

**LORENZO GANDINI**

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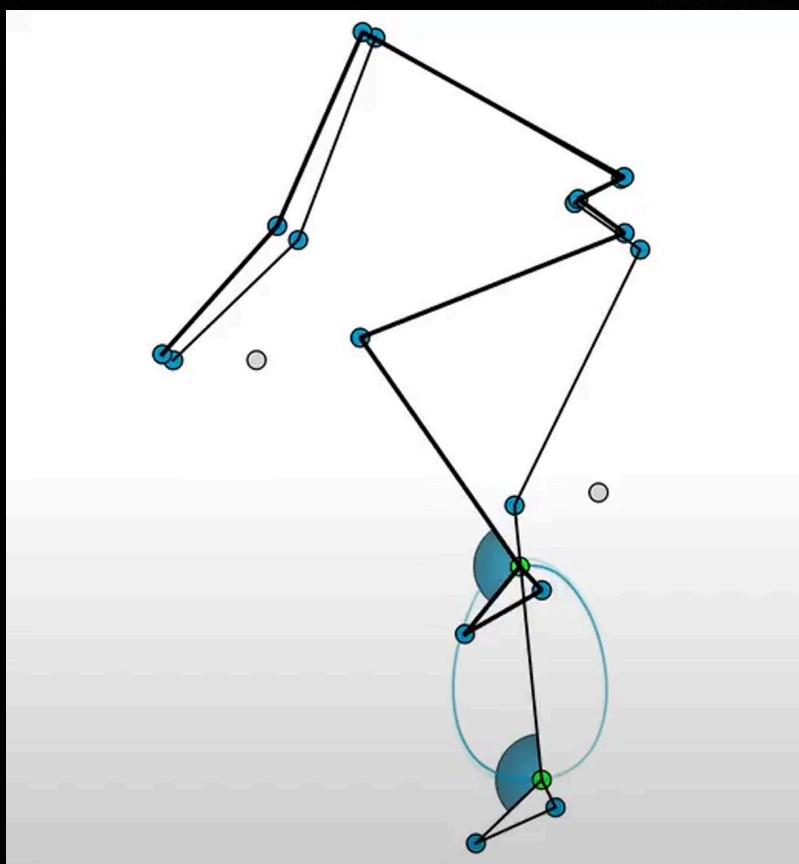
**SEBASTIANO LONARDI**

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**B**iomechanical **O**ptimized  
**O**bserveation in **S**port **T**raining

# BOOST

# DESIRED OUTCOME



**1.**  
Postural and kinematic's improvement analysis



**2.**  
Evaluating sport performances trough different parameters



**3.**  
Describe training trends for each athlete

# MILESTONES

## M1.

**Recruiting** athletes and giving them the training schedule previously defined.

## M2.

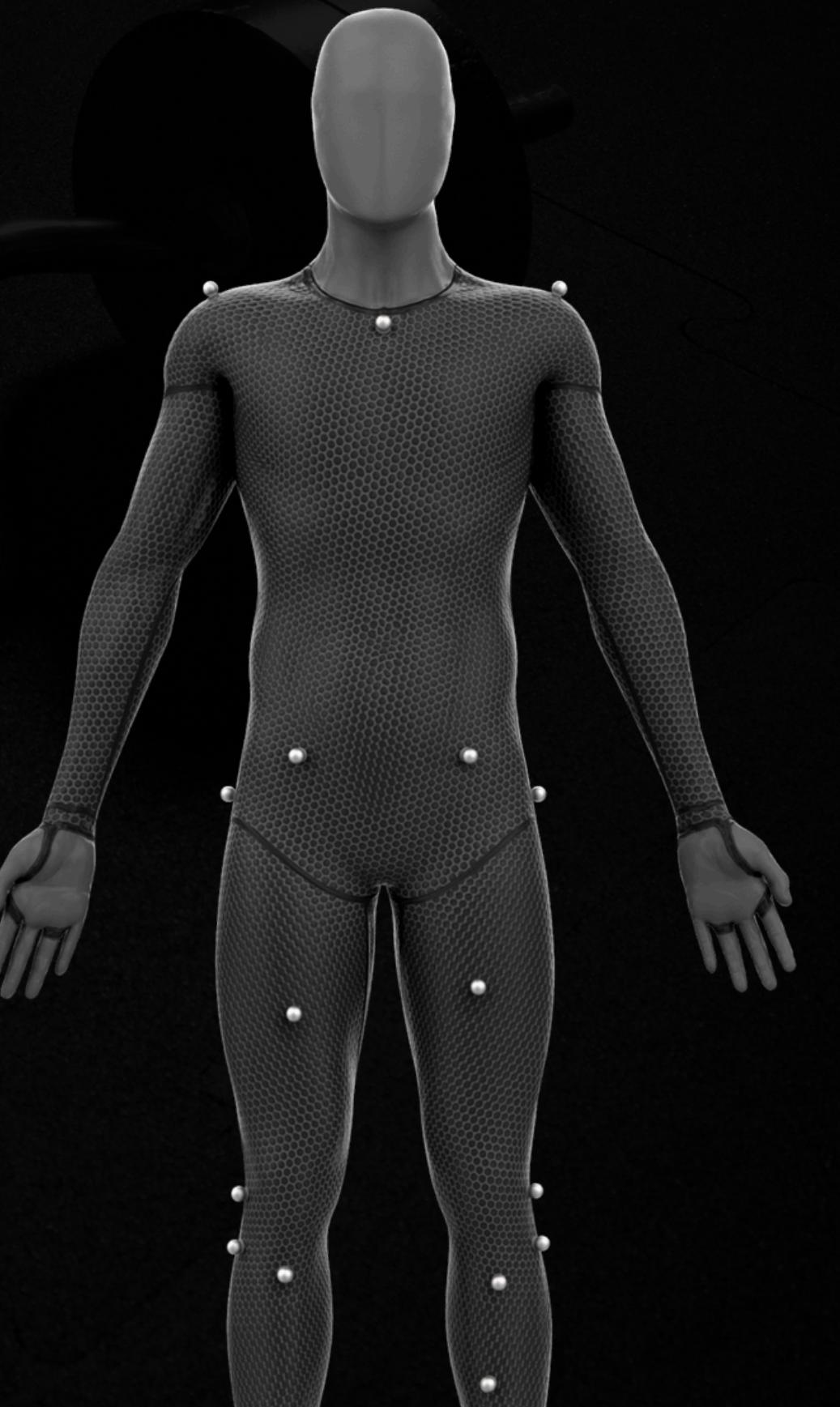
Complete the development of the **kinematic analysis** with **MoCap system**

