

La Valutazione della Resistenza: i Test da Campo a Dettato Sonoro



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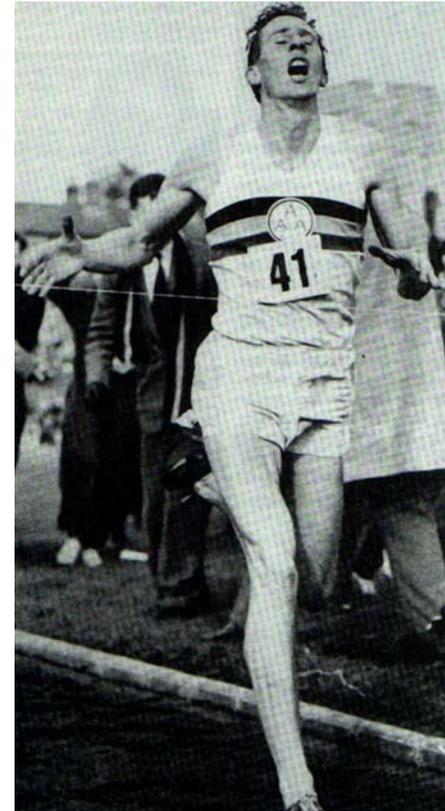
21 Febbraio 2007, Sala CONI Regionale, Ancona

Piano dell'Incontro

- Definizione Resistenza
- Rassegna Test Campo
- Illustrazione Protocolli
- "Dritte" x Applicazione
- Discussione

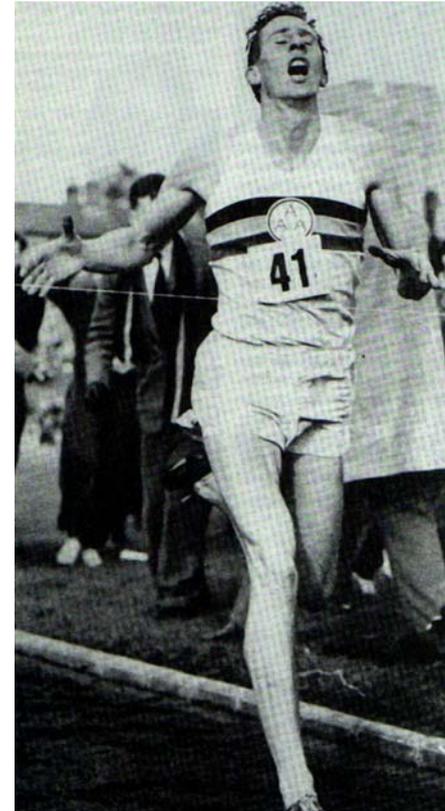
Resistenza

“Abilità di Protrarre un
Attività Mantenendo la Max
Intensità Possibile
Relativamente al Compito”

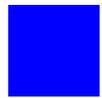


Resistenza

- Resistenza Aerobica
- Resistenza Anaerobica



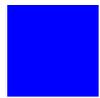
Resistenza: Aerobica



VO₂max

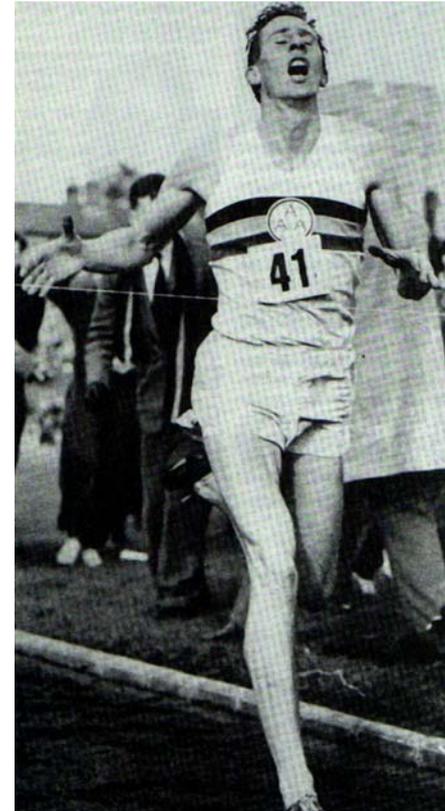


Soglia Anaerobica



Economia

Pate and Kriska. *Sports Med.* 1984



Massimo Consumo di O₂

**Il Massimo Volume di Ossigeno
Trasportato e Consumato dai
Muscoli Attivi**

Massimo Consumo di O₂

$$VO_{2\max} = HR_{\max} \times SV_{\max} \times A-VO_2\text{diff}_{\max}$$

■ HR = Frequenza Cardiaca

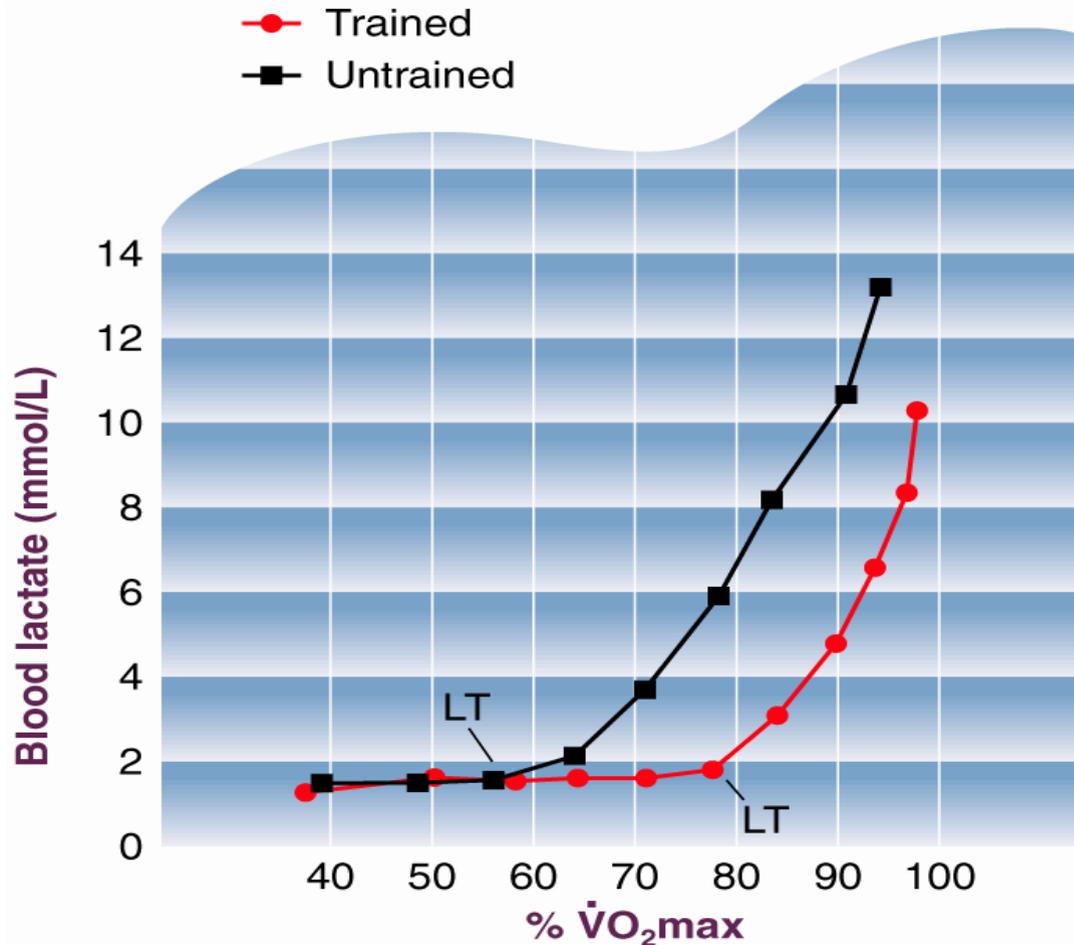
■ SV = Gettata Sistolica

■ A-V O₂diff = Differenza Artero-venosa O₂

Soglia Anaerobica

- “Punto” in cui si verifica un **Accumulo di Lattato** pur essendo ancora **in un Regime Aerobico**
- Forte relazione con la prestazione di resistenza prolungata

Soglia Anaerobica

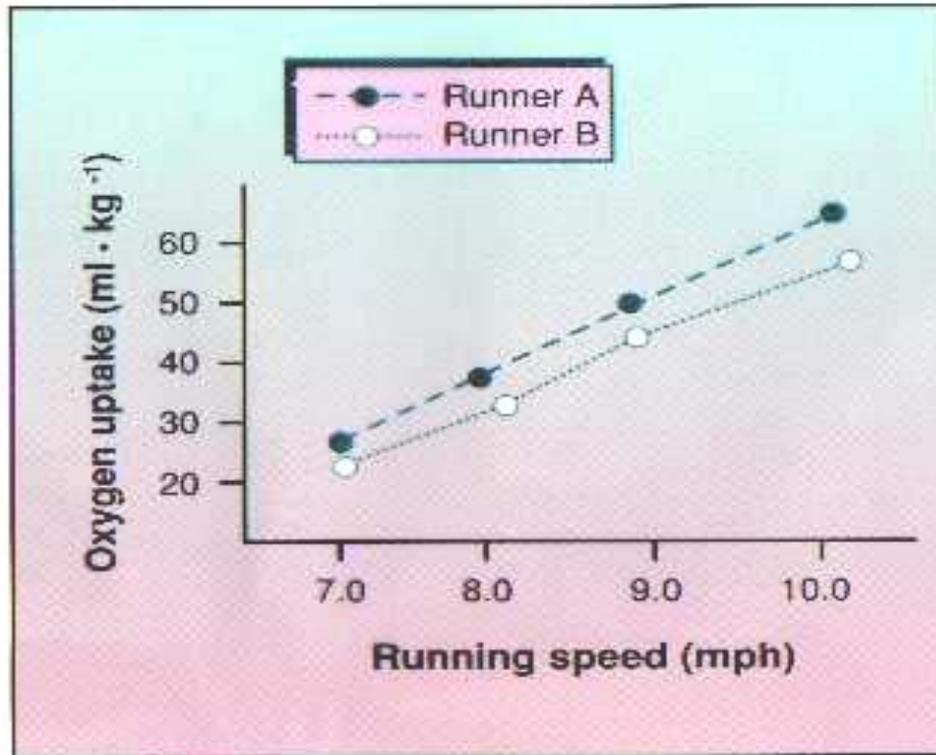


Economia

■ Volume di Ossigeno Utilizzato per Unità di Lavoro



Economia



Differences in efficiency of running.

