SELECTION OF OPTIMUM WEIGHT IN WOMEN DISCUS THROWERS THROW WEIGHT TRAINING

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INTRODUCTION

Throw weight training is an important content in specific speed strength for women discus throwers. It is one of the most effective means for raising the specific explosive force. And It has been prove by the modern training practice of the throwers. However, over a long period of time, to select implement weights has depended coaches own subjective experience, which is with considerable blindness. Therefore, the purpose of this paper is take the individual throwing power of the thrower as basis to research fixing the way of optimum weight in specific speed strength for different women discus throwers by making measure of
throwing weights (kettle-bell) and calculation of its throwing power.

METHODS

1. The study objects of this paper are 60 grade 2 and above Chinese women discus throwers (tab.1).

Tab.1 General Situation of Study Objects

	Master	Grade 1	Grade 2
Number	13	17	30
Age	22±2.6	20.8±2.7	18.5±2.6

Master: 55m; Grade 1: 51m; Grade 2: 39m

2. Asking for the thrower, from standard weight of women discus(1Kg) to 7Kg, take 0.25Kg-1Kg as a weight unit, to stand throwing various kettle-bell. Each weight has 2-3 times to throw, and take the best one as its decisive result.

3. Using two "Chuen Feng" high speed cameras have shot together the movement of thrower, and making analysis, thereby, getting the data about the angle of release, the height of release, and the distance of force.

RESULTS

1. The Definition significance of Greatest Throwing Power

Power means that work has been done within a unit time, that is: $P=\frac{A}{t}$.

Throwing power means that work what the muscles have done when the throwers o throwing movements, that is: $P=\frac{\int_0^s Fds}{t}=\frac{\overline{F}s}{t}=\overline{F}V_0$

At the time when the implement is released, the velocity comes to the highest value (V_0), so the power ($\overline{F}V_0$) is the greatest power for throwing his weight of implement. During the kettle-bells of different weight are thrown with all out, the power that the thrower displays is not same between various weights(Tab.2), and one of them is the greatest value, which is called the greatest throwing power (Tab.3).

Tab.2 Weight of the Greatest Throwing Power for Different Women Discus Throwers (Kg)

	Master	Grade 1	Grade 2
Number	13	17	30
Weight	5.25±0.50	4.38±0.93	4.00±0.82

Tab.3 Contrast Between Kettle-Bell Result & Throwing Power

	1	2	3	4	4.5	5	5.5	6	6.5	7 Kg
R(m)	41.66	34.68	28.84	24.12	22.60	21.20	19.50	18.00	17.08	16.02
Z.L.----										
P(w)	945	1441	1643	1678	1698	1738	1668	1632	1620	1606
R(m)	37.46	29.66	23.12	19.80	19.12	17.47	15.71	14.68	13.48	12.52
C.L.----										
P(w)	799	1124	1151	1215	1291	1261	1162	1134	1084	1053

Discus results: Z.L. 63.50m; C.L. 59.76m

Because throwing power is a sensitive index to mirror the speed strength and explosive force of the throwers, and adopting the weight of the greatest throwing power can bring the motion velocity and muscle strength of the throwers into fully play and match the velocity with the strength in optimum. Therefore, it is the optimum weight in the speed strength train of the throwers.

2. The steps and methods to Fix the Optimum Weight

1) Measuring Results to Throw Kettle-Bell

Asking for the thrower, from standard weight of women discus (1Kg) to 7Kg, take 0.25Kg-1Kg as a weight unit, to stand throwing various kettle-bell. Each weight has 2--3 times to throw, and take the best one as its decisive result.

2) Calculating Throwing Power

According to the formula for throwing power of discus throwers:

$$\overline{F}V_0 = \frac{5.45MD^3}{S\cos^3 a(D\tan a + h)\sqrt{D\tan a + h}}$$

(M: the weight of implement; D: the distance of throw; S: the distance of force; a: the angle of release; h: the height of release)

Throwing power can be calculated separately. In order to be easy to calculation and application for coaches, it has been prepared " The Evaluate Software to Select Optimum Weight for Discus Throwers" (omit),"The Measuring List of the Greatest Throwing Power for Discus Throwers"(omit).

3) Fixing the Weight

Through making a comparison among the power various kettle-bells, fixing the weight of the greatest throwing power, and that is the optimum weight in throwing kettle-bell.

CONCLUSION

1. Adopting the weight of the greatest throwing power can bring the motion velocity and muscle strength of the throwers into fully play and match the velocity with the strength in optimum. Therefore, it is the optimum weight in the speed strength train of the throwers.

2. It is different for the kettle-bell weights of the greatest throwing power what the thrower display. Generally speaking, the higher the thrower's performance , the heavier the kettle-bell weight.

3. Even if the thrower's performance is same , the weight of the greatest throwing power or the optimum throwing weight is not also completely same. Therefore, to select the optimum throwing weight should vary from person to person according to their the greatest throwing weight.

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