

ON TWO CASES OF MUSCULAR ABNORMALITY IN THE CAT.¹

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The muscular anomalies here described were found by the writer in specimens of the domestic cat used for dissection in class work in the University of Michigan. As both of the cases presented certain interesting features it seemed advisable to publish an account of them at this time.

I. A CASE OF ABNORMAL INSERTION OF THE M. LATISSIMUS DORSI.

In the cat the tendon of insertion of the M. latissimus dorsi normally is in two parts. One of these parts is joined by the muscle and tendon fibers of the M. teres major, and the conjoined tendon of these two muscles is inserted on the medial side of the shaft of the humerus. The other portion of the latissimus tendon, which may not be always present according to Reighard and Jennings,² joins with the pectoralis minor, reaching the bone along the line of insertion of the pectoralis minor. This line is along almost exactly the middle of the ventral face of the humerus. As a consequence of the existence of their different lines of insertion the two portions of the latissimus tendon form an arch, which makes up a part of the bicipital arch.

In a well-formed, adult male cat dissected by the writer the very peculiar arrangement at the insertion end of the M. latissimus dorsi shown in Fig. 1 was found on both sides of the body. From the cranial border of the latissimus a slip (Fig. 1, *x*), about 4 cms. long and 6 mm. wide passed craniad above that portion of the latissimus which joins the pectoralis minor (Fig. 1, *y*). This slip was inserted by fleshy fibers on the surface of the M. pectoantibrachialis on the medial surface of the leg, just beneath

¹ Contributions from the Zoölogical Laboratory of the University of Michigan, No. 65.

² Reighard, J., and H. S. Jennings, "Anatomy of the Cat." New York, 1901 p. 121.

the skin. This band of muscle formed a very distinct, rather thick slip.¹ The relations of all the other muscles of the leg were normal. The two tendons of insertion normal to the latissimus dorsi were present and in their usual relations. The abnormal slip was simply added on, as it were, to the muscles normally present.

