

## **REF** Pursuit Upper Limb

**CE** Class I Medical Device

# User manual

### **Distribution mode**

Available for direct download at  
<http://virtualisvr.com/espace-client/>  
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## 1. GENERAL

### 1.1. Description

The **Pursuit Upper Limb** software is an immersive 3D simulation based on virtual reality technology, which immerses a person in a digitally created artificial world.

**Pursuit Upper Limb** is an upper limb re-education software: tracking of a moving target with the upper limb using the VR controller or a tracker.

### 1.2. Indications

Orthopedic, neurological, or rheumatic functional re-education of the upper limb.

### 1.3. Contraindications

Epileptic patients, children under 15 years of age, pregnant women.

### 1.4. Module field of application

This module is used to work on the upper limbs by tracking a target according to a trajectory and amplitudes defined by the user. The patient must keep the target within a viewfinder (controlled by the position of the hand-held controller). In case of gripping difficulties, the controller can be replaced by the tracker attached to a limb segment using the strap provided. When the target being tracked is 100% inside the viewfinder, the viewfinder is green. Otherwise, it is red.

Note: the software can also be used for other purposes. The tracker can be attached at different levels of the lower limb. It is therefore conceivable to use this module for orthopedic, neurological and rheumatological functional rehabilitation of the lower limb.

### 1.5. Intended user






Healthcare professionals: physiotherapists; occupational therapists; neuropsychologists; ENT doctors; neurologists; PMR doctors (physical medicine and rehabilitation), etc.

Research Centers: CNRS, CHU, INSERM, etc.

### 1.6. Warnings and caution

Immersion in Virtual Reality is a powerful tool, especially for stimuli that can induce sensory conflicts.

**WARNING**




These stimulations can potentially cause certain disorders: vagal discomfort, epileptic seizures, migraines, vomiting, malaise, dizziness, syncope etc.

This type of re-education must be approached progressively, particularly in Virtual Reality where the stimulation is "powerful".


The contraindications are identical: mainly epilepsy and migraines.

**RECOMMENDATION**



As postural reactions can be spectacular, we **STRONGLY** recommend that you place the patient in a secure environment and stay close to him/her throughout the session to anticipate any loss of balance or discomfort caused by the use of virtual reality.


**RECOMMENDATION**



It is also recommended to increase the duration and intensity of stimulation very gradually after an initial short session to ensure the patient's tolerance to this type of stimulation.

Motion sickness is treated by "habituation", so you need to recreate the symptoms experienced during transport.

**WARNING**



It is essential to stop the session when the first symptoms appear, generally "sweating".

Define a working area of about 3m<sup>2</sup> to allow for risk-free movements.

Take a 10-to-15-minute break every 30 minutes of use.





It would be counterproductive to take into account the fact that some motivated patients may wish to go further. It's up to the professional to "dose" immersion so as not to provoke neurovegetative symptoms. This type of symptom can intensify in the hour following the session.

Nor can Virtualis be held responsible for any disturbances suffered by patients during or use of their software.

The accessories required to use the software may emit radio waves that can interfere with the operation of nearby electronic devices. If you have a pacemaker or other implanted medical device, do not use the product until you have taken advice from your doctor or the manufacturer of your medical device.



