# Standard Bike Fit

## With the LEOMO TYPE-R / TYPE-S

With Adam Hansen

# How to do a bike fit with the TYPE-R/TYPE-S

Before any bike fit the rider should stretch as they would normally do before a ride to maximize their mobility to get the best from their fit. The LEOMO will read the riders range of movements and the riders restrictions based on high values throughout the bike fit.

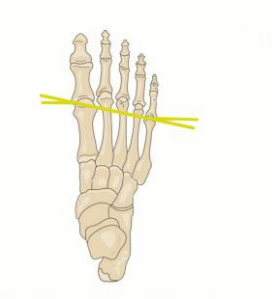
If this is the riders very first fit on a bike, start the Find a Safe Position section below, or skip to using the Optimise your bike fit with LEOMO.

A safe position is when the rider does not over extend their knee join throughout the entire pedal cycle. When the handle bars block the vision of the front  hub creates a balance weigh distribution for greater control.

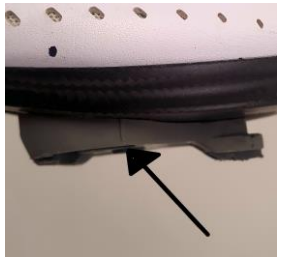
# Find a Safe position

## Step 1. Placing Cleat on the Shoe.

Mark the 1st and 5th Met Head on the riders cycling shoes as shown:



Find the centre of spindle/axel indicator on the clear.



Place the spindle/axel indicator in the middle of the 1st and 5th Met Head.

# Find a Safe position

## Step 2. Saddle height

Place one pedal at the 6 o'clock position with the foot parallel to the ground and make sure the rider has a slight bend in the knee for it to count as ***Safe Starting Position***. The greater the bend equals, more safe, as ***Safe Starting Position***.

# Find a Safe position

## Step 3. Saddle fore/aft

Place the pedal at 3 o'clock position with the foot parallel to the ground. Hold a plumb bob behind the Patella (kneecap) and have it intersect the pedal spindle/axel. If it falls behind, adjust the saddle forward. If it falls in front, adjust the saddle backwards

Behind

Centre

In Front

# Find a Safe position

## Step 4. Handlebar

Find what is comfortable for the rider as a Safe Starting Position to being with. A good ***Safe Starting Position*** is when the rider is on the bars and the rider can not see the front wheel hub as its hidden behind the handlebars. This creates a well balanced centre of gravity for easy handling.


# Find a Safe position

## Safe Riding Position

This is regarded as a ***Safe Starting Position*** and now continue to the Optimise your bike fit with LEOMO.

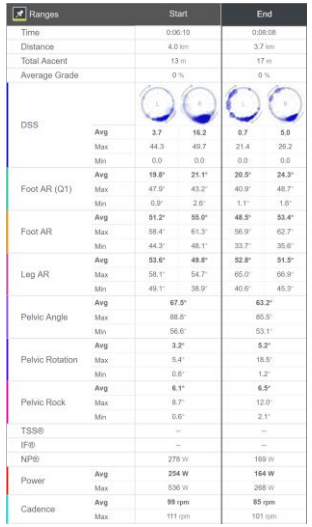
Why should I continue and why not just use this position?

There are many ways to get close to this position like this. Measuring inseam height and using a formula to work out seat height or heal on pedal with straight leg all do an okay job. However, every rider has different muscles flexibility, mobility and range. With the LEOMO, we prefer not to create a riders position from a database of anyone, we create what is best for the rider given their mobility, flexibility and strength.

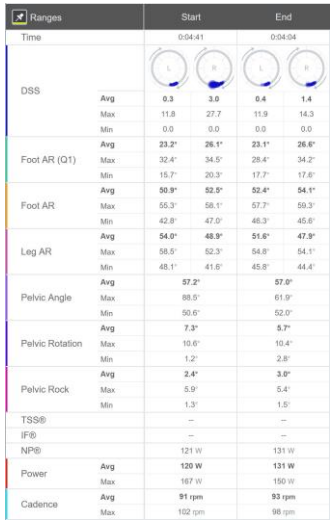
# Optimise your bike fit with LEOMO

It has been identified in case studies that it takes a while for a rider's body to adopt a new position/change on a bike. It's always best to do a ***Short-Pre-Ride*** for a few minutes before starting a lap record. The longer a lap record is recorded, the more accurate the position will be. Aim for at least a minute.
(LEOMO's MPI's are at the end of this manual for reference.}

