

# RIVISITANDO CARMELO BOSCO: DOVE VA LA SCIENZA DELLO SPORT NEL 2020?

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ASPETAR

UCL FIFA UNIVERSITY OF ST. MARKS & CROFT

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## ITRE MOSCHETTIERI



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## LA STORIA E IL CONTESTO

*"Navigant quidam et labores peregrinationis longissimae una mercede perpetuntur cognoscendi aliquid abditum remotumque."*

Alcuni si mettono in mare e sopportano i travagli di un lunghissimo viaggio per la sola ricompensa di conoscere qualcosa di nascosto e lontano

Seneca, *De Otio*



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# VIBRAZIONI

Biology of Sport, Vol. 35 No. 3, 1998

ARTICLE

## THE INFLUENCE OF VIBRATION ON THE PERFORMANCE OF HUMAN MOTOR SYSTEMS

**Clayton R. Knapik, Orlan T. University of Iowa, USA; Vincenzo Di Stefano, University of Naples Federico II, Italy; Robert J. Stein, University of Illinois at Urbana-Champaign, USA; Robert J. Stein, University of Illinois at Urbana-Champaign, USA**

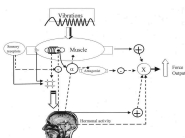
Received: 10/19/97, Accepted: 1/15/98

**ORIGINAL ARTICLE**

**Clayton R. Knapik, Orlan T. University of Iowa, USA; Vincenzo Di Stefano, University of Naples Federico II, Italy; Robert J. Stein, University of Illinois at Urbana-Champaign, USA; Robert J. Stein, University of Illinois at Urbana-Champaign, USA**

Received: 10/19/97, Accepted: 1/15/98

**Abstract**



## Effects of Vibration on Human Motor System Performance

Abstract: The purpose of this study was to determine the effects of whole-body vibration on the performance of human motor systems. The study was conducted in a laboratory setting. The subjects were 10 healthy young men. The study was divided into two parts. In the first part, the subjects performed a series of motor tasks while standing on a platform that was vibrating at a frequency of 10 Hz. In the second part, the subjects performed the same motor tasks while standing on a platform that was vibrating at a frequency of 20 Hz. The results of the study showed that the performance of the subjects was significantly lower when they were standing on a vibrating platform compared to when they were standing on a non-vibrating platform. The decrease in performance was most pronounced for the tasks that required the greatest force output.

Keywords: vibration, motor system, performance, force output, human motor system

Introduction: The human motor system is a complex system that is capable of performing a wide range of motor tasks. The performance of the human motor system is influenced by a number of factors, including the frequency and amplitude of vibration. The purpose of this study was to determine the effects of whole-body vibration on the performance of human motor systems.

Methods: The study was conducted in a laboratory setting. The subjects were 10 healthy young men. The study was divided into two parts. In the first part, the subjects performed a series of motor tasks while standing on a platform that was vibrating at a frequency of 10 Hz. In the second part, the subjects performed the same motor tasks while standing on a platform that was vibrating at a frequency of 20 Hz.

Results: The results of the study showed that the performance of the subjects was significantly lower when they were standing on a vibrating platform compared to when they were standing on a non-vibrating platform. The decrease in performance was most pronounced for the tasks that required the greatest force output.

Conclusion: The results of this study suggest that whole-body vibration can have a negative effect on the performance of human motor systems. The decrease in performance was most pronounced for the tasks that required the greatest force output.

References: [1] Knapik, C. R., Di Stefano, V., & Stein, R. J. (1998). The influence of vibration on human motor system performance. *Biology of Sport*, 35(3), 197-204.



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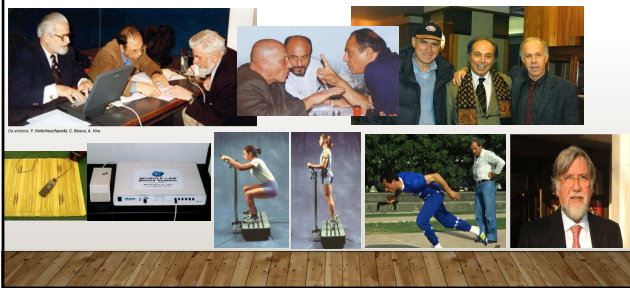
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# DALLA SCIENZA ALLE APPLICAZIONI



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**ORIGINAL ARTICLE**

**Differences in morphology and force/velocity relationship between Sprinters and Endurance runners**

Received: 10/19/97, Accepted: 1/15/98

**Abstract**

**Introduction**

**Methods**

**Results**

**Conclusion**

**References**

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Rivalutare sempre il passato



"Doping begins when harm from their heavy training workload becomes more dangerous than harm from using doping." Grigory Rodchenkov

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MA ANCHE IL PRESENTE...



