



**SPEED  
SKATING  
DATA**

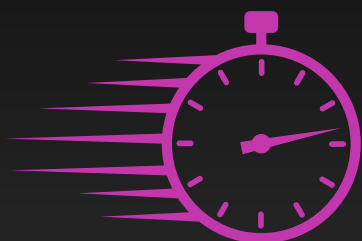


# **SLOW MOTION ANALYSIS**

**LORENZO MAGGIONI**  
**12 MARCH 2025**

# START OVERVIEW

## TIME TO COMPLETE 10 METERS



YOU	THE BEST*
2.063s	2.063s

## STARTING POSITION



YOU	Selected by
FRONTAL	75%
	of the best**

## MEAN ACCELERATION



YOU	AVERAGE SPRINTER
3.63 m/s/s	3.11 m/s/s

## MEAN PUSH FREQUENCY



YOU	AVERAGE SPRINTER
3.86 Hz	3.74 Hz

\*Best time recorded over the 10m distance with video analysis.

\*\*Sub 9 seconds athletes over the 100m distance.

# GROUND CONTACT TIME

## WHAT IS IT?

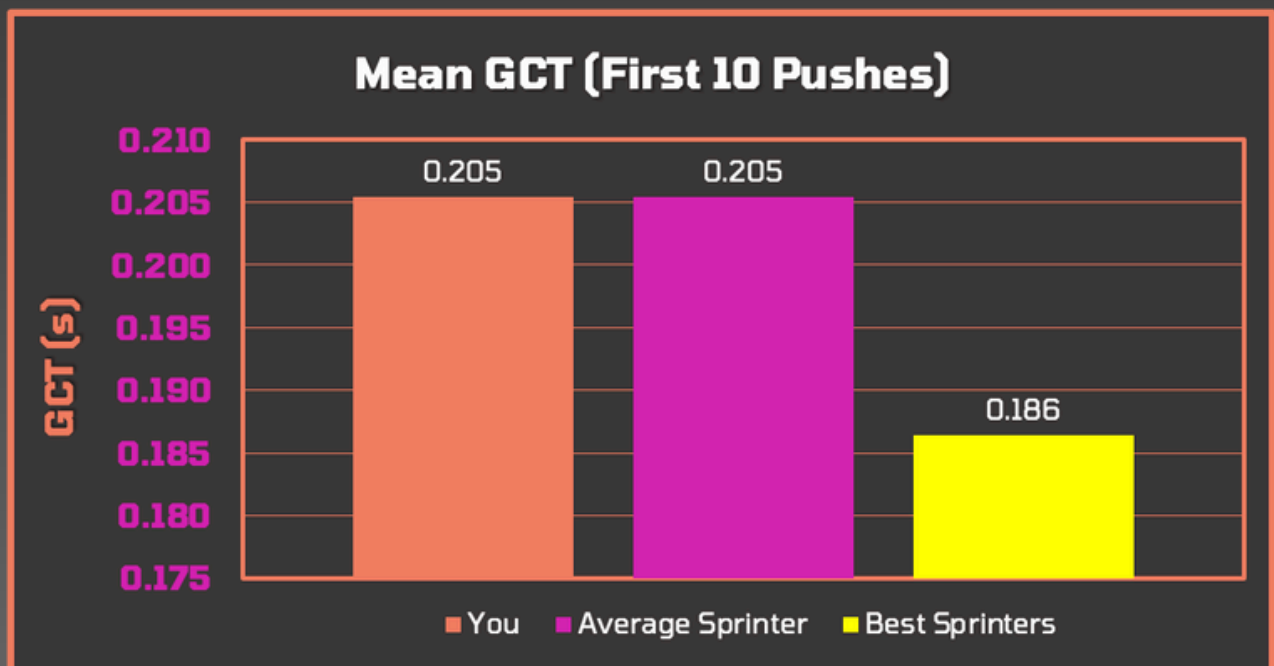
THE GROUND CONTACT TIME IS THE TIME SPENT ON THE GROUND BY A SKATE DURING THE PUSHING PHASE. IT STARTS AS SOON AS ALL THE WHEELS TAKES CONTACT WITH THE GROUND AND ENDS WHEN THE LAST WHEEL OF THE SKATE LEAVES THE GROUND.

## MEAN GROUND CONTACT TIME\*



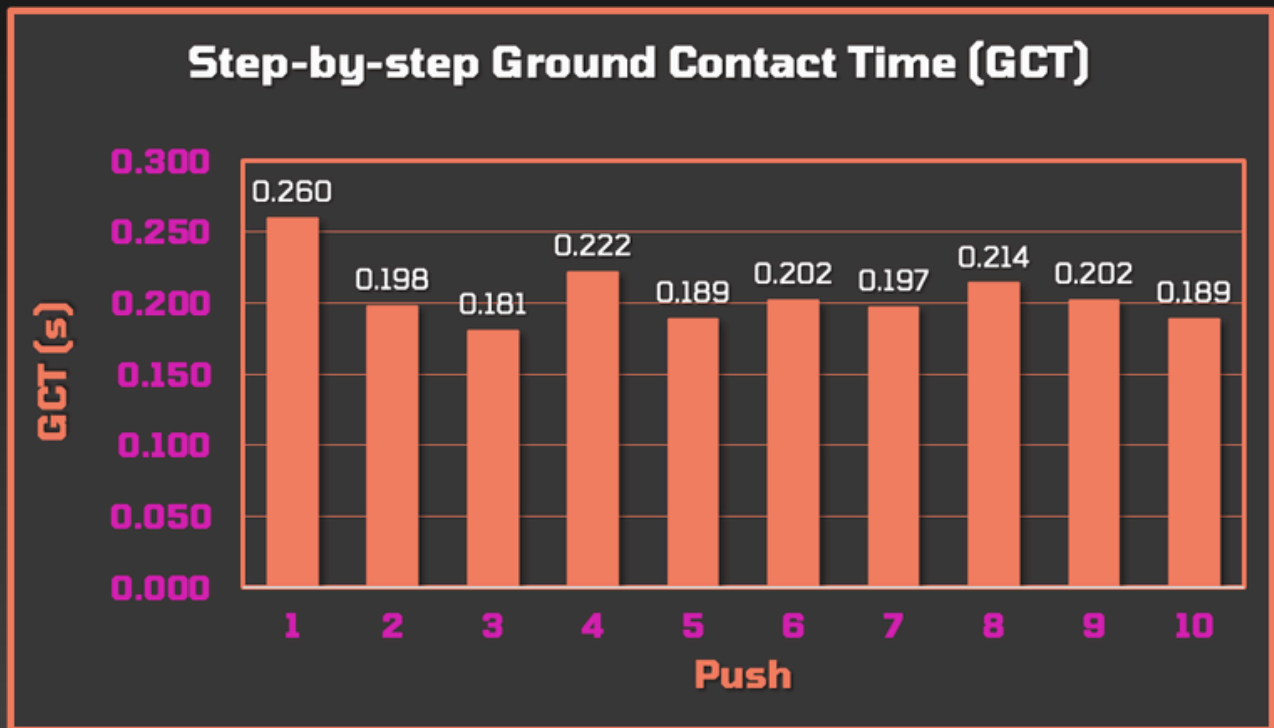
YOU THE BEST\*

0.205s 0.186s



\*Average values for the first 10 pushes.

# GROUND CONTACT TIME STEP-BY-STEP ANALYSIS



## THE IMPORTANCE OF A STEP-BY-STEP ANALYSIS

THE WORK CONDUCTED BY THE SSD TEAM SHOWED THAT A STEP-BY-STEP ANALYSIS CAN GIVE IMPORTANT INSIGHTS ON ATHLETES' TECHNIQUE AND PERFORMANCE.