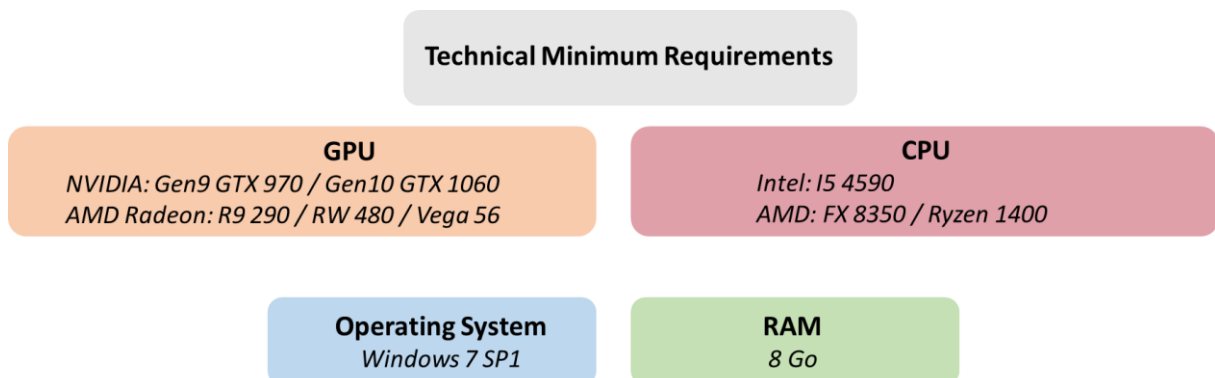
**Any serious incident should be notified in writing to [qualite@virtualisvr.com](mailto:qualite@virtualisvr.com)**

### 1.7. Hardware and minimum configuration requirements

#### Hardware required to use the system:

- VR Ready PC
- VR System: HTC VIVE, HTC VIVE Pro or compatible system
- Lighthouse bases (HTC VIVE tracking)

In order to install and use our virtual reality applications, we recommend a configuration equal to or higher than the system requirements:



### 1.8. Required accessories

Headset and controller or tracker.





### 1.9. Patient setup

Seated or standing position.

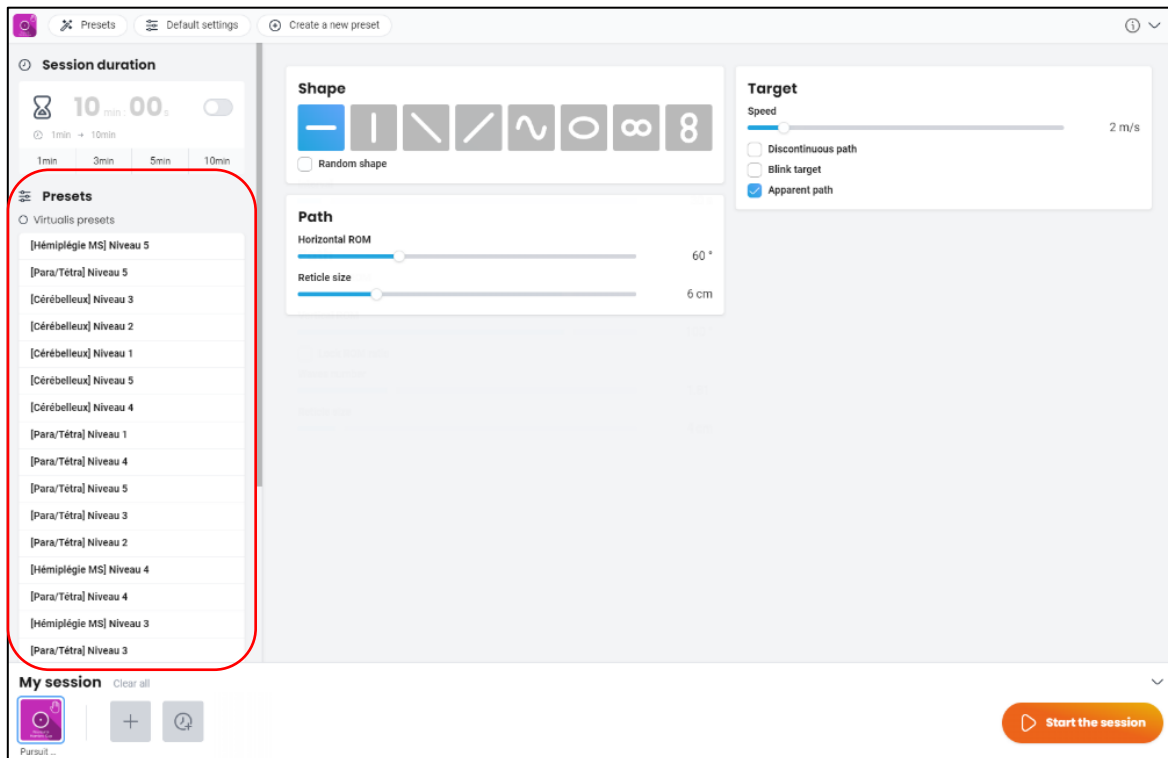
Standing position on a foam block (Airex-type foam, Balance Pad reference): specific work on balance (vestibulo-spinal reflex).