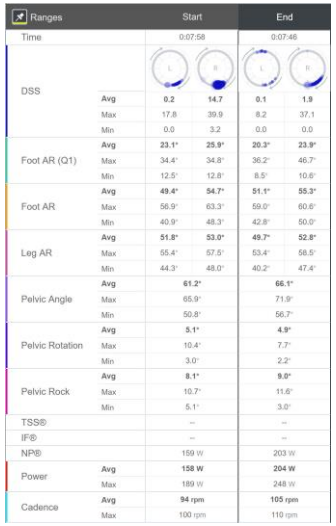
A case study performed on serval Pro Riders in 2018, showing their DSS was always better at the end of their training compared to the beginning.



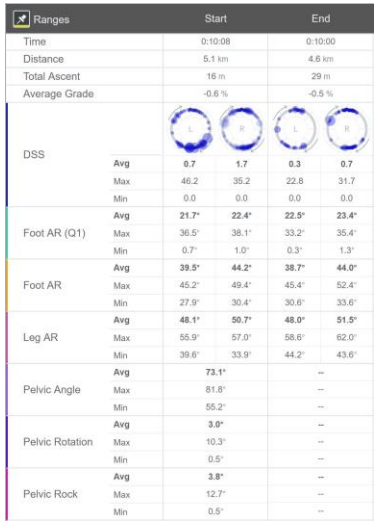
| Ranges | | Start | End |
|---|---|---|---|
| Time | | 0:06:10 | 0:08:06 |
| Distance | | 4.0 km | 3.7 km |
| Total Ascent | | 13 m | 17 m |
| Average Grade | | 0 % | 0 % |
| DSS | Avg | 3.7 | 16.2 | 0.7 | 5.0 |
| | Max | 44.3 | 49.7 | 21.4 | 26.2 |
| | Min | 0.0 | 0.0 | 0.0 | 0.0 |
| Foot AR (Q1) | Avg | 19.8° | 21.1° | 20.5° | 24.3° |
| | Max | 47.9° | 43.2° | 40.9° | 48.7° |
| | Min | 0.9° | 2.6° | 1.1° | 1.8° |
| Foot AR | Avg | 51.2° | 55.0° | 48.5° | 53.4° |
| | Max | 58.4° | 61.3° | 56.9° | 62.7° |
| | Min | 44.3° | 48.1° | 33.7° | 35.6° |
| Leg AR | Avg | 53.6° | 49.8° | 52.8° | 51.5° |
| | Max | 58.1° | 54.7° | 65.0° | 66.9° |
| | Min | 49.1° | 38.9° | 40.6° | 45.3° |
| Pelvic Angle | Avg | 67.5° | 63.2° |
| | Max | 88.8° | 85.5° |
| | Min | 56.6° | 53.1° |
| Pelvic Rotation | Avg | 3.2° | 5.2° |
| | Max | 5.4° | 18.5° |
| | Min | 0.6° | 1.2° |
| Pelvic Rock | Avg | 6.1° | 6.5° |
| | Max | 8.7° | 12.0° |
| | Min | 0.6° | 2.1° |
| TSS® | | – | – |
| IF® | | – | – |
| NP® | | 278 W | 169 W |
| Power | Avg | 254 W | 164 W |
| | Max | 536 W | 268 W |
| Cadence | Avg | 99 rpm | 85 rpm |
| | Max | 111 rpm | 101 rpm |



