FACILITIES AVAILABLE IN CSIR - CLRI GAIT ANALYSIS LABORATORY, Shoe and Product Design Center

3D Motion Analysis

Kinematic Analysis

Device

- Infrared cameras Smart DX 6000 (BTS, ITALY) – 8 Nos.
- Software SMART Clinic

Purpose

- For joint range measurement studies of human locomotion and posture

Applications

- By studying the 3D Gait and motion analysis of particular subject the Gait deviation can be evaluated and the subsequent corrective e.g. orthotic/prosthetics can be recommended

Kinetic Analysis

Device

- 2 Nos. kistler piezoelectric force plates
- 2 Nos. AMTI strain gauge force plates
**Purpose**

- To measure the impact of the ground reaction force of the foot or the footwear to the ground

**Applications**

- To measure the force applied by sportsmen during jump with specific types of footwear

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**Electromyography (EMG) system**

**Device**

- BTS wireless FreeEMG3000 – 16 channel EMG

**Purpose**

- To assess the muscle function during Gait analysis synchronized with kinematics (joint range) and kinetics (joint forces)
Applications

- For identification of the muscle responsible for movement impairment and subsequent treatment procedures in terms of rehabilitation aids (orthotics / Prosthetics), physiotherapy or surgical intervention and the effectiveness of treatment can also be evaluated by follow up studies.
- For example, impact of shoe design/ materials on muscle fatigue, impact of routine secular work or posture on muscles, etc

Plantar Pressure Measurement Device

Device

- BTS-P WALK 2 m length

Purpose

- A walkway system to measure temporal(time) and spatial(length) parameters and multi-chrome plantar pressure distribution map on motion

Applications

- To diagnose the pathologies related to the balance and Gait disorders
- To study distribution of plantar pressure at foot-ground interface and to identify the site of peak plantar pressure to protect it from further complications by providing corrective/ therapeutic footwear/ orthotics. For example, study of effect of insole/ insocks/ footbeds / arch support on uniform plantar pressure distribution to improve foot comfort.
In-shoe plantar pressure measurement device

Device

• F-scan versaTek - Tekscan, USA

Purpose

• A wireless system to measure dynamic in-shoe plantar pressure at the foot and footwear interface

Applications

▪ Immediate determination of orthotic efficacy.
▪ Pre and post-surgical evaluation
▪ Identifying areas of potential ulceration
▪ Screening diabetes and other neuropathic patients
▪ Observing foot and gait abnormalities
▪ Regulating weight bearing after surgery
▪ Monitoring degenerative foot disorders

Instrumented treadmill
Device

- Zebris FDM-T Gait analysis system (Germany)

Purpose

- A dynamic treadmill system integrated with pressure sensors to measure temporal (time) and spatial (length) parameters and multi-chrome plantar pressure distribution map with gait training function

Applications

- For identifying the plantar pressure at foot and ground interface and to identify site of peak plantar pressure
- For rehabilitation and training of Gait (Gait simulator)
G-SENSOR

A solution for accurate and quick measurement of gait parameters

- The wireless device consists of
- Tri axial accelerometer which gives the acceleration
- Tri axial gyroscope which gives the motion
- Magnetometer which gives the speed of the subject
- Positioned on L5
- Communicates with the computer using Bluetooth connection with a range up to a distance of 20 meters
- Quick analysis and automatic report
- Gives the spatial temporal parameters like, speed, cadence, % stride length, gait cycle duration, Stance phase duration, swing phase duration, double support duration, single support duration, right and left foot contacts, pelvic angles, and Acceleration

APPLICATIONS

- Study the Gait parameters of subjects
- Identification of symmetry index between left and right leg
- Results used to plan the rehabilitation programme after injuries and surgeries
Energy expenditure analyser

Device

• Ergostick computerized portable gas-analysis system

Purpose

• To measure the energy expenditure-VO2 (maximal oxygen consumption) during activity

Applications

- slow vital capacity
- Cardiopulmonary exercise testing
- CO2- diffusion testing

BODY COMPOSITION ANALYSIS

Device

• ioi-353 body composition analyser (korea)

Purpose

• The device that measures impedance with tetra polar electrode techniques, sensing accurate value of body composition.

Application

• To collect the demographic data for 3D Gait analysis

The device shows the body composition like
- lean body mass,
- soft lean mass
- total body water,
- protein mass and
- mineral mass

And information regarding
- body mass index,
- per cent body mass,
- basal metabolic rate
- waist to hip ratio,
- age matched to body,
- body type,
- segmental analysis and
- target to control