Shimane J. Med. Sci. Vol. 3, pp. 23-26, 1979

High Percentage of Appearance of the M. sternalis in Shimane Inhabitants

(m. sternalis/Shimane inhabitants)

KAZUSHIGE NAKAMURA[a], KENICHIROU INOMATA[a], KOZO SUGIOKA[a], TAKAFUMI YOSHIOKA[a], MIKI HORIE[a], and TAKEHIKO UMETANI[b]

[a]*Department of Anatomy, Shimane Medical University, Izumo 693 and* [b]*Department of Anatomy, Division I, Kobe University School of Medicine, Kobe 650, Japan*

(Received June 30, 1979)

The m. sternalis, one of the variations of the muscles on the surface of the fascia pectoralis, was observed in 14 cases among 49 cadavers dissected at Shimane Medical University in 1978-79.

The appearance of this muscular variation was at a high percentage (28.5%) compared with reports from other areas of Japan. Among the Chinese, the incidence is 21.9 %.

The m. sternalis is a small variation muscle running the surface of the pectoral fascia. In many cases, it is a very thin muscular fiber cord over the m. pectoralis major from above to below. Since Cabrolius reported this variation in 1604, other anatomists have also documented such evidence in the pectoral region (1, 2). Systematic observations on this muscle among the Japanese were reported by Adachi (3, 4), Matushima, Nii (5) and Hoshiba (1).

Our data show that the appearance of the m. sternalis in Shimane Prefecture persons was found in a higher percentage (28.5%) compared with other districts in Japan. In this report the following was examined; 1) philogenetical and ontogenetical origin, 2) nerve supply and 3) anthropological meaning of this small variation muscle.

MATERIALS AND METHODS

Forty-nine cadavers (24 male and 25 female) were dissected in the Department of Anatomy, Shimane Medical University in 1978—79. All had been born in Shimane Prefecture, Japan and the ages ranged from 50 to 100 years (Table I).

At the dissection of the pectoral region, after skin incision of the breast through the median line and the removal of subcutaneous tissues, the m. sternalis was examined. When this small variation muscle was found, it was cleaned and exposed carefully. Approaching the muscle on the surface of the pectoral fascia, the *origo* and *insertio* of the muscle and its innervation were revealed, then sketches were made and photographs taken.

TABLE I. *Incidence of Appearances of the M. sternalis*

		Unilateral			Bilateral	Total
		Right	Left	Cross		
Males	(n=24)	3	0	2	1	6
Females	(n=25)	2	1	1	4	8
Total	(n=49)	5	1	3	5	14

RESULTS

1. Appearance of the M. sternalis

The number and sex of the cadavers who had the m. sternalis and the location of the m. sternalis (bilateral or unilateral, and crossing or not) are shown in Table I. The appearance of the m. sternalis was at a rate of 28.5%.

2. The Origo and Insertio of the M. sternalis

The *origo*, *insertio* and its course of the m. sternalis in all cases are shown in Fig. 1. In 10 cases, the m. sternalis arose from the vagina m. recti abdominis and in 8 cases from the fascia of the m. pectoralis major, on the level of sixth or seventh ribs. In six cases, these muscles were inserted by a short tendon into the under border of the m. sternocleidomastoideus.

Our observations suggest that the m. sternalis is a connecting muscular fiber between the m. rectus abdominis and sternocleidomastoideus or a part of flat lateral slip of the m. pectoralis major.