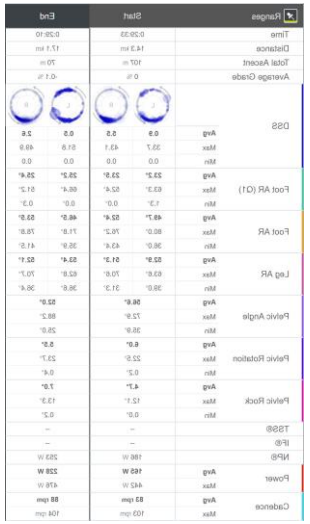
| Ranges | | Start | End |
|---|---|---|---|
| Time | | 0:04:41 | 0:04:04 |
| DSS | Avg | 0.3 | 3.0 | 0.4 | 1.4 |
| | Max | 11.8 | 27.7 | 11.9 | 14.3 |
| | Min | 0.0 | 0.0 | 0.0 | 0.0 |
| Foot AR (Q1) | Avg | 23.2° | 26.1° | 23.1° | 26.6° |
| | Max | 32.4° | 34.5° | 28.4° | 34.2° |
| | Min | 15.7° | 20.3° | 17.7° | 17.6° |
| Foot AR | Avg | 50.9° | 52.5° | 52.4° | 54.1° |
| | Max | 55.3° | 58.1° | 57.7° | 59.3° |
| | Min | 42.8° | 47.0° | 46.3° | 45.6° |
| Leg AR | Avg | 54.0° | 48.9° | 51.6° | 47.9° |
| | Max | 58.5° | 52.3° | 54.8° | 54.1° |
| | Min | 48.1° | 41.6° | 45.8° | 44.4° |
| Pelvic Angle | Avg | 57.2° | 57.0° |
| | Max | 88.5° | 61.9° |
| | Min | 50.6° | 52.0° |
| Pelvic Rotation | Avg | 7.3° | 5.7° |
| | Max | 10.6° | 10.4° |
| | Min | 1.2° | 2.8° |
| Pelvic Rock | Avg | 2.4° | 3.0° |
| | Max | 5.9° | 5.4° |
| | Min | 1.3° | 1.5° |
| TSS® | | – | – |
| IF® | | – | – |
| NP® | | 121 W | 131 W |
| Power | Avg | 120 W | 131 W |
| | Max | 167 W | 150 W |
| Cadence | Avg | 91 rpm | 93 rpm |
| | Max | 102 rpm | 96 rpm |



| Ranges | | Start | End |
|---|---|---|---|
| Time | | 0:07:58 | 0:07:46 |
| DSS | Avg | 0.2 | 14.7 | 0.1 | 1.9 |
| | Max | 17.8 | 39.9 | 8.2 | 37.1 |
| | Min | 0.0 | 3.2 | 0.0 | 0.0 |
| Foot AR (Q1) | Avg | 23.1° | 25.9° | 20.3° | 23.9° |
| | Max | 34.4° | 34.8° | 36.2° | 46.7° |
| | Min | 12.5° | 12.8° | 8.5° | 10.6° |
| Foot AR | Avg | 49.4° | 54.7° | 51.1° | 55.3° |
| | Max | 56.9° | 63.3° | 59.0° | 60.6° |
| | Min | 40.9° | 48.3° | 42.8° | 50.0° |
| Leg AR | Avg | 51.8° | 53.0° | 49.7° | 52.8° |
| | Max | 55.4° | 57.5° | 53.4° | 58.5° |
| | Min | 44.3° | 48.0° | 40.2° | 47.4° |
| Pelvic Angle | Avg | 61.2° | 66.1° |
| | Max | 65.9° | 71.9° |
| | Min | 50.8° | 56.7° |
| Pelvic Rotation | Avg | 5.1° | 4.9° |
| | Max | 10.4° | 7.7° |
| | Min | 3.0° | 2.2° |
| Pelvic Rock | Avg | 8.1° | 9.0° |
| | Max | 10.7° | 11.6° |
| | Min | 5.1° | 3.0° |
| TSS® | | – | – |
| IF® | | – | – |
| NP® | | 159 W | 203 W |
| Power | Avg | 158 W | 204 W |
| | Max | 189 W | 248 W |
| Cadence | Avg | 94 rpm | 105 rpm |
| | Max | 100 rpm | 110 rpm |



| Ranges | | Start | End |
|---|---|---|---|
| Time | | 0:10:08 | 0:10:00 |
| Distance | | 5.1 km | 4.6 km |
| Total Ascent | | 16 m | 29 m |
| Average Grade | | -0.6 % | -0.5 % |
| DSS | Avg | 0.7 | 1.7 | 0.3 | 0.7 |
| | Max | 46.2 | 35.2 | 22.8 | 31.7 |
| | Min | 0.0 | 0.0 | 0.0 | 0.0 |
| Foot AR (Q1) | Avg | 21.7° | 22.4° | 22.5° | 23.4° |
| | Max | 36.5° | 38.1° | 33.2° | 35.4° |
| | Min | 0.7° | 1.0° | 0.3° | 1.3° |
| Foot AR | Avg | 39.5° | 44.2° | 38.7° | 44.0° |
| | Max | 45.2° | 49.4° | 45.4° | 52.4° |
| | Min | 27.9° | 30.4° | 30.6° | 33.6° |
| Leg AR | Avg | 48.1° | 50.7° | 48.0° | 51.5° |
| | Max | 55.9° | 57.0° | 58.6° | 62.0° |
| | Min | 39.6° | 33.9° | 44.2° | 43.6° |
| Pelvic Angle | Avg | 73.1° | – |
| | Max | 81.8° | – |
| | Min | 55.2° | – |
| Pelvic Rotation | Avg | 3.0° | – |
| | Max | 10.3° | – |
| | Min | 0.5° | – |
| Pelvic Rock | Avg | 3.8° | – |
| | Max | 12.7° | – |
| | Min | 0.5° | – |



