# KFORCE

## by

## KINVENT

**D**evices are designed to reahabilitate and assess and monitor patients recovery.

Devices use Bluetooth to measure muscle strength, balance and movement.

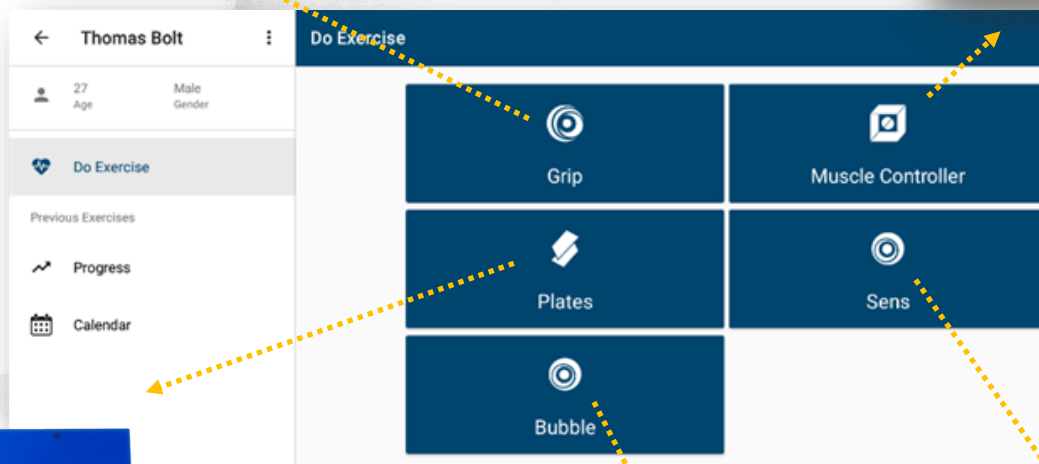**K-FORCE : 5 measurement devices and one dedicated application**

**Muscle Controller**

the hand-held dynamometer

**Grip**

the grip dynamometer

← Thomas Bolt ⋮

👤 27     Male
    Age     Gender

💙 Do Exercise

Previous Exercises

📈 Progress

📅 Calendar

Do Exercise

| | |
|---|---|
| ◎ Grip | ▣ Muscle Controller |
| ◆ Plates | ◎ Sens |
| ◎ Bubble | |

**Sens**

the connected goniometer

**Plates**

the force platforms

**Bubble**

the pressure air dynamometer

# **K-FORCE** in brief

- Application available from Google play and Apple Store.

- Compatible with Android 5.0+ and iOS 10.0+.

- Allows physiotherapists to individualise rehabilitation programmes according to patients physical abilities.

