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Relationships between Muscular Strength of Upper Arm Muscle Group and Physical Measurements
(Report II)
——Relationships between Pull-up Scores and Skinfold Thickness——

By *Sadayoshi Imae**

In my Report I, the author, based on the thinking that pull-up exercises are remarkably influenced by the degree of obesity or leanness, by the difference in the muscle mass, etc., made a study on the relationships between the body weight deviation as an index to indicate the degree of obesity or leanness and the pull-up scores, and made it clear that there was an negative correlation between the deviation and the scores with significant level of 1%. As a result of the study made on the relationships between the weight-corrected upper arm circumference as an index to indicate the total body muscle mass and the pull-up scores, the author also made it clear that there was a positive correlation between the two with significant level of 1%.

In this paper, the author made measurements for 606 male university students of their stature, body weight, upper arm circumference, upper arm skinfolds, back skinfolds, abdomen skinfolds and pull-up scores. Based on the values obtained from these measurements, a study was made mainly on the relationships between the pull-up scores and skinfold thickness. The results obtained were as follows.

(1) The correlation coefficient between pull-up scores and upper arm skinfolds was −0.3115, that between the scores and back skinfolds was −0.2537, that between the scores and abdomen skinfolds was −0.3417 and that between the scores and total skinfolds (upper arm + back + abdomen) was −0.3387. All these figures showed the existence of significant negative correlations with the level of 1%.

(2) When a study was made on the changes in the pull-up scores, which were produced by the increase in the skinfold thickness, the results obtained were as follows.

① As to upper arm skinfolds, the pull-up scores decreased gradually up to 15 mm. However, the decreases were remarkable when the skinfolds was 16 mm

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and over, thus significant differences were seen. Especially, the decreases noted as to the skinfolds of 20 mm or thereabout were remarkable.

② As to back skinfolds, no significant differences were seen up to 20 mm concerning the pull-up scores. However, when the skinfolds increased to 21 mm and over, there occurred remarkable decreases in the pull-up scores, exhibiting significant differences. Especially, the decreases seen as to the skinfolds of 25 mm or thereabout were remarkable.

③ Concerning abdomen skinfolds, the pull-up scores decreased gradually up to 25 mm. However the scores decreased remarkably when the skinfolds was 26 mm and over, significant differences being noted. Especially, the decreases were remarkable when the skinfolds was 30 mm or thereabout.

④ Regarding total skinfolds, the pull-up scores decreased gradually up to 60 mm. However the scores decreased remarkably when the skinfolds was 61 mm and over, exhibiting significant differences. Especially, remarkable decreases were noted when the skinfolds was 70 mm or thereabout.

As is known from the above description, the smaller skinfold thickness acts upon the pull-up exercises as a positive factor. On the contrary, the larger skinfold thickness acts as a negative factor.

Further, when the skinfold thickness increases to a certain degree, there exists a critical point at which pull-up scores decrease significantly. This critical point seems to be existing somewhere near 20 mm as to upper arm skinfolds, somewhere near 25 mm as to back skinfolds, somewhere near 30 mm as to abdomen skinfolds and somewhere near 70 mm as to total skinfolds.

The body weight deviations were examined concerning the persons whose skinfold thickness exceeded the critical point. The examination showed that most of them were in the state of obesity.