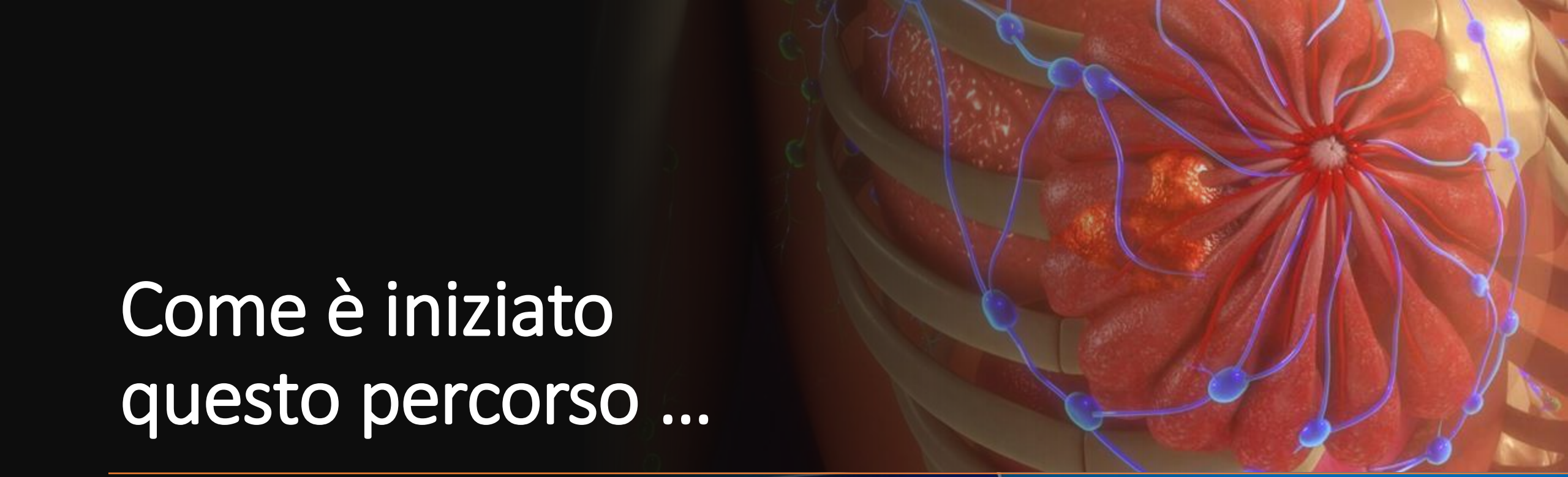
Rotary
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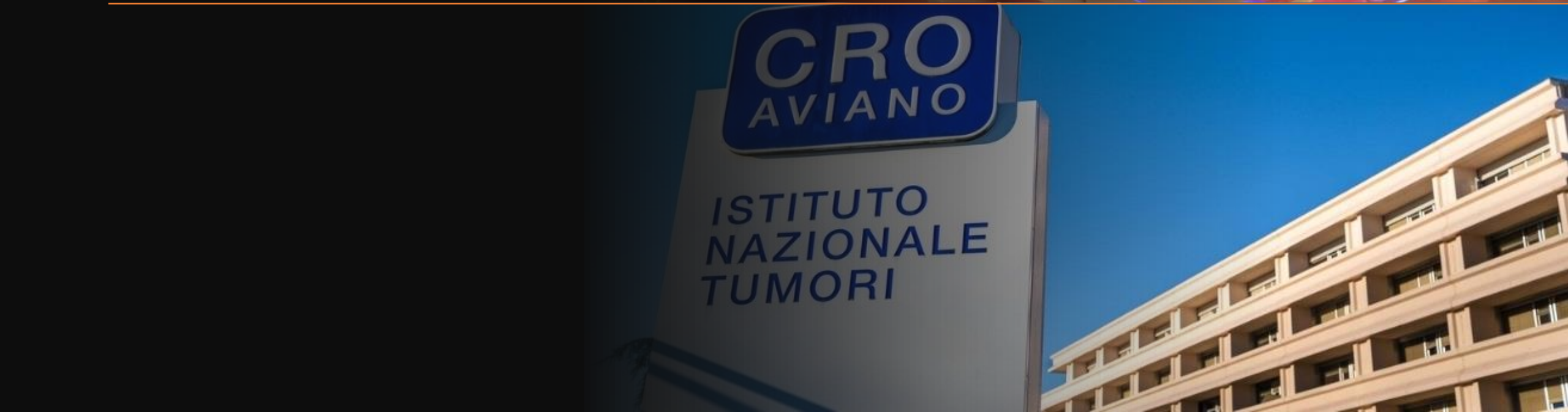
Atleti e pazienti corrono insieme