## 2. SOFTWARE USE

### 2.1. Session settings

When starting the **Pursuit Upper Limb** software, you reach a home page from which you can find some protocols of different difficulty levels.

For each protocol, the different options are already set.



The variable settings for this module are as follows:



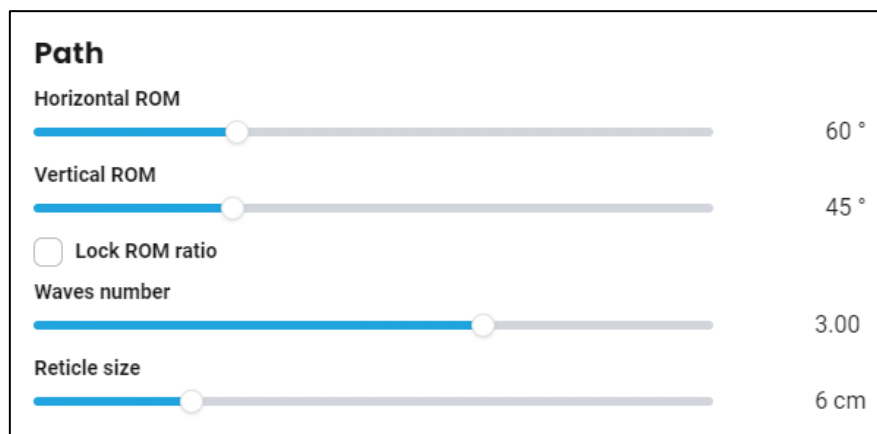
### 2.1.1. Shape (movement path)



Several types of paths are available. Simply click on the required path to select it. The “**Random shape**” option is used to generate a path and its animation setting completely randomly **at a selected interval**.

**Interval:** 10 to 300 s.

### 2.1.2. Path settings



Each predefined path shape can be customized by changing settings such as the horizontal and vertical angle, the number of waves, etc. The settings available differ depending on the chosen **Shape**.

- **Horizontal ROM:** 15 to 170°.
- **Vertical ROM:** 15 to 120°.

Horizontal and vertical angles can be “frozen” by checking the “**Lock ROM ratio**” box.

- **Waves number:** 1.00 to 4.00.

- **Reticle size:**

More accuracy is required if the Reticle size is small.

Value: 2 to 20 cm.

### 2.1.3. Target settings



**Target**

Speed 2 m/s

Discontinuous path

Blink target

Frequency 0.4 s

Apparent path

**Speed:**

The object movement speed can be set using the cursor.

Value: 0 to 20 m/s.

**Discontinuous path:**

The exercise sequence is fully modular. The track can consist of a one-way or round trip by ticking the "**Discontinuous path**" box.

**Blink target:**

The object can remain displayed for the duration of the exercise or appear intermittently by ticking the "**Blink target**" box.

**Frequency:**

This setting appears when "**Blink target**" is activated.

The disappearance interval and duration can be modulated.

Value: 0.2 to 2.0 s.