## M3.

Complete the software that will provide **analysis of the collected data**.

## M4.

Collect all necessary data for **posture** and **performance analysis**.



# CONTINGENCY PLAN



## M1 : RECRUITING ATHLETS - REACHED

8 athletes have been recruited for the project.



## M2. KINEMATIC ANALYSIS OF ATHLETS

Analysis of legs, ankles, spine angles and spine oscillations.



## M3. PERFORMANCE DATA ANALYSIS

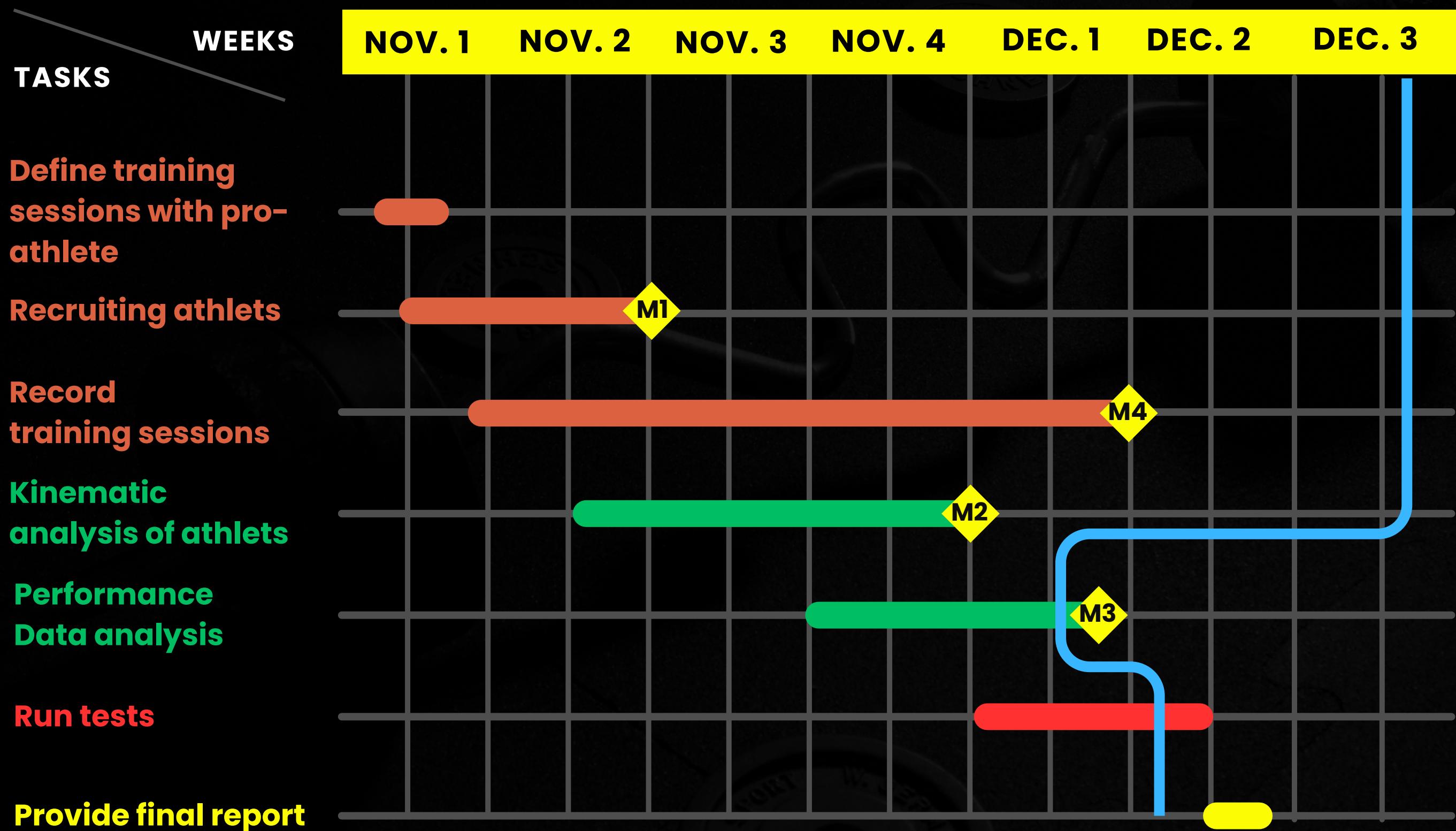
Up to now, we have only **power, speed and heart-reate**. There will be also **VO2 max**



