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A Study on the Balance of Static Maximam Strength by Using Statistical Variance

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Generally speaking, we can observe various effects of muscular strength training. To discuss these effects, we set up following two standpoints. One is the improvement of total muscular strength, the other is the balance among each items.

We used the sum of the muscular strength of each items to measure the improvement of total muscular strength and statistical variance for balance among each items.

In this analysis, we used a new technique of variance formula. This was as follows.

$$S^2 = \frac{1}{n} \sum_{j=1}^{2k-1} (j-k)^2 h_j, \quad n = \sum_{j=1}^{2k-1} h_j \quad (1)$$

k : number of the items to be measured (= 8)

h_j : value of No. j ($j=1, 2, \dots, 15$)

Among the data, form(1) has no interdependence between each $\sum_j h_j$

(Proof)

If

$$\sum_{j=1}^{2k-1} h_j = n, \quad \sum_{j=1}^{2k-1} h'_j = n'.$$

$$h_j = n \cdot h'_j / n' \quad (2)$$

$$S'^2 = \frac{1}{n'} \sum_{j=1}^{2k-1} (j-k)^2 h'_j, \quad n' = \sum_{j=1}^{2k-1} h'_j \quad (3)$$

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Substitute form(1) for form(3).

$\therefore \text{form}(1) = \text{form}(3)$

As a result, we can say that this form is very useful for estimating the balance of muscular strength.