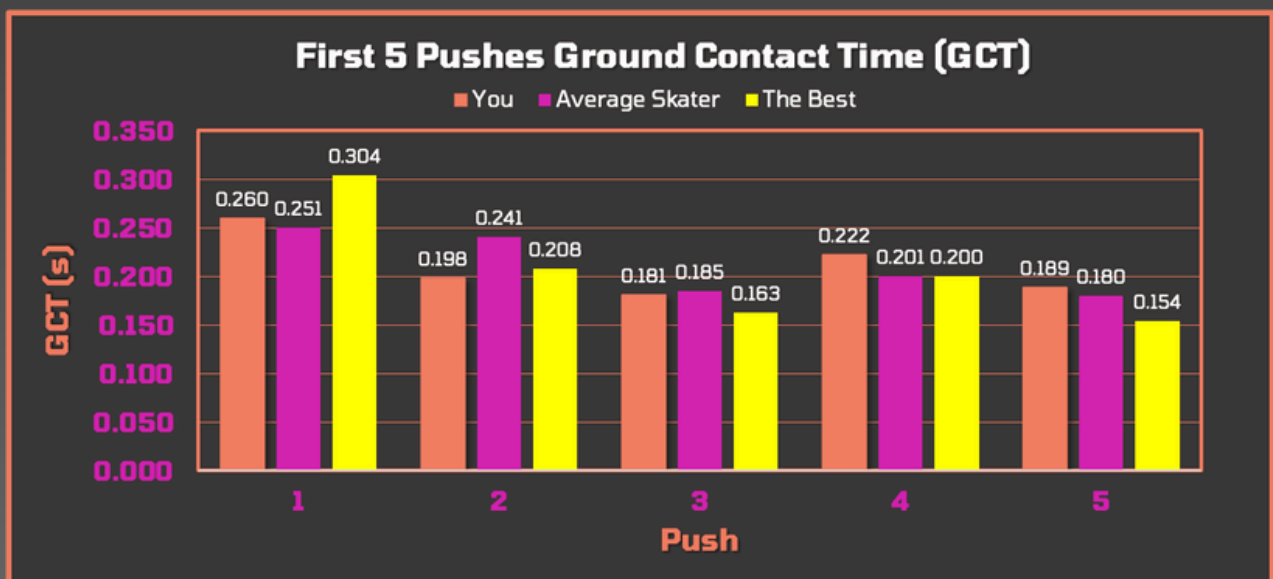
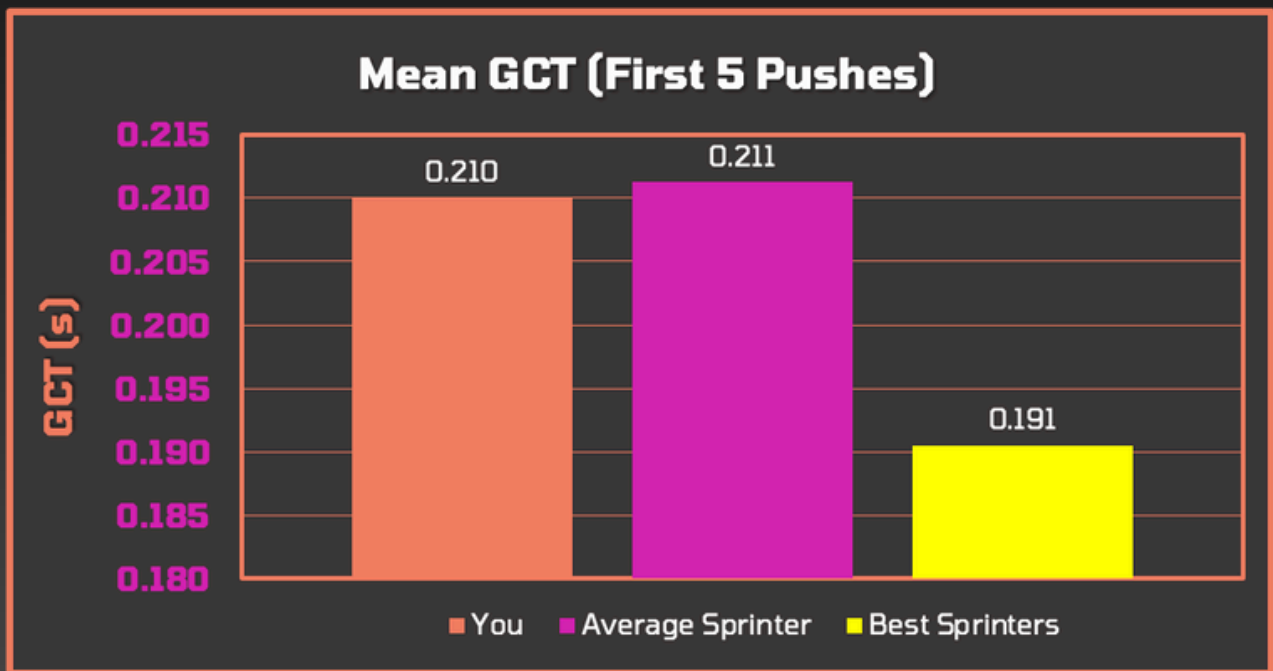
MORE SPECIFICALLY, THE FASTEST SKATERS OVER THE FIRST 10 METERS OF A STANDING START USUALLY SPEND LESS TIME ON THE GROUND DURING THE FIRST 5 PUSHES.

IF WE LOOK AT THE 100M PERFORMANCE, THE SKATERS THAT ARE ABLE TO REDUCE THE GCT OF THE LATTER PUSHES (PUSHES 5-10) ARE USUALLY THE FASTEST.



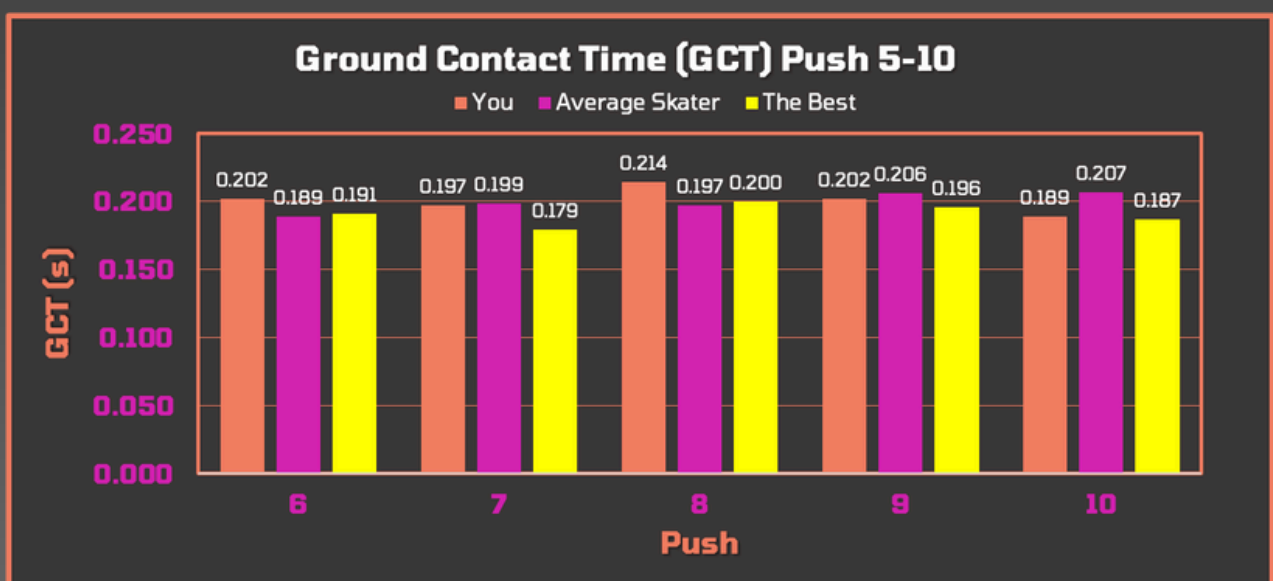
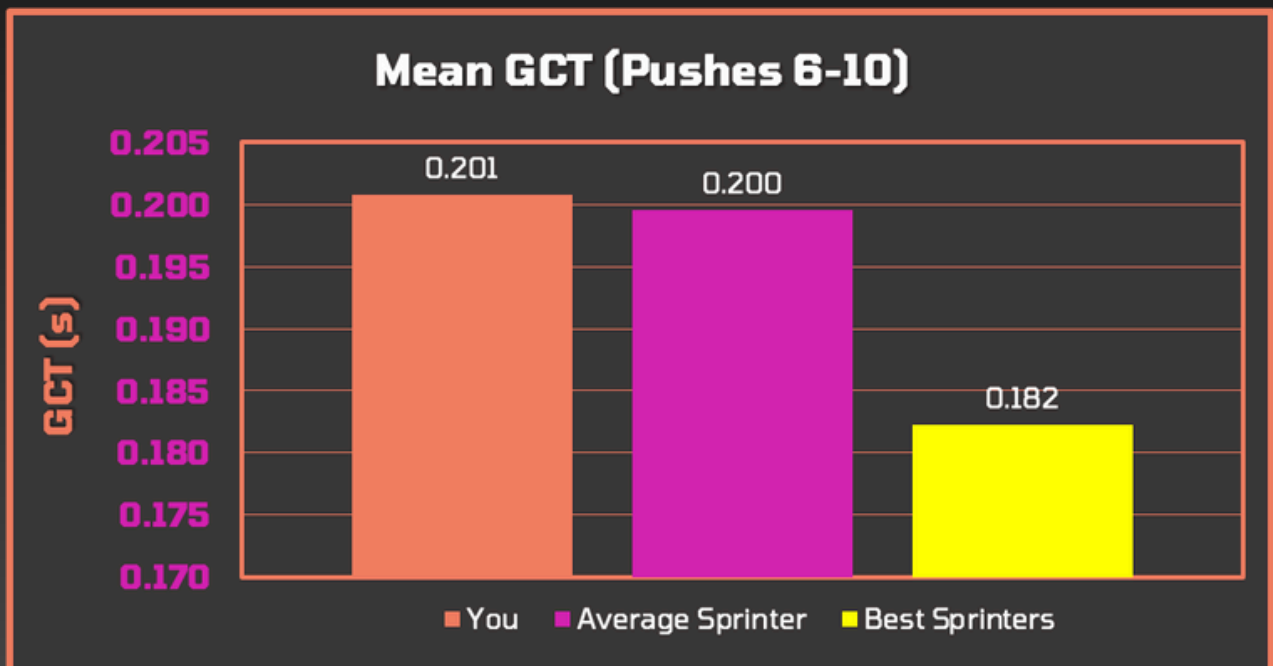
# GROUND CONTACT TIME STEP-BY-STEP ANALYSIS

