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## Musculus scalenus dorsalis of the Japanese serow, *Capricornis crispus*

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### SUMMARY

The M. scalenus dorsalis was macroscopically investigated in both sides of 26 Japanese serows (52 cases). The muscle was found in 33 of 52 cases and varied considerably from the rudimentary to the well-developed type.

### INTRODUCTION

The M. scalenus dorsalis (M. supracostalis) of domestic ruminants in classic textbooks of veterinary medicine has been briefly described as being located between the transverse processes of the cervical vertebrae and the ribs in the ox and goat<sup>1-3)</sup> but is supposedly absent in sheep<sup>2,3)</sup>.

Kresan (1970)<sup>4)</sup> reported the muscle in the goat, but not in sheep. Variation of the M. scalenus dorsalis in small domestic ruminants has not been described in the literature, but it is frequently encountered in usual dissection.

In wild ruminants, no evidence regarding the M. scalenus dorsalis has been available.

In this report, we described the morphology of the M. scalenus dorsalis in the Japanese serow, one of wild ruminants.

### MATERIALS AND METHODS

Twenty-six Japanese serows, *Capricornis crispus* (16 males and 10 females) which were killed from January to February in 1984 in Japan were used for the gross anatomy.

The specimens were dissected on both sides without any fixation.

### RESULTS

The M. scalenus dorsalis of the Japanese serow was observed in 33 of 52 cases (63.5%) : on both sides in 12 specimens and on one side in 9 specimens. Development of the M. scalenus dorsalis varied considerably, so it was grouped into poorly- and well-developed ones.

The poorly-developed M. scalenus dorsalis was nearly linear to narrow cord in shape (Fig. 1). The size varied greatly from the rudimentary to those which arose from the transverse processes of the fifth and sixth cervical vertebrae, ran caudally on the N. thoracicus longus and faded out on the lateral side of the M. serratus ventralis thoracis located between the first and second ribs. This type was found in 23 of 33 cases.

In the well-developed ones, the muscle was shaped like a curved band (Fig. 2). It originated from the transverse processes of the fifth and sixth cervical vertebrae and lay on the ventral edge of the M. scalenus medius. It ran caudo-ventrally on the N. thoracicus longus, bent ventrally in front of the first rib and passed through under a common trunk consisting of the N. thoracolateralis and N. thoraco-ventralis. It ended on the ventro-lateral surface of the M. serratus ventralis thoracis situated in the area of the first to second ribs. Frequently it slipped into the inner side of the M. rectus thoracis and

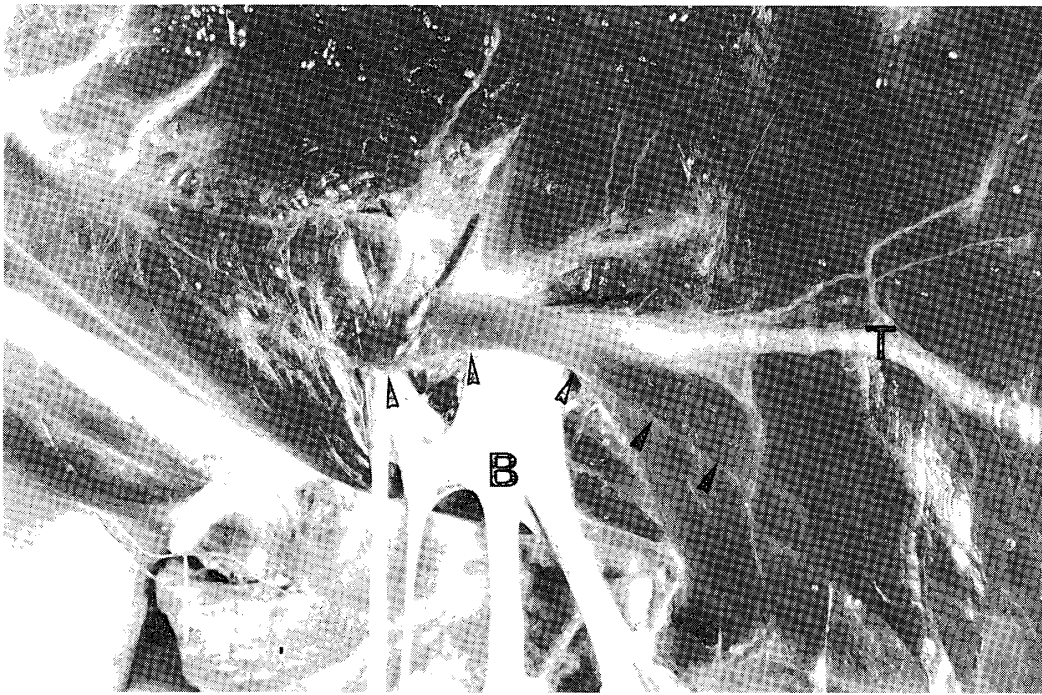


Fig. 1. Poorly-developed *M. scalenus dorsalis* (arrowheads) seen on the left side appears thin and lucent. It courses on the *N. thoracicus longus* (T) and ends on the lateral surface of the *M. serratus ventralis thoracis*. B : *Plexus brachialis*.

