TEST DI FORZA
In palestra

PERFORMANCE LAB

PerformanceLab

Come valutare la forza: i test in palestra

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Prima di tutto è necessario porsi delle domande: Perché svolgo dei test di forza?

Ho intenzione di allenare "la forza" nell'arco dell'anno? In che modo?

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In che modo la forza è legata alle prestazioni nello sport?

ORIGINAL ARTICLES

J SPORTS MED PHYS FITNESS 1995;35:13-9

Relationship between strength qualities and sprinting performance

WARREN YOUNG, BRIAN McLEAN, JAMES ARDAGNA

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The purpose of this study was to investigate the relationship between strength measures and sprinting performance, and to determine if these relationships varied for different phases of sprint running. Twenty (11 males and 9 females) elite junior track and field athletes served as subjects. Athletes performed maximum sprints to 50 m from a block start and time to 2.5, 5, 10, 20, 30, 40 and 50 m were recorded by electronic timing gates. The resultant forces applied to the blocks were obtained from two force platforms. Twenty-seven measures of strength and speed-strength (absolute and relative to bodyweight) were collected from the height jumped and the force-time curve recorded from the takeoff phase of vertical jumping movements utilizing pure concentric, stretch shortening cycle (SSC) and isometric muscular contractions. Pearson correlation analysis revealed that the single best predictor of starting performance (2.5 m time) was the peak force (relative to bodyweight) generated during a jump from a 120 degree knee angle (concentric contraction) (r=0.86, p=0.0001). The single best correlate of maximum sprinting speed was the force applied at 100 ms (relative to bodyweight) from the start of a loaded jumping action (concentric contraction) (r=0.80, p=0.0001). SSC measures and maximum absolute strength were more related to maximum sprinting speed than starting ability. It was concluded that strength qualities were related to sprinting performance and these relationships differed for starting and maximum speed sprinting.

KEY WORDS: Strength qualities - Sprint start - Maximum speed - Specificity.

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Sprint running is a fundamental activity for many sports and can be viewed as consisting of a number of components such as the start, acceleration and maximum speed phases. The acceleration phase continues for approximately 30-50 m after the start for top sprinters,[1] but may be shorter for less qualified athletes. In many sports played on the field or court, maximum effort sprints may be too short to allow maximum speed to be reached. In this situation the athlete is more concerned with the development of starting and acceleration ability rather than maximum speed. In track and field sprint events an athlete may possess good starting ability but the maximum speed capacity may be considered a weakness, or the reverse may be true. Therefore the physical abilities required for one phase may be different from those needed for another phase of sprint performance. For example, the correlation between absolute isometric strength and maximum speed has been found to be higher than the relationship between absolute isometric strength and starting speed.[2,3]

The importance of strength qualities for sprinting performance is not clear. Several studies [3-5] have reported significant correlations between strength measures and speed while others [6,7] have reported

RELATIONSHIP BETWEEN MAXIMAL SQUAT STRENGTH AND FIVE, TEN, AND FORTY YARD SPRINT TIMES

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ABSTRACT

INTRODUCTION

The Relationship Between Lower Extremity Injury, Low Back Pain, and Hip Muscle Strength in Male and Female Collegiate Athletes

Nadler, Scott F. DO*; Malanga, Gerard A. MD*†; DePrince, Melissa MS*; Stitik, Todd P. MD*; Feinberg, Joseph H. MD*†‡

Clinical Journal of Sport Medicine: April 2000 - Volume 10 - Issue 2 - p 89-97
Clinical Investigations

In che modo la forza è legata alle prestazioni nello sport?

Le evidenze positive circa i miglioramenti della performance ottenuti grazie allo sviluppo della forza nello sport sono numerosi.

È importante considerare però la specificità dei lavori da svolgere, in base al modello sportivo; tutto ciò deve essere proposto però solo successivamente ad una fase di adattamento più generale, grazie alla quale i nostri atleti diventeranno capaci di gestire i sovraccarichi in sicure

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Quali test svolgere?

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Basic.. Più o meno

- Panca Piana
- Squat (o varianti)
- Stacco
- Military Press
- Clean&Jerk (o varianti)
- Snatch (o varianti)

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Come svolgere i test?

Proporre i test **non in sicurezza** comporta un alto rischio per i nostri atleti.

E' necessario svolgerli solo su esercizi sui quali essi sono già «sufficentemente» allenati, e dei quali lo schema motorio sia stato ampiamente compreso.

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Calcolare i massimali

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- Atleti esperti
- Atleti che hanno un'idea del proprio massimale teorico
- Atleti che hanno come obiettivo di performance l'aumento del proprio 1Rm

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Calcolare i massimali

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Questa è solo una delle possibili progressioni..

