THE RETRACTOR MUSCLE OF THE POUCH IN THE GEOMYIDAE

THE retractor of the cheek pouch in the pocket gophers (*Geomys bursarius, Thomomys bottae, Thomomys bulbivorus*) and in the kangaroo rat (*Dipodomys spectabilis*) has been thought to represent the platysma,[1,2,3] although it is more extensive and has a more caudal origin than in other mammals. It arises, in the pocket gophers, from the superficial layer of the lumbodorsal fascia and from the last two thoracic vertebrae, superficial to and coextensive with the spinotrapezius. It runs parallel with the latter to the spine of the scapula; but, instead of attaching to the spine, it continues craniad to insert on the caudal and dorsal margins of the pouch.

The part of the muscle cranial to the scapula receives branches from the facial nerve, while the more caudal portion receives, in the four species named above, the terminal branch of the accessory. To determine whether or not the accessory nerve actually supplies the muscle, it was suggested to me by Professor A. Brazier Howell, of Johns Hopkins University, that stimulation experiments be performed. An induction coil and a bipolar electrode were used in the experiments, which were repeated in four individuals of *Thomomys bottae*. The current was the weakest that would induce contraction of the facial muscles when the facial nerve was stimulated.

The skin of the living, anesthetized animal was cut, ventral to and parallel with the retractor muscle, and deflected. This exposed the shoulder and neck region, the facial nerve and the terminal branch of the accessory. The facial nerve was stimulated near the stylomastoid foramen: the facial muscles, including the cranial portion of the retractor muscle, contracted. The facial nerve was then severed to prevent possible reflex action by it.

The terminal branch of the accessory nerve, as it emerged from the ventral border of the spinotrapezius to pass to the retractor muscle, was stimulated: the caudal portion of the retractor contracted, but none of the adjacent muscles did so. The accessory nerve was then exposed as it emerged from the jugular foramen, by cutting the origins of the sterno- and cleidomastoid muscles and of the posterior belly of the digastric. The nerve was stimulated at this point: the trapezius and retractor muscles contracted, but none of the adjacent muscles reacted. In two individuals the accessory nerve was cut distally from the place of stimulation: the retractor muscle did not contract. In two other individuals the nerve was stimulated through the trapezius: the fibers of this muscle which were in contact with the electrodes contracted, but not the muscle as a whole, while the retractor muscle contracted as previously. The cut end of the accessory nerve at this place was stimulated with similar result.

These experiments appear to confirm the anatomical findings and to show that the caudal half of the retractor muscle of the pouch is innervated by the accessory, while the cranial portion is supplied by the facial nerve. Consequently it seems probable that the caudal portion has been derived from the trapezius, a conclusion which the origin and topographical relationships of the retractor muscle tend to strengthen. If this be true it is the only case to my knowledge in which the trapezius contributes to the dermal musculature.

In the ground squirrel (*Citellus richardsonii*) the platysma attaches to the spine of the scapula. The fibers of the spinotrapezius run in the same direction as those of the platysma, and the more superficial ones are separated from the latter muscle only by fascia. Should these fibers become split off from the deeper part of the spinotrapezius, and should they and the platysma become free from the spine of the scapula, the resulting compound muscle would be similar to the retractor muscle of the pouch in the Geomyidae (in the inclusive sense). Similar changes have taken place in the digastric muscles of some mammals, and it seems reasonable to conclude that such has been the history of the retractor of the cheek pouch in pocket gophers and their allies.

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2 C. E. McChesney, *Bull. U. S. Geol. Geog. Survey Territ.*, 4: 201–218, 1878.
3 H. L. Osborn, SCIENCE, o. s., 23: 102–103, 1894.

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