

## MODULE: TURN

### BRIEF DESCRIPTION:

Changing locomotion direction through different kinds of turns is a part of everyday life. In its extreme this movement act is very common in many sports (sport games) which are based on quickness and agility. Turn is a clinical test, where the subject has to make at least two forward steps and then quickly turn for 180°. After the turn, the subject walks/runs back to the start point. Based on the ground reaction force the software calculates the time needed to execute the turn and the sway velocity during the turn.

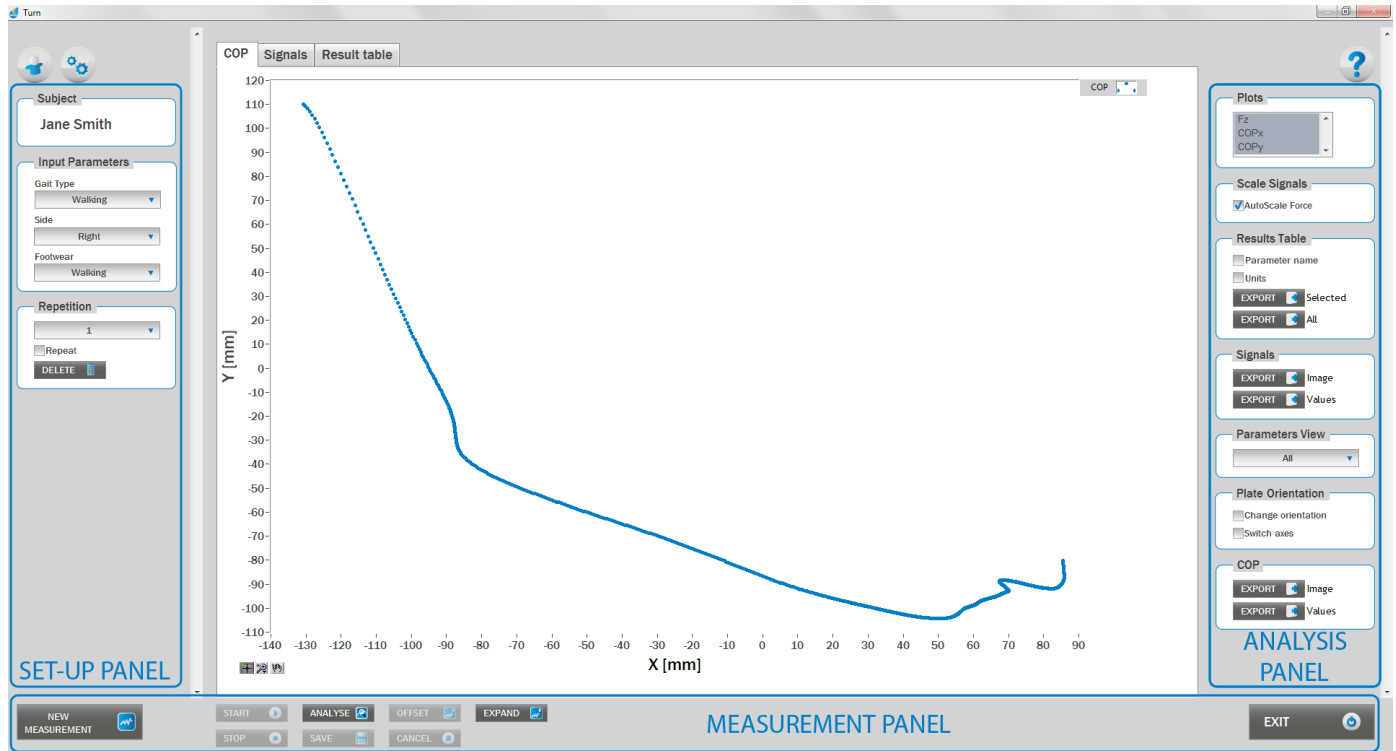
The initial position of the subject is usually a standing position approximately two steps behind the force plate. The subject then approaches the force plate and executes the turn on a force plate. The test is finished when the subject walks back to the starting point. Although only the turn is quantified based on a ground reaction force, it is important to make at least two steps before and two steps after the turn to make the test as natural as possible.



When the Turn module opens, the existing measurements of the selected subject inside the current Visit are displayed and the user can review them (see section Analysis for details). If no measurements have yet been done for this subject, then only the option to start a new measurement is enabled. In order to begin a new measurement, click New Measurement button and select the Input Parameters to exactly define the measurement task.