- Evolutive devices through frequent software updates and innovative accessories.
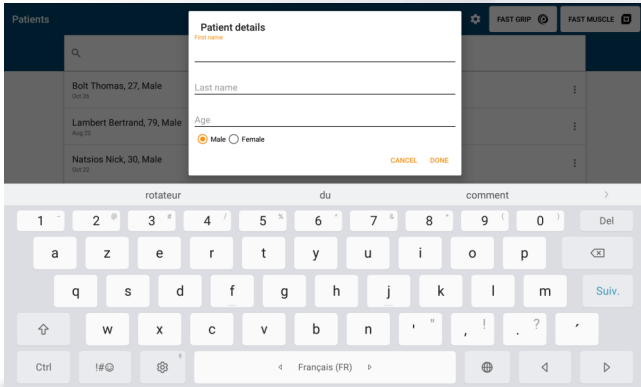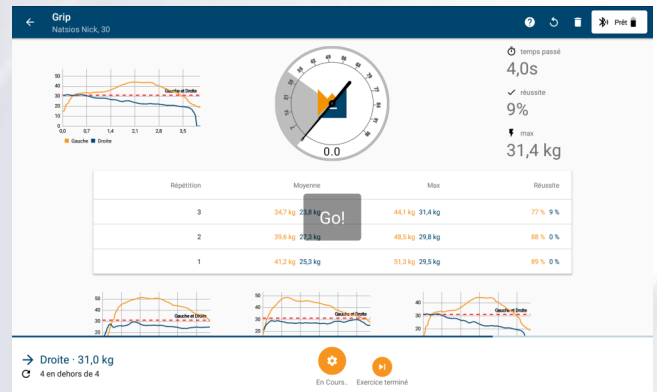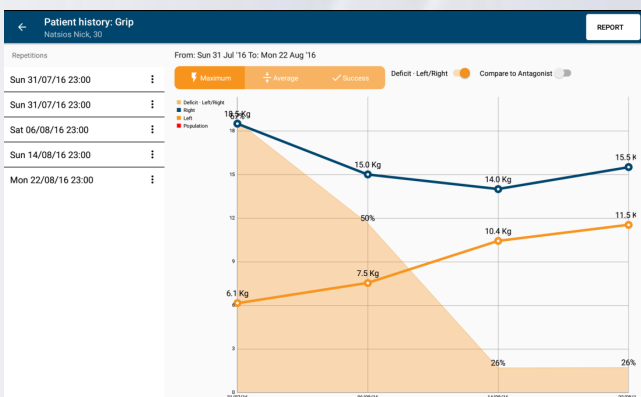
**Manage patient's individual record in the database**
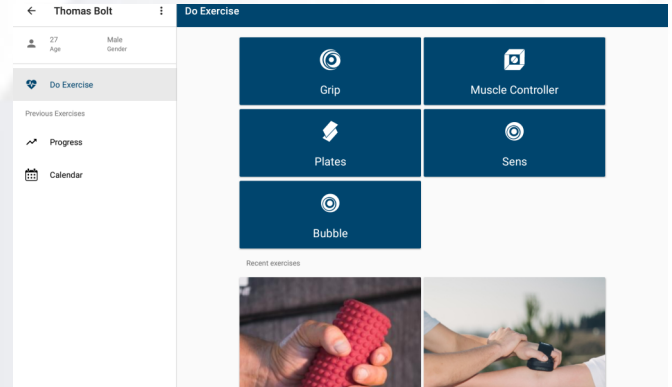
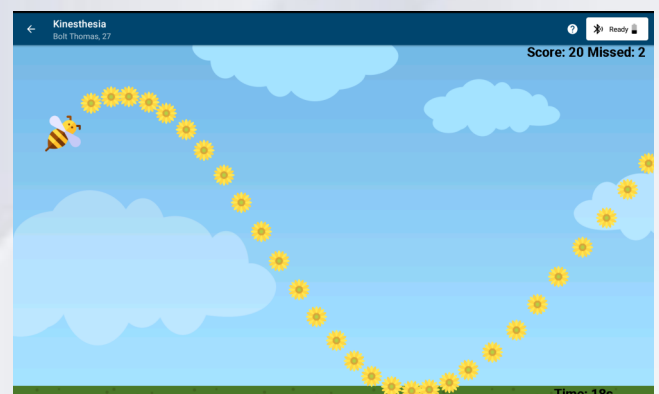**Select device, monitor progress and calendar**
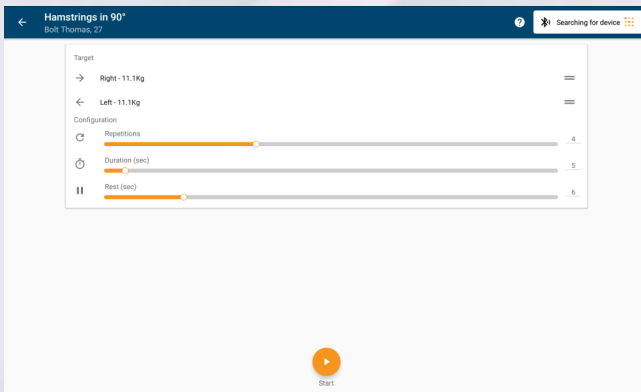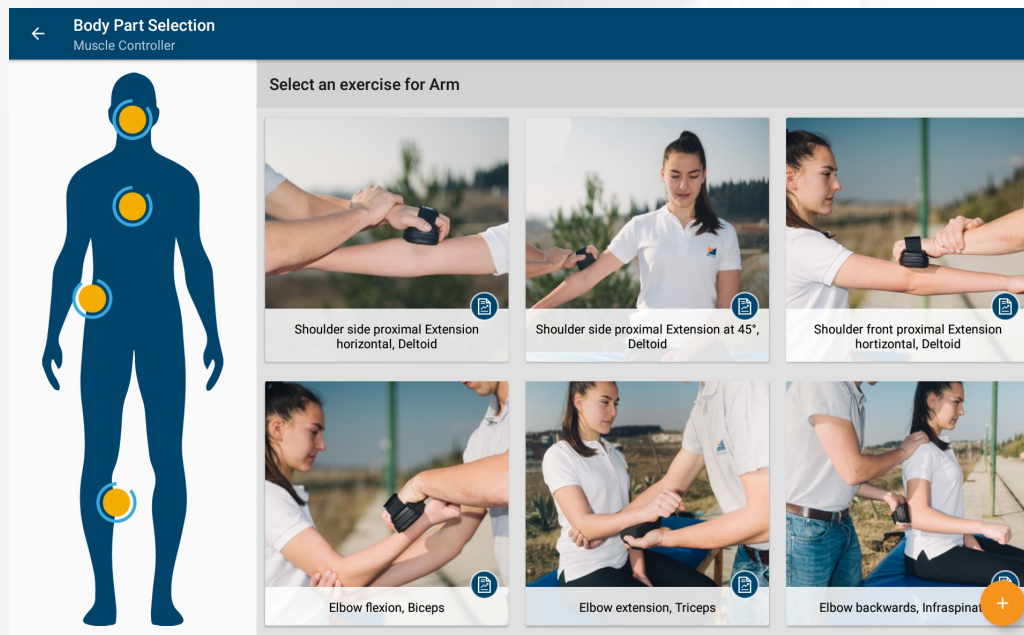
**Customise measurement**

