

Medicine of Cycling

Triathlon & Time Trial Basics

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BICYCLEFITGURU

Why Differentiate TT & Tri Bike Positions?

TT:
Rest & Recover pre/
post-Cycling



Tri:
Swim & Run pre/post-
Cycling



Cycling - 1890's

SCORCHING STILL RAMPANT

The bicycle rider who speeds down the street leaving a trail of wounded and dying behind him is known as a "scorcher." He seems to think he owns the street. People who happen to be out walking have no chance unless they too are riding bicycles. It is getting to be so that no one is safe who does not ride a bicycle.

Even if the "cyclist" does not go fast there is still the danger of his pedals hitting something in their mad whirl round and round. It stands to reason that a big pedal jutting out from the side of a bicycle is going to hit **something** as it goes past and some day it may be you that it hits or your own mother.



Is the game worth the candle? The public is entitled to a square deal. Let the "scorchers" go where they can really "scorch."



TT Racing – Origins

1890 – England
National Cyclists' Union
Ban Open Road
Competitions

1890's – North Road Club
Staggered Start Races
Secret Locations
Dress Conduct -- Black



Triathlon Racing – Origins

1920's - France

Le Trios Sports

Channel Marne; 12k Bike; 3k
run



1970's – USA

Mission Bay Triathlon

500-Yard Swim; 5-Mile Bike; 6-
Mile Run



Scott Aerobar



Patent # US 7127966 B2

Aerobar Market Entry

Greg LeMond
1989 Tour De
France
58-Second Gain
in TT
Yellow Jersey by
8-Seconds!