When the New Measurement button is selected for the first time after entering the Turn module, the force plate is initialized. After the automatic initialization process is finished, the zero offset must be done (follow the instructions on the pop-up message). The plate must be unloaded during the entire initialization and zero offset procedure. This procedure is performed every time you enter the Turn measurement module. Zero offset can be repeated any time manually by pressing the Offset button, otherwise the automatic zero offset is done every 30 minutes.

## BASIC FUNCTIONS:



## SET-UP PANEL:

### SUBJECT

#### Name

The selected subject.

### INPUT PARAMETERS

See Selecting Input Parameters section for details.

### REPETITION

#### Repetition

Number of repetitions for the selected Input parameters.

#### Repeat

If checked, the selected repetition is replaced when the new measurement is performed.

#### Delete

Delete the selected repetition.



## ANALYSIS PANEL:

### PLOTS

#### Plots

The list of all channels. The selected channels are shown on the graph.

### SCALE

#### AutoScale Force

If checked, the vertical scale of the graph is adapted to the maximum and minimum value of all force signals.

### RESULTS TABLE

In the Result Table panel, result parameters from Result table tab can be exported into clipboard, CSV or TXT format. Format of the file can be set in settings window under export section. For details about setting the parameters refer to Settings Section.

#### Parameter Name

Parameter name will be included.

#### Units

Units of the parameters will be included.

#### Export Selected

By clicking on Export Selected button only the parameters that are selected in the table will be included.

#### Export All

By clicking on Export All button all parameters from the table will be included.

### SIGNALS

In the Signals panel, image or values (row data) of acquired signal can be exported. Image and values can be exported with different parameters, which can be set in Settings window under export section. For details about setting the parameters refer to Settings Section.

#### Export Image

Export the image of signals (as visible on the graph on the Signals tab) into the clipboard. Image can be paste in any image editor.

#### Export Values

Export values (raw data) of signals (as visible on the graph on the Signals tab) into CSV or TXT format. Format of the file can be set in settings window under export section. For details about setting the parameters refer to Settings Section.



## PARAMETERS VIEW

In the Parameters View panel, calculated parameters which are displayed in the result table can be set. By default, all and basic view are available. Basic view contains preset parameters and cannot be changed. Custom view can be defined, by clicking »Manage...« button.

To create a new view click on add button and enter the name of the view. Parameters included in the view are selected by checking the checkboxes next to them. To confirm the changes click save.

## COP

In the COP panel, image or values (row data) of acquired signal can be exported. Image and values can be exported with different parameters, which can be set in Settings window under export section. For details about setting the parameters refer to Settings Section.

### Export Image

Export the image of signals (as visible on the graph on the Signals tab) into the clipboard. Image can be paste in any image editor.

### Export Values

Export values (raw data) of signals (as visible on the graph on the Signals tab) into CSV or TXT format. Format of the file can be set in settings window under export section. For details about setting the parameters refer to Settings Section.

## PLATE ORIENTATION

### Change orientation

Plate orientation is changed for 180°.

### Switch axes

Switches the X and Y axes without moving the force platform.

## MEASUREMENT PANEL

### New Measurement

Starts with a new measurement.

### Start

Starts the measurement.

### Stop

Stops the measurement.

### Save

Saves the measurement.

### Cancel

Cancel the last measurement.



## **Offset**

Makes zero offset. Note that the force platform must be unloaded during the process.

## **Analyse**

Performs the analysis.

## **Collapse**

Collapses the graph and the side panels are shown.

## **Expand**

Expands the graph and the side panels are hidden.

## **Exit**

Closes the measurement module.

## **SELECTING INPUT PARAMETERS:**

Before the measurement can start, the user has to choose some input parameters with which the measured motor task is specifically defined. These parameters are important for further analysis, comparisons and reporting. The task's characteristics are defined by the following parameters:

### **GAIT TYPE:**

#### **Walking**

The subject performs the turn while walking.

#### **Running**

The subject performs the turn while running.

#### **Other user defined**

In the Settings panel of the main window of the software the user can define any other type of gait (see Settings Section for details). After doing so, the newly defined input parameter will from then on appear as an optional choice under the Gait Type in the Turn measurement module.

### **SIDE:**

#### **Left:**

The subject performs the support phase of the turn over the force plate with his left leg.

#### **Right**

The subject performs the support phase of the turn over the force plate with his right leg.

### **FOOTWEAR:**

#### **Barefoot, Shoes, High Heels**

The user selects the type of the shoes that the subject is wearing.



### Other user defined

In the Settings panel of the main window of the software the user can define any other type of footwear (see Settings Section for details). After doing so, the newly defined input parameter will from then on appear as an optional choice under the Footwear in the Turn measurement module.