## FIRST 5 PUSHES



# GROUND CONTACT TIME STEP-BY-STEP ANALYSIS

## PUSH 6-10





# FLIGHT TIME

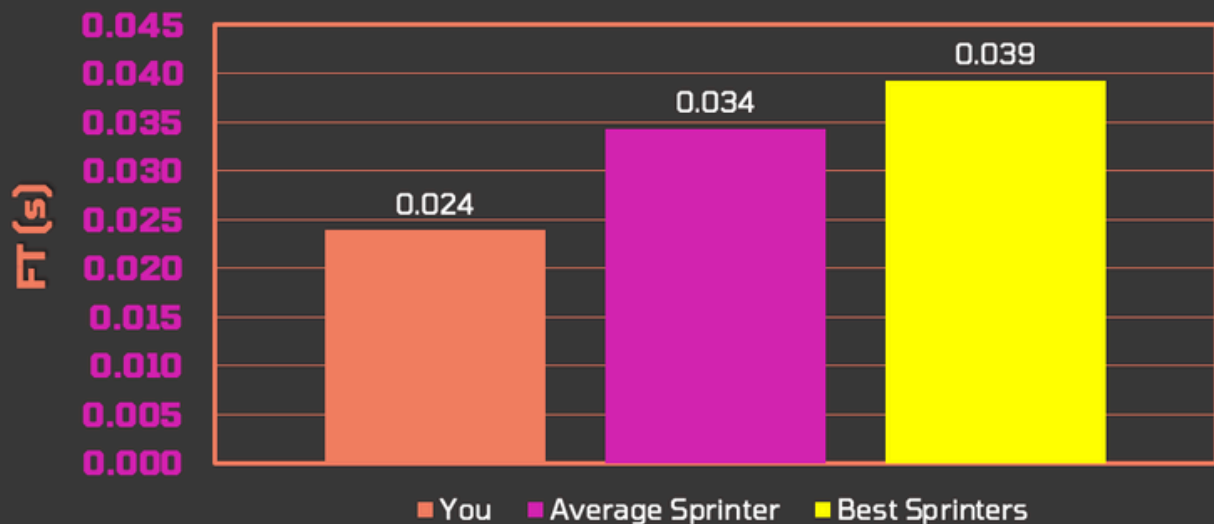


## WHAT IS IT?

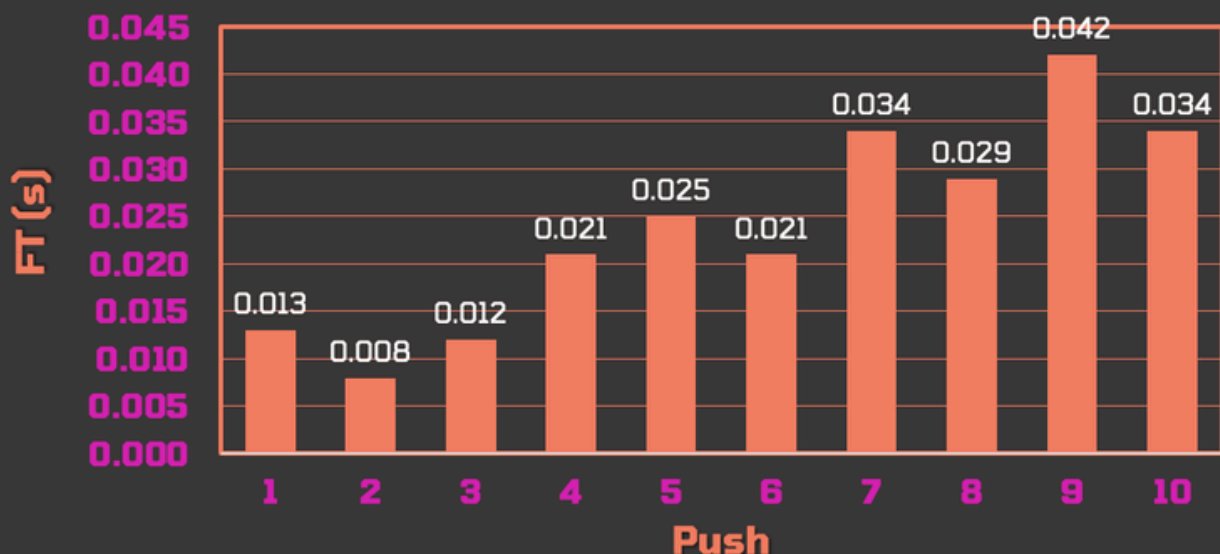
THE FIGHT TIME IS THE TIME DURING WHICH NO SKATE IS IN CONTACT WITH THE GROUND.

IT STARTS WHEN THE LAST WHEEL OF THE BACK FOOT LEAVES THE GROUND AND IT ENDS WHEN THE FIRST WHEEL OF THE FRONT FOOT TAKES CONTACT WITH THE GROUND.

### Mean Flight Time (First 10 Pushes)



### Step-by-step Flight Time (FT)





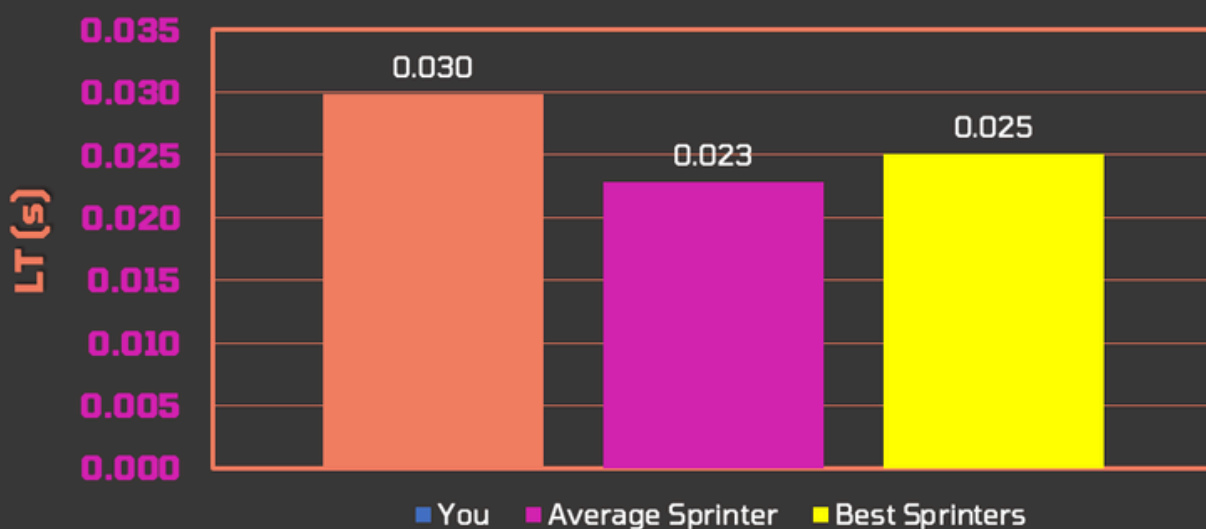
# LATENT TIME



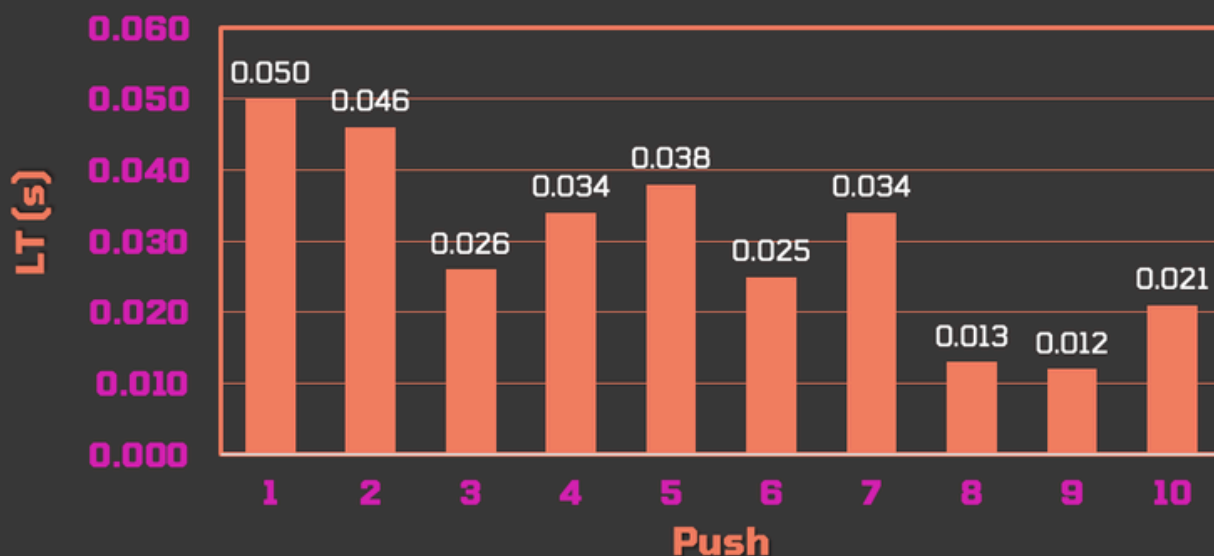
## WHAT IS IT?

THE LATENT TIME IS THE TIME DURING WHICH THE SKATE TAKES CONTACT WITH THE GROUND BUT THE PUSH IS STILL NOT EFFECTIVE. IT SPANS FROM WHEN THE FIRST WHEEL TOUCHES THE GROUND (EITHER THE FRONT OR BACK WHEEL) AND ENDS WHEN ALL THE FOUR WHEELS TOUCH THE GROUND.