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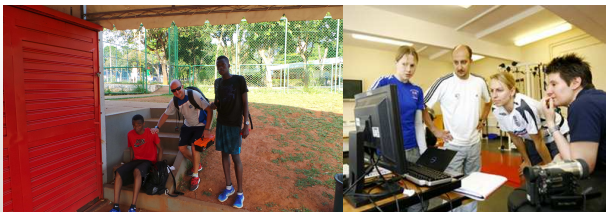
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PORTARE LA SCIENZA SUL CAMPO

"Un allenamento senza valutazione e misurazione è come un viaggio senza meta." (Carmelo Bosco)



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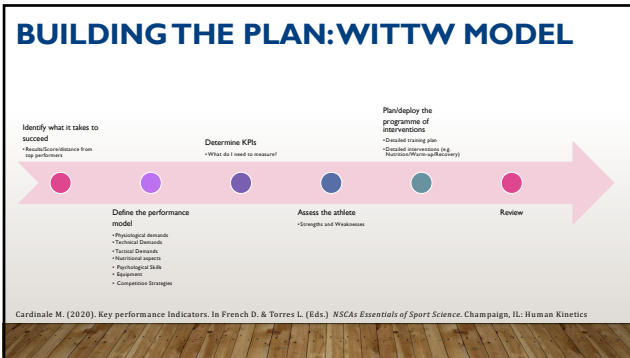
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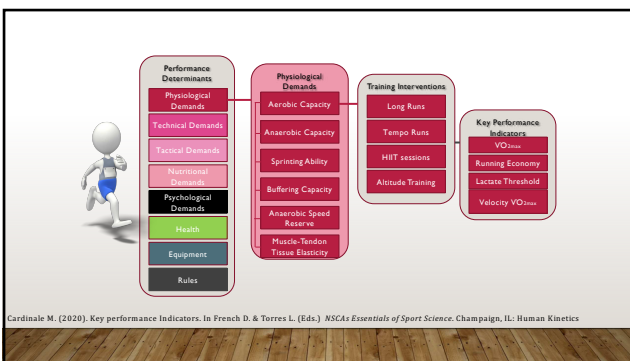
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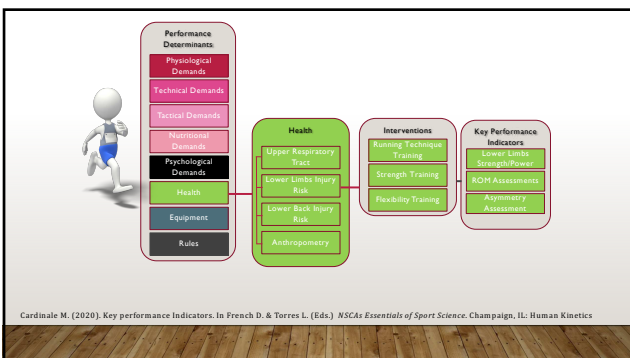
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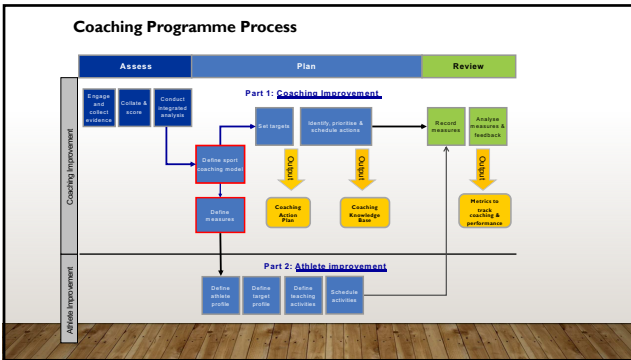
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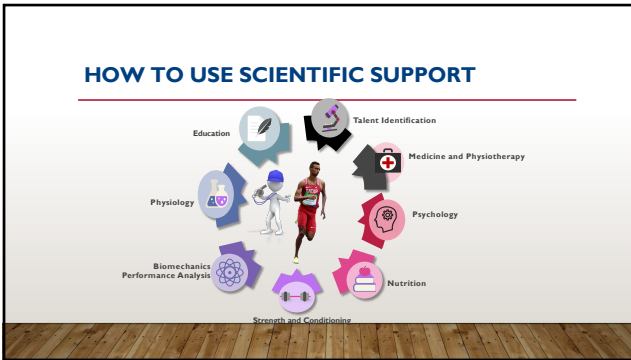
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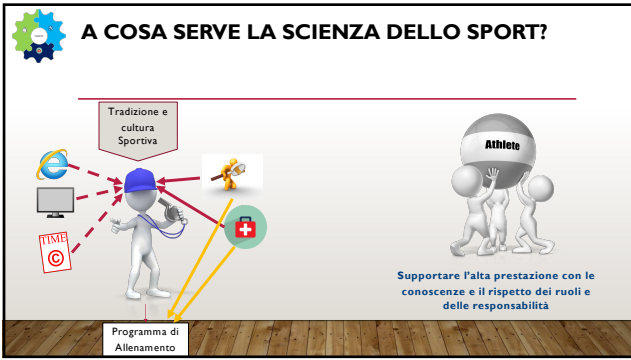
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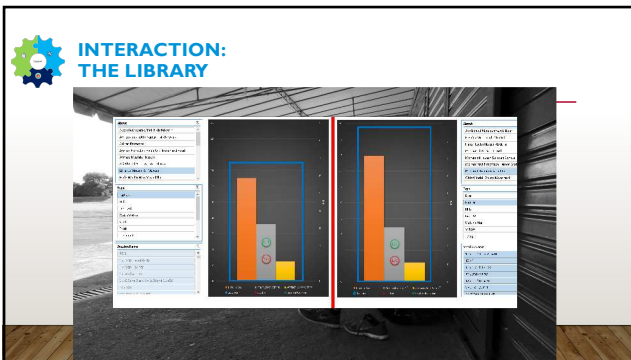
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**ESEMPIO- WARM-UP AND NEW TECH**

