



# HIGH PERFORMANCE CONFERENCE

MADRID 2025

*Collaboration between Scientist and the  
Member Federation - the Italian example*

*Gaspare Pavei*

Picture organigramme then ZOOM in in our Area

It's like this since 2021, although since 2018 there was a formal "Evaluation" Team

In the previous years someone just went around testing athletes, it was more a "on Call" activity.



FEDERAZIONE ITALIANA  
DI ATLETICA LEGGERA

## *Research Team (since 2018)*

*Head Coach & Head of Research Team*

*Prof. Antonio La Torre – University of Milan*



*Prof. Gennaro Boccia (PhD)*

University of Turin

*Neuromuscular aspects*



*Stefano Righetti (MD)*

IRCCS San Gerardo, Monza

*Physiology / Nutrition*



*Prof. Jacopo Vitale (PhD)*

Schulthess Klinik, Zürich

University of Physical  
Culture in Cracow

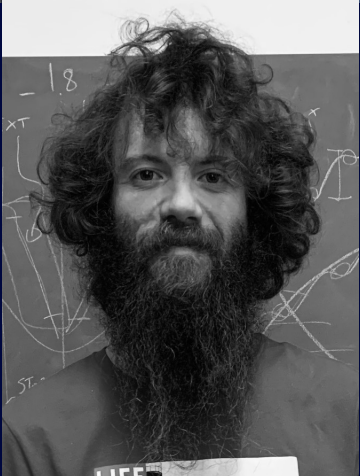
*Sleep*



*Prof. Gaspare Pavei (PhD)*

University of Milan

*Biomechanics / Physiology*





## Research Team (since 2018)

### What we are asked to

- Support
- Give Insights
- Educate
- Lead research projects

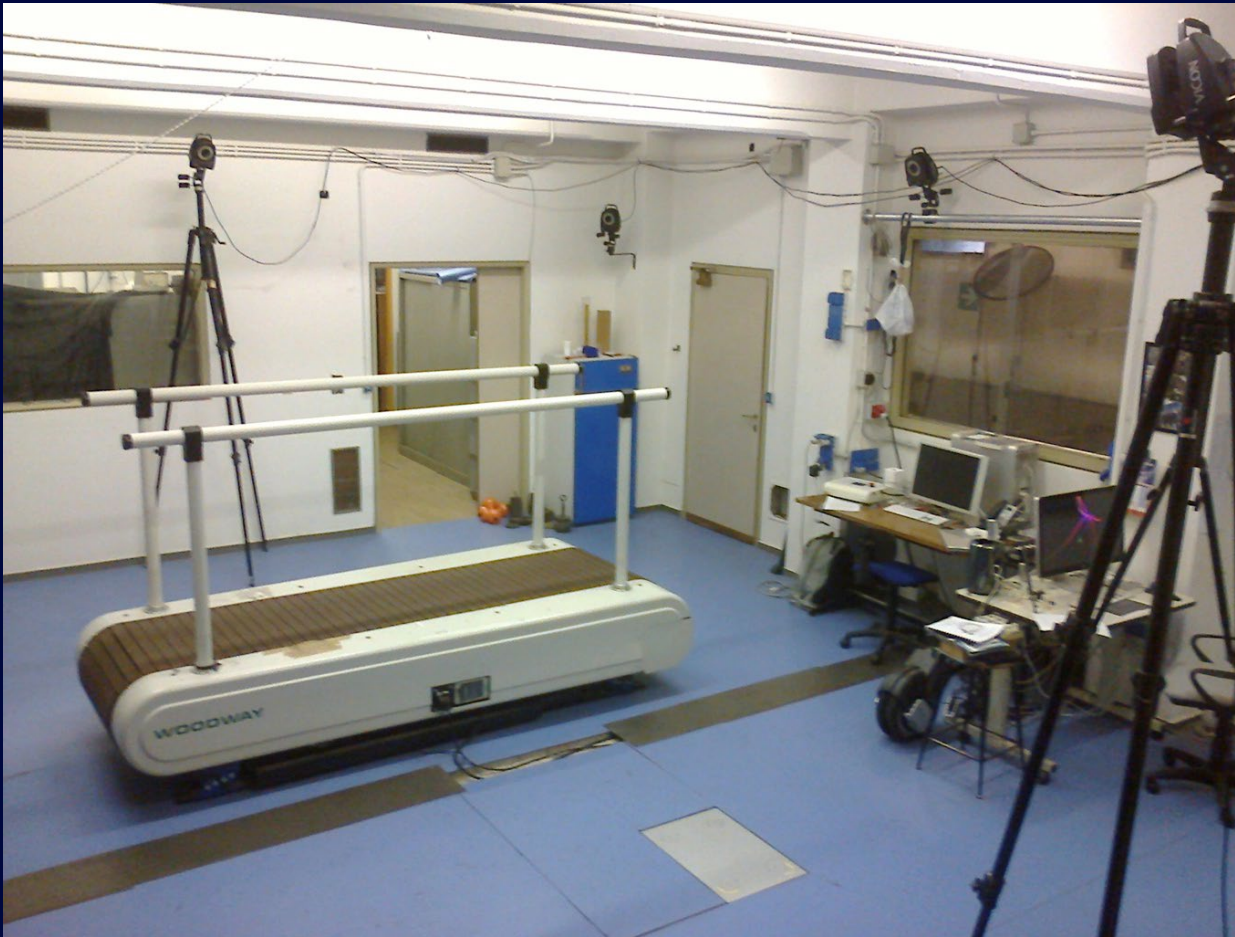




# *The 3D Analysis*

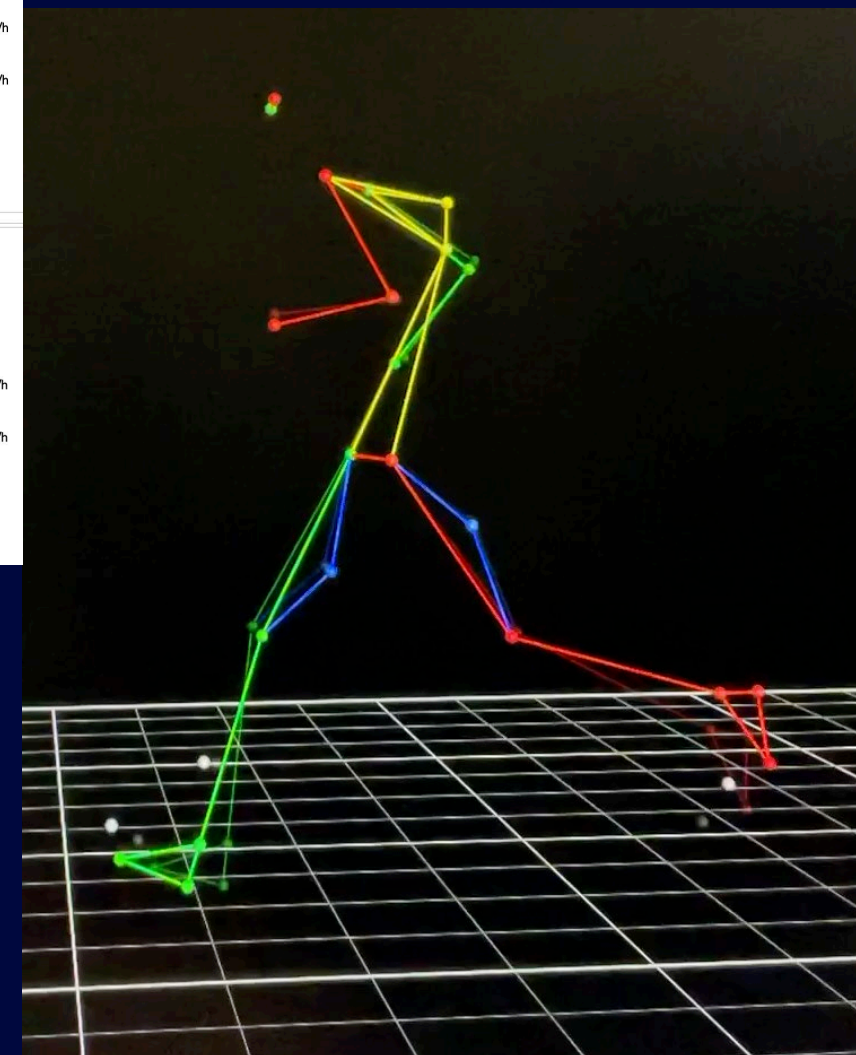
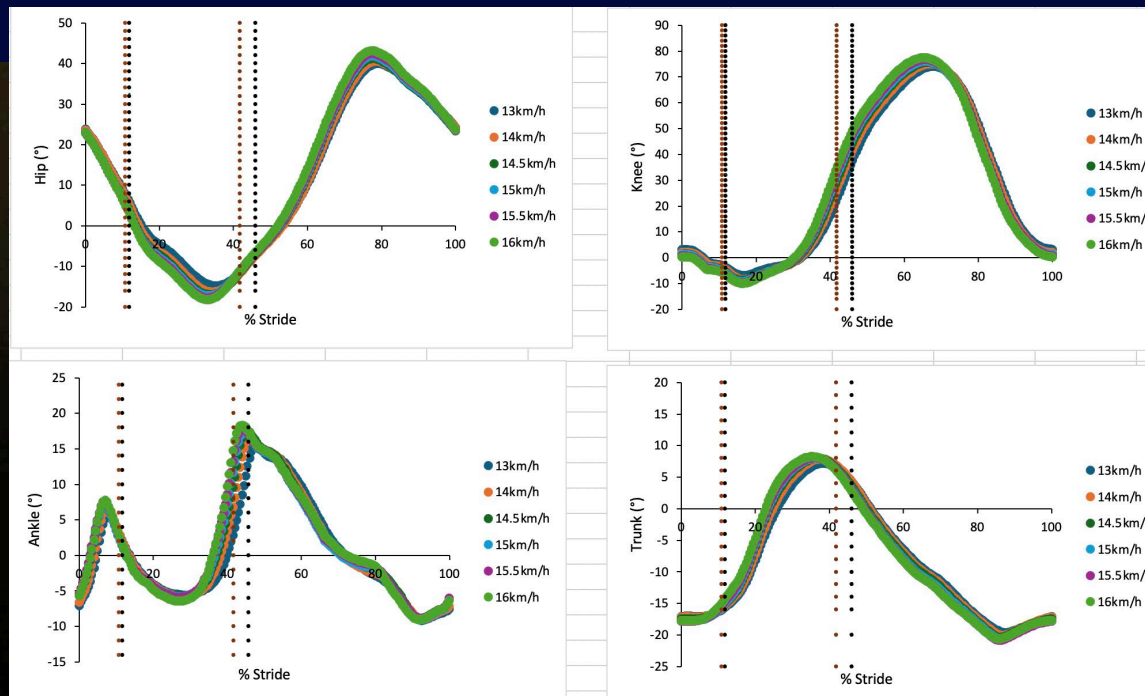
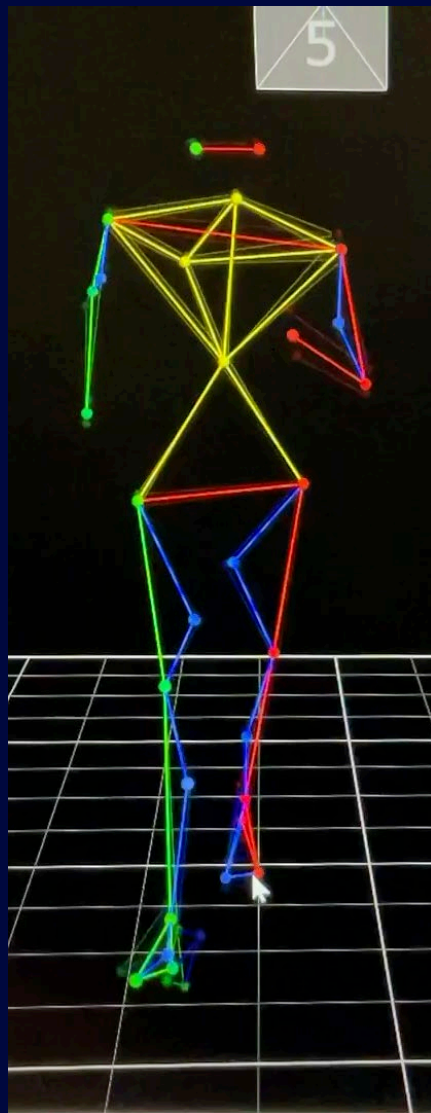