Dr.ssa Giulia Bongiorno
Dr. Luca Miceli

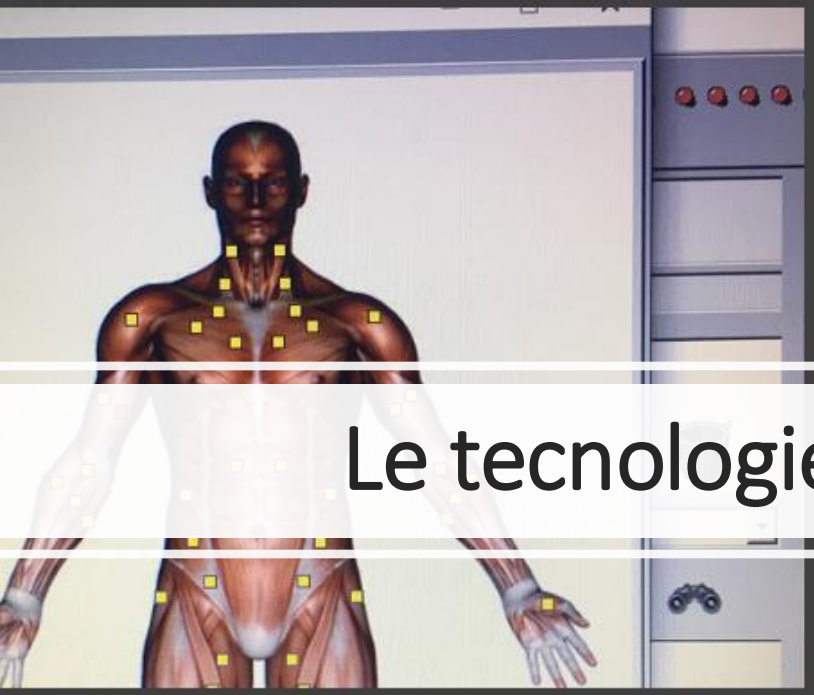
Pordenone, 6 novembre 2025

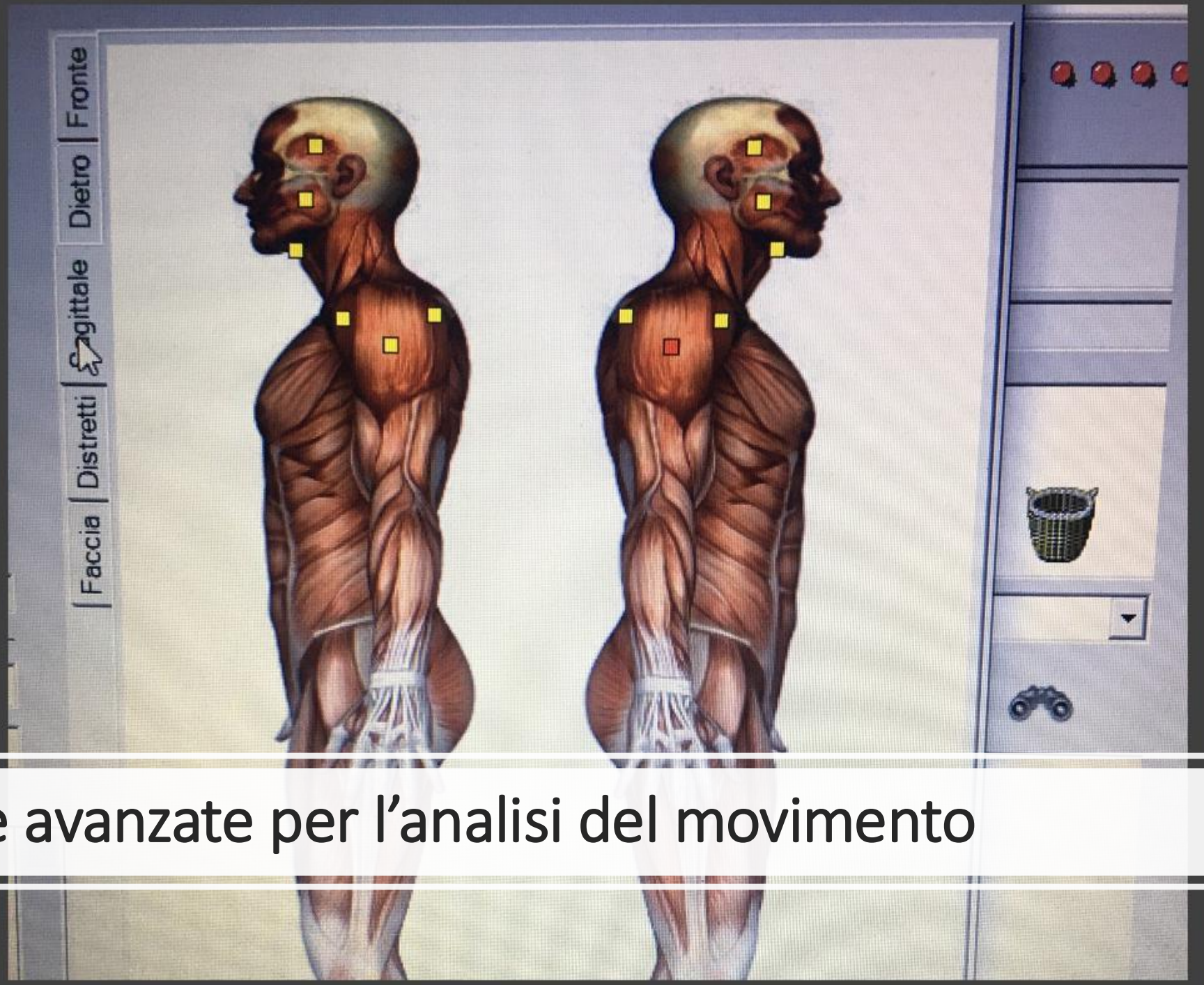
Come è iniziato questo percorso …











Le tecnologie avanzate per l’analisi del movimento

Il quesito che ci siamo posti

Come veicolare tali conoscenze e competenze dall'ambito della ricerca a quello clinico senologico senza il supporto di un servizio di bioingegneria?

…Acquisendo sicurezza nell'uso di tali tecnologie in ambiti quanto più possibile standardizzati (ambito sportivo)…

….Dedicandosi dapprima a distretti corporei con meno muscoli da analizzare (arti inferiori)…

…confrontandosi con la comunità scientifica internazionale (scrivendo)…

… in sintesi: studiando!!!

Il pattinaggio corsa a rotelle: perché proprio questa disciplina?

- Ripetitività del gesto
- Arti inferiori più semplici da studiare rispetto alla spalla
- Attivazioni e coattivazioni più nette
- Richiede forza, resistenza, equilibrio, coordinazione
- Fasi simmetriche (rettilinei) e fasi asimmetriche (curve)
- Modello prestazionale «in house»



Algoritmi matematici testati prima sugli atleti e poi sui pazienti





Le pubblicazioni scientifiche in ambito sportivo



Le pubblicazioni scientifiche in ambito sanitario

sports

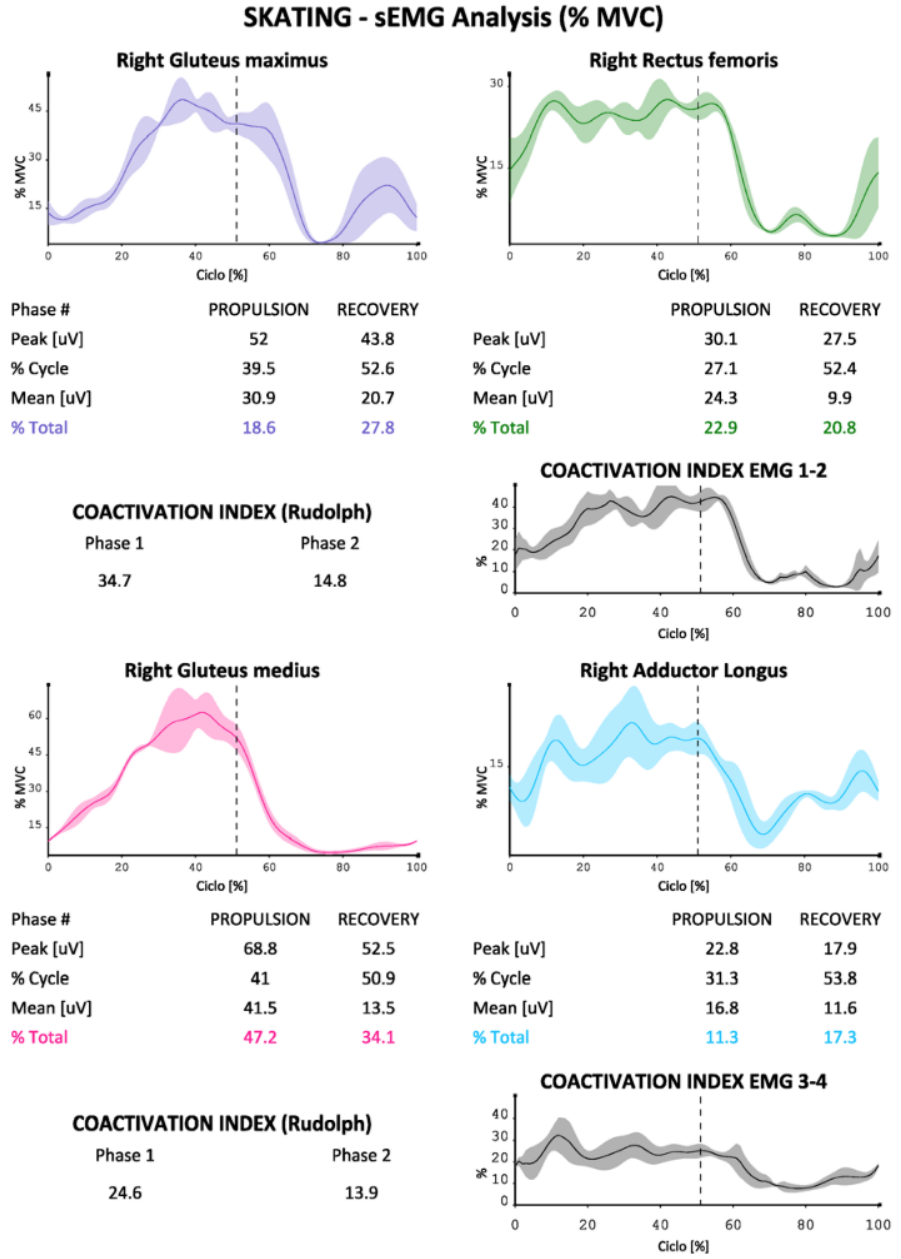
MDPI

Case Report

Roller Speed Skating Kinematics and Electromyographic Analysis: A Methodological Approach

Giulia Bongiorno [1], Helena Biancuzzi [2,*], Francesca Dal Mas [3], Giuseppe Fasano [4] and Luca Miceli [2]