### Mean Latent Time (First 10 Pushes)



### Step-by-step Latent Time (LT)





# ***LATENT TIME***

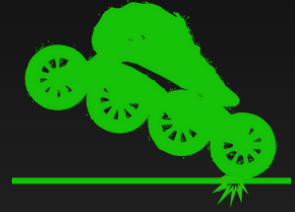
## ***LANDING TOUCH ANALYSIS***



***NEGATIVE***  
*BACK WHEEL FIRST*



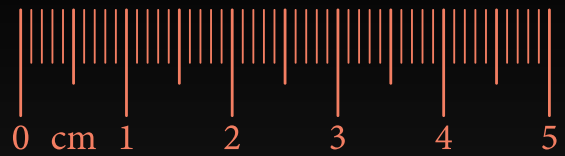
***NEUTRAL***  
*ALL WHEELS  
TOGETHER*



***POSITIVE***  
*FRONT WHEEL FIRST*

<b>PUSH</b>	<b>LANDING TOUCH</b>
Push 1	Positive
Push 2	Positive
Push 3	Positive
Push 4	Positive
Push 5	Positive
Push 6	Positive
Push 7	Positive
Push 8	Positive
Push 9	Neutral
Push 10	Negative

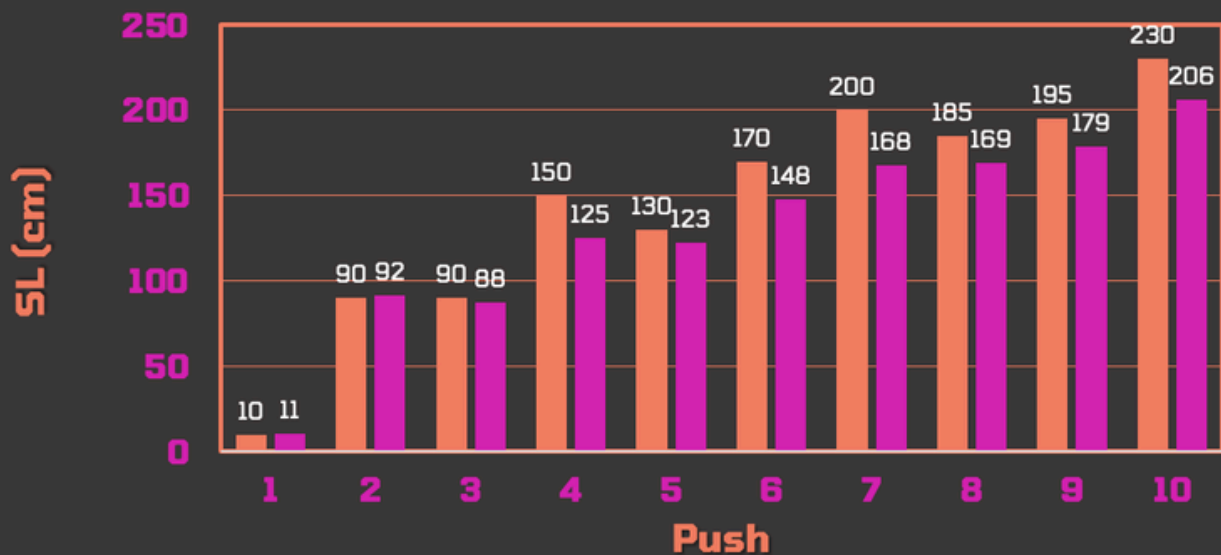
# STEP LENGTH



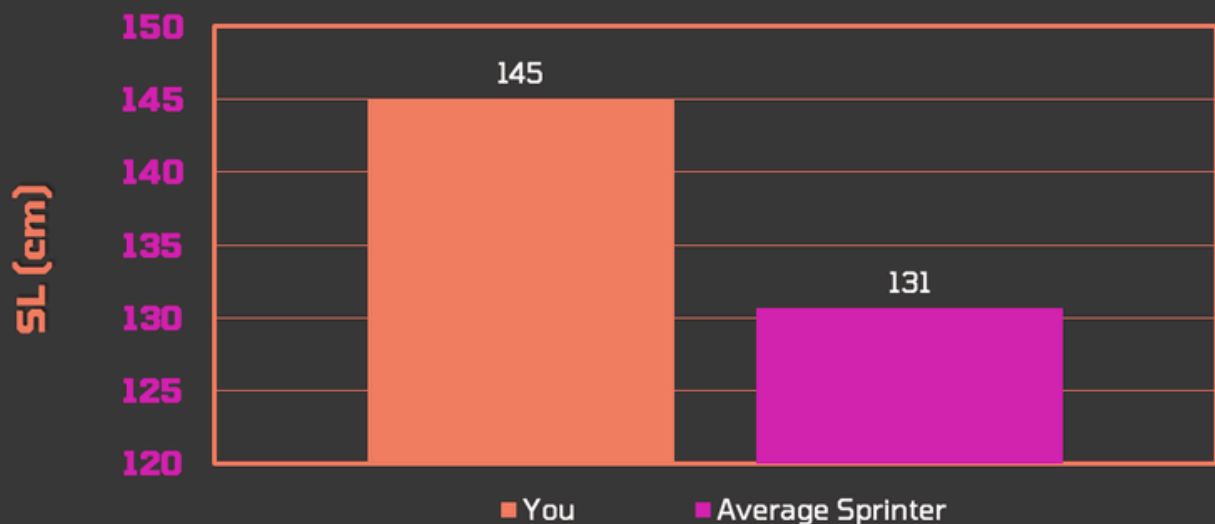
## WHAT IS IT?

STEP LENGTH IS THE SINGLE MOST IMPORTANT PARAMETER WITH THE BEST TIMES RECORDED OVER THE 10M DISTANCE BY THE ATHLETES THAT ARE ABLE TO COVER THE GREATER DISTANCES WITH EACH STEP.

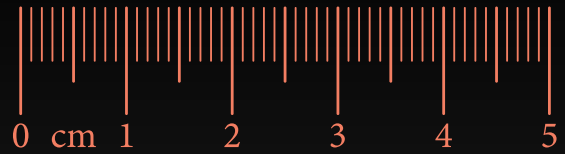
### Step-by-step Step Length (SL)



### Mean Step Length (First 10 Pushes)



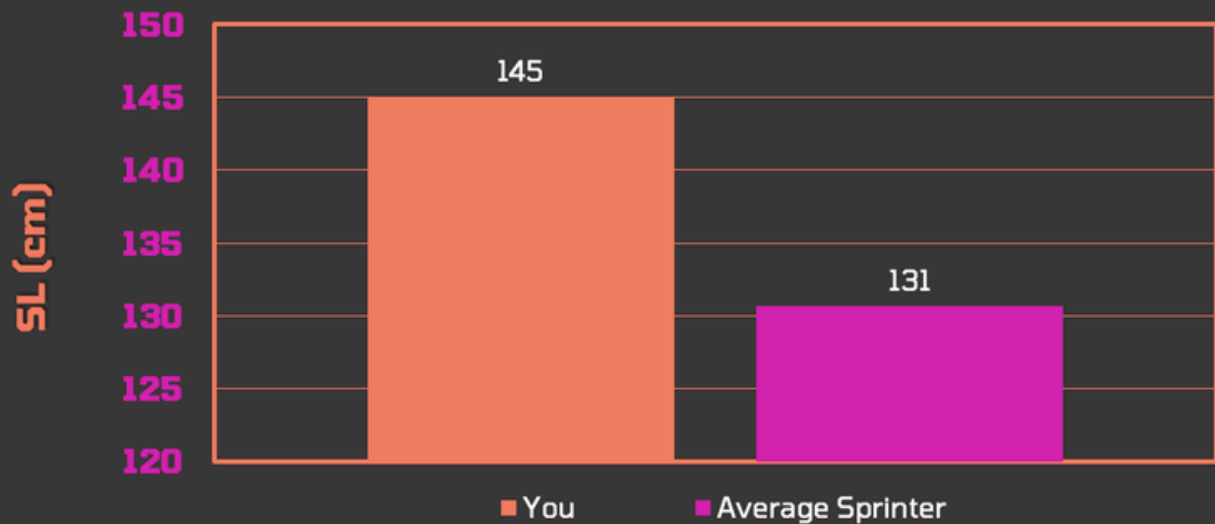
# STEP LENGTH



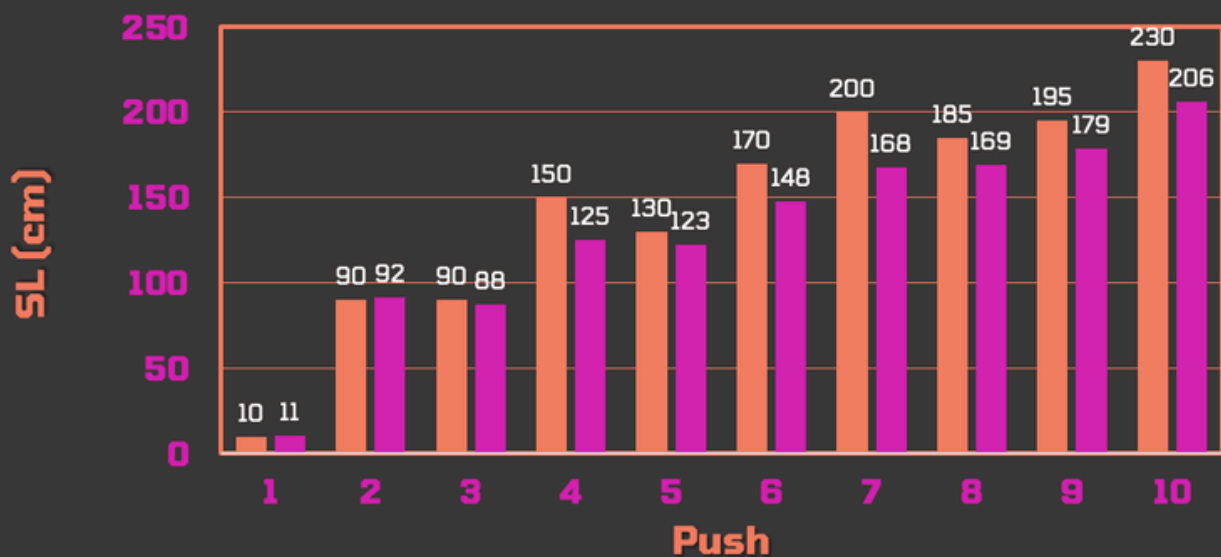
## WHAT IS IT?

STEP LENGTH IS THE SINGLE MOST IMPORTANT PARAMETER WITH THE BEST TIMES RECORDED OVER THE 10M DISTANCE BY THE ATHLETES THAT ARE ABLE TO COVER THE GREATER DISTANCES WITH EACH STEP.