Starting the test

2. The participant should perform a warm-up with a self-selected load that will allow them to complete a minimum of 6-10 repetitions (approx. 50% predicted 1RM).
3. 1-5 minute rest (decided by test administrator).
4. Participants then select a weight based on the previous effort which allows them to perform 3-repeptitions (approx. 80% of predicted 1RM).
5. 1-minute rest (decided by test administrator).
6. Participants now increase the load and begin attempting their 1RM. A series of single attempts should be completed until a 1RM is achieved.
7. Rest periods should remain at 1-5 minutes between each single attempt and load increments typically range between 5-10% for the upper-body, and 10-20% for the lower-body exercises. 1RMs should be achieved within 3-7 attempts.
8. If multiple 1RM tests are being administered (e.g. back squat, bench press, and deadlift), then it is recommended that all test exercises should be separated by a 3-5 minutes rest period.

NOTE: It is essential that the test administrator follows the exact same testing procedure at every successive test throughout the training programme. This ensures that the previous testing data/information can be used and compared against future tests.

Max (Kg)	Numero massimo di ripetizioni possibili con relativa % di carico												
	>20	20	19-18	17-16	15-14	13-12	11-10	9-8	7-6	5-4	3-2	1	1
	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
25	10	11	12	13	15	16	17	18	20	21	22	23	25
30	12	13	15	16	18	19	21	22	24	25	27	28	30
35	14	15	17	19	21	22	24	26	28	29	31	33	35
40	16	18	20	22	24	26	28	30	32	34	36	38	40
45	18	20	22	24	27	29	31	33	36	38	40	42	45
50	20	22	25	27	30	32	35	37	40	42	45	47	50
55	22	24	27	30	33	35	38	41	44	46	49	52	55
60	24	27	30	33	36	39	42	45	48	51	54	57	60
65	26	29	32	35	39	42	45	48	52	55	58	61	65
70	28	31	35	38	42	45	49	52	56	59	63	66	70
75	30	33	37	41	45	48	52	56	60	63	67	71	75
80	32	36	40	44	48	52	56	60	64	68	72	76	80
85	34	38	42	46	51	55	59	63	68	72	76	80	85
90	36	40	45	49	54	58	63	67	72	76	81	85	90
95	38	42	47	52	57	61	66	71	76	80	85	90	95
100	40	45	50	55	60	65	70	75	80	85	90	95	100
105	42	47	52	57	63	68	73	78	84	89	94	99	105
110	44	49	55	60	66	71	77	82	88	93	99	104	110
115	46	51	57	63	69	74	80	86	92	97	103	109	115
120	48	54	60	66	72	78	84	90	96	102	108	114	120
125	50	56	62	68	75	81	87	93	100	106	112	118	125
130	52	58	65	71	78	84	91	97	104	110	117	123	130
135	54	60	67	74	81	87	94	101	108	114	121	128	135
140	56	63	70	77	84	91	98	105	112	119	126	133	140
145	58	65	72	79	87	94	101	108	116	123	130	137	145
150	60	67	75	82	90	97	105	112	120	127	135	142	150
155	62	69	77	85	93	100	108	116	124	131	139	147	155
160	64	72	80	88	96	104	112	120	128	136	144	152	160
165	66	74	82	90	99	107	115	123	132	140	148	156	165
170	68	76	85	93	102	110	119	127	136	144	153	161	170
175	70	78	87	96	105	113	122	131	140	148	157	166	175

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Calcolare i massimali

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METODO INDIRETTO

- Sicurezza
- Gesto motorio non efficace/compreso al 100%
- Non necessità di tenere di conto dell' 1Rm nella programmazione

Percentage Of 1RM	Repetitions Allowed
100	1
95	2
90	3-4
85	5-6
80	7-8
75	9-10
70	11-12

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Velocity Based Training

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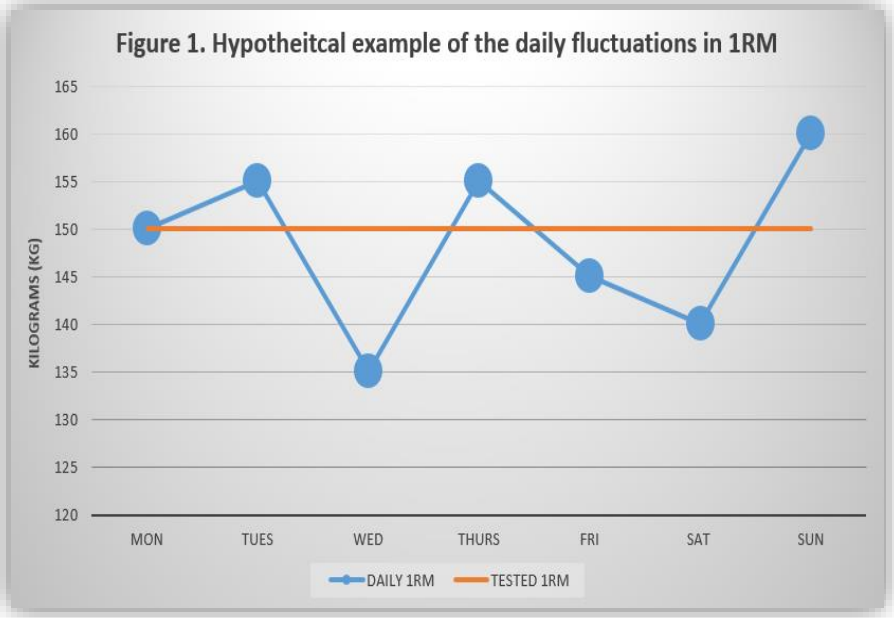

