uveitis.....	243
Intermediate Uveitis/Pars Planitis.....	248
Posterior Uveitis.....	249
Generalized Uveitis.....	257
Masquerade Syndromes.....	257
Posterior Scleritis.....	257
Tumors.....	258
CHAPTER THIRTEEN Glaucoma.....	265
Introduction.....	265
Primary Open-Angle Glaucoma.....	265
Secondary Open-Angle Glaucoma.....	268
Normal (Low)-Tension Glaucoma.....	271
Primary Angle-Closure Glaucoma.....	273

Secondary Angle-Closure Glaucoma	276
CHAPTER FOURTEEN Lens	279
Introduction	279
Dislocated Lens (Ectopia Lentis)	279
Acquired cataracts	282
Posterior Capsular Opacification	287
Aphakia	288
Pseudophakia	290
CHAPTER FIFTEEN Vitreous	293
Introduction	293
Posterior Vitreous Detachment	293
Vitreous Hemorrhage	294
Asteroid Hyalosis	295
Persistent Hyperplastic Primary Vitreous	296
Pars Plana Vitrectomy	296
CHAPTER SIXTEEN Retina	299
Introduction	299
Trauma	299
Vascular Disorders	301
Retinopathies Associated with Systemic Disease	309
Macular Disorders	316
Retinal Detachment	331
Retinitis Pigmentosa	335
Angioid Streaks	338
APPENDIX Differential Diagnosis of Common Ocular Symptoms	342
INDEX	345

CHAPTER ONE

Ocular Anatomy, Physiology, and Embryology

Introduction

The eyes function like cameras: images are focused by a “lens” (the cornea and lens) on to the “film” (photo-receptors which are special light receptors in the retina). The visual pathway (see Ch. 5) transmits these images to the brain where they can be interpreted or “seen.” Knowing basic ocular anatomy, physiology, and embryology is important for understanding how this complex organ works and how it can be affected by disease.

Basic Ocular Anatomy and Physiology

The eye is a delicate sense organ that is surrounded by specialized structures and protected by the bony orbit, soft tissues, and eyelids. The globe itself is composed of three primary layers or “coats”: the sclera, the uvea, and the retina. Anteriorly, the cornea covers the central area of the eye, and the conjunctiva covers the sclera. The iris, the ciliary body, and the choroid constitute the uvea. The crystalline lens separates the anterior and posterior chambers from the vitreous body. The optic nerve transmits images from the retina to the brain (Figure 1-1).

ORBIT

The orbit is a bony cavity that protects the eye. The volume of the adult orbit is approximately 30ml. The orbit has four sides composed of seven bones (Table 1-1; Figures 1-2 and 1-3).

TABLE 1-1

Osteology		
Orbit	Bones	Related structures/ miscellaneous
Roof	Sphenoid (lesser wing) Frontal	Lacrimal gland fossa Trochlea Supraorbital notch (medial)
Lateral wall	Sphenoid (greater wing) Zygomatic	Lateral orbital tubercle of Whitnall Strongest orbital wall Lateral orbital rim at equator of globe
Floor	Maxilla Palatine Zygomatic	Contains infraorbital nerve and canal Forms roof of maxillary sinus
Medial wall	Sphenoid Maxilla Ethmoid Lacrimal	Lacrimal sac fossa Adjacent to ethmoid and sphenoid sinuses Posterior ethmoidal foramen Weakest orbital wall

The orbit contains a number of apertures that transmit vital nerves and vessels to the eye and surrounding tissues. The three major apertures are:

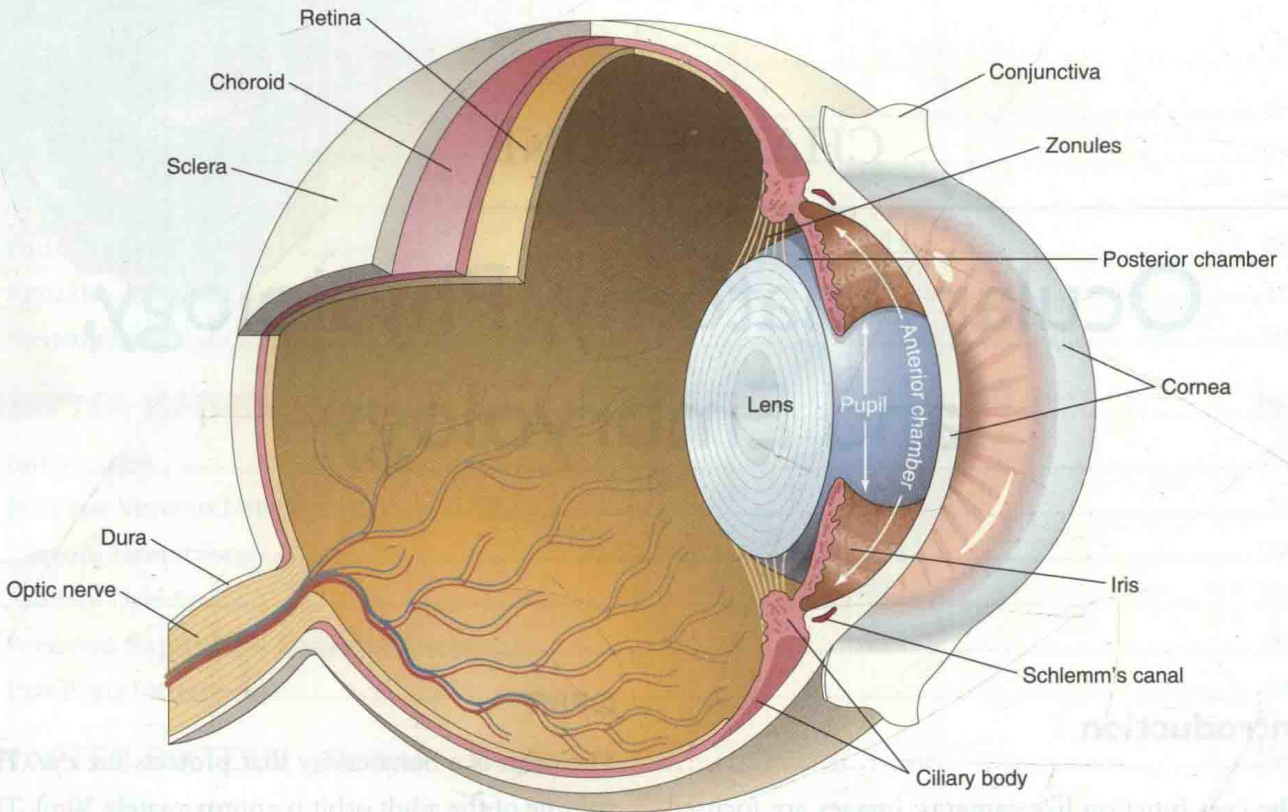


FIGURE 1-1
Basic anatomy of the eye.

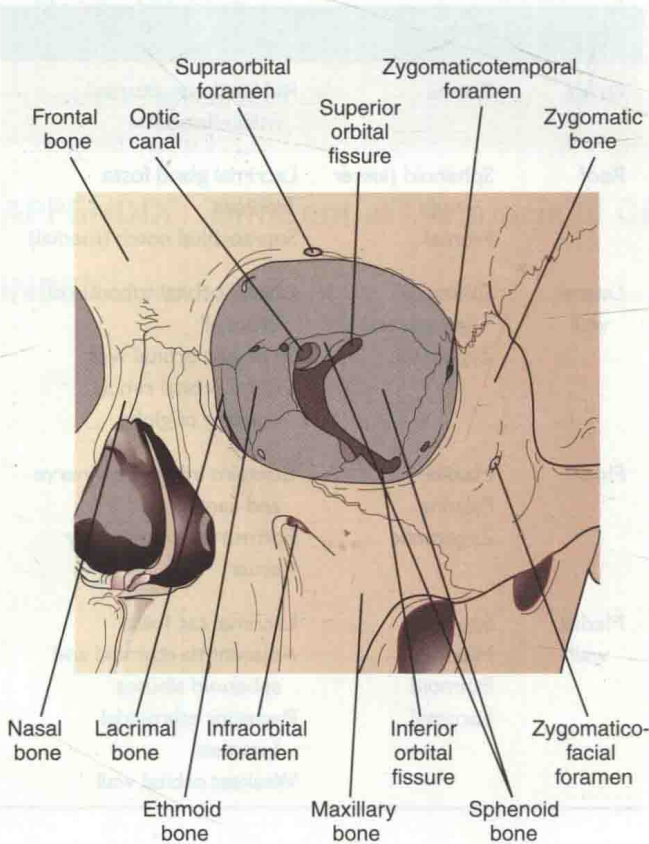
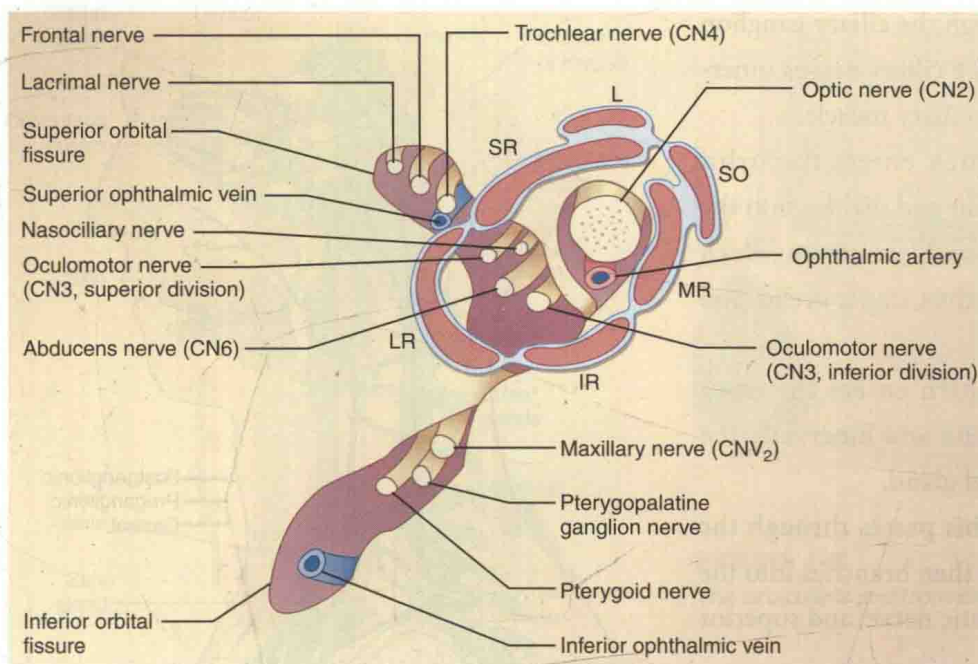