**Give biofeedback**

**Consult progress report**

**Use Rehab-game and have fun!**

**K-FORCE application** - Create an assessment programme with device Muscle Controller.



**On Muscle Controller home page, go to the right bottom corner and add a new assessment window.**
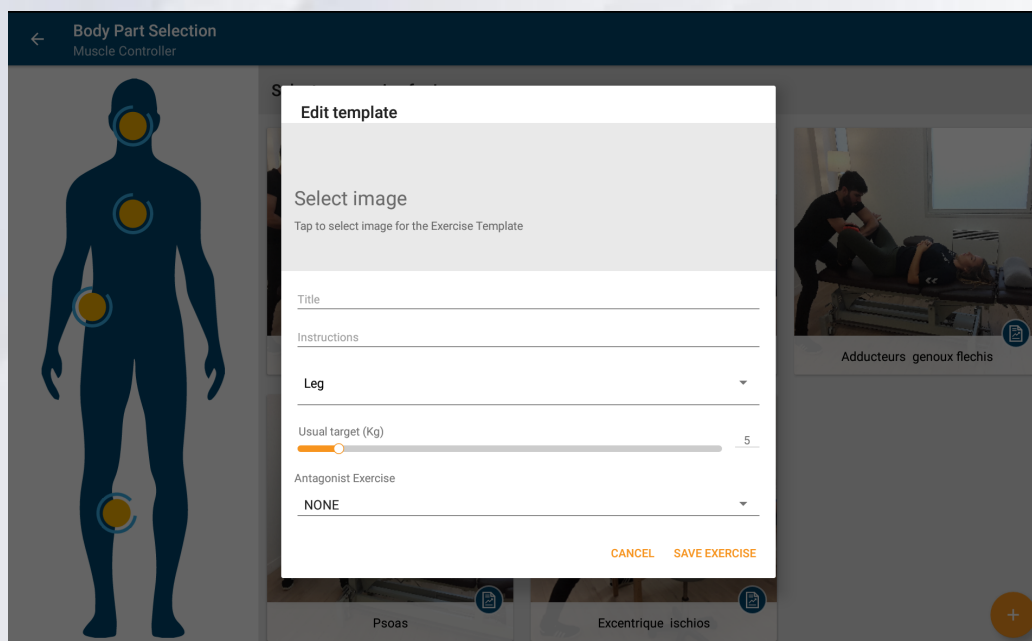


**Create the template and define the assessment parameters.**

To create a muscular assessment, fiche, click on button **+** and complete the template (photo, title, instructions, limb).

In order to get an advanced antagonist report, K-FORCE app allows you to pair an existing or newly created muscle group assessment with its antagonist muscle group assessment for the same limb.