### Mean Step Length (First 10 Pushes)



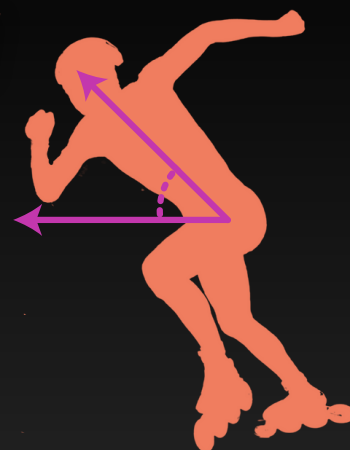
### Step-by-step Step Length (SL)



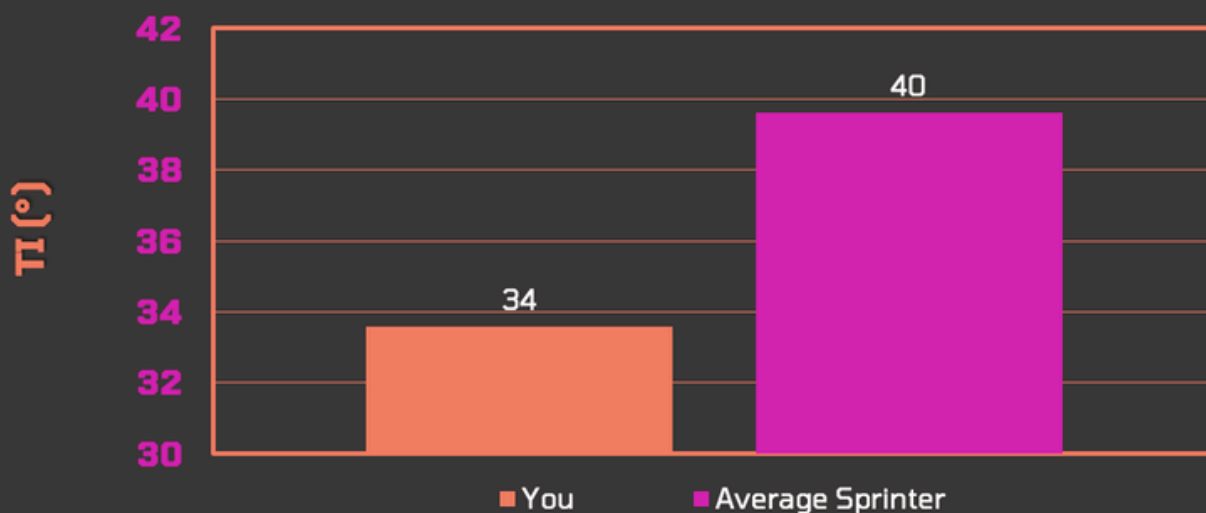
# TRUNK INCLINATION

## WHAT IS IT?

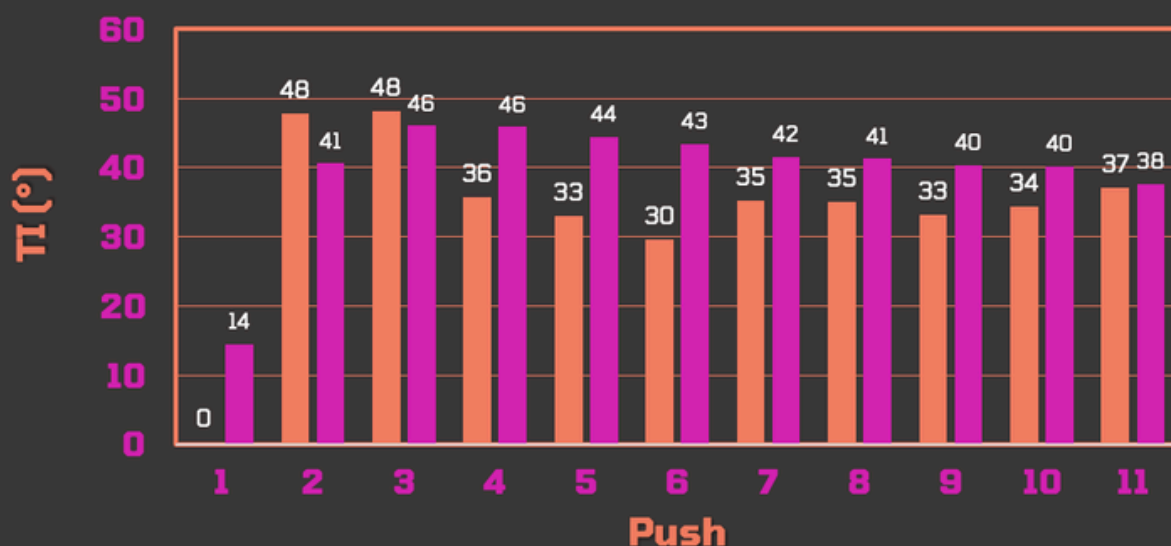
TRUNK INCLINATION IS CALCULATED AS THE ANGLE BETWEEN THE ATHLETE'S TORSO AND THE GROUND. A SMALLER ANGLE IS USUALLY CORRELATED TO A BETTER PERFORMANCE OVER THE 100M DISTANCE.



### Mean Trunk Inclination (First 10 Pushes)



### Step-by-step Trunk Inclination (TI)





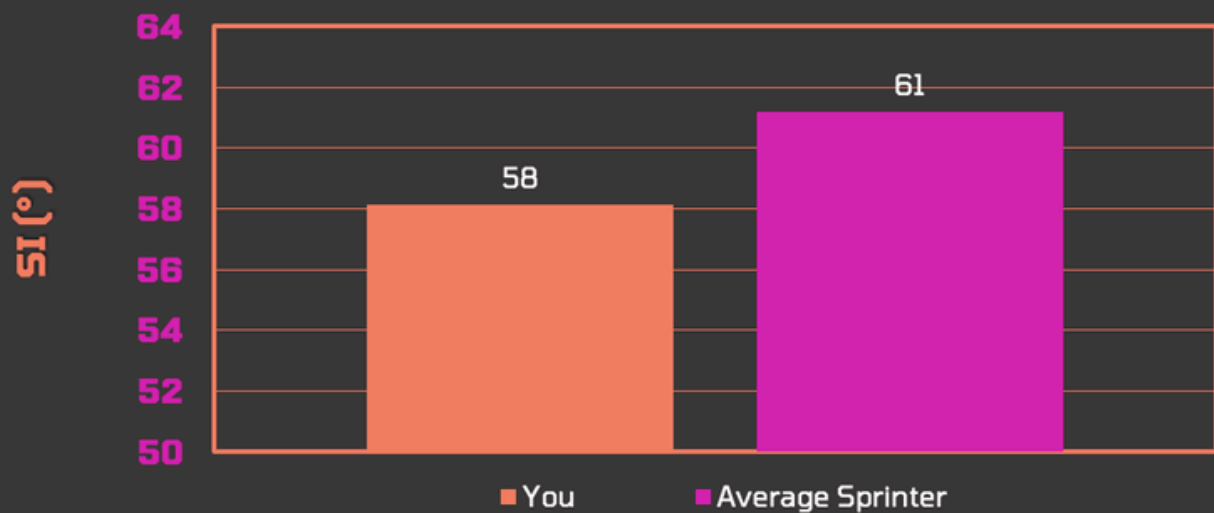
# SHIN INCLINATION

## WHAT IS IT?

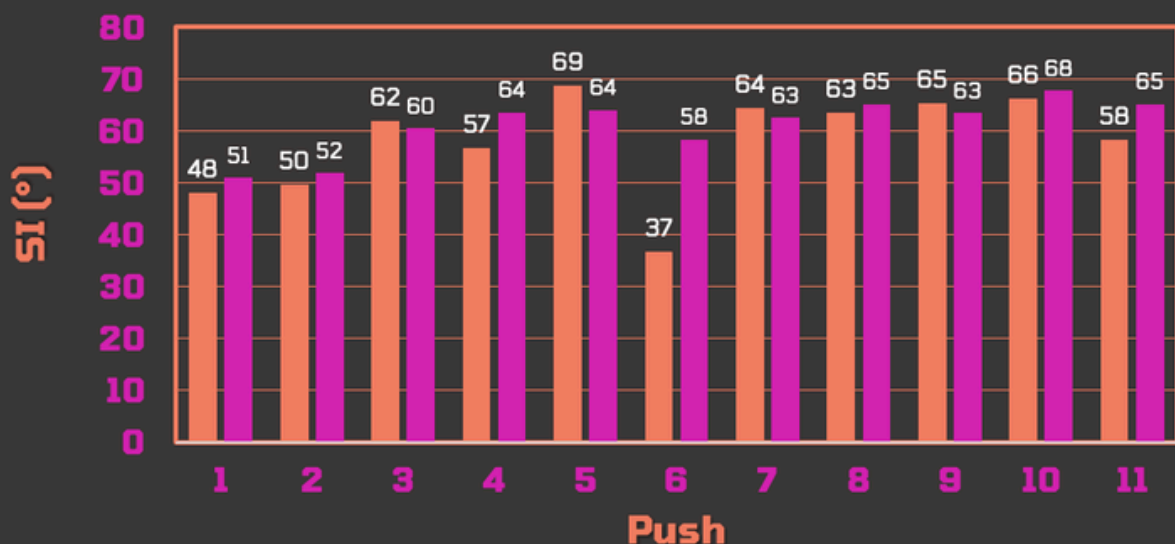
SHIN INCLINATION IS CALCULATED AS THE ANGLE BETWEEN THE ATHLETE'S SHIN (AT TOUCH DOWN) AND THE GROUND. A SMALLER AVERAGE ANGLE OVER THE FIRST 10 PUSHES IS STRONGLY CORRELATED TO A BETTER PERFORMANCE OVER THE 10M DISTANCE.