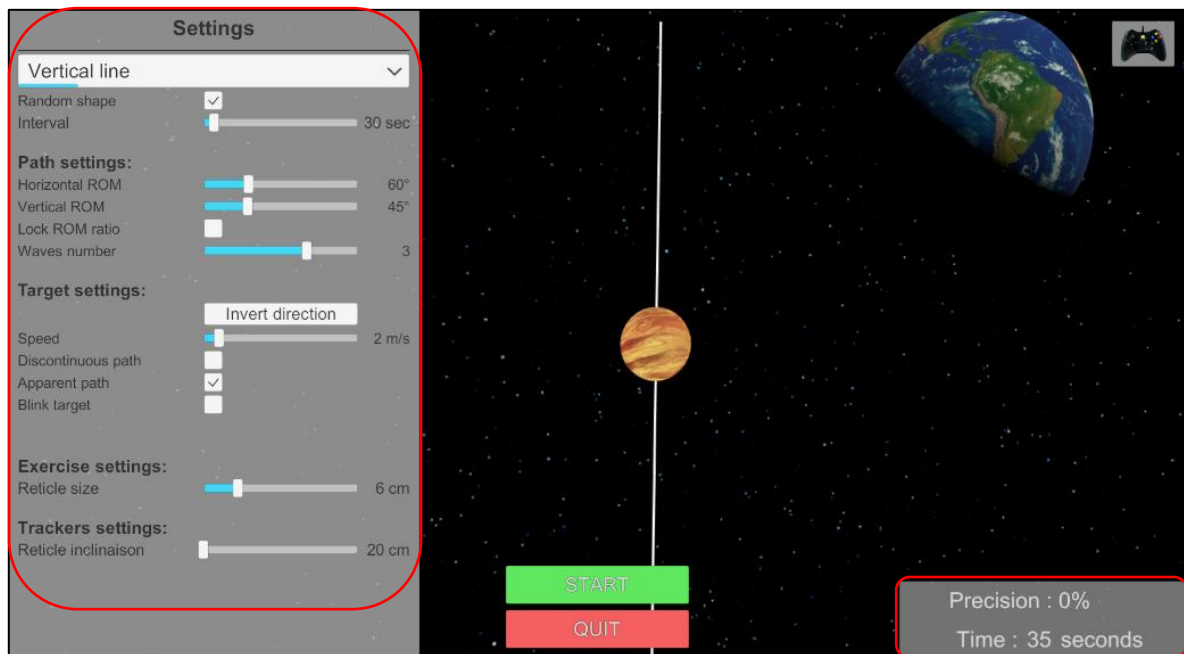


## Apparent path:

The object path can be displayed or hidden by checking the box.

### 2.2. Session

Once the presets have been selected, the user can launch the virtual interface by pressing the "**Start the session**" button at the bottom right of the screen.



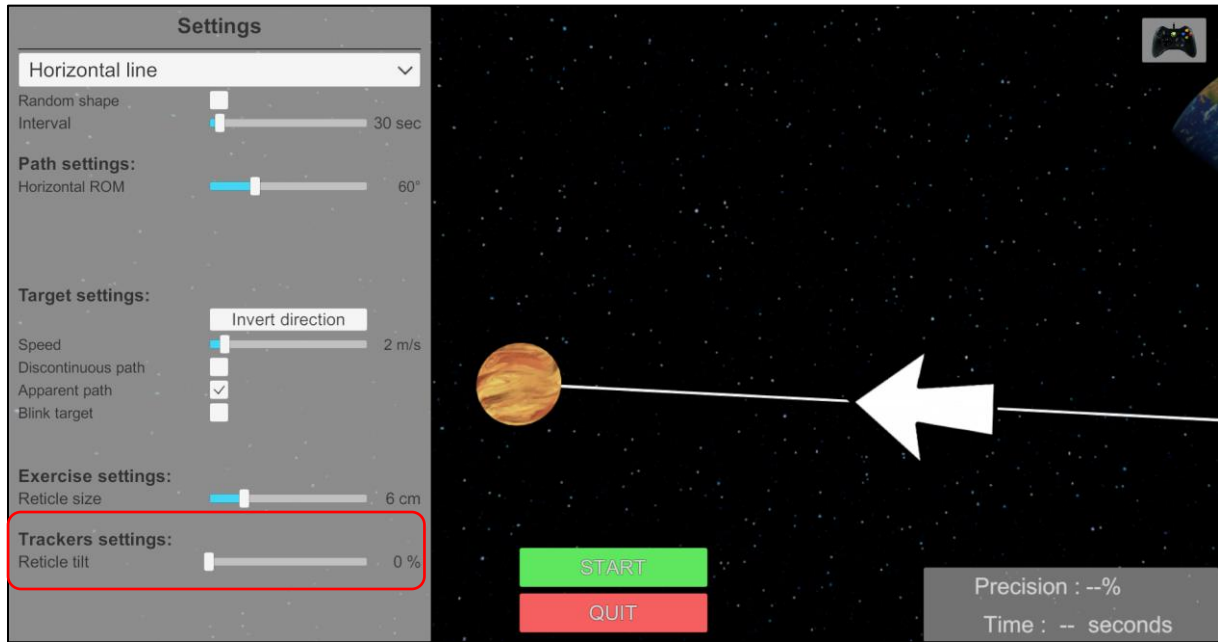
During the session, the user can modify the parameters from the **left side of the screen**. They are not visible to the patient.