# K-FORCE application - Generate measurement reports with device Muscle Controller.



**Measure of the deficit percentage**
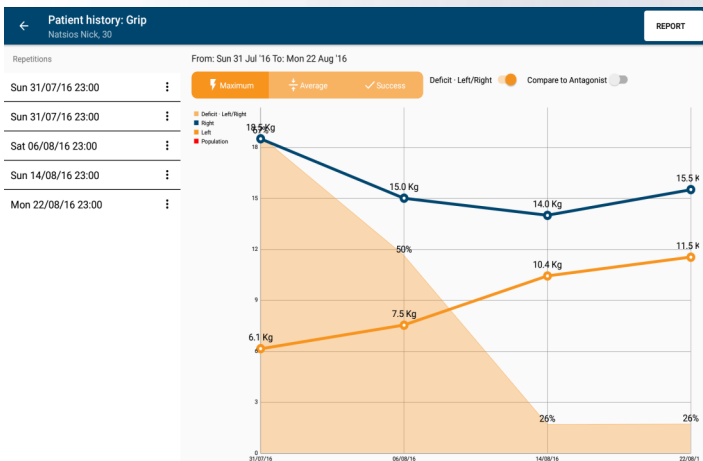
Measure the strength difference between the healthy and the injured limbs. Here, the deficit is displayed in orange.

Compare on a single chart the maximal strength of a muscle group with an antagonist group. Here, the quadriceps muscle group (full lines) is compared with the antagonist hamstrings muscle group (dashed lines).
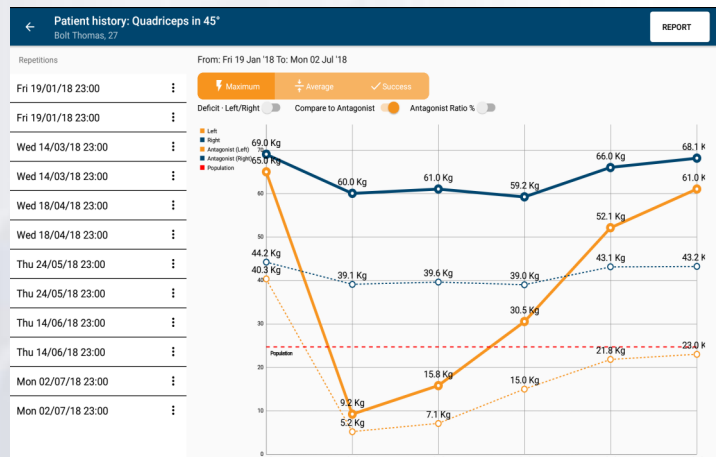


**Superposition of antagonist muscle groups charts**



**Display of antagonist muscle groups ratios**

The practitionner can determine if the differences (maximal strength) between the antagonist muscle groups are normal or pathologic.