## M4. RECORD TRAINING SESSIONS

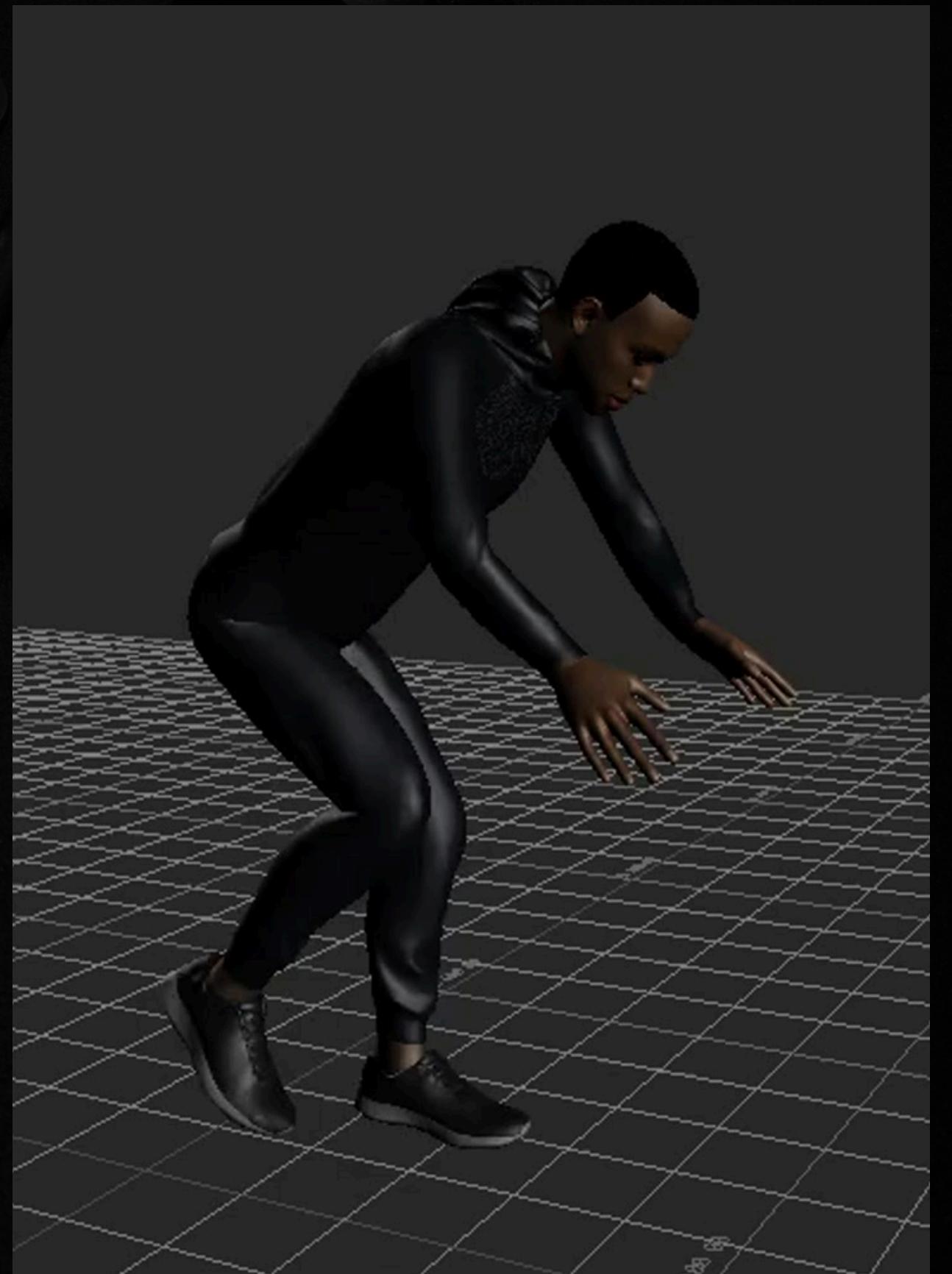
From 8 volunteers, **only 2 of them have complete dataset**. 3 riders has training data with 1 setting.