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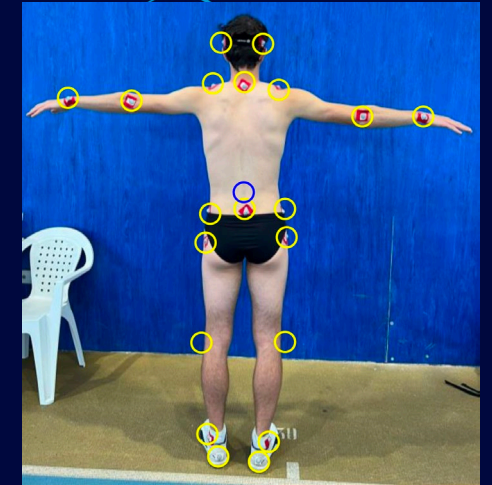
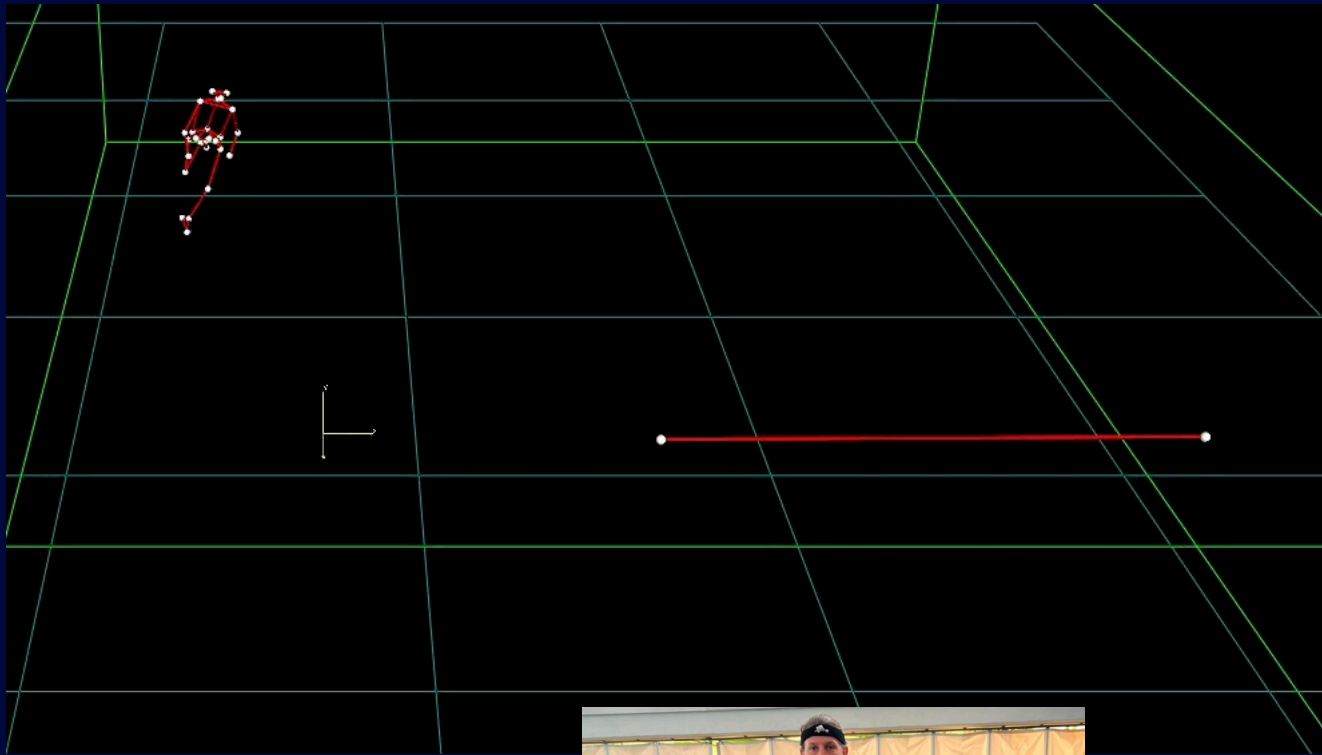