**In the bottom right of the screen**, the user can observe the results of the session live.

You can also pause the exercise by clicking the "**Pause**" button at the bottom of the screen.

#### 2.2.1. Using the trackers

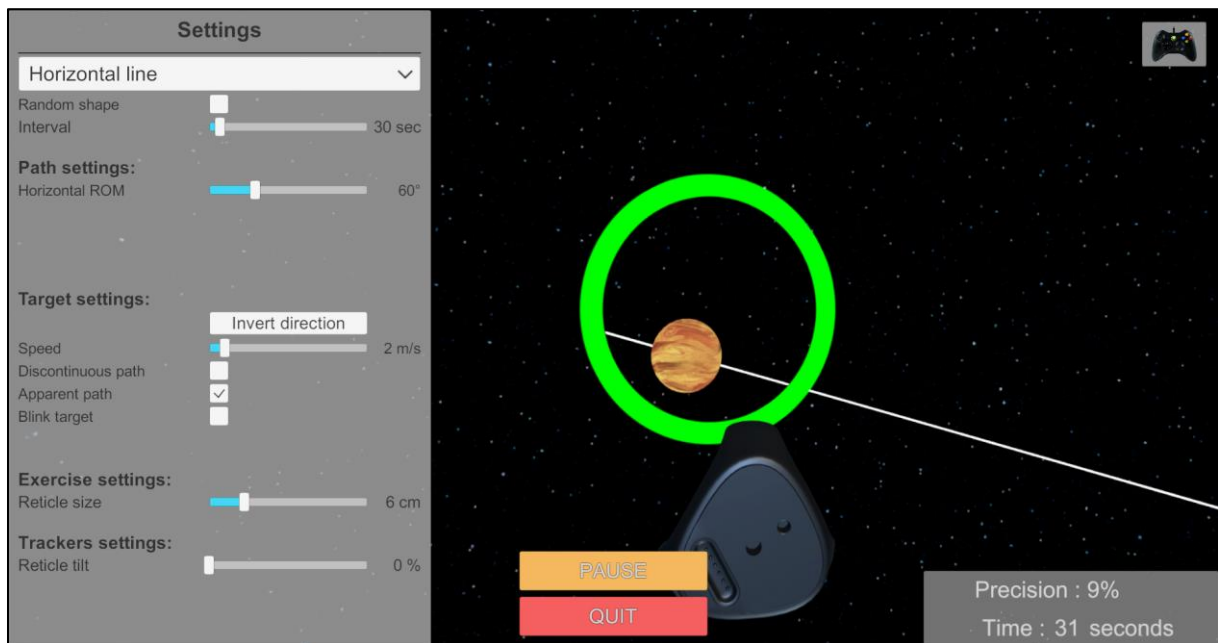
In case of gripping difficulties, the controller can be replaced by a tracker attached to a limb segment using the strap provided. The tracker can also be attached to different sections of the lower limb.



