

Orbicularis Oculi

Authored by
mohammad looti

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Primary Disciplinary Field(s): Anatomy, Physiology, Ophthalmology, Neurology, Plastic Surgery

1. Core Definition

The **orbicularis oculi** is a complex, circular muscle that encircles the orbit and eyelids, playing a pivotal role in the protection of the eye and the intricate movements associated with ocular function and facial expression. As a superficial muscle of facial expression, it is uniquely positioned to control the opening and closing of the eyelids, contributing significantly to both voluntary and involuntary actions such as blinking, winking, and forced eye closure. Its name, derived from Latin, aptly describes its form and location: "orbicularis" meaning 'circular,' and "oculi" referring to 'of the eye.' This muscle is not merely a simple sphincter but a sophisticated arrangement of muscle fibers divided into distinct parts, each contributing to specific aspects of ocular dynamics. Its actions are essential for maintaining the health of the ocular surface, distributing the tear film, and safeguarding the delicate structures within the orbit from external threats.

Anatomically, the orbicularis oculi is situated beneath the skin of the eyelids and the periorbital region, forming a broad, flat sheet of muscle that originates from the medial side of the orbit and fans out laterally. Its innervation by branches of the facial nerve (cranial nerve VII) underscores its classification as a muscle of facial expression, distinguishing it from the intrinsic muscles of the eye involved in gaze. The muscle's functional integrity is paramount for vision, as its proper contraction ensures adequate lubrication and protection, while its dysfunction can lead to a range of ocular pathologies, from dry eye syndrome to exposure keratitis. Understanding the detailed anatomy and physiology of the orbicularis oculi is thus fundamental in fields ranging from ophthalmology and neurology to reconstructive surgery, where its precise function and potential pathologies are routinely encountered and managed.

2. Etymology and Historical Development

The term **orbicularis oculi** has Latin roots, with *orbicularis* meaning 'circular' or 'around a circle' and *oculi* meaning 'of the eye,' accurately describing the muscle's anatomical configuration and location. This nomenclature has been consistently used in anatomical texts for centuries, reflecting a precise understanding of its form and function. Early anatomical descriptions, dating back to ancient Greek physicians like Galen, recognized muscles around the eye, though their detailed subdivisions and specific functional roles were further elucidated during the Renaissance and subsequent periods of systematic anatomical investigation. Figures like Andreas Vesalius, through his groundbreaking work *De humani corporis fabrica* (1543), provided highly detailed illustrations and descriptions of human musculature, including those of the face and orbit, laying the foundation for modern anatomical understanding.

The detailed understanding of the orbicularis oculi's tripartite division into orbital, palpebral, and lacrimal portions evolved as anatomical dissection techniques became more refined and microscopical studies advanced. The recognition of the distinct functions of each part--from forceful eye closure to delicate blinking and tear drainage--highlighted the muscle's complexity beyond a simple sphincter. For instance, the lacrimal part, sometimes referred to as Horner's muscle, was specifically identified for its role in tear dynamics. The advent of neuroscience and clinical neurology further deepened insights into its innervation by the facial nerve and the implications of nerve damage on muscle function, leading to a comprehensive appreciation of its role in both health and disease. Today, anatomical atlases and medical textbooks continue to refine and present this knowledge, emphasizing the orbicularis oculi's crucial role in ocular physiology and pathology, and its significance in understanding a wide range of clinical presentations.

3. Key Characteristics and Anatomical Divisions

The **orbicularis oculi** muscle is distinguished by its concentric arrangement of fibers and its division into three primary, functionally distinct parts: the **orbital part**, the **palpebral part**, and the **lacrimal part**. While continuous, these sections exhibit unique anatomical characteristics, origins, insertions, and primary functions, collectively ensuring the comprehensive protection and lubrication of the eye. All three parts are innervated by the temporal and zygomatic branches of the facial nerve (CN VII), which is crucial for coordinating their actions and is essential for both voluntary and involuntary eyelid movements.

