

ISOMETRIC STRENGTH ASSESSMENT IN WEIGHTLIFTING

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When the decision was made to carry out the isometric deadlift test, some very important aspects were addressed in order to make the test effective as regards the analysis of the resulting numbers.

Firstly, it was necessary to adapt the system to make the starting position as close as possible to that of the technical exercise. Then, it was necessary to define the type of grip required of the athlete, the “snatch” (a wider grip) or the “clean & jerk” (more narrow). Lastly, it was necessary to identify the precise moment in the exercise in which the barbell would be locked in order to measure the expressed force. The same iron platform used previously was adopted for the starting position; the only change made was a slight raise in the place where the feet are positioned so as to create

a system that reduces the “run-up” to the bar. The “snatch” grip (wider one) was decided on, as it is considered less traumatic, and allows to anticipate the barbell lock.

We decided to implement the barbell lock as soon as movement of the barbell raises the weight plates slightly, basically, when the bar is located halfway up the tibia. The purpose of this is to keep the angles of the body very narrow, which consequently does not create substantial differences in athletes with short limbs and those with long limbs. Another aspect: if you want to measure the muscle “potential” of individuals taking the test, it is considered more useful to do so when the angle at the knee is still narrow so as not to distort the results. In fact, if the lock point of the barbell was taken at kneecap

height, it would be easier, even for those with an inferior technique, to produce positively good muscle performance.

A final consideration, with a narrow angle it is not possible to “piggy-back” the system carrying out the test and so, it is not possible to use one’s own body weight.

The isometric deadlift test should be analyzed from two points of view:

- The correct position in performance
- The ability to express force quickly.

It is important to assume a correct starting position, in order to render the body effective during the muscle contraction phase of the lower limbs. This presupposes a relatively sound knowledge of the technique

ISOMETRIC DEADLIFT TEST

n	m f	1 RM deadlift	kg barbell	kg iso	t	kg barbell	kg iso	t	kg 1st test	kg 2nd test
1	F	115	70	121	0,08	80	115,2	0,08	191	195,2
2	F	120	80	110,6	0,07	75	113,6	0,07	190,6	188,6
3	F	125	80	147,5	0,08	85	123,2	0,08	227,5	208,2
4	F	110	70	106,8	0,06	75	138	0,08	176,8	213
5	F	100	65	59,7	0,06	65	85	0,08	124,7	150
6	F	90	65	33,2	0,04	65	75,1	0,06	98,2	140,1
7	F	100	65	100	0,07	65	96,1	0,06	165	161,1
8	M	180	130	237	0,10	150	159,9	0,10	367	309,9
9	M	155	70	184,3	0,07	100	184,8	0,09	254,3	284,8
10	M	205	100	140	0,08	100	193,8	0,08	240	293,8
11	M	170	130	207,3	0,09	150	192,9	0,12	337,3	342,9
12	M	170	130	165,2	0,09	150	121,4	0,10	295,2	271,4
13	M	160	70	83,3	0,06	80	99,1	0,06	153,3	179,1

TABLE NO. 1 ISOMETRIC DEADLIFT TEST IN ADVANCED ATHLETES

ISOMETRIC DEADLIFT TEST								
n	m f	max clean	barbell	iso	T	barbell	iso	T
1	M	75	40	151	0,06	40	135	0,06
2	F	79	40	105	0,06	40	111	0,06
3	M	105	40	184	0,05	40	163	0,07
4	M	90	40	95	0,07	40	127	0,06
5	M	55	40	70,8	0,05	40	95,4	0,07
6	F	60	40	68,8	0,06	40	93,6	0,07
7	M	105	40	194	0,05	40	211	0,05
8	M	70	40	140	0,05	40	114	0,05
9	M	115	40	172	0,06	40	202	0,07
10	M	113	40	166	0,05	40	178	0,06
11	M	135	40	188	0,06	40	177	0,07
12	F	60	40	71,5	0,07	40	78,8	0,08
13	M	70	40	139	0,07	40	117	0,06
14	F	50	40	70,6	0,06	40	85,7	0,04
15	F	78	40	89,2	0,06	40	86,1	0,07
16	F		40	84,5	0,05	40	103	0,05
17	M	50	40	113	0,07	40	127	0,06
18	M	65	40	74,6	0,07	40	103	0,07

TABLE NO. 2 ISOMETRIC DEADLIFT TEST IN YOUTH CATEGORIES

and good joint mobility. Without delving into the technical aspects of the snatch exercise, a very low performance time (less than 1 second) obliges the athlete to apply force in a very short time.

The Globus Iso Control allows us to see both the peak force, expressed in kg, and the time in which the peak force was reached from the moment in which the load cell has been subjected to traction. This way it is also possible to verify the features and abilities of the application of the athlete's maximal

strength. In an initial phase, an empty barbell tied to a chain was used. The results obtained were already good, but a question arose: would an athlete used to feeling a "heavy" load in his hands, make less of an effort given the lightness of the equipment used during the test? So, the barbell was loaded with two 10kg plates and the results improved. The weight was subsequently increased and the results were even better, all within the correct confines of the exercise/test. At this point, it was decided to stan-

dardise the load on the barbell for both men and women: about 70% of the deadlift maximal. Naturally, in order to make the tests perfectly compatible with the actual sport, the female athletes used the women's barbell and the male athletes used the men's one.

The results were very interesting, and are summarised in **Table 1**. Table n.1 shows the data of a number of advanced athletes. In some cases, you can see that even when the weight of the barbell is increased, the total weight moved

does not change. For some athletes, the difference between 1 RM and the isometric test is not very different. This may mean that this athlete has still some work to do on the actual muscle structure aspects.

For some athletes, there is a major difference between the 1 RM and the isometric test. This may mean that the athlete has great muscle potential that he fails to express as his level of neuromuscular training is quite low. At this point, the same test was also carried out with younger athletes (categories: children, beginners, under 17).

Given the young age and lack of experience, many of them they did not have a deadlift maximal. It was decided to take the clean maximal

as it is a statistic that coaches and athletes acquire very early on.

For organisational and practical reasons, the work proposed was based on a fixed load rather than on load percentages; this was to prevent the youths from being too enthusiastic and overdoing things, which could have resulted in injury. The data obtained are shown in **Table 2**. There were some interesting results also in this case, from different points of view. Not only for the loads produced, but also as regards start up times.

It must also be said that, on this occasion, there were also some errors in the technical approach, mainly due to lack of experience, but it can be extremely useful to coaches to plan training workouts even better.

It is clear that we are only at the beginning, and that the numbers are still inadequate to produce comprehensive statistics, however, it was decided to use this test in all gatherings of the *Progetto Italia Youth* of the Italian Weightlifting Federation. In this way, we will obtain the data of the most promising athletes on the Italian weightlifting scene, and we will be able to see how performances change, using these guidelines to direct the sessions of physical training sessions.

One last point: as the maximal isometric contraction has a great effect on neuromuscular activation, what would happen if an athlete performed an isometric test before stepping up on the platform? But more about that another time.



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