# GANTT DIAGRAM



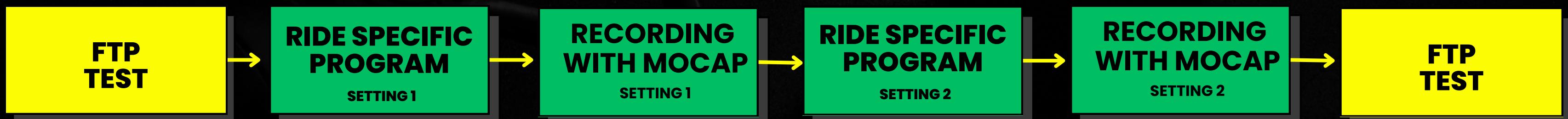
# VINCENZO NIBALI

- MALE
- 27 YEARS OLD
- FOOTBALL PLAYER
- LITTLE BIKE EXPERIENCE
- RIGHT ADDUCTOR LESION
- INITIAL FTP : 169

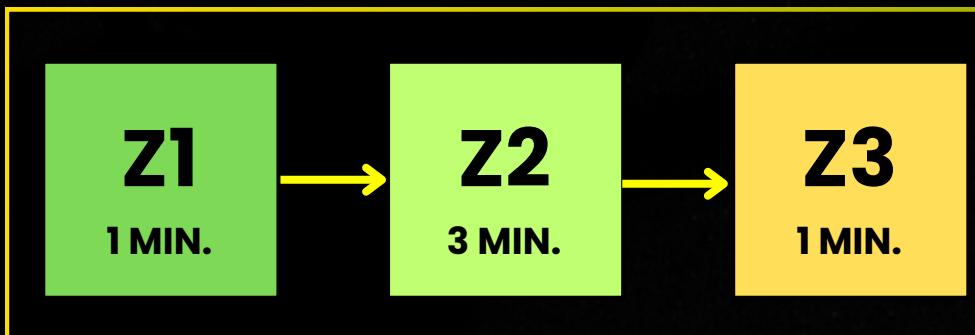


# ATHLETE PLAN

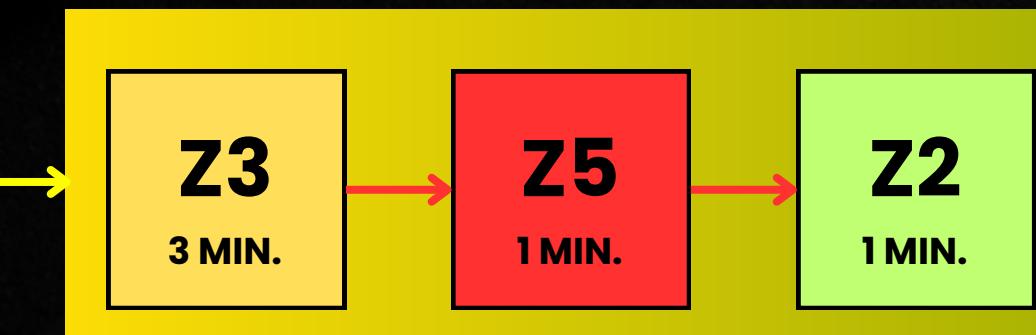
INITIAL FTP : 169