### Mean Shin Inclination (First 10 Pushes)



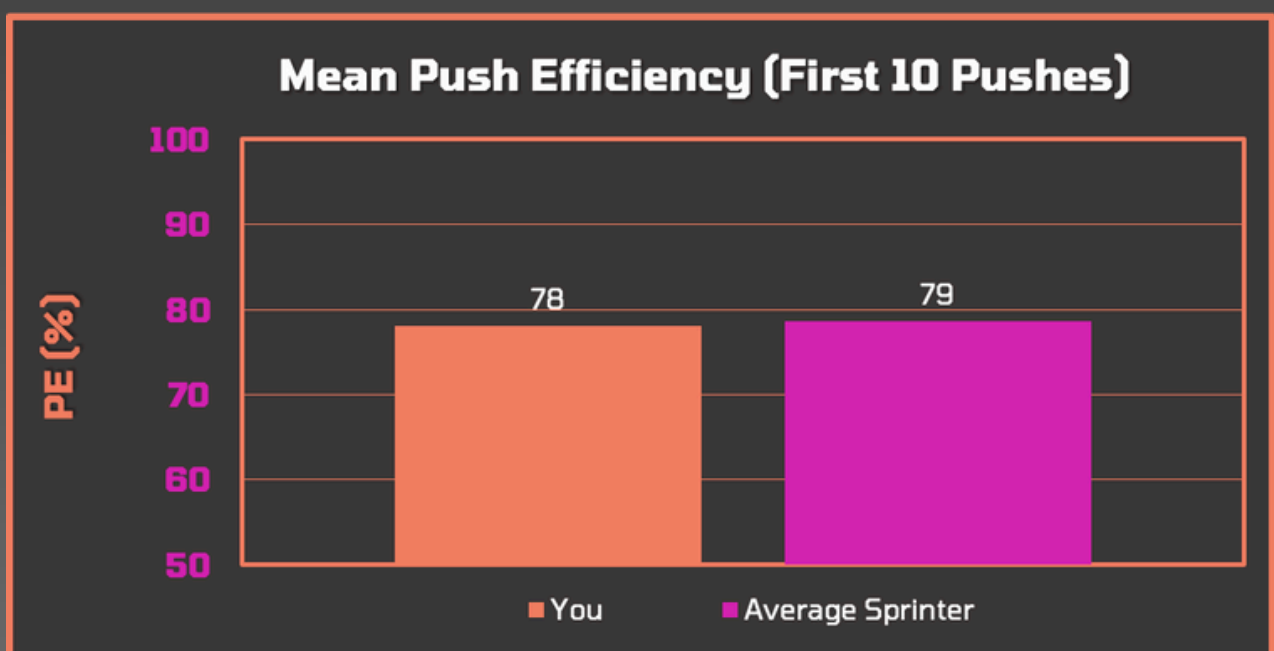
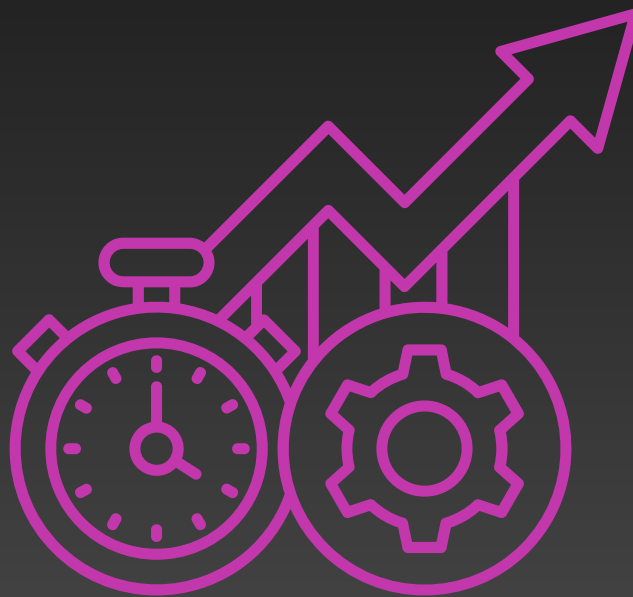
### Step-by-step Shin Inclination (SI)



# PUSH EFFICIENCY

## WHAT IS IT?

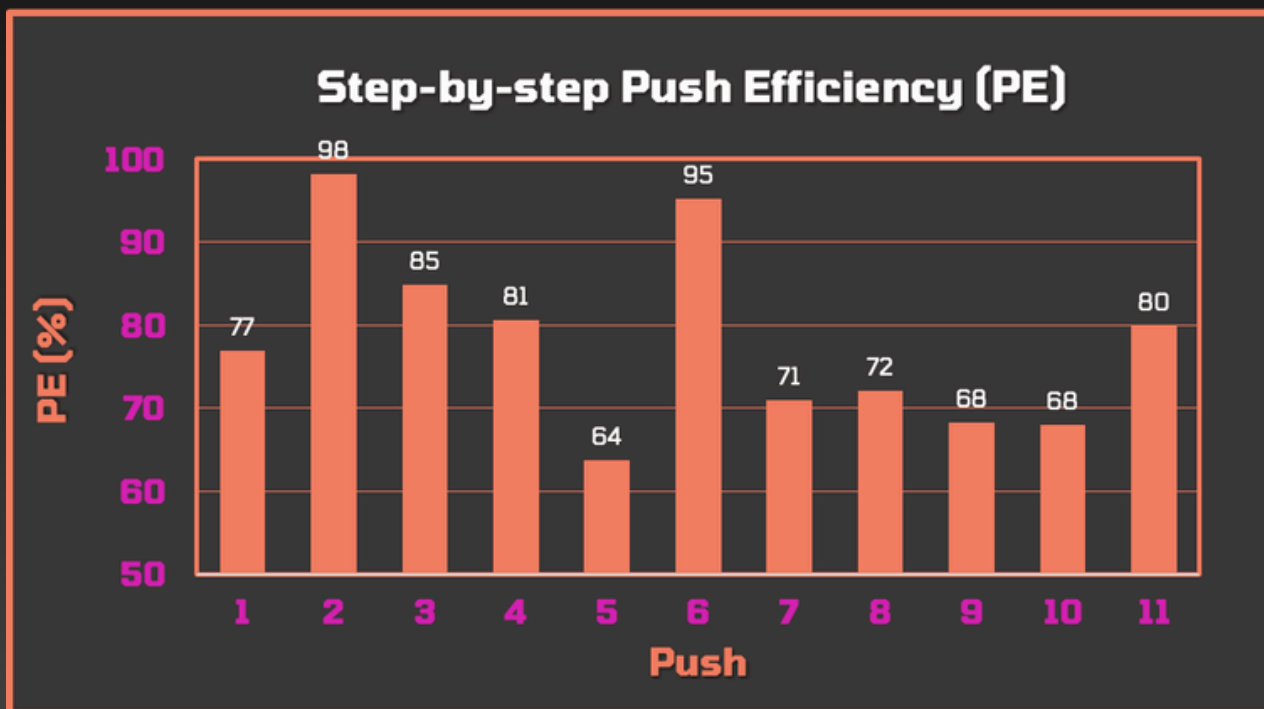
PUSH EFFICIENCY IS A MEASURE OF THE COHERENCE BETWEEN THE TRUNK INCLINATION AND THE SHIN INCLINATION. IT IS EXPRESSED AS A PERCENTAGE. A GREATER PUSH EFFICIENCY IS STRONGLY CORRELATED WITH SHORTER TIMES OVER THE 10M DISTANCE.



