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<th><strong>Title</strong></th>
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| **Author** | 安藤, 勝英(Ando, Katsuhide)  
山内, 賢(Yamauchi, Ken)  
加藤, 大仁(Kato, Hirohito)  
今栄, 貞吉(Imae, Sadayoshi) |
| **Publisher** | 慶應義塾大学体育研究所 |
| **Publication year** | 1993 |
| **Abstract** | |
| **Notes** | Abstract |
| **Genre** | |

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

By Katsuhide Ando*
Ken Yamauchi**
Hirohito Kato**
Sadayoshi Imae***

Generally speaking, we can observe various effects of muscular strength training. To discuss these effects, we set up following two standpoint. 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.

\[ S^2 = \frac{1}{n} \sum_{j=1}^{2k-1} (j-k)^2 h_j, \quad p4 \quad n = \sum_{j=1}^{2k-1} h_j \quad (1) \]

\( k \) : number of the items to be measured (= 8)
\( h_j \) : value of No. j (j=1, 2, ..., 15)
Among the data (1) has no interdependence between each \( \sum_j h_j \)

(Proof)

If

\[ \sum_{j=1}^{2k-1} h_j = n, \quad \sum_{j=1}^{2k-1} h_j' = n' \]

\[ h_j = n \cdot h_j' / n' \quad (2) \]

\[ S^2 = \frac{1}{n'} \sum_{j=1}^{2k-1} (j-k)^2 h_j', \quad n' = \sum_{j=1}^{2k-1} h_j' \quad (3) \]

* Associate Professor of the Institute of Physical Education, Keio University.
** Assistant of the Institute of Physical Education, Keio University.
*** Professor of the Institute of Physical Education, Keio University.
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.