## WARM-UP

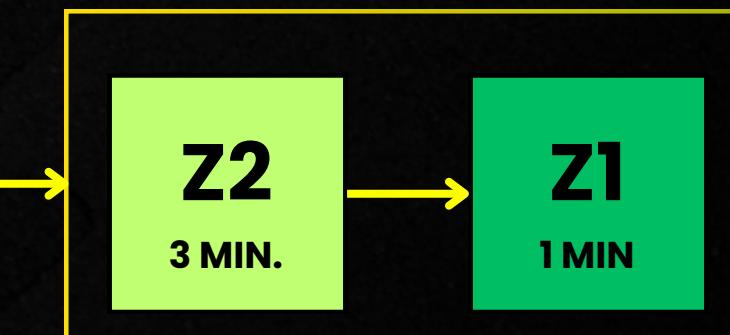


## TRAINING SESSION



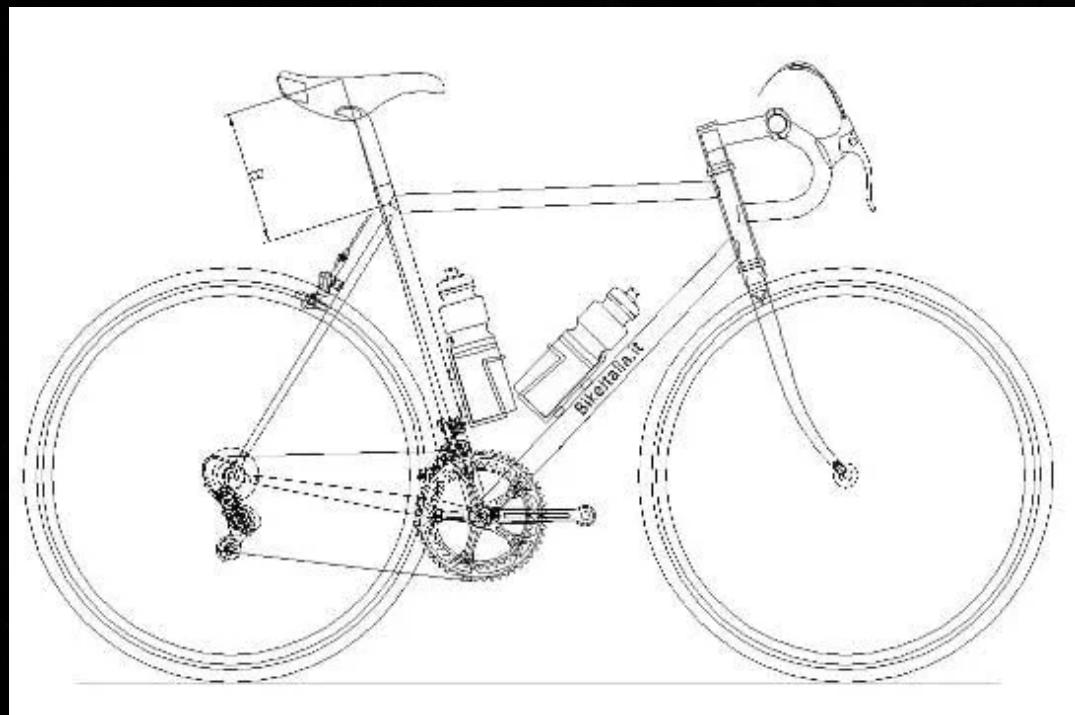
⌚ 5 TIMES

## DEFATIGUE

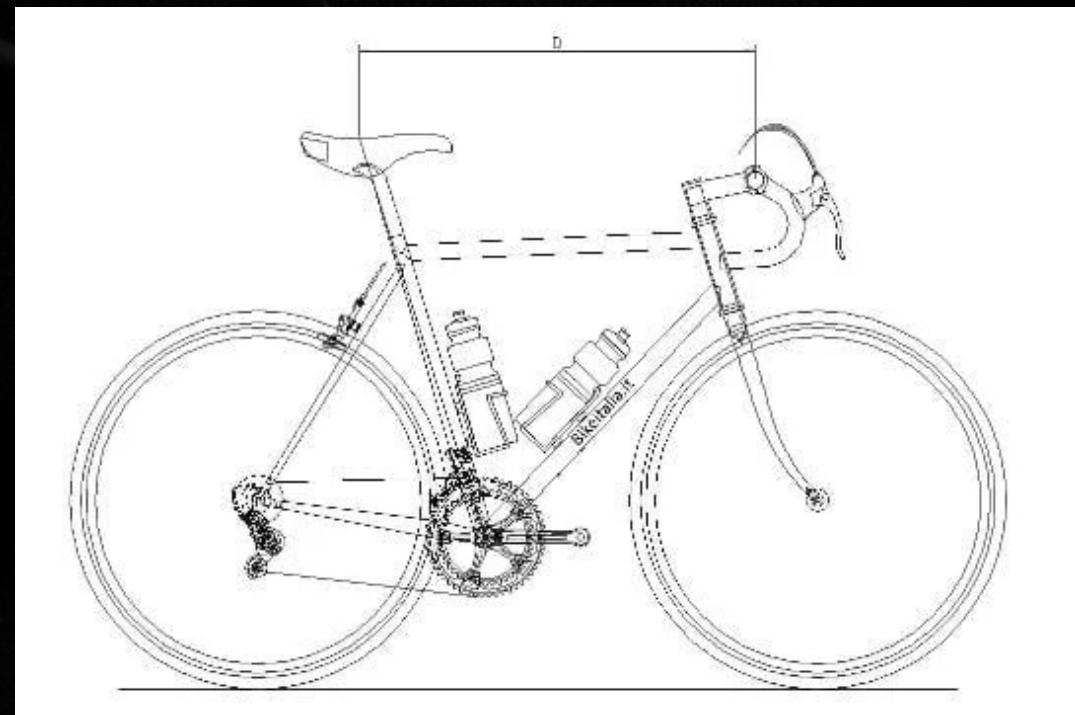


# BIKE SETTINGS

**1. SADDLE HEIGHT**



**2. SADDLE-HANDBAR DISTANCE**



**3. SADDLE-HANDBAR DROP**