# Optimise your bike fit with LEOMO

## Step 1. Setting Seat height

Setting seat height is based on LAR and Pelvic Rock. A rider will produce more power with a higher LAR and lower Pelvic Rock. The goal is to achieve greater leg range while maintaining the most stable planted position in the saddle for better power transfer from less pelvic movement.

Take note of the riders current LEOMO MPI's as a starting point after a *Short-Pre-Ride*.

Increasing the saddle height will increase the rider's LAR, however, if the saddle is too high for the given rider's range mobility, then their Pelvic Rock will increase. Slowly increase the saddle height while maintaining the same Pelvic Rock.

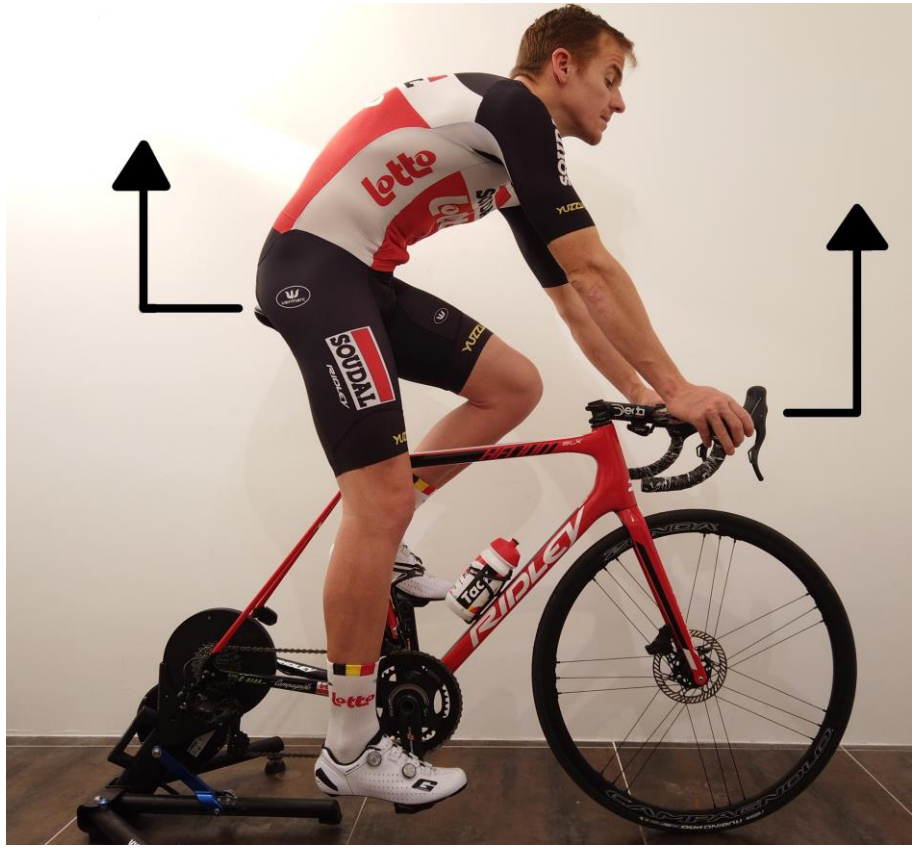
After every increase do a *Short-Pre-Ride* before the next lap record.

Just before the rider's Pelvic Rock increases too much, that is the point of this riders mobility range. Increasing more will only make the rider less stable in a seated position creating less stability and less power transfer for that rider.

# Optimise your bike fit with LEOMO

Every time an increase in saddle height, raise the handlebars the same distance to maintain the same **Pelvic Angle**. For example, if an increase of 5mm with saddle height, raise the handlebars 5mm also. If the handlebars are not moved the same distance with the seat, then the **Pelvic Angle** will decrease. Closing up the hip joint. It also works the same in the opposite direction.