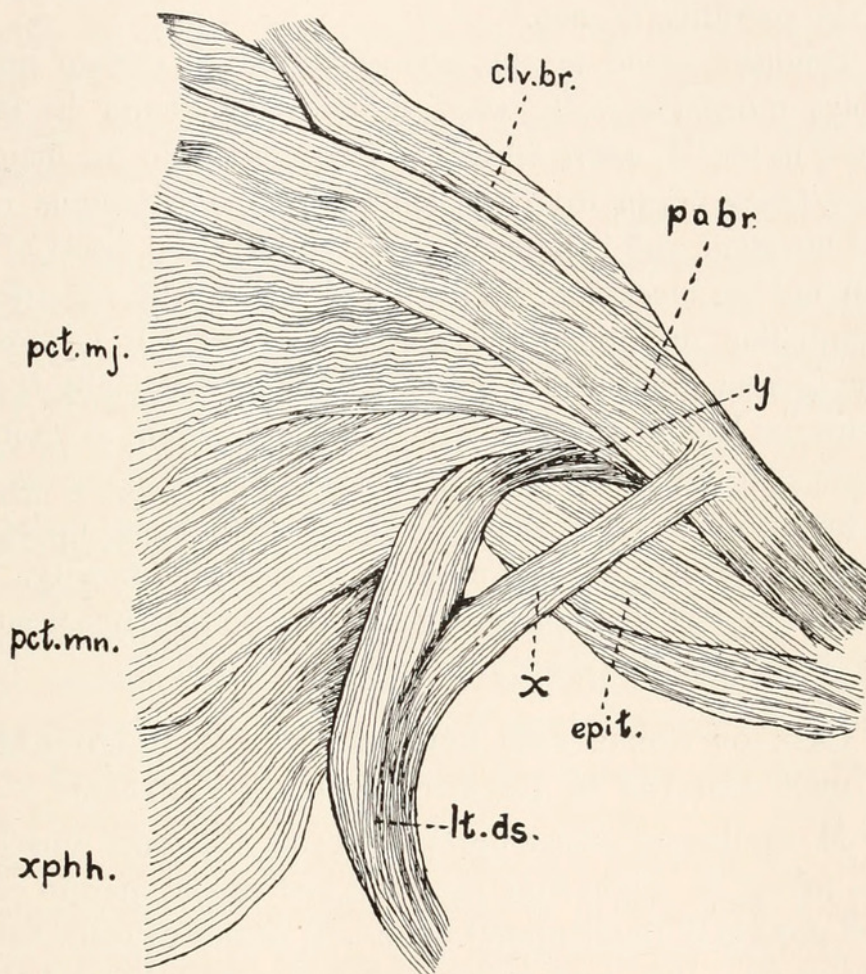


FIG. 1. Ventral view of left side of the thoracic region in cat, showing abnormal insertion of the M. latissimus dorsi. *clv. br.*, M. clavobrachialis; *pabr.*, M. pectoantibrachialis; *epit.*, M. epitrochlearis; *lt. ds.*, M. latissimus dorsi; *xphh.*, M. xiphihumeralis; *pct. mj.*, M. pectoralis major; *pct. mn.*, M. pectoralis minor; *x*, abnormal slip of M. latissimus dorsi; *y*, portion of the latissimus dorsi which joins the pectoralis minor.

The conditions found in this case of the latissimus dorsi inserting in three portions, one of which does not reach the humerus at all, is apparently unique. So far as I have been able to dis-

¹ In another cat dissected by a student in the laboratory precisely the same arrangement was found, except that the muscle slip was much thinner than in the case here described. Only a few fibers reached the pectoantibrachialis.

cover no record of such a condition has been made in teratological literature, nor is such a condition found normally in any form. In most mammals¹ the latissimus inserts by one tendon; in some forms (*e. g.*, the cat) usually by two; and finally as a variation, which apparently occurs with some frequency, it inserts by two tendons in forms where it normally has only one. This last is the condition in man.²

The condition found in this abnormality to a certain degree resembles morphologically what is normally found in many mammals in the *M. epitrochlearis*. This muscle, in the majority of cases, takes origin from the surface of the latissimus dorsi near its insertion, and is inserted into the superficial fascia of the forearm and the olecranon. This muscle is usually regarded as a differentiation product of the latissimus dorsi. It is possible that the present abnormality may indicate that originally the *M. epitrochlearis* had in the carnivora a greater extent at its insertion, extending on to the superficial fascia of the upper as well as the forearm. Further than this I am not able to make any suggestion regarding the significance of this abnormality. On account of the fact that apparently such a case had not been described, it seemed desirable to make a record of it.

II. A CASE OF CONNECTION BETWEEN THE *M. CLEIDOMASTOIDEUS* AND THE *M. LEVATOR SCAPULÆ VENTRALIS*.

The *M. cleidomastoideus* normally forms a distinct muscle in the cat, taking its origin from the apex and caudal margin of the mastoid process of the temporal bone. It passes caudad, flattening during its course, and is inserted on the lateral four fifths of the clavicle and laterad of the clavicle on the clavicular raphe. This clavicular raphe is formed between the *Mm. cleidomastoideus* and *clavotrapezius* (= *M. cleido-occipitalis* + *cleido-cervicalis* Streissler)³ craniad, and the *M. clavobrachialis* (= *Pars claviculi*

¹ Cf. Leche, W., *Mammalia*, in Bronn's "Klassen u. Ordnungen des Thier-Reichs," Bd. 6, V. Abth., 1874-1900, pp. 722-725.

² Cf. Le Double, A. F., "Traité des Variations du Système Musculaire de l'Homme," Paris, 1897, T. I., pp. 194-202.

Testut, L., "Les Anomalies Musculaires chez l'Homme," Paris, 1884, pp. 106-118.

³ Streissler, E., "Zur vergleichenden Anatomie des *M. cucullaris* und *M. sternocleidomastoideus*," *Arch. f. Anat. (u. Physiol.) Jahrg.*, 1900, pp. 335-365, Taf. XXI. u. XXII.

of *M. deltoideus* of earlier writers) caudoventrad. At its insertion the cleidomastoid lies entirely beneath the clavotrapezius. Lying close besides the cleidomastoid (dorsad and in part mediad) is the *M. levator scapulæ ventralis* (= *M. omo-transversarius* Streissler, *loc. cit.*, = Pars ventralis of the *M. omo-cleidotransversarius* Leche, *loc. cit.*, = "omo-trachélien" Le Double, *loc. cit.*). This muscle in the cat takes origin by two heads, one coming from the basis cranii opposite the middle of the bulla tympani, and the other from the ventral surface of the transverse process of the atlas.

In a well-developed adult female cat dissected by the writer, the following abnormal relation of the cleidomastoid and the levator scapulæ ventralis was found on the left side of the body. At almost precisely the middle point of the levator scapulæ ventralis a thick muscle band, approximately 4 mm. wide, passed from the ventral border of this muscle cranioventrad to the dorsal border of the *M. cleidomastoideus*, with which muscle it joined. The connecting band was throughout its length of approximately the same thickness as the *Mm. cleidomastoideus* and levator scapulæ ventralis at the places where it joined them.

