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BIUS 1 Pedal

The BIUS 1 pedal for applications in medicine, diagnostics and sport represents the development of a functional pedalling mechanism that consistently permits the natural three-dimensional movement of the knee joint in repeated bending and stretching cycles. Success has thus been achieved in removing the constraints of conventional pedals for ergometers and bicycles and enabling the knee joint to assume its natural habitual motion in both the frontal and transverse planes. This development is particularly important because the knee is the joint primarily affected by osteoarthritis in the human body. Guaranteeing the customary natural movement of the knee joint means initiating and permitting movements that are characterized by minimal joint friction and hence minimal abrasion and wear. At the same time, the propulsive force required for moving the crank of the ergometer or bicycle is maximized while friction is minimized. Scientific studies at our institute have been able to impressively demonstrate the modified knee kinematics due to the BIUS 1 pedal. Scientific publications to this effect are currently in the preparation stage. At present, the mechanism of action is being investigated at molecular level. One particular objective is to scientifically demonstrate the reduced wear of the cartilage on the medial compartment of the knee joint, which is primarily affected by osteoarthritis. 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. The pedal can be used widely in ergometers and bicycles for medicine and sport and for purposes of both rehabilitation and prevention.
The BIUS technology is both meaningful and highly innovative from a biomechanical orthopaedic view. If the large number of applications

for ergometers and bicycles are taken into account, it may be postulated that the technology has an extremely high market potential. In Germany alone, more than 40 million people employ ergometers, bicycles or similar devices for training, diagnostics or sport as well as for everyday use. The number of people involved in cycling as a sport can be conservatively estimated as approximately 15 million solely in Germany.

At the same time, degenerative diseases of the knee joint occur in more than 10% of the population from the age of 40 onwards. Figures such as this clearly indicate a market potential of proportions that are difficult to estimate. As the innovative character and the mechanism of action of BIUS 1 have been scientifically proven and an obvious market potential already exists in Germany, there should be no obstacles to its economic exploitation in medicine, sport and everyday use.

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