

Levator palpebrae superioris muscle

The levator palpebrae superioris muscle (LPS) acts as the upper eyelid's major elevator and retractor and is innervated by the [oculomotor nerve](#). The muscle's paralysis is manifested by ptosis.

The levator palpebrae superioris originates on the [Lesser wing of sphenoid bone](#), just above the optic foramen. It broadens and decreases in thickness (becomes thinner) and becomes the levator aponeurosis. This portion inserts on the skin of the upper eyelid, as well as the superior tarsal plate. It is a skeletal muscle. The superior tarsal muscle, a smooth muscle, is attached to the levator palpebrae superioris, and inserts on the superior tarsal plate as well.

Nerve supply

As with most of the muscles of the orbit, the levator palpebrae receives somatic motor input from the ipsilateral superior division of the oculomotor nerve. An adjoining smooth muscle, the superior tarsal muscle, which is occasionally confused to be a portion of the levator palpebrae superioris, is actually only attached, and it is separately innervated by sympathetic fibers that originate in the cervical spinal cord.

Function

The levator palpebrae superioris muscle elevates and retracts the upper eyelid.

Clinical significance

Damage to this muscle or its innervation can cause ptosis, which is drooping of the eyelid. Lesions in CN III can cause ptosis because without stimulation from the oculomotor nerve, the levator palpebrae cannot oppose the force of gravity, and the eyelid droops.

Ptosis can also result from damage to the adjoining superior tarsal muscle or its sympathetic innervation. Such damage to the sympathetic supply occurs in Horner's syndrome, and presents as a partial ptosis. It is important to distinguish between these two very different causes of ptosis. This can usually be done clinically without issue, as each type of ptosis is accompanied by other distinct clinical findings.

70 orbits were dissected. After removing the orbital roof, the LPS' shape and anatomical variations (i.e., the presence of accessory muscular bands or atypical formation of the muscle) were assessed. To visualize the distribution of the oculomotor nerve's intramuscular sub-branches, the isolated levator palpebrae superioris muscles were stained using Sihler's staining technique.

Several LPS anatomical variations were observed in the specimens examined, in seven of which (7/70; 10%) additional delicate muscular slips arose from the LPS' lateral border and reached the lacrimal

gland. Histological examination confirmed the presence of striated skeletal muscle fibers in all those cases. In three other specimens (3/70; 4.28%), supernumerary muscular bands ("tensor trochleae") were found that linked the levator with the superior oblique muscle's trochlea. In the next case, the LPS' origin was double and the muscle was bipartite on its proximal half. In most cases (55/70; 78.6%), muscular branches formed a single bundle that wrapped around the superior rectus muscle's medial border to reach the levator's inferior surface. Intramuscular sub-branches were distributed largely within the proximal two-thirds of the LPS and formed an irregular, tree-like pattern. However, thin sub-branches and small retrograde sub-branches extended as far as the muscle's insertion.

Plastic surgeons and ophthalmologists should be aware of the levator palpebrae superioris muscle's anatomic variations both in planning and conducting surgeries on the upper eyelid ¹⁾.

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Haładaj R, Wyśiadecki G, Tubbs RS, Topol M. Anatomical variations of the levator palpebrae superioris, including observations on its innervation and intramuscular nerves' distribution pattern. *Ann Anat.* 2019 Nov 11. pii: S0940-9602(19)30143-8. doi: 10.1016/j.aanat.2019.151439. [Epub ahead of print] PubMed PMID: 31726207.

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