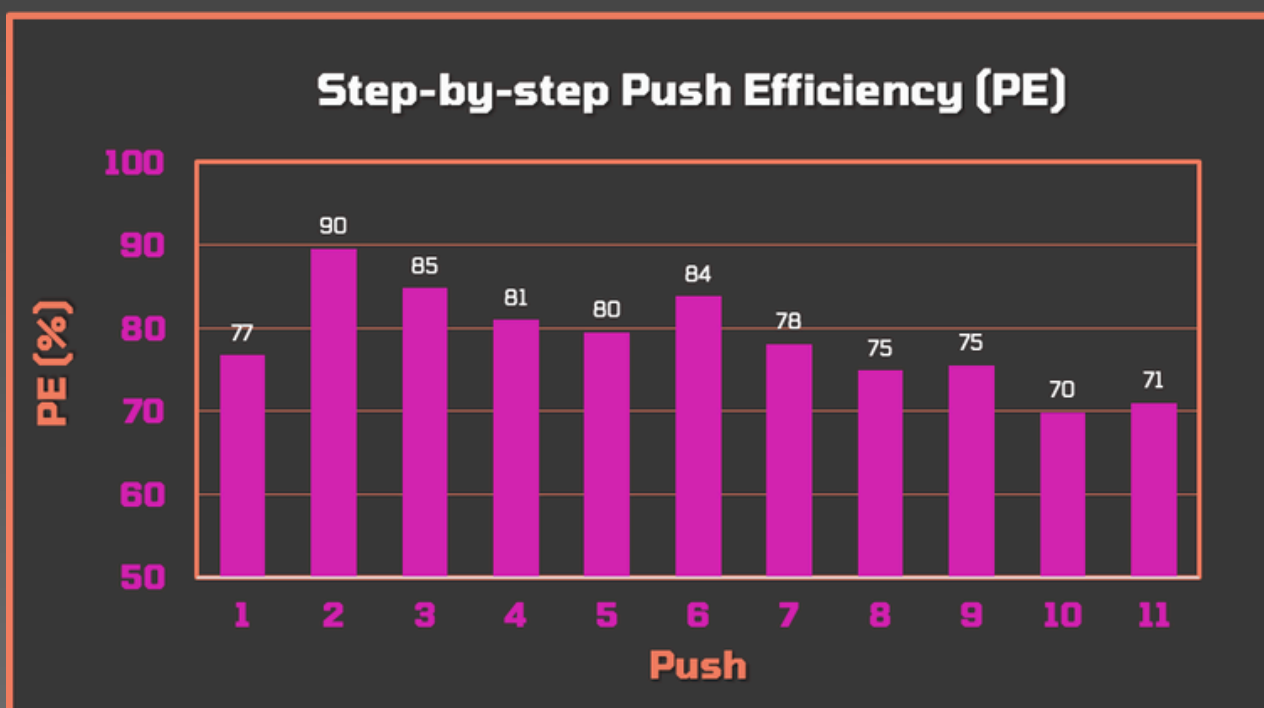
# ***PUSH EFFICIENCY***

## ***STEP-BY-STEP ANALYSIS***

***YOU***



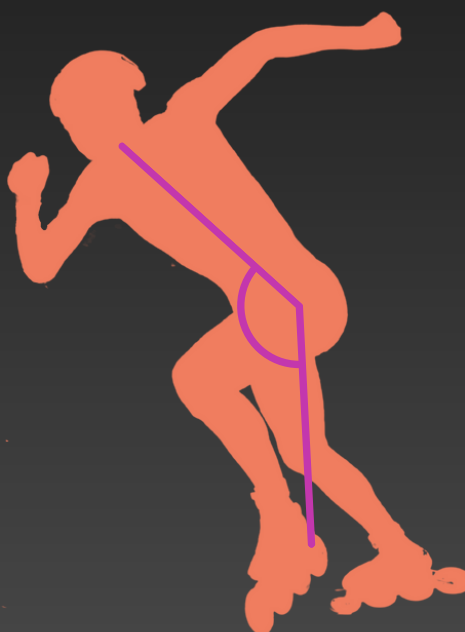
## ***AVERAGE SPRINTER***



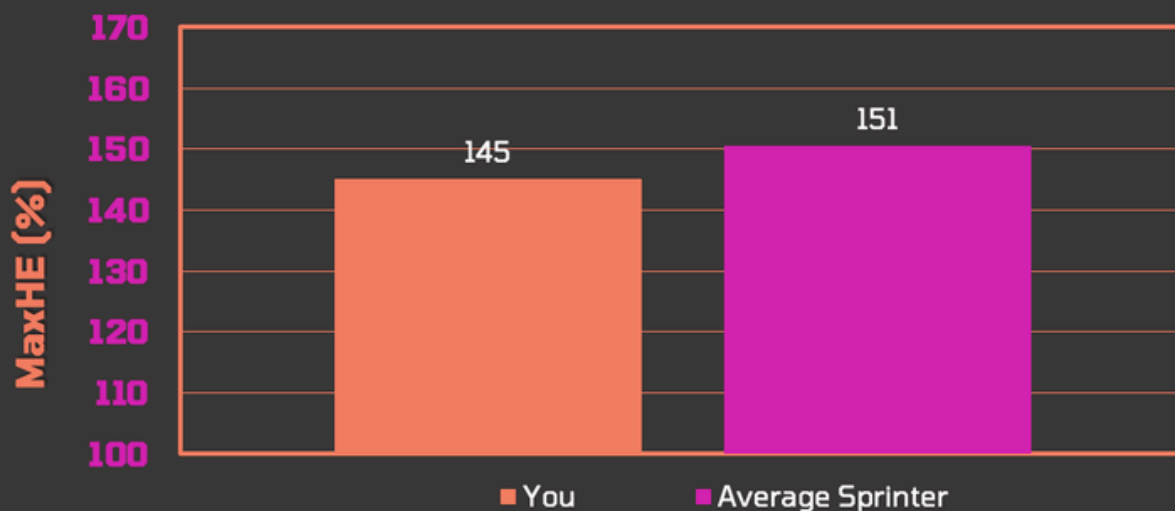
# MAXIMUM HIP EXTENSION

## WHAT IS IT?

MAXIMUM HIP EXTENSION (MAXHE) IS THE ANGLE BETWEEN THE TRUNK AND THE THIGH AT THE END OF A PUSH. A GREATER MEAN MAXIMUM HIP EXTENSION IS SLIGHTLY CORRELATED TO BETTER PERFORMANCES OVER THE 10-M DISTANCE. A GREATER HIP EXTENSION OVER THE FIRST 3 STEPS SEEMS TO BE OF AN EVEN GREATER IMPORTANCE.



Mean Max Hip Extension (First 10 Pushes)