**K-FORCE application** - Understand the stance assessment results with device Plates.



Distribution
Left Limb 50%
Right Limb 50%

Standard Deviation
Lateral 1.4 mm
Longitudinal 5.1 mm

Range
Lateral 7.6 mm
Longitudinal 23.0 mm

CoP Average Position
Lateral 0.5 mm
Longitudinal -36.0 mm

Footprint Stats
Surface 51.1 mm² Norm 102.9 mm²
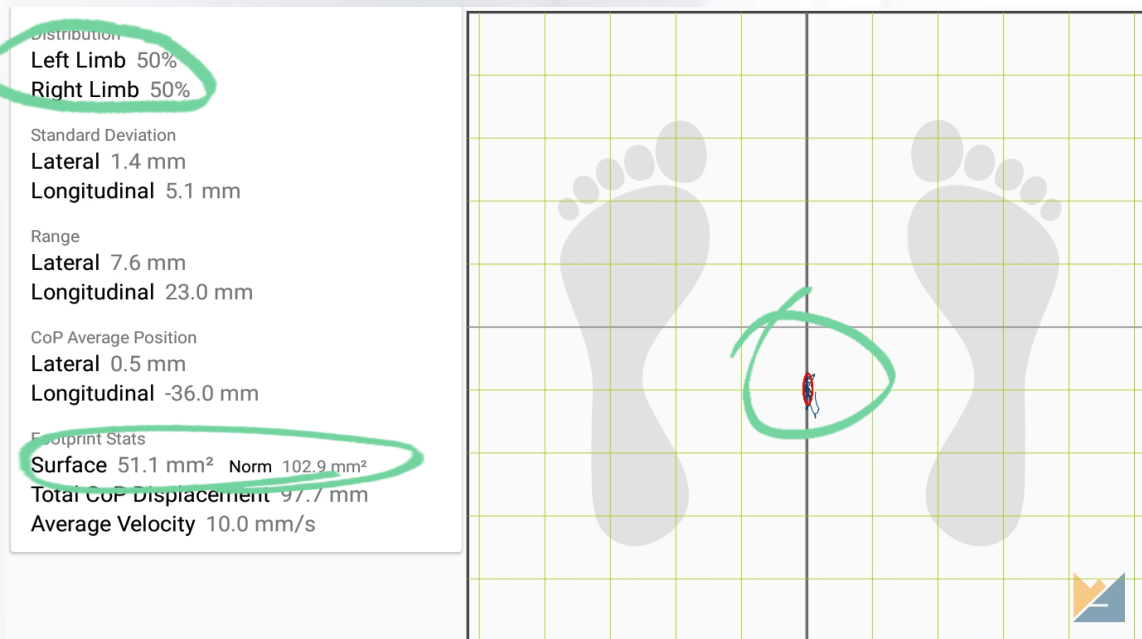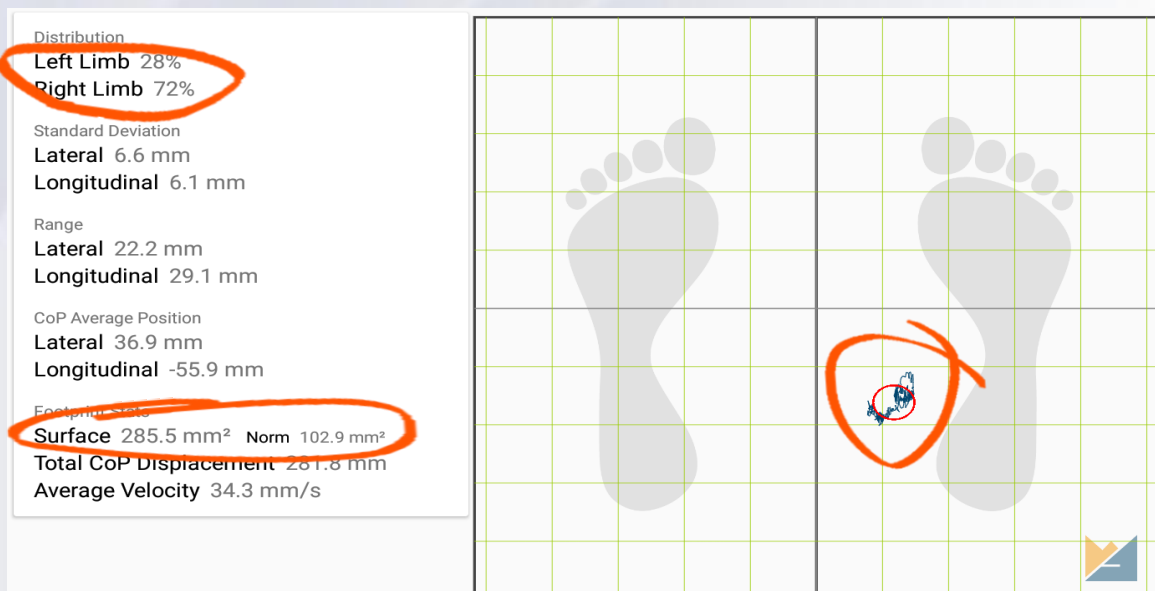Total CoP Displacement 97.7 mm
Average Velocity 10.0 mm/s

**Centre of pressure and weight distribution analysis on a normal stance assessment**

Above, the weight distribution between both limbs is measured at 50/50. The surface covered by the centre of pressure displacement is lower than the norm. The stance assessment is good.



Distribution
Left Limb 28%
Right Limb 72%

Standard Deviation
Lateral 6.6 mm
Longitudinal 6.1 mm

Range
Lateral 22.2 mm
Longitudinal 29.1 mm

CoP Average Position
Lateral 36.9 mm
Longitudinal -55.9 mm

Footprint Stats
Surface 285.5 mm² Norm 102.9 mm²
Total CoP Displacement 281.8 mm
Average Velocity 34.3 mm/s

**Centre Of Pressure and weight distribution analysis on a bad stance evaluation**

Above, the weight distribution is measured at 28/72. The surface covered by the COP displacement is well above the norm. The posture is unbalanced and unstable.