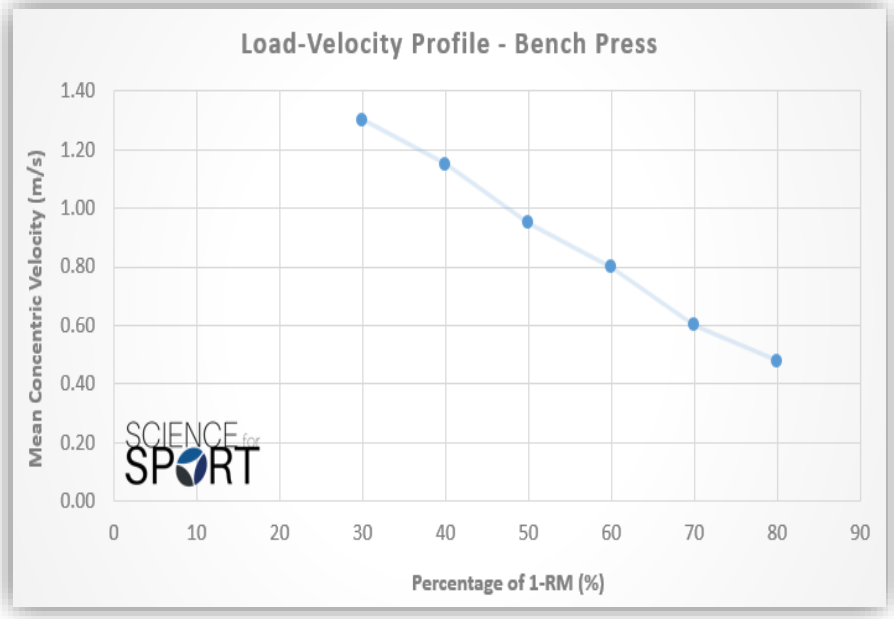

Utilizzare il metodo della velocità, calcolato con video-analisi o sensori inerziali, per testare e trovare il massimale in modo indiretto e molto più presso dei classici metodi indiretti.

https://www.scienceforsport.com/velocity-based-training/

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Velocity Based Training

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Table 5. The Strength-Velocity Continuum and associated velocity ranges from various exercises.

Percentage of 1-RM (%)					
0 10 20	30 40	50 60	70 80	90 100	
None	Starting Strength	Speed-Strength	Strength-Speed	Accelerative Strength	Absolute Strength
Original and arbitrary velocity ranges (m/s; [40])					
	>1.3	1.3-1	1-0.75	0.75-0.5	<0.5
Research Supported Velocity Ranges (m/s)					
Back Squat [26]	-	-	-	-	<0.54
Bench Press [10, 41]	>1.3	1.3-0.9	0.95-0.63	0.63-0.32	<0.32
Prone Pull [41]	>1.52	1.52-1.23	1.23-0.94	0.94-0.67	<0.67

Table 3. Mean concentric velocity (m/s) for the repetitions in reserve during the back squat.

Reps left in the tank	60%	65%	70%	75%	Average (m/s)	SD	CV
9	0.54	0.51	0.50	0.49	0.51	0.02	4%
8	0.52	0.51	0.47	0.49	0.49	0.02	4%
7	0.50	0.50	0.48	0.47	0.49	0.02	4%
6	0.48	0.48	0.46	0.45	0.47	0.01	3%
5	0.49	0.47	0.46	0.44	0.46	0.02	5%
4	0.47	0.46	0.45	0.42	0.45	0.02	5%
3	0.47	0.43	0.43	0.41	0.43	0.02	5%
2	0.44	0.44	0.43	0.39	0.42	0.02	6%
1	0.39	0.40	0.44	0.38	0.40	0.02	6%
0	0.34	0.32	0.33	0.31	0.32	0.01	3%

This table is adapted [24] and [5].

Senza guardare in casa USA, in Italia sono 30 anni che si parla di curva forza/potenza o forza velocità (Bosco e Colli).

Per noi risulta utile anche per programmare poi tutti i lavori e ad avere feedback continui dagli atleti.

OUTCOME MEASURE	FEEDBACK GROUP	NON-FEEDBACK GROUP
VERTICAL JUMP	4.6% INCREASE	2.8% INCREASE
HORIZONTAL JUMP *	2.6% INCREASE	0.5% INCREASE
10M SPRINT	1.3% INCREASE	0.1% INCREASE
20M SPRINT	0.9% INCREASE	0.1% INCREASE
30M SPRINT*	1.4% INCREASE	0.4% INCREASE

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Grazie!!!

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