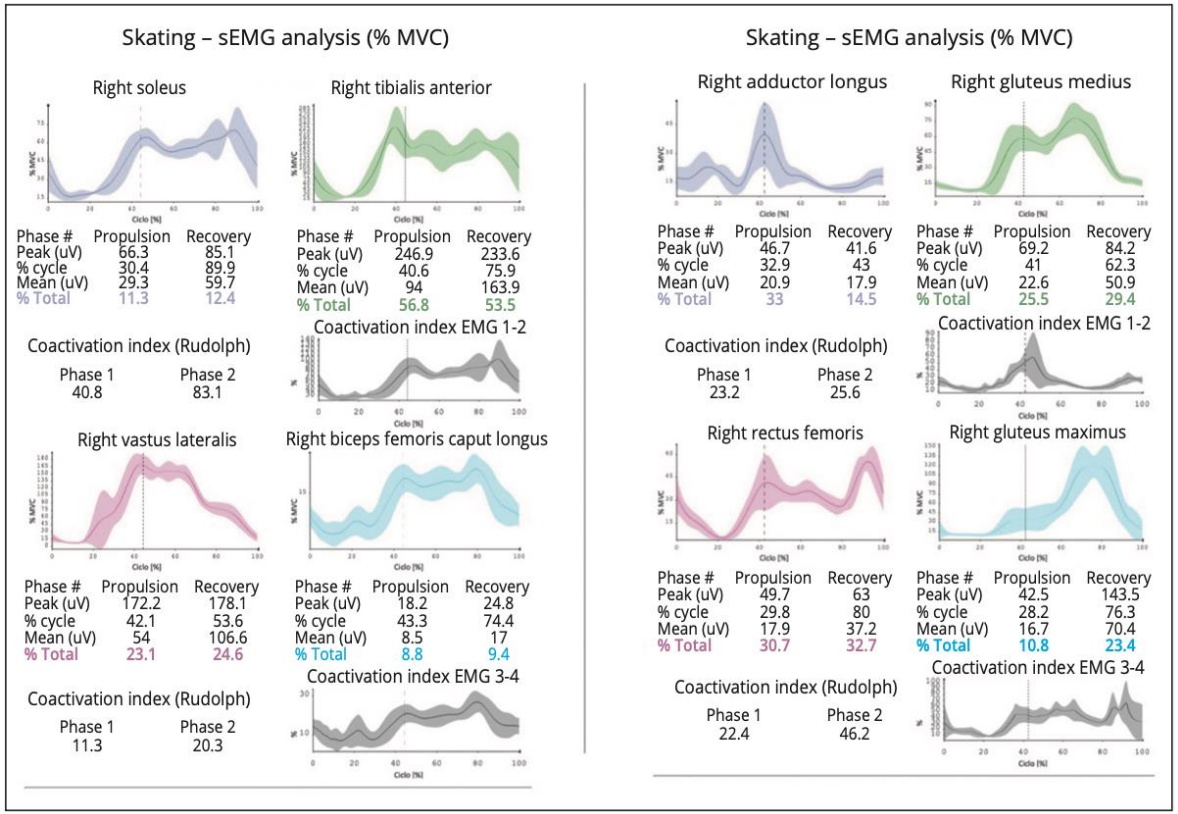




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The Journal of Sports Medicine and Physical Fitness 2023 August;63(8):906-7
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EMG surface analysis in short track in line speed skating athletes: the curve after the straight





sensors

MDPI

Article

Training in Roller Speed Skating: Proposal of Surface Electromyography and Kinematics Data for Educational Purposes in Junior and Senior Athletes

Giulia Bongiorno [1], Giulio Sisti [2], Helena Biancuzzi [3], Francesca Dal Mas [4,5], Francesco Giuseppe Minisini [6] and Luca Miceli [2,*]

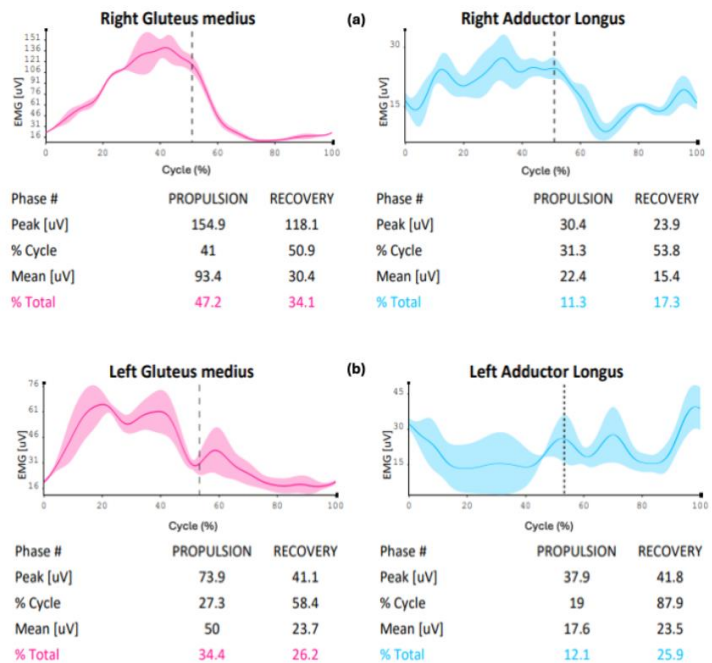


Figure 5. (**a**,**b**) EMG comparison of the right side of the elite athlete (**a**) and the left side of the novice (**b**). The figure indicates the sEMG value during the skating cycle phase of the right gluteus medius and right adductor longus muscles, in the two subjects; the table below each graph indicates, during the propulsion and recovery phase (separated by the dotted vertical line), the peak electromyographic value, the percentage of the cycle at which this peak develops, the average electromyographic value, its percentage distribution in the two phases.

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Case report: Movement analysis in oncological rehabilitation: proposal of a kinematic and surface electromyographic protocol in breast oncology

Giulia Bongiorno[1], Andrea Tomasi[2], Giulio Vigni[2], Alessandro Rizzardo[2], Helena Biancuzzi[3], Francesca Dal Mas[4,5], Rym Bednarova[6] and Luca Miceli[7]*

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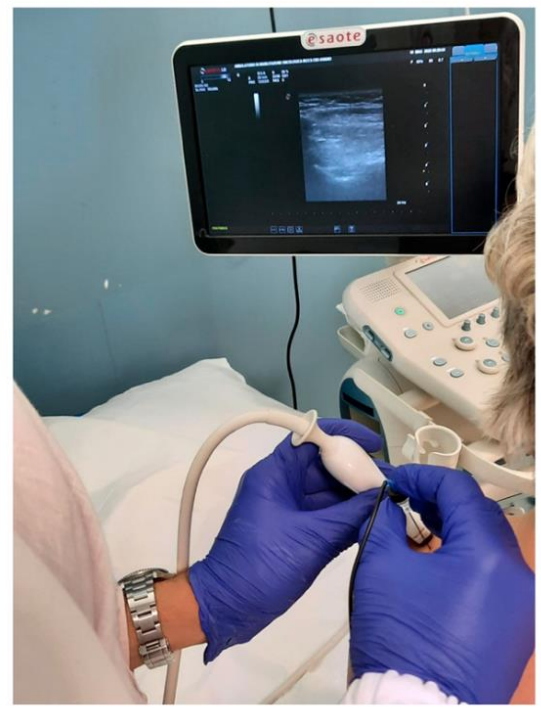


FIGURE 1
Performing pulsed radiofrequency treatment of the left suprascapular nerve (photograph obtained with the consent of the portrayed subject).



FIGURE 2
Example of positioning of the electromyographic probes (photograph obtained with the consent of the portrayed subject).

