Statistics on the Musculature of the Japanese

By

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There are many reports on the statistics of the musculature of the Japanese. Therefore, it seems that it is useless trying to report the statistics of the musculature. But yet the results of the observations by many authors are not set in order. My result is a drop in the bucket, however, I think that it will be of service, when the results of many authors are collected to know the true condition of the musculature of the Japanese.

Observations

M. pectoralis major

The absence of the entire muscle of the pectoralis major is very rare, I could count 50 cases of the absence of the pectoralis major of Japanese in literatures from 1893. Numazaki et al. (1960) reported 3 cases of the absence of the pectoralis major. I have not observed the absence of the pectoralis major in my dissecting room's life.

An abnormous slip from the pectoralis major to the biceps brachii.................................15 arms (4.7%) in 160 bodies.

An abnormous slip from the pectoralis major to the latissimus dorsi .....................................12 arms (3.7%) in 160 bodies.

M. pectoralis intermedius

The pectoralis major is divided into two layers, the superficial layer is like the descriptions in the text-books.

The deep layer is covered by the superficial layer, and arises from the third to the sixth ribs, the origin varies little personally. This deep layer is the pectoralis intermedius. In many cases the separation of this muscle from the pectoralis major is not completely,
but the substantive existence of this muscle is certainly. Th
lateral portion of this muscle is fused with the terminal portion o
the pectoralis major.

The presence of the pectoralis intermedius is 32% (112 : 351).

M. pectoralis minor

The pectoralis minor arises from the second, third, fourth, and
fifth ribs near the costal cartilage, and the fiber-bundles converge
upward and outward to a flattened tendon to be inserted into the
processus coracoideus scapulae. The variation is seen in the origin.

Origin.
The ribs of the origin of the pectoralis minor are as follows:

<table>
<thead>
<tr>
<th>Ribs</th>
<th>Number of muscle</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. II. III</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>II. III. IV</td>
<td>46</td>
<td>14.1</td>
</tr>
<tr>
<td>II. III. IV. V</td>
<td>115</td>
<td>35.2</td>
</tr>
<tr>
<td>III. IV</td>
<td>9</td>
<td>2.7</td>
</tr>
<tr>
<td>III. IV. V</td>
<td>153</td>
<td>46.7</td>
</tr>
<tr>
<td>III. IV. V. VI</td>
<td>1</td>
<td>0.3</td>
</tr>
</tbody>
</table>

The pectoralis minor arises from the third, fourth and fifth rib
in a large number of my instances.
The upperest rib and the number of instances:

<table>
<thead>
<tr>
<th>The upperest rib</th>
<th>both sides</th>
<th>Number of instances</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>right</td>
<td>left</td>
</tr>
<tr>
<td>I</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>43</td>
<td>42</td>
<td>33</td>
</tr>
<tr>
<td>III</td>
<td>51</td>
<td>32</td>
<td>29</td>
</tr>
</tbody>
</table>

The lowest rib and the number of instances:

<table>
<thead>
<tr>
<th>The lowest rib</th>
<th>both sides</th>
<th>right</th>
<th>left</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>IV</td>
<td>11</td>
<td>19</td>
<td>14</td>
<td>55</td>
<td>16.8</td>
</tr>
<tr>
<td>V</td>
<td>83</td>
<td>48</td>
<td>54</td>
<td>268</td>
<td>82.2</td>
</tr>
<tr>
<td>VI</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0.3</td>
</tr>
</tbody>
</table>

The lowest rib of the origin of the pectoralis minor is the fifth
rib in a large number of of my materials.
If I quote the origin of the pectoralis minor of apes from literatures, the following table will be made:

<table>
<thead>
<tr>
<th>Apes</th>
<th>Ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chimpanzee</td>
<td>II. III. IV. V</td>
</tr>
<tr>
<td>Orang-oetang</td>
<td>II. III. IV. V</td>
</tr>
<tr>
<td>Gorilla</td>
<td>II. III. IV. V</td>
</tr>
<tr>
<td>Semniopithecus</td>
<td>II. III. IV. V. VI. VII</td>
</tr>
<tr>
<td>Catarchina</td>
<td>I. II. III. IV. V. VI. VII</td>
</tr>
<tr>
<td>Platyrhina</td>
<td>II. III. IV. V. VI</td>
</tr>
</tbody>
</table>

I think that the pectoralis minor is reducing from the upper and lower end, and in man and some apes the origin from the first, eighth, seventh and sixth ribs already disappeared. Especially in man it seems that the origin from the second and fifth ribs are tracing the fate of the disappearance.
The origin of the pectoralis minor of the new borns is as follows:

<table>
<thead>
<tr>
<th>Ribs</th>
<th>Number of muscle (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. II. III</td>
<td>0</td>
</tr>
<tr>
<td>II. III. IV</td>
<td>8 (13.3%)</td>
</tr>
<tr>
<td>II. III. IV. V</td>
<td>21 (35.0%)</td>
</tr>
<tr>
<td>III. IV. V</td>
<td>31 (51.6%)</td>
</tr>
</tbody>
</table>

M. rectus abdominis

M. rectus abdominis forms a flat but strong muscle which traverses the entire length of the abdominal wall immediately lateral to the linea alba. The variation may be found in the origin and the number of the tendinous inscription.

Loth has classified the origin into 3 types: the primitive, normal and progressive.

If my results are arranged according to Loth's scheme the following table is obtained:

<table>
<thead>
<tr>
<th>Type</th>
<th>Mori</th>
<th>Loth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primitive type</td>
<td>8.1%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Normal type</td>
<td>78.2%</td>
<td>67.0%</td>
</tr>
<tr>
<td>Progressive type</td>
<td>13.8%</td>
<td>31.0%</td>
</tr>
</tbody>
</table>

It is interest to compare my results with that of Loth.

In 200 cadavers (400 sides; right 200, left 200) the origin of the rectus abdominis is as follows:

<table>
<thead>
<tr>
<th>Ribs</th>
<th>Number of side</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. V</td>
<td>8</td>
</tr>
<tr>
<td>Primitive type IV. V. VI</td>
<td>12</td>
</tr>
<tr>
<td>V. VI</td>
<td>13</td>
</tr>
<tr>
<td>Normal type V. VI. VII</td>
<td>313</td>
</tr>
<tr>
<td>Progressive type VI. VII</td>
<td>32</td>
</tr>
<tr>
<td>VI. VII. VIII</td>
<td>20</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. V</td>
<td>8.0%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Primitive type IV. V. VI</td>
<td>3.0%</td>
<td>8.1%</td>
</tr>
<tr>
<td>V. VI</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>Normal type V. VI. VII</td>
<td>78.2%</td>
<td></td>
</tr>
<tr>
<td>Progressive type VI. VII</td>
<td>5.0%</td>
<td>8.0%</td>
</tr>
</tbody>
</table>
The tendinous inscription. The number of the tendinous inscription is interest comparative anatomically and anthropologically. The number of the tendinous inscription in my instances is as follows:

<table>
<thead>
<tr>
<th>Number of tendinous inscription</th>
<th>Instances (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>36.0</td>
</tr>
<tr>
<td>4</td>
<td>61.0</td>
</tr>
<tr>
<td>5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

M. pyramidalis

The pyramidalis is a somewhat variable muscle which arises below from the upper surface of the body of the pubis and from the symphysis and is inserted above into the linea alba, somewhere between the umbilicus and the symphysis. This muscle is very importance anthropologically. This muscle of Japanese is observed by many authors.

1. Absence. If the results of many authors are summarized I can make the following table:

A. The number of the cadavers which have no pyramidalis.

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of observation</th>
<th>Absence</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Both side</td>
<td>right</td>
</tr>
<tr>
<td>Okayama</td>
<td></td>
<td>2(3.1%)</td>
<td>2(3.1%)</td>
</tr>
<tr>
<td></td>
<td>男</td>
<td>62</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>女</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>男+女</td>
<td>85</td>
<td>2(2.4%)</td>
</tr>
<tr>
<td>Kyoto</td>
<td></td>
<td>2(3.1%)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>男</td>
<td>52</td>
<td>1(5.0%)</td>
</tr>
<tr>
<td></td>
<td>女</td>
<td>20</td>
<td>3(4.2%)</td>
</tr>
<tr>
<td></td>
<td>男+女</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>Kyushu</td>
<td></td>
<td>5(6.8%)</td>
<td>1(1.4%)</td>
</tr>
<tr>
<td></td>
<td>男</td>
<td>74</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>女</td>
<td>3</td>
<td>5(6.5%)</td>
</tr>
<tr>
<td></td>
<td>男+女</td>
<td>77</td>
<td>0</td>
</tr>
<tr>
<td>Kyushu</td>
<td></td>
<td>2(3.2%)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>男</td>
<td>62</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>女</td>
<td>21</td>
<td>2(2.4%)</td>
</tr>
<tr>
<td></td>
<td>男+女</td>
<td>83</td>
<td>0</td>
</tr>
<tr>
<td>Kyushu</td>
<td></td>
<td>12(4.8%)</td>
<td>7(2.8%)</td>
</tr>
<tr>
<td></td>
<td>男</td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>女</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>男+女</td>
<td>250</td>
<td>12(4.8%)</td>
</tr>
</tbody>
</table>
B. Absence in one side.

<table>
<thead>
<tr>
<th>Region</th>
<th>Right</th>
<th>Left</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of observation</td>
<td>Number of absence</td>
<td>Number of observation</td>
</tr>
<tr>
<td>Okayama</td>
<td>⊙ 65</td>
<td>4(6.2%)</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>⊙ + ⊙ 85</td>
<td>4(4.8%)</td>
<td>85</td>
</tr>
<tr>
<td>Kyoto</td>
<td>⊙ 52</td>
<td>2(3.0%)</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>⊙ + ⊙ 72</td>
<td>3(4.2%)</td>
<td>72</td>
</tr>
<tr>
<td>Kyushu</td>
<td>⊙ 74</td>
<td>6(8.1%)</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>⊙ + ⊙ 77</td>
<td>6(7.0%)</td>
<td>77</td>
</tr>
<tr>
<td>Kyushu</td>
<td>⊙ 62</td>
<td>4(6.5%)</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>⊙ + ⊙ 83</td>
<td>4(4.8%)</td>
<td>83</td>
</tr>
<tr>
<td>Kyushu</td>
<td>⊙ 250</td>
<td>19(7.6%)</td>
<td>230</td>
</tr>
<tr>
<td></td>
<td>⊙ + ⊙ 250</td>
<td>19(7.6%)</td>
<td>250</td>
</tr>
</tbody>
</table>

From this table we can calculate that the pyramidalis absents in about 5–6% and presents in 95–94% in Japanese. If the percentage of the presence of the pyramidalis is compared with that of many races the following table is made: (from L o t h’s table)

<table>
<thead>
<tr>
<th>Race</th>
<th>Authors</th>
<th>Number of observation</th>
<th>Presence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>French</td>
<td>Arcel (1902)</td>
<td>146</td>
<td>71</td>
</tr>
<tr>
<td>French</td>
<td>Le Double (1897)</td>
<td>243</td>
<td>89</td>
</tr>
<tr>
<td>Berber</td>
<td>Leblanc, Curtillet (1930)</td>
<td>43</td>
<td>72</td>
</tr>
<tr>
<td>English</td>
<td>Thomsson (1897)</td>
<td>270</td>
<td>74</td>
</tr>
<tr>
<td>Irish</td>
<td>Knott</td>
<td>160</td>
<td>76</td>
</tr>
<tr>
<td>American</td>
<td>Dwight (1895)</td>
<td>673</td>
<td>79</td>
</tr>
<tr>
<td>Polander</td>
<td>L o t h (1924)</td>
<td>200</td>
<td>79</td>
</tr>
<tr>
<td>Alsatian</td>
<td>Schwalbe and Pfitzner (1894)</td>
<td>393</td>
<td>87</td>
</tr>
<tr>
<td>Chinese</td>
<td>Nakano (1923)</td>
<td>23</td>
<td>100</td>
</tr>
<tr>
<td>Chinese</td>
<td>Wagenstein (1927)</td>
<td>80</td>
<td>99</td>
</tr>
<tr>
<td>Neger</td>
<td>L o t h (1912) and Streblo (1915)</td>
<td>105</td>
<td>87</td>
</tr>
<tr>
<td>Black</td>
<td>Vallois (1926)</td>
<td>2266</td>
<td>82</td>
</tr>
</tbody>
</table>

From this table 1 can see that the percentage of the absence of the pyramidalis of Japanese is smaller than that of the other races.
C. Form.

I classified the form of the pyramidalis into 9 types.

Type 1. The apex of the muscle of the both sides is on the same level and the left origin is elongated to the anterior surface of the pubis ........................................2.4%

Type 2. The apex of the muscle of the both sides is on the same level and the right origin is elongated to the anterior surface of the pubis ...........................................9.6%

Type 3. The apex of the left pyramidalis is higher than the right, and the origin of the both sides is on the same level .........................3.6%

Type 4. The apex of the left pyramidalis is higher than the right, and its origin is elongated to the pubis ..............................13.3%

Type 5. The apex of the left pyramidalis is higher than the right, and the origin of the right pyramidalis is elongated to the surface of the pubis ........................................19.3%

Type 6. The apex of the right pyramidalis is higher than the left, and the origin of the muscle of the both sides in on the same level ...................................................6.0%

Type 7. The apex of the right pyramidalis is higher than the left, and the origin of the left pyramidalis is elongated to the surface of the pubis ........................................21.7%

Type 8. The apex of the right pyramidalis is higher than the left, and the origin of the right pyramidalis is elongated to the surface of the pubis ........................................15.7%

Type 9. The pyramidalis is divided into two parts ..........1.1%

D. Length. The length indicates the distance between the apex of the muscle and the upper margin of the pubis.

<table>
<thead>
<tr>
<th>Length cm</th>
<th>Male (%)</th>
<th>Female (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0-2.0</td>
<td>5.1</td>
<td>0</td>
</tr>
<tr>
<td>2.1-3.0</td>
<td>1.3</td>
<td>1.0</td>
</tr>
<tr>
<td>3.1-4.0</td>
<td>11.4</td>
<td>0</td>
</tr>
<tr>
<td>4.1-5.0</td>
<td>11.4</td>
<td>17.9</td>
</tr>
<tr>
<td>5.1-6.0</td>
<td>31.6</td>
<td>25.0</td>
</tr>
<tr>
<td>6.1-7.0</td>
<td>24.1</td>
<td>25.0</td>
</tr>
<tr>
<td>7.1-8.0</td>
<td>7.6</td>
<td>17.9</td>
</tr>
<tr>
<td>8.1-9.0</td>
<td>7.6</td>
<td>7.1</td>
</tr>
<tr>
<td>9.1-10.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10.1-11.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11.1-12.0</td>
<td>0</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Average: ♂ 5.2 cm (1.0-9.6), ♀ 5.3 cm (1.1-11.1)
Index = \[
\frac{\text{length of muscle}}{\text{umbo-symphyseal distance}}
\]

<table>
<thead>
<tr>
<th>Index</th>
<th>Male (%)</th>
<th>Female (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10</td>
<td>4.5</td>
<td>0</td>
</tr>
<tr>
<td>11-15</td>
<td>3.2</td>
<td>3.6</td>
</tr>
<tr>
<td>16-20</td>
<td>5.2</td>
<td>0</td>
</tr>
<tr>
<td>21-25</td>
<td>13.6</td>
<td>8.9</td>
</tr>
<tr>
<td>26-30</td>
<td>18.7</td>
<td>30.4</td>
</tr>
<tr>
<td>31-35</td>
<td>22.6</td>
<td>14.3</td>
</tr>
<tr>
<td>36-40</td>
<td>15.5</td>
<td>14.3</td>
</tr>
<tr>
<td>41-45</td>
<td>4.5</td>
<td>15.5</td>
</tr>
<tr>
<td>46-50</td>
<td>3.9</td>
<td>3.6</td>
</tr>
<tr>
<td>51-55</td>
<td>1.3</td>
<td>7.1</td>
</tr>
<tr>
<td>56-60</td>
<td>3.2</td>
<td>1.7</td>
</tr>
<tr>
<td>61-65</td>
<td>3.9</td>
<td>1.7</td>
</tr>
<tr>
<td>66-70</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>71-75</td>
<td>0</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Average of index: ♂ 34.0 (6.4-65.3), ♀ 35.9 (15.9-73.3)

From this result I can say that the apex of the pyramidalis reaches to one-third of the umbo-symphyseal distance.

M. obliquus externus abdominis

The external obliquus forms a muscular sheet in the lateral portion of the anterior abdominal wall. The origin varies individually.

In my 166 instances (right 166, left 166) the upperest rib of the origin is as follows:

<table>
<thead>
<tr>
<th>Upperest rib</th>
<th>Right (♂ + ♀, %)</th>
<th>Left (♂ + ♀, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>0</td>
<td>12.0</td>
</tr>
<tr>
<td>V</td>
<td>81.9</td>
<td>84.3</td>
</tr>
<tr>
<td>VI</td>
<td>18.1</td>
<td>14.4</td>
</tr>
<tr>
<td>VII</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Piersol has described in his human anatomy that the external oblique arises by seven or eight fleshly digitations from the corresponding number of the lower ribs. According to this description the upperest rib of the external oblique is fifth or fourth. Loth has given the following table:
If I quote the origin of the external oblique of the apes for the purpose of reference, the upperest rib of the origin is as follows:

- Semnopithecus
- Papale
- Papio
- Gibbon

Loth has named the type from the fourth rib as the primitive type and from the seventh as the progressive type. In my instances there are primitive type rarely and no progressive type.