If the **Pelvic Rock** is increasing with saddle height, then lower the seat height till the Pelvic has stabilized as much as possible finding the most reduced **Pelvic Rock** that can be achieved.



# Optimise your bike fit with LEOMO

## Step 2 . Saddle fore/aft

Setting seat fore/aft is based on **LAR**, **Pelvic Rotation** and **Pelvic Rock**. Deciding to have a more forward and aggressive / TT position, compared to a more mid or rear saddle back position is based purely on the fitter or rider's requirements. Generally moving the saddle back works the gluteus maximus more and forwards the quadriceps more. However, the rider's hip-flexors / iliopsoas comes into play to bring the knee back to finalize their pedal stroke and this determines the efficiency of the rider from their mobility range.

The hip is one of the key factors to create the most amount of power and needs to work in its optimal range for that rider. If the hip-flexors / iliopsoas can not bring back the knee within the rider's mobility range, then they will lose stability in the saddle and this will increase **Pelvic Rotation** and **Pelvic Rock**.

Adjust the saddle to the desired position based on the rider's goal, forwards for more aggressive / TT position or rear for maximizing the gluteus maximus muscles.

Take note of your current LEOMO MPI's as a starting point after a ***Short-Pre-Ride***.

# Optimise your bike fit with LEOMO

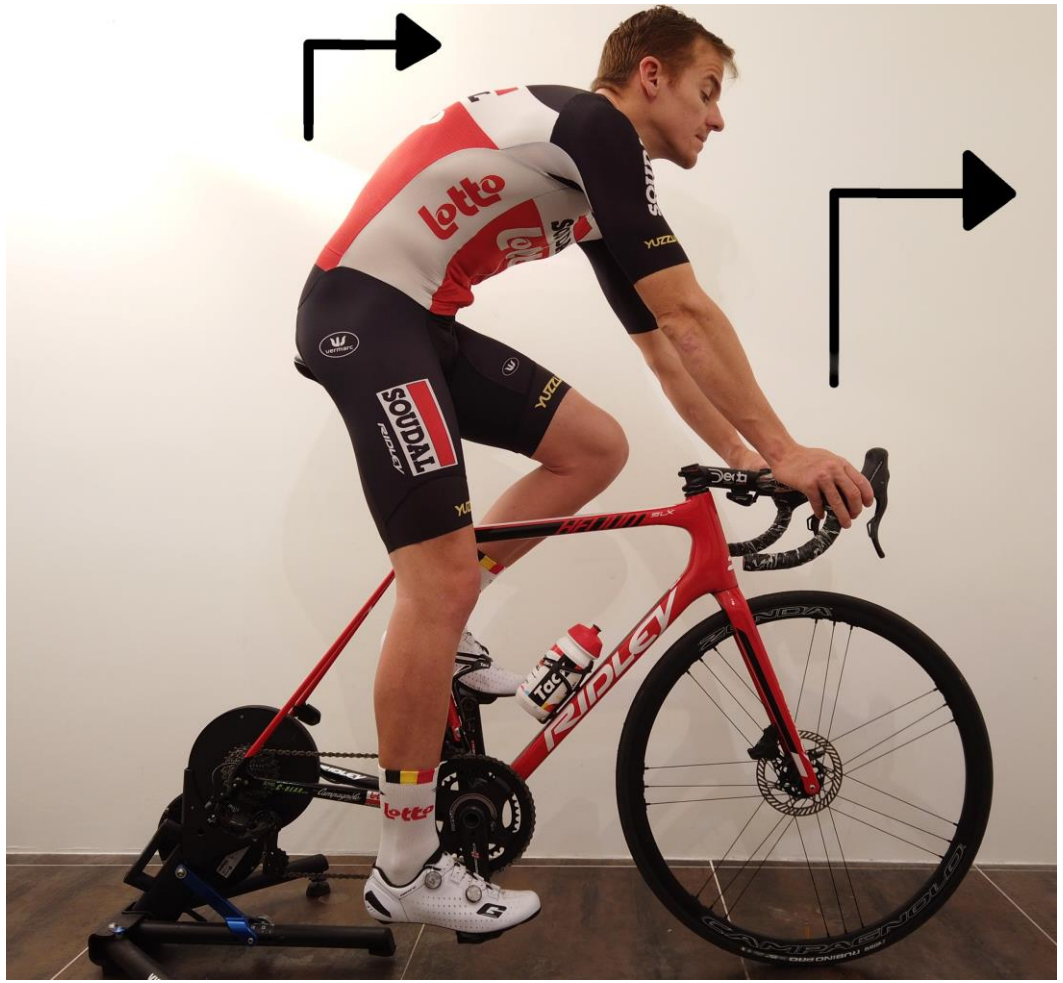
When moving the saddle further back, this will increase the rider's **LAR** because of a greater distance from the seated position to the bottom bracket. When moving the saddle forwards, it decreases the rider's **LAR** as the distance from the seated position is closer to the bottom bracket. It is best to lower saddle height slightly when moving back and increase saddle height when moving forwards to maintain same **LAR**.