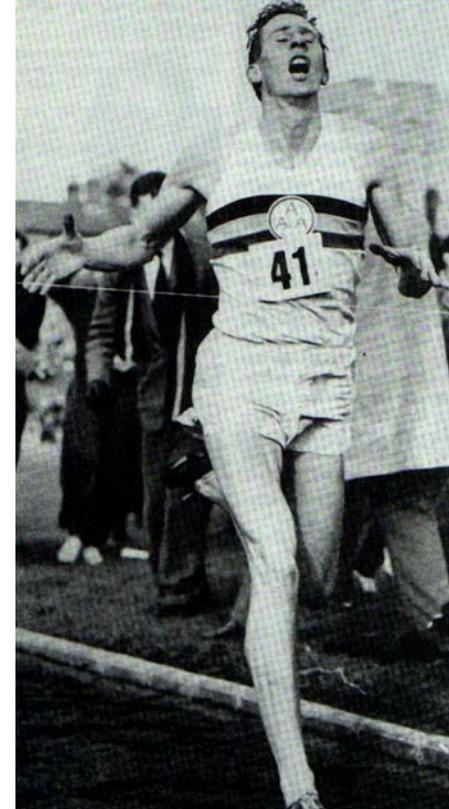
Resistenza: Anaerobica

- **Abilità di Protrarre Lavoro in Condizioni di Scarso O₂**



Valutazione: Resistenza

- **Test Laboratorio**
- **Test Campo**

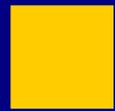


Test da Campo: Quale?

Criteri di Scelta

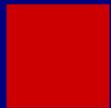
Test da Campo: Criteri Scelta

Validità



Logica

**Movimento Simile
alla Disciplina?**



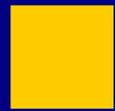
Criterio



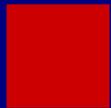
Diretta

Test da Campo: Criteri Scelta

Validità



Logica



Criterio **Misura effettivamente
quello che vogliamo?**



Diretta

Test da Campo: Criteri Scelta

Validità

-  **Logica**
-  **Criterio**
-  **Diretta**

**Ha relazioni con
l'attività gara?**

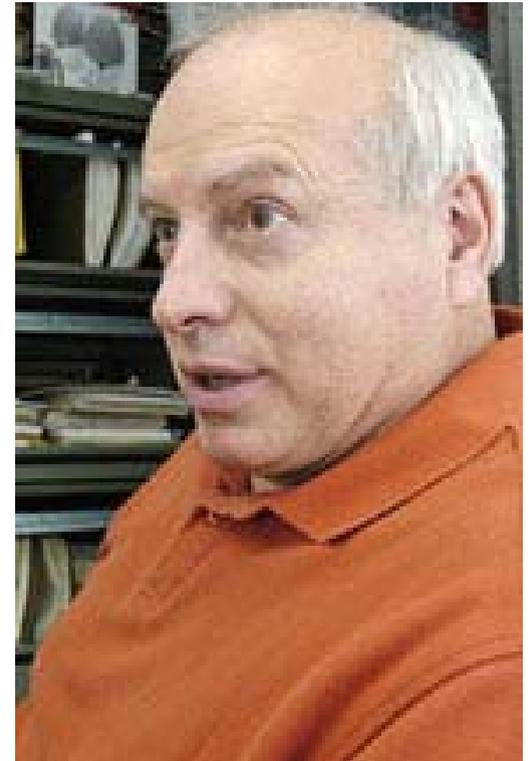
I "Beep Test"

■ Montreal Un.Track test

■ Léger 2'-1' step

■ Multistage Fitness Test

■ Yo-yo test Test



Montreal University Track test

Léger e Boucher 1980

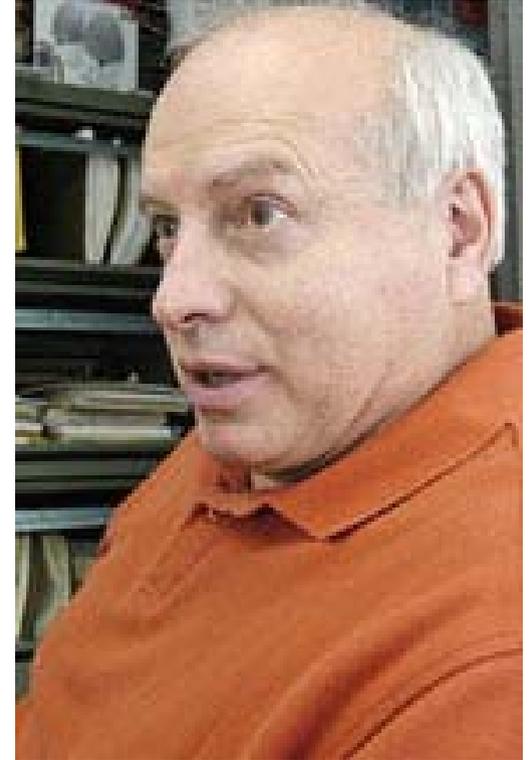
Protocollo:

Pista atletica 200-400m

Step 2'

Velocità iniziale 8 km h⁻¹

Incrementi 1 km h⁻¹

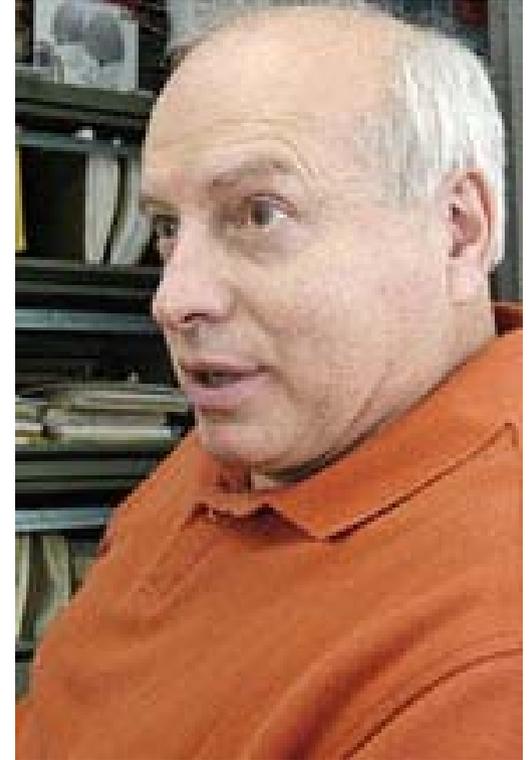


Montreal University Track test

Léger e Boucher 1980

Ritmo dettato da beep

Punti di repera /20-50m



Montreal University Track test

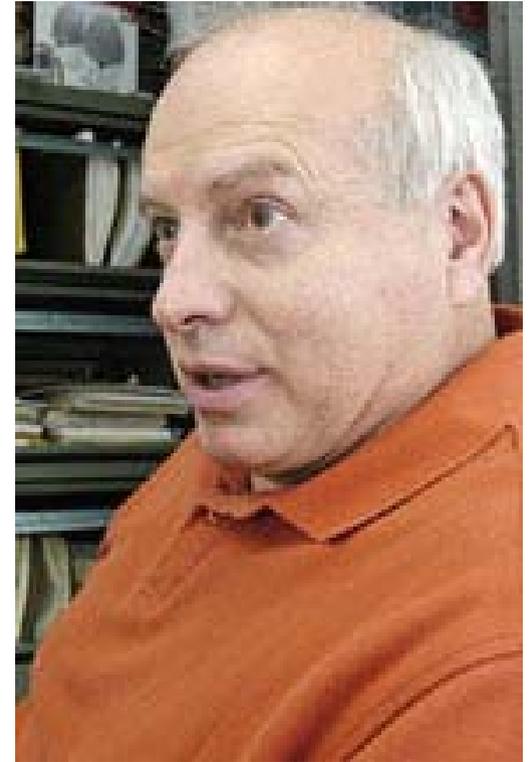
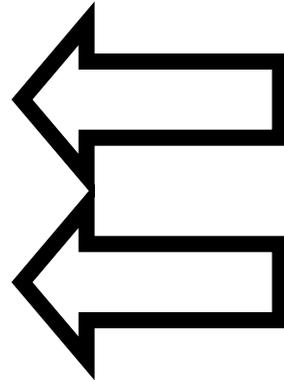
Léger e Boucher 1980

Test ad esaurimento

Oggettivo*

Soggettivo

***Incapacità di mantenere il ritmo per 100m**



Montreal University Track test

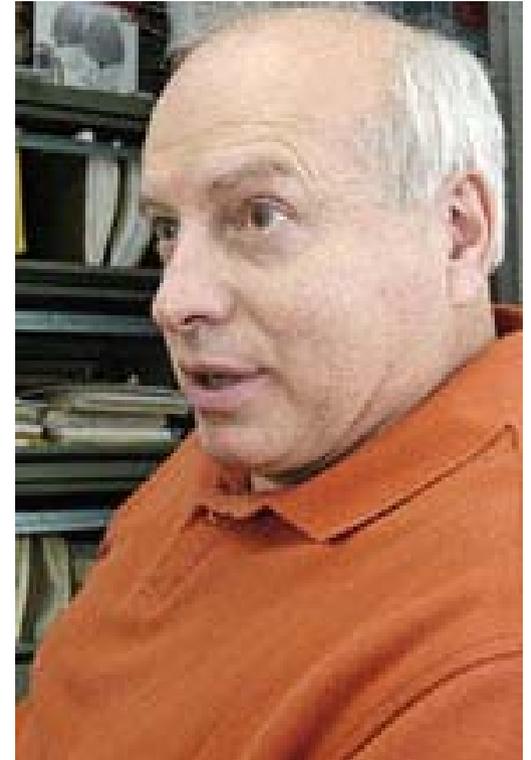
Léger e Boucher 1980

Risultati?