# PERFORMANCE IMPROVEMENT



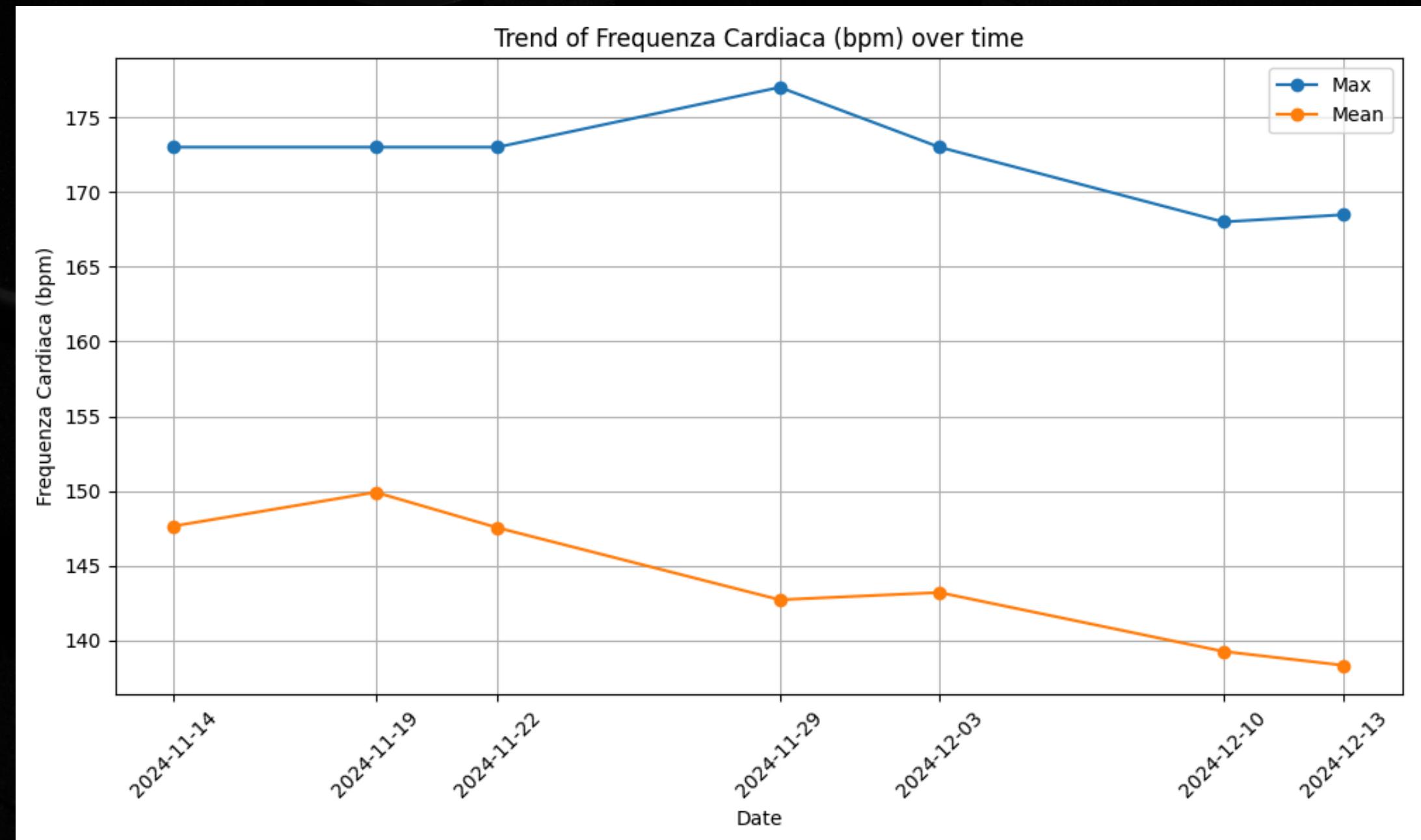
**1. POWER**



**2. SPEED**



**3. HEART-BEAT**



# KINEMATIC ANALYSIS

## KNEE

Peeks and deeps of the knee angle in a pedaling cycle

## STOMACH-ANGLE

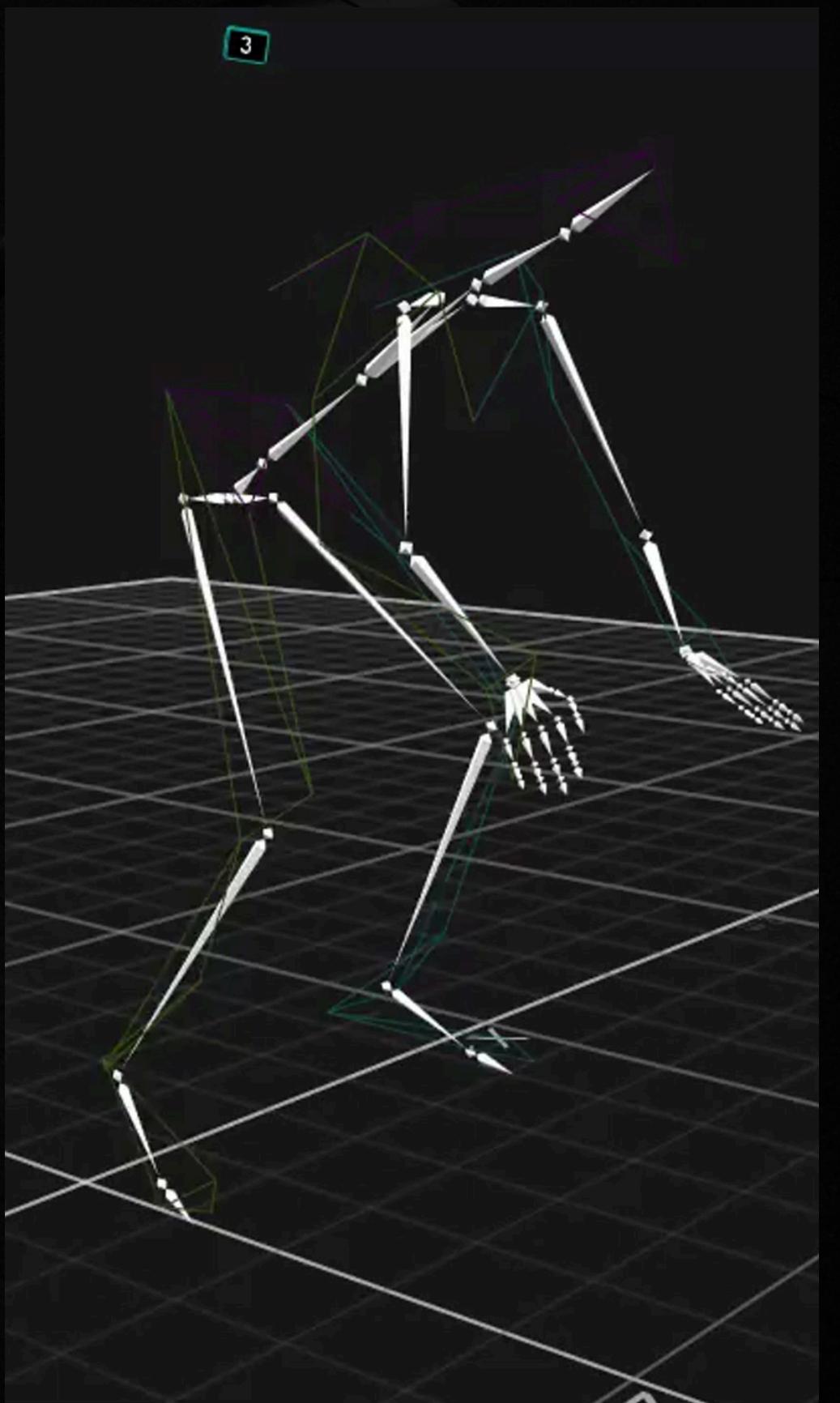
It measures how much the back is straight