TT-Specific Bike Position

Maximum
Aerodynamic
Benefit

Minimum
Metabolic and
Biomechanical
Cost



UCI Regulations

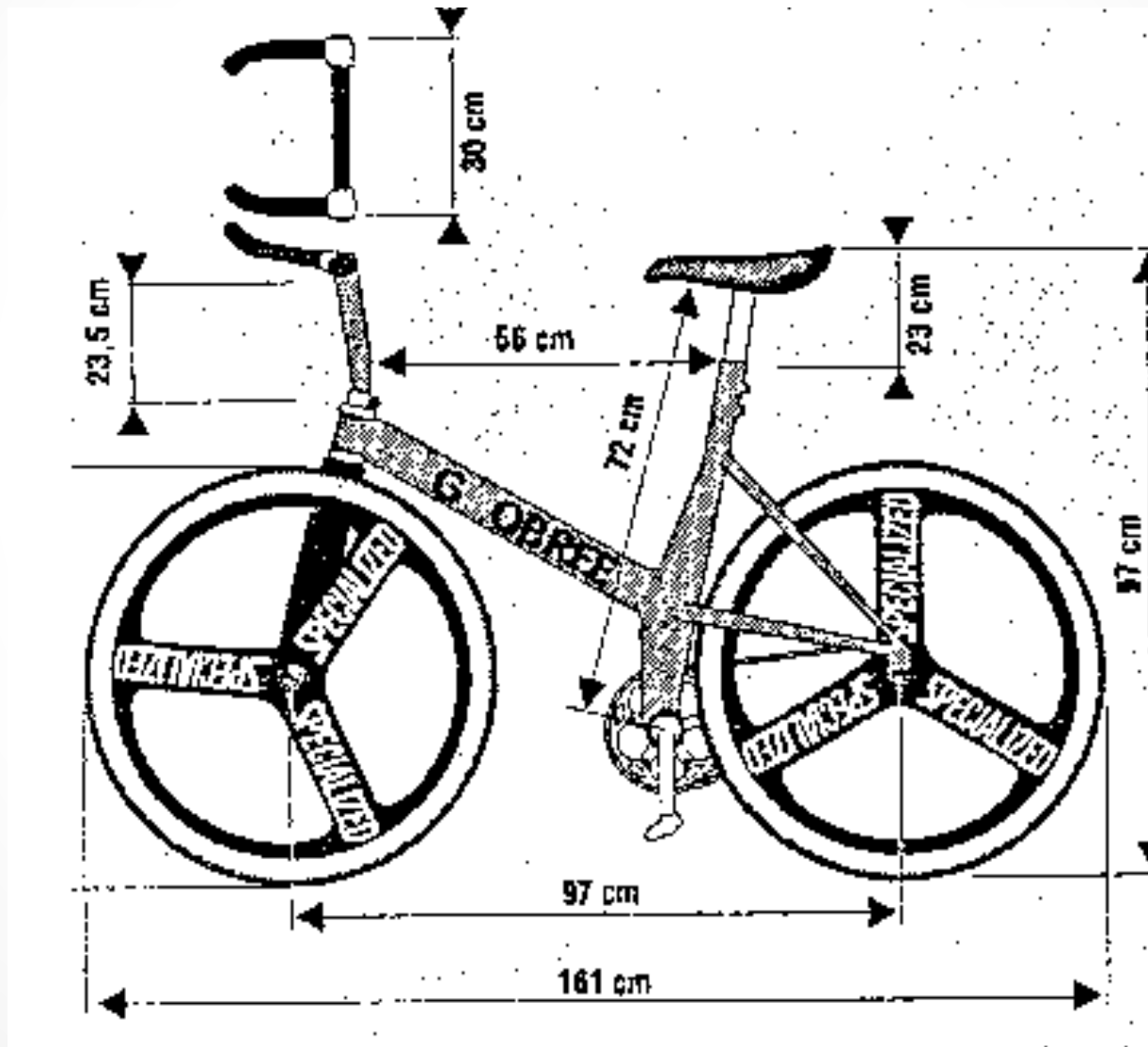


Graeme Obree

Pos #1



Obree's Bike Pos #1



Graeme Obree

Pos #2



Tri-Specific Bike Position

Maximum
Aerodynamic
Benefit

Minimum
Metabolic and
Biomechanical
Cost

Swim
Recovery

Run
Preparation



Bike Fit – Triathlon



Cockpit Reach

TRI:

Recover and Rest
Forearm Support
Shifter Access



TT:

Aerodynamics
Shifter Access
Forearm Support
UCI Regulations



Cockpit Differential

TRI

Within Functional Hip ROM
Individual & Event-Specific
Comfort/Aerodynamics

TT

Within Functional Hip ROM
Individual & Event-Specific
Aerodynamics/Comfort



Aero/Arm-Pad – Z

TRI:

Forearms Centered in Aero-Pads \leq Shoulders

Adjust for Optimal Tidal-Flow
Physical & Metabolic Recovery



TT:

Forearms Centered in Aero-Pads \leq Shoulders

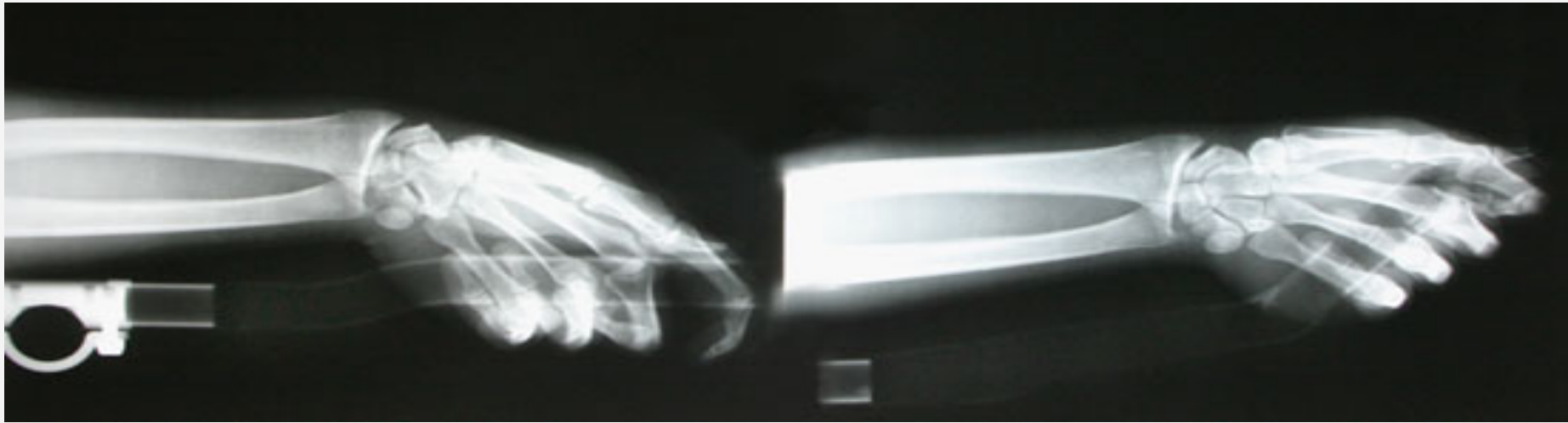
Adjust for Optimal Tidal-Flow
Aerodynamics



Extensions Design

TRI:

Consistent with Natural Wrist
Position



TT:

Consistent with Natural Wrist
Position

UCI Guidelines



Saddle Height

Tri:

Biomechanics

Power

Run

Deg = 25-35, 38, 40, 42???