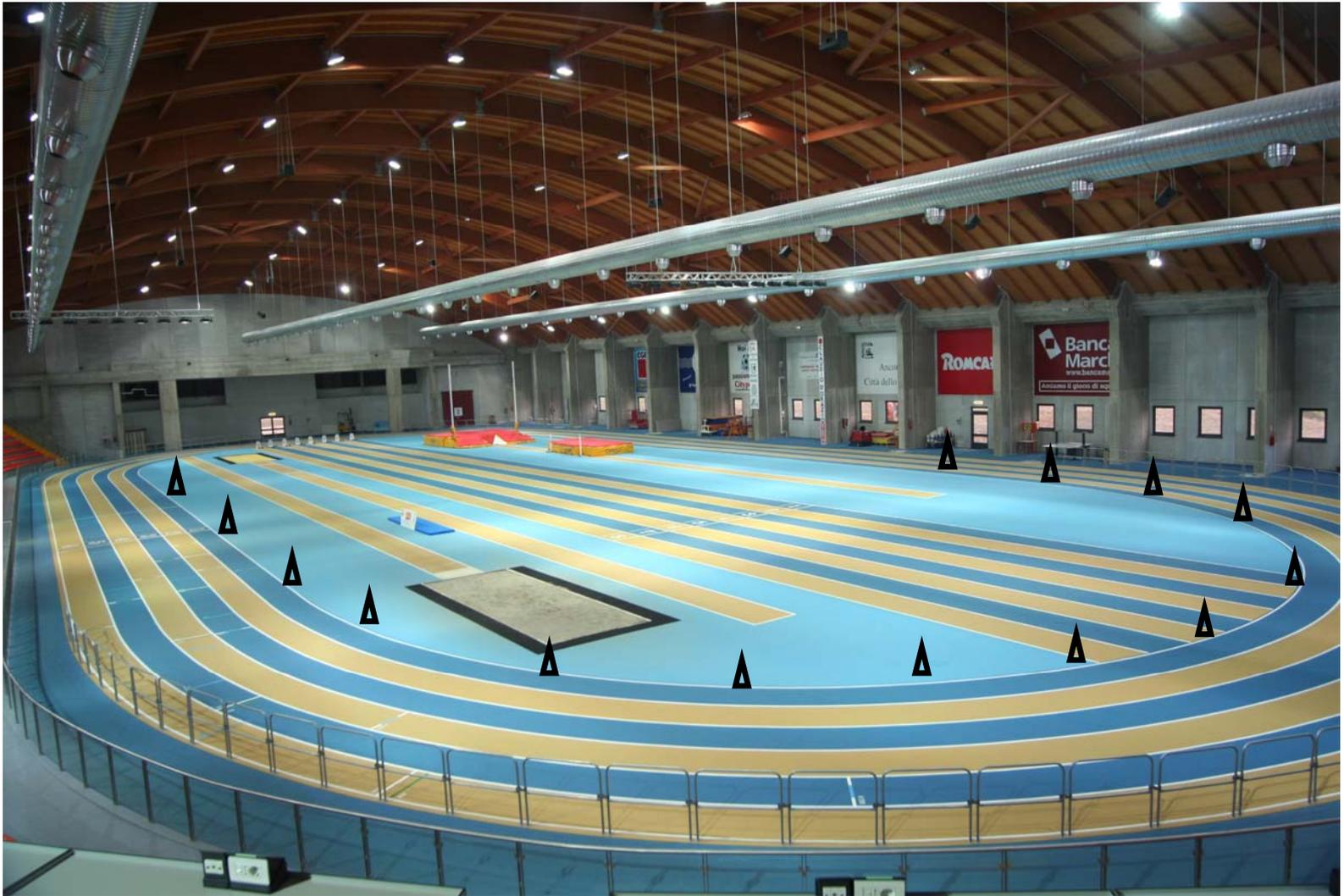
Massima Velocità Aerobica*

$VO_{2max} = 3.5 \text{ MVA}$

*MVA= Velocità ultimo stage completato

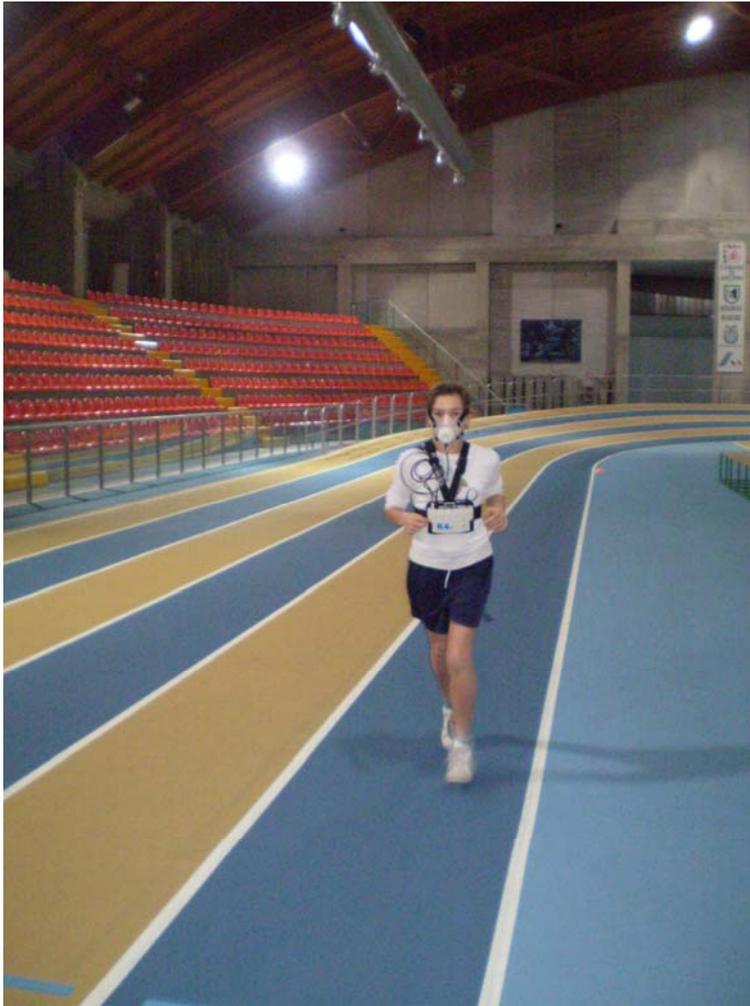


Montreal University Track test



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Montreal University Track test



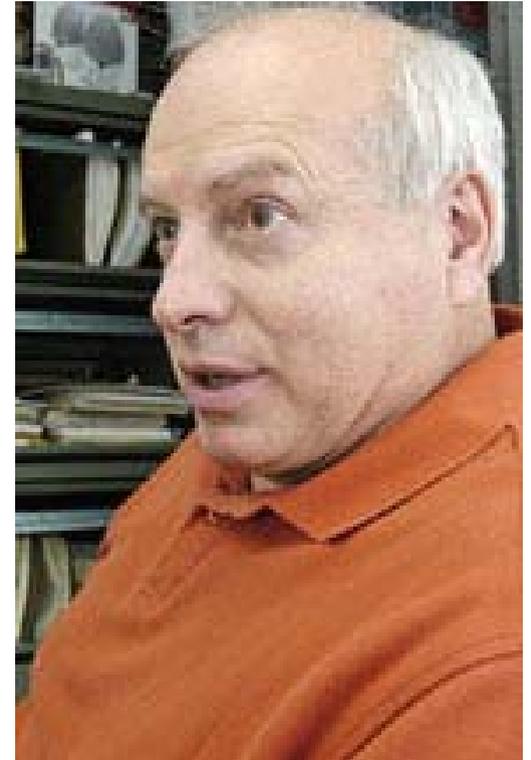
21 Febbraio 2007, Sala CONI Regionale, Ancona

Montreal University Track test

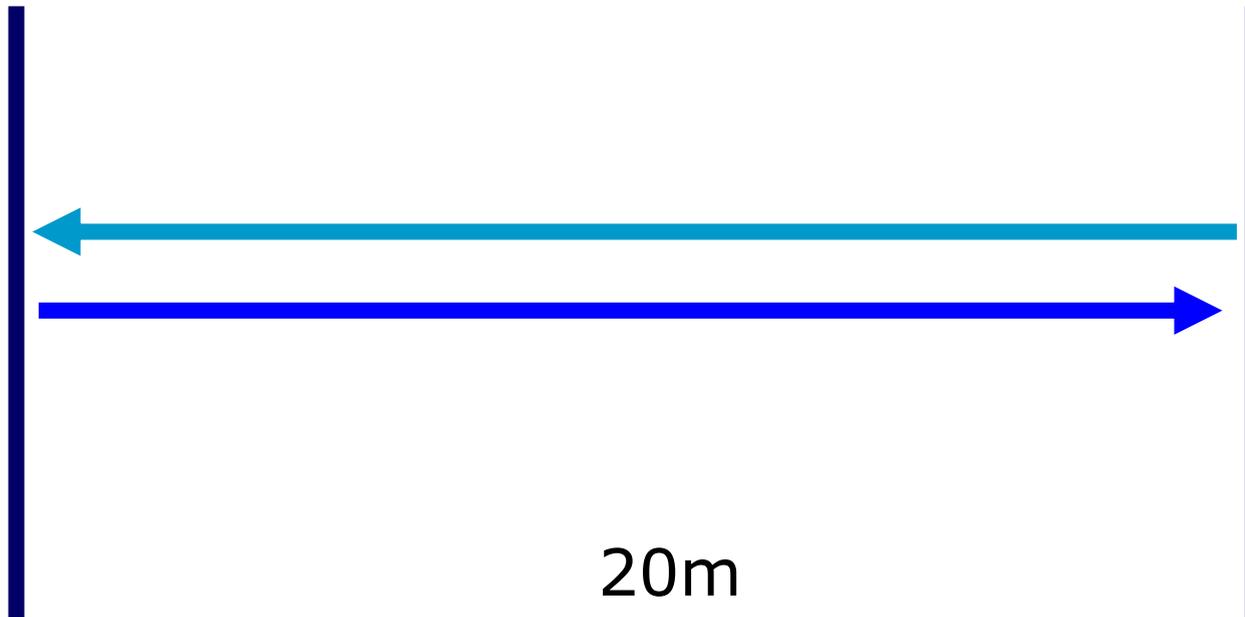
Léger e Boucher 1980

Validità?

$r=0.96$ $p<0.001$



I Test a Navetta



Un po' di Storia



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Test Léger Step 2'

Léger e Lambert 1982

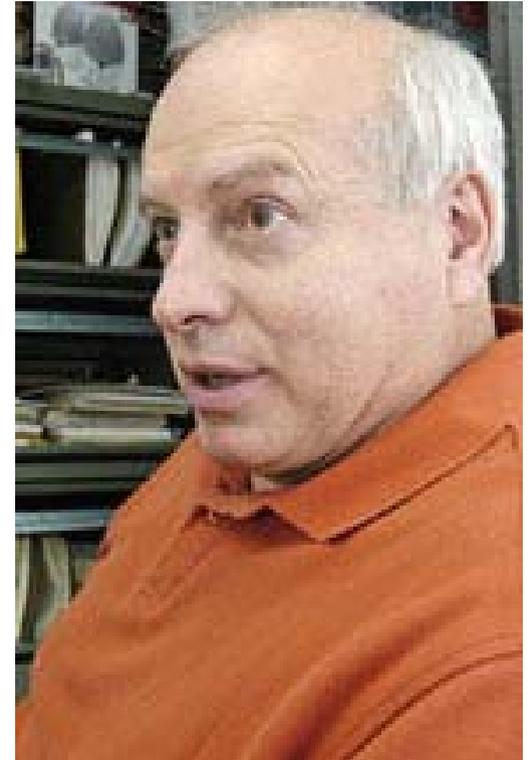
Protocollo:

Base 20m

Step 2'

Vel. iniziale 8.0-7.5 km h⁻¹

Incrementi 0.5 km h⁻¹



Test Léger Step 2'

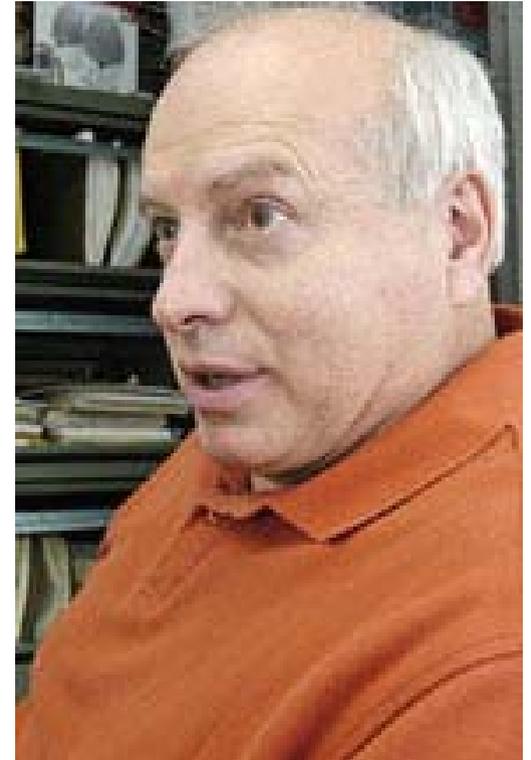
Léger e Lambert 1982

Protocollo:

