VALD

FORCEDECKS

DUAL FORCE PLATE SYSTEM

ForceDecks Starter’s Guide

A comprehensive guide to setting up your ForceDecks and conducting tests.

Contents

1 What is in a Starter's Guide?

This Starter's Guide is designed to assist new users in getting started with VALD. Learn the basics and quickly integrate VALD into your everyday workflows with simple, step-by-step instructions; strategies for getting the most out of VALD; recommendations for best practice; and links to additional resources for further learning.

2 What is not in a Starter's Guide?

This Starter's Guide is intended to initiate your journey with VALD. It does not encompass any advanced information, complex techniques, or in-depth analysis outside of the scope of a new user's level.

While this guide might not cover every single aspect or topic, there are additional resources available to complement the Starter's Guide in your learning journey.

3 Resources

As a VALD client, there are many resources at your disposal in addition to this Starter's Guide.

Get in touch with a Client Success Manager

When you first start your VALD journey, you will be introduced to your Client Success Manager (CSM).

Our CSMs are here to assist you with your onboarding process and have specialised skills and knowledge in the applied use of your VALD systems, uniquely positioning them to set up you and your team for success.

Get in touch

https://valdperformance.com/vald-client-success-team/

Get in touch with VALD Support

With our friendly support team members placed strategically across the globe, we are here to help with any how-to or troubleshooting queries.

Get the help you need when you need it by reaching out to our support team.

Submit a request

support@vald.com

Additional resources

In addition to our invaluable Client Success and Support teams, we also have a wide range of auxiliary documentation available to you.

- VALD Hub Starter's Guide
- ForceDecks Advanced Guide
- ForceDecks Hardware Assembly
- ForceDecks Test Protocols

4 Getting started with ForceDecks

ForceDecks is a dual force plate hardware and software system designed to help you collect and interpret objective measurements across a wide variety of isometric, dynamic, and balance tests. Testing with ForceDecks allows you to accurately measure how individuals move and easily track progress over time, providing you with the right information, for the right decision, at the right time.

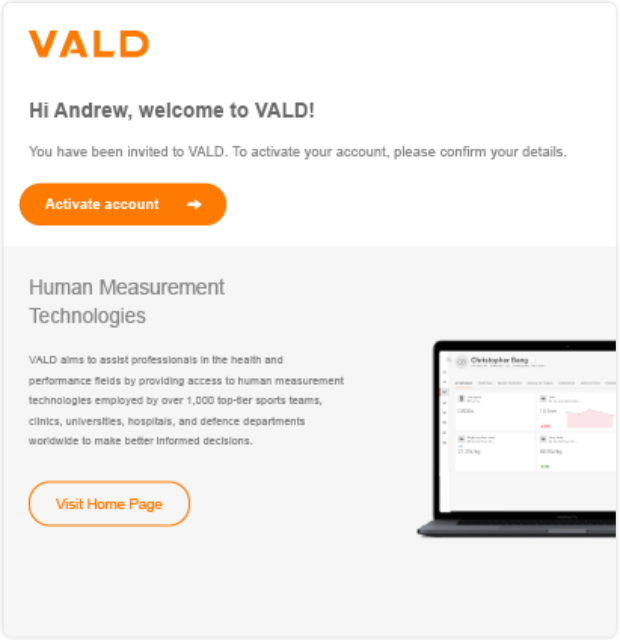
ForceDecks use calibrated load cells that accurately capture force exerted by an individual during different movements. You can measure neuromuscular performance during both bilateral (involving both limbs) and unilateral (single limb) tests, providing metrics for individual limb performance, bilateral performance, and inter-limb asymmetries.

You can use the ForceDecks system in various aspects of patient or athlete care, including assessment, training, monitoring, and rehabilitation. Using ForceDecks will provide you with valuable insights into an individual's movement, performance, and asymmetry, enabling you to make better informed decisions.

5 Prerequisites

5.1 Setting up VALD Hub

Prior to testing individuals with the ForceDecks system (or any VALD systems), you must activate and set up your VALD Hub account.



Taking the time to properly set up your VALD Hub account will enable you to use VALD Hub to its full potential, providing an extremely powerful tool to derive meaningful results and achieve success across your organisation.

It is recommended to read through our VALD Hub Starter's Guide before continuing with this document, as the VALD Hub guide will provide a comprehensive overview of:

- *Activating your VALD account.*
- *Creating profiles for your patients or athletes.*
- *Creating Categories and Groups to organise your profiles.*
- *Adding additional users to your account.*

Read VALD Hub Starter's Guide

5.2 Overview of ForceDecks hardware

ForceDecks are delivered to you assembled, calibrated, and ready to use.

For a detailed list of things to consider when setting up your ForceDecks for testing, please consult Appendix B.

ForceDecks hardware is available in five models (FDMini, FDLite, FDMax, FD4000), grouped into two generations. For a full list of ForceDecks technical specifications, please consult our Knowledge Base.

ForceDecks FDLite pictured above.

5.3 Overview of ForceDecks software

The ForceDecks software is designed to complement your ForceDecks hardware. As you conduct assessments, you can collect and analyse data with just a few clicks using one of our ForceDecks software solutions.