# The 3D Analysis



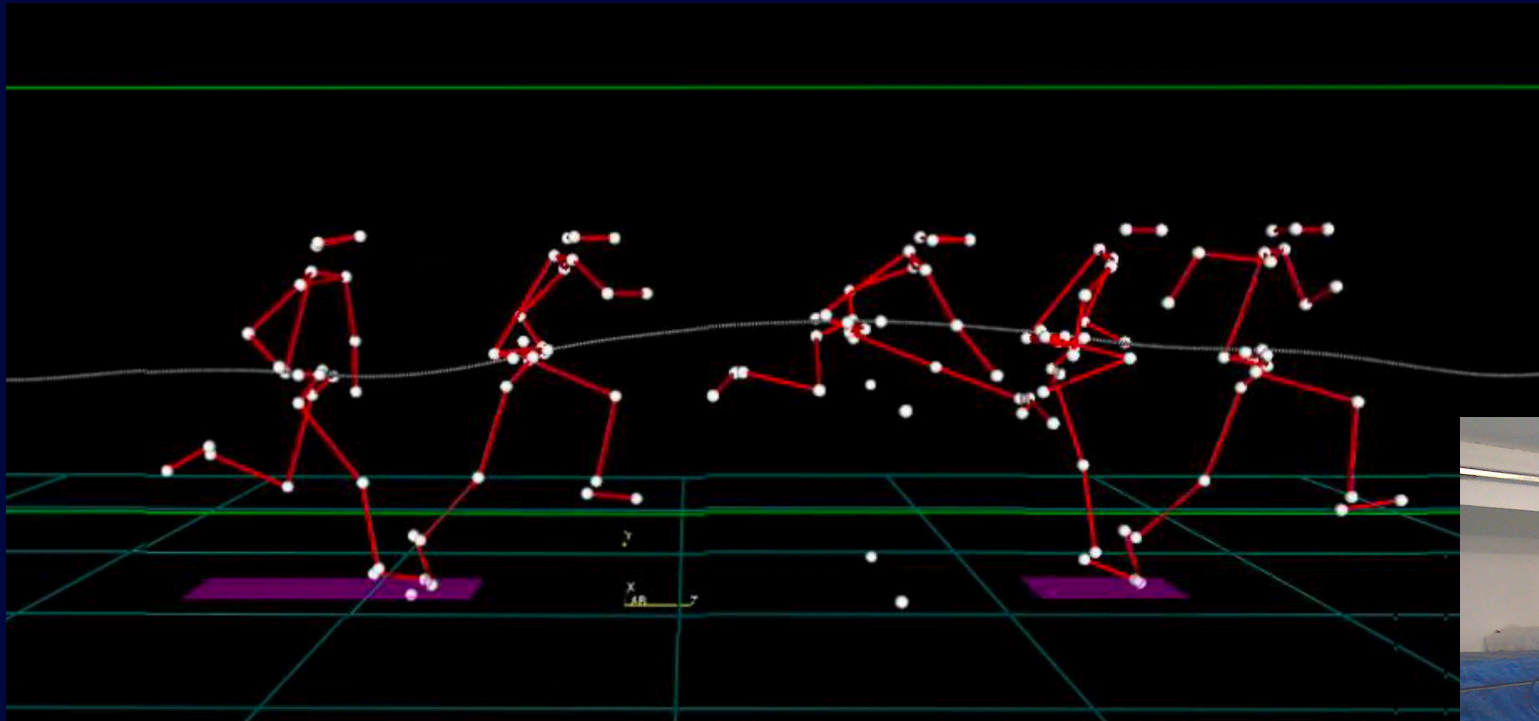


# The 3D Analysis





# *The 3D Analysis*



# *The Sleep Project*





# *The Sleep Project*

*To sleep dreaming medals: "Sleep4Win"*



## The "Sleep4Win" project

2018-2021 (and ongoing...)

N=12 Olympic athletes (6F and 6M)

N=1 Paralympic athlete

N=6 different track&field disciplines

N=3 gold medals

**> 750 nights**

**> 250 daytime naps**

In-, off-, pre-season

# The Sleep Project

## How do elite athletes sleep?

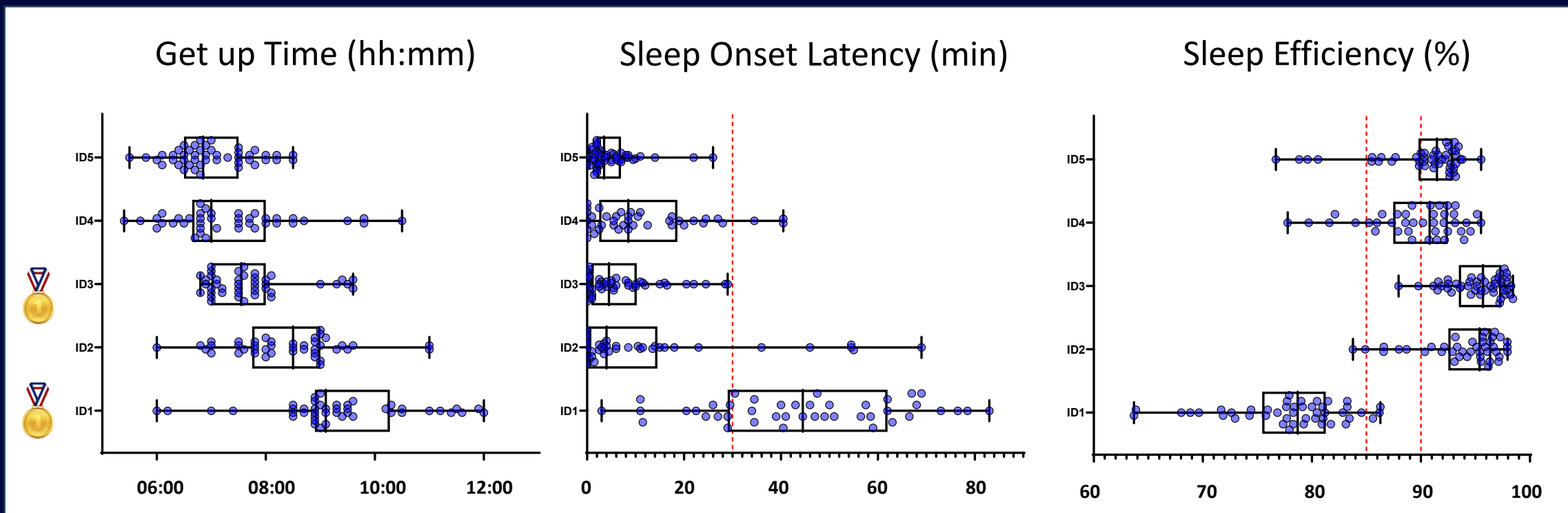
- 18.8% athletes: poor-sleepers
- 31.3% athletes: short-sleepers
- Higher sleep quality in females and short-term disciplines
- Huge amount of daytime naps  
n=227, higher in males
- Sleep hygiene strategies had an impact on total sleep time (+22min)