Base 20m

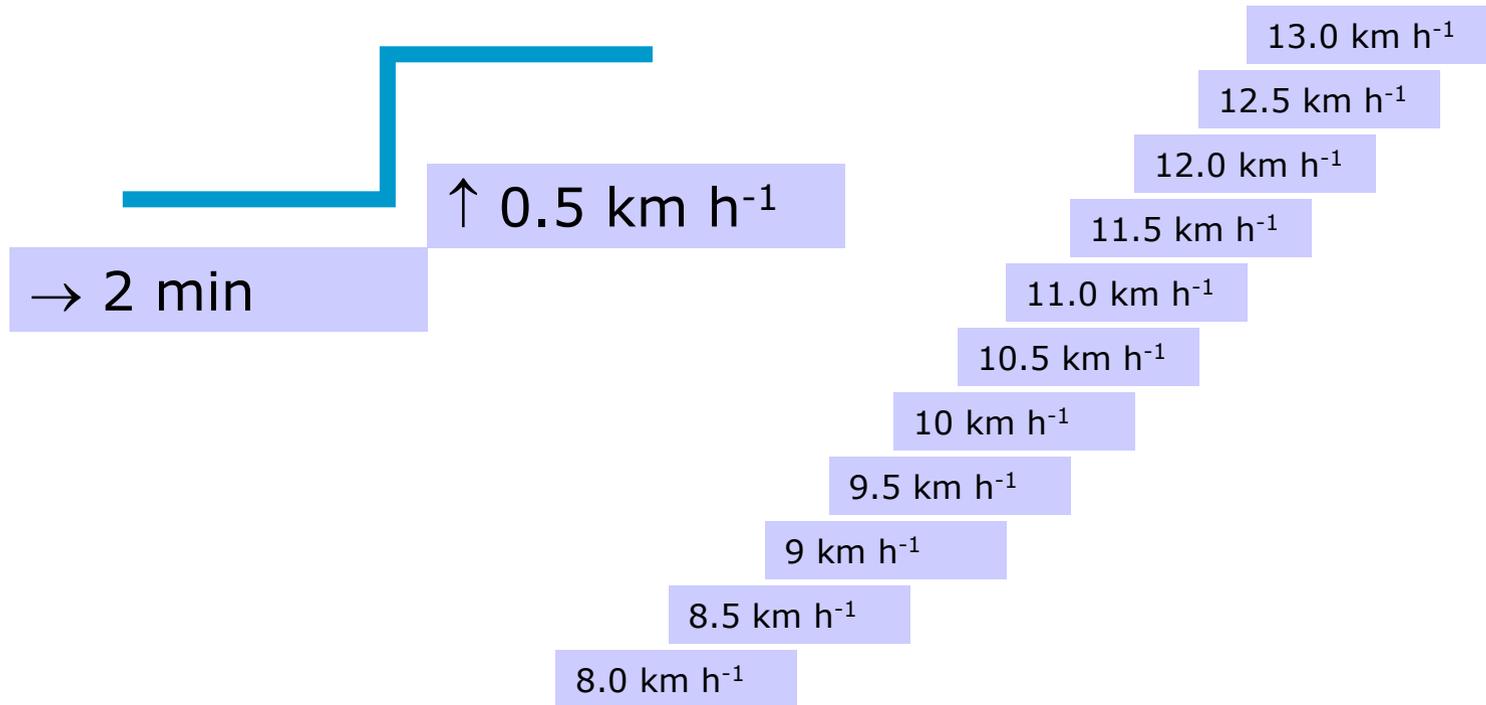
Ritmo dettato da beep

Punti di repera /20



Test Léger Step 2'

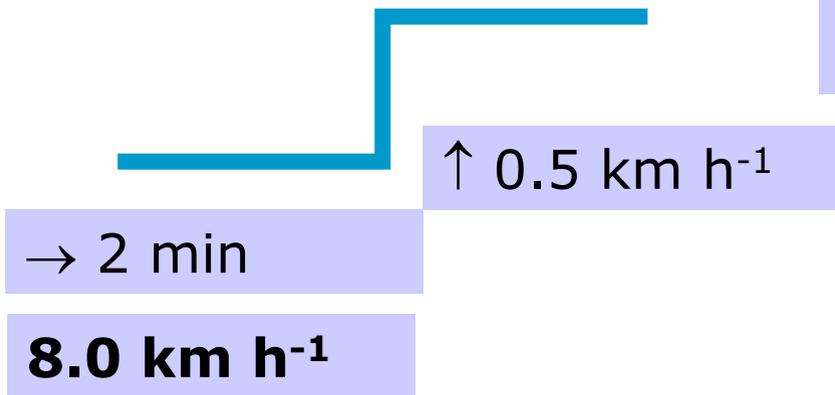
Protocollo:



Léger e Lambert 1982

Test Léger Step 2'

Protocollo:



Test ad Esaurimento

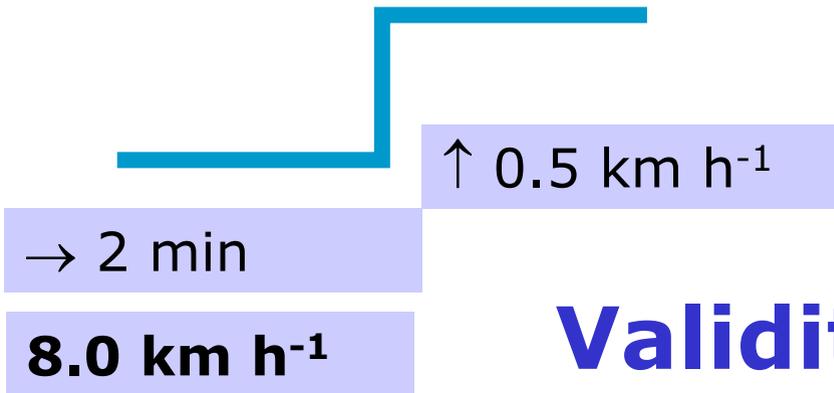
Oggettivo*

*Ritardo di 3m al "beep"

Soggettivo

Léger e Lambert 1982

Test Léger Step 2'



Validità **r=0.84**

Ripetibilità **r=0.97**

MUTTvs 20-m SRT r=0.92

Test Léger Step 1'

Léger e Lambert 1982

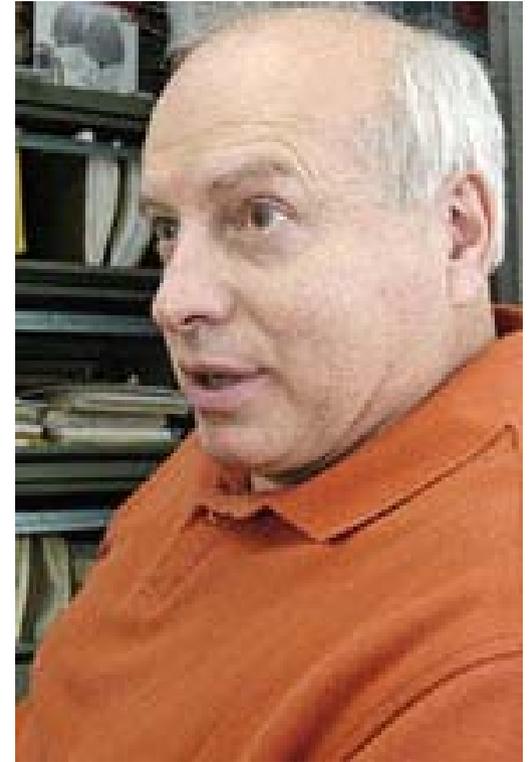
Protocollo:

Base 20m

Step 1'

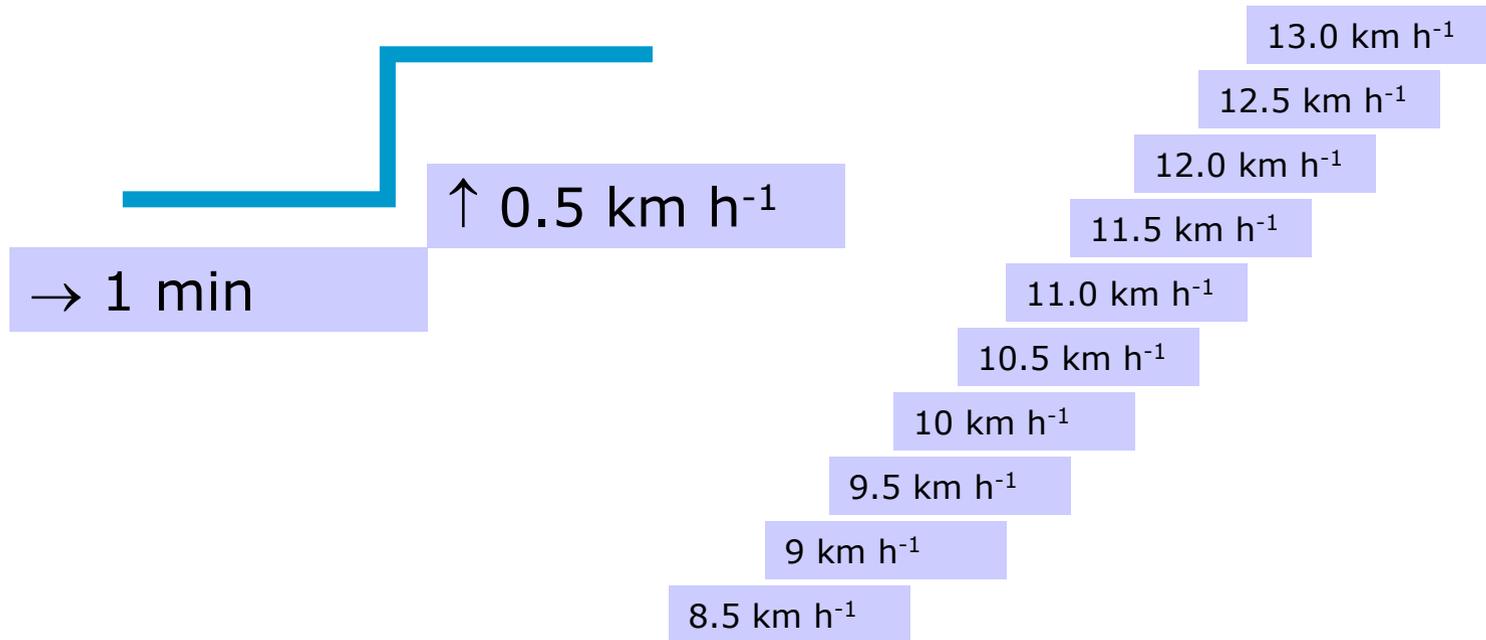
Vel. iniziale 8.5 km h⁻¹

Incrementi 0.5 km h⁻¹



Test Léger Step 1'

Protocollo:



Léger e Lambert 1982; Léger e coll. 1988

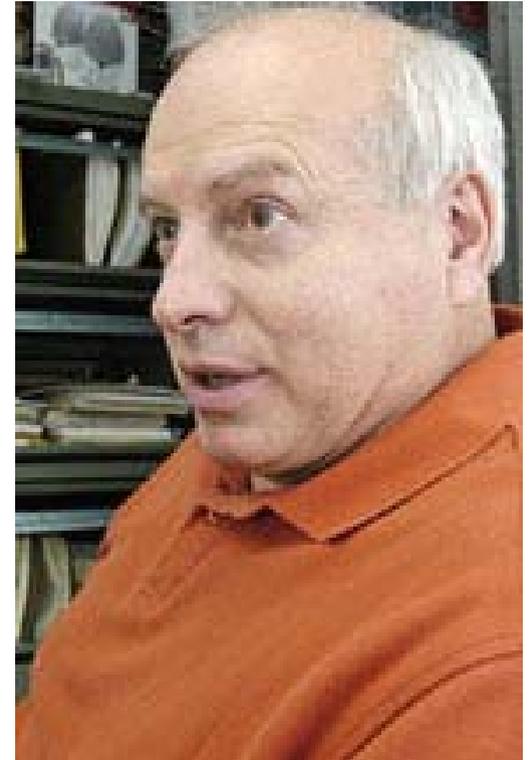
Test Léger Step 1'

Protocollo:

Base 20m

Ritmo dettato da beep

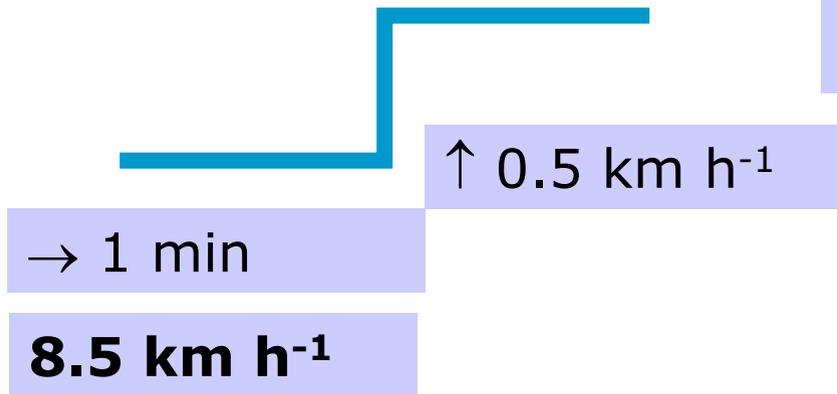
Punti di repera /20



Léger e Lambert 1982; Léger e coll. 1988

Test Léger Step 1'

Protocollo:



Test ad Esaurimento

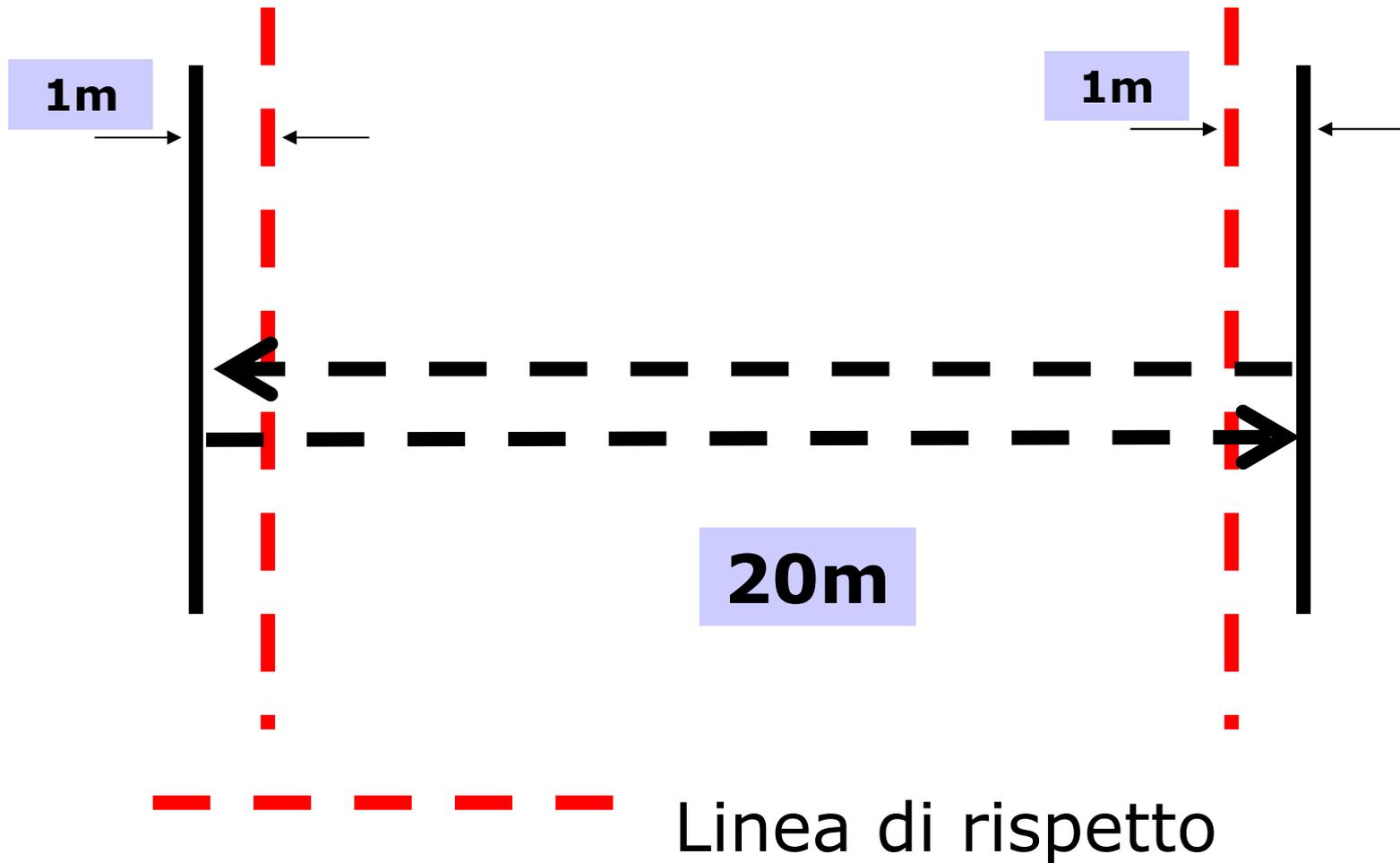
Oggettivo*

*Ritardo di 1-2m al "beep"

Soggettivo

Léger e coll. 1984

Test Léger Step 1'



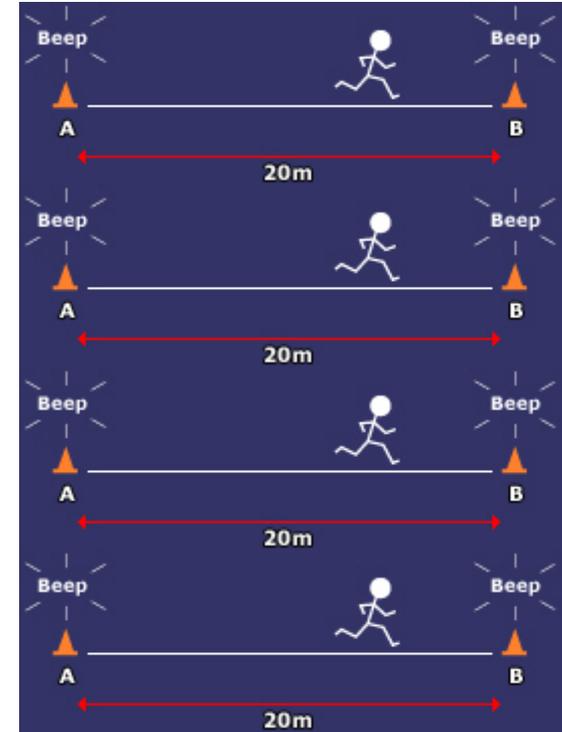
Test Léger Step 1'

Risultati:

Step Effettuati

Tempo di Lavoro

Stima VO_{2max} ml kg⁻¹min⁻¹



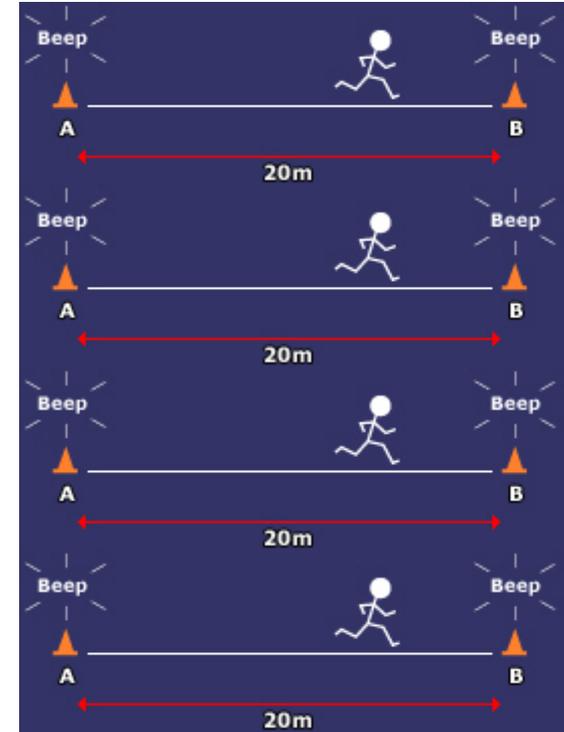
Léger e Lambert 1982; Léger e coll. 1988

Test Léger Step 1'

Stima VO_{2max} ml kg⁻¹min⁻¹

R=0.71 età <18 anni

SE_y = 12.1%



Léger e Lambert 1982; Léger e coll. 1988

Test Léger Step 1'

Stima $VO_{2\max}$ ml kg⁻¹min⁻¹

$$VO_{2\max} = 31.025 + 3.238X_1 - 3.248 X_2 + 0.1536 X_1X_2$$

X_1 = Vel. Ultimo Step

X_2 = Età Soggetti

Léger e Lambert 1982; Léger e coll. 1988

Test Léger Step 1'