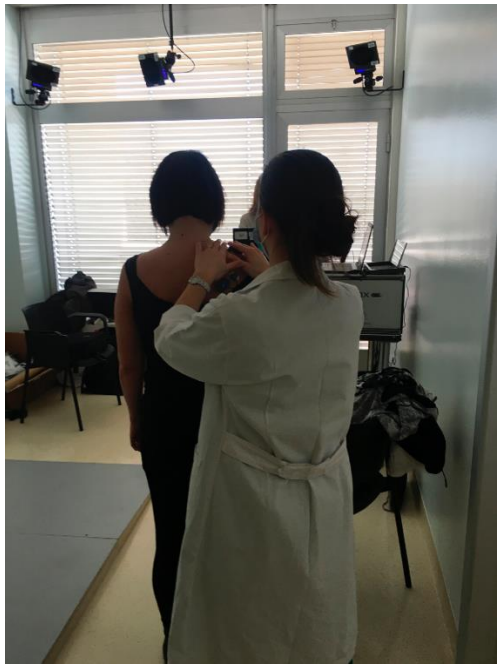
surgeries

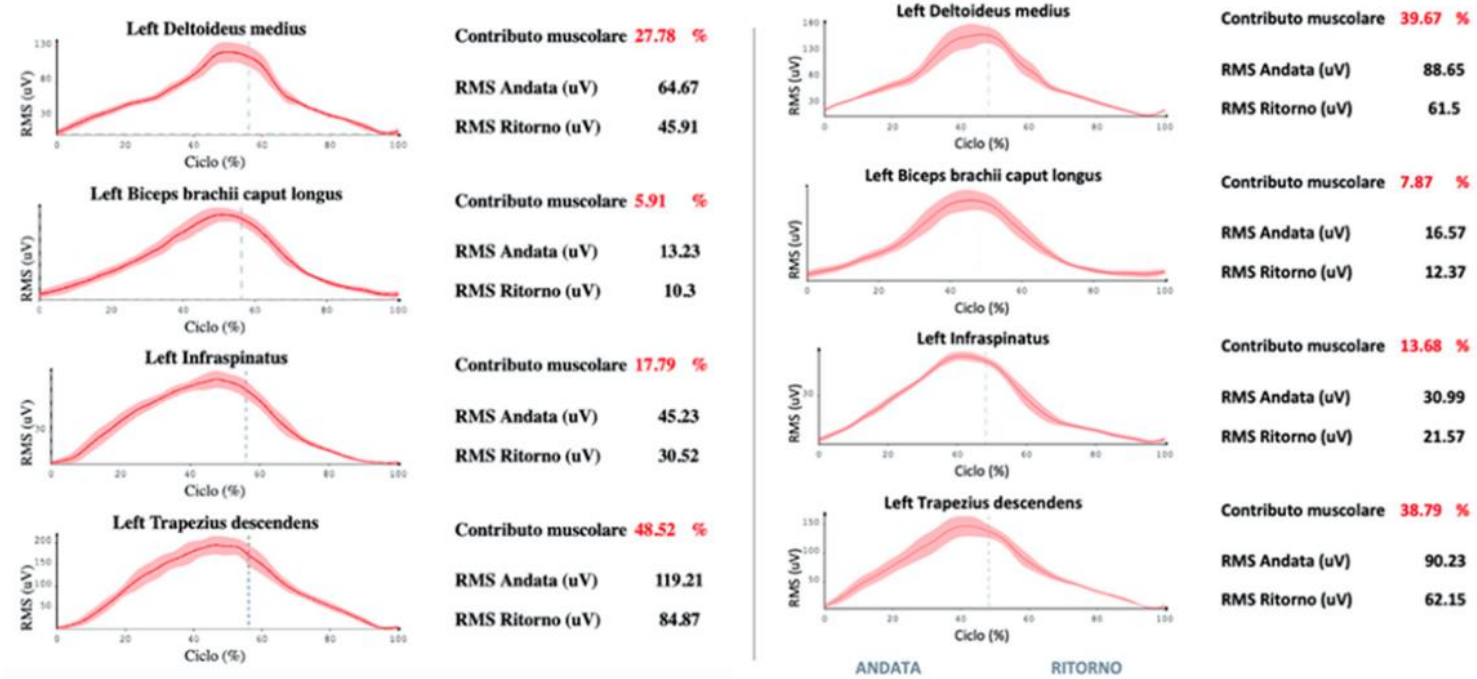
MDPI

Case Report

Pulsed Radiofrequency as a Standalone Treatment for Adhesive Capsulitis

Giulia Bongiorno [1], Rym Bednarova [2], Helena Biancuzzi [3], Francesca Dal Mas [4], Alessandro Rizzardo [5], Andrea Tomasi [5], Giulio Edoardo Vigni [5] and Luca Miceli [6,*]





Gazzetta Medica Italiana - Archivio per le Scienze Mediche
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Electromyographic analysis of the upper limb in healthy subjects for a post-breast cancer functional re-education perspective

Roberta Podda[1], Giulia Bongiorno[2], Helena Biancuzzi [3], Francesca Dal Mas [4,5], Enrico Rejc[1], Luca Miceli [6]*



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ORIGINAL ARTICLE

SPORT INJURIES AND REHABILITATION

Surface electromyographic wheel speed skate protocol and its potential in athletes' performance analysis and injury prevention

Giulia BONGIORNO [1], Giulio SISTI [2], Francesca DAL MAS [3], Helena BIANCUZZI [4], Lorenzo BORTOLAN [5, 6], Ivan PAOLATTO [7], Miriam ROSA [7], Luca MICELI [8] *

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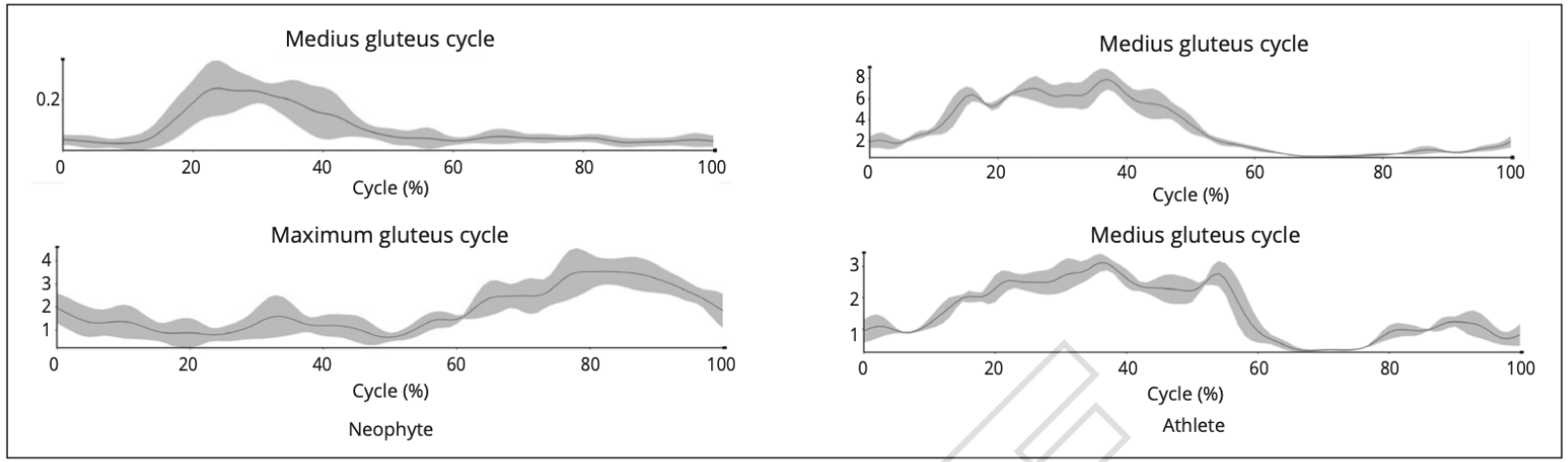
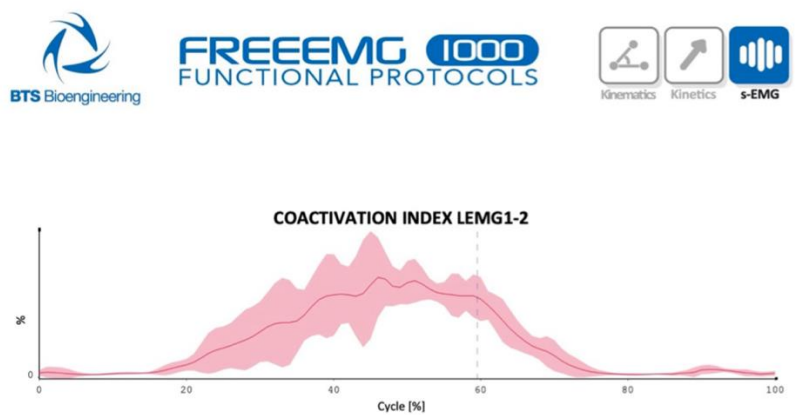


Figure 4.—The electromyographic pattern of beginner and former athletes in leg muscles.



COACTIVATION INDEX (RUDOLPH) LEFT EMG 1-2

Phase 1	Phase 2
25.99 ± 8.05	**9.15 ± 2.67**

FIGURE 1
Static and dynamic coactivation indices.

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The rehabilitation tailor: applying personalized medicine to cancer recovery

Giulia Bongiorno[1], Helena Biancuzzi[2], Francesca Dal Mas[3,4] and Luca Miceli[5]*

[1]Friuli Riabilitazione Rehabilitation Center, Roveredo in Piano, Italy, [2]Department of Economics, Ca' Foscari University of Venice, Venice, Italy, [3]Department of Management, Ca' Foscari University of Venice, Venice, Italy, [4]Collegium Medicum, University of Social Sciences, Łodz, Poland, [5]Department of Pain Medicine, IRCCS C.R.O. National Cancer Institute of Aviano, Aviano, Italy

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Evaluation of muscle energy in isometric maintenance as an index of muscle fatigue in roller speed skating

Giulia Bongiorno[1], Helena Biancuzzi[2], Francesca Dal Mas[3] and Luca Miceli[2]*

[1]Friuli Riabilitazione Rehabilitation Center, Roveredo in Piano (PN), Italy, [2]Department of Pain Medicine, IRCCS C.R.O. National Cancer Institute of Aviano, Aviano, Italy, [3]Department of Management, Ca' Foscari University of Venice, Venice, Italy