M. obliquus internus abdominis

The internal oblique muscle arises from the outer two-thirds of ligamentum inguinale, from the whole length of the middle lip of the crest of the ilium, and from the lumbo-dorsal fascia. From this extended origin its fibers spread out in a fan-shaped manner, the more posterior ones passing upward and forward to be inserted into the lower ribs.

The upperest rib which has the insertion of the obliquus internus abdominis is as follows:

<table>
<thead>
<tr>
<th>Rib</th>
<th>Right (%)</th>
<th>Left (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>XI</td>
<td>34</td>
<td>36</td>
</tr>
</tbody>
</table>

There is no instance which has his upperest insertion on VII or IX.

Loth has classified the rib which has the upperest insertion of the obliquus internus abdominis into four types. If I quote the results of Loth comparing with my result, I can make the following table.

<table>
<thead>
<tr>
<th>Upperest rib</th>
<th>♂ + ♀</th>
<th>♂</th>
<th>♀</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>67</td>
<td>60</td>
<td>77</td>
</tr>
<tr>
<td>VI</td>
<td>32</td>
<td>38</td>
<td>22</td>
</tr>
<tr>
<td>VII</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
The situation of the insertion of the internal oblique on ribs in Japanese is very similar to that of Polander.

M. sternalis

The sternalis is the most familiar abnormal muscle. It is a flat and somewhat frequently seen on the surface of the pectoralis major, usually nearly parallel to the sternum. The origin and insertion vary individually. It arises from the sheath of the rectus abdominis and some of the costal cartilage and terminates on the sternocleidomastoideus, on the sternum, or on the fascia covering the pectoralis major. When it presents on both sides, the two muscles may be fused across the sternum. This muscle of Japanese is researched in detail, and there are many reports on this muscle.

I observed 350 corpses (700 sides), 25 corpses (50 sides). The sternal muscle is found in 36 corpses (10.3%) and 3 corpses (12.0%).

The items are as follows:

12 corpses have on both sides.
16 corpses have on right side.
8 corpses have on left side.
2 corpses have on both sides.
1 corpse has on right side.

<table>
<thead>
<tr>
<th>Right (%)</th>
<th>Left (%)</th>
<th>Right+Left (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂ 4.0</td>
<td>2.8</td>
<td>6.8</td>
</tr>
<tr>
<td>♀ 3.0</td>
<td>4.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

In my results the sternalis is found in about 10.0% of the bodies, and it appears more frequently in the right than in the left.

The form of the sternalis.
I divided the form of the sternalis into 6 types.
1. The both ends attach on the pectoral fascia...7 sides (1.0%).
2. The upper end attaches on the sternum and the lower end on the pectoral fascia ........................................7 sides (1.0%).
Fig. 2. Various forms of M. sternalis.
Fig. 3. Various forms of M. sternalis.
3. The upper end attaches on the sternum and the lower end attaches on the sheath of the rectus abdominis .....12 sides (1.7%).
4. The upper end attaches on the pectoral fascia and the lower end attaches on the sheath of the rectus abdominis 8 sides (1.1%).
5. The upper end attaches on the tendon of the sternocleidomastoideus and the lower end attaches on the pectoral fascia 2 sides (0.2%).
6. The upper end attaches on the tendon of the sternocleidomastoideus and the lower end is on the sheath of the rectus abdominis 17 sides (2.4%).

The nerve.
The preparation of the nerve to this muscle is difficult, and the relation between the nerve and the muscle is as follows:

<table>
<thead>
<tr>
<th>Nn. thoracici anteriores</th>
<th>Nn. intercostales</th>
<th>Nn. thorac.+inter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of muscle</td>
<td>12(32.4%)</td>
<td>5(13.5%)</td>
</tr>
</tbody>
</table>
M. subclavius

The subclavius is an almost cylindrical muscle arising from the first rib and its cartilage near their junction. The muscle extends for some distance along the lower border of the clavicle between the costal tuberosity and the coracoid tuberosity. The variation appear in the insertion.

The abnormal subclavius.
The manifestation of the insertion in ordinary sense is seen in two forms.

1. I Form.
The lateral end of the subclavius is divided into two portions, and one portion is inserted into the under surface of the clavicle, and the other into the root of the processus coracoideus. This form presents 12 sides (16.8%) in 72 sides.

2. II Form.
The lateral portion of the subclavius is inserted once into the under surface of the middle third of the clavicle and then goes more lateralward to insert into the root of the processus coracoideus or the margo superior scapulae. This form presents 6 sides (0.3%) in 72 sides.

M. subclavius posticus, Rosenmüller,
s. scapulocastalis minor, Gruber

The subclavius posticus arises from the first costal cartilage and goes lateral along the dorsal surface of the clavicle and over the vasa subclavia and plexus brachialis. It is inserted into the margo superior scapulae opposite to the omohyoideus.
I found 5 (1%) scapulocostales minor in 250 cadavers (500 sides).

Nishi has reported 2 scapulocostales in 12 cadavers. In European M. macalister has found this muscle in 7%. According to Eisler only 3 examples of this muscle are found in his 25 years dissecting room life.

It is thought that this muscle is not so rare in Japanese.

M. costoclavicularis

The costoclavicularis is a small and bandlike muscle and covered with the upper portion of the pectoralis minor. It arises from the second rib and extends upward and lateralward, and for some distance along the lower border of the subclavius, and at last is inserted into the under surface of the lateral middle of the clavicular.

I have found 3 instances of this muscle in 367 cadavers.

Nishi has reported 1 instance in 12 cadavers.

I think that this muscle is very rare in Japanese.

The nerve of this muscle is missed in my instances. Nishi has reported that the nerve of this muscle is perhaps the twig of the Nn. thoracici antt.

M. supraclavicularis

The supraclavicularis arises from the upper margin of the manubrium sterni and passes lateralward over the capsule of the sternoclavicular joint, and is inserted into the upper surface of the medial third of the clavicle. This muscle is thin, and short.

I have found 2 instances of this muscle in 1050 cadavers.

Nishi has reported the existance of this muscle in his anatomical textbook. I think that this muscle is very rare in Japanese. I have missed the nerve of this muscle.

M. sternocleidomastoideus

The sternocleidomastoideus is attached below by two heads to the sternum and clavicula. The sternal head arises by a tendon from the anterior surface of the manubrium sterni, and the clavi-
cular head more band-like, and takes origin from the upper surface of the sternal end of the clavicula. The heads are directed upward and backward, the clavicular head gradually passing beneath the sternal one, and the two eventually fusing, are inserted into the mastoid process of the temporal bone and into the outer part of the linea nuchae superior.

The comparative anatomy reveals that the primary constitution of this muscle consists of five portions, and these five portions arranged as follows:

I. superficial layer
   1. superficial sterno-mastoid portion
   2. sterno-occipital portion
   3. cleido-occipital portion

II. deep layer
   4. deep sterno-mastoid portion
   5. cleido-mastoid portion

The variation of this muscle appears according to this comparative anatomical condition.

I. The complete distinctness of the two heads.

The complete distinctness of the sternal and clavicular heads is seen so frequently in Japanese. I have such distinctness of two heads in 450 (88.6%) out of 510 instances. I regard the complete distinctness of the heads as normal in Japanese. And in such cases between the heads there intervenes a triangular space (trigonum supraclavicularis minor) covered with the cervical fascia.

II. The dependence of the superficial and deep layer.

The complete independence of the superficial and deep layer is
Statistics on the Musculature of the Japanese

rare. If there is independence of two layers each layer has its own fascia. I have such instances in 10 (1.0%) out of 1020 sides.

III. The independence of the cleido-occipital portion.

The independence of the cleido-occipital portion is found in 102 (10.9%) out of 1020 sides. The independence of the cleido-occipital portion is seen only near the insertion on the occipital bone.

M. geniohyoideus

The geniohyoideus arises by short tendinous fibers from the mental spine of the mandibula and is inserted into the ventral surface of the body of the hyoid bone.

In all my instances the geniohyoideus is more or less fused with the one of the opposite side, and is incompletely divided into superficial and deep layers.

M. mylohyoideus

The median raphe is frequently not so obvious. In my 210 heads 45 (21.4%) heads have obvious raphe. There is no absence of this muscle in my instances.

M. stylohyoideus

The stylohyoideus arises from the lateral and dorsal part of the processus styloideus ossis temporalis by a round tendon, and the muscle is attached to the ventral surface of the body of the hyoid bone near its junction with the great cornu.

The variations are found in the situation of the insertion, and the variations occur in three cases.

1. The stylohyoideus passes by the medial side of the intermediate tendon of the digastricus.

178 sides (right 90, left 88) in 254 sides (right 127, left 127) ................................................................. 70.1%

2. The stylohyoid passes by the lateral side of the intermediate tendon of the digastricus.

5 sides (right 3, left 2) in 245 sides (right 127, left 127)... ........................................................................ 1.9%
3. The end tendon of the styloideus is divided into two parts to let the intermediate tendon of the digastricus pass through and then attached to the ventral surface of the body of the hyoid bone.

71 sides (right 34, left 37) in 254 sides (right 127, left 127)

In these 71 cases the thickness of the medial and lateral parts is not equal, and I classified then as follows:

| The thickness of the both parts is equal: |  |
|------------------------------------------|--|---|
| Right | Left | Total |
| 9     | 14   | 23    |
|       |      | 33.8% |

<table>
<thead>
<tr>
<th>The medial part is thicker:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The difference of the variations on the right and left sides is as follows:

1. In the both sides the tendon divides into two parts and let the tendon of the digastricus pass through ..............................................................15.7% (20 in 127 cadavers)

2. In the both sides the tendon of the stylohyoideus passes by the medial side of the intermediate tendon of the digastricus. ..................................................66.1% (84 in 127 cadavers)

3. In the both sides the tendon of the mylohyoideus passes by the lateral side of the tendon of the digastricus..............................................

M. digastricus

The venter anterior of the digastricus has many variations, I have observed the anterior belly of 262 cadavers, and classified them into eight forms.

I. The normal form.

The anterior belly arises from the fossa digastricus of the mandible, and is directed downward, backward, and slightly outward to become continuous with the intermediate tendon .......................... 46.1% (121 in 262 cadavers)

II. The ape form.

The anterior belly arises not only from the intermediate tendon of the digastricus but also from the aponeurosis intertendines. The
Statistics on the Musculature of the Japanese

aponeurosis intertendines is called as aponeurosis interdigastricque by Zlabeck. The muscle fibers arise from the aponeurosis intertendines and intermediate tendon, and extend to the mandible to be inserted into the inner surface of mandible. ................................................................. 5 (1.9%) in 262 instances.

III. The anterior type.
The muscle fiber arising from the aponeurosis intertendines forms the plate, and this plate fuses with the muscle arising from the intermediate tendon of the digastricus to make one broad plate.

There are two forms in this type.

a) The continuous type.
The muscle arising from the aponeurosis intertendines and the anterior belly of the digastricus fuse together entirely, and there is no boundary between them.

Both sides have this type...27 (10.3%) cadavers in 262 instances.
Only one side has this type ................................................
........................................18 (6.8%) (right 9, left 9) in 262 instances.

b) The discontinuous type.
There is boundary between the muscle arising from the aponeurosis intertendines and the anterior belly of the digastricus.

Both sides have this type ...............1 (0.3%) in 262 cadavers.
Only one side has this type ................................................
........................................ 5 (1.9%) (right 3, left 2) in 262 instances.

IV. The posterior type.
The muscle fibers arising from the aponeurosis intertendines make thin muscle plate, and go to the mandible. The boundary between the anterior belly of the digastricus and the abnormous muscle plate is clear.

There are two forms in this type.

a) The continuous form.
The abnormous muscle plate goes anteriorly and is inserted into the inner surface of the mandible. A few muscle fiber from this abnormous muscle plate goes into the mylohyoideus.

In right side.................................2 (0.7%) in 262 instances.
In left side.................................2 (0.7%) in 262 instances.

b) The myloid form.
The abnormous plate goes medially to fuse with the mylohyoideus of opposite side. If the both sides have such abnormous
muscle, the abnormous muscle plates make raphe in the media line.

Both sides have this abnormous plate ..........................

...............................................12 (4.9%) in 262 instances.
One side has this abnormous plate..................................

...................... 30 (11.4%) (right 14, left 16) in 262 instances.

---

Fig. 8. Various forms of the anterior belly of the digastricus.
1. x intertendinous aponeurosis.
3. Ape form b.
4. Posterior type a.
5, 6. Posterior type b.
8. Accessory fasciculus between mandible and anterior belly.
9, 10. Combinated form.
11. Schemata of the abnormous fibers from anterior belly.
Fig. 9. Various forms of the anterior belly (1).
Fig. 10. Various forms of the anterior belly (2).
Fig. 11. Various forms of the anterior belly (3).
V. The biceps form.
The anterior belly is divided into two heads, the medial head goes to the opposite side to be inserted into the fossa digastricus of the opposite side. In the insertion the abnormous muscle is above and the anterior belly of the digastricus is down.

One side has this abnormous muscle ............................... 8 (3.4%) (right 2, left 6) in 262 instances.

VI. The accessory muscle fiber between the mandible and the anterior belly of the digastricus.
The accessory fasciculus between the mandible and the anterior belly of the digastricus is observed very rarely. The abnormous fasciculus arises from the lateral margin of the anterior belly of the digastricus and goes to the mandible to be inserted into it. The thickness of the accessory fasciculus varies individually.

Both sides have this accessory fasciculus..........................
................................. 1 (0.3%) in 262 cadavers.
One side has the accessory fasciculus ................................
................................. 3 (1.1%) (right 1, left 2)

VII. The combined form.
The situation of the abnormous muscle is very complicate. If we analyze it we can know that it consists from the combination of the above mentioned (I-VI) forms.

a) The co-existence of the anterior and posterior types.
8 (3.4%) in 262 instances

b) The intricate form.
21 (8.7%) in 262 instances.

The variation of the anterior belly of the digastricus was studied by Shin do and Yam ada.
If I make the table of the abnormous anterior belly of the digastricus I can take the following:

<table>
<thead>
<tr>
<th>Authors</th>
<th>Number of cadaver which have abnormous anterior belly</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shin do</td>
<td>80 in 130</td>
<td>61.5</td>
</tr>
<tr>
<td>Yam ada</td>
<td>28 in 50 (adults)</td>
<td>56.0</td>
</tr>
<tr>
<td>Yam ada</td>
<td>44 in 100 (fetus)</td>
<td>44.0</td>
</tr>
<tr>
<td>Mori</td>
<td>141 in 262</td>
<td>54.9</td>
</tr>
<tr>
<td>total</td>
<td>294 in 542</td>
<td>average 54.1</td>
</tr>
</tbody>
</table>


Statistics on the Musculature of the Japanese

From this table we can say that the more than the half of Japanese people have the abnormalous anterior belly of the digastricus.

We can take the following table from the reference of the digastricus. (from Loth's table)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Right</th>
<th>Left</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hallet (1847)</td>
<td>15:1</td>
<td></td>
<td></td>
<td>48%</td>
</tr>
<tr>
<td>Wood (1862)</td>
<td>102:6</td>
<td></td>
<td></td>
<td>51%</td>
</tr>
<tr>
<td>Le Doule (1891)</td>
<td>6%</td>
<td></td>
<td></td>
<td>52%</td>
</tr>
<tr>
<td>Loth (1931)</td>
<td>12%</td>
<td></td>
<td></td>
<td>52.7%</td>
</tr>
<tr>
<td>Bavero (1896)</td>
<td>26%</td>
<td></td>
<td></td>
<td>63.3%</td>
</tr>
<tr>
<td>Bianchi (1896)</td>
<td>36%</td>
<td></td>
<td></td>
<td>73%</td>
</tr>
</tbody>
</table>

The abnormalous anterior belly is seen also in the more than the half of the european. Todt has said that there is racial difference of the situation of the anterior belly of the digastricus. Loth has said there is no racial difference. I think that the racial difference would be searched for the form of variation rather than the frequency. I suppose that in general the situation of the abnormality of the anterior belly of the digastricus of the european is simple, but in Japanese it is very complexity.

M. sternohyoideus

The sternohyoideus arises from the deep surface of the median extremity of the clavicle, the costoclavicular ligament, the neighbouring part of the sternum and the ribs. There are many variations in the situation of the origin.

