

BTS SPORTLAB

Complete solution
for the functional evaluation
of the athlete



BTS Bioengineering

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The functional evaluation of the athlete, including non-professional, is an important tool that allows knowing, in a quantitative way, its physical and biomechanics characteristics.

With BTS SPORTLAB, sports-medicine staff has a scientific support to improve performances, plan individual training programs, identify and correct deficiencies in the athletic preparation and reduce drastically the risk of sports injuries.

Through repeated analysis of sporting gesture, BTS SPORTLAB provides objective and quantitative information to assess the muscular-skeletal situation of each athlete, its motor strategies and progress over time.

The system, based on optoelectronic technologies and wireless devices, is not invasive. In this way it ensure the full freedom of movement: the athlete can carry out any sporting gesture without restrictions or limits.

The collected information allows structuring specific mesocycles of preparation for every athlete, reducing the risk of accidents due to overloading, which has become the key aspect of success for the professional team.

With BTS SPORTLAB, the technical and medical staff can take prompt action to correct deficiencies or structural alterations that cannot be otherwise pointed out. Moreover it can conduct a physical training targeted for patients, using at best their different physical characteristics.

BTS SPORTLAB is particularly useful to identify and manage the recovery strategies of the athlete who has suffered an injury.

The system permits to:

- Identify the best treatment to be applied (rehabilitative program, surgery ...)
- Monitor the rehabilitation effects over time
- Identify the achievement of full recovery in order to prevent relapses due to an earlier resumption of activities.

BTS SPORTLAB allows executing a functional and integrated evaluation based on 4 key-factors:

1) Posture

The postural analysis wants to highlight the eventual alterations in the correct body structure because they can cause structural overload, chronic pain and loss of joint mobility, with a consequent alteration of the athletic performance and the increase of injury risk.

The analysis allows designing a rehabilitation path enhancing the functional recovery through the evaluation of: muscle imbalance, feet support, dental occlusion and paramorphism spine.

2) Movement

The motion analysis allows verifying the ability to perform different movements and to ensure their efficiency, through the improving of the body structure and the coordinated and proprioceptive components.

Analyze a movement means to individuate the position and the speed that characterize every time the linear or angular lifting of any bodily part.

The sporting gesture then may be broken down and analyzed into its cinematic, dynamics and of muscular recruitment components, in order to optimize it.

The athlete's performance then can be studied and improved.

3) Muscular activity

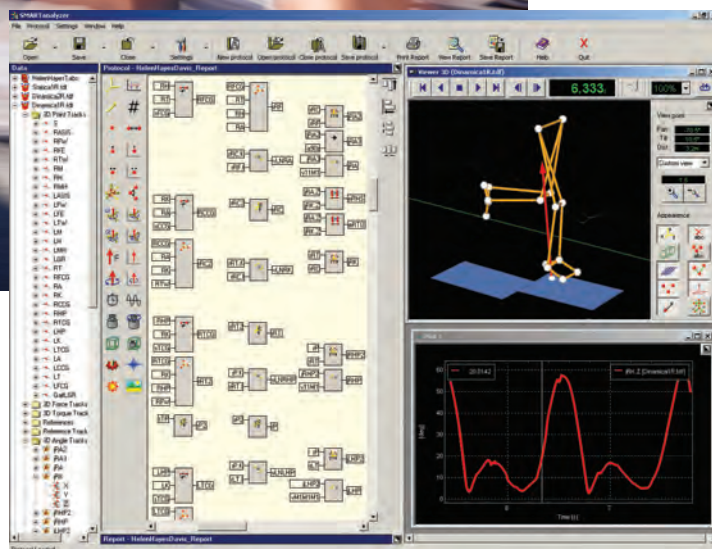
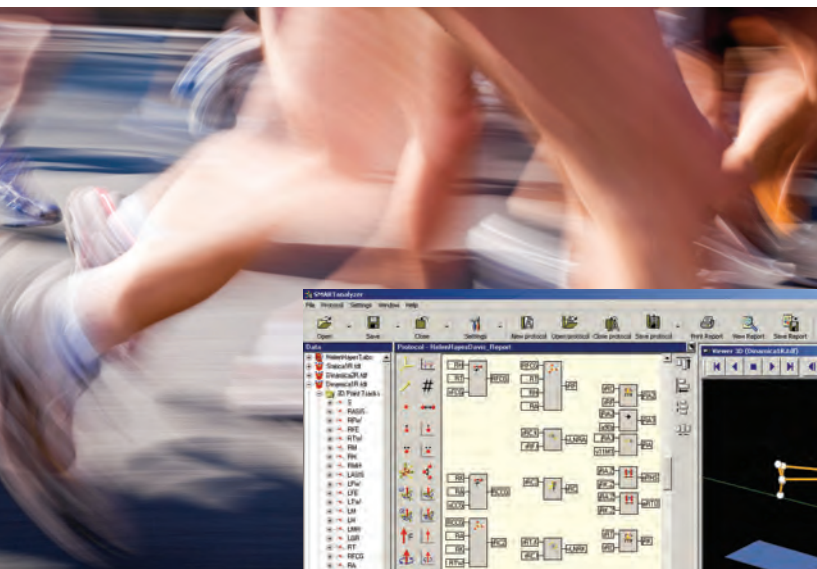
Dynamic electromiographic analysis allows executing a functional evaluation of the muscular chains activation in a non-invasive way.