Stima $\text{VO}_{2\text{max}}$ $\text{ml kg}^{-1}\text{min}^{-1}$

$r=0.90$ età > 18 anni

$\text{SE}_y = 9.6\%$

$$\text{VO}_{2\text{max}} = -23.4 + 5.8X_1$$

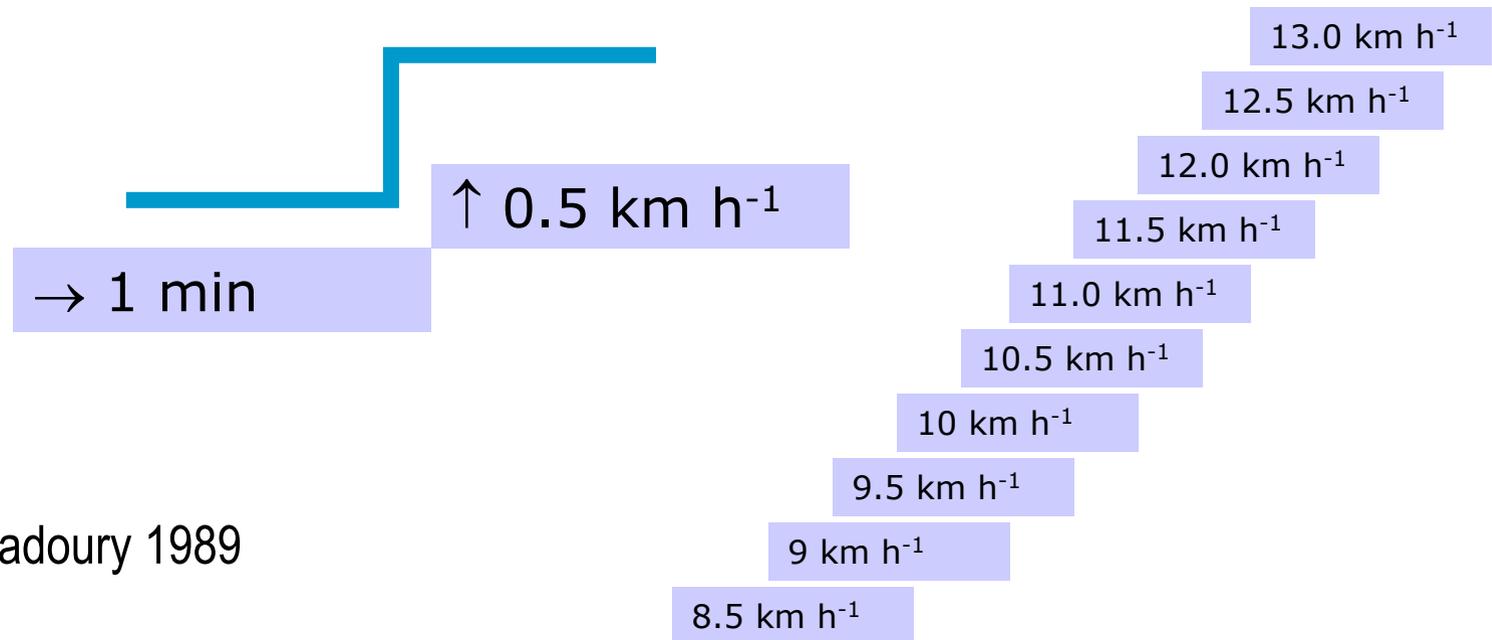
$X_1 = \text{Vel. ultimo step}$

Léger e Gadoury 1989

Test Léger Step 1'

Particolarità

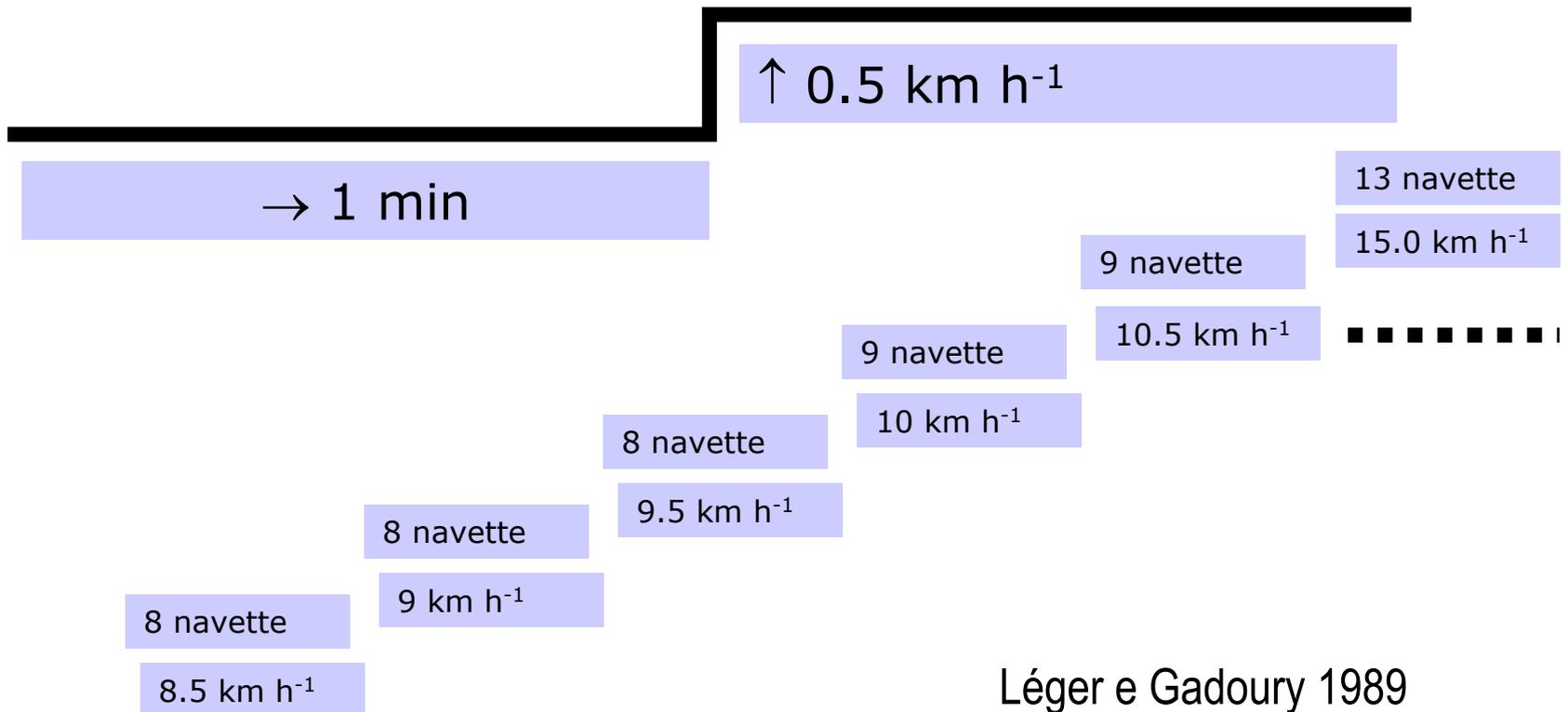
$X_1 = \text{Vel. ultimo step}$



Léger e Gadoury 1989

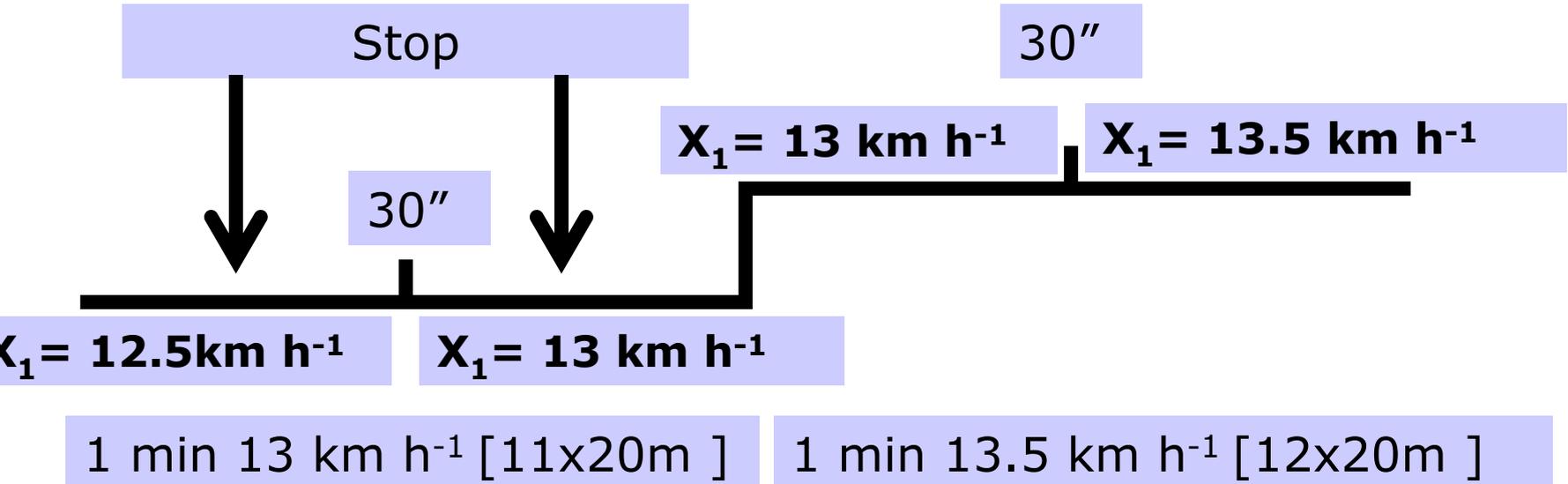
Test Léger Step 1'

X_1 = Velocità Ultimo Step



Test Léger Step 1'

$X_1 =$ Velocità Ultimo Step



Léger e Gadoury 1989

Multistage Fitness Test

Ramsbottom e coll. 1988

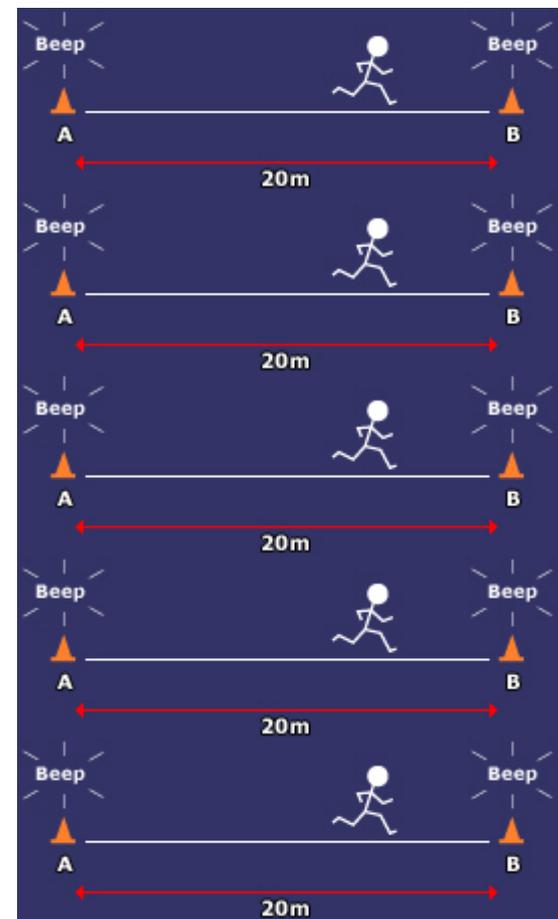
Protocollo:

Base 20m

Step 1'

Vel. iniziale 8.0 km h⁻¹

Incrementi 0.5 km h⁻¹



Multistage Fitness Test

Ramsbottom e coll. 1988

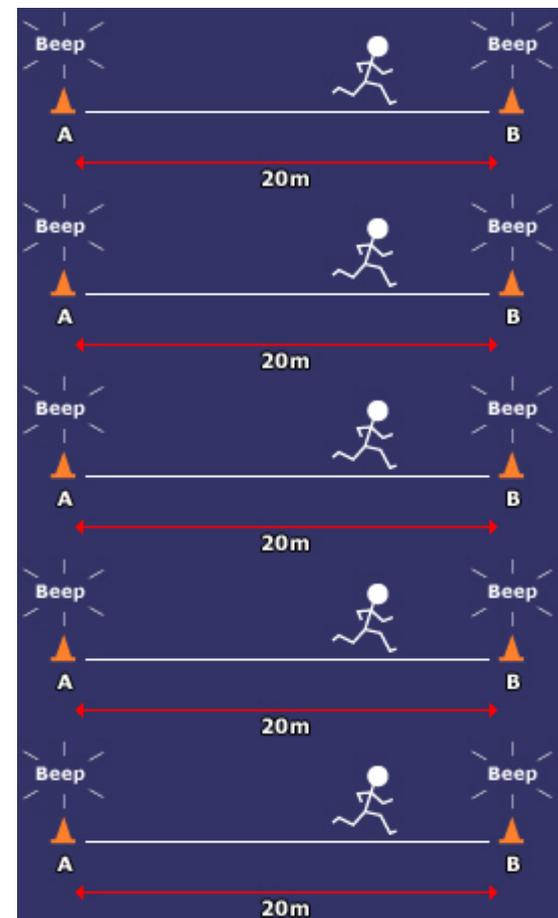
Differenze con test Léger?