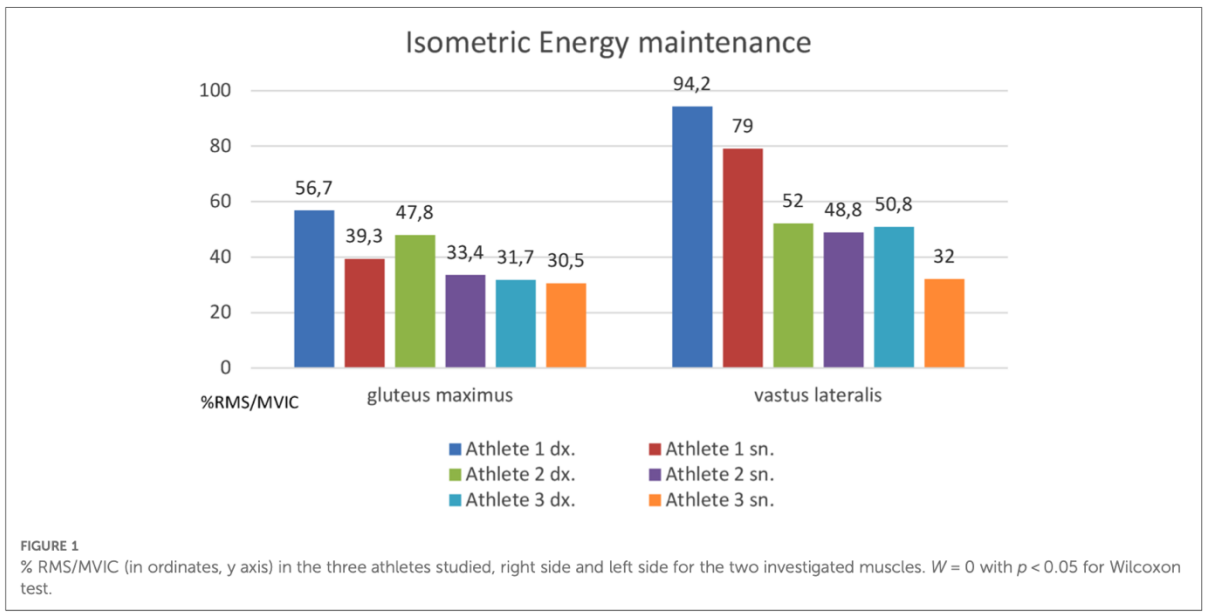


FIGURE 1
% RMS/MVIC (in ordinates, y axis) in the three athletes studied, right side and left side for the two investigated muscles. $W = 0$ with $p < 0.05$ for Wilcoxon test.

Bongiorno *et al. J Anesth Analg Crit Care* (2024) 4:22
https://doi.org/10.1186/s44158-024-00156-4

Journal of Anesthesia, Analgesia and Critical Care

CORRESPONDENCE Open Access

Pulsed radiofrequency on peripheral nerve as a rehabilitation aid

Giulia Bongiorno[1], Helena Biancuzzi[2], Francesca Dal Mas[3,4], Rym Bednarova[5], Alessandro Vittori[6] and Luca Miceli[7*]

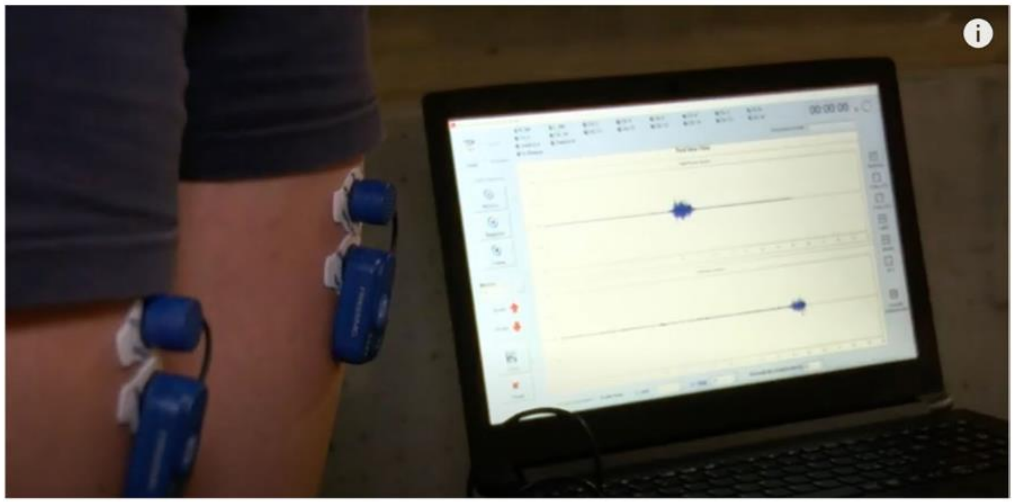


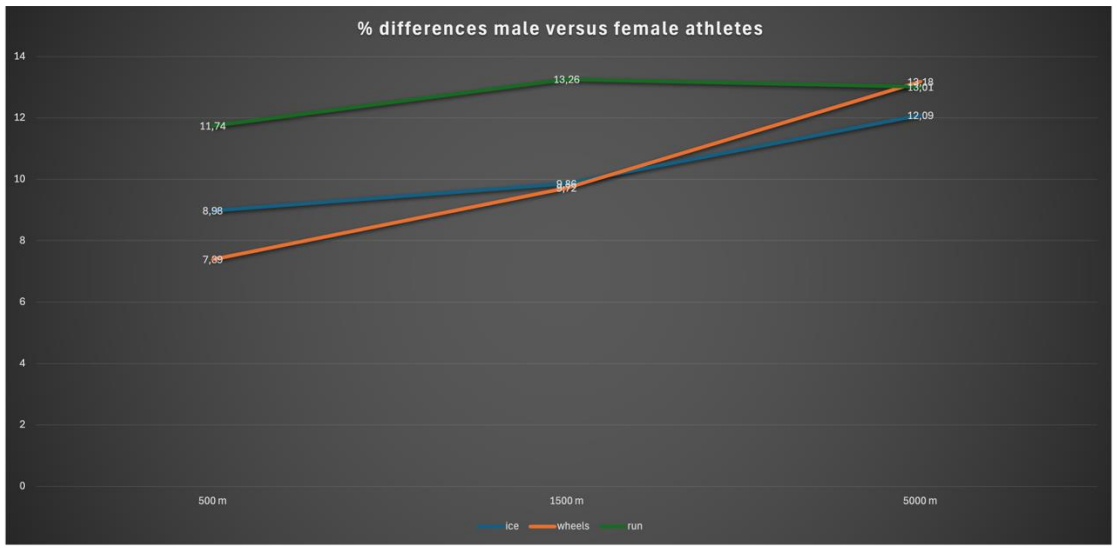
Fig. 1 Example of placement of surface electromyographic probes on the rectus femoris muscles, connected to a PC in wireless mode

The Journal of Sports Medicine and Physical Fitness
EDIZIONI MINERVA MEDICA

Roller speed skating Versus ice speed skating: differences in male and female élite athletes

Roller speed skating Versus ice speed skating: differences in male and female élite athletes

Giulia Bongiorno[1], Giulio Sisti[2], Francesca Dal Mas[3,4], Helena Biancuzzi[5], Francesco Giuseppe Minisini[6], Luca Miceli[2]



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OPINION
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The Rehabilitation Tailor: Applying Personalized Medicine to Cancer Recovery

Giulia Bongiorno[1], *Helena Biancuzzi*[2]*, *Francesca Dal Mas*[3], *Rym Bednarova*[4] and *Luca Miceli*[2]

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Keywords: cancer rehabilitation, physiotherapy, breast cancer, fitness activity, women

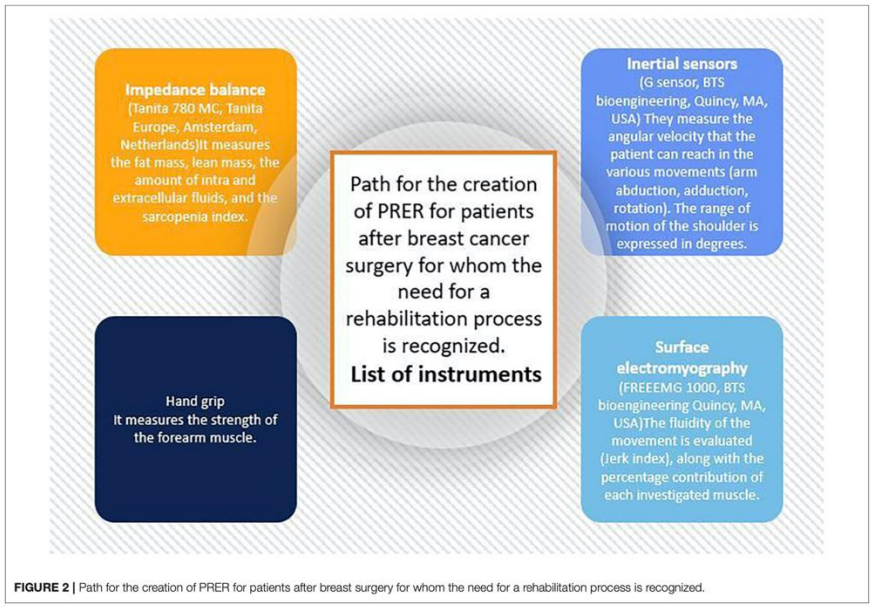


FIGURE 2 | Path for the creation of PRER for patients after breast surgery for whom the need for a rehabilitation process is recognized.