It provides directions about the moment, the duration and the extent of the muscular activation during the execution of a technical and athletic gesture.

4) Forces

The analysis of forces allows evaluating the dynamic behavior of a subject during walking, running and jumping.

The understanding of the forces reaction than to the lower limb joints, permits to prevent or to limit the overload.



BTS SMART-Analyzer

Advanced software useful for the multi-factorial analysis of movements.

It allows an easy construction of personalized calculation protocols for the complete analysis of the sporting gesture through an innovative interface made of objects.

1

Infrared video cameras

8 optoelectronic infrared video cameras follow the passive marker trajectories positioned in specific points of the body according to protocols that have been validated by the international scientific community. Starting from the three-dimensional coordinates of the markers acquired, the system calculates the internal centers of rotation within each joint (shoulder, pelvis, hip, knee and ankle), outputting the changes in angle projected onto the three main planes of the body (frontal, sagittal and transversal).

2

Video recording

3 TVCs for video recording and real time display of the patient's movement taken from different viewpoints.

3

Sensorized floor

BTS P-6000, sensorized floor made of digital triaxial force plates, records the 3 components of ground reaction force, the Centre of Pressure (COP) coordinates and the torsion moment. These data combined with the kinematic ones, allows calculating joint moments and powers.

4

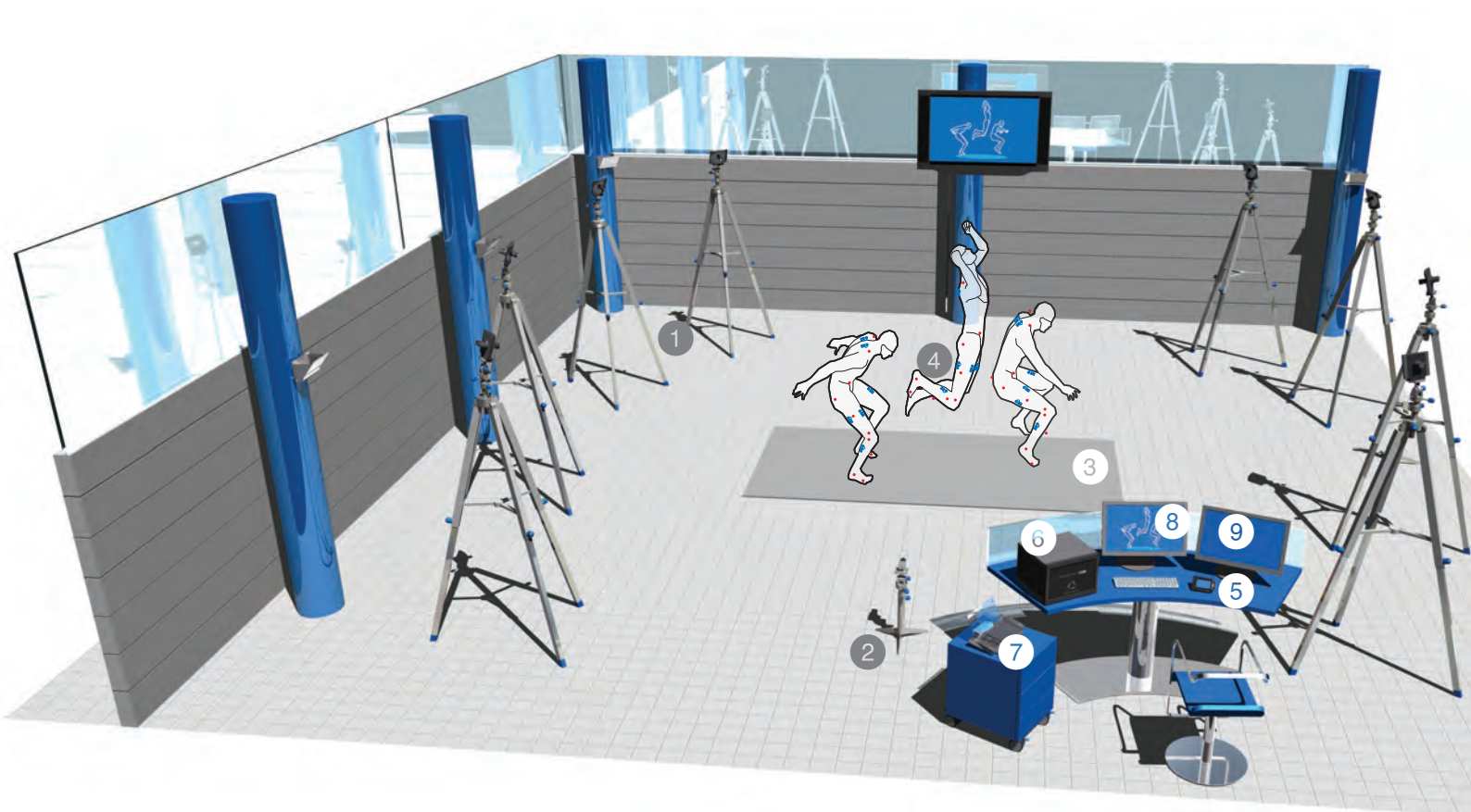
Wireless electromyographic probes

16 BTS FREEEMG wireless electromyographic probes. Light, miniaturizing and wireless, they do not affect the patient's natural movements and can be placed on the muscles by simply applying pressure to the pre-gelled adhesive electrodes. The synchronization of the electromyographic signal with the kinematics and kinetics allows for an assessment not only of muscle activation but also the exact moment at which this occurs during the gait cycle.

5

Application software

BTS SMART-Performance allows for the analysis of all sporting movements in order to better investigate and improve athletes' performance, optimizing training, preventing injury and guiding rehabilitation programs. It includes predefined analysis protocols dedicated to various sporting disciplines such as football, golf, cycling, tennis and baseball. SMART-Performance also allows for the acquisition and assessment of any sports movement by the athlete and equipment, thanks to the high TVC's acquisition frequency (up to 2 kHz).