Computo navette effettuate

Formula età indipendente

Facilità raccolta dati

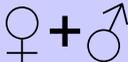
1 Formula per Stima VO_{2max}



Multistage Fitness Test

Palizkca e coll. 1987; Ramsbottom e coll 1988

Validità MSFT vs Léger?

Prestazione			
Léger [plaiier]	r=0.82	r=0.89	r=0.92
MSFT [laps]	r=0.83	r=0.93	r=0.93

Multistage Fitness Test

Palizkca e coll. 1987; Ramsbottom e coll 1988

Stima VO_{2max} ?

Test

Equazione

Léger

$$VO_{2max} = 20.6 + 3 \times N^{\circ} \text{steps}$$

MSFT

$$VO_{2max} = 23.7 + 0.29 \times N^{\circ} \text{navette}$$

Yo-Yo Tests



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Yo-Yo Tests

Bangsbo 1992

2 Livelli

Yo-Yo Endurance

Yo-Yo Inter. Endurance

Yo-Yo Inter. Recovery



Yo-Yo Endurance

Bangsbo 1992

Livello 1 = MSFT



Yo-Yo Endurance

Bangsbo 1992

Livello 1

Base 20m

Step 1'

Vel. iniziale 8.0 km h⁻¹

Incrementi 0.5 km h⁻¹



Yo-Yo Endurance

Bangsbo 1992

Protocollo Livello 2:

Base 20m

Step 1'

Vel. iniziale 11.5 km h⁻¹

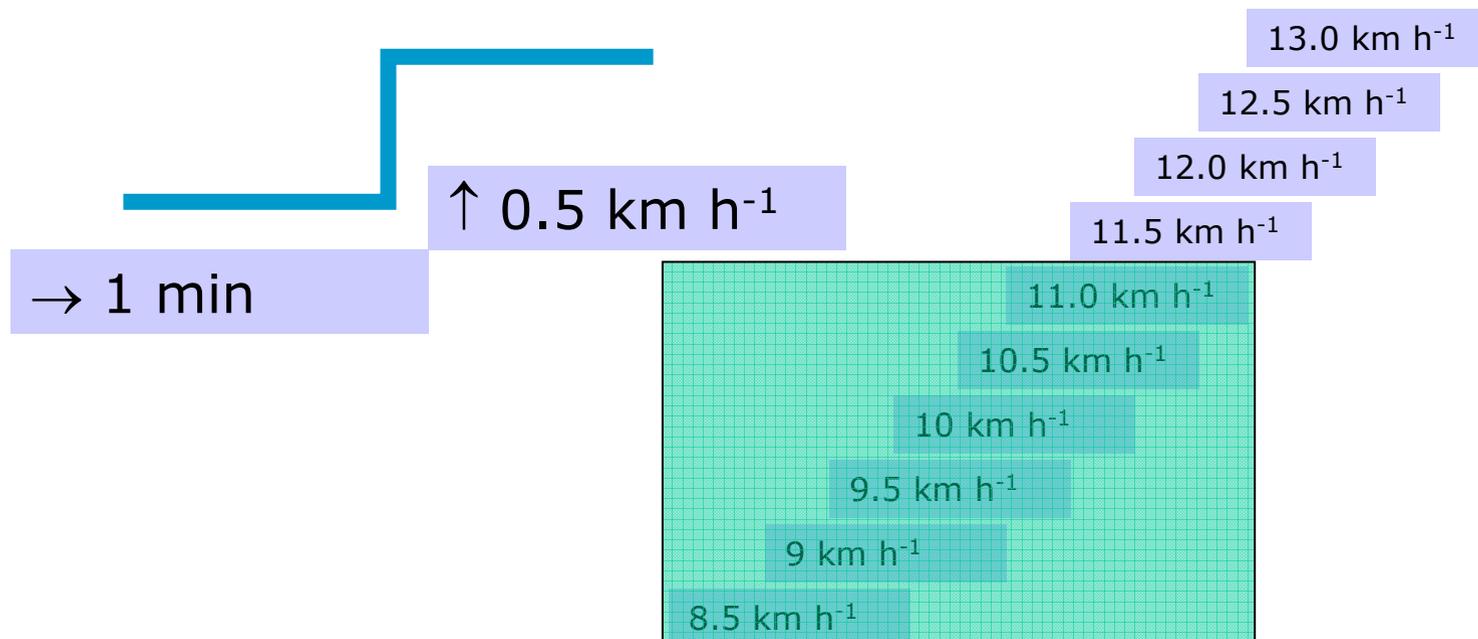
Incrementi 0.5 km h⁻¹



Yo-Yo Endurance L2

Bangsbo 1992

Protocollo Livello 2:



Yo-Yo Intermittent Recovery

Bangsbo 1992

Protocollo L1:

Base 20m

Velocità iniziale 10 km h⁻¹

Incrementi 0.5 km h⁻¹/8x2x20m

10s recupero/2x20m

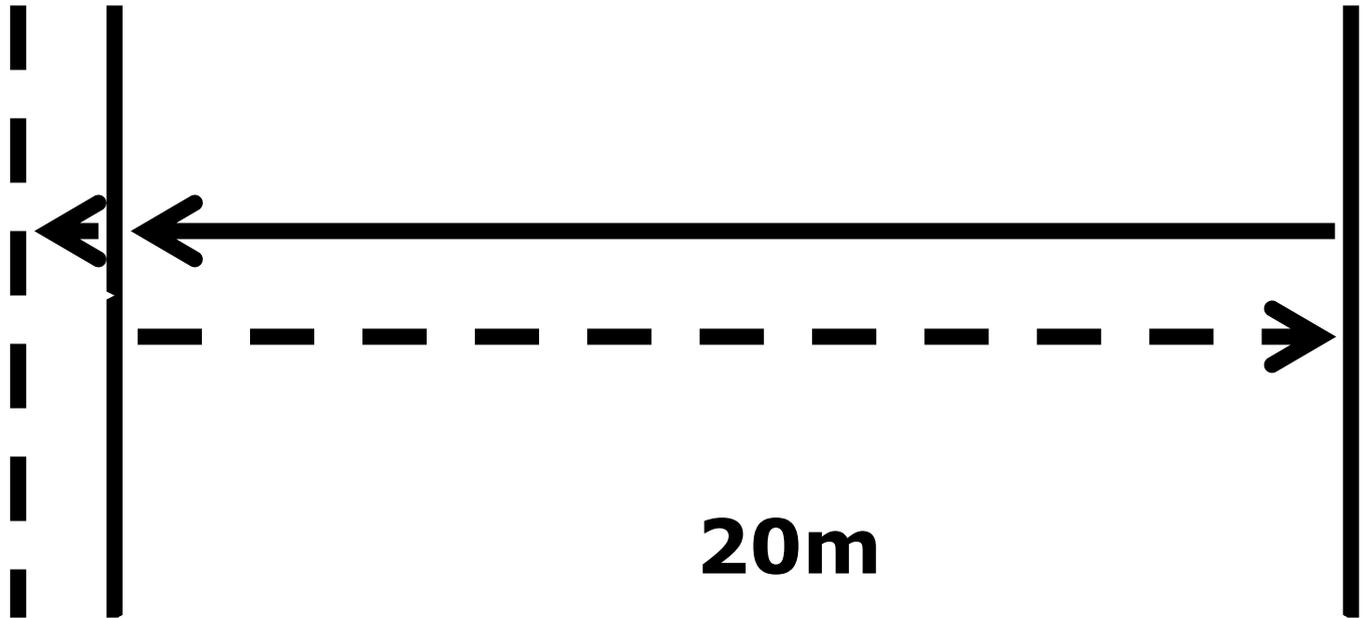


Yo-Yo Intermittent Recovery

10s recupero/2x20m

5m

Zona
Recupero
Attivo

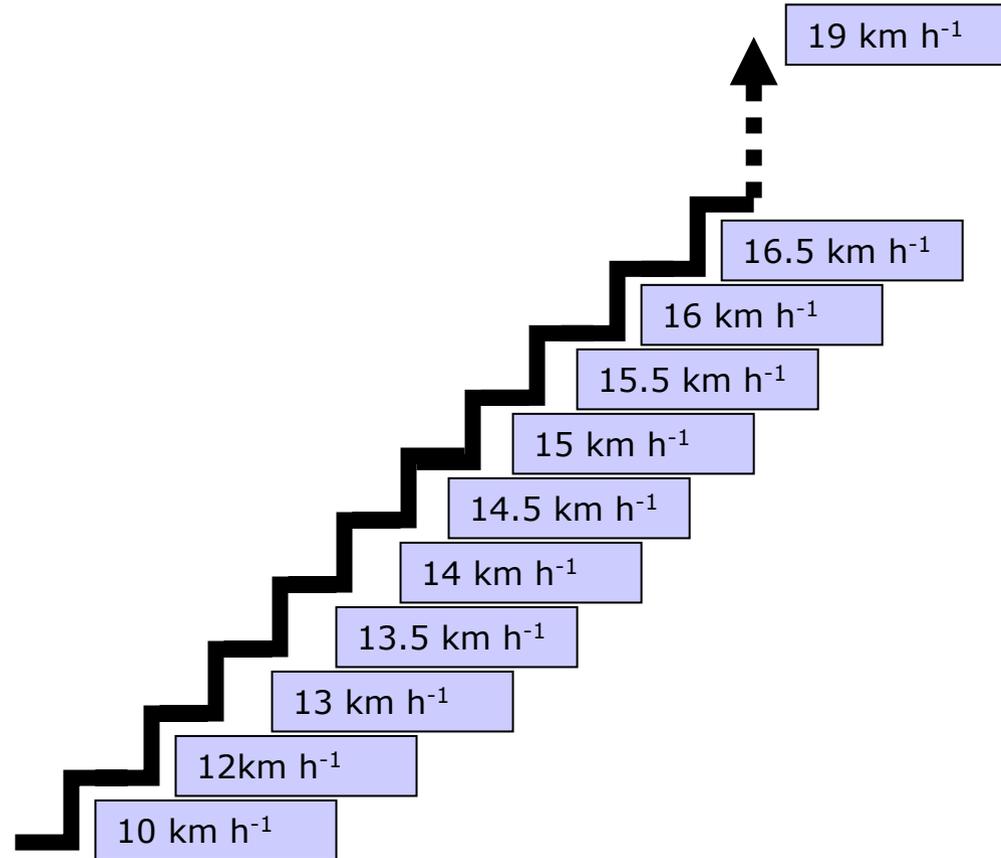


Yo-Yo Intermittent Recovery

Protocollo L1



BLODPR~2.JPG



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Yo-Yo Intermittent Recovery

Protocollo L1



2X20m

19 km h⁻¹

8

16.5 km h⁻¹

8

16 km h⁻¹

8

15.5 km h⁻¹

8

15 km h⁻¹

8

14.5 km h⁻¹

8

14 km h⁻¹

4

13.5 km h⁻¹

3

13 km h⁻¹

2

12 km h⁻¹

1

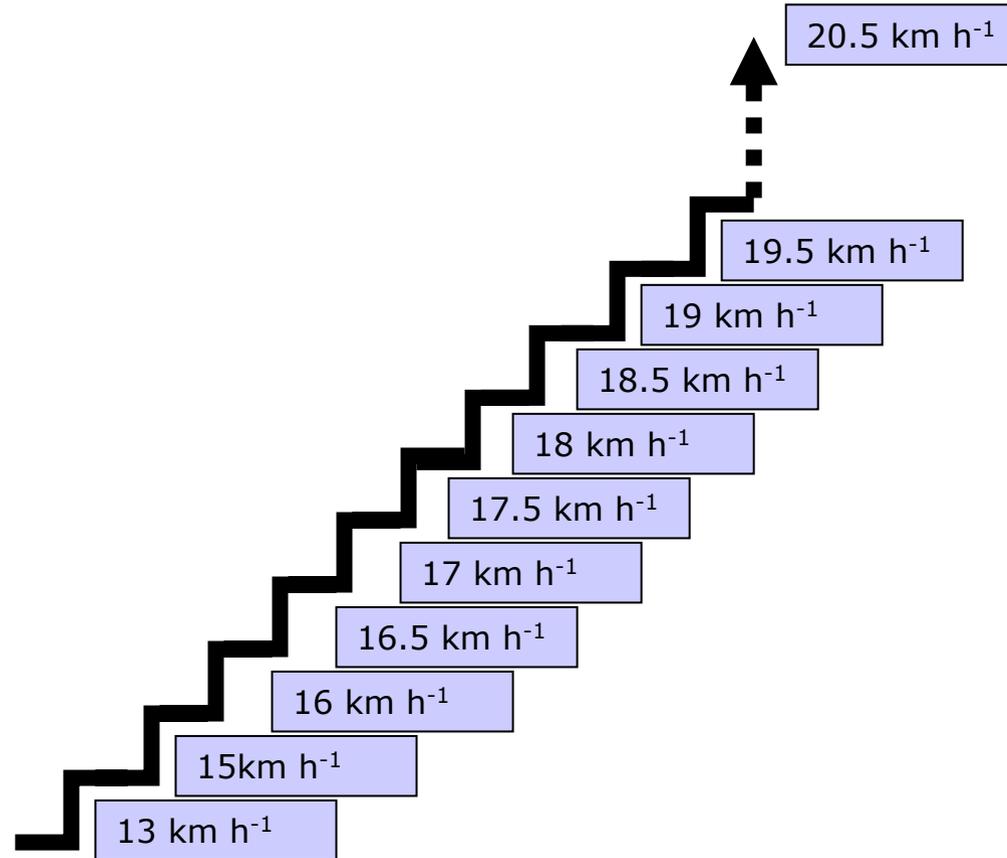
10 km h⁻¹

1

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Yo-Yo Intermittent Recovery

Protocollo L2



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Yo-Yo Intermittent Recovery

Protocollo L2

2X20m

20.5 km h⁻¹

8

19.5 km h⁻¹

8

19 km h⁻¹

8

18.5 km h⁻¹

8

18 km h⁻¹

8

17.5 km h⁻¹

8

17 km h⁻¹

4

16.5 km h⁻¹

3

16 km h⁻¹

2

15 km h⁻¹

1

13 km h⁻¹

1



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Conclusioni

Yo-Yo EL2

Test Aerobico Generico

Guida Allenamento Aerobico

Inizio Preparazione!

Conclusioni

Yo-Yo IRL1

Endurance Calcio-Specifico
Parte Finale Preparazione
Valutazione Campionato!
Importanza Forza Esplosiva!

Yo-Yo Intermittent Endurance L1

Base	20m
Step	1 min
Velocità iniziale	8.0 km h ⁻¹
Incrementi Vel.	0.5 km h ⁻¹ min ⁻¹
Recupero	5 s / 2x20 m
Base Recupero	2.5 m

Bangsbo 1994

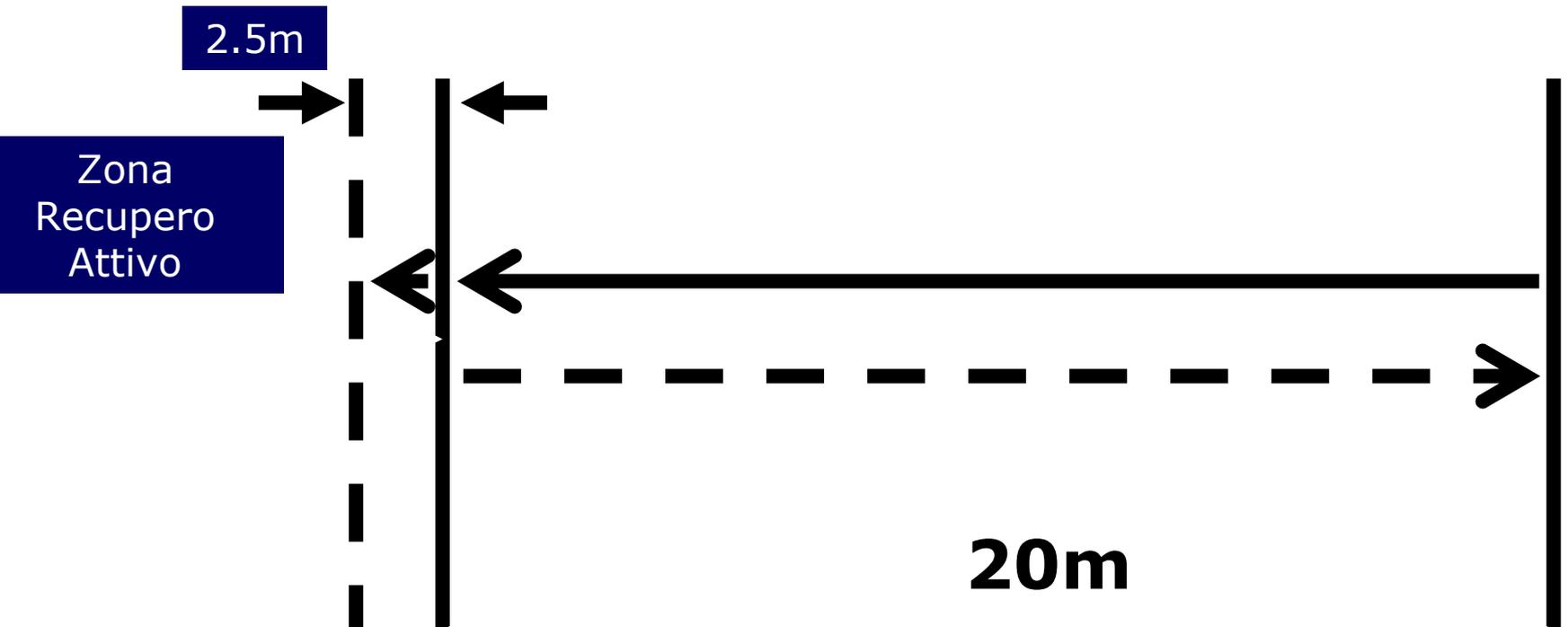
Yo-Yo Intermittent Endurance L2

Base	20m
Step	1 min
Velocità iniziale	11.5 km h ⁻¹
Incrementi Vel.	0.5 km h ⁻¹ min ⁻¹
Recupero	5 s / 2x20 m
Base Recupero	2.5 m

Bangsbo 1994

Yo-Yo Intermittent Endurance

5s recupero/2x20m



Yo-Yo Intermittent Endurance

Journal of Strength and Conditioning Research, 2006, 20(2), 326–330
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CARDIORESPIRATORY RESPONSES TO YO-YO INTERMITTENT ENDURANCE TEST IN NONELITE YOUTH SOCCER PLAYERS

CARLO CASTAGNA,¹ FRANCO M. IMPELLIZZERI,² ROMUALDO BELARDINELLI,³ GRANT ABT,⁴ AARON COUTTS,⁵ KARIM CHAMARI,⁶ AND STEFANO D'OTTAVIO¹

¹School of Sport and Exercise Sciences, Faculty of Medicine and Surgery, University of Rome Tor Vergata, Rome, Italy; ²Human Performance Lab, S.S. MAPEI, Castellanza, Italy; ³Department of Cardiovascular Rehabilitation and Prevention, Hospital "G.M. Lancisi", Ancona, Italy; ⁴St. Martin's College, Lancaster, United Kingdom; ⁵Human Performance Laboratory, University of Technology, Sydney, Australia; and ⁶Unité de Recherche "Evaluation, Sport, Santé", National Centre of Medicine and Science in Sports (CNMSS), El Menzah, Tunisia.

ABSTRACT. Castagna, C., F.M. Impellizzeri, R. Belardinelli, G. Abt, A. Coutts, K. Chamari, and S. D'Ottavio. Cardiorespiratory responses to yo-yo intermittent endurance test in nonelite youth soccer players. *J. Strength Cond. Res.* 20(2): 326–330. 2006.— This study examined the validity of the Yo-yo Intermittent Endurance Test (Level 1; YYIET) as indicator of aerobic power in youth soccer players. Cardiorespiratory responses were determined in 18 moderately trained nonelite youth soccer players (age, 16.6 ± 0.8 years; height, 178.7 ± 6.2 cm; body mass, 69.8 ± 6.0 kg; $\dot{V}O_{2peak}$, 52.8 ± 7.4 ml·kg⁻¹·min⁻¹) while performing the YYIET and an incremental treadmill test. Maximal heart

Of these, the Yo-yo Intermittent Endurance Test (YYIET) has become popular (2, 4, 32). The YYIET is a progressive intermittent shuttle run test that allows 5 seconds recovery following every second 20-m shuttle. Its aim is to progressively illicit a maximal physiological response from players during a soccer specific (intermittent) protocol. Two YYIET versions are currently available, Level 1 and Level 2. Level 1 has been devised for young and-or amateur athletes or habitually active people, while Level 2 is supposed to be used to test the en-

Yo-Yo Inter. Endurance L1

Conclusioni

Stima VO_{2max}	NO
Troppo lungo	Si
Test VO_{2max}	NO

Castagna Impellizzeri e coll. 2006b