**Table 2 Baseline Sleep Characteristics**

	Total sample	Females	Males	Gender differences	ES	Short-term disciplines	Long-term discipline	Disciplines differences	ES
Number of nights	N = 425	n = 165	n = 260	—	—	159	266	—	—
Bedtime, h:min	00:20 (01:04); 00:14–00:26	00:13 (00:57); 00:04–00:22	00:24 (01:08); 00:16–00:32	$P = .027$	0.18, trivial	00:36 (01:03); 00:26–00:46	00:10 (01:03); 00:03–00:38	$P < .001$	0.41, small
Wake-up time, h:min	07:55 (01:00); 07:49–08:01	07:56 (01:03); 07:26–08:06	07:54 (00:57); 07:48–08:02	$P = .983$	—	08:18 (01:15); 08:07–08:30	07:41 (00:42); 07:36–07:46	$P < .001$	0.61, moderate
Total sleep time, h:min	07:09 (01:00); 07:04–07:15	07:18 (00:53); 07:10–07:26	07:03 (01:03); 06:56–07:11	$P = .030$	0.26, small	07:15 (01:03); 07:06–07:25	07:06 (00:57); 06:59–07:13	$P = .266$	—
Sleep efficiency, %	89.86 (7.17); 89.18–90.55	91.72 (4.74); 90.99–92.45	88.69 (8.41); 87.69–89.68	$P = .003$	0.44, small	91.67 (4.56); 90.95–92.38	88.79 (8.17); 87.80–89.77	$P = .013$	0.44, small
Sleep latency, min	14.33 (20.88); 12.34–16.32	6.99 (8.67); 5.65–8.32	18.99 (24.70); 15.97–22.00	$P < .001$	0.65, moderate	6.69 (8.73); 5.33–8.06	18.89 (24.42); 15.94–21.84	$P < .001$	0.67, moderate
WASO, min	26.68 (19.32); 24.84–28.52	25.68 (16.82); 23.10–28.27	27.31 (20.76); 24.78–29.85	$P = .737$	—	27.36 (16.43); 24.79–29.93	26.27 (20.88); 23.75–28.80	$P = .017$	0.06, trivial
Subjective sleep quality (0–10 scale)	6.77 (1.39); 6.62–6.91	6.90 (1.33); 6.70–7.10	6.71 (1.41); 6.52–6.90	$P = .156$	—	6.69 (1.40); 6.46–6.93	6.81 (1.39); 6.63–6.99	$P = .551$	—

Abbreviations: CI, confidence interval; ES, effect size; WASO, wake after sleep onset. Note: Data are reported as mean (SD); 95% CI (lower–upper).

# The Sleep Project





High inter- and intra-individual variability of elite athletes' sleep → Individual solutions!!!



# The Sleep Project

Let's have a Nap (NO, NOT NOW!!!!)



	Sleep monitoring 1	Sleep monitoring 2	Sleep monitoring 3
	22 naps (68 min)	26 naps (49 min)	21 naps (52 min)
	NA	6 naps (27 min)	13 naps (46 min)
	22 naps (70 min)	5 naps (26 min)	0 naps
	11 naps (32 min)	11 naps (31 min)	NA
	29 naps (84 min)	37 naps (63 min)	22 naps (78 min)