TT:

Biomechanics

Aerodynamics

Power

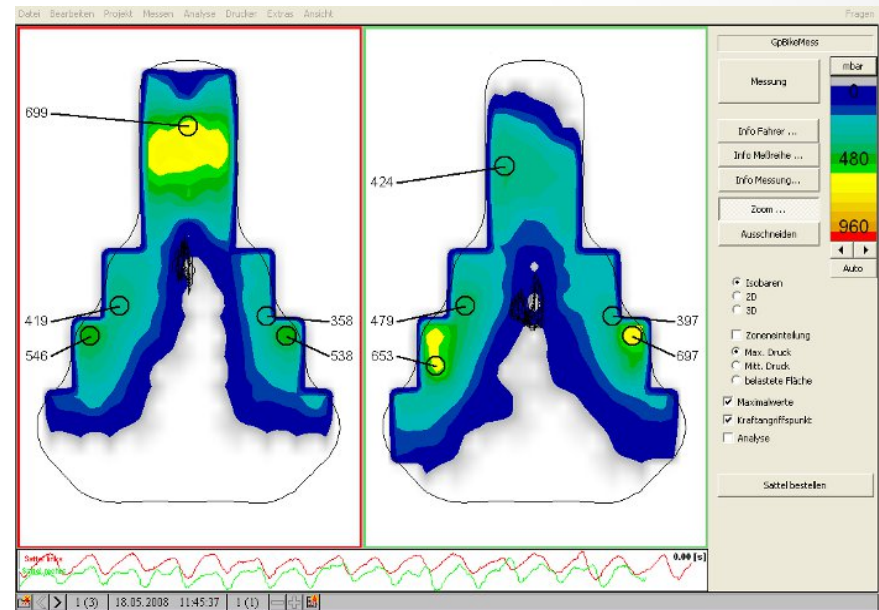


Saddle "W.A.L.T"

Tri:
Specific to Individual and Differential
Pressure Mapping?
Supported but not "Falling"
0-?-Degrees



TT:
Specific to Individual
24 – 30cm Length
< -3 – Degrees Incline



Seat Tube Angle

Tri:

Frame = 76-78

Virtual = 76-85+



TT:

Frame = 74-76

Virtual = 74-85+



Center of Gravity

TRI:

Individual- Specific
Morphology, Core,
Flexibility, Experience...



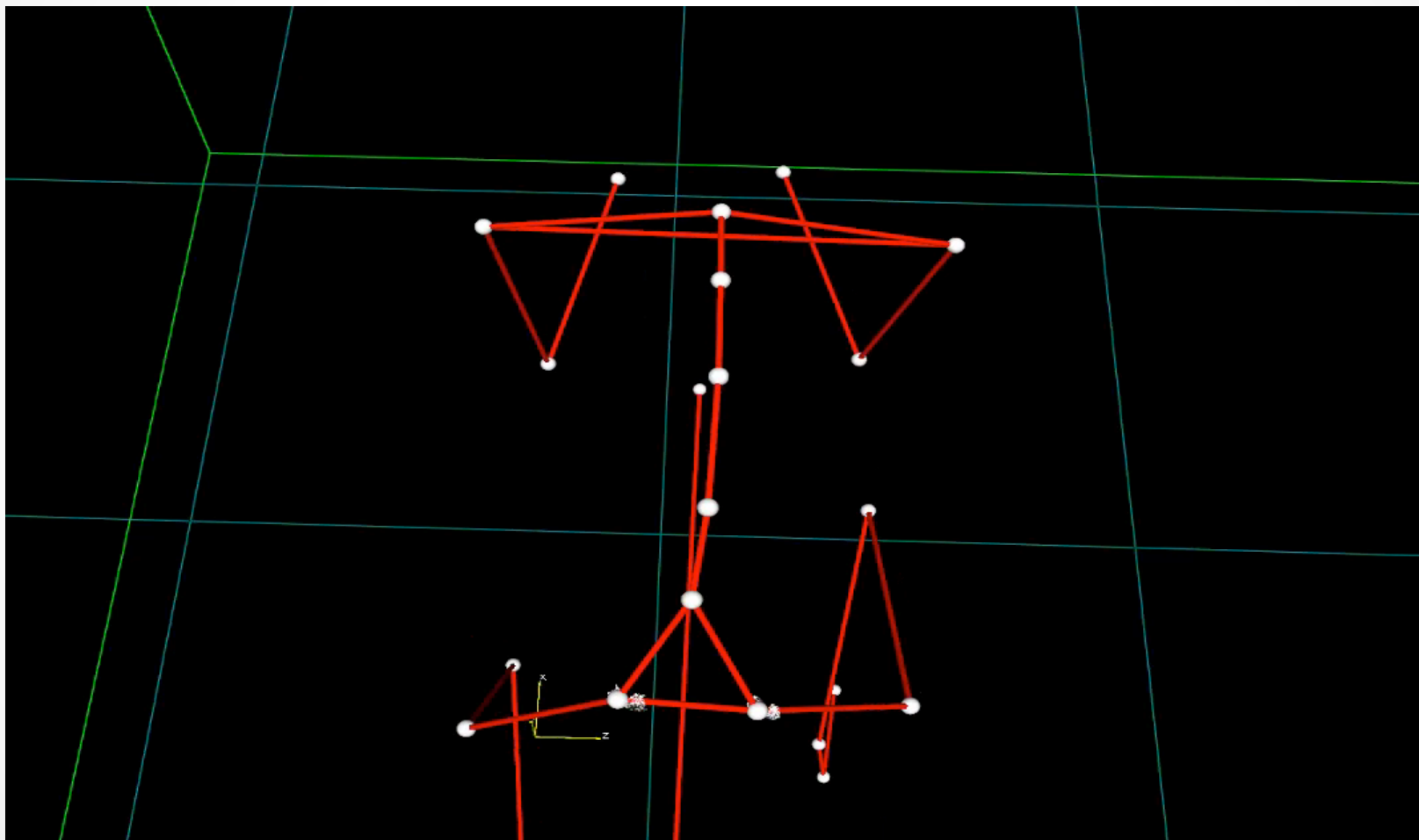
TT:

Individual- Specific
Morphology, Core,
Flexibility, Experience...

UCI Guidelines!



Symmetry



Conclusions:

- TT Specific Bike Fit = Optimal Aerodynamics and Power, with emphasis on Aerodynamics
- Tri-Specific Bike Fit = Optimal Power and Aerodynamics, with emphasis on Comfort, Swim-Recovery and Run Performance

Bike Fit - X/Y



Bike Fit - BB/Components



Governing Bodies

TRI

USAT – 1982 (www.usat.com)

ITU – 1989 (www.triathlon.com)

WTC – 1990 (www.ironman.com)

TT

UCI – 1900 (www.uci.ch)

USA Cycling – 1975 (www.usacycling.org)

Article 1.3.013

“The peak of the saddle shall be a minimum of 5 cm to the rear of a vertical plane passing through the bottom bracket spindle... in no circumstances shall the peak of the saddle extend in front of a vertical line passing through the bottom bracket spindle.

The peak of the saddle can be moved forward until the vertical line passing through the bottom bracket spindle where that is necessary for morphological reasons. By morphological reasons should be understood everything to do with the size and limb length of the rider.

Only one exemption for morphological reasons may be requested; either the peak of the saddle can be moved forward or the handlebar extensions can be moved forward, in accordance with Article 1.3.023”



Article 1.3.022

“In competitions other than those covered by article 1.3.023, only the traditional type of handlebars (see diagram «structure 1») may be used. The handlebars must be positioned in an area defined as follows: above, by the horizontal plane of the point of support of the saddle (B); below, by the horizontal line passing through the highest point of the two wheels (these being of equal diameter) (C); at the rear by the axis of the steerer tube (D) and at the front by a vertical line passing through the front wheel spindle with a 5 cm tolerance (see diagram «Structure (1A)»). The distance referred to in point (A) is not applicable to the bicycle of a rider who takes part in a sprint event on track (flying 200 m, flying lap, sprint, team sprint, keirin, 500 metres and 1 kilometre), but must not exceed 10 cm in relation to the vertical line passing through the front wheel spindle.”

Article 1.3.104

“The plane passing through the highest points at the front and rear of the saddle shall be horizontal. The length of the saddle shall be 24 cm minimum and 30 cm maximum.”

(3-Degrees or 1 cm – Tip-to-Tail)

Article 1.3.203

“The height difference between the elbow support points and the highest and lowest points of the handlebar extension (including gear levers) **must be less than 10 cm**. The position of the tip of the saddle must be at least 5 cm behind the vertical plane passing through the bottom bracket axle. The distance between the vertical line passing through the bottom bracket axle and the extremity of the handlebar may not exceed 75 cm, with the other limits set in article 1.3.022 (B,C,D) remaining unchanged. Elbow or forearm rests are permitted.