Material: adult 43 cadavers (right 43, left 43)

<table>
<thead>
<tr>
<th>Origin</th>
<th>Right</th>
<th>Left</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sternum</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>11.6</td>
</tr>
<tr>
<td>Sternum+clavicle</td>
<td>32</td>
<td>32</td>
<td>64</td>
<td>74.4</td>
</tr>
<tr>
<td>Sternum+clavicle+1st rib</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4.6</td>
</tr>
<tr>
<td>Sternum+clavicle+1st rib+2nd rib</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4.6</td>
</tr>
</tbody>
</table>

In a large number the sternohyoideus arises from the sternum and the median extremity of the clavicle.

The sternohyoideus has occasionally the inscriptio tendines. I have found it in 22 (36.6%) in 60 sides. Ada chi has reported that the inscriptio tendines is found in 77.2%.
M. sternothyreoideus

The sternothyreoideus arises from the posterior surface of the manubrium sterni and from the cartilages of the first and second ribs, and passes upward to be inserted into the oblique line of the thyroid cartilage. There is often variation in this muscle.

The origin. Material: 40 cadavers.
I classified the origin as follows:

<table>
<thead>
<tr>
<th>Origin</th>
<th>Right</th>
<th>Left</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sternum</td>
<td>19</td>
<td>18</td>
<td>37</td>
<td>46.2</td>
</tr>
<tr>
<td>Sternum + clavicula</td>
<td>8</td>
<td>9</td>
<td>17</td>
<td>21.2</td>
</tr>
<tr>
<td>Sternum + clavicula + 1st rib</td>
<td>13</td>
<td>13</td>
<td>26</td>
<td>32.5</td>
</tr>
</tbody>
</table>

The tendinous intersection. The tendinous intersection is found in 32.3% in 40 sides.

The continuation of the fibers with the thyreohyoideus. It is frequently that some of the fibers of the sternothyreoideus are continued directly into the thyreohyoideus. In 560 cadavers (right 560, left 560, 68.2%) such continuation is found in 764 sides (right 401, left 363).
The omohyoideus is a long, flat muscle consisting of two bellies united by an intermediate tendon. The inferior belly arises from the lateral portion of the margo superior of the scapula.

The intermediate tendon. Material: 120 cadavers, right 120, left 120.

212 (88.4%) sides have the intermediate tendon.

26 (12.6%) sides have no intermediate tendon.

The situation of the intermediate tendon varies individually.

I have classified the form of the intermediate tendon into 5 forms.

I. Form. The intermediate tendon is short and narrow. ...... 12 (5.0%) sides (right 4, left 8).

II. Form. The intermediate tendon is long and narrow. ...... 76 (31.6%) sides (right 40, left 36).

III. Form. The intermediate tendon does not extend over the all breadth, and exists only in medial or lateral side of the muscle. 108 (45.0%) sides (right 56, left 52).

IV. Form. The intermediate tendon is as wide as the muscle and moderately long. 12 (5.0%) sides (right 4, left 8).

V. Form. The intermediate tendon is as wide as the muscle, but it is very short and wavy 4 (1.6%) sides (right 4).

The classification of the intermediate tendon is very difficult, because the subjectivity will be led easily at the observation.
The origin from the margo superior scapulae. I classified the origin into 3 types.

I. It arises from the superior transverse ligament. ................

II. It arises from the superior transverse ligament and the margo superior scapulae. ............24 (25.5%) sides (right 14, left 10).

III. It arises from the superior margo of scapula and does not arise from the transverse ligament. ................................. 68 (2.3%) sides (right 32, left 36).

The breadth of the origin is 22 mm on an average (15–40 mm) in 94 sides (right 47, left 47).

M. cleidohyoideus

The cleidohyoideus arises from the inner surface of the middle of the clavicula and goes upward between the sternohyoideus and the superior belly of the omohyoideus and is inserted into the hyoid bone.

I have classified the situation of the cleidomastoideus into 3 forms.
I. The isolated form.
The sternocleidohyoideus does not fuse with the neighbouring muscle, and is inserted into the hyoid bone.

II. Double of the superior belly of the omohyoideus.
The cleidohyoid muscle fuses with the superior belly of the omohyoideus on its way to the hyoid bone.

III. The cleidohyoid muscle arises from the clavicula and goes upward and fuses with the sternohyoid on its way to hyoid bone.

The cleidohyoid muscle is found, in spite of its form, in 8 (2.6%) in 30 sides.

M. omoclavicularis

The omoclavicularis is long and flat muscle extending between the scapula and the clavica. It arises from the margo superior scapulæ, its origin is ventral to the origin of the omohyoideus.
The breadth of the origin is as wide as the omohyoideus and goes narrowing ventrad to be inserted into the inner surface of the middle of the clavicula with strong and narrow tendon.
I found 6 (3%) sides in 200 sides.

M. levator glandulae thyreoideae

The levator glandulae thyreoideae is a small muscle connecting the cranial tip of the pyramidal lobe to the thyroid cartilage or
even to the hyoid bone. This muscle is divided into many forms according to its origin and insertion. If the classification is set at defiance, and the muscle between the thyroid gland and the hyoid bone or the thyroid cartilage is treated as the levator glandulae thyreoideae, the result of the statistical observation of the muscle is as follows:

<table>
<thead>
<tr>
<th>Authors</th>
<th>Number of the levator glandulae thyreoideae</th>
<th>Cadavers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mori</td>
<td>210(♂ + ♀)</td>
<td>510</td>
<td>41.1</td>
</tr>
<tr>
<td>Koganei, Arai and Shikinami</td>
<td>15♂ 1♀</td>
<td>32♂ 8♀</td>
<td>46.9♂ 16.7♀</td>
</tr>
<tr>
<td>Oseki</td>
<td>18♂ 14♀</td>
<td>92♂ 76♀</td>
<td>19.6♂ 18.4♀</td>
</tr>
<tr>
<td>Shugyo</td>
<td>42♂ 13♀</td>
<td>91♂ 35♀</td>
<td>41.7♂ 37.1♀</td>
</tr>
</tbody>
</table>

From this table it is calculated following table:

<table>
<thead>
<tr>
<th>Number of levator glandulae thyreoideae</th>
<th>%</th>
<th>Number of cadavers</th>
</tr>
</thead>
<tbody>
<tr>
<td>313</td>
<td>37.1</td>
<td>856</td>
</tr>
</tbody>
</table>

I have classified the levator glandulae thyreoideae into the following types:

I. M. hyopyramidalis.
   It arises from the hyoid bone and is inserted into the tip of the lobus pyramidalis thyreoideae. 53:210 (25.0%).

II. M. thyreopyramidalis.
   It arises from the thyroid cartilage and is inserted into the tip of the lobus pyramidalis thyreoideae. 18:210 (0.8%).

III. M. thyreoglandularis.
   It arises from the thyroid cartilage and is inserted into the sheath of the thyroid gland. 115:210 (54.7%).

IV. M. hyoglandularis.
   It arises from the hyoid bone and is inserted into the sheath of the thyroid gland. 28:210 (13.3%).

V. M. tracheoglandularis.
   It arises from the upper end of the trachea and is inserted into the capsule of the isthmus of the thyroid gland. 7:210 (3.3%).
M. scalenus anterior

There is not a little variation in the extent of the upper attachment of the scalenus anterior, the origin being increased or, more usually, diminished in number.

In my instances (120 cadavers, right side 120, left side 120) the origin from the anterior tuberculum of the transverse processes of the vertebrae are as follows:

<table>
<thead>
<tr>
<th>Cervical vertebrae</th>
<th>Right</th>
<th>Left</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>II, III, IV, V</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>3.3</td>
</tr>
<tr>
<td>III, IV, V</td>
<td>53</td>
<td>55</td>
<td>108</td>
<td>45.0</td>
</tr>
<tr>
<td>IV, V, VI</td>
<td>63</td>
<td>61</td>
<td>124</td>
<td>51.6</td>
</tr>
</tbody>
</table>

More than half a number of my instances have the origin from the fourth to the sixth cervical vertebra.

The upper end of the origin is as follows:

<table>
<thead>
<tr>
<th>Cervical vertebra</th>
<th>Number of sides</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>8</td>
<td>33.3</td>
</tr>
<tr>
<td>III</td>
<td>109</td>
<td>45.0</td>
</tr>
<tr>
<td>IV</td>
<td>124</td>
<td>51.6</td>
</tr>
</tbody>
</table>

Each vertebra offers the origin as in the following table:

<table>
<thead>
<tr>
<th>The origin from the</th>
<th>Number of sides</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>II cervical vertebra</td>
<td>8</td>
<td>33.3</td>
</tr>
<tr>
<td>III cervical vertebra</td>
<td>116</td>
<td>48.3</td>
</tr>
<tr>
<td>IV cervical vertebra</td>
<td>240</td>
<td>100.0</td>
</tr>
<tr>
<td>V cervical vertebra</td>
<td>240</td>
<td>100.0</td>
</tr>
<tr>
<td>VI cervical vertebra</td>
<td>124</td>
<td>51.6</td>
</tr>
</tbody>
</table>

The tendon of all scalenus anterior is inserted into the scalenus tubercle on the upper surface of the body of the first rib.

M. scalenus posterior

The scalenus posterior arises by short tendon from the posterior tuberculum of the transverse processes of the cervical vertebrae,
and the origin has many variations. It is inserted by a short tendon into the lateral surface of the first or the second rib. Nishi has reported the origin and absence of this muscle. I have observed only the insertion of this muscle.

In my instances 51 cadavers (102 sides, right 51, left 51) the scalenus posterior is inserted as in the following table:

<table>
<thead>
<tr>
<th>Ribs</th>
<th>Number of side</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>I</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>I. II</td>
<td>37</td>
<td>34</td>
</tr>
<tr>
<td>I. II. III</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

In Japanese it is not rare that the scalenus anterior is inserted into the third rib.

M. trapezius

According to the comparative anatomical studies the trapezius in man consists of three parts; viz. M. dorsoscapularis superior, M. dorsoscapularis inferior and M. cleidooccipitalis.

The cleidooccipitalis belongs originally to the region of the sternocleidomastoideus and its fiber-bundles pass obliquely downward and laterally. The dorsoscapularis superior takes the middle portion of the trapezius and its fiber-bundles pass transversely. The dorsoscapularis inferior takes the lower portion of the trapezius and its fiber-bundles pass obliquely upward and laterally.

The variations of the trapezius are explained from the above mentioned comparative anatomical conditions.


The lower limit of attachment on the vertebral spines is as follows:

<table>
<thead>
<tr>
<th>Lower limit</th>
<th>Number of sides</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. VII</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>IX</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>X</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>XI</td>
<td>36</td>
<td>43</td>
</tr>
<tr>
<td>XII</td>
<td>36</td>
<td>29</td>
</tr>
<tr>
<td>L. I</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>II</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
The lower limit which does not reach to the twelfth thoracic vertebra is considered as the reduction of the origin. There are 62.3% of the reduction of the spinal origin of the trapezius in my materials. Kräuse has reported such reduction as 6.04 (♂) and 7.0% (♀) in European.

In fetus the lower limit of the spinal origin is as follows:

<table>
<thead>
<tr>
<th>Lower limit</th>
<th>Number of sides</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
<td>left</td>
</tr>
<tr>
<td>T. IX</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>X</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>XI</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>XII</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

By comparing the lower limit of the adult with that of the fetus I can understand that the lower limit of the adult is higher than that of the fetus. During the observation of the lower part of the spinal origin in adult I can find frequently that the aponeurosis in this part is broken and the lower limit is undeterminable. In such cases the lower part of the trapezius does not reach on the spinous process or interspinous ligament, and adheres on the fascia lumbo-borsalis. Chudzinski and Du Bois Reymond have already reported such cases. I have found such cases in 20.8% in my instances.

I think that the lower part of the aponeurosis of the trapezius becomes thinner and thinner with the elongation of the vertebral column, and at last the lower part is destroyed.

The lower limit of the trapezius is symmetrical in a large number, but in adult it is not so, viz.:

Symmetrical 86 bodies (78%)
Asymmetrical 23 bodies (22%)  

In this asymmetrical examples the left lower limit is higher than the right in a large number.

2. The aponeurosis.

The aponeurosis of the right and left muscles are continuous across the middle line. Between above the middle of the septum nuchae and the thoracic vertebra the aponeurosis give rise to an extensive quadrilateral tendinous area.

The position of the widest part of the aponeurosis is as follows:
Fig. 17. Various forms of the clavicular insertion of the trapezius.
Fig. 18. Various forms of the clavicular insertion of the trapezius.
From this result I can not state the position of the widest part of the aponeurosis.

3. Separation of the original portion.
There are 15 (6.9%) sides which have the separation between the cervical and occipital portions.

4. The clavicular insertion.
The trapezius develops from the branchial musculature. At the first stage the anlage of the trapezius and the sternocleidomastoid is same. After a time this anlage separates into two portions, and from the dorsal portion develops the trapezius and from the ventral the sternocleidomastoideus. The anomaly in the part of the clavicular insertion is explained from this developmental fact.

I observed the abnormous bundle from the anterior margin, this bundle is inserted into the clavicle.
Abnormous bundle in both sides

.................................................. 16 (12.3%) cadavers in 130 cadavers.
Abnormous bundle in right side .................4 (3.0%) sides.
Abnormous bundle in left side ..................7 (5.3%) sides.

In a large number the external jugular vein passes through the space which is made between the clavicle and the abnormous bundle from the anterior margin of the trapezius. The condition of the abnormous bundle is variable. In some case it is tendinous, and in some case it is muscular.

I know M. cleidomastoideus that arises from the clavicle and inserted into the occipital bone. The above mention abnormous bundle is one kind of the cleidomastoid muscle.

5. The absence of the trapezius.
I could not find total defect of the trapezius.

The breadth of the clavicular insertion.

\[
\text{Breadth of clavicular insertion} \times 100 \over \text{Length of clavicula} = 33.1(34.0-36.3)
\]

\[
\text{Breadth of clavicular insertion} \times 100 \over \text{Length of clavicula} = 33.1(34.0-36.3)
\]
The length of the trapezius.
The length is calculated from the occipital insertion to the lower end in the median line.

Length 163 mm (146-180).

M. latissimus dorsi

The latissimus dorsi arises 1) from an aponeurosis attached to the processus spinalis and ligamentum interspinale of the five or six last thoracic and upper lumbar vertebrae, to the fascia lumbodorsalis, and to the posterior third of the crista iliaca, 2) from the external surface and upper margin of the last three or four ribs by muscular slips which interdigitate with those of the external oblique, 3) from the inferior angle of the scapula by muscular slips or fasciculus.

The above mentioned form is the scheme of the latissimus dorsi and as a matter of fact there are considerable variations in the extent of its fleshy portion and in the attachment of its aponeurosis to the vertebral column, crest of the ilium, the ribs, and the scapula.

1. Origin from the vertebral column.
I have observed the upper limit of the aponeurosis from the vertebral column and obtained the following table:

<table>
<thead>
<tr>
<th>Upper limit</th>
<th>right</th>
<th>Number of side left</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. V</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>VI</td>
<td>9</td>
<td>7</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>VII</td>
<td>21</td>
<td>23</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>VIII</td>
<td>15</td>
<td>15</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>IX</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

In a large number of the origin the upper limit is on the VII thoracic spinous process.

2. Origin from the rib.
The origin from the rib is as follows:

<table>
<thead>
<tr>
<th>Rib</th>
<th>right</th>
<th>Number of side left</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX. X. XI. XII</td>
<td>13</td>
<td>12</td>
<td>25</td>
<td>41.6</td>
</tr>
<tr>
<td>X. XI. XII</td>
<td>17</td>
<td>18</td>
<td>35</td>
<td>58.3</td>
</tr>
<tr>
<td>XI. XII</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
I quote Nishi's and Shibuya's results and make the following table:

<table>
<thead>
<tr>
<th>Authors</th>
<th>Ribs</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nishi</td>
<td>IX. X. XI. XII</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>X. XI. XII</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>XI. XII</td>
<td>6</td>
</tr>
<tr>
<td>Shibuya</td>
<td>IX. X. XI. XII</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>X. XI. XII</td>
<td>67.9</td>
</tr>
</tbody>
</table>

In Japanese the last three ribs supply the origin to the lattissimus dorsi most frequently.

3. Origin from the inferior angle of the scapula.

<table>
<thead>
<tr>
<th>Number of cadavers which have scapular origin in both sides</th>
<th>Number of cadavers which has scapular origin in one side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
</tr>
<tr>
<td></td>
<td>53.3%</td>
</tr>
</tbody>
</table>

4. Langer's axillary arch.

The muscular slip extends from the lattissimus dorsi across the axillary fossa to the tendon of the pectoralis major near the intertubercular groove. This muscular slip is Langer's axillary arch. I observed 52 instances in 1050 sides of adults, namely 5%.

M. rhomboideus

There are not great variations in the rhomboideus.

1. Upper limit of the vertebral origin.

The upper limit of the rhomboideus is as follows:

<table>
<thead>
<tr>
<th>Upper limit</th>
<th>Number of side</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. 4</td>
<td>right left</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5 5</td>
<td>10</td>
<td>16.7</td>
</tr>
<tr>
<td>5</td>
<td>18 18</td>
<td>36</td>
<td>60.0</td>
</tr>
<tr>
<td>6</td>
<td>7 7</td>
<td>14</td>
<td>23.3</td>
</tr>
</tbody>
</table>

The upper limit of the vertebral origin is most frequently on the fifth cervical spinous process.

