



BioConform
biomechanical components

A pedal reinvents the wheel: BIUS1 ensures greater endurance and joint protection when cycling

Innovation for hobby and professional cyclists alike and a great opportunity to prevent osteoarthritis in the land of the joint surgery world champions: the world's first bicycle pedal with a patented mechanism that follows the 3-dimensional sequence of movements of the leg joints. As confirmed by the German Sport University Cologne, the effect is to afford maximum protection for joints, greater stamina and improved sensorimotor function.

Jena, December 2013. Under the name of BIUS1, the BioConform company is now launching a high-tech pedal which for the first time transmits the natural three-dimensional human kinematics to the sequence of motions employed for the bicycle. While other bicycle components "impose" 2-dimensional movements on the leg joints and encourage abnormal strain, the patented mechanism of BIUS1 takes account of the qualities of the human knee as a "tilt and turn hinged joint". A biomechanically correct sequence of movements in bending and stretching the leg demands a tilt between the thigh and shin of approximately 7°. What actually sounds logical is absolutely new to the market because the classical pedal does not allow such room for manoeuvre. In contrast, BIUS1 permits cycling in a style known as skating mode, thanks to its spring and gliding mechanism. Cross-country skiers and speed skaters have been using the skating technique for a long time as an efficient means of forward propulsion.

More stamina and power due to greater use of muscles and less friction

Execution of the 3D movement pattern has the effect of protecting joints – particularly under sporting load. The joint surfaces can adjust to each other to lower friction. This not only provides a means of effectively countering muscular dysbalances (uneven muscle load) and abnormal strain on joints and tendons but even increases the cyclist's endurance and performance.

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BIUS1 is also the world's first pedal to exercise the muscles on the inner and outer side of the leg – in addition to those on the front and rear. As a result considerably more muscles are exercised than with conventional pedals and thus become available as providers of power, especially for endurance. In sports medicine, this beneficial situation is described as “muscular variability” and is confirmed for BIUS1 by the Goethe University Frankfurt am Main.

Changes in knee movements scientifically demonstrable

The small change in the pedal mechanism has a great potential for competitive sport as well as in the prevention and therapy of osteoarthritis. “Scientific studies at our institute have been able to impressively demonstrate the modified knee kinematics due to the BIUS 1 pedal,” explains Prof. Dr Gert-Peter Brüggemann of the Institute of Biomechanics and Orthopaedics at the German Sport University Cologne. “Consequently, in times of enormous demographic change coupled with a need for physical activity and long-term function of the musculo-skeletal system, BIUS 1 is especially significant from a sociomedical perspective.”

Because human cartilage does not have any nerve cells and is therefore unable to report any pain, continuous abnormal strain is often aggravated by neglect over a long period of time. The natural movement pattern achieved by the BIUS1 pedal generally has to be relearned at the beginning. For this reason, both the performance benefits and the joint protecting effect of the BIUS1 do not become apparent until after a period of three to six months when used systematically – but then the effect is indeed significant. This is why systematic instruction for the 3-dimensional biomechanical execution of the movement supplies the foundation for all successful training.

“We also see a special opportunity in the prevention and therapy of osteoarthritis,” says the developer of the pedal and BioConform managing director Jörg Töpfer. As a trained physiotherapist, he is familiar with the serious consequences for those people affected and the billions in expenditure incurred by osteoarthritic diseases that can be prevented with BIUS1.

Maximum product quality and service-orientation

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The independent test body responsible for the product inspection VELOTEC GmbH in Schweinfurt, Germany, has tested and approved BIUS1. Manufactured entirely in Germany, the pedal is made of aircraft aluminium with an abrasion-resistant anodized finish. It is available in two colours (aluminium look and red) and has Teflon-coated friction bearings. It is assembled as a modular single-component design and is therefore particularly convenient to service: each component can be replaced. Thanks to the quality of the forged materials used and the high level of craftsmanship, it is suitable for riders with a weight of up to 120 kg. BioConform grants a two-year guarantee on the pedal and specifies a service life of approx. 45,000 km.

At a price of EUR 225.00, which includes value-added tax but not postage and packaging, a pair of pedals can be purchased from selected specialist retailers and at www.bioconform.com. BIUS1 is easy to mount on all models of bicycle.

You will find more information together with a film clip comparing the two-dimensional and three-dimensional movement patterns at www.bioconform.com/biomechanik/video.

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