**K-FORCE application** - Understand the dynamic analysis results with device Plates.

The dynamic movement shown below is a squats set. Plates measures separately the ground reaction forces (blue: right leg and orange: left leg.) The black curve is the total force reaction.

The application analyses the weight supports distribution according to the ground reaction forces level.

Small forces correspond to the movement excentric phase, when the knee switches from extension to flexion (the hollows on the charts).

Big  forces correspond to the movement concentric phase, when the knee switches from flexion to extension (the peaks on the charts).



**Fully unbalanced squat analysis**
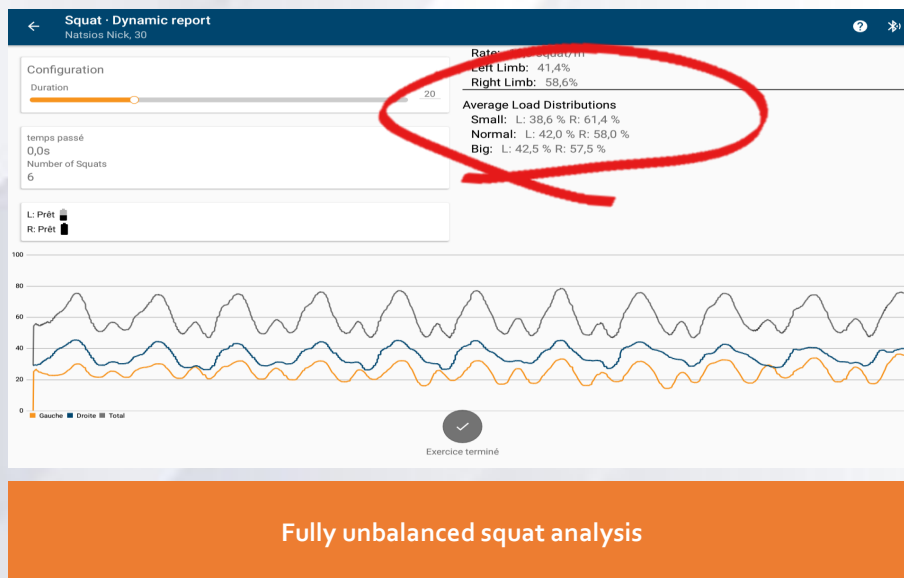
Above:  predominance of the right limb in the movement execution, with an average distribution close to 40/60.



**Excentric phase unbalanced squat**
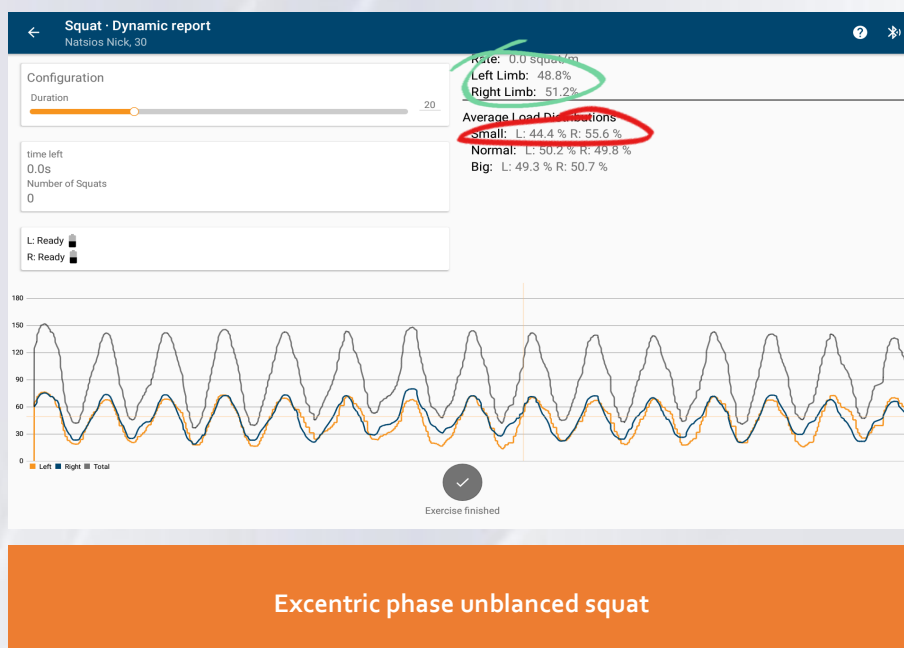
Above: measurement doesn't show a big difference in the average distribution on the set. Predominance of the right support during the excentric phase (Small forces measured at at 44/56).