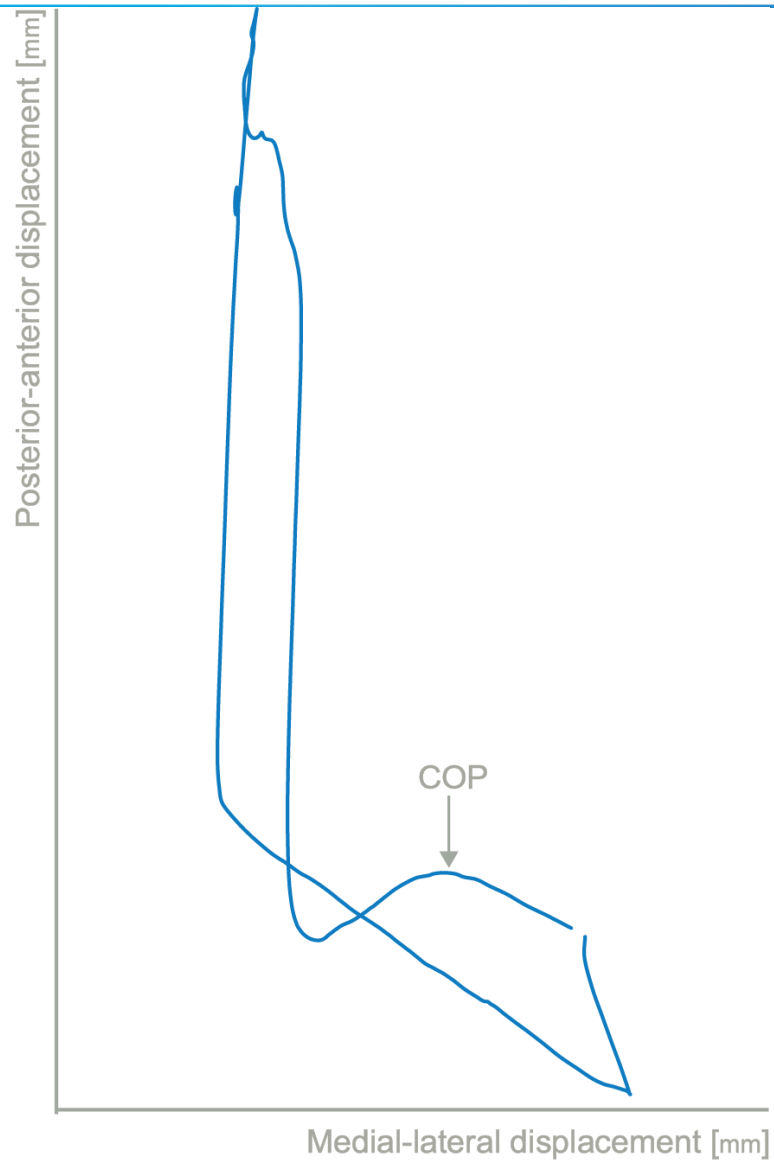
## MEASUREMENT:

After selecting input parameters, the subject acquires the required position facing the force plate from a certain distance. When asked, he/she starts approaching the plate in order to make a turn by stepping on it. When the subject is approaching the force plate, click Start. The software will automatically recognize the beginning and the end of the turn. For details about this automatic acquisition please see Settings Section.

If you want to start a new measurement, click the New Measurement button and repeat the procedure. Before doing so, you can change the Input Parameters; if not, the Input Parameters of the previous measurements will be used. If you want to repeat a certain measurement, click on the drop down menu, select the repetition you want to replace and check the box Repeat. Then click Start and a pop-up window will ask you if you really want to repeat the measurement. Click OK if you want to repeat.

## ANALYSIS:

Analysis enables you to check the signals of the ground reaction force (GRF) and the calculated parameters. Under the Signal tab you can see the signal and markers which are placed automatically. You can move all markers if they were placed incorrectly. Under the Results Table tab you can see all the calculated parameters numerically, while the visualisation of the results comparisons can be done under the Results Graphs tab. These two tabs enable you to make quick comparisons of the values of the parameters among different repetitions and/or among different sub-versions of the test. If you want to confirm the measurement, click Save. If you would like to export the calculated parameters use Export function in Result Table panel.



## CALCULATED PARAMETERS:

### PARAMETERS

#### Turn T [s]

The time needed to execute the 180-degree in-place turn. This time begins when forward progression is arrested and ends when forward progression in the opposite direction is initiated.

#### Turn Sway [mm/s]

The average COP velocity during the turn time. It quantifies the postural stability of the individual during the turn time. Turn sway is expressed in millimetres per second.