2. Lower limit of the vertebral origin.
The lower limit of the vertebral origin is most frequently on the fifth thoracic vertebra.

3. Scope of the origin on the spinous process.

<table>
<thead>
<tr>
<th>Scope</th>
<th>Number of side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
</tr>
<tr>
<td>C. IV T. III</td>
<td>1</td>
</tr>
<tr>
<td>C. IV T. IV</td>
<td>3</td>
</tr>
<tr>
<td>C. V T. IV</td>
<td>7</td>
</tr>
<tr>
<td>C. V T. V</td>
<td>11</td>
</tr>
<tr>
<td>C. VI T. V</td>
<td>3</td>
</tr>
<tr>
<td>C. VI T. VI</td>
<td>5</td>
</tr>
</tbody>
</table>

The vertebral origin spreads most frequently on eight spinous processes.

4. Separation of the rhomboideus.

The rhomboideus major and minor are fused with each other occasionally, I have observed such cases in 14.0% (70 sides in 500 sides).

The separation of the rhomboideus minor from the major is found in 86%. The place of the separation lies between the VI and VII cervical spinous processes most frequently.

M. rhomboideus minus

This muscle arises from the spinous process above the origin of the latissimus dorsi and runs lateral, and near the scapula the muscle fibers disappear or passes into the fascia of the teres major.

This muscle is never rare in Japanese. I have observed 56 cases of this muscle in 505 sides, namely it presents in 11.4%.

Nishi has reported this muscle in Japanese, and it presents in 16% according to him.

M. levator scapulae

1. Origin.

In Japanese the origin from the first cervical vertebra is always
Fig. 19. Abnormal slip (Δ) from the levator scapulae.
Statistics on the Musculature of the Japanese

present, and the lower limit of the origin is variable.

<table>
<thead>
<tr>
<th>Origin (cervical vertebrae)</th>
<th>Number of sides</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
<td>left</td>
<td>total</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>I. II</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>I. II. III</td>
<td>8</td>
<td>8</td>
<td>16</td>
<td>26.6</td>
<td></td>
</tr>
<tr>
<td>I. II. III. IV</td>
<td>20</td>
<td>20</td>
<td>40</td>
<td>66.6</td>
<td></td>
</tr>
<tr>
<td>I. II. III. IV. V</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3.3</td>
<td></td>
</tr>
</tbody>
</table>

The origin of the levator scapulae is most frequently from I, II, III, IV cervical vertebrae.

2. Abnormous fasciculus.

Wood and Krause have classified the abnormous fasciculus into two groups.

1. Dorsal fasciculus. There are two forms in this fasciculus:

a) The abnormous fasciculus arises from the dorsal portion of the upper part of the origin, and runs downward and is inserted into the serratus dorsalis superior, or on the rhomboideus, or on the spinous process of the vertebra.

Fig. 20. Abnormous slip (△) from the levator scapula.
Fig. 21. Abnormal slip (△) from levator scapulae.
S: scapula
b) The fasciculus arises from the processus mastoideus and runs along the splenius capitis and is inserted on the medial angle of the scapula.

2. Ventral fasciculus. This fasciculus arises from the cervical vertebra running downward and is inserted on the ventral surface of the subscapularis or the serratus posterior superior.

In my instances I have met two kinds of anomaly.

a) Abnormous slip arises from the medial margin of the levator scapulae, and it runs medialward and downward to be inserted on the spinous process of the second thoracic vertebra, or on the dorsal surface of the serratus posterior superior, or on the fascia lumbo-dorsalis. Such abnormality are found in 9 (9%, right 4, left 5) sides in 100 sides.

b) Abnormal slip arises from the medial margin of the levator scapulae, it runs downward, and spreads to be inserted on the ventral surface of the subscapularis. Such anomaly are found in 22 (right 7, left 15) sides in 100 sides.

M. serratus posterior superior

The serratus posterior superior arises by a flat tendon from the lower part of the septum nuchae and from the spinous processes of the lower cervical vertebrae and upper thoracic vertebrae. Its fibers are directed downward and lateralward to be inserted into the outer surface of the ribs, lateral to their angles.

1. Origin.

The scope of the origin is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Cervical</th>
<th>Thoracal</th>
<th>Number of sides</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
<td>left</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV......VII</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>V......VI</td>
<td>5</td>
<td>7</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>VI............I</td>
<td>18</td>
<td>15</td>
<td>33</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>V............I</td>
<td>20</td>
<td>21</td>
<td>41</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>VI............I</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>IV............II</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>V............II</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

In Japanese the scope of the origin of the serratus posterior superior lies between the fifth cervical vertebra and the first thoracic vertebra most frequently.

From the above mentioned table I calculated upper and lower limit of the origin.
2. Insertion.

The ribs of the insertion are as follows:

<table>
<thead>
<tr>
<th>Ribs</th>
<th>Number of side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
</tr>
<tr>
<td>II. III. IV</td>
<td>44</td>
</tr>
<tr>
<td>II. III. IV. V</td>
<td>72</td>
</tr>
<tr>
<td>II. III. IV. V. VI</td>
<td>10</td>
</tr>
<tr>
<td>III. IV</td>
<td>4</td>
</tr>
<tr>
<td>III. IV. V</td>
<td>34</td>
</tr>
</tbody>
</table>

**M. serratus posterior inferior**

The serratus posterior inferior arises by a broad but thin tendon from the posterior layer of the lumbo-dorsal fascia from about the level of the second lumbar to that of the tenth thoracic vertebra. Its fibers are directed upward and lateralward and inserted into the outer surface of the lower ribs. There are variations on origin and insertion.

1. The upper limit of the origin.

<table>
<thead>
<tr>
<th>Upper limit</th>
<th>Number of side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
</tr>
<tr>
<td>T. X</td>
<td>15</td>
</tr>
<tr>
<td>XI</td>
<td>31</td>
</tr>
<tr>
<td>XII</td>
<td>4</td>
</tr>
<tr>
<td>L. I</td>
<td>0</td>
</tr>
<tr>
<td>II</td>
<td>0</td>
</tr>
</tbody>
</table>

2. Insertion.
From this result I can say that the serratus posterior inferior is inserted into the lower four ribs in a large number. I calculated the upper limit of the insertion from the above mentioned table, namely:

<table>
<thead>
<tr>
<th>Upper rib</th>
<th>Number of side</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
</tr>
<tr>
<td>XI</td>
<td>3</td>
</tr>
<tr>
<td>IX</td>
<td>22</td>
</tr>
<tr>
<td>X</td>
<td>3</td>
</tr>
<tr>
<td>XI, XII</td>
<td>3</td>
</tr>
<tr>
<td>XI, XII</td>
<td>2</td>
</tr>
</tbody>
</table>

The XI rib is the lowest limit of the insertion in 61 (26%) sides, and the XII is the lowest rib of the insertion in 145 (93%) sides.

M. rectus capitis posterior major

The rectus capitis posterior major arises from the upper surface of the spine of the epistropheus and the muscle-fibers diverge to form a broad triangular band which is inserted into the lateral half of the linea nuchae inferior of the occipital bone and the area below it.

I have observed this muscle in 112 cadavers (right 112 sides, left 112 sides) and classified them into three forms.

I form.

The rectus capitis posterior major has the form as described in the anatomical text-book.

Both side have this form ..................84 cadavers (76.5%)
Right side has this form .................. 7 cadavers (6.2%)
Left side has this form ................. 6 cadavers (5.3%)

The relation of muscles of both sides is varies individually. There is space between the both muscles or there is no space, therefore the rectus capitis posterior minor can be seen or not from
the outside. In a large number the medial portion of the rectus capitis major covers the lateral portion of the rectus capitis minor.

II form.
The muscle is divided longitudinally into two parts.

Muscle of both sides is divided into two parts:.................
................................................................. 3 cadavers (2.6%)  
Muscle of right side is divided into two parts.................
................................................................. 1 cadaver  
Muscle of left side is divided into two parts................
................................................................. 2 cadavers (1.7%)  

In my instances the rectus capitis posterior major is divided into two parts in 4%.

III form.
The muscle receives accessory slip from the other muscle.

The muscles of the both sides receive the accessory slip from
the rectus capitis minor .........................3 cadavers (2.6%).
Muscle of the right side receives the accessory slip from
the rectus capitis posterior minor ..........2 cadavers (1.7%).
Muscle of the left side receives the accessory slip from the
rectus capitis minor .........................9 cadavers (8.0%).
Muscle of the left side receives the accessory slip from the
obliquus capitis inferior......................1 cadaver (0.9%).

In my 224 sides I found 18 rectus capitis posterior major which
received accessory slip from another muscle.

M. rectus capitis posterior minor

It arises from the upper part of the side of the posterior
tubercle of the atlas, and the fiber-bundles diverge to form a flat
triangular sheet inserted below them distal third of the linea nuchae
inferior of the occipital bone on the inferior surface of the squama
occipitalis. This small muscle has many variations in its form. I
observed the rectus capitis posterior minor in 112 cadavers (right
side 112, left sides 112), and classified it into 4 forms.

I form.
It arises from the posterior tubercle of the atlas and passes
upward broadening as it goes, and is inserted into the inner
portion of the linea nuchae inferior. This is the typical form described in text-book.

Muscles of both sides have this form .........................
................................. 54 cadavers (48.2%).
Right side has this muscle ..................16 cadavers (14.2%).
Left side has this muscle ...............10 cadavers (8.9%).

Namely the typical form is seen in 134 (59.8%) in 224 sides.
In this form the developing grade of the muscle varies very much. In some cadaver the right and left muscles are well-developed and the medial margin of the both muscles touch each other, and in some cadaver the muscle is small and there is wide distance between the right and left muscles.

II form (absence).
In my 112 cadavers the absence of this muscle is as follows:
2 (1.7%) cadavers have not this muscle in both sides.
1 (0.8%) cadaver has not right rectus capitis posterior minor.
3 (2.4%) cadavers have not left rectus capitis posterior minor.

III form.
The rectus capitis posterior minor is divided into two parts longitudinally.

The muscles of both sides are divided into two parts longitudinally ................ 17 cadavers (15.1%).
Right muscle is divided .................. 11 cadavers (0.9%).
Left muscle is divided .................. 12 cadavers (1.0%).

I can calculate from the above mentioned table that the rectus capitis posterior minor absents in 25.4% of sides.

In a large number the division is two-division, and three-division is a few. Generally the lateral fasciculus of the divided muscle is smaller. The lateral fasciculus goes latero-cranial and fuses with the medial margin of the rectus capitis posterior major or is inserted independently into the linea nuchae inferior.

IV form.
The rectus capitis posterior minor receives accessory slip from the other muscle, and the slip comes from the spine of the epistropheus or the septum nuchae.
M. Mori

Muscles of both sides have accessory slip .................
............................................................................. 7 cadavers (6.2%).
Left muscle has accessory slip ..................... 1 cadaver (0.9%).

Namely the rectus capitis posterior minor has the accessory slip in 6.6%.

M. atlantomastoideus

The atlantomastoideus is a small muscle and passes from the transverse process of the atlas to the mastoid process. If the splenius capitis is took off and the medial region of the longissimus capitis is observed, we can find the atlantomastoideus. This muscle is separated from the obliquus capitis inferior by the A. occipitalis, and sometimes the A. occipitalis passes between the atlantomastoideus and the longissimus capitis.

I have observed this muscle in the following:

Right and left sides have the atlantomastoideus..............
............................................................................. 5 cadavers (9.2%).
Right side has the atlantomastoideus...... 5 cadavers (9.2%).
Left side has the atlantomastoideus ..... 4 cadavers (7.4%).

This is the results of the observation in 54 cadavers, and if calculate the side which has the atlantomastoideus from this table, the atlantomastoideus presents in 19 sides (right 10, left 9), namely in 17.5%.

The typical atlantomastoideus arises from the processus transversus atlantis and is inserted into the mastoid process as above mentioned. Sometimes the atlantomastoideus receives accessory slip.

In one case a slip arises from the transverse process of the atlas elongates and joins in the fasciculus of the splenius capitis.

In one case the lower portion of the atlantomastoideus elongates to be inserted into the transverse process of the epistropheus.

In one case the upper portion of the atlantomastoideus joins in the longissimus capitis.

I can see always distinctly that this muscle is innervated by the dorsal branch of the C1. The upper portion of the longissimus capitis and the obliquus capitis superior are innervated similarly by the dorsal branch of the C1. Namely I have opinion that the longissimus capitis, the obliquus capitis superior and the atlantomastoideus develop from the same anlage.
Fig. 22. M. atlantomastoideus (△).
Sometimes the atlantomastoideus has the connection with the splenius. The morphological explanation of this fact is very difficult, because we have already learned that the splenius cervicis develops from the lateral superficial myotome, and the longissimus capitis et cervicis develops from the medial myotome. But there is a fasciculus which arises from the atlantomastoideus and joins in the splenius cervicis as I have above mentioned. From this variation I have opinion that a portion of the splenius capitis develops from the medial myotome.

The similar muscle to this atlantomastoideus is observed in Gorilla (Sommer), chimpanzee (Gratiet et Alix) and seminopithecus (Kohbrugge). From the comparative anatomical fact I think that the existence of the atlantomastoideus of man is not curious.

**Platysma**

I classified my results into five types according to Loth's schemata, and obtained the following table:

128 cadavers are observed.

- **Type I.** muscle paucier sans entrecroisement .......................... 16 cadavers (12.5%).
- **Type II.** avec entrecroisement sous le menton uni-ou bilatéral .......................... 84 cadavers (65.6%).
- **Type III.** avec entrecroisement sur le cou, mais au dessus de la proéminence .......................... 3 cadavers (2.3%).
- **Type IV.** avec entrecroisement sous la proéminence laryngienne dans la partie inférieure du cou ..........................
  19 cadavers (14.2%).
- **Type V.** avec entrecroisement sur le sternum ..........................
  6 cadavers (4.6%).

My results are arranged as Type II> Type IV> Type I> Type V> Type III.

It is very difficult to determine the lower end of the platysma. I prepared very carefully and obtained the following results:

- **I.** The lower end is on the 1st intercostal space .......................... 76 cadavers (59.3%).
- **2.** The lower end is on the 2nd intercostal space ..........................
  52 cadavers (40.6%).
M. transversus thoracis

The transversus thoracis forms thin sheath situated upon the posterior surface of the medial portion of the anterior thoracic wall. It arises at one edge by a series of slips from the costal cartilage; the upper fibers are directed obliquely downward and medially, and the lower ones transversely to be inserted by a thin, flat tendon to the sides of the lower portion of the sternum and to the xiphoid process.

Material: 310 sides.

Fig. 23. Scope of transversus thoracis
(The schemata followed Lot h).
1. The uppermost rib of origin.

<table>
<thead>
<tr>
<th>Rib</th>
<th>Number of side</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>7</td>
<td>2.2</td>
</tr>
<tr>
<td>II</td>
<td>122</td>
<td>39.3</td>
</tr>
<tr>
<td>III</td>
<td>155</td>
<td>50.0</td>
</tr>
<tr>
<td>IV</td>
<td>23</td>
<td>7.4</td>
</tr>
<tr>
<td>V</td>
<td>3</td>
<td>0.9</td>
</tr>
</tbody>
</table>

2. The lowest rib of origin.

<table>
<thead>
<tr>
<th>Rib</th>
<th>Number of side</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>50</td>
<td>16.1</td>
</tr>
<tr>
<td>VI</td>
<td>237</td>
<td>76.4</td>
</tr>
<tr>
<td>VII</td>
<td>23</td>
<td>7.4</td>
</tr>
</tbody>
</table>

3. The scope of the transversus thoracis on inner surface of thoracic wall.

<table>
<thead>
<tr>
<th>The upperest rib</th>
<th>The lowest rib</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I</td>
<td>1 0.3%</td>
</tr>
<tr>
<td>II</td>
<td>27 8.74%</td>
</tr>
<tr>
<td>III</td>
<td>21 6.7%</td>
</tr>
<tr>
<td>IV</td>
<td>1 0.3%</td>
</tr>
<tr>
<td>V</td>
<td>3 0.9%</td>
</tr>
</tbody>
</table>

M. serratus anterior

The serratus anterior arises from the outer surface of the ribs. Its fibers may be regarded as arranged in three groups; the uppermost, the middle and the lowest group.

The variation of this muscle is found in the origin and the developmental grade of each group.

1. Origin. 204 sides were observed.

<table>
<thead>
<tr>
<th>Uppermost rib</th>
<th>Number of side</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>182</td>
<td>89.2</td>
</tr>
<tr>
<td>II</td>
<td>22</td>
<td>10.7</td>
</tr>
</tbody>
</table>
The dorsal supracostal muscle is inconstant, but it is not very rare. Its form is not simple and it is rational to divide its form into three types according to Eisler.

1. I type.
   It is found on the dorsal wall of the thorax. It arises from the rib to be inserted into the rib passing over one or two ribs. The muscle fibers follow the same direction as the external intercostal muscle.