### Reticle tilt:

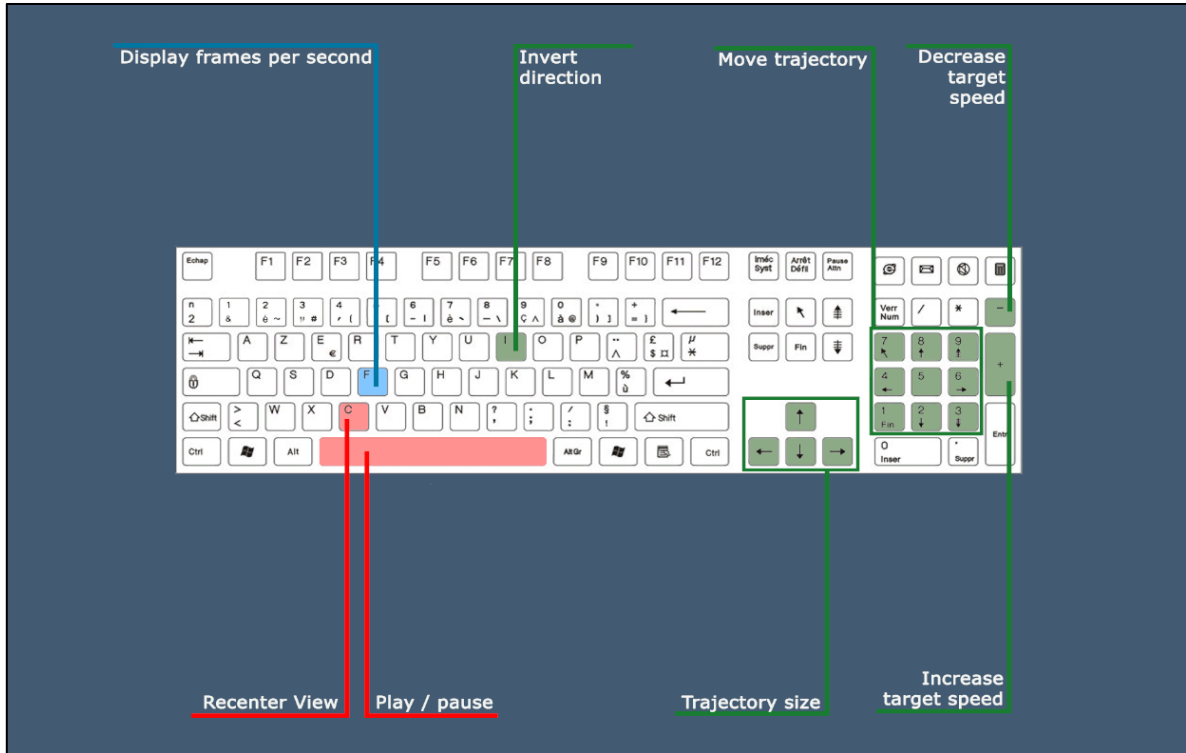
The tracker's reticle tilt can be modified.

Value: 0 to 100 %.



### 2.3. Shortcuts

During the session, the shortcut list is found by clicking on the Xbox controller icon in the upper right corner of the screen.





To activate a controller, turn it on and press the trigger.





## 2.4. Results

### 2.4.1. Summarized results

At the end of the session, a score corresponding to the patient’s accuracy is displayed.

### 2.4.2. Report and graphs

Click on the histogram icon to access the detailed results and the session’s report.

