

DOCUMENTATION

Human Biomechanics

Development and professional origins of the sex-specific concept

Kristin Stahl, certified master orthopaedic technician and founder of the KS Institute for Human Biomechanics, is developing a sex-specific concept of human biomechanics based on 38 years of practical experience in orthopaedic technology.

The starting point is the reference model question: Is one common biomechanical reference model sufficient when female and male bodies have different mechanical starting conditions?

The concept

Within the concept developed by Kristin Stahl, two sex-specific biomechanical reference models are distinguished: classical biomechanics as the reference model for the male body and ZYKLOMECHANIK® as the conceptual biomechanical reference model for the female body.

ZYKLOMECHANIK® was developed by Kristin Stahl and registered as a trademark in 2025. It describes the study of the control mechanisms of movement in female bodies and, within Kristin Stahl's concept of human biomechanics, constitutes the conceptual biomechanical reference model for the female body.

The SAM Method developed by Kristin Stahl describes the fundamental mechanical principles of Sandwich, Axis and Muscle Tone. It had already been developed as a mechanical working model in 2015 and forms an early foundation of the later sex-specific concept. The fundamental principles apply to women and men. The sex-specific question concerns the different mechanical starting conditions.

Orthopaedic technology provision

The practical development work resulted in orthopaedic technology provision systems that can be configured on a sex-specific basis: ORTHO base for insole provision, ORTHO seat for seated provision and ORTHO ground as a bed overlay. The applications follow the common mechanical concept.

Sport and training

The sex-specific development work was also transferred to movement, training and sport. This includes the JaneAlign Pro® training device for women and the ArniAlign Pro® training device for men, both developed by Kristin Stahl. The concept therefore encompasses sex-specific approaches to sport and training in addition to orthopaedic technology provision.

ZYKLOMECHANIK® Seal

The ZYKLOMECHANIK® Seal was developed by Kristin Stahl as a designation for products whose mechanical design takes into account the specific biomechanical requirements of the female body. The Seal is awarded on the basis of defined ZYKLOMECHANIK® criteria.

Path of insight

Observation → recurring pattern → practical modification → effect → mechanical question → model → scientific evaluation

Professional classification

The general scientific term human biomechanics was not invented by Kristin Stahl. Her original contribution is the development of the sex-specific concept of human biomechanics described here, including the reference model question, ZYKLOMECHANIK® as the conceptual female reference model, its connection with the SAM Method, and the provision and training systems developed from this work.

A consistent scientific distinction is made between observation, experiential knowledge, working hypothesis, conceptual model and evidence. The sex-specific reference models are subject to scientific evaluation and are not presented as already scientifically confirmed.

Documented development

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| 2015 | SAM Method already developed as a mechanical working model, based on the fundamental mechanical principles of Sandwich, Axis and Muscle Tone. |
| 2024 | Formulation and public presentation of sex-specific orthopaedic technology as a professional approach by Kristin Stahl at OTWorld in Leipzig in May 2024. Presentation of the "Manifesto for Sex-Specific Orthopaedic Technology". |
| 2025 | Development and public scientific presentation of ZYKLOMECHANIK® by Kristin Stahl; registration of the ZYKLOMECHANIK® trademark; utility models for JaneAlign Pro® and ArniAlign Pro®. |
| 2026 | Further development of human biomechanics as a sex-specific reference model concept; scientific elaboration in the Special Article; further development of applications in orthopaedic technology and sport; and development of the ZYKLOMECHANIK® Seal for the designation of appropriately designed products. |

"Mechanics is not unisex." "Individualisation does not replace a reference model." "The reference standard is now female, too."

Kristin Stahl

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