## SPINE-GROUND

Hip-Chest → ground angle

## SPINE OSCILLATIONS

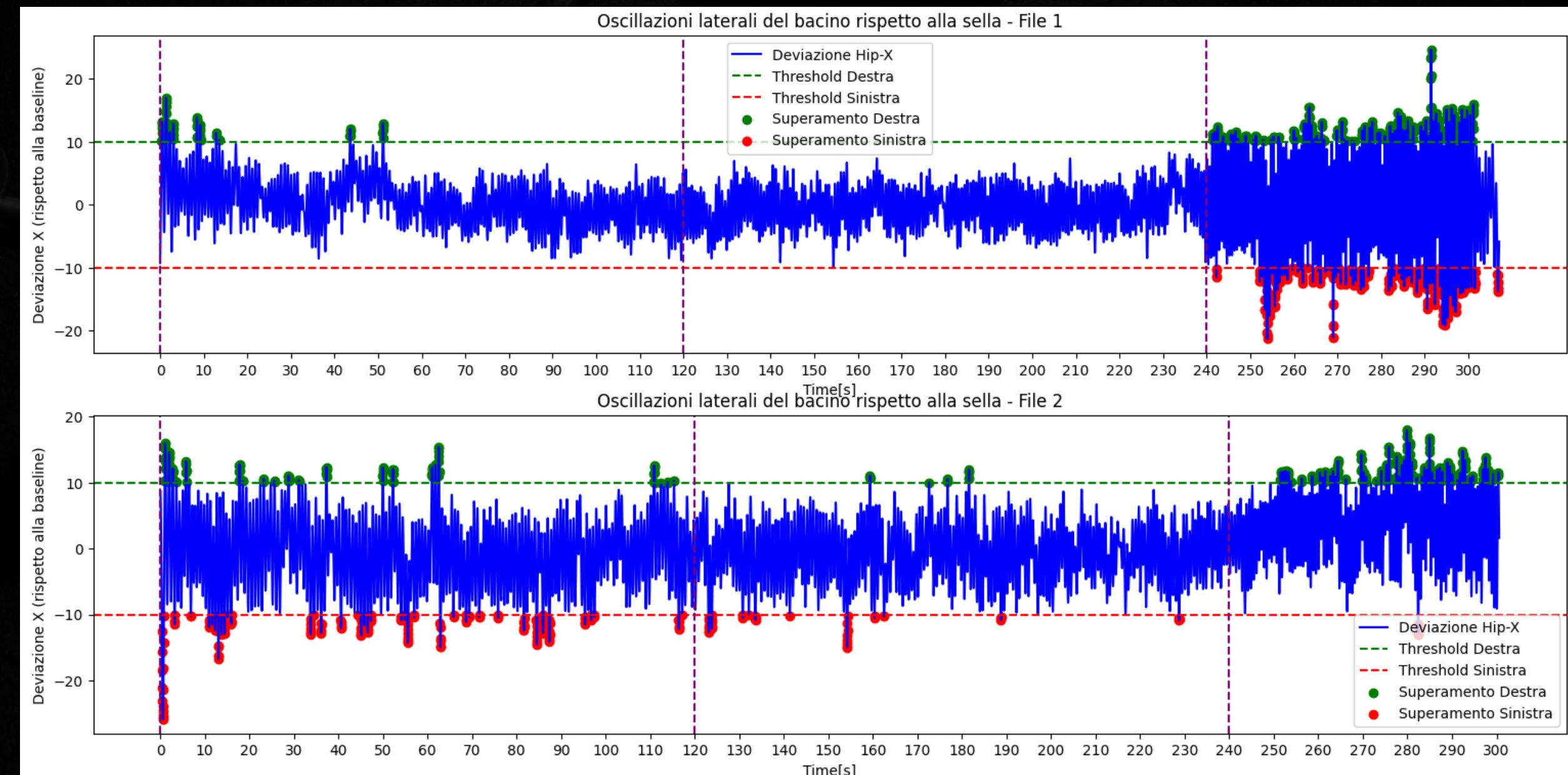
Oscillations of the spine respect of the spine axes