69 naps / 111 nights → 62.2%; 64.3 hrs

19 naps / 67 nights → 28.3%; 12.7 hrs

27 naps / 97 nights → 27.8%; 27.8 hrs

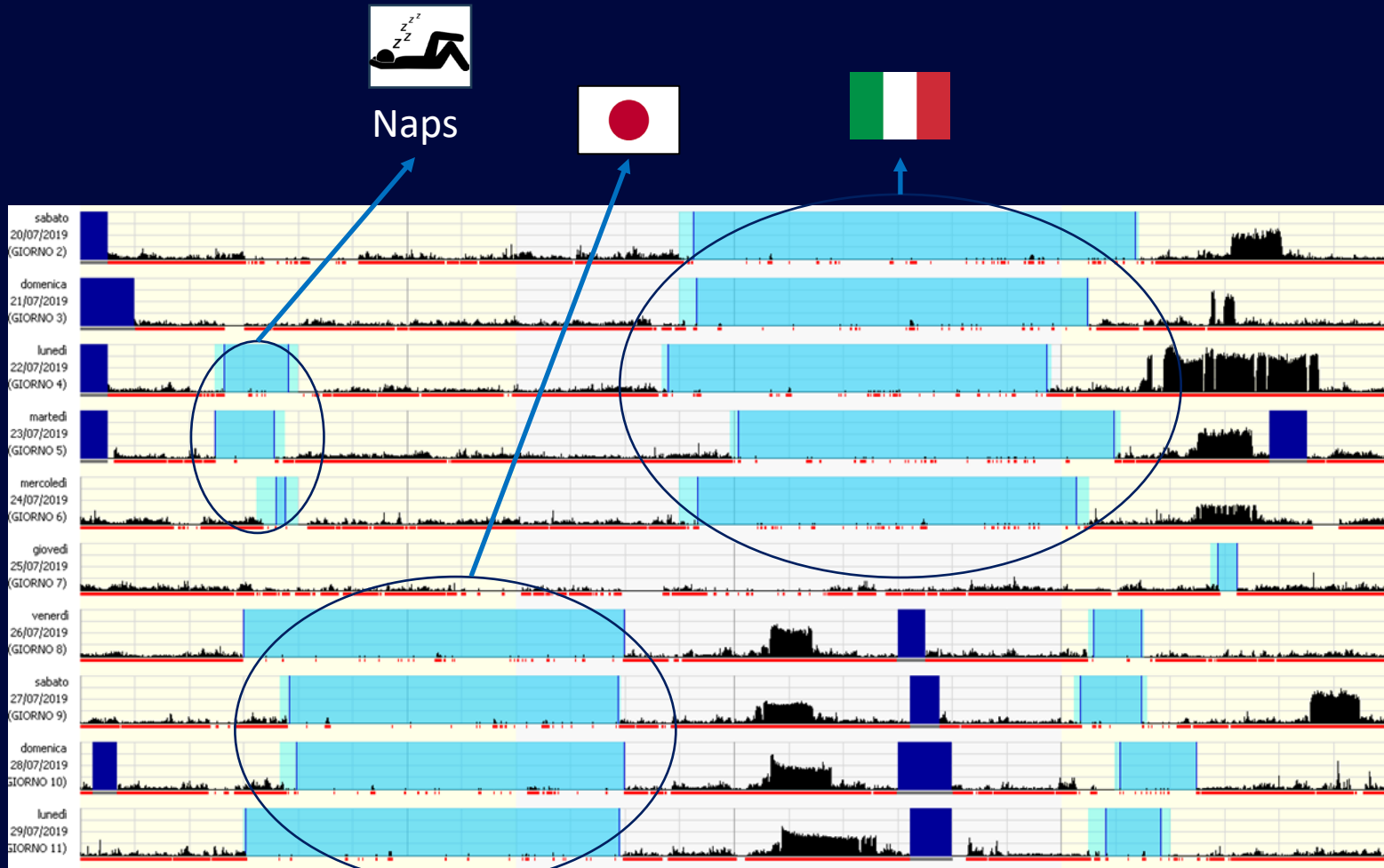
22 naps / 67 nights → 32.6%; 11.6 hrs

88 naps / 97 nights → 90.7%; 108.1 hrs

13 – 15 extra nights (7.5 hours per night)  
of sleep thanks to daytime naps

# The Sleep Project

Actigraphy: tri-axis accelerometer



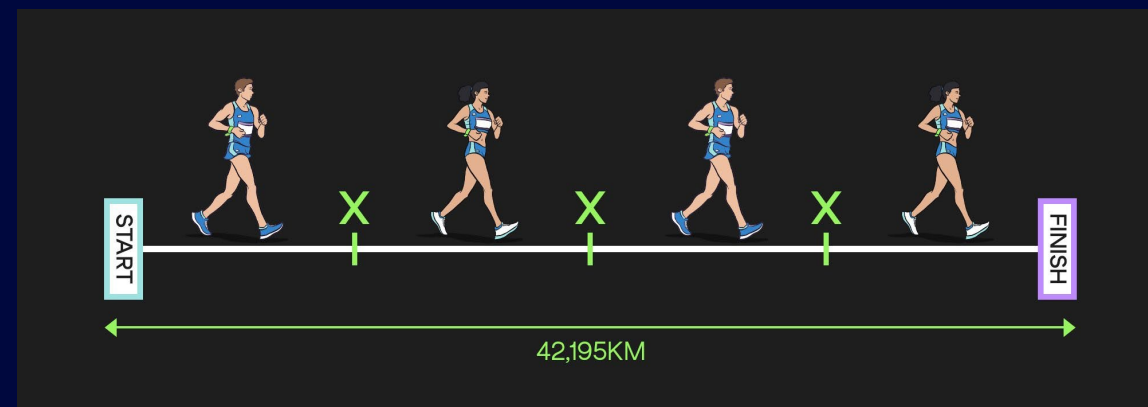
Example of an actogram

- Medical device for diagnosis
  - Valid vs PSG
  - Medium costs
  - Non-invasive
  - No hospitalization
- Real-life monitoring up to 3 months