Move the saddle in the desired position until **Pelvic Rotation** and **Pelvic Rock** combined does not increase. If the **Pelvic Rotation** increases with **Pelvic Rock** and desired seat position is not achieved, then the rider needs to improve their strength and or mobility for that position to be as stable as possible in the saddle for better power transfer for the desired position wanted.

It is still possible to move the saddle in the desired direction with an increase in **Pelvic Rotation** and **Pelvic Rock**, however, there will be less stability in the pelvis seated position in the saddle, when there is, an increase in **Pelvic Rotation** and **Pelvic Rock** will be shown.

# Optimise your bike fit with LEOMO

Every time the saddle moves forwards, move the handlebars the same distance to maintain the same **Pelvic Angle**. For example, if the saddle moves 5mm forwards, move the handlebar 5mm too. If the handlebars are not moved in the same distance with the seat, then the **Pelvic angle** will increase. Opening up the hip joint. It also works the same the opposite direction, meaning a closing of the hip joint.



# Optimise your bike fit with LEOMO

## Step 4. Set Handlebar

Setting handle height and length is based on **Torso Angle**, **Pelvic Angle**, **Pelvic Rock** and **Pelvic Rotation**. Deciding to have the handlebar lower and forwards for a faster and aggressive position, compared to higher and closer for comfort position is based purely on the fitter or rider's requirements.

Generally, moving handlebars lower and forwards puts more weight on the upper body of the rider, which can create faster fatigue and numbness in the arms / hands. Depending on how the rider's back handles the change, **Pelvic Angle** can remain the same if the back is arched, then only **Torso Angle** is decrease. Otherwise they both decrease. If the riders desire is to go longer or lower for better aerodynamics. They can do so until, **Pelvic Rock** and **Pelvic Rotation** increases. Just before **Pelvic Rock** and **Pelvic Rotation** increases this becomes the rider's optimal maximum range for best stability in the saddle.

Remember, there are 17 unfused vertebrae's between shoulder and hips and no two riders will move the same when adjusting the handlebars. This is why one rider may keep the same **Pelvic Angle** and only make a change in their **Torso Angle** while another rider will more **Pelvic Angle** and **Torso Angle** together.

# Optimise your bike fit with LEOMO

Moving the handlebars higher and closer will increase the riders **Pelvic Angle** and put more pressure on the saddle and less pressure on the arms, creating a more comfortable position.

Take note of your current LEOMO MPI's as a starting point after a ***Short-Pre-Ride*** after every change.

Now you know that the handlebars can play an important role effecting the **Pelvic Angle** you can make adjustments to improve the riders comfort on the saddle by increasing the **Pelvic Angle.**

Or If you were unable to move the riders seat more backwards because an increase in **Pelvic Rock** or **Pelvic Rotation** you can adjust the riders handlebars even more back to increase **Pelvic Angle** and decrease **Pelvic Rock** and **Pelvic Rotation** for better stable position in the saddle.

# Optimise your bike fit with LEOMO

## Fit Complete.

Once all steps are followed, the rider is now in their optimal position based on their mobility, flexibility and range of movement. It is not to say they can not improve their position further. For an example if a TT rider wanted to go lower with the handle bars they would need to work on being more flexible to maintain that position.

This is why we do fits like this, its personal, for the individual rider. It might sound complicated, but the truth is, bio mechanics and bike fitting is. No two people are the same, even with same height and same inseam. They will both have different mobility, flexibility and strength and that’s how we base our fits, tailored to the individual.