# KINEMATIC ANALYSIS



## 1. KNEE

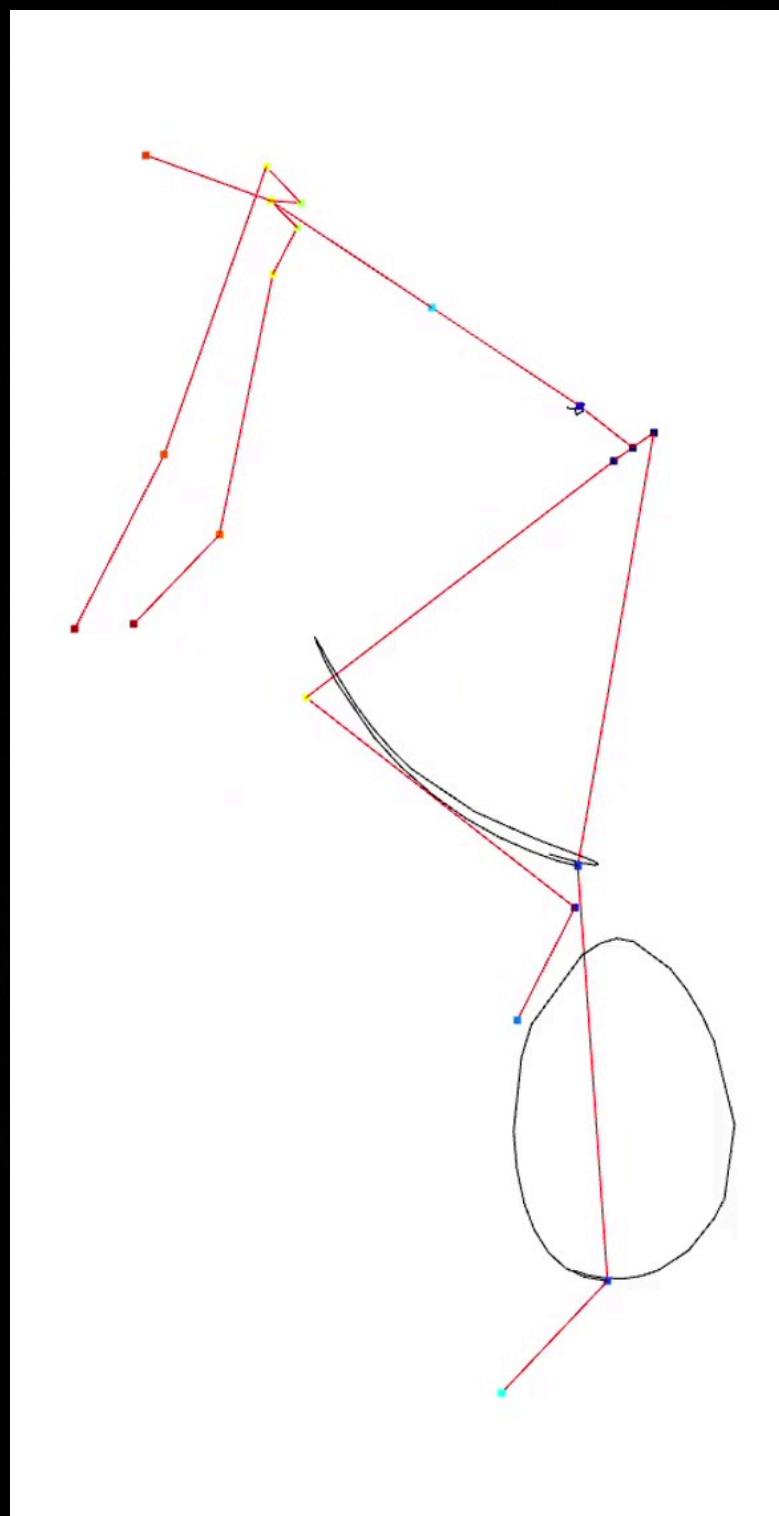


## 2. SPINE ANGLES



## 3. SPINE MOVEMENTS

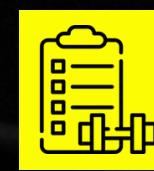
# CRITICAL POINTS



DEPENDENCY OF VOLUNTEERS



FTP - DEPENDENCY



VARIATIONS OF TRAINING PROGRAMS



DIFFERENT BIKE SETTINGS FOR WOMAN



USE SAME CARDIO SENSORS



ATHLETES COULD TRAIN ALSO IN OTHER WAYS



COLLABORATE WITH BIOMECHANIC

BOOST

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# THANK YOU

For Your Attention

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