Ancoli-Israel et al. 2003

# *The Race Walking Relay*



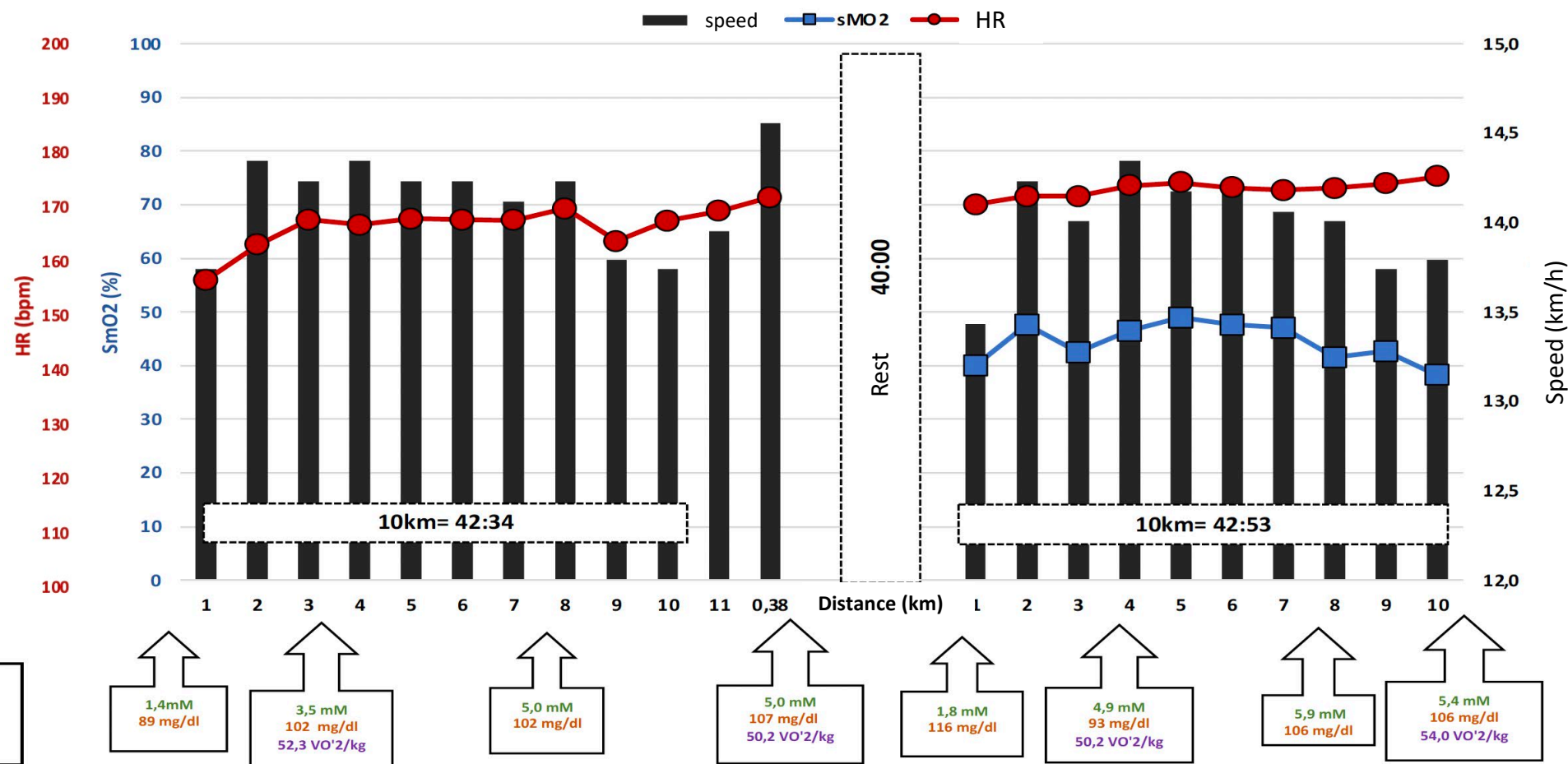


# The Race Walking Relay

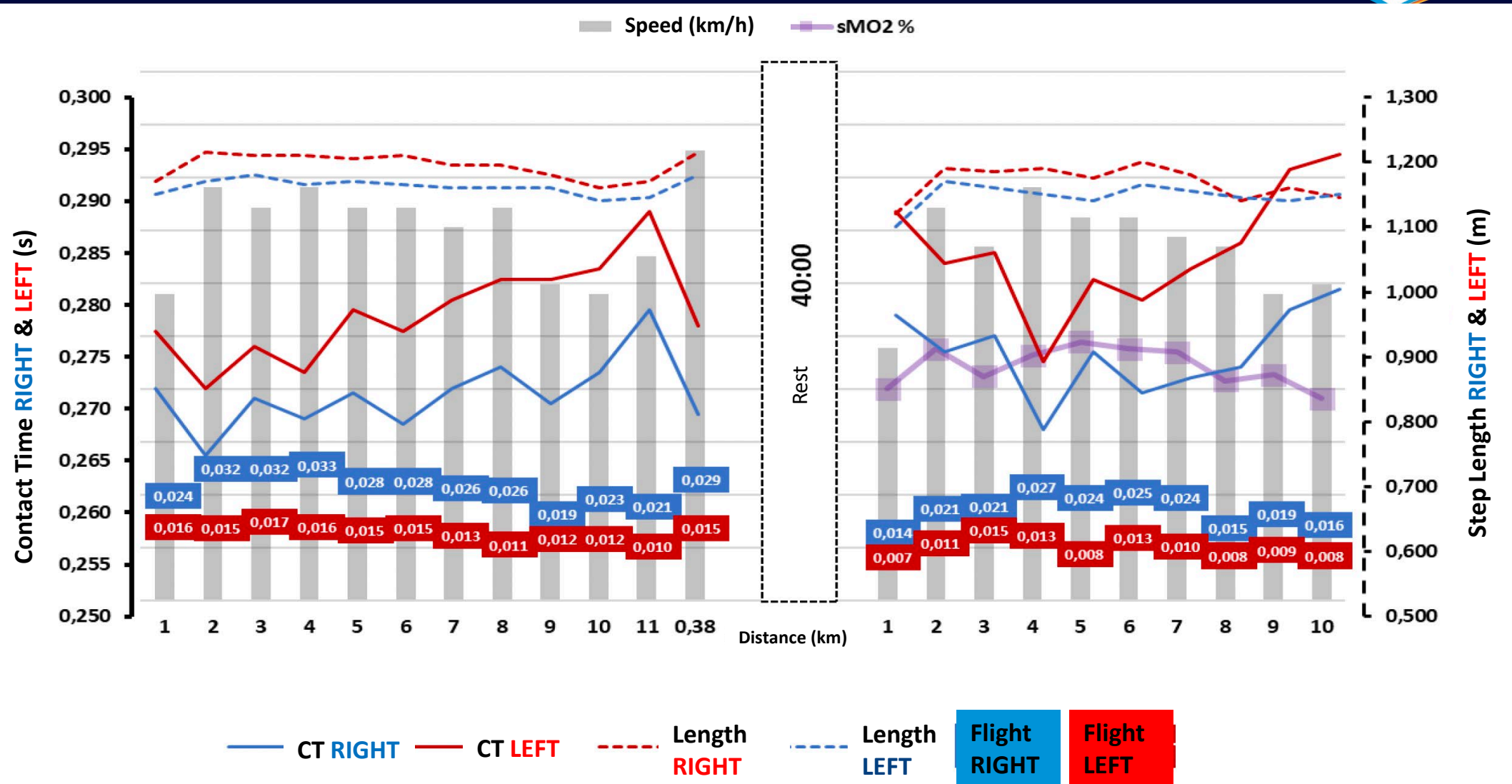
- Oxygen Consumption -> Metabolic Cost
- Lactate production / accumulation
- Heart Rate
- Spatiotemporal parameters
- CHO supplementation (with glycemia)
- As a function of *Distance*