2. II type.
   The muscle fibers arise from the ribs by as from one to three fleshy slips or digitation and direct craniomedial to be inserted into the rib. The muscle fibers follow the same direction as the serratus posterior superior.

3. III type.
   The muscle fibers arise from the eighth to tenth ribs and pass dorsocranial. The insertion varies according to the grade of development of the muscle fibers. In the case of the feeble development of the muscle fibers the cranial end of the muscle passes into the fascia over the ribs. In the case of strong development of the muscle the terminal tendon is inserted into the fascia of the deep muscle of the trunk.

There are 65 cases of the supracostalis dorsalis, and I classified them as follows:
Fig. 24. M. supracostalis posterior.
M. supracostalis anterior

The supracostalis anterior is seen on the anterior surface of thorax wall, passing from the anterior end of the first rib downward to the fourth, sometimes to the third.

I have observed 126 supracostalis anterior in 1200 cadavers (2400 sides).

The form of this muscle is very simple, and the origin and insertion are variable individually.

1. Origin.

<table>
<thead>
<tr>
<th>Uppermost rib</th>
<th>Number of side</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>105</td>
<td>4.4</td>
</tr>
<tr>
<td>II</td>
<td>21</td>
<td>0.8</td>
</tr>
</tbody>
</table>

2. Insertion.

<table>
<thead>
<tr>
<th>Lowest rib</th>
<th>Number of side</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>58</td>
<td>2.4</td>
</tr>
<tr>
<td>IV</td>
<td>68</td>
<td>2.8</td>
</tr>
</tbody>
</table>

3. Scope of muscle.

<table>
<thead>
<tr>
<th>Lowest rib</th>
<th>Uppermost rib I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>58</td>
<td>2.4%</td>
</tr>
<tr>
<td>IV</td>
<td>47</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

A large number of my instances the supracostalis anterior arises from the first rib and is inserted into the fourth rib.

Livan has found this muscle in 47%, I have found this muscle in 5.2% in 2400 sides of cadavers.

M. deltoideus

The deltoideus arises from: 1) the lateral border and upper surface of the acromion, 2) from the ventral and upper surface of the lateral portion of the clavicle, and 3) from the spine of the
scapula. There are sometimes separation between these three portions. I observed the separating situation of each portion.

1. Between the acromial portion and the rest of the muscle.
   - Perfect separation: 12 arms (24%).
   - Unperfect separation: 19 arms (38%).
   - No separation: 19 arms (38%).

2. Between the clavicular portion and the rest of the muscle.
   - Perfect separation: 2 arms (4%).
   - Unperfect separation: 2 arms (4%).
   - No separation: 46 arms (92%).

3. Origin from the spine.
   - The origin from the spine is limited only on the spine: 16 arms (32%).
   - The origin from the spine is limited on the spine and the fascia infraspinata: 31 arms (62%).
   - The origin from the spine is only on the fascia infraspinata: 3 arms (6%).

**M. teres major**

In my instances the teres major is always present.

The situation of the tendon.

1. The terminal tendon is fused with the tendon of the latissimus dorsi in 28 arms (28%).
2. The insertion-place of the teres major and the latissimus dorsi lie parallel on the humerus: 13 arms (26%).
3. The insertion-place of the teres major and the latissimus dorsi make V-shape on the humerus: 10 arms (20%).
4. A abnormal slip arises from the tuberculum infraglenoidale, and it goes lateralward to fuse with the terminal tendon of the teres major: 1 arm (2%).

**M. teres minor**

1. The fusion with the infraspinatus.

The percentage of the fusion of the teres minor with the
251

infraspinatus is 10 arms (20%).
2. The absence of the teres minor.
The percentage of the absence is 2 arms (4%).

M. coracobrachialis

1. The separation of the belly of the muscle.
   a. The belly of the muscle is completely separated into superficial and deep layers.......................8 arms (16%).
   b. The belly of the muscle is incompletely separated into superficial and deep layers ......................4 arms (8%).
   c. The belly is not separated .......................38 arms (76%).

2. The relation between the N. musculocutaneus and the belly of muscle.
   a. In 47 (94%) instances the musculocutaneous nerve runs through the belly of the muscle.
   b. In 3 (6%) instances the musculocutaneous nerve runs on the ventral surface of the muscle.

In 3 (6%) instances a abnormal slip arises from the distal portion of the coracobrachialis and runs medialward to fuse with the medial surface of the terminal portion of the pectoralis major. It may be a kind of the axillar arches.

M. biceps brachii

I examined only the third head.
In my 50 arms there are ten (20%) arms which have the third head.
The origin of the third head is as follows:

1. The distal portion of the tuberositas deltoideus ........
   4 arms (8%).
2. The distal portion to the place of the insertion of the coracobrachialis .............................. 3 arms (6%).
3. The terminal tension of the pectoralis major............
   2 arms (4%).
4. The tuberositas minor ....................... 1 arm (2%).
M. brachialis

In 12 arms (24%) the muscle is divided into two distinct heads. In 1 arm (2%) a abnormous slip arises from the latero-distal portion of the brachialis to be inserted into the tuberositas radii.

M. triceps brachii

I. Origin.
1. The long head. In 49 arms (98%) the long head arises from the capsule of the shoulder-joint and the margo axillaris scapulae neighbouring the cavitas glenoidalis.
   In one arm (2%) the long head arises only from the margo axillaris scapulae neighbouring the cavitas glenoidalis.
2. The medial and lateral head.

   The medial head locates proximal to the lateral head ...... ................................. 36 arms (72%).
   The medial and the lateral heads locate in equal level...... ................................. 14 arms (28%).

II. Abnormous slip.
In one arm (2%) small slip arises from the portion between the origin of the medial and lateral heads, and goes distalward to fuse with the lateral head of the triceps.
In one arm (2%) a slender slip arises from the caudal surface of the capsule of the shoulder-joint and goes distalward to fuse with the medial head of the triceps.

M. palmaris longus

There are many reports about the palmaris longus. I have observed following things in 100 arms (♀ 50, ♂ 50).
1. The length of common portion of the palmaris longus and the flexor digitorum superficialis.
   ♀ 48–114 mm, Average 70.5 mm.
   ♂ 42–86 mm, Average 64.8 mm.
2. The length of the muscle portion.
 Statistics on the Musculature of the Japanese 253

♀ 102-176 mm, Average 129.8 mm.
♂ 92-140 mm, Average 120.2 mm.

3. The distance between the distal end of the muscle-fiber and the articulatio radio-carpea.
♀ 70-144 mm, Average 112.9 mm.
♂ 74-119 mm, Average 104.9 mm.

4. The length of the terminal tendon.
♀ 112-206 mm, Average 172.1 mm.
♂ 115-184 mm, Average 157.6 mm.

5. The width of the terminal tendon in the middle portion.
♀ 2-8 mm, Average 4.2 mm.
♂ 3-4 mm, Average 3.4 mm.

6. The maximal width of the muscle belly.
♀ 5-24 mm, Average 15.6 mm.
♂ 4-18 mm, Average 12.2 mm.

7. Index= \[ \frac{\text{The length of the muscle belly}}{\text{The length of the radius}} \times 100. \]
♀ 45.83-72.13, Average 57.11.
♂ 48.42-71.79, Average 57.76.

The percentage of the absence.

There are many reports on the absence of the palmaris longus.

It is obtained the following table by citing them:

<table>
<thead>
<tr>
<th>Authors</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adachi</td>
<td>2.7-3.9</td>
</tr>
<tr>
<td>Koganei and Arai</td>
<td>3.9</td>
</tr>
<tr>
<td>Shikinami</td>
<td>3.9</td>
</tr>
<tr>
<td>Matsushima</td>
<td>3.2</td>
</tr>
<tr>
<td>Inoue</td>
<td>8.0</td>
</tr>
<tr>
<td>Taketa</td>
<td>3.7</td>
</tr>
<tr>
<td>Suzuki, Report I</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>♀ 6.0</td>
</tr>
<tr>
<td>Suzuki, Report II</td>
<td>♀ 7.0</td>
</tr>
<tr>
<td></td>
<td>♂ 6.0</td>
</tr>
<tr>
<td>Suzuki, Report III</td>
<td>♀ 5.5</td>
</tr>
<tr>
<td></td>
<td>♂ 9.5</td>
</tr>
</tbody>
</table>

If I calculate average value of these data I gain 5.0%. Namely the palmaris longus of Japanese is absent in ca. 5%.
Variation.

1. The belly of the muscle lies in the distal instead of the proximal part of the forearm. 3 arms (1%) in 360 arms.
2. The terminal tendon terminates in the fascia of the forearm. 3 arms (1.4%) in 205 arms.
3. The separation of the terminal tendon.
   The terminal tendon is divided into two fasciculus. 3-4 arms (1.0%) in 40 arms.
   The terminal tendon is divided into three fasciculus ... 1 arm (2.5%) in 40 arms.

M. pronator teres

Instances: 80 arms (♀ 40, ♂ 40)

1. The length of the humeral head.
   ♀ 20-40 mm, Average 29 mm.
   ♂ 18-33 mm, Average 23.2 mm.

2. The distance between the caput radii and the point of the reunion of the humeral- and ulnar head.
   ♀ 32-83 mm, Average 48.8 mm.
   ♂ 27-51 mm, Average 41.5 mm.

3. The length of the ulnar head.
   ♀ 15-29 mm, Average 22.6 mm.
   ♂ 8-24 mm, Average 18.1 mm.

4. The width of the place of the insertion.
   ♀ 8-15 mm, Average 11.7 mm.
   ♂ 7-12 mm, Average 10.3 mm.

5. The distance between the caput radii and the proximal end of the insertion on the radius.
   ♀ 57-108 mm, Average 75.0 mm.
   ♂ 43-70 mm, Average 60.1 mm.

6. \[ \text{Index} = \frac{5}{\text{The distance between the caput radii and proc. styloideus radii}} \times 100. \]
   ♀ 25.70-45.39, Average 31.80.
   ♂ 22.63-35.90, Average 28.49.
7. The distance between the caput radii and the distal end of the insertion on the radius.
   ♂ 116-166 mm, Average 132.3 mm.
   ♀ 109-147 mm, Average 125.1 mm.

8. The length of the insertion on the radius.
   ♂ 40-90 mm, Average 61.7 mm.
   ♀ 50-86 mm, Average 68.2 mm.

9. Index=$\frac{\text{The distance between the caput radii and proc. styloideus radii}}{(7)}\times 100$.
   ♂ 47.37-63.89, Average 57.61.
   ♀ 51.90-70.33, Average 59.32.

10. The length of the proximal portion fusing with M. flexor carpi radialis.
    ♂ 76-121 mm, Average 103 mm.
    ♀ 80-110 mm, Average 95 mm.

11. The length of the radius.
    ♂ 197-268 mm, Average 228 mm.
    ♀ 190-248 mm, Average 211 mm.

12. Supplementary fasciculus.
    The pronator teres receives a muscular slip from the brachialis ..................................................15%.
    The pronator teres receives a muscular slip from the biceps brachii .............................................17.5%.

    Fibrous connection between the pronator teres and the other muscles:
    Fibrous connection between the brachialis and the pronator teres ..............................................0.5%.
    Fibrous connection between the flexor digitorum superficialis and the pronator teres ........................0.25%.

13. The ulnar head is very week in 10%.

14. Relation between the median nerve and the pronator teres.
    a. The median nerve passes between the humeral- and ulnar heads..................................................95%.
    b. The median nerve passes between the flexor digitorum profundus and the pronator teres ....................0.25%.
The median nerve passes through the humeral head of the pronator teres..........................0.25%.

In 4% the portion of the insertion is divided into two parts.

The minimal width of the terminal tendon.

\[ \odot \text{5–10 mm, Average 7.3 mm.} \]
\[ \odot \text{5–8 mm, Average 6.3 mm.} \]

M. flexor carpi ulnaris

I could not find any variation in form or situation of the origo and insertion.

1. The distance between the distal end of the ulnar head and the radio-carpeal joint.

\[ \odot \text{60–112 mm, Average 83.4 mm.} \]
\[ \odot \text{58–96 mm, Average 73.9 mm.} \]

2. The distance between the proximal end of the terminal tendon and the radio-carpeal joint.

\[ \odot \text{112–210 mm, Average 166 mm.} \]
\[ \odot \text{102–188 mm, Average 148 mm.} \]

3. The distance between the distal end of the muscular fiber and the radio-carpeal joint.

\[ \odot \text{–6–13 mm, Average 6 mm.} \]
\[ \odot \text{–3–12 mm, Average 6.2 mm.} \]

In 6% the muscular part of the flexor carpi ulnaris goes distalward beyond the radio-carpeal joint, and these cases are indicated with minus, namely \[-6 \text{ mm indicates that the terminal end of the muscular lies 6 mm distal to the radio-carpeal joint.}\]

M. flexor carpi ulnaris brevis

This abnormous muscle arises from the distal quarter of the volar surface of the ulna and is inserted in the pisiform. I have found 4 cases (1.9%) of this muscle in 205 arms.

M. epitrochleo-olecranonis

This small muscle runs from the medial epicondyle to the olecranon over the groove for the N. ulnaris. I have found in 5%
of this muscle in 96 arms.

M. flexor carpi radialis

It arises from the medial epicondyle of the humerus and the septa between its head and the pronator teres, the flexor superficialis and the palmaris longus.

1. The length of the common portion with the palmaris longus.
   - $\phi$ 35-112 mm, Average 71.4 mm.
   - $\varphi$ 43-82 mm, Average 60.3 mm.

2. The length of the common portion with the flexor digitorum superficialis.
   - $\phi$ 65-155 mm, Average 115.1 mm.
   - $\varphi$ 88-128 mm, Average 105.2 mm.

3. The distance between the humero-radial joint and the proximal end of the terminal tendon of the flexor carpi radialis.
   - $\phi$ 62-112 mm, Average 82.6 mm.
   - $\varphi$ 50-80 mm, Average 65.3 mm.

4. The distance between the radio-carpal joint and the terminal tendon to the 2nd metacarpal.
   - $\phi$ 34-56 mm, Average 40.1 mm.
   - $\varphi$ 32-46 mm, Average 39.1 mm.

5. The distance between the distal end of the muscular fiber and the radio-carpal joint.
   - $\phi$ 32-95 mm, Average 56.6 mm.
   - $\varphi$ 35-78 mm, Average 61.5 mm.

6. Index = \( \frac{(5)}{\text{The length of the radius}} \) \times 100.
   - $\phi$ 12.96-41.67, Average 24.72.
   - $\varphi$ 17.95-37.89, Average 29.05.

7. The length of the portion of the muscle fiber.
   - $\phi$ 140-220 mm, Average 181.9 mm.
   - $\varphi$ 135-186 mm, Average 163.5 mm.

8. Index = \( \frac{(7)}{\text{The length of the radius}} \) \times 100.
   - $\phi$ 57.38-94.84, Average 79.68.
   - $\varphi$ 69.57-92.82, Average 77.66.
9. The maximal length of the terminal tendon.
   ♂ 158-220 mm, Average 183.4 mm.
   ♀ 140-250 mm, Average 176.1 mm.

10. The width of the middle part of the terminal tendon.
    ♂ 4-10 mm, Average 6.0 mm.
    ♀ 5-7 mm, Average 5.6 mm.

11. The maximal width of the belly of the muscle.
    ♂ 12-31 mm, Average 19.5 mm.
    ♀ 12-23 mm, Average 16.3 mm.

12. The width of the origo-tendon.
    ♂ 7-20 mm, Average 13.7 mm.
    ♀ 7-14 mm, Average 10.6 mm.

    a. In 7.5% the flexor carpi radialis have the radial origin.
       In these cases the radial origo is well developed and distinguished.
    b. In 5% the flexor carpi radialis receives a muscular slip from the processus coronoides.
    c. In 2% the muscle is wholly doubled.

    a. The terminal tendon is inserted into the second metacarpal...............90.0%.
    b. The terminal tendon sends a tendinous slip to the 3rd metacarpal .....................7.5%.

15. The flexor carpi radialis is absent in 2.5% of my instances.

M. flexor carpi radialis accessorius

It is present in 2.5% of my instances. A muscular slip arises from the belly of the muscle, and goes distalward along the belly of the flexor carpi radialis and the terminal tendon goes distalward to be inserted into the naviculare.

M. flexor digitorum superficialis

1. The distance between the caput radii and the proximal end of the radial head.
2. The distance between the radio-carpal joint and the distal end of the radial head.

♀ 52-136 mm, Average 90.3 mm.
♂ 65-111 mm, Average 82.1 mm.

3. The width of the radial head, it is measured on the radius.

♀ 13-120 mm, Average 65 mm.
♂ 40-85 mm, Average 70 mm.

4. a. The distance between the proximal end of the terminal tendon and the radio-carpal joint.

♀ 67-168 mm, Average 108 mm.
♂ 82-168 mm, Average 101 mm.

b. The distance between the proximal end of the terminal tendon for the middle finger and the radio-carpal joint.

♀ 90-167 mm, Average 129 mm.
♂ 64-132 mm, Average 108 mm.

c. The distance between the proximal end of the terminal tendon for the ring finger and the radio-carpal joint.

