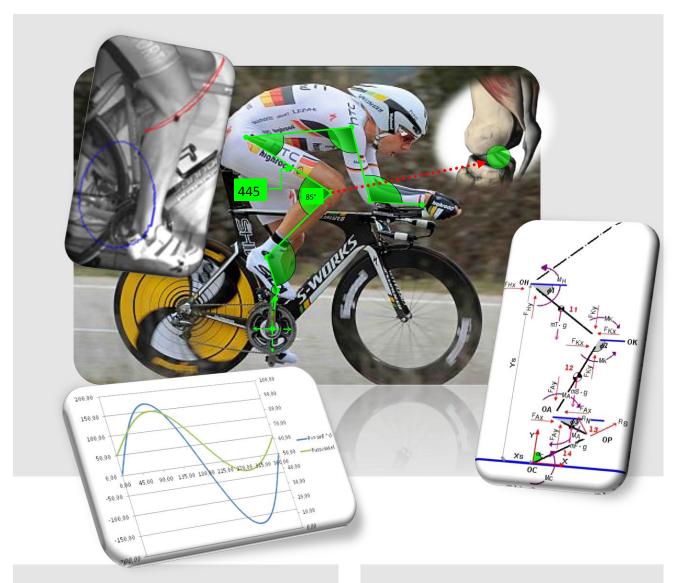
Body Bike Fitting System

Sophisticated Biomechanical Analysing Tools





These tools close the gap between current bike fitting systems which are at best semi peer-reviewed and available scientific scopes.

Normally there are two approaches to bicycle fitting: **Power Enhancement** *and **Injury Avoidance****. To adress these, we have to consider the internal and external forces and torques.

* Since we exclude all non-physical techniques we are restricted to that what we can measure and reproduce.

That what we mean by valid.

Therefore we only improve the conditions under which the cyclist can increase his effort. Since everyone is unique, we refuse to use statistic data or pseudoscience like *Applied Kinesiology* regarding bicycle fit.

Since all inner and outer quantities are limited by mathematical equilibrium conditions – and this applies to the inner biological mechanism too – we use simple biomechanical principles to optimize movement of the lower extremities.

** Results do <u>not</u> replace any anamnesis in medical sense.

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Abstract

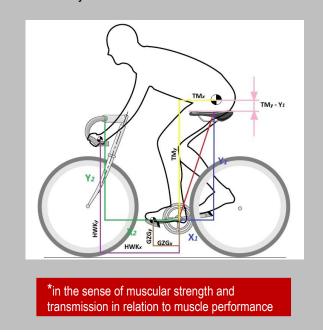
"Cycling is a marriage between the human body, which is somewhat adaptable, and a machine that is somewhat adjustable" (Andy Pruitt, Boulder, U.S.)

To determine and calculate the best position* on the bike we have to gain real dynamic data during pedaling. First we determine the actual kinematic and dynamic properties of the lower limbs.

A software program using the rider's anthropometrics calculates a target kinematic and dynamic by shifting the points of body contact with the bike. Afterwards the bike contact points are measured, representing the current position.

Thus, the bicycle and the rider are included in a common coordinate system. The size differences between current and new contact points are calculated. And this will enables the execution of the optimal motion, and identification of the bicycle fit which facilitates said motion.

With the aid of a purpose-made *Bike Jig* all relevant parts like saddle, handle-, trial bars or cranks can be measured, adjusted and/ or later proofed in the same coordinate system.



Methodology Workflow High Speed BASLER) Image Acquisition and synchronous Streaming Appointing relevant Markers Body Marker Detection and Tracing Power Test Rig Calculating Linked Point 2D-Kinematics & Dynamics Pedal and Muscle Force Data Calculating Target Kinematics & Dynamics ANYBODY **₹** Bike OpenSim Model Visualization Capturing current X/Y bike part coordinates Calculating and Figuring ideal X/Y bike part coordinates onto Bike Jig to support fitting