Orbital Part (Pars Orbitalis): This is the outermost and largest portion of the orbicularis oculi, forming a broad, reddish, and relatively thick band of muscle fibers that encircle the entire orbit. It originates from the medial palpebral ligament, the frontal process of the maxilla, and the nasal part of the frontal bone. Its fibers form complete ellipses around the orbital margin, extending superiorly towards the eyebrow and inferiorly over the cheekbone. The primary function of the orbital part is **forceful eye closure**, such as squinting or winking, which protects the eye from bright light, dust, or injury. Its powerful contraction draws the eyebrows downwards and the skin of the forehead medially, creating characteristic "crow's feet" wrinkles at the lateral canthus during strong contraction. This part is largely responsible for the more vigorous protective reflexes of the eye and is often targeted in cosmetic procedures to mitigate signs of aging.

Palpebral Part (Pars Palpebralis): Situated within the eyelids themselves, this portion is significantly thinner, paler, and more delicate than the orbital part. It arises from the medial palpebral ligament and the adjacent bone, forming a series of concentric curves that run within both the upper and lower eyelids. The fibers of the upper eyelid pass laterally to insert into the lateral palpebral raphe, while those of the lower eyelid do the same. The palpebral part is responsible for **involuntary blinking** and gentle eye closure, which are essential for spreading the tear film evenly across the cornea and removing small foreign particles. Its continuous, rhythmic

contractions maintain ocular surface hydration and clear vision without conscious effort. This gentle action prevents drying of the cornea and conjunctiva, which is critical for ocular health and is often disrupted in conditions like facial nerve paralysis.

Lacrimal Part (Pars Lacrimalis) / Horner's Muscle: Also known as Horner's muscle, this is the smallest and most deeply situated part of the orbicularis oculi, often described as indistinct due to its very thin and pale muscle fibers. It originates from the posterior lacrimal crest of the lacrimal bone and passes laterally, splitting to embrace the lacrimal sac, with some fibers inserting into the tarsal plates. Its primary role is in the **drainage of tears**. Upon contraction during a blink, the lacrimal part pulls the eyelids and the lacrimal papilla medially, dilating the lacrimal sac and creating a negative pressure that actively draws tears from the conjunctival sac into the lacrimal drainage system. This action is crucial for preventing epiphora (overflow of tears) and maintaining the efficiency of the tear drainage pathway, contributing significantly to ocular comfort and clarity of vision.

4. Physiological Functions and Clinical Significance

The diverse anatomical divisions of the **orbicularis oculi** underpin a range of critical physiological functions, extending from basic eye protection to the nuanced expressions of human emotion. Its actions are indispensable for maintaining ocular health and facilitating clear vision. The primary functions revolve around eyelid movements, tear film distribution, and tear drainage, each contributing significantly to the delicate balance required for optimal eye function.

Eyelid Closure and Protection: The most evident function of the orbicularis oculi is the closure of the eyelids. The **orbital part** is responsible for forceful, voluntary closure, such as squinting in bright light or firmly shutting the eyes against irritants. This powerful action forms a protective barrier, preventing foreign bodies from entering the eye and shielding the sensitive ocular surface from environmental hazards. The **palpebral part**, conversely, performs the more subtle and frequent involuntary blinking, which is vital for spreading the tear film evenly across the cornea, hydrating the eye, and clearing away small debris. The continuous action of this part prevents corneal drying and maintains optical clarity, acting as a natural windshield wiper for the eye. The coordination between these parts ensures both reflexive protection and continuous lubrication.

Tear Drainage: The specialized **lacrimal part (Horner's muscle)** plays a unique and essential role in the lacrimal drainage system. During blinking, this muscle contracts to pull the lacrimal puncta (small openings on the eyelid margins) medially and dilate the lacrimal sac. This creates a suction effect, actively drawing tears from the surface of the eye into the lacrimal canaliculi and then into the lacrimal sac, eventually leading to the nasolacrimal duct. Efficient tear drainage is crucial for preventing excessive tearing (epiphora) and maintaining the appropriate volume of tear film on the ocular surface, thus contributing to overall eye comfort and preventing maceration of the

skin.

Facial Expression: Beyond its protective and functional roles, the orbicularis oculi is a significant muscle of facial expression. Its contractions contribute to a variety of non-verbal cues, including smiling, surprise, and discomfort. The formation of periorbital wrinkles, commonly known as "crow's feet," especially during smiling or squinting, is a direct result of the contraction of the orbital part. These expressions are integral to human communication and social interaction, highlighting the muscle's broader role in the intricate musculature of the face and its aesthetic significance.