FIGURE 1-2
Bony anatomy of the orbit in frontal view.

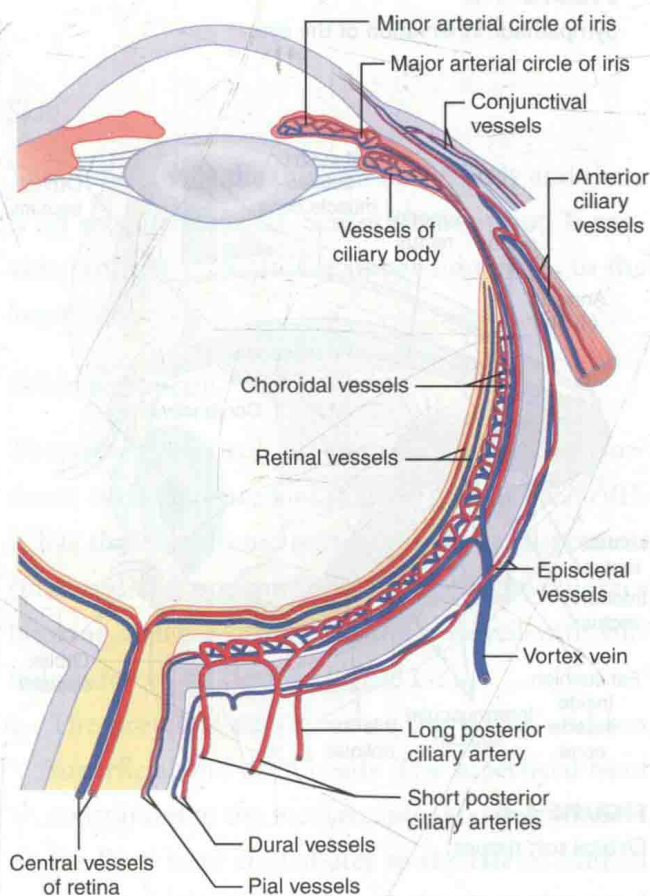
1. Superior orbital fissure: located between the orbital roof and lateral wall, the superior orbital fissure separates the greater and lesser wings of the sphenoid, and transmits cranial nerves (CN) III, IV, V₁, and VI, the superior ophthalmic vein, and sympathetic fibers to the iris dilator muscle.
2. Optic canal (orbital foramen): contained within the lesser wing of the sphenoid, the optic canal is 10mm long and transmits the optic nerve (CN II), ophthalmic artery, and sympathetic nerves to the ocular and orbital blood vessels.
3. Inferior orbital fissure: bordered by the maxillary bone (medially), zygomatic bone (anteriorly), and the greater wing of the sphenoid (laterally), the inferior orbital fissure transmits CN V₂, the zygomatic nerve, and inferior ophthalmic vein.

Orbital vasculature

The ophthalmic artery, which is the first branch of the internal carotid artery within the skull, gives rise to the arterial system (Figure 1-4), consisting of the:

**FIGURE 1-3**

Orbital apex, superior and inferior orbital fissure. MR, medial rectus; IR, inferior rectus; LR, lateral rectus; SR, superior rectus; L, levator; SO, superior oblique. Note that the trochlear nerve lies outside the muscle cone.

**FIGURE 1-4**

Vascular supply to the eye. All arterial branches originate with the ophthalmic artery. Venous drainage is through the cavernous sinus and the pterygoid plexus.

1. Central retinal artery, which enters the optic nerve behind the globe and supplies blood to the inner two-thirds of the retina.
2. Posterior ciliary arteries: the long posterior ciliary arteries supply the anterior segment while the short posterior ciliary arteries supply the choroid and the optic nerve head.

The venous system consists of:

1. The superior and inferior ophthalmic veins, which drain the superior and inferior vortex veins in the choroid, travel through the superior and inferior orbital fissures, respectively, and empty into the cavernous sinus.
2. The central retinal vein, which emerges from the optic nerve behind the globe and joins the ophthalmic veins.

Orbital innervation

Sensory innervation of the orbit is provided by branches of the trigeminal nerve (CN V):

1. Ophthalmic division (V_1): this has three branches:
 - The nasociliary nerve, which enters the orbit within the annulus of Zinn and branches to form short and long ciliary nerves. The short