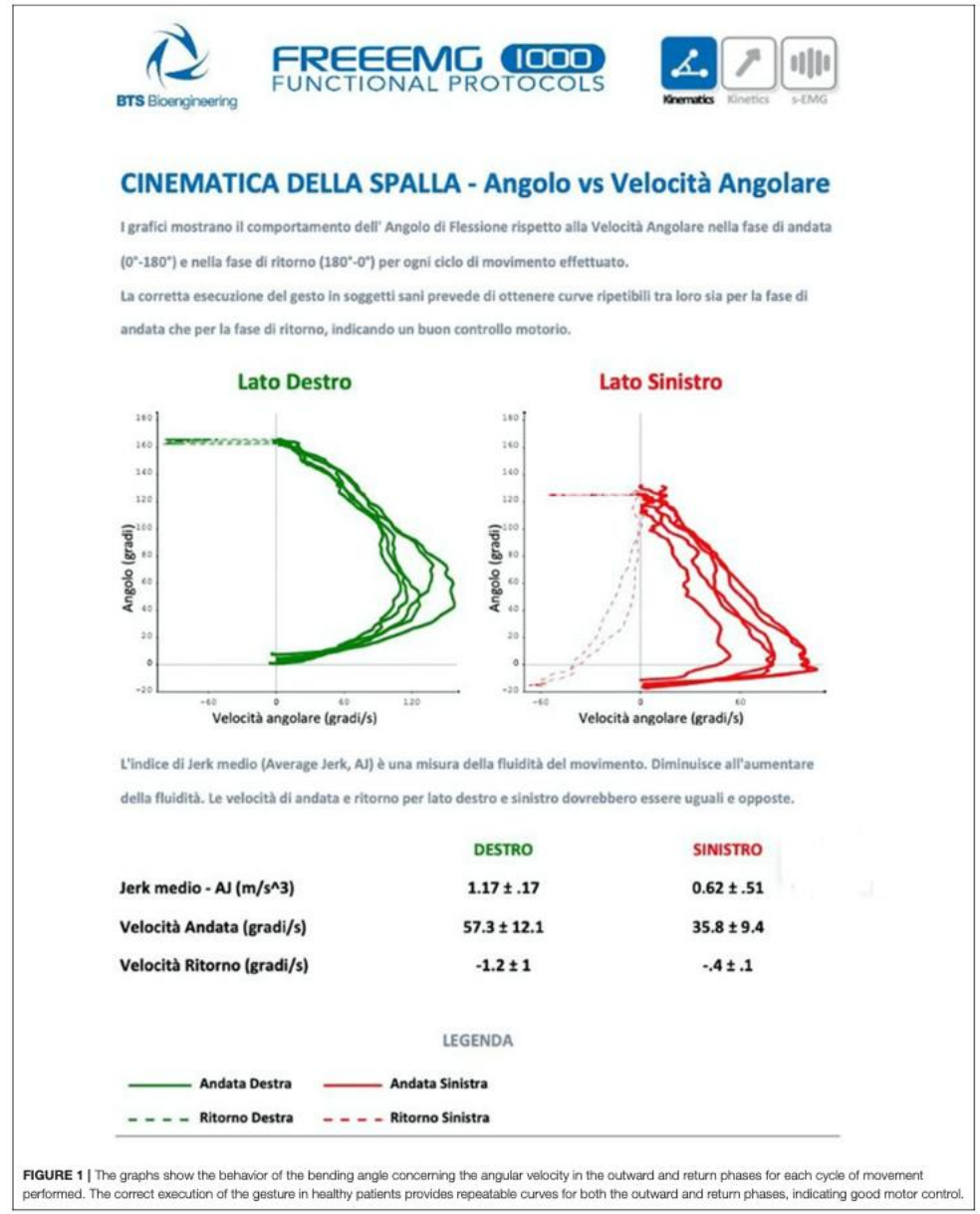


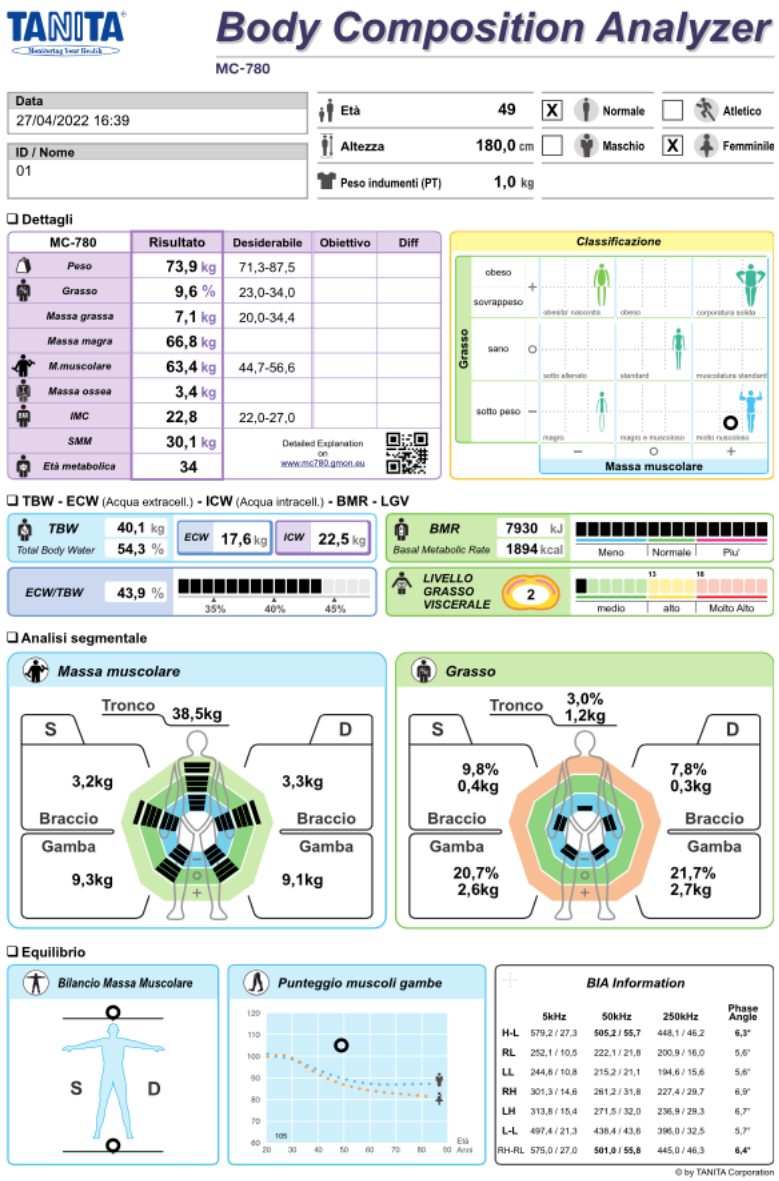
FIGURE 1 | The graphs show the behavior of the bending angle concerning the angular velocity in the outward and return phases for each cycle of movement performed. The correct execution of the gesture in healthy patients provides repeatable curves for both the outward and return phases, indicating good motor control.