From a clinical perspective, dysfunction of the orbicularis oculi can lead to a wide array of debilitating conditions, profoundly impacting ocular health and quality of life:

Bell's Palsy: This condition involves acute unilateral paralysis of the facial nerve, leading to weakness or paralysis of the orbicularis oculi on the affected side. Patients experience an inability to close the eye fully (lagophthalmos), resulting in exposure keratopathy, dry eye, and an increased risk of corneal damage due to inadequate tear spreading and protection. The absence of blinking and protective eye closure necessitates aggressive lubrication and, in severe cases, surgical interventions such as tarsorrhaphy or gold weight implantation to protect the eye.

Blepharospasm: Characterized by involuntary, sustained contractions of the orbicularis oculi, leading to forceful and uncontrollable eyelid closure. This can range from increased blinking to functional blindness and is often treated with botulinum toxin injections to temporarily relax the muscle, providing significant symptomatic relief.

Entropion and Ectropion: These conditions involve the inversion (entropion) or eversion (ectropion) of the eyelid margin, often due to age-related laxity or spasticity of the orbicularis oculi. Entropion causes eyelashes to rub against the cornea (trichiasis), leading to irritation and corneal abrasion, while ectropion exposes the conjunctiva, leading to chronic irritation, tearing, and potential damage to the ocular surface. Surgical correction often involves addressing the muscle's tone and position, sometimes by tightening or weakening specific parts of the orbicularis oculi.

Lagophthalmos: This refers to the inability to close the eyelids completely, allowing the eye to remain partially open even during sleep. It can result from facial nerve paralysis, severe proptosis, or scarring. Chronic lagophthalmos leads to corneal drying, ulceration, and potential vision loss, highlighting the critical role of orbicularis oculi in maintaining ocular surface integrity.

These clinical examples underscore the critical importance of the orbicularis oculi for both ocular health and overall quality of life, highlighting why its proper function is a cornerstone of ophthalmic and neurological assessment and intervention.

5. Innervation and Blood Supply

The intricate functions of the **orbicularis oculi** are critically dependent on its precise innervation and robust blood supply, ensuring its constant activity and rapid responses. Understanding these vascular and neural pathways is fundamental for diagnosing and treating conditions affecting the periorcular region and is crucial for surgical planning to preserve function and minimize complications.

Innervation: The orbicularis oculi muscle is exclusively innervated by branches of the facial nerve (CN VII), which is responsible for controlling all muscles of facial expression. Specifically, the muscle receives its motor supply from the **temporal branch** and the **zygomatic branch** of the facial nerve. The temporal branch typically innervates the superior parts of the orbital and palpebral portions, while the zygomatic branch supplies the inferior parts. This complex branching pattern allows for coordinated and nuanced control over eyelid movements, from gentle blinks to powerful winks. Damage to the facial nerve, such as in cases of Bell's palsy, trauma, or surgical procedures (e.g., parotidectomy), directly impairs the function of the orbicularis oculi, leading to lagophthalmos, impaired blinking, and compromised tear drainage, thereby increasing the risk of corneal exposure and injury. The precise anatomical course of these nerve branches is a critical consideration during surgical interventions in the periorbital and temporal regions.

Blood Supply: The vascular supply to the orbicularis oculi is rich and originates from several arterial sources, reflecting the high metabolic demand of constantly active muscle tissue and the need for rapid responses. The primary contributors are branches of the ophthalmic artery, which itself is a branch of the internal carotid artery, and branches of the external carotid artery. Key arteries involved include the:

Lateral palpebral arteries: These are branches of the lacrimal artery, which originates from the ophthalmic artery, and primarily supply the lateral portions of the muscle and eyelids.

Medial palpebral arteries: Originating directly from the ophthalmic artery, these vessels supply the medial portions of the orbicularis oculi and eyelids, forming anastomoses with the lateral palpebral arteries.

Infraorbital artery: A branch of the maxillary artery (from the external carotid artery), contributing to the supply of the inferior orbital part of the muscle.