Barrett, D., Elliott, P., & Coombs, M. (2005). The effect of muscle temperature on neuromuscular and performance characteristics of lower limbs in men. *Abstract - Medicine and Science in Sports and Exercise*

Carrillo, S., Elliott, P., Lussmore, M., Coombs, M. Warm-up Protocols in Elite Boxing Athletes. *Abstract in Power Output Strength Cond. Res. 2017, 3(2) (1) 196-197*

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## LA REALTÀ IN SCIENZA DELLO SPORT

Cardinale M, Varley MC. Wearable Training-Monitoring Technology: Applications, Challenges, and Opportunities in Sports. *Physical Performance*. 2017; April 10; eppp. 2015; 2012. doi: 10.1123/eppp.2015.0123. Equ. 2016; Nov 11



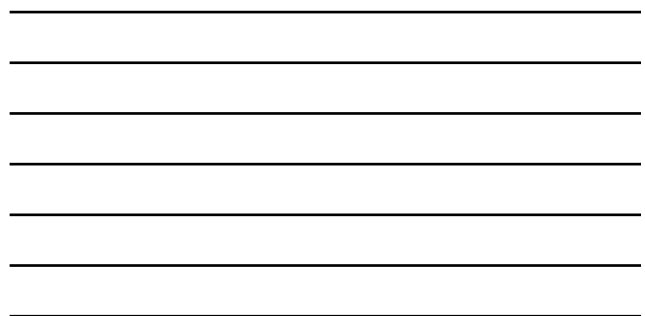
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## UTILIZZARE I DATI

TABLE 3. Reference values (BMD adjusted for chronological age) for adolescent athletes in comparison with nonathletes. Values are presented as mean (SD) and 95% CI. Values in parentheses indicate the difference in BMD between athletes and nonathletes.