♀ 72-158 mm, Average 114 mm.
♂ 70-141 mm, Average 106 mm.

d. The distance between the proximal end of the terminal tendon for the little finger.

♀ 29-133 mm, Average 68 mm.
♂ 25-98 mm, Average 61 mm.

5. The length (mm) of the terminal tendons for fingers.

<table>
<thead>
<tr>
<th></th>
<th>II finger</th>
<th>III finger</th>
<th>IV finger</th>
<th>V finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>♀</td>
<td>195-276</td>
<td>250-323</td>
<td>188-303</td>
<td>124-260</td>
</tr>
<tr>
<td>Average</td>
<td>239</td>
<td>266</td>
<td>238</td>
<td>178</td>
</tr>
<tr>
<td>♀</td>
<td>205-245</td>
<td>184-296</td>
<td>184-250</td>
<td>128-221</td>
</tr>
<tr>
<td>Average</td>
<td>225</td>
<td>237</td>
<td>226</td>
<td>164</td>
</tr>
</tbody>
</table>

6. The distance (mm) between the distal end of the muscles for fingers and the radio-carpal joint.
The minus indicates that the muscle fiber elongates distalward passing the radio-carpal joint.

7. The width (mm) of the tendons for fingers.

<table>
<thead>
<tr>
<th></th>
<th>II finger</th>
<th>III finger</th>
<th>IV finger</th>
<th>V finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂</td>
<td>7-30</td>
<td>-18-49</td>
<td>-2-83</td>
<td>-4-50</td>
</tr>
<tr>
<td>Average</td>
<td>9</td>
<td>14</td>
<td>40</td>
<td>19</td>
</tr>
<tr>
<td>♀</td>
<td>-8-12</td>
<td>-10-25</td>
<td>6-63</td>
<td>-10-29</td>
</tr>
<tr>
<td>Average</td>
<td>1</td>
<td>9</td>
<td>44</td>
<td>10</td>
</tr>
</tbody>
</table>

8. Index = \[ \frac{\text{Width of radial head (3)}}{\text{Length of radius}} \times 100. \]

♂ 5.00-50.85, Average 29.41.


In 5% of my instances the muscle for the second finger has transverse tendon.

10. The radial head is absent in 7.5% of my instances, and in 12% of my instances the radial head is very feeble.

11. Abnormal fasciculus. (fig. 26)

a. A small fasciculus arises from the distal portion of the radial head and goes distalward to fuse with the tendon for V finger. The fusing point lies about 15 mm distal to the radio-carpal joint. Such anomaly is observed in 2.5%.

b. In 0.8% the terminal tendon of the middle finger of the flexor digitorum superficialis and the terminal tendon of the middle finger of the flexor digitorum profundus are fused each other, and there is a small muscle on the fusing place.

c. The terminal tendon for the second finger is divided longitudinally into a large and a small tendon. The small part has a muscle and its terminal tendon is fused with the first lumbrical muscle. Such case is found 1:205 arms.

d. The terminal tendon for the V finger has no Champer's
chiasma, and the tendon is inserted on the radial side of the middle phalanx of the little finger. Such case is found 1:205 arms.

12. The fusion with the neighbouring muscle.
   a. The fusion with the pronator teres .....................2.5%.
   b. The fusion with the flexor pollicis longus ............45%.
   c. The fusion with the flexor digitorum profundus.......8%.

13. There is a tendinous connection between tendons for II and III fingers in the palma.

---

Fig. 26. Anomalies in M. flex. dig. superf.
1. Tendinous connection between the tendon for II and III fingers.
2. Muscle on the fusing place of M. flexor dig. superf. and M. flexor dig. prof.
3. The tendon of abnormal muscle is fused with the lumbricalis (†).
4. Abnormal muscle fasciculus arising from the radial side of the flex. dig. superf. is fused with the tendon for V finger.
M. flexor digitorum profundus

1. The distance between the radio-carpal joint and the distal end of the origin from the ulna.
   ♂ 52-80 mm, Average 68 mm.
   ♀ 47-84 mm, Average 59 mm.

2. The distance between the caput radii and the proximal end of the origin from the ulna.
   ♂ 11-108 mm, Average 65 mm.
   ♀ 42-80 mm, Average 60 mm.

3. The length of the radial origin on the radius.
   ♂ 10-68 mm, Average 36 mm.
   ♀ 31-81 mm, Average 41 mm.

4. The distance (mm) between the radio-carpal joint and the proximal end of the tendons for fingers.

<table>
<thead>
<tr>
<th></th>
<th>II finger</th>
<th>III finger</th>
<th>IV finger</th>
<th>V finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂</td>
<td>66-156</td>
<td>102-166</td>
<td>98-176</td>
<td>82-168</td>
</tr>
<tr>
<td>Average</td>
<td>119</td>
<td>134</td>
<td>133</td>
<td>121</td>
</tr>
<tr>
<td>♀</td>
<td>95-142</td>
<td>103-153</td>
<td>93-156</td>
<td>72-155</td>
</tr>
<tr>
<td>Average</td>
<td>110</td>
<td>128</td>
<td>126</td>
<td>109</td>
</tr>
</tbody>
</table>

5. The distance (mm) between the radio-carpal joint and the distal end of muscle fibers for fingers.

<table>
<thead>
<tr>
<th></th>
<th>II finger</th>
<th>III finger</th>
<th>IV finger</th>
<th>V finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂</td>
<td>13-61</td>
<td>-16-50</td>
<td>-7-30</td>
<td>6-75</td>
</tr>
<tr>
<td>Average</td>
<td>27</td>
<td>15</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>♀</td>
<td>11-122</td>
<td>-6-20</td>
<td>-10-35</td>
<td>2-40</td>
</tr>
<tr>
<td>Average</td>
<td>27</td>
<td>7</td>
<td>9</td>
<td>25</td>
</tr>
</tbody>
</table>

The minus indicates that the distal end of the muscle fiber lies distal to the radio-carpal joint.

6. The width (mm) of the terminal tendon for fingers.

<table>
<thead>
<tr>
<th></th>
<th>II finger</th>
<th>III finger</th>
<th>IV finger</th>
<th>V finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂</td>
<td>3-7</td>
<td>4-7</td>
<td>4-7</td>
<td>3-5</td>
</tr>
<tr>
<td>Average</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>♀</td>
<td>5-9</td>
<td>4-7</td>
<td>4-6</td>
<td>3-6</td>
</tr>
<tr>
<td>Average</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
7. The flexor digitorum profundus has radial origin ......84%.

8. Accessory slip to the flexor digitorum profundus.
   a. The flexor digitorum profundus receives the muscular slip from the coronoid process ....40%.
   b. The flexor digitorum profundus receives the muscular slip from the medial epicondylus of the humerus .......
   .................................................................1:205 arms.
   c. The flexor digitorum profundus receives the muscular fasciculus from the flexor pollicis longus.........12.5%.
   d. The proximal part of the terminal tendon of the flexor digitorum profundus is fused with the proximal part of the terminal tendon of the flexor digitorium superficialis...
   .................................................................11%.

M. flexor pollicis longus

1. The distance between the radio-carpal joint and the distal end of the insertion on the radius.
   ♂ 32-72 mm, Average 47 mm.
   ♀ 30-55 mm, Average 41 mm.

2. The length of the insertion on the radius.
   ♂ 93-152 mm, Average 127 mm.
   ♀ 100-142 mm, Average 116 mm.

3. The distance between the radio-carpal joint and the distal end of the insertion on the membrana interossea.
   ♂ 56-102 mm, Average 77 mm.
   ♀ 50-74 mm, Average 63 mm.

4. The distance between the radio-carpal joint and the proximal end of the terminal tendon.
   ♂ 70-152 mm, Average 122 mm.
   ♀ 94-130 mm, Average 113 mm.

5. The distance between the radio-carpal joint and the distal end of the muscular fiber.
   ♂ –6-40 mm, Average 16 mm.
   ♀ 6-26 mm, Average 14 mm.

The minus indicates that the distal end of the muscular fiber lies distal to the radio-carpal joint.
6. The width of the terminal tendon.

♂ 4-7 mm, Average 5 mm.
♀ 4-6 mm, Average 4 mm.

7. The length of Ganzer's accessory fasciculus.

♂ 76-135 mm, Average 98 mm.
♀ 81-103 mm, Average 94 mm.

8. The width of Ganzer's accessory fasciculus.

♂ 3-12 mm, Average 7 mm.
♀ 3-11 mm, Average 6 mm.

9. In 50% of my instances I have found Ganzer' fasciculus. If I cite the percentage of the presence of Ganzer's fasciculus the following table is obtained:

<table>
<thead>
<tr>
<th>Races</th>
<th>Authors</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>European</td>
<td>Le Double</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Wood</td>
<td>39</td>
</tr>
<tr>
<td>Negres</td>
<td>Loth</td>
<td>89.3</td>
</tr>
<tr>
<td>Aino</td>
<td>Sano</td>
<td>70.0</td>
</tr>
<tr>
<td>Japanese</td>
<td>Adachi</td>
<td>62.7</td>
</tr>
<tr>
<td></td>
<td>Inoue</td>
<td>71.0</td>
</tr>
</tbody>
</table>

I classify Ganzer' fasciculus as follows:

a. From the epicondylus medialis humeri ......... 24%.
b. From the processus coronoideus ulnae .......... 68%.
c. From the epicondylus medialis and the processus coronoideus ........................................... 8%.

10. Relation between the terminal tendon and Ganzer' fasciculus.

a. The terminal tendon of the flexor pollicis longus arises from the Ganzer's fasciculus .................. 40%.
b. The terminal tendon of the flexor pollicis longus arises from the belly of the flexor pollicis longus and Ganzer's fasciculus ................................................... 40%.
c. The terminal tendon of the flexor pollicis longus arises from the fusing part of the flexor pollicis longus and Ganzer' fasciculus......................................................... 16%.
d. The tendon from the flexor pollicis longus and the tendon from the Ganzer's fasciculus fuse together to make one tendon ................................................................. 4%.
11. The connection with the other muscles.
   a. The muscular fasciculus from the flexor pollicis longus goes into the flexor digitorum profundus............12.5%.
   b. The tendinous fasciculus from the terminal tendon of the flexor pollicis longus is fused with the tendon of the flexor digitorum profundus for the II finger ..........7.5%.
   c. Ganzer' fasciculus is divided into two parts, and the terminal tendon of the first part is fused with the flexor pollicis longus and the terminal tendon from the second part goes distalward to fuse with the tendon of the flexor digitorum profundus for II finger .........................5%.

12. The flexor digitorum profundus and the flexor pollicis longus are connected with muscular fasciculus ...............4.5%.

13. The percentage of the absence of the origin from the interosseal membrane..........................................7.5%.

M. pronator quadratus

1. The distance between the radio-carpal joint and the distal end of the insertion on the radius.
   ♂ 4–40 mm, Average 8.7 mm.
   ♀ 3–18 mm, Average 8.3 mm.

2. The width of the insertion on the radius.
   ♂ 38–65 mm, Average 53 mm.
   ♀ 35–52 mm, Average 44 mm.

3. The distance between the radio-carpal joint and the distal end of the insertion on the ulna.
   ♂ 7–24 mm, Average 14 mm.
   ♀ 5–19 mm, Average 11 mm.

4. The width of the insertion on the ulna.
   ♂ 39–58 mm, Average 50 mm.
   ♀ 35–55 mm, Average 42 mm.

5. The form of the muscle is various and the direction of the muscular fibers in a muscle is not same. It is difficult to classify the muscle according to its form. I show various forms of the muscle in figures.
Fig. 27. Various forms of M. pronator quadratus.
1...30 (39%),  2...15 (19%),  3...5 (6%),  4...15 (19%) 
5...20 (2%),  6...2 (2%),  7...5 (6%),  8...2 (2%)

M. brachioradialis

1. The distance between the epicondylus lateralis humeri and the proximal end of the muscle.
♀ 65–120 mm, Average 97 mm.
♂ 72–120 mm, Average 91 mm.

2. The distance between the humero-radial joint and the proximal end of the muscle.
♀ 75–135 mm, Average 106 mm.
♂ 80–133 mm, Average 103 mm.

3. The length of the insertion on the humerus.
♀ 53–96 mm, Average 70 mm.
♂ 50–88 mm, Average 67 mm.

4. The distance between the radio-carpal joint and the proximal end of the terminal tendon.
♀ 125–184 mm, Average 154 mm.
♂ 127–168 mm, Average 143 mm.
5. Index = \( \frac{(4)}{\text{Length of radius}} \times 100. \)
   - \( \text{♀} \) 56.96–80.84, Average 67.20.
   - \( \text{♂} \) 64.29–64.29, Average 67.91.

6. The distance between the radio-carpal joint and the distal end of the muscle fiber.
   - \( \text{♀} \) 70–125 mm, Average 100 mm.
   - \( \text{♂} \) 72–115 mm, Average 87 mm.

7. The width of the terminal tendon.
   - \( \text{♀} \) 8–19 mm, Average 13 mm.
   - \( \text{♂} \) 5–16 mm, Average 11 mm.

8. The connection by muscular accessory slip with the neighbouring muscles.
   a. With M. brachialis ........................................... 2.5%.
   b. With M. abductor pollicis longus ...................... 12.5%.
   c. With M. extensor carpi radialis longus ............... 5.0%.
   d. With M. biceps brachii .................................. 2.5%.

9. Insertion.
   a. The terminal tendon is inserted into the Lig. radio-carpeum dorsale ........................................... 2.5%.
   b. The terminal tendon is doubled throughout its length, and the Ramus superficialis n. radialis passes between these slips ........................................... 2.5%.

M. extensor carpi radialis longus

1. The distance between the epicondylius humeri lateralis and the proximal end of the extensor carpi radialis longus.
   - \( \text{♀} \) 36–62 mm, Average 47 mm.
   - \( \text{♂} \) 35–62 mm, Average 45 mm.

2. The distance between the humero-radial joint and the proximal end of the extensor carpi radialis longus.
   - \( \text{♀} \) 42–83 mm, Average 55 mm.
   - \( \text{♂} \) 48–72 mm, Average 56 mm.

3. The length of the origo of the extensor carpi radialis longus on the humerus.
4. The length of the origo of the extensor carpi radialis longus et brevis on the humerus.

♀ 35–72 mm, Average 48 mm.
♂ 35–60 mm, Average 45 mm.

5. The distance between the caput radii and the proximal end of the terminal tendon of the extensor carpi radialis longus.

♀ 40–78 mm, Average 56 mm.
♂ 48–62 mm, Average 54 mm.

6. The distance between the radio-carpal joint and the proximal end of the terminal tendon of the extensor carpi radialis longus.

♀ 32–90 mm, Average 51 mm.
♂ 32–64 mm, Average 49 mm.

Fig. 28. Various forms of the tendons of M. extensor carpi radialis longus et brevis.

X. M. e. c. r. brevis. △. M. e. c. r. longus.
7. The distance between the radio-carpal joint and the distal end of the muscle fiber of the extensor carpi radialis longus.
   ♂ 54-90 mm, Average 69 mm.
   ♀ 44-81 mm, Average 56 mm.

8. The distance between the caput radii and the distal end of the muscle fiber of the extensor carpi radialis longus.
   ♂ 110-172 mm, Average 151 mm.
   ♀ 125-164 mm, Average 146 mm.

9. The width of the terminal tendon of the extensor carpi radialis longus.
   ♂ 9-17 mm, Average 13 mm.
   ♀ 7-16 mm, Average 11 mm.

10. Index = \( \frac{(6)}{\text{Length of radius}} \times 100 \).
11. Anomalies.

a. The flexor carpi radialis longus arises with two heads, the muscular fiber from the distal head is fused with the flexor carpi radialis brevis, and the terminal tendon of the extensor carpi radialis brevis is fused with the terminal tendon of the extensor carpi radialis longus (Fig. 28, 4) ... 2.5%.

b. The extensor carpi radialis longus arises from two heads, one is larger. The larger head is fused with the extensor carpi radialis brevis. The smaller head is fused with the middle portion of the extensor carpi radialis brevis.

The terminal tendon of the extensor carpi radialis brevis is divided into two. The smaller one is fused with the terminal tendon of the extensor carpi radialis longus (Fig. 28, 1, 2) 2.5%.

c. The extensor carpi radialis longus is divided into two, and each muscle has its own terminal tendon. The extensor carpi radialis brevis is divided into two, and each muscle has its own tendon. Thus there are four extensor carpi radialis. The proximal portion of two muscles are fused together to make the extensor carpi radialis intermedius of Wood (Fig. 28, 3) 2.5%.

d. There are many forms of the separation of the terminal tendon (Fig. 28, 5–8) 5.4%.

---

**M. extensor carpi radialis brevis**

1. The distance between the radio-carpal joint and the proximal end of the terminal tendon of the extensor carpi radialis brevis.

- ♂ 121–174 mm, Average 143 mm.
- ♀ 120–152 mm, Average 135 mm.

2. The width of the terminal tendon of the extensor carpi radialis brevis.

- ♂ 7–12 mm, Average 8 mm.
- ♀ 6–8 mm, Average 6 mm.
3. Index = \( \frac{3}{\text{Length of radius}} \times 100 \).