Journal of Cancer Education
https://doi.org/10.1007/s13187-022-02225-0

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Physical Activity in Oncology: To Do, Not to Do, and How to Do It? An Announcement of an Educational Program

Helena Biancuzzi[1] · Francesca Dal Mas[2] · Giulia Bongiorno[3] · Rym Bednarova[4] · Luca Miceli[1]



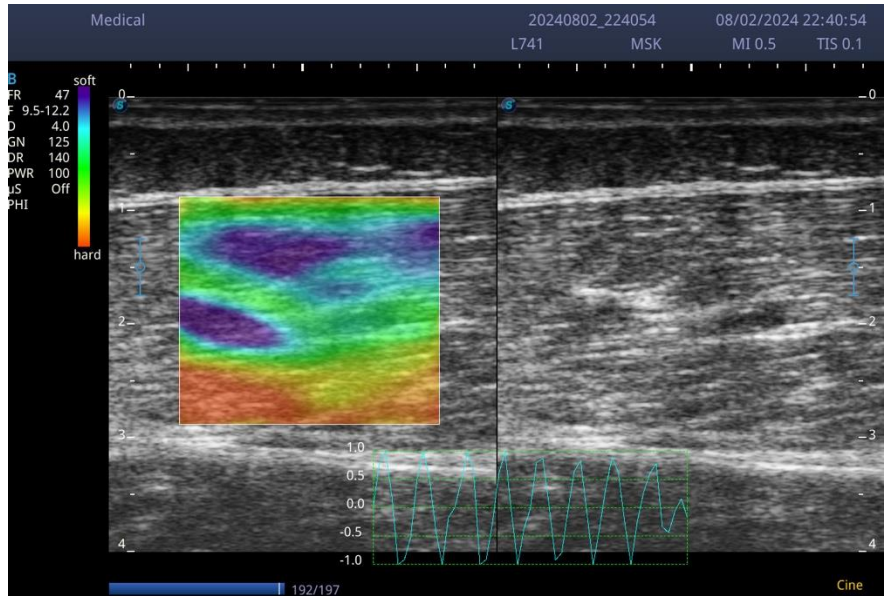
The Journal of Sports Medicine and Physical Fitness
EDIZIONI MINERVA MEDICA

Vastus lateralis stiffness in roller speed skate athletes evaluated with sonoelastography.

When the sport meets the health

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sensors

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Communication

The Kinematic and Electromyographic Analysis of Roller Skating at Different Speeds on a Treadmill: A Case Study

Giulia Bongiorno [1], Giulio Sisti [2], Francesca Dal Mas [3,4], Helena Biancuzzi [5], Tiwana Varrecchia [6,*], Giorgia Chini [6], Alberto Ranavolo [6], Barbara Pellegrini [7,8], Lorenzo Bortolan [7,8] and Luca Miceli [9]

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Artificial intelligence as a potential teaching tool for athletes: when the skate and the smartphone run together

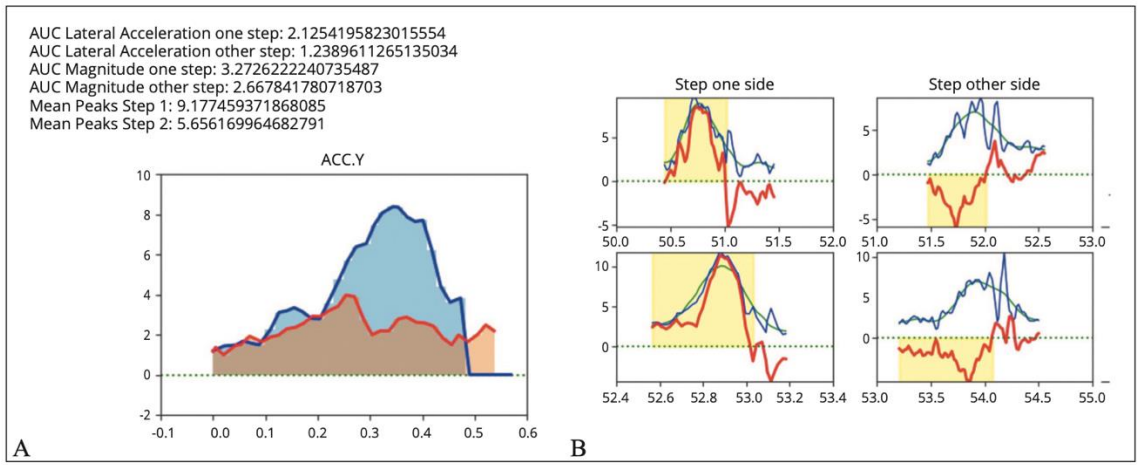


Figure 2.—A) Representation of the average lateral acceleration/time curve on the right leg compared to the left leg; B) graphical representation of the automatic analysis of the curves (dark gray area; yellow in the online version) to extrapolate the AUC (area under the curve).

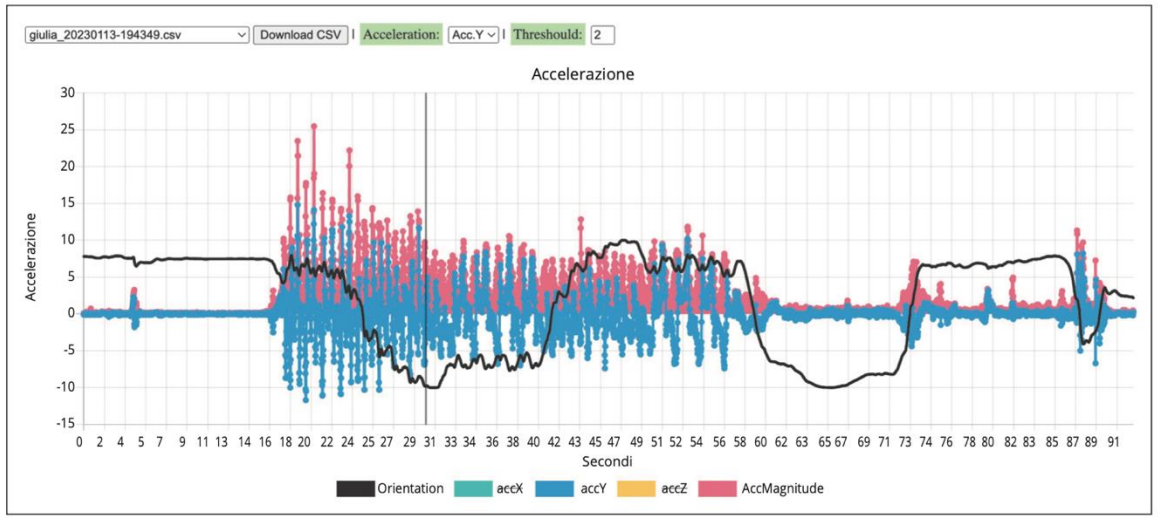


Figure 1.—Graphic representation, during a lap of the skating rink (length 200 m), of magnitude (light gray line; pink in the online version), lateral acceleration (dark gray line; blue in the online version), orientation (black line). The two horizontal sections of the orientation parameter represent straight lines, the slopes identify the curves.

«Bongiorno index»

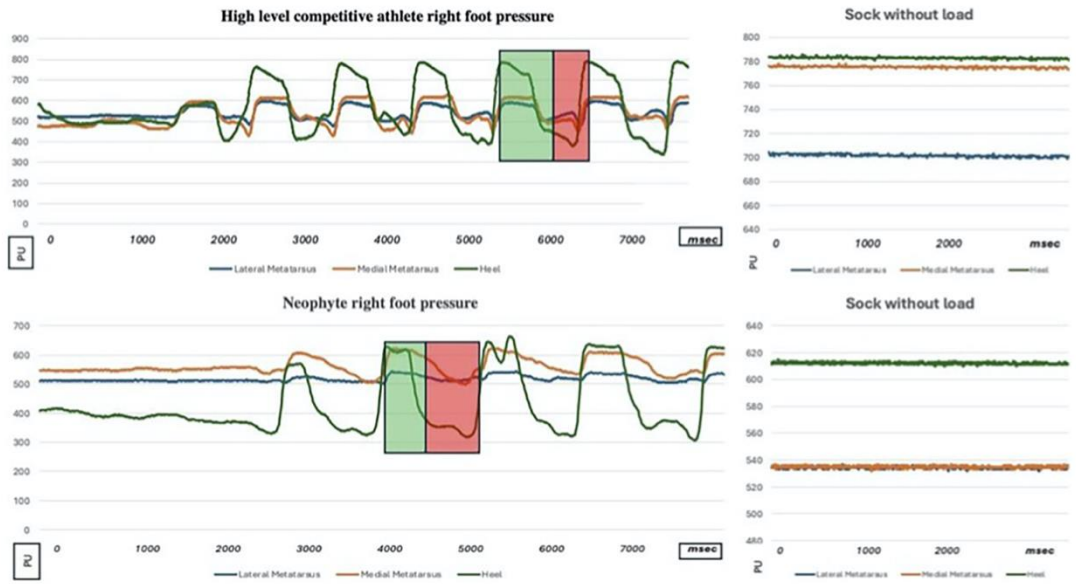


FIGURE 7
Curves Showing Variations in Pressure Distribution of the Medial Metatarsus, Lateral Metatarsus, and Heel of the Novice Athlete and high-level competitive athlete (former world champion in roller speed skate). In the right side of the figure the stand signal acquisition for both athletes. The skating stride, in this case for the right foot, is divided into a propulsion phase, highlighted by a light green rectangle (during which the "Bongiorno index"—BI—was calculated representing the absolute value of the medio-lateral acceleration relative to the magnitude of the total acceleration), and a recovery phase, highlighted by a light red rectangle. *Y* axis measure units PU: pressure Unit (ranged from 0 to 1,024—see text to major details), *X* axis measure units: ms, milliseconds (1,000 ms = 1 s) $*p < 0.05$.