6

Workstation

Super multiprocessor computer with 24 parallel processing units. Receives, integrates, synchronizes and re-processes all signals from the devices connected. An internal master clock ensures synchronism even during very long acquisitions, thereby obtaining a perfect correlation, moment by moment, of all signals.

7

EMG handheld unit

Wireless palmtop computer with touchscreen display. Receives the signal from the electromyographic probes and transmits it to the workstation. Allows for the configuration of settings and display of signals near the patient or within 50 meters of the patient.

8

Monitors

Full HD screen for the simultaneous display of all kinematic, kinetic and electromyographic data, with picture in picture reproduction of the video shots from the various different angles.

9

EMG Docking Station

Wireless electromyographic probe docking station. Fitted with internal battery to allow for charging even without an external power supply.

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Components

Workstation

| | Standard | Optional |
|--|----------|----------|
| BTS SMART-DX Core for capture, synchronization and data processing | ● | |
| Monitor LCD Full HD | ● | |

Kinematics

| | | |
|--|---|---|
| BTS SMART-DX 7000 8 TVC: High Frequency Digital Optoelectronic System | ● | |
| BTS SMART-Performance, software solution for biomechanical analysis in sport | ● | |
| BTS SMART-Analyzer, software solution for creating user-defined analysis protocols | | ● |

Electromyography

| | | |
|--|---|--|
| BTS FREEEMG 300 surface EMG system with 16 wireless probes, 16bit/4kHz | ● | |
| BTS EMG-Analyzer, software solution for creating user-defined analysis protocols | ● | |

Force Analysis

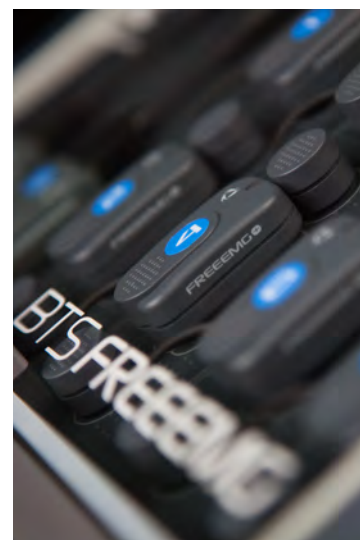
| | | |
|--|---|--|
| BTS P-6000 sensorized floor (sensing area 2400x800mm - equivalent to 8 traditional force plates) | ● | |
| BTS Digivec Augmented reality software and real time video superimposed force vectors | ● | |

Video Acquisition System

| | | |
|---------------------------|---|--|
| 3 BTS VIXTA video cameras | ● | |
|---------------------------|---|--|

Accessories

| | | |
|---|---|---|
| Support mounts for clamping and positioning of cameras | ● | |
| Marker Starting Kit | ● | |
| Pelvimeter | ● | |
| Modular walkway for the housing of the sensorized floor | | ● |



* Technical specifications are subject to change without prior notice.



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