♂ 53.18-76.32, Average 63.81.
♀ 60.75-69.71, Average 64.03.

**M. extensor digitorum**

1. The total length of the origo of the extensor carpi radialis longus and the extensor digitorum on the humerus.

♂ 16-41 mm, Average 27 mm.
♀ 17-50 mm, Average 26 mm.

2. The total length of the origo of the extensor digiti quinti and the extensor digitorum on the humerus.

♂ 109-213 mm, Average 159 mm.
♀ 115-160 mm, Average 136 mm.

3. The distance between the radio-carpal joint and the proximal end of the terminal tendon for fingers (mm).

<table>
<thead>
<tr>
<th></th>
<th>II finger</th>
<th>III finger</th>
<th>IV finger</th>
<th>V finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂</td>
<td>77-140</td>
<td>101-176</td>
<td>88-168</td>
<td>60-154</td>
</tr>
<tr>
<td>Average</td>
<td>117</td>
<td>149</td>
<td>134</td>
<td>98</td>
</tr>
<tr>
<td>♀</td>
<td>89-162</td>
<td>105-158</td>
<td>96-150</td>
<td>72-124</td>
</tr>
<tr>
<td>Average</td>
<td>108</td>
<td>129</td>
<td>115</td>
<td>89</td>
</tr>
</tbody>
</table>

4. The distance between the radio-carpal joint and the distal end of the muscle fiber for fingers (mm).

<table>
<thead>
<tr>
<th></th>
<th>II finger</th>
<th>III finger</th>
<th>IV finger</th>
<th>V finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂</td>
<td>6-80</td>
<td>50-141</td>
<td>-8-107</td>
<td>5-86</td>
</tr>
<tr>
<td>Average</td>
<td>42</td>
<td>116</td>
<td>72</td>
<td>27</td>
</tr>
<tr>
<td>♀</td>
<td>20-76</td>
<td>83-126</td>
<td>44-88</td>
<td>12-44</td>
</tr>
<tr>
<td>Average</td>
<td>45</td>
<td>103</td>
<td>66</td>
<td>28</td>
</tr>
</tbody>
</table>

The minus indicates that the distal end of the muscle-fiber lies distal to the radio-carpal joint.

5. Separation.

a. Separation of the muscle.

Three separations (the third portion is divided into two) ..........................................................90%.

Four separations ..................................................10%.
b. Separation of the terminal tendon.
   III tendon is doubled ........................................2.5%.
   IV tendon is doubled ........................................5.0%.
   V tendon is doubled ..........................................12.5%.
   II and IV tendons are doubled ..............................2.5%.
   IV and V tendons are doubled ................................2.5%.
   III IV and V tendons are doubled .........................15.0%.
   III and V tendons are doubled ................................2.5%.

6. Absence of junctura tendinea.
   1. The absence of the junctura tendinea between II and
      III tendons .....................................................10.0%.
   2. The absence of the junctura tendinea between IV and
      V tendons .....................................................2.5%.
   3. The absence of the junctura tendinea between III and
      IV tendons .....................................................10.0%.

7. The absence of the terminal tendon for V finger ......4.0%.

M. extensor indicis

1. The distance between the olecranon and the proximal end
   of the origin on the ulna.
   ♂ 100-166 mm, Average 135 mm.
   ♀ 100-138 mm, Average 119 mm.

2. The distance between a) the proximal end of the origin and
   the radio-carpal joint, b) the distal end of the origo and the radio-
   carpal joint.
   a) ♂ 73-158 mm, Average 115 mm.
      ♀ 86-131 mm, Average 112 mm.
   b) ♂ 31-58 mm, Average 45 mm.
      ♀ 35-51 mm, Average 40 mm.

3. The length of the insertion on the ulna.
   ♂ 35-105 mm, Average 70 mm.
   ♀ 59-91 mm, Average 76 mm.

4. The distance between the distal end of the origo on the
   interosseal membrane and the radio-carpal joint.
   ♂ 27-70 mm, Average 50 mm.
   ♀ 39-60 mm, Average 48 mm.

5. The distance between the radio-carpal joint and the proxi-
mal end of the terminal tendon.

♂ 11–76 mm, Average 43 mm.
♀ 33–56 mm, Average 33 mm.

6. The distance between the radio-carpal joint and the distal end of the muscle fiber.

♂ −19–25 mm, Average 0.1 mm.
♀ −20–11 mm, Average −3 mm.

The minus indicates that the distal end of the muscle fiber lies distal to the radio-carpal joint.

7. The width of the terminal tendon.

♂ 3–7 mm, Average 4 mm.
♀ 3–5 mm, Average 4 mm.

8. Relations.

a. The distal end of the muscle fiber lies distal to the radio-carpal joint .................................48%.
b. The distal end of the muscle fiber lies on the radio-carpal joint ........................................8%.
c. The distal end of the muscle fiber does not reach to the radio-carpal joint ........................................44%.
d. The terminal tendon is doubled throughout its length ........................................................ 12%.
e. The distal half of the muscle is doubled throughout its length, and each portion has its own terminal tendon ..... ................................. 8%.

M. extensor digiti minimi

1. The length of the common portion of the origin of the extensor digiti minimi and the extensor digitorum.

♂ 72–153 mm, Average 104 mm.
♀ 63–131 mm, Average 94 mm.

2. The distance between the proximal end of the terminal tendon and the radio-carpal joint.

♂ 75–155 mm, Average 115 mm.
♀ 50–144 mm, Average 104 mm.

3. The distance between the distal end of the muscle fiber and the radio-carpal joint.
4. The width of the terminal tendon.

♀ 2–56 mm, Average 26 mm.
♀ 12–43 mm, Average 30 mm.

♀ 3–6 mm, Average 4 mm.
♀ 3–7 mm, Average 4 mm.

5. The split of the terminal tendon.

a. The tendon is not splitted........................6%.

b. The tendon is doubled throughout of its length ...82%.

c. The tendon is splitted into three slips..............12%.

M. extensor minimi accessorius

The extensor digiti minimi divides into two slips. The ulnar portion extends on the back of the fifth metacarpal to the base of the first phalanx of the little finger, this slip is the extensor digiti minimi. The radial slip extends to the dorsal carpal ligament to insert into it. This is the extensor digiti minimi accessorius. The extensor digiti minimi accessorius is found in 4% of my instances.

M. extensor digiti minimi et quarti

The terminal tendon of the extensor digiti minimi divides into two slips, and one of them extends to the dorsal on the back of the fifth metacarpal to insert into the first phalanx of the little finger, and another slip extends to the dorsal on the back of the fourth metacarpal to fuse with the terminal tendon of the extensor digitorum for the fourth finger.

The extensor digiti minimi et quarti presents in 2%.

M. extensor carpi ulnaris

1. The length of the insertion on the ulna.

♀ 65–128 mm, Average 91 mm.
♀ 68–115 mm, Average 91 mm.

♀ 118–204 mm, Average 153 mm.
♀ 116–157 mm, Average 142 mm.
3. The distance between the distal end of the muscle fiber and the radio-carpal joint.
   ♂ 6-48 mm, Average 21 mm.
   ♀ 5-26 mm, Average 19 mm.

4. The width of the terminal tendon.
   ♂ 2-11 mm, Average 6 mm.
   ♀ 5-7 mm, Average 6 mm.

M. supinator

1. The length of the fibrous portion of the origin.
   ♂ 40-80 mm, Average 54 mm.
   ♀ 37-60 mm, Average 50 mm.

2. The distance between the radio-humeral joint and the distal end of the insertion on the radius.
   ♂ 85-144 mm, Average 107 mm.
   ♀ 84-107 mm, Average 98 mm.

3. The distance between the radio-carpal joint and the distal end of the insertion on the radius.
   ♂ 60-138 mm, Average 144 mm.
   ♀ 83-128 mm, Average 106 mm.

4. The length of the muscle.
   ♂ 52-120 mm, Average 74 mm.
   ♀ 50-80 mm, Average 54 mm.

5. The length of the insertion on the radius.
   ♂ 60-115 mm, Average 74 mm.
   ♀ 57-87 mm, Average 74 mm.

6. Index = \( \frac{4}{\text{Length of humerus}} \times 100 \).
   ♂ 24.53-50.44, Average 32.69.
   ♀ 23.36-36.73, Average 30.48.

7. Index = \( \frac{5}{\text{Length of radius}} \times 100 \).
   ♀ 23.64-42.62, Average 35.20.
8. The distance between the middle point of the radius and the distal end of the insertion on the radius.
   ♂ —14-26 mm, Average 7 mm.
   ♀ —9–21 mm, Average 6 mm.

   The minus indicates that the distal end of the insertion lies distal to the middle point of the radius, these cases are found in 16%.

9. The distance between the olecranon and the distal end of the insertion on the ulna.
   ♂ 70–100 mm, Average 83 mm.
   ♀ 62–87 mm, Average 75 mm.

10. The length of the insertion on the ulna.
    ♂ 25–57 mm, Average 39 mm.
    ♀ 30–49 mm, Average 39 mm.

M. abductor pollicis longus

1. The distance between the radio-carpal joint and the proximal end of the insertion on the radius.
   ♂ 54–84 mm, Average 68 mm.
   ♀ 48–73 mm, Average 62 mm.

2. The distance between the radio-humeral joint and the proximal end of the insertion on the ulna.
   ♂ 41–70 mm, Average 56 mm.
   ♀ 36–55 mm, Average 47 mm.

3. The distance between the radio-carpal joint and the proximal end of the insertion (a) on the radius, and (b) on the ulna
   a. ♂ 126–190 mm, Average 145 mm.
      ♀ 110–189 mm, Average 144 mm.
   b. ♂ 153–210 mm, Average 176 mm.
      ♀ 145–182 mm, Average 165 mm.

4. The extend of the insertion (a) on the radius, (b) on the ulna.
   a. ♂ 73–120 mm, Average 89 mm.
      ♀ 67–123 mm, Average 92 mm.
   b. ♂ 27–78 mm, Average 58 mm.
      ♀ 23–90 mm, Average 51 mm.
5. The distance between the radio-carpal joint and a) the proximal end of the terminal tendon, and b) the distal end of the muscle fiber.
   a. ♂ 70-136 mm, Average 100 mm.
      ♀ 63-108 mm, Average 92 mm.
   b. ♂ 10-48 mm, Average 31 mm.
      ♀ 18-40 mm, Average 30 mm.

6. The width of the terminal tendon.
   ♂ 4-11 mm, Average 6 mm.
   ♀ 4-9 mm, Average 6 mm.

7. The abductor pollicis longus is fused with the extensor pollicis brevis in 10% of my instances.

8. The split of terminal tendon.
   a. The tendon is doubled throughout its length...........35%.
   b. The tendon is splitted into three slips.................46%.
   c. The tendon is splitted into four slips ..................14%.
   d. The tendon is splitted into five slips ..................4%.

9. Insertion.
   On the first metacarpal ..................................2%.
   On the first metacarpal and the tendon of the abductor pollicis brevis...............................24%.
   On the first metacarpal, the tendon of the abductor pollicis brevis and os trapezium............40%.

M. extensor pollicis brevis

1. The distance between the humero-radial joint and the proximal end of the insertion on the radius.
   ♂ 90-144 mm, Average 120 mm.
   ♀ 83-123 mm, Average 111 mm.

2. The distance between the olecranon and the proximal end of the insertion on the ulna.
   ♂ 92-160 mm, Average 127 mm.
   ♀ 100-125 mm, Average 112 mm.

3. The distance between the radio-carpal joint and the proximal end of the insertion on a) the radius, and b) on the membrana interossea, c) on the ulna.
a. ♂ 74–134 mm, Average 108 mm.
♀ 67–118 mm, Average 91 mm.
b. ♂ 74–152 mm, Average 111 mm.
♀ 86–136 mm, Average 109 mm.
c. ♂ 90–160 mm, Average 124 mm.
♀ 105–138 mm, Average 121 mm.

4. The length of the insertion on a) the radius, b) membrana interossea, and c) the ulna.
   a. ♂ 31–85 mm, Average 61 mm.
      ♀ 18–69 mm, Average 44 mm.
   b. ♂ 10–78 mm, Average 44 mm.
      ♀ 12–98 mm, Average 51 mm.
   c. ♂ 12–65 mm, Average 24 mm.
      ♀ 17–27 mm, Average 22 mm.

5. The distance between the radio-carpal joint and a) the proximal end of the terminal tendon, b) the distal end of the muscle fiber.
   a. ♂ 30–105 mm, Average 66 mm.
      ♀ 15–72 mm, Average 48 mm.
   b. ♂ 10–39 mm, Average 22 mm.
      ♀ 4–27 mm, Average 15 mm.

6. The width of the terminal tendon.
   ♂ 2–7 mm, Average 4 mm.
   ♀ 3–5 mm, Average 3 mm.

7. The fusion of the head with another muscle.
   With the abductor pollicis longus .............................10%.
   With the extensor pollicis longus .............................50%.

8. The absence of the ulnar origin .............................28%.

9. The absence of the extensor pollicis brevis ..............2%.

10. The split of the terminal tendon ...........................10%.

11. The situation of the insertion of the extensor pollicis brevis. I classified the situation of the insertion as follows:
   a. The insertion is on the proximal phalanx ...........58.3%.
   b. The insertion is on the proximal- and end phalanx ....
      .................................................................20.8%.
   c. The insertion is on the end phalanx............... 21.0%.
M. extensor pollicis brevis

1. In 5% of my instances the terminal tendon is doubled.

2. The insertion of the terminal tendon.
   a. The terminal tendon is inserted into the end phalanx of the thumb ..........................80%.
   b. The terminal tendon is fused with the terminal tendon of the extensor pollicis brevis, and is inserted into the end phalanx of the thumb........................................20%.
   c. The terminal tendon is doubled throughout its length, and one is inserted into the end phalanx of the thumb, and another is into the proximal phalanx ......................15%.

M. palmaris brevis

It arises at the lateral edge of the palmar aponeurosis from the tendinous slips and extends into the deep surface of the skin along the ulnar border of the palm.

1. The width of the aponeurotic insertion.
   ♂ 8-38 mm, Average 21 mm.
   ♀ 12-35 mm, Average 22 mm.

2. The width of the insertion into the skin.
   ♂ 16-57 mm, Average 21 mm.
   ♀ 15-35 mm, Average 26 mm.

3. The length of the muscle.
   ♂ 16-32 mm, Average 24 mm.
   ♀ 16-30 mm, Average 22 mm.

4. There is no absence of this muscle in my instances. But the muscle varies in size, and in 10% of my instances this muscle is well developed, and in 32% the muscle not well developed. In 16.2% the muscle sends a tendinous slip to the pisiform bone.

Mm. lumbricales

1. Origin.
   a. The first lumbricalis arises from the radial side of the terminal tendon of the flexor digitorum profundus for the second finger.........................................................100%.
b. The second lumbricalis arises from the radial side of the terminal tendon of the flexor digitorum profundus for the middle finger ........................................78%.

The second lumbricalis arises with two heads, one arises from the radial side of the tendon of the flexor digitorum profundus for middle finger, and another arises from the ulnar side of the tendon of the flexor digitorum profundus for second finger .......................................................22%.

c. The third lumbricalis arises with two heads from the oppositing surface of the terminal tendons for the middle and fourth fingers .........................................................94%.

The third lumbricalis arises from the ulnar side of the terminal tendon for the middle finger .........................6%.

d. The fourth lumbricalis arises with two heads from the oppositing surface of the terminal tendons of the flexor digitorum profundus for the fourth and fifth fingers...98%.

The fourth lumbricalis arises from the ulnar side of the terminal tendon of the flexor digitorum profundus for the fourth finger...............................2%.

2. Insertion.

a. The tendons of the first and second lumbricalis are attached along the side of the first phalanx to the radial border of the tendon of the extensor digitorum for the second and third finger ........................................10%.

b. The third lumbricalis is divided into two slips, and one is inserted on the ulnar surface of the extensor digitorum for the fourth finger ........................................20%.

The terminal tendon of the third lumbricalis is inserted on the radial surface of the extensor digitorum for the fourth finger ........................................80%.

c. The fourth lumbricalis is divided into two slips, one is inserted on the ulnar surface of the extensor digitorum for the fourth finger, and another is inserted on the ulnar surface of the terminal tendon of the extensor digitorum for the fifth finger ........................................24%.

The fourth lumbricalis is inserted on the ulnar surface of the extensor digitorum for the fourth finger ......4%.

The fourth lumbricalis is inserted on the radial surface of the extensor digitorum for the fifth finger .........96%.
M. adductor pollicis

1. Origin.

The transverse head arises from the third and fourth metacarpal bone ............................................. 76%.

The transverse head arises from the third metacarpal bone ........................................................................ 24%.

2. Situation of the belly.

Two heads are completely separated ......................... 82%.

Two heads are less completely separated ............... 16%.

The transverse head is divided into two layers .......... 2%.