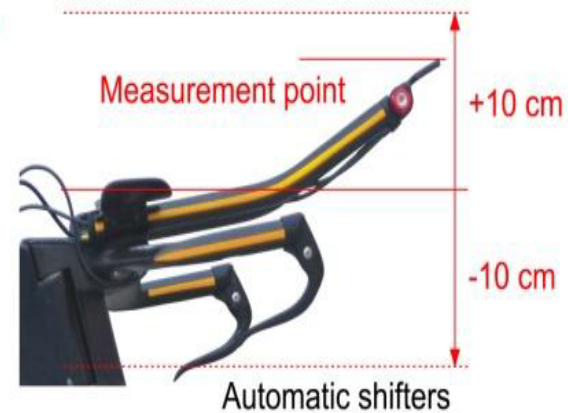
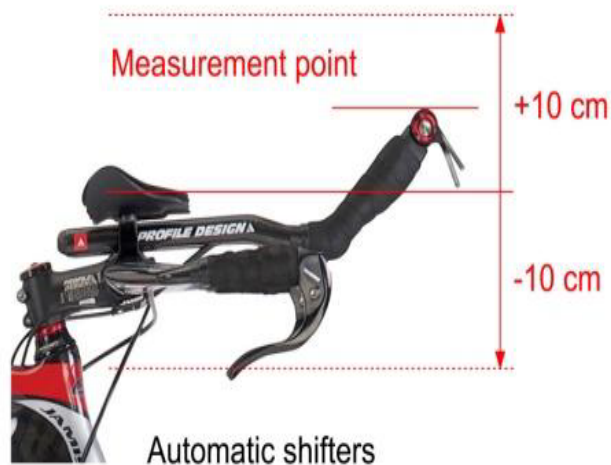
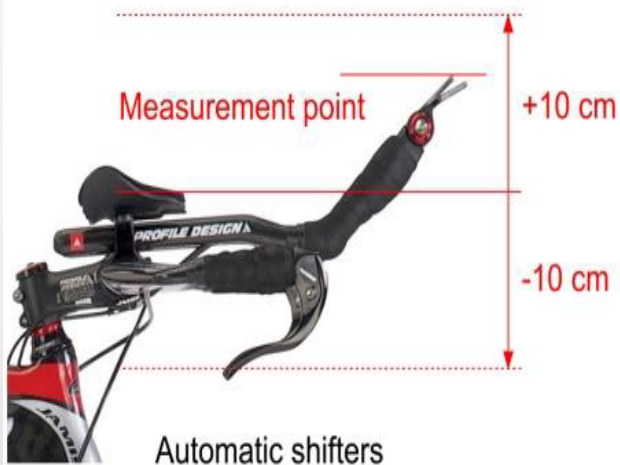
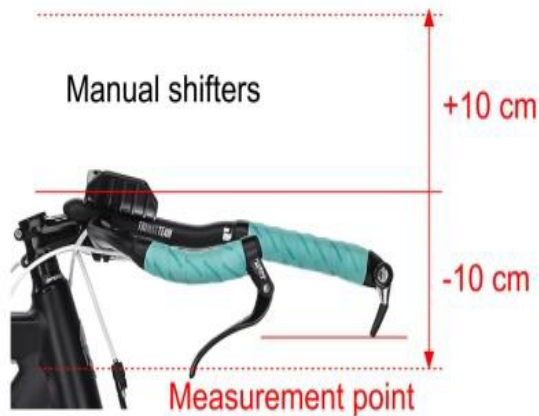
For road time trial competitions, controls or levers fixed to the handlebar extension may not extend beyond the 75 cm limit.

For the track and road competitions covered by the first paragraph, **the distance of 75 cm may be increased to 80 cm** to the extent that this is required for morphological reasons.

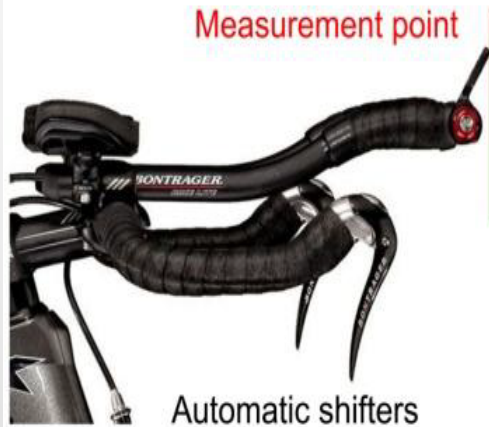
For riders that are 190 cm tall or taller, the horizontal distance between the vertical lines passing through the bottom bracket axle and the extremity of the handlebar extensions including all accessories may be extended to 85 cm.

Only one exemption for morphological reasons may be requested; either the handlebar extension can be moved forward or the peak of the saddle can be moved forward, in accordance with Article 1.3.013.”

UCI 1.3.023



UCI 1.3.023



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