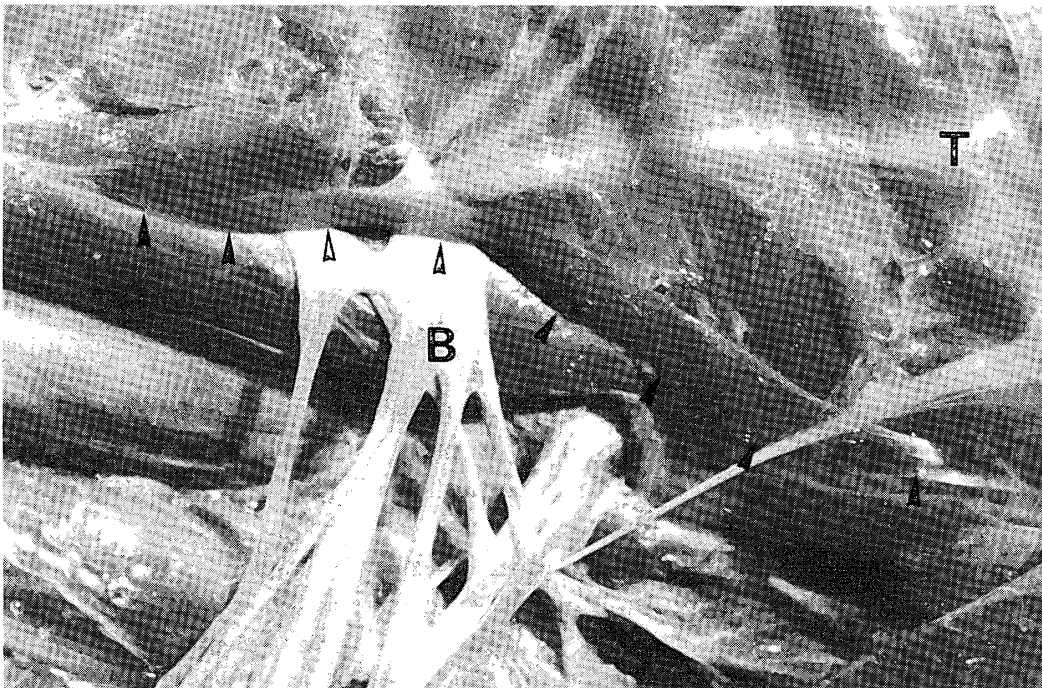


Fig. 2. Well-developed *M. scalenus dorsalis* (arrowheads) on the left side runs caudally on the brachial plexus (B) and terminates on the second rib. T : *N. thoracicus longus*.

inserted on the ventral part of the second rib. It measured up to approximately 13.5 cm in length and 2 cm in width. No distinct innervation to the M. scalenus dorsalis was detected by gross observation in any case. This type was encountered in 10 of 33 cases.

Where the M. scalenus dorsalis was found on both sides, development of the muscle in both sides was similar in size and shape except in one specimen.

## DISCUSSION

Malformations of the muscle in domestic ruminants have been reported by some workers. Priester *et al.* (1970)<sup>5)</sup> reviewed the anomalies in domestic animals and in bovine, found congenital defects of the musculoskeletal system in 40 of 533 cases examined. Dennis (1972)<sup>6)</sup> found one case of muscular hyperplasia of left hindquarter in 250 lambs. Tanudimadja (1973)<sup>7)</sup> described bilateral anomaly of muscles extending between the manubrium sterni and the M. omohyoideus in a goat. Ghoshal (1978)<sup>8)</sup> reported that the M. sternohyoideus of both sides were absent in a sheep. In the Japanese serow, the M. scalenus dorsalis was found in 33 cases (63.5%), which varied evidently in size and shape. Absence of the muscle was observed in 19 cases (36.5%) : both sides in 5 specimens and one side in 9 specimens. This frequency obtained in the Japanese serow strongly indicates that the M. scalenus dorsalis is rudimentary, unlike the abnormalities reported by authors described above. Innervation of the M. scalenus dorsalis in the present study was detected by gross observation in neither poorly- nor well-developed types. These findings indicate that the M. scalenus dorsalis does not have an important role for the movement in the neck and trunk.

Ellenberger and Baum (1906)<sup>1)</sup>, Nickel *et al.* (1954)<sup>2)</sup> and Getty (1975)<sup>3)</sup> reported that the M. scalenus dorsalis in the ox arose from the transverse processes of the third to sixth cervical vertebrae and ended on the second to fourth ribs. Nickel *et al.* (1954)<sup>2)</sup> and Getty (1975)<sup>3)</sup> observed that the muscle arose from the transverse processes of the fourth to sixth cervical vertebrae and inserted on the second to third ribs in the goat. In the Japanese serow, the muscle arose from transverse processes of the fifth and sixth cervical vertebrae and stopped on the area of the first and second ribs. It seems, in comparison with domestic ruminants, that the origin of the M. scalenus dorsalis of the Japanese serow is reduced in number and the insertion shifts cranially.

A variation of insertion of the M. scalenus dorsalis is one in which the poorly-developed type inserts near the N. thoracicus longus and the well-developed one ends on a more ventral part of the trunk. The regional difference of insertion is unknown. However, two possible origins regarding insertion come to mind. In the first, the M. scalenus dorsalis occurs basically at its destined site from early embryonic stages. In the second, the muscle essentially appears as a triangular form on the lateral surface of the M. serratus ventralis in the embryo. A greater part of the middle region regresses with the growth of embryos and the remainder becomes cord-shaped. Which is correct will be resolved by studies of embryonic M. scalenus dorsalis in the future.

## ACKNOWLEDGMENT

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## ニホンカモシカの背斜角筋について

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### 要 約

ニホンカモシカの背斜角筋（最上肋間筋）について、26頭（左右合せて52例）の肉眼解剖を行ない、52例中33例において本筋を認めた。背斜角筋の発育は非常に変化に富み、痕跡程度のものから、長さ約13.5 cm、幅約2 cmに及ぶ発育の良いものまで幅広く認められた。本筋への神経支配は肉眼では全く観察されなかった。

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