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The Comparison of Weight-Corrected Upper Arm Circumference of Athletes as a Parameter of their Body Muscle Mass

By *Ryuya Yoda**

The upper arm circumference (UAC) and weight deviation from standard weight by percentage have a fairly close relationship with each other, and a linear relationship is obtained, which is indicated by a regression equation.

We have previously reported that when upper arm circumference is corrected to the standard weight value by this regression equation, this weight-corrected UAC is a good index of body muscle mass, and that the weight-corrected UAC declines with advancing age.

The regression equation for UAC (y) and weight deviation from the standard by percentage (x), which was obtained from male members of university athletic groups, is as follows.

$$y=0.20x+27.3 \quad (y \dots \text{cm})$$

Accordingly, weight-corrected UAC was obtained using the equation:

$$\text{Weight-corrected UAC} = \text{UAC actually measure} - 0.20x$$

In the case of male students who did not belong to any athletic group, the regression equation obtained was:

$$y=0.18x+27.0$$

Accordingly weight-corrected UAC was obtained from the equation:

$$\text{UAC actually measured} - 0.18x.$$

By comparing the mean values of weight-corrected UAC of members belonging to various kinds of athletic groups with that of non-members, the following results were obtained.

1. As a whole, the weight-corrected UAC of the members was significantly larger than that of non-members, by which assumption was made that there was an in-

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crease in the body muscle mass for the athletic groups.

2. As a result of comparisons made between sports of various kinds, it was known that the weight-corrected UAC of the members belonging to heavy gymnastics, weight lifting, swimming, archery, various kinds of combative sports, boating groups was significantly larger than that of students belonging to no group. While in the case of the members of various kinds of ball games, skating, running groups, their weight-corrected UAC was equal to, or significantly smaller than, that of ordinary students. As for the groups whose member's weight-corrected UAC was larger, although extraordinary development of the upper arm muscles should be taken into consideration, a remarkable increase in the body muscle mass could be assumed. On the other hand, as for the members of groups whose weight-corrected UAC was small, the assumption was that there was almost no increase in the body muscle mass; in the case of groups of such kinds, different from the former groups where muscular strength itself is required substantially, other motor abilities rather than muscular strength are required much more, it is assumed that the development of such abilities is urged.