Region	Age (years)	BMD (g/cm <sup>3</sup> )	P
Lumbar spine (n = 75)	13	1.02 (0.06, 1.08)	.26
	14	1.00 (0.05, 1.01)	.26
	15	1.00 (0.05, 1.02)	.26
	16	1.00 (0.05, 1.01)	.26
Total hip (n = 46)	13	1.20 (0.07, 1.05)	.28
	14	1.19 (0.07, 1.02)	.27
	15	1.19 (0.06, 1.14)	.27
	16	1.19 (0.06, 1.15)	.27
Femoral neck (n = 46)	13	1.20 (0.07, 1.05)	.28
	14	1.19 (0.07, 1.02)	.27
	15	1.19 (0.06, 1.14)	.27
	16	1.19 (0.06, 1.15)	.27
Distal radius (n = 27)	13	0.88 (0.08, 1.00)	.25
	14	0.88 (0.08, 1.00)	.25
	15	0.88 (0.08, 1.00)	.25
	16	0.88 (0.08, 1.00)	.25
Distal ulna (n = 27)	13	0.71 (0.11, 0.96)	.007
	14	0.71 (0.11, 0.71)	.25
	15	0.71 (0.08, 1.00)	.25
	16	0.71 (0.08, 1.00)	.25
Distal tibia (n = 27)	13	1.14 (0.16, 1.13)	<.001
	14	1.14 (0.16, 1.13)	.26
	15	1.14 (0.16, 1.13)	.26
	16	1.14 (0.16, 1.13)	.26

From P. Wilmore in Wilmore and Lupton (1985), reprinted with permission.



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## L'IMPORTANZA DEI NUMERI

- 280 time-loss injuries
- 78% sport related
- 178 days lost
- 5110 days lost
- 51% overuse injuries
- 60% prevalence
- 4.2 inj/1000AE
- 18.2 days lost/1000AE
- 80 days lost/1000AE
- 15.7% Foot/toes
- 14.6% Knee
- 12.3% Thigh
- 11.9% Lower leg
- 11% HEAD & TRUNK
- 11% LOWER LIMB

**Upper limb injuries (29%)**  
 No injuries in competition along 4 seasons  
 ++ Muscle and joint injuries

**Injured in competitions (26 inj/1000 CE)**  
 52% of all muscle strains (71% hamstrings)  
 + severity in competition (842 DL/1000CE)

Highest incidence= 5.3 inj/1000 AE  
 ↑ severity= 246 (95% CI 14.4 to 33.2)  
 30% of all stress fx (vs+spondylolysis)

69% overuse injuries. ↑ BONE STRESS  
 84% injuries in the lower limb  
 Highest training exposure (213651 AE/session)

Martinez-Silvan et al. (under evaluation)



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**TRADURRE SCIENZA DELLO SPORT IN AZIONE**

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### SOMMARIO

- **Bosco** ci ha lasciato una **legacy** di metodi e modelli che possono essere ancora utilizzati per valutare atleti e per programmare l'allenamento.
- Ma la scienza va Avanti, bisogna aggiornarsi [leggere] e si deve avere una mente più aperta
- Il metodo scientifico, o metodo sperimentale, è la modalità tipica con cui la scienza procede per raggiungere una conoscenza della realtà oggettiva, affidabile, verificabile e condivisibile. Il metodo deve restare, le convinzioni cambiano.
- Molte delle tecnologie al momento sul mercato per valutare lo "stato" dell'atleta o per riuscire a prevedere infortuni o performance **non hanno ALCUNA evidenza scientifica** di validità
- Molti metodi di allenamento 'venduti' per validi non hanno alcuna evidenza che funzionino

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### QUO VADIS?

- La scienza dello sport avanza rapidamente, il modello degli istituti di scienza dello sport inizia a vacillare (vedi AIS/UK/USOC etc).
- Il miglioramento delle conoscenze dei tecnici deve avere la stessa priorità dell'innovazione scientifica
- Le università devono modernizzare i programmi e collaborare con le organizzazioni professionali
- Siamo circondati da disinformazione, scarsa professionalità, pseudo-esperti e guru. Bisogna sviluppare il pensiero critico negli operatori del settore
- Come diceva Bosco (e Scoglio), bisogna continuare ad imparare e prepararsi per evitare di parlare "ad-minchiam".

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Marco\_Cardinale



Grazie dell'attenzione

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Grazie per gli insegnamenti, le scoperte e le invenzioni che ci permettono ancora oggi di studiare gli effetti dell'allenamento

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