# ◎ GRIP

A dynamometer to assess the strength of the hand.

## Technical features

Weight: 200 grams

Dimensions: 40 x 45 x 120 mm

Wireless range: up to 20 meters

Maximal strength: 90 kg

Sensitivity: 500 grams

Accuracy: 100 grams

Sampling frequency: 75 Hz

Autonomy: 5 hours (battery charge: 20 minutes)

**Grip strength assessment with K-Force Grip**

# MUSCLE controller

A hand-held dynamometer dedicated to muscle groups assessment.

- Ergonomic design for easy use by the physiotherapist.
- Silicone surface for optimal patient's comfort.
- The ideal tool for the muscle strength assessment.

## Technical features

Weight: 300 grams

Dimensions: 60 x 100 x 140 mm

Wireless range: up to 20 meters

Maximal strength: 90 kg

Sensitivity: 500 grams

Accuracy: 100 grams

Sampling frequency: 75 Hz

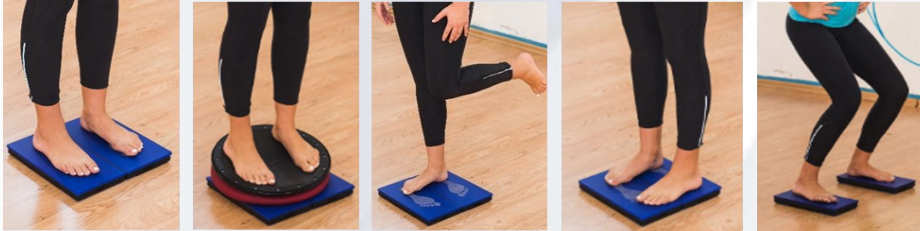Autonomy: 5 hours (battery charge: 20 minutes)

**External rotator assessment with K-Force Muscle Controller**

# PLATES

Force platforms to measure balance in various settings.

Light and robust, ideal to assess and strenghten proprioception.



**K-Force Plates - Exemples of use**

## Technical features

Weight: 1600 grams

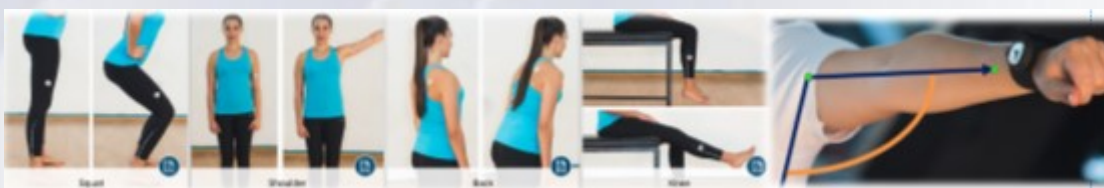Dimensions: 30 x 320 x 160 mm x 2

Wireless range: up to 20 meters

Maximal strength: 300 kg per Plates, 600 kg for both

Sensitivity: 2,5 kg per Plates

Accuracy: 500 grams



# SENS

A connected goniometer to measure the joint range of motion, based on a reference posture.



**K- Force Sens - Exemples of use**

## Technical features

Weight: 40 grams

Dimensions: 35 x 25 x 10 mm

Wireless range: up to 20 meters

Sensitivity: 5°

Accuracy: 3°

Sampling frequency: 100 Hz

Autonomy: 1 hour (battery charge: 15 minutes)

**BUBBLE**

Pressure air dynamometer transducing the pressure fluctuations into a force measurement.

Its plug sensor can be connected to a big range of inflatable tools.



**Exemples of Bubble use**

## Technical features

Weight: 100 grams

Dimensions: 80 x 55 x 25 mm

Wireless range: up to 20 meters

Maximal strength: 90 kg

Sensitivity: 500 grams

Accuracy: 500 grams

Sampling frequency: 75 Hz

Autonomy: 5 hours (battery charge: 20 minutes)