In considering the significance of this abnormality the possibility of its representing a case of reversion may be dismissed at once, because in their comparative anatomy the cleidomastoid and levator scapulæ ventralis are known to be quite distinct muscles. The *M. cleidomastoideus* is a differentiation from the general sternocleidomastoid group of muscles, which in turn is to be considered as having separated from the trapezius group.¹ It belongs to the rather thin, superficial sheet of muscle which covers the dorsal, lateral and part of the ventral surface of the neck, and the dorsal surface of the cranial thoracic region in all the Mammalia. This sheet of muscle breaks up into varying numbers of separate muscles in different groups. All of these muscles, however, as has been very clearly brought out by Streissler (*loc. cit.*), fall into either a dorsal or a ventral group. The dorsal group may be characterized as the dorso-scapularis-trapezius group, and the ventral as the sternocleidomastoid group. All the muscles of this superficial layer are innervated primarily

¹ Cf. Leche, *loc. cit.*, pp. 701-706.

by the N. accessorius, with, in some cases, fibers from the cervical plexus going to the muscles of the ventral group. The levator scapulæ ventralis or omo-cleido-transversarius, pars ventralis (Leche) belongs to an entirely different set of muscles than those just considered. According to Leche¹ it is highly probable that this muscle is a differentiation product of the muscle group from which the M. levator scapulæ comes. It is innervated by fibers from the ventral branches of the spinal nerves.

Evidently then, since the cleidomastoid and the levator scapulæ ventralis have such different sources the abnormality under discussion cannot be considered as a reversion.

The abnormality does, however, seem to be suggestive as possibly giving us light on the meaning of the conditions found in man with reference to the muscles of the ventral neck region. In what manner will be apparent if the relations in man are considered briefly. The M. omotransversarius (*i. e.*, levator scapulæ ventralis) is normally found in some form or other in practically all mammals up to man. In man it is only occasionally present as a separate muscle in abnormal cases. It has been a problem how to account for the absence of this muscle under normal conditions in man, and no satisfactory explanation for it has ever appeared so far as is known to the writer. On the other hand the human sternocleidomastoid is, of course, a complex muscle, made up by the fusion of elements normally forming distinct and separate muscles in the lower forms. Streissler² has shown that this muscle contains at least the following elements: In the superficial portion a sternomastoideus superficialis, a sterno-occipitalis and a cleido-occipitalis element; and in the deep layer a sternomastoideus profundus and a cleidomastoideus element.

The fact that occasionally the omotransversarius appears in man as a distinct muscle may be taken as strong presumptive evidence that in all cases the muscle is present in man as an element in the ventral neck musculature. Why it is not found under normal circumstances is because it is indistinguishably fused with some other muscle. In the abnormal cases where it does appear as a separate muscle we most probably have simply

¹ *Loc. cit.*, pp. 731-735.

² *Loc. cit.*

a failure to fuse or only partial fusion, where normally complete fusion occurs.

The abnormality here under consideration has suggested to me the view that *normally in man the omotransversarius element is fused completely with the cleidomastoid portion of the M. sternocleidomastoideus*. This view would make the sternocleidomastoid a complex of six elements, as shown in the following scheme :

M. sternocleidomastoideus (Man)	{	Sternomastoideus superficialis	}	Superficial.
		Sterno-occipitalis		
		Cleido-occipitalis		
	{	Sternomastoideus profundus	}	Deep.
		Cleidomastoideus		
		Omotransversarius		

The evidence for this view comes from two sources. In the first place, the occurrence in anomalous cases in man of a separate M. omotransversarius makes it extremely probable that this element is generally present in man, but in normal cadavers is completely fused with some other muscle. In the second place, the anomalous case in the cat just described shows that in a form lower than man it is possible for a partial fusion of the cleidomastoid and omotransversarius muscles to occur as a variation. This makes it seem probable that the muscle complex with which this omotransversarius element in man normally fuses is the sternocleidomastoid.

SUMMARY.

1. A case of insertion of a portion of the M. latissimus dorsi on the M. pectoantibrachialis is described.
2. A case of partial union of the Mm. cleidomastoideus and levator scapulæ ventralis (or omotransversarius) is described.
3. The view is advanced that the human sternocleidomastoid muscle contains an omotransversarius element. This element is normally completely fused with the deep portion of the sternocleidomastoid, but, in abnormal cases, it may fail to fuse completely and consequently then appears as a separate muscle.



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