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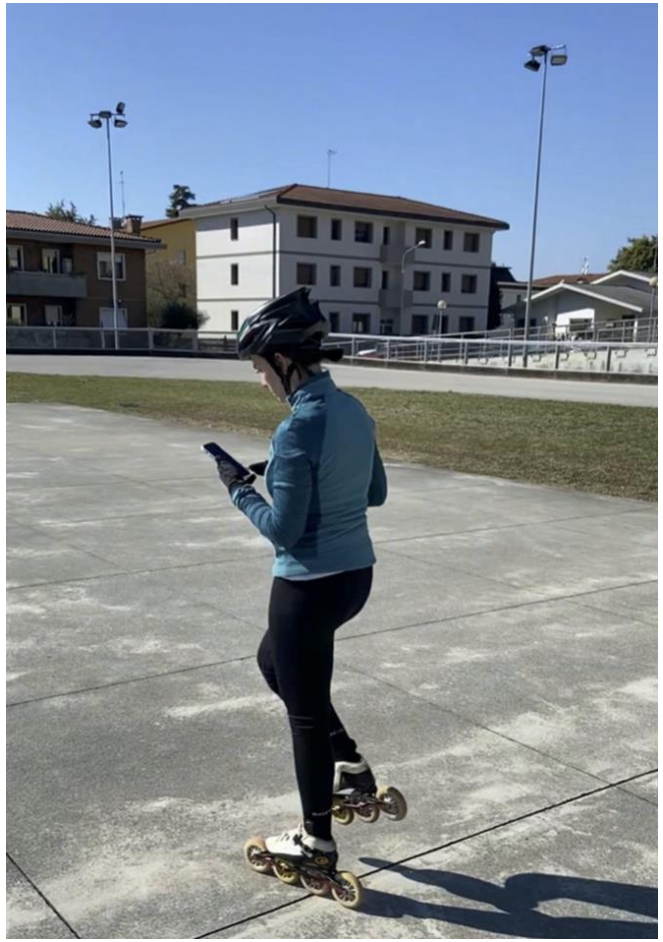
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Skating efficiency and technique during roller speed skate using innovative piezoelectric smart socks: an exploratory study

Giulia Bongiorno[1], Francesco Giuseppe Minisini[2], Helena Biancuzzi[3], Francesca Dal Mas[4,5] and Luca Miceli[6]*

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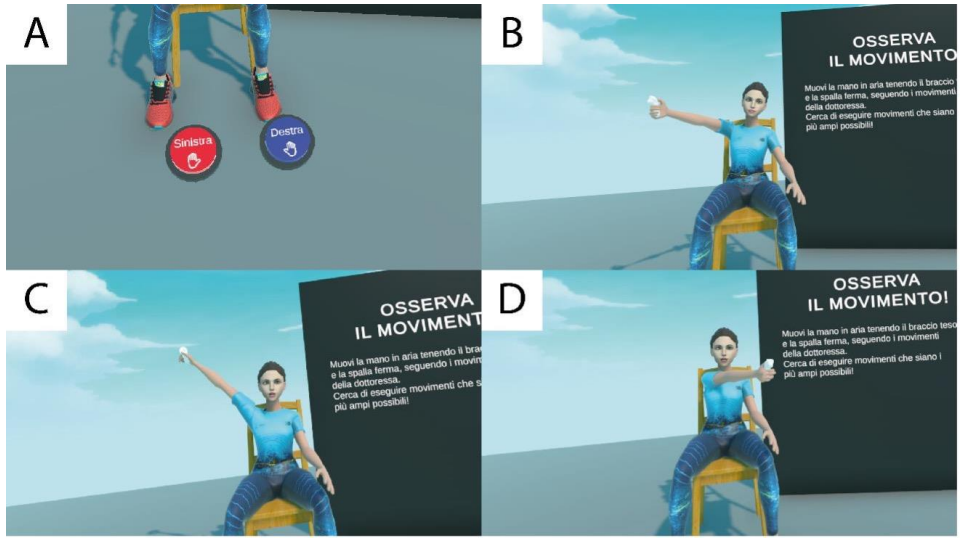


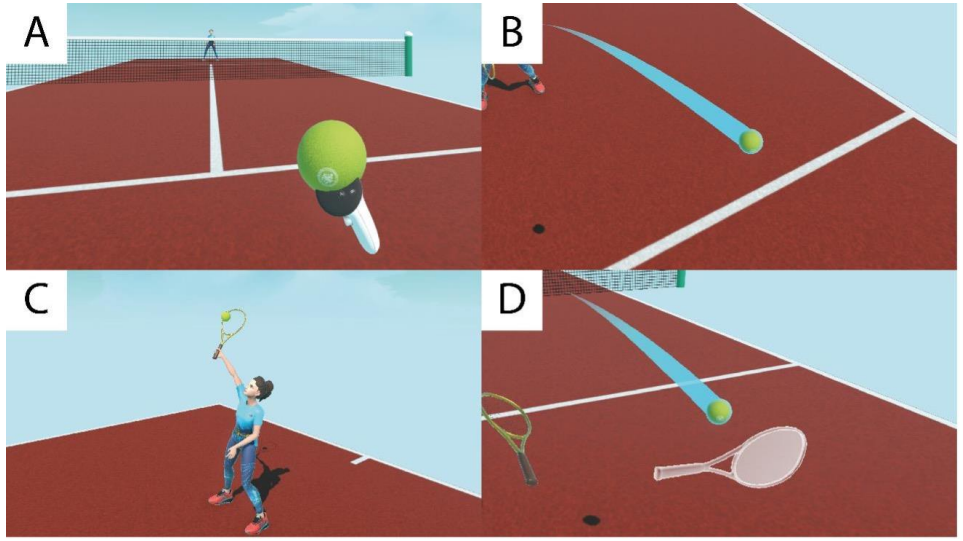


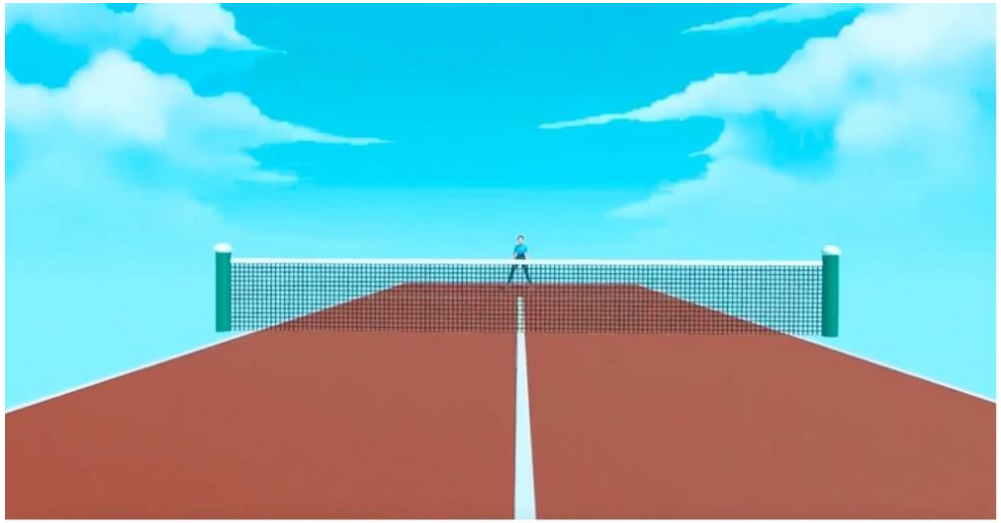
Coach virtuale per l'allenamento del pattinaggio corsa con telemetria in tempo reale

UNIVERSITÀ DEGLI STUDI DI UDINE

hic sunt futura









L’utilizzo della realtà virtuale nella riabilitazione senologica

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L’originalità del progetto:

- Clinica, Ricerca, Didattica e Comunicazione
  - Sport e salute intimamente connessi
- Fare squadra (dolore, sport, riabilitazione)
- **La ricerca come vettore di presa in carico**