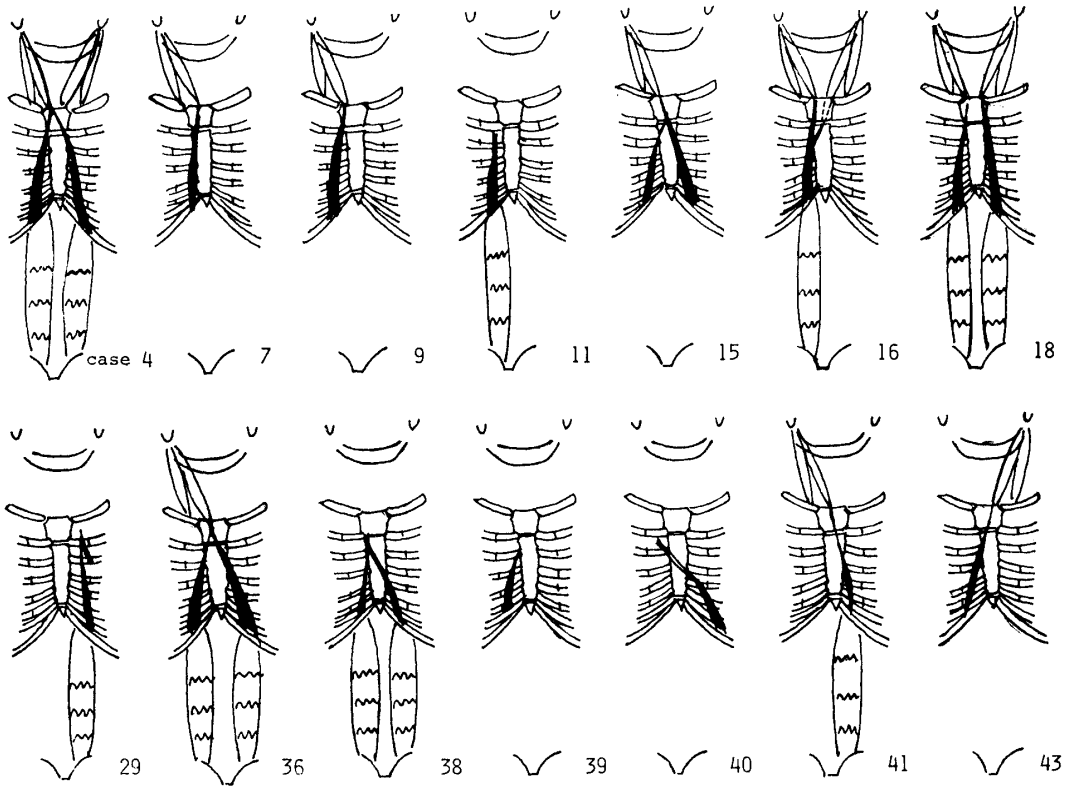

Fig. 1. Schemata of the m. sternalis in fourteen cases documented in this study.

3. Nerve Supply

The m. sternalis was supplied by the lst, 2nd or 3rd intercostal nerves in cases where the innervation and course from the nerve trunk could be identified (case 11, 36, 38, 41 and 43).

DISCUSSION

The ratio of the appearance of the m. sternalis in each race, including bilateral and unilateral existence, hitherto reported in the literature is shown in Table II. The data on the Japanese show a tendency toward a higher per-

TABLE II. *Percentage of Appearance of the M. sternalis in Different Races* (1, 5)

Races	Samples	Appearance	%	Authors
Irish	350	11	3.1	MacAlister (1875)
Scot	650	21	3.2	Turner (1866)
Belgian	110	4	3.6	Colson (1886)
British	175	7	4.0	Wood (1868)
Irish	358	16	4.4	Cunningham (1888)
French	809	37	4.6	Le Double (1898)
Russian	95	5	5.3	Gruber (1860)
Negro	58	7	12.0	Loth (1912)
Filipino	136	5	3.7	Yap (1921)
Chinese	32	7	21.9	Nakano (1923)
Japanese (Okayama)	90	10	11.1	Adachi (1900)
〃 (Tokyo)	39	7	17.9	〃 (1900)
〃 (Kyoto)	54	10	18.5	〃 (1908)
〃 (Kyushu)	77	12	15.6	Matsushima (1927)
〃 (Kanazawa)	117	12	10.2	Nii (1931)
〃 (〃)	140	10	7.1	Hoshiba (1935)
〃 (〃)	257	22	8.5	〃 (1935)
〃 (Shimane)	25	7	28.0	Nakamura et al. (1978)

centage compared with that of Europeans, and the rate of the appearance of the m. sternalis in Shimane showed the highest percentage (28.5%) among reports from other areas of Japan. Among the Chinese the rate is 21.9 %.

Regarding hypotheses as to the origin of the m. sternalis; 1) elongated muscular slips from the upper part of the m. rectus abdominis, 2) elongated downwards muscle from the m. sternocleidomastoideus, 3) a part of the m.

pectoralis, 4) a part of the platysma and 5) a muscular slip of the m. obliquus externus abdominis (1, 2).

We consider the m. sternalis one of a muscle chain (the m. rectus abdominis—m. sternalis—m. sternocleidomastoideus) in the lateral sides near the

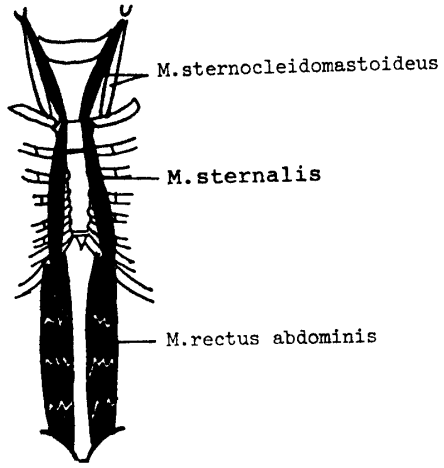

Fig. 2. A muscular chain on the m. sternalis.

anterior median plane in the trunk, the so-called "Mm. longitudinales mediales trunci". Our muscle chain hypothesis on the origin of the m. sternalis is based on the observation that the intercostal nerve runs to the m. sternalis and the m. rectus abdominis in much the same way (6).

REFERENCES

1) Hoshiba, S. (1936) On the m. sternalis. *Bull. Dept. Ant. Kanazawa* **23**, 241–261 (in Japanese).
2) Bardeleben K. (1888) Die morphologische Bedeutung des Musculus "sternalis". *Anat. Anz.* **3**, 324–333
3) Adachi, B. (1904) Haufigeres Vordommen der M. sternalis bei den Japaner. *Z. Morphol. Anthropol.* **7**, 133–144
4) Adachi, B. (1910) Beitrage zur Anotomie der Japaner. *Z. Anat. Morphol.* **12**, 261–312
5) Nii, K. (1931) On the M. sternalis. *J. Jūzen Med. Soc.* **36**, 399–405 (in Japanese).
6) Kusunoki, T. (1960) On the innervation to the sternal muscle. *Yokohama Med. Bull.* **11**, 283–304