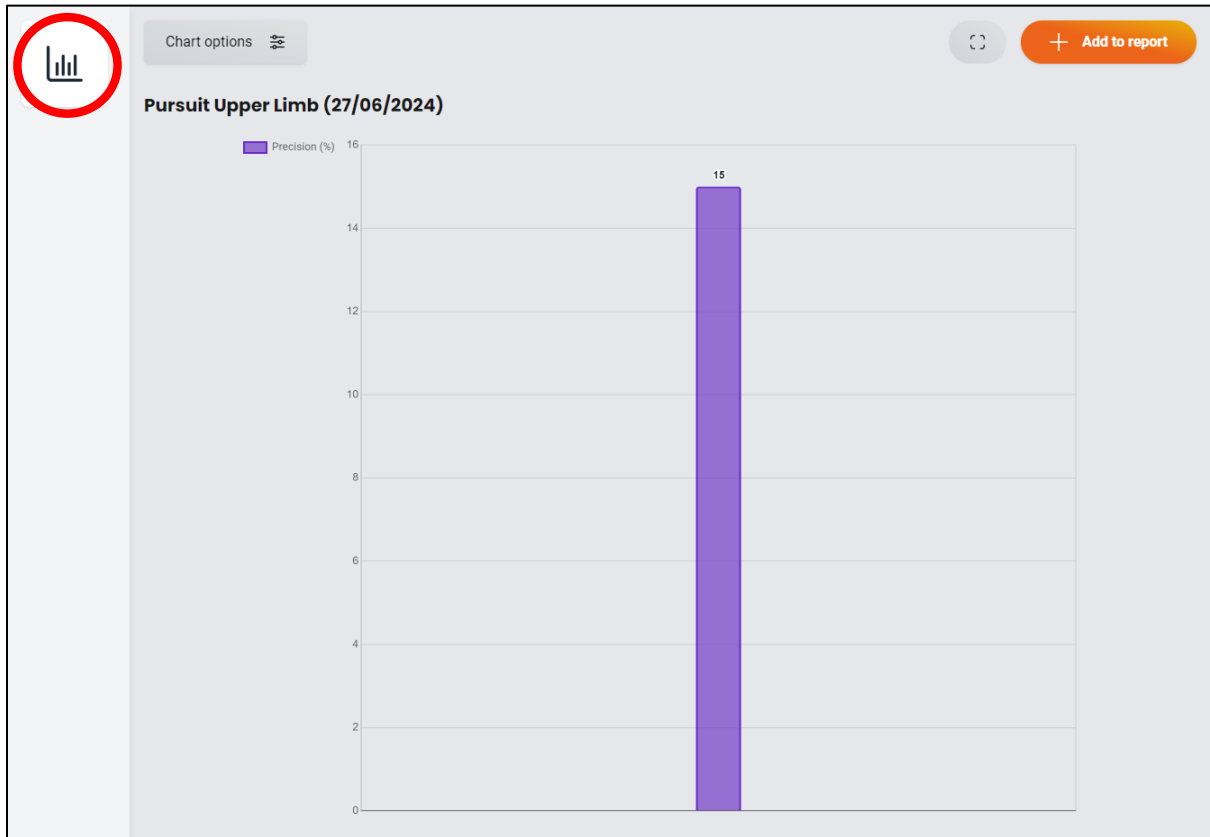
The screenshot shows the 'Pursuit Upper Limb' software interface. At the top left, there is a 'Session details' section with the date '28/06/2024' and a histogram icon circled in red. Below this is a navigation bar with 'Parameters', 'Results', and 'Notes' tabs. The main area contains a table with the following data:

Name	Initial value	Final value
Shape	Horizontale line	Horizontale line
Random shape	×	×
Interval	30.00 s	30.00 s
Horizontal ROM	60.00 °	60.00 °
Vertical ROM	45.00 °	45.00 °
Lock ROM ratio	×	×
Waves number	3.00	3.00
Speed	2.00 m/s	2.00 m/s
Discontinuous path	×	×
Blink target	×	×
Frequency	0.40 s	0.40 s
Apparent path	✓	✓
Viewfinder Size	6.00 cm	6.00 cm
Horizontal offset	0	0.0
Vertical offset	0	0.0

At the bottom of the interface, there are two buttons: 'Start session with initial values' and 'Start session with final values'.