M. psoas minor

This muscle is inconstant in development and is frequently absent. The percentage of the absence is examined by many authors, if the results of authors are cited, the following table is obtained:

<table>
<thead>
<tr>
<th>Number of observed sides</th>
<th>Number of side of absence</th>
<th>%</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>67</td>
<td>65</td>
<td>M o r i</td>
</tr>
<tr>
<td>154</td>
<td>90</td>
<td>58.4</td>
<td>M a t s u s h i m a</td>
</tr>
<tr>
<td>212</td>
<td>106</td>
<td>50.0</td>
<td>K o g a n e i, A r a i</td>
</tr>
<tr>
<td>94</td>
<td>51</td>
<td>54.3</td>
<td>S h i k i n a m i</td>
</tr>
<tr>
<td>227</td>
<td>104</td>
<td>45.8</td>
<td>A d a c h i</td>
</tr>
<tr>
<td>91</td>
<td>54</td>
<td>59.3</td>
<td>A d a c h i</td>
</tr>
<tr>
<td>80</td>
<td>42</td>
<td>52.5</td>
<td>I g a r a s h i, H o s h i b a</td>
</tr>
</tbody>
</table>

From this statistics the percentage of the absence of the psoas minor is calculated as follows:

<table>
<thead>
<tr>
<th>Number of observed side</th>
<th>Number of side of absence</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>958</td>
<td>513</td>
<td>53.4</td>
</tr>
</tbody>
</table>

For purposes of reference I quote the percentage of absence of this muscle from the literatures (L o t h’s Anthropologie des parties molles, 1931).
Chez les Russes (G r u b e r) ...........................................48%.
Chez les Alsaciens (S c h w a l b e) .................................57%.
Chez les Anglais en general (T h o m s o n) ......................59%.
Chez les Ecossais (T h o m s o n) ....................................63%.
Chez les Irlandais (T h o m s o n) ....................................66%.
Chez les Negres (L o t h, E c s t e i n, S t r e b l o w) ....52.4%.
Chez les Chinois (N a k a n o) ....................................51.9%.

M. psoas major

I observed the upperest end of the origin in 152 sides.

<table>
<thead>
<tr>
<th>Uppermost vertebra</th>
<th>Number of side</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumbar I</td>
<td>150</td>
<td>98.6</td>
</tr>
<tr>
<td>II</td>
<td>2</td>
<td>1.3</td>
</tr>
</tbody>
</table>

In my instances there is no psoas major which arises from the thoracic vertebra.

M. sartorius

Material: 50 thigh, ♂

I classified the distal portion of the sartorius into 5 types.

1. The boundary of the muscular part and the terminal tendon is clear, and the terminal tendon is moderate ......................62%.

2. The boundary of the muscular part and the terminal tendon is not so clear, but the length of the terminal tendon is moderate ........................................26%.

3. The terminal tendon is very short, and the muscle fiber is inserted directly into the tibia ........................................12%.

4. The distal portion of the muscle is longitudinally divided into two parts, and the tendon of the secondary slip is attached to the anterior wall of the adductor canal ......15 in 320 thigh (4.7%).

5. The distal half of the sartorius has no muscle fiber, and is transformed into fibrous band. The fibrous band is attached to the fascia over the vastus medialis.................2 in 320 thigh (0.6%).

M. vastus lateralis

Material: 50 thigh, (♀).

The variations of this muscle, aside from a greater or less fusion of its parts, are not marked. I classified the fusing situa-
tion of this muscle with the vastus intermedius.

Total fusion ................................................................. 18%.
Partial fusion............................................................... 55%.
No fusion................................................................. 26%.

I classified the insertion into four types according to the relations to the rectus femoris.

1. The distal portion of this muscle lies lateral to the distal portion of the rectus femoris ....................... 52%.
2. The distal portion of this muscle is covered with the distal part of the rectus femoris ......................... 28%.
3. The distal portion of this muscle is fused with the fascia of the rectus femoris ............................. 12%.
4. The distal portion of this muscle is fused with the terminal tendon of the rectus femoris ................. 8%.

M. vastus medialis

Material: 50 thigh, ♂.

1. I classified the fusing situation of the distal portion of the vastus medialis and the rectus femoris.
   a. The total fusion of the distal part of the vastus medialis and the rectus femoris ....................... 22%.
   b. The distal portion of the vastus medialis is fused with the terminal tendon of the rectus femoris ...... 19%.
   c. There is no fusion between the vastus medialis and the rectus femoris .................................. 80%.

2. I classified the fusing situation between the vastus medialis and the vastus intermedius.
   a. The both muscles are fused totally .................. 20%.
   b. There is partial fusion between the both muscles... 50%.
   c. There is no fusion between the both muscles ..... 30%.

Mm. adductores

I classified the fusing situation of the adductores into 8 types.
1. M. adductor longus, M. adductor brevis and M. adductor magnus are fused in the neighbouring of the origin ....... 4%.
2. The fusion between the adductor longus and adductor brevis in the neighbouring of the origin ............ 4%.
3. The fusion of the adductor longus, adductor brevis and adductor magnus in the neighbouring of the insertion on the femur ......................................................... 8%.

4. The fusion of the adductor longus and the adductor magnus in the neighbouring of the insertion on the femur ...............38%.

5. The fusion of the adductor brevis and adductor magnus in the neighbouring of the insertion on the femur ......................6%.

6. The adductor brevis is fused with the adductor magnus totally .................................................................8%.

7. The adductor magnus is fused with the adductor minimus totally ..............................................................................8%.

8. There is no fusion between the adductores, each muscle is isolated from origin to insertion .................................14%.

9. Division of the adductor magnus.
   In 70% the adductor magnus is divided into three portions, and in 20% the adductor magnus is divided into two portions.

M. biceps femoris

I observed the situation of the isolation of two heads.
   The muscle of the long head is not fused with the muscle of the short head, the muscles from both heads are completely isolated ..............................................................30%.
   The terminal tendon of the long head is fused with the muscle of the short head .............................................70%.

M. gastrocnemius

Material: 50 legs. ♂.

1. The distance between the proximal end of the origo and the fusing part of the both heads.
   Medial head: 134–272 mm, Average 230 mm.
   Lateral head: 172–246 mm, Average 204 mm.

2. The distance between the proximal end of the origo and the fusing part of the both heads, this measure is made in the isolated muscle.
   Medial head: 175–259 mm, Average 226 mm.
   Lateral head: 165–242 mm, Average 206 mm.
3. The distance between the distal end of each head and the upper end of the tibia.
   Medial head: 142–226 mm, Average 183 mm.
   Lateral head: 137–219 mm, Average 174 mm.

4. \[ \text{Index} = \frac{\text{Length of medial head}}{\text{Length of tibia}} \times 100. \]
   45.3–83.4, Average 68.2.
   \[ \text{Index} = \frac{\text{Length of lateral head}}{\text{Length of tibia}} \times 100. \]
   52.5–75.0, Average 62.4.

5. The distance between the distal end of the muscle fiber and the upper end of the calcaneus.
   Medial head: 114–194 mm, Average 151 mm.
   Lateral head: 130–200 mm, Average 164 mm.

6. \[ \text{Index} = \frac{(1)}{\text{Length of tibia}} \times 100. \]
   Index of medial head: 34.7–36.0, Average 46.5.
   Index of lateral head: 39.6–58.4, Average 50.1.

7. The width of the muscle belly of the heads.
   Medial head: 24–90 mm, Average 46 mm.
   Lateral head: 24–80 mm, Average 37 mm.

8. The distance between the upper end of the tibia and the fusing part of the both heads.
   23–131 mm, Average 68 mm.

9. The width of the origo of the both heads.
   Medial head: 23–47 mm, Average 34 mm.
   Lateral head: 12–35 mm, Average 19 mm.

10. The length of the tendon of the origo of the both heads.
    Medial head: 141–211 mm, Average 182 mm.
        Lateral head: 132–207 mm, Average 156 mm.

11. The width of the terminal tendon.
    The maximal width: 23–70 mm, Average 40 mm.
        The minimal width: 9–13 mm, Average 12 mm.

12. The sesamoid bone.
    The sesamoid bone is found in the lateral head, the percentage
of the presence of the sesamoid bone is 28%.

13. Accessory head.
A small muscular slip arises from the capsule of the knee joint, and it goes distalward to fuse the lateral or medial head of the gastrocnemius. Such slip is found in 2.8% in my instances.

M. soleus

Materials: 50 legs, ♂.
1. The length of the origo on the tibia.
   32-45 mm, Average 40 mm.
2. The length of the origo on the fibula.
   27-128 mm, Average 86 mm.
3. The absence of the tibial head is 14%.
4. The distance between the upper end of the tibia and the proximal end of the insertion on the tibia.
   88-170 mm, Average 114 mm.
5. The distance between the upper end of the tibia and the distal end of the insertion on the tibia.
   117-222 mm, Average 154 mm.
6. The muscle belly.
   The length of the muscle fiber.
   215-395 mm, Average 279 mm.

\[
\text{Index} = \frac{\text{Length of muscle fiber}}{\text{Length of tibia}} \times 100.
\]

66.6-118.6, Average 91.2.

The index which exceeds 100 indicates that the muscle fiber of the soleus extends distal to the talo-crural joint. The muscle fiber extends distal to the talo-crural joint in 4%.

7. The width of the muscle belly.
   80-94 mm, Average 86 mm.
8. The thickness of the muscle belly.
   12-33 mm, Average 22 mm.

9. The distance between the upper end of the tibia and the fusing part of the gastrocnemius and the soleus.
Statistics on the Musculature of the Japanese

a. This is measured in the median line.
   100–250 mm, Average 175 mm.
b. This is measured along the medial margin.
   136–264 mm, Average 200 mm.
c. This is measured along the lateral margin.
   92–308 mm, Average 183 mm.

10. Index = \( \frac{9(b)}{\text{Length of tibia}} \times 100. \)
    38.9–80.4, Average 66.1.

11. The situation of the fusing of the gastrocnemius and the soleus.
    Musculous fusion ..............................................44%.
    Tendinous fusion ..............................................56%.

M. plantaris

1. The absence of the muscle.
   It is absent in 4% of my instances.

2. The accessory fasciculi.
   a. The accessory fasciculus arises from the capsule of the knee-joint.........................................................16%.
   b. The soleus receives a small fasciculus from the lateral head of the gastrocnemius .....................................2.5%.
   c. The accessory fasciculus arises from the upper part of the tibia ..............................................................2.5%.

3. The length of the muscle belly.
   24–115 mm, Average 83 mm

4. The width of the muscle belly.
   7–30 mm, Average 17 mm.

5. The distance between the upper end of the tibia and the distal end of the muscle fiber.
   24–84 mm, Average 49 mm.

M. flexor hallucis longus

The terminal tendon passes over the dorsal talotibial ligament, and through the groove on the posterior surface of the talus and
the under-surface of the sustentaculum tali, where it lies on the fibular side of the tendon of the flexor digitorum longus. It then crosses the deep surface of this tendon, to which it gives a slip, passes over the plantar surface of the medial head of the flexor hallucis brevis. The slip is divided into many slips, and they go to toes.

I classified the terminal tendon of the flexor hallucis longus as follows:

<table>
<thead>
<tr>
<th>Principal tendon and slips</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0</td>
</tr>
<tr>
<td>I and slip to II toe</td>
<td>8</td>
</tr>
<tr>
<td>I and slips to II et III toe</td>
<td>64</td>
</tr>
<tr>
<td>I and slips to II, III et IV toe</td>
<td>26</td>
</tr>
<tr>
<td>I and slips to II, III, IV et V toe</td>
<td>2</td>
</tr>
</tbody>
</table>

**M. tibialis posterior**

I examined the situation of the insertion of the terminal tendon, and classified the following many types:

<table>
<thead>
<tr>
<th>Insertion</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naviculare, Cuneiforme I et II</td>
<td>11</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme III et IV</td>
<td>31</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme I, Metatarsal I</td>
<td>1</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme I, Metatarsal II</td>
<td>2</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme I, Metatarsal III</td>
<td>6</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme I, Metatarsal IV</td>
<td>6</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme, Cuboideum</td>
<td>14</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme, Fascia of flexor hallucis brevis</td>
<td>10</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme I, terminal tendon of peroneus longus</td>
<td>10</td>
</tr>
<tr>
<td>Naviculare, Cuneiforme I, Aponeurosis plantaris</td>
<td>5</td>
</tr>
</tbody>
</table>

**M. peroneus longus**

I classified the situation of the insertion of the terminal tendon.

<table>
<thead>
<tr>
<th>Insertion</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metatarsal I</td>
<td>64</td>
</tr>
<tr>
<td>Metatarsal I, Cuneiforme I</td>
<td>28</td>
</tr>
<tr>
<td>Metatarsal I, Naviculare</td>
<td>2</td>
</tr>
<tr>
<td>Metatarsal I, Cuneiforme I, terminal tendon of tibialis posterior</td>
<td>4</td>
</tr>
</tbody>
</table>
M. peroneus brevis

I examined the situation of the insertion of the terminal tendon of the peroneus brevis.

1. The tendon is inserted into the tuberosity of the fifth metatarsal \(47\%\).
2. The terminal tendon sends a slip to the end phalanx of the fifth toe \(20\%\).
   This slip has a small belly of muscle \(8\%\).
3. The terminal tendon of the peroneus brevis sends a slip to the distal part of the fifth metatarsal \(10\%\).
4. The terminal tendon sends a slip to the end phalanx of the fourth toe \(5\%\).

![Fig. 30. A slip from the terminal tendon of the peroneus brevis.](image)

1. A slip has muscle belly.
2. A slip extends to the end phalanx of the fifth toe.
3. A slip is inserted into the fifth metatarsal.

M. peroneus digiti quinti

It is a small muscle, and it arises from the distal end of the fibula and is inserted into the fifth toe. I found 2 cases of this peroneus digiti quinti in 73 legs, namely in \(2.7\%\).

M. tibialis anterior

I classified the situation of the terminal tendon of the tibialis anterior, and obtained the following results:

1. The terminal tendon passes over the front of the tibia
to the medial side of the foot, where it is inserted into the medial surface of the cuneiforme I and the base of the metatarsal I. The terminal tendon is not divided .....78%.
2. The terminal tendon is divided into two slips and one is inserted into the cuneiforme I, and another tendon is inserted into the metatarsal I.................................20%.
3. The terminal tendon is divided into three, and each tendon is inserted into the cuneiforme I, metatarsal I and naviculare respectively........................................2%.

M. extensor hallucis longus

I examined the terminal tendon, and classified the results as follows:
1. The terminal tendon has no slip to any where or from any where, and it is inserted into the endphalanx of the big toe ...............................................................16%.
2. The terminal tendon gives a small slip to the first phalanx of the big toe in the middle of the first metatarsal ................................................................. 78%.
3. The terminal tendon is divided into two slips near the insertion, and each is inserted into the endphalanx of the big toe ...............................................................2%.
4. The terminal tendon sends a small slip to the base of the first metatarsal ...............................................................4%.

M. extensor digitorum longus

The length of the muscle fiber.
218–356 mm, Average 315 mm.

The separation of the distal portion of the muscle.
1. The distal portion of the muscle is divided into two layers, superficial and deep, and each layer is divided into two portions. Terminal tendons for second and third toes come from the superficial layer, and the terminal tendons for fourth and fifth toes come from the deep layer ...34%.
2. The distal portion of the muscle is divided into two layers. The distal portion of the superficial portion is divided into three parts, and each part sends a terminal tendon to the first, second and third toe. The terminal
tendon of the fifth toe comes from the deep layer......40%.
3. The muscle is not divided into two layers, and the distal portion is divided into four, each portion sends a terminal tendon to the II, III, IV, and V toe......................26%.

M. peroneus tertius

In my instances the peroneus tertius is not completely differentiated. The fiber-bundles descent obliquely forward to be inserted in a penniform manner on a tendon which runs along the lateral margin of the tendon of the extensor digitorum.

The terminal tendon is inserted into the base of the fifth metatarsal ........................................68%.
The terminal tendon is inserted into the base of the fourth metatarsal ......................................32%.

Aponeurosis plantaris

1. Classification of the aponeurosis plantaris.
I classified the aponeurosis plantaris according to L o t h’s classification.

Type I, Aponéurose fibulaire très forte ......................48%.
Type II, Aponéurose fibulaire mince, mais prolongée...24%.
Type III, Aponéurose fibulaire ne parcourant pas toute la plante du pied ........................................20%.
Type IV, Aponéurose fibulaire faisant défaut...........8%.

2. The length of the aponeurosis.

118-171 mm, Average 151 mm.

\[
\text{Index} = \frac{\text{Length of aponeurosis}}{\text{Length of foot}} \times 100.
\]

60.5-74.6, Average 69.2

3. The distance between the apex of the tuber calcanei and the distal end for each toe.

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>100-153</td>
<td>113-165</td>
<td>118-171</td>
<td>109-164</td>
<td>75-134</td>
</tr>
<tr>
<td>Average</td>
<td>125</td>
<td>149</td>
<td>149</td>
<td>136</td>
<td>112</td>
</tr>
</tbody>
</table>
M. flexor digitorum brevis

In my instances the fasciculus for the fifth toe is absent in 16% of feet.

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