

Quote request

To request a quote for a **MOT EK Medical** solution configured to your needs, please complete the web form at our site:

www.motekmedical.com/cf.html

The company

MOT EK Medical - founded in 1998 in the Netherlands - offers revolutionary technology for the healthcare sector. By means of unique software, **MOT EK Medical** integrates both existing and new technologies into research and medical solutions for a.o. orthopedic, neurological and rehabilitation use.

Our clients

Our clients are hospitals, medical centers, research facilities and universities.

Some references

- Brooke Army Medical Center
Texas, USA
- Military Rehabilitation Center
Doorn, The Netherlands
- SHEBA Medical Center
Tel Aviv, Israel
- John Moores University
Liverpool, UK
- McGill University
Montreal, Canada

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HUMAN BODY MODEL

Real-time measurement and visualization of muscle forces

The **Human Body Model** (HBM) is a unique software module enabling 3D real-time measurement and visualization of muscle forces and joint torques.

Benefits

The HBM is a powerful research tool that for the first time makes it possible to process clinically relevant data real time. The HBM has a built in full body model (16 segments, 48 DOF) which saves the user a large amount of time in building his own model. All you need to do is enter five parameters, click the button and an automated process will start making the model subject specific. The model and processing is absolutely state of the art. The software allows you to accurately repeat experiments.

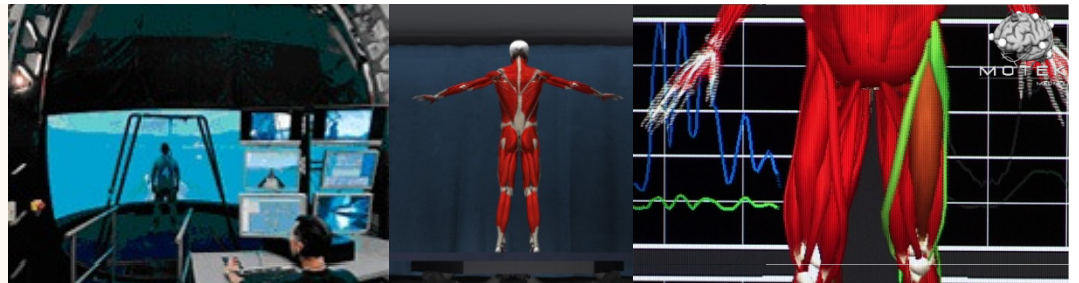
A unique feature of the HBM is that it has the capability to estimate muscle forces from joint moments in real-time using static optimization, a well established technique in biomechanics. The individual muscle forces and joint moments from the human body are visualized real time in a way that makes clear the force transference in the musculoskeletal system.

The software can be used in virtual reality assisted environments. The clinical outputs can be used to control any aspect of the virtual environment and provide real-time feedback and visualization.

Applications

The HBM can be used for applications in fundamental and applied research, evaluation and assessment, rehabilitation, sports, and ergonomics. Some examples:

- Understanding balance compensation strategies and control mechanisms.
- Musculoskeletal systems behavior.
- Explorations of the muscle force interactions with spatial environments.
- Better understanding of the role of sensory inputs and sensory motor organization in posture and locomotion
- Balance compensation anomalies and muscle force related postural stability problems.
- Gait problems arising from inefficient muscle usage.
- Early identification of degenerative muscular conditions and dysfunctions.



Compatible

MOTeK Medical offers CAREN® software making it possible to configure and integrate various devices to client specific needs.

Easy to use

The CAREN® software graphical user interface allows operation and application development with limited technical skills.

Customized

MOTeK Medical offers several different motion capture methods: optical, magnetic, inertial and customized video based motion capture systems.

MOTeK Medical products

Based on CAREN® software

CAREN system

6 DOF motion base with 3D real-time interactive system allowing enhanced research and rehabilitation for balance, locomotion, etc.

V-Gait

Interactive instrumented treadmill for gait research and rehabilitation.

Human Body Model

Real-time software module for biomechanical analysis of human movement.

Mobility center of the future

All future techniques for improving balance and locomotion under one roof, where research and clinical use complement each other.

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Product

The HBM includes a high-fidelity biomechanical full body model, consisting of 18 body segments (bones) and 46 kinematic degrees of freedom. The joint centers, joint axes, and mass properties are generated based on subject data according to state-of-the art research protocols. Its inputs are the 3D trajectories of markers on the body, and the ground reaction forces generated during the movement. Its outputs are the 3D joint kinematics (joint angles) and kinetics (joint moments), defined according to the ISB standards.

Features:

- Kinematic analysis using robust global optimization
 - 3D pelvis translation and orientation (6 DOF)
 - 34 joint rotation variables
 - 6 joint translation variables
- Low-pass filtering
 - 2nd order state variable filtering
 - User-selected cut off frequency
- Inverse dynamic analysis
 - 34 joint moments
 - Joint power calculation
- Muscle force estimation
 - Static optimization
 - Various cost functions
 - Muscle power calculation
 - Lower extremity (43 muscle elements each side)
 - Arm and shoulder (102 muscle elements each side, fall 2008)
 - Spine and trunk (fall 2008)

Configurations

Minimal hardware requirements to run the HBM software are:

- A 3D real-time motion capture system, multiple vendors are supported.
- Two 3D force plates for the left and right foot, multiple vendors are supported.
- A Windows XP computer system

To be able to do real time gait analysis a treadmill is required. An interactive virtual reality environment is optional.

MOTeK Medical has developed an advanced instrumented treadmill that goes by the name **V-Gait**. The V-Gait can be delivered with 3D force plates and a front display to create a virtual reality environment.

The HBM can also be implemented within the **CAREN system**. The CAREN system is the high end version of the V-Gait. It is primarily a visualization and virtual reality system.

The HBM is a standalone application, but can come as part of the powerful **CAREN software suite**. With the CAREN software the HBM can easily be implemented in a virtual reality environment either with the V-Gait or the CAREN system.