Several graph types are available to view the results:

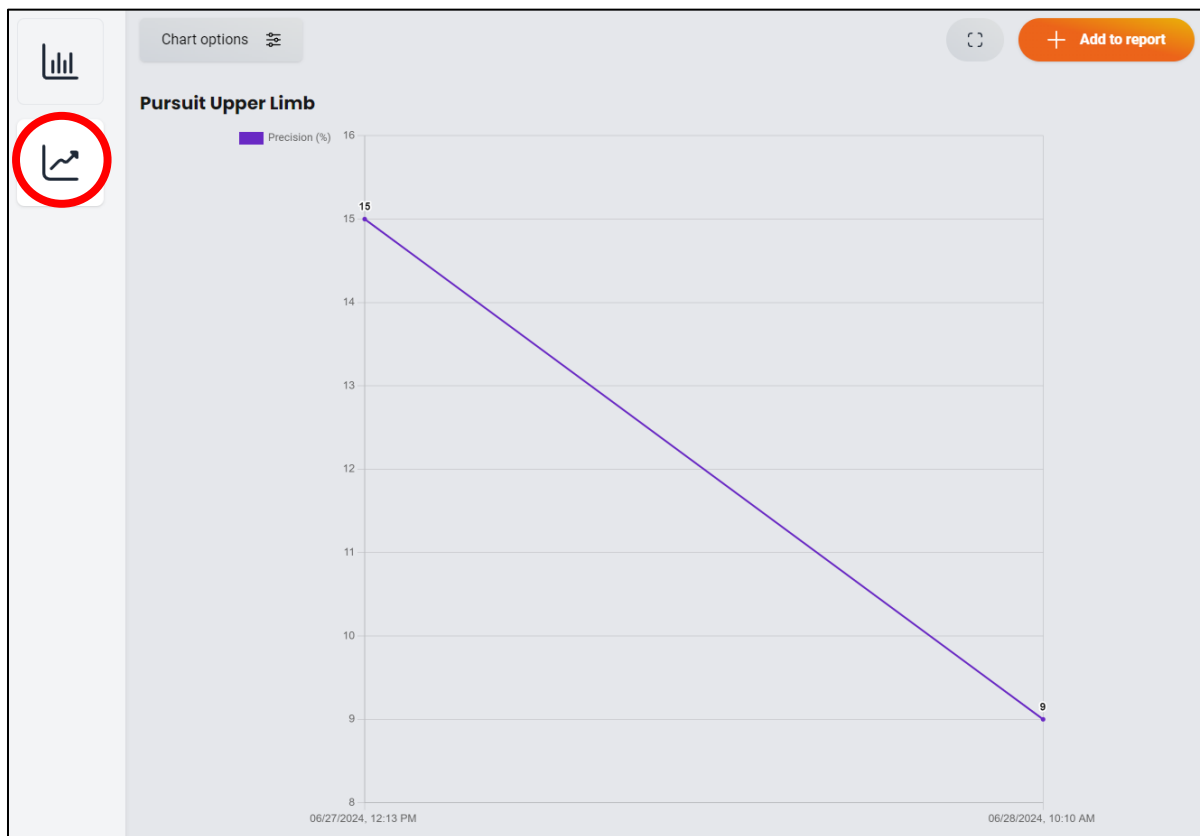




Or:

If you select more than one session's results, the following graph is available:





You can access other results by clicking on "Chart options".

More options

**Include properties**

Unselect all

**Results**

Precision % +

**Parameters**

Shape	—
Interval	s —
Horizontal ROM	° —
Vertical ROM	° —
Waves number	—
Speed	m/s —
Frequency	s —
Duration	s —
Viewfinder Size	cm —
Horizontal offset	—
Vertical offset	—





## 2.5. Data processing

Data retrieval and analysis uses the Patient Management software (see dedicated user manual).