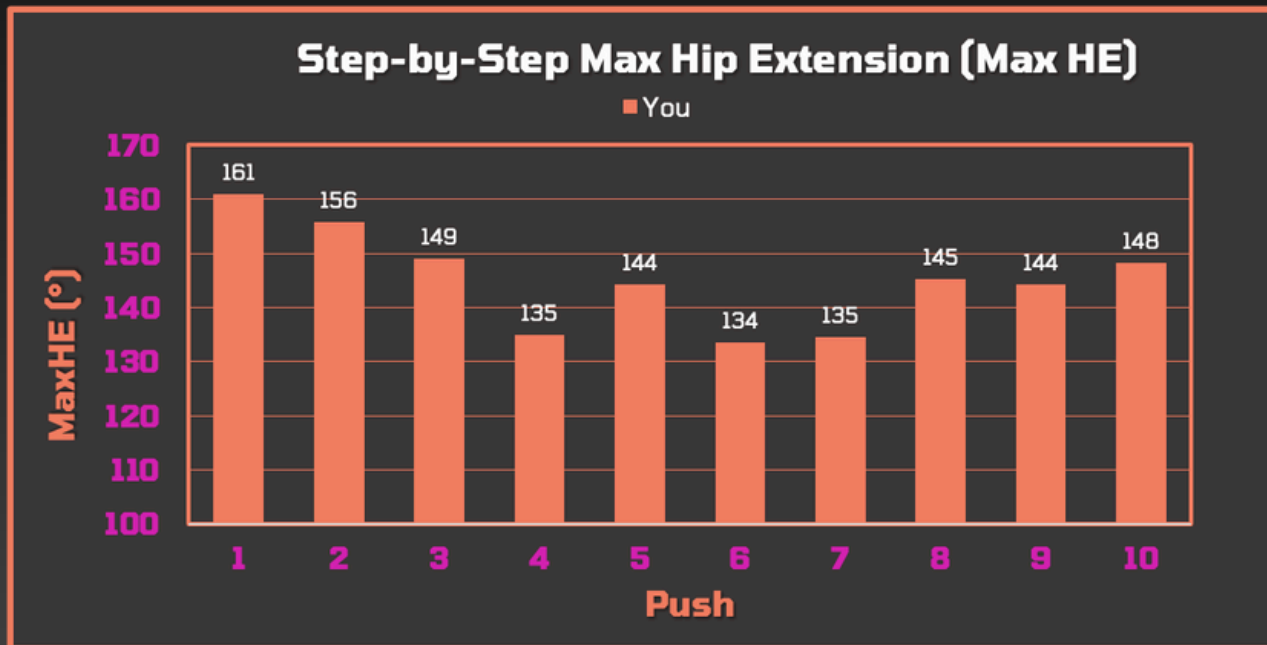




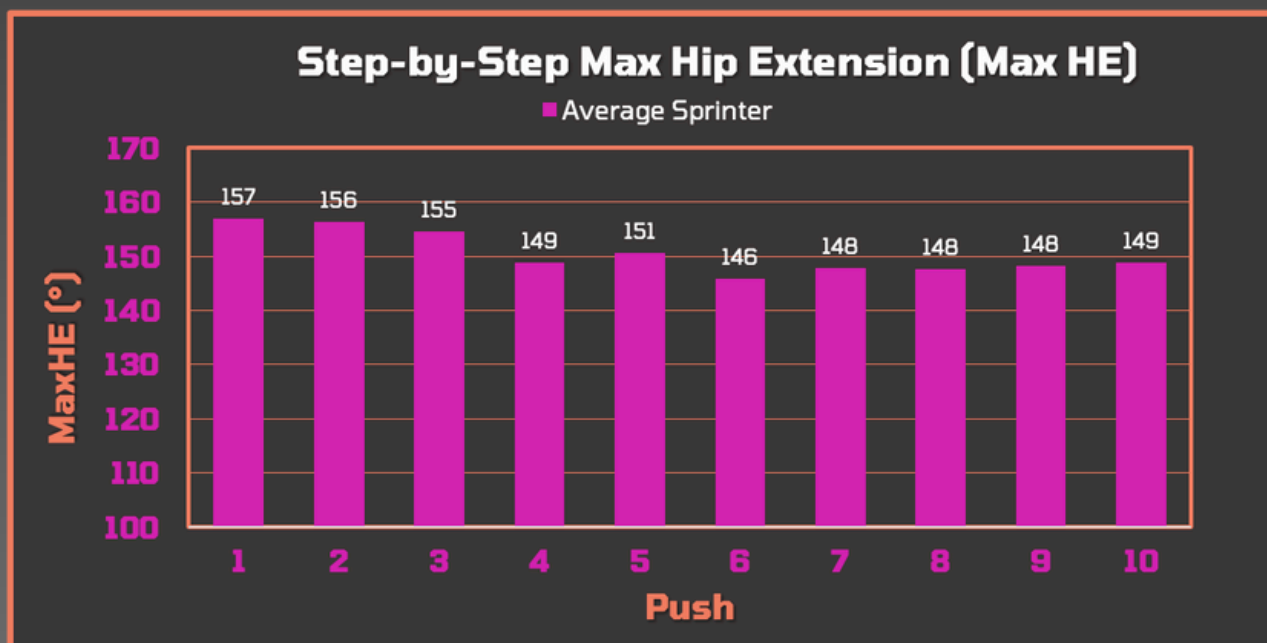
# MAXIMUM HIP EXTENSION

## STEP-BY-STEP ANALYSIS

YOU



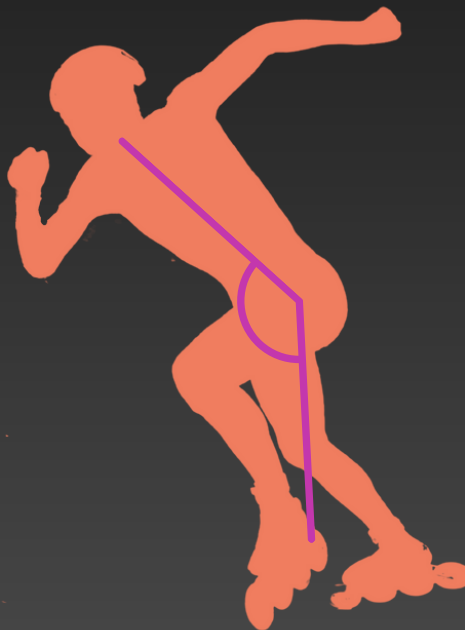
## AVERAGE SPRINTER



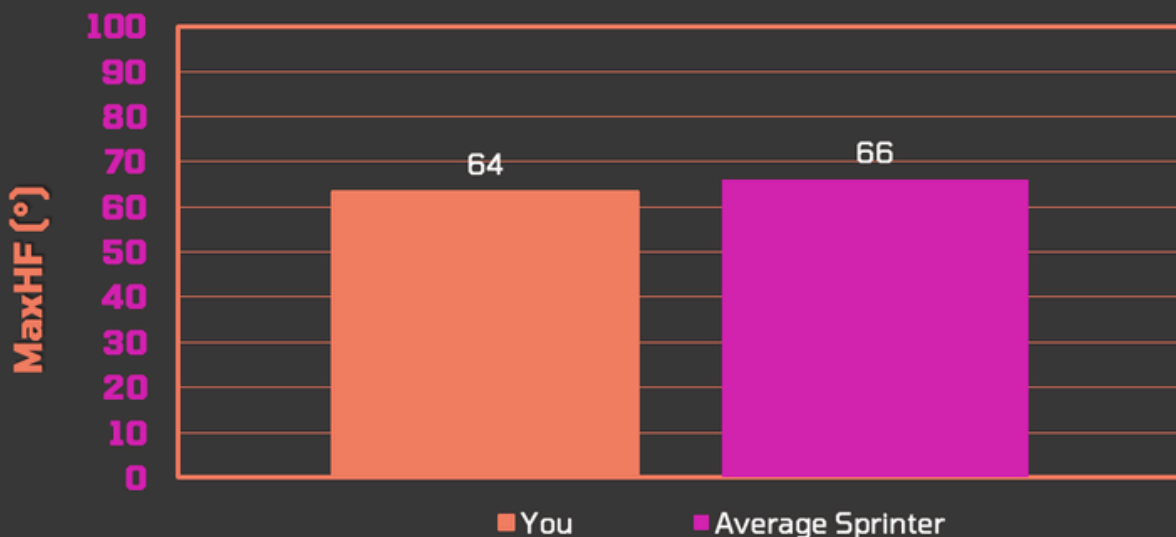
# MAXIMUM HIP FLEXION

## WHAT IS IT?

MAXIMUM HIP FLEXION (MAXHF) IS THE ANGLE BETWEEN THE TRUNK AND THE FRONT (RECOVERY) THIGH AT THE END OF A PUSH. GRATER MEAN MAXIMUM HIP FLEXION (SMALLER ANGLE) IS CORRELATED TO BETTER PERFORMANCES OVER THE 10M DISTANCE. INCREASING HIP FLEXION IS EXTREMELY IMPORTANT FROM STEP 5 TO STEP 10.



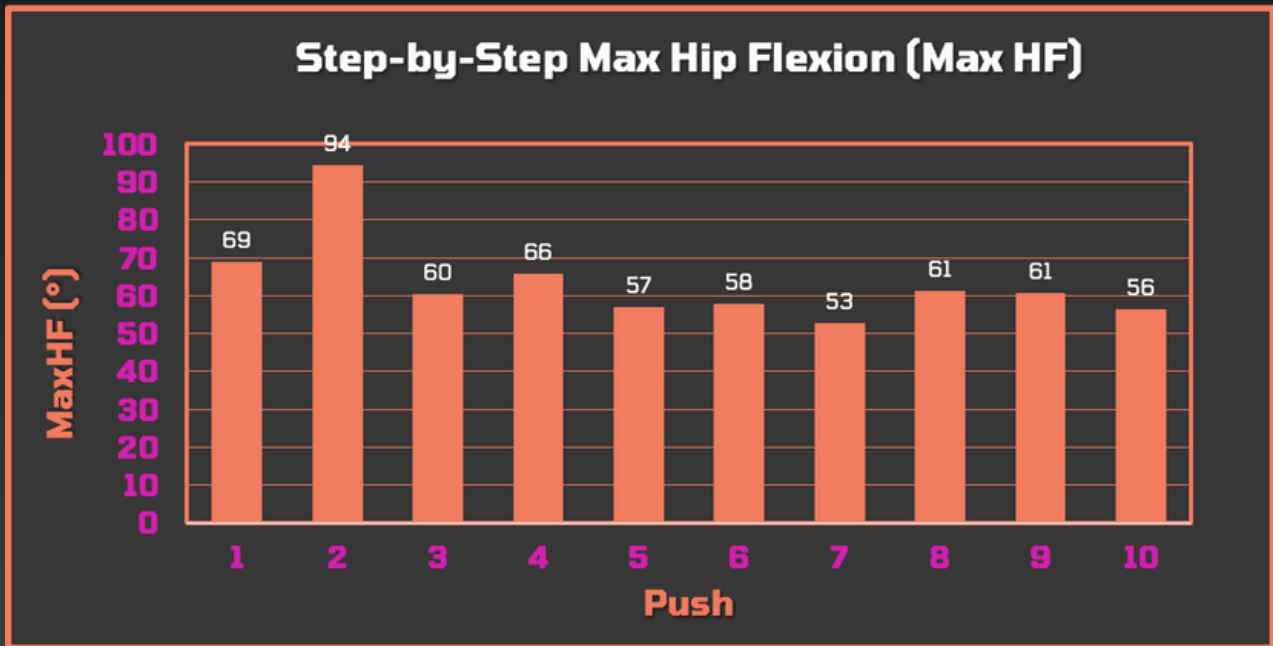
Mean Max Hip Flexion (First 10 Pushes)



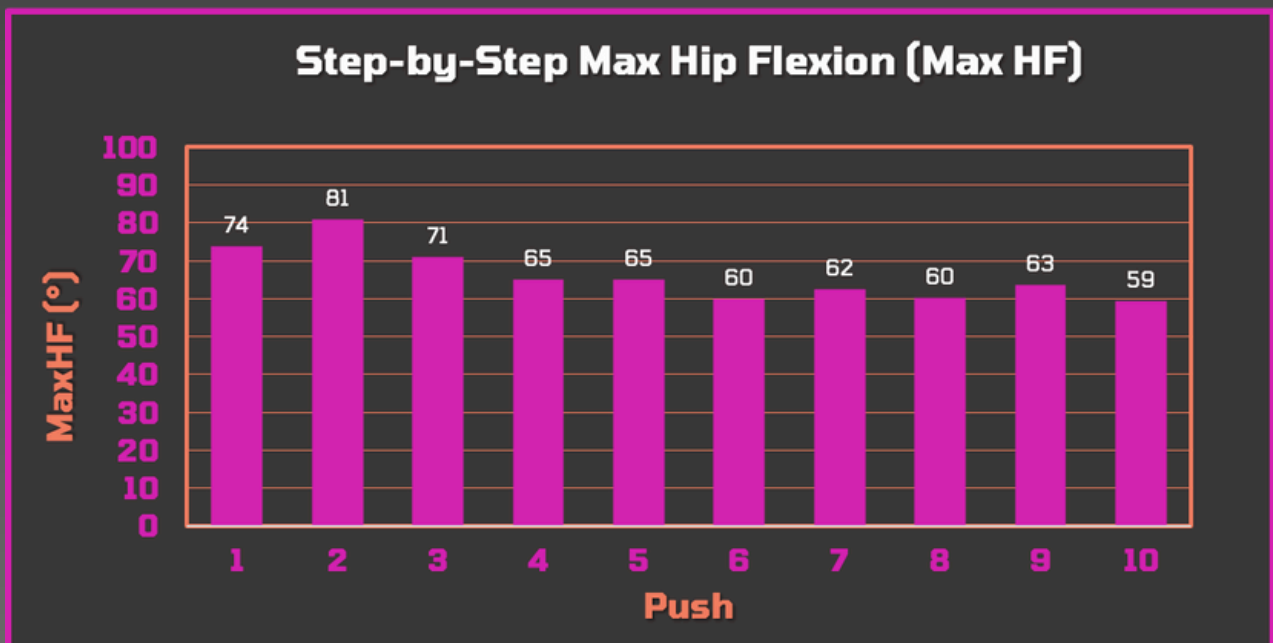
# MAXIMUM HIP FLEXION

## STEP-BY-STEP ANALYSIS

YOU



## AVERAGE SPRINTER



# MAXIMUM HIP FLEXION

## STEP-BY-STEP ANALYSIS (STEP 5-10)

