Diplopia in a swimmer due to badly fitting goggles

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Summary
An unusual effect of badly fitting swimming goggles is described. The goggles pressed on the trochlea of the left eye, interfering with the action of the superior oblique muscle. Diplopia resulted, which took several weeks to resolve.

Keywords: swimming goggles; ocular damage

Recently, in this journal, Jowett and Jowett reported that their daughter developed a purpuric rash over the left eyelid and a right-sided conjunctivitis as a result of badly fitting goggles. The condition resolved without sequelae within 24 hours. There have been several accounts of trauma affecting the eyes associated with badly fitting goggles while swimming, causing serious injuries as well as contact dermatitis from the cushion seals.

Case report

The author of this paper (a retired general practitioner) swims regularly in the local pool, usually without goggles. Mild conjunctivitis often develops due to the chlorine in the water, and he decided to wear swimming goggles to prevent this. Immediately on leaving the pool he noticed marked diplopia. There was also some discomfort in the upper and medial corner of the left orbit, due to pressure from the badly cushioned goggles. One image was obliquely above the other. This was particularly disturbing when he crossed a road: two cars appeared to approach him, one apparently somewhat higher and to the side of the other. It became necessary to wear an occlusive eye shade over the left eye.

Advice was sought from an ophthalmic surgeon. Investigations showed malfunction of the superior oblique muscle of the left eye. Improvement was slow and not complete for over a month. No special treatment was needed (apart from the occlusive eye shade).

Discussion

Eye movements are controlled by six muscles (figure): the four rectus muscles arise from a fibrous ring surrounding the optic nerve. The medial and lateral rectus muscles lie in a horizontal plane and adduct and abduct the eyeball. The other four muscles have more complex actions. The superior and inferior rectus muscles are inserted into the eyeball in such a way that they rotate the eyeball at the same time as they move it up or down. The inferior oblique arises from the floor of the orbit and passes obliquely backwards to be attached to the eye.

The superior oblique muscle arises from a narrow tendon medial to the fibrous ring and its belly passes forward above the medial rectus. It then forms a slender tendon, which passes through the trochlea and then turns backwards and laterally to be attached to the eyeball on its posterior superior quadrant. The trochlea (pulley) is situated a few millimetres behind the superomedial orbital margin, at the side of the nose. A synovial sheath ensures smooth action of the tendon through the trochlea.

The goggles pressed against the bone at this point. They presumably caused oedema affecting the trochlea and preventing the smooth action of the tendon where it turns backwards. The unopposed action of the other muscles then prevented coordinated movements of the left and right eye, causing diplopia.

Sports equipment should always be of good quality and well fitting. Swimming goggles should have satisfactory cushion seals, soft flexible frames, shatterproof lenses and adjustable head-bands. They should certainly fit comfortably.