

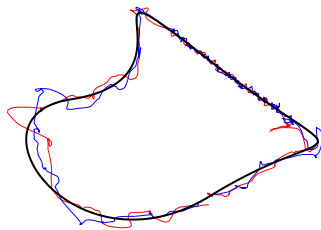
## The Butterfly Test

The Butterfly Test assesses the movement control of the neck through the ability of the patient with neck pain to correct movements on a moment-to-moment basis (in real time).

### Graphical Results

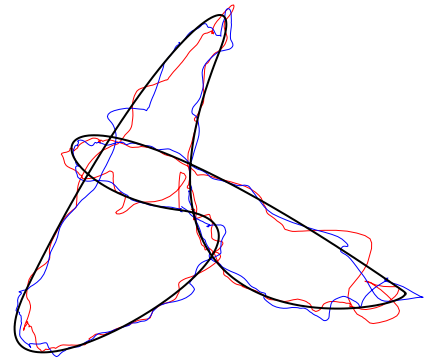
The following graphs demonstrate the performance for the Butterfly Test

Easy Pattern

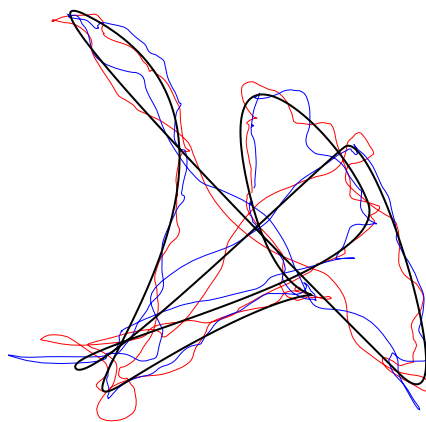


— Butterfly Path  
— Measurement 1  
— Measurement 2

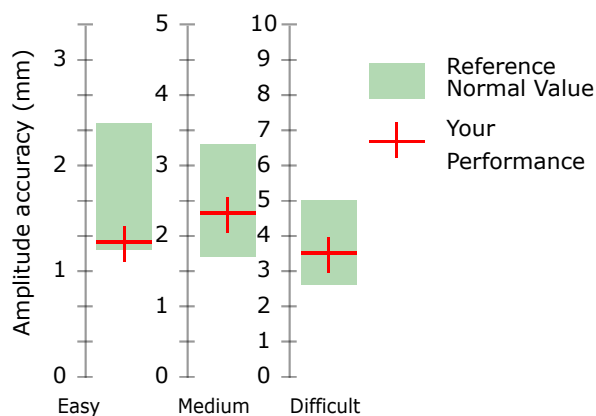
Medium Pattern



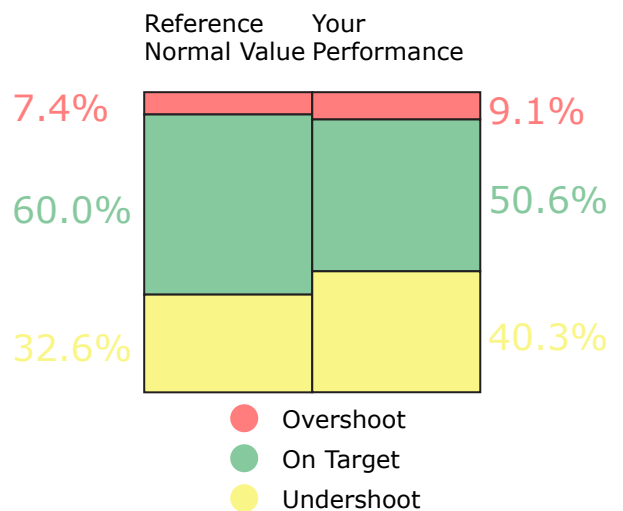
Difficult Pattern



Amplitude Accuracy

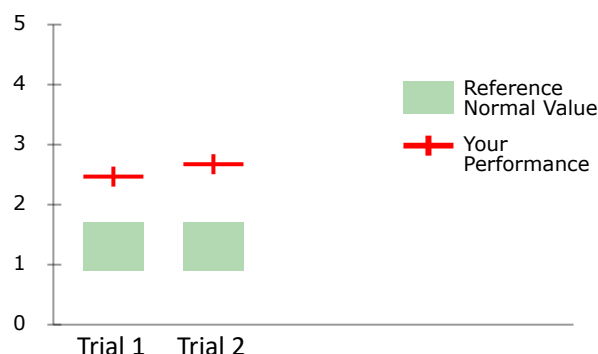


Directional Accuracy

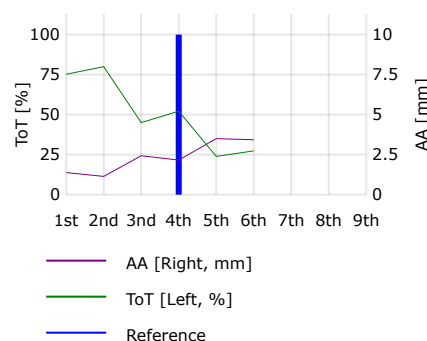


# The Butterfly Test

## Smoothness of Movements - Easy Pattern



## Repeated Measures



## Numerical Results

Amplitude Accuracy (mm)		
Difficulty Level	Mean	2SD
Easy	1.26	2.07
Medium	2.30	3.10
Difficult	3.47	4.25

Directional Accuracy (%)						
Difficulty Level	Undershoots (%)	2SD	Time on Target (%)	2SD	Overshoots (%)	2SD
Easy	16.49	2.83	77.61	2.4	5.91	0.5
Medium	42.52	1.62	48.57	3.56	8.93	1.95
Difficult	61.91	1.02	25.63	1.73	12.46	2.74

Smoothness of Movements		
Difficulty Level	Index	2SD
Easy	2.57	0.1

## Outcome measures

Four outcome measures represent three different aspects of neck proprioception (movement sense in the Butterfly Test):

- **Amplitude Accuracy:** Indicates the average mismatch between the "butterfly" dot and the cursor on the head, which indicates movements of the neck, by mean deviations of movements in millimeters (mm)  $\pm$  2 standard deviations.
- **Directional Accuracy:** Indicates Time on Target (ToT), Undershoots versus Overshoots, which are indicated as a percentage (%) of the total time used to perform the trial.
- **Index for Smoothness of Movements:** Calculates the smoothness or ease of movements, indicated by an unitless index from 0-5 (easy pattern).
- **Repeated measures:** The graph shows progressive difficulty levels from easy pattern to difficult. With increased difficulty, it is expected that AA increases and ToT decreases. The intersection between the two curves should be on the right hand side of the vertical line. Intersection before indicates fatigue.

Test carried out by:

Name printed

Signature