Superficial temporal artery: A terminal branch of the external carotid artery, providing supply to the lateral and superior orbital regions, particularly the orbital part of the muscle.

This extensive anastomotic network ensures a redundant and robust blood supply, critical for maintaining the muscle's function even if one source is compromised. Venous drainage largely

parallels the arterial supply, with blood collected by the ophthalmic veins (superior and inferior) and superficial temporal veins, eventually draining into the cavernous sinus and internal jugular vein system, respectively. This rich vascularization is not only vital for muscle physiology but also has significant implications for surgical procedures in the periorbital area, where meticulous hemostasis is required to prevent hematoma formation and ensure optimal healing.

6. Surgical and Aesthetic Considerations

The prominent location and functional importance of the **orbicularis oculi** muscle make it a focal point in various surgical and aesthetic procedures, particularly in ophthalmology, plastic surgery, and dermatology. Its involvement in eyelid dynamics and facial aesthetics necessitates a thorough understanding of its anatomy and potential for manipulation to achieve successful clinical outcomes and prevent complications.

Blepharoplasty: This common cosmetic procedure, aimed at rejuvenating the appearance of the eyelids, often involves meticulous manipulation of the orbicularis oculi. In upper blepharoplasty, excess skin and sometimes a strip of the orbital part of the orbicularis oculi may be removed to reduce hooding and create a more open eye appearance. In lower blepharoplasty, muscle repositioning or tightening might be performed to address puffiness or hollowness and to support the eyelid margin. Precise surgical technique is paramount to avoid damaging the muscle or its innervation, which could lead to lagophthalmos, altered blinking, or asymmetry, thus emphasizing the delicate balance between aesthetic enhancement and functional preservation.

Correction of Eyelid Malpositions: Surgical repair of conditions like entropion (inward turning) and ectropion (outward turning) frequently targets the orbicularis oculi. For spastic entropion, weakening the pre-tarsal and pre-septal orbicularis oculi muscles, often through sutures or excision, can help correct the eyelid inversion. For involutional ectropion, tightening the lateral canthal tendon and sometimes the orbicularis oculi can restore proper eyelid position and improve tear drainage. These procedures require careful assessment of muscle tone and elasticity, as well as the overall support structures of the eyelid.

Botulinum Toxin Injections: The orbicularis oculi is a primary target for cosmetic injections of botulinum toxin (e.g., Botox) to reduce the appearance of dynamic wrinkles, particularly "crow's feet" (lateral canthal rhytides). By temporarily paralyzing or weakening specific fibers of the orbital part, the toxin reduces muscle contraction, thereby smoothing the overlying skin. Therapeutically, botulinum toxin is also used to treat medical conditions involving orbicularis oculi hyperactivity, such as benign essential blepharospasm and hemifacial spasm, providing significant relief from involuntary muscle spasms and improving quality of life for affected individuals.

Facial Reanimation Surgery: In patients suffering from facial nerve paralysis (e.g., due to trauma, tumor removal, or Bell's palsy), reconstructive surgeons may employ various techniques to restore

orbicularis oculi function. This can involve nerve grafts, muscle transfers (e.g., temporalis muscle flap), or static suspensions to achieve eyelid closure and prevent corneal exposure. The goal is not only functional restoration, enabling the eye to close and blink, but also aesthetic symmetry and the ability to express emotions, which are crucial for social interaction and psychological well-being.

These interventions highlight the versatility and critical role of the orbicularis oculi in both form and function, necessitating a deep understanding of its anatomy for specialists across ophthalmology, plastic, and reconstructive surgery to achieve optimal patient outcomes.

7. Further Reading

[Orbicularis Oculi Muscle - Wikipedia](#)

[Orbicularis oculi muscle - Anatomy, function and innervation | Kenhub](#)

[The Orbicularis Oculi Muscle - Origin - Insertion - Action - Innervation - TeachMeAnatomy](#)

[Anatomy, Head and Neck, Orbicularis Oculi Muscle - StatPearls - NCBI Bookshelf](#)

[What Is Blepharospasm? - American Academy of Ophthalmology](#)

[What Is Bell's Palsy? - American Academy of Ophthalmology](#)