# The Race Walking Relay



# The Race Walking Relay





# The Race Walking Relay

*Antalya 2024*



*1<sup>st</sup> : 2h56'45"*



*Paris 2024*



*6<sup>th</sup> : 2h53'52"*



# *The Specific Quintuple Test*





# *The Specific Quintuple Test*



Sequence: R-R-L-R-L-sand OR L-L-R-L-R-sand

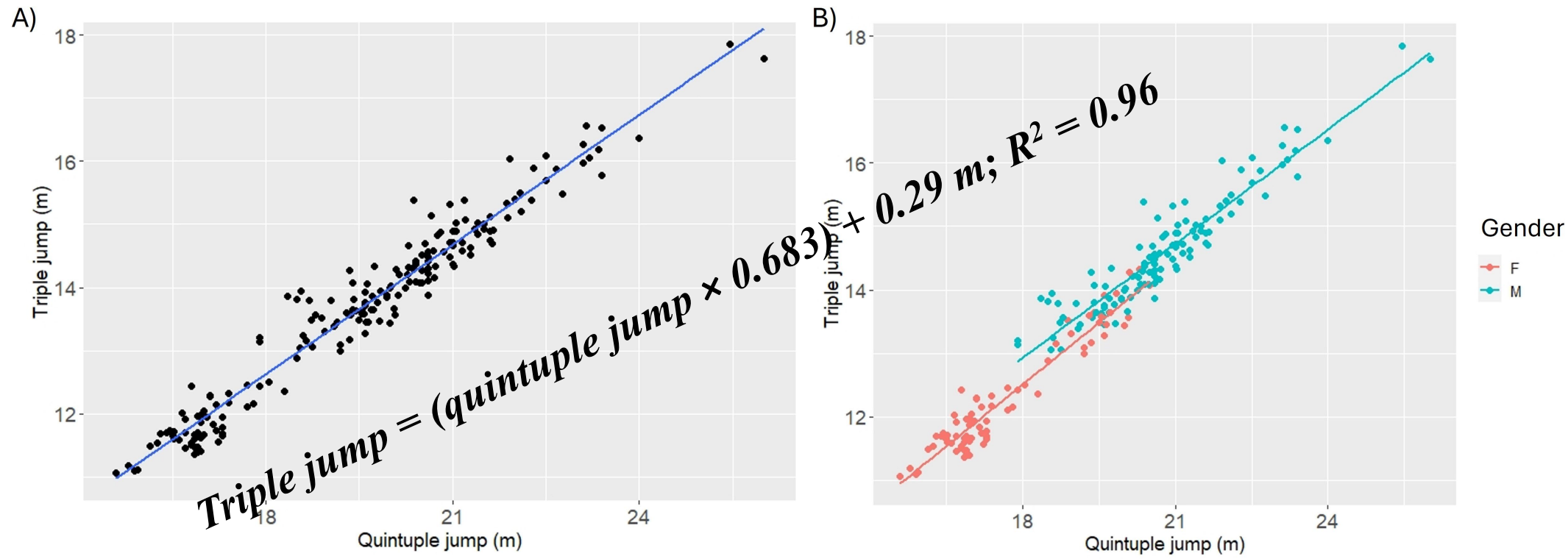
- 68 athletes (27 Women)
- 8-15 days testing – competition
- Athletes are familiar with the procedure
- 10-step run-up from standing position



# The Specific Quintuple Test

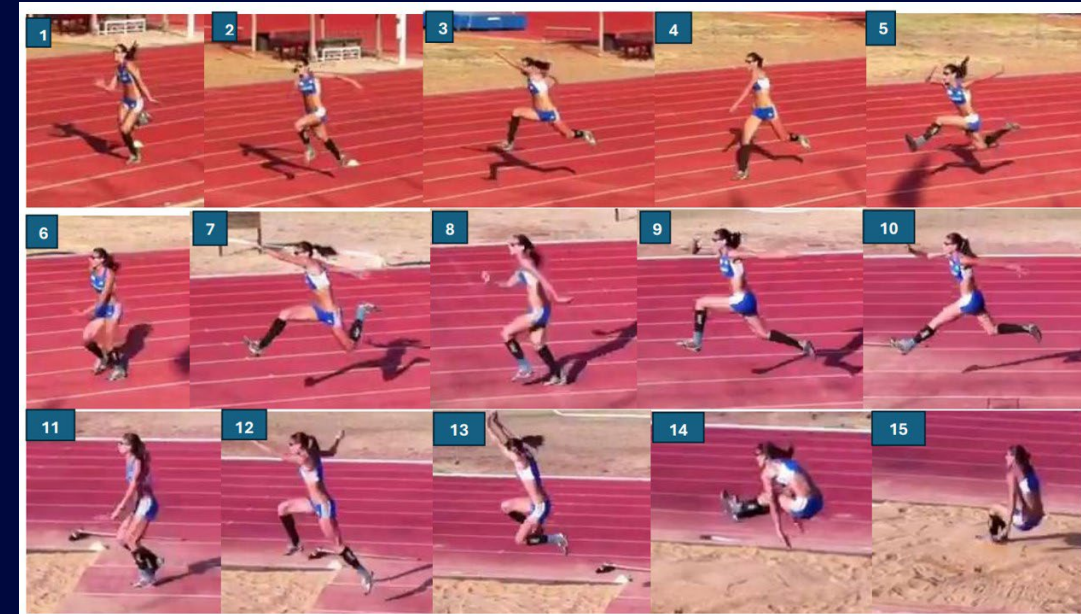


• 68 athletes (27 Women)



# *The Specific Quintuple Test*

- Specific
- Lower Impacts
- Good Prediction (Residual 0.3 m)



Special Thanks to:

- Mattia Beretta
- Andrea Matarazzo
- Stefano Serranò

## *What was/is needed*

- Collaboration with Sport Science and Medicine Institute of the National Olympic Committee
- Collaboration with Universities / Laboratories that have devices
- Biunivocal dialog Research Team – Coaches
- **Education**
- **Money!!!**





# *All that glitters is not Gold!!!*

- Coaches that do not want to share
- Coaches that keep going with '80s ideas
- Coaches are Italian native speakers: Scientific literature in English is a limitation!
- We need to chose 'the least worst' instruments/devices
- We take long time to analyse data and give answer
- Very specific questions
- The 'one shot' question/answer





*Thanks to...*



ITA fichó a Forrest Gump de técnico.  
\* spero che mi perdoniate gli amici italiani.  
(è uno scherzo).



*Andrea Di  
Castro Nicolò  
Brigati*



**CONI**

ISTITUTO DI MEDICINA  
E SCIENZA DELLO SPORT



*ALL Tested Athletes  
...& for Your  
Attention!!!*