Knowledge Base Guide: About ForceDecks Software

5.3.1 Different software apps

When testing with ForceDecks, there are three different software apps you can use that cater to the preferences and requirements of you and your team.

iOS	Windows
ForceDecks	ForceDecks ForceDecks Jump

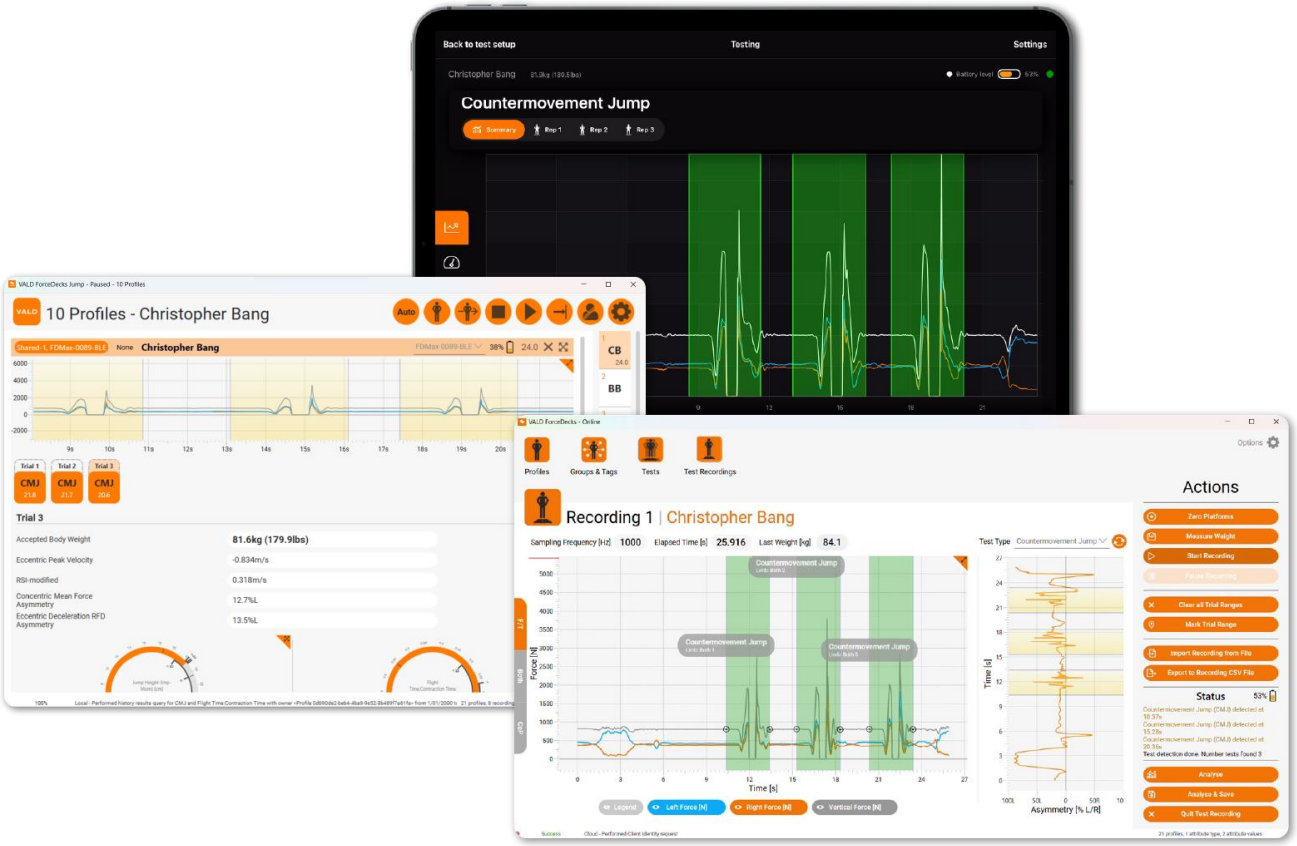
ForceDecks iOS is suitable for all users, providing extensive functionality in the convenience of your iPad or iPhone. ForceDecks iOS is a portable and user-friendly solution for collecting and analysing data directly on your iOS device, with an easy and intuitive workflow and advanced post-testing reports.

Users can also enable ForceDecks Vision on iPad devices and capture video of the assessment. This footage automatically synchronises with the force trace data to highlight the different phases of movement.

ForceDecks Windows is often used in university or high-performance settings, providing comprehensive force plate analysis and performance assessment. Manage your test recordings in the Windows app by easily editing and removing reps, moving tests between profiles, and adding custom test tags.

When using ForceDecks Windows, users can generate customisable metric reports, export force data, and integrate with third-party force plate hardware (via USB).

ForceDecks Jump for Windows is the ideal solution for testing multiple athletes simultaneously or in quick succession. Connect multiple sets of ForceDecks plates via USB for efficient and rapid testing, maximising your productivity and convenience.



5.3.2 Download ForceDecks

To download **ForceDecks for iOS**, **scan the QR code** or go to the App Store and search for 'ForceDecks' to install.

ForceDecks Windows and **ForceDecks Jump for Windows** can be downloaded through the following guide.

> To use ForceDecks on Windows, you must firstly obtain an Activation Code from the VALD Support Team (support@vald.com) using the steps in this Knowledge Base Guide.

6 Considerations before you test

We often get asked what tests should be conducted and metrics should be analysed. We suggest using the following framework to aid decision making.

What are you testing?	When testing individuals, you should **determine the test types that will best suit the session**. In a health setting it is important to consider what physical impairments you are looking to assess, and in the athletic population you may consider what physical adaptations you are hoping to measure. Creating test batteries might be helpful for increased efficiency if you work with clients with either similar conditions or similar performance goals.
Why are you testing?	The purpose for testing on ForceDecks is to **better understand an individual's physical ability**. Whether we are measuring a patient who has just commenced rehab, or an athlete who is about to begin their competitive season, the purpose of testing is to measure critical components of physical function.
When are you testing?	The frequency with which testing is conducted is predicated upon the goals of the client and their individual circumstances, as well as the desired outcome of testing. Consider the physical demands of the test, as well as the level of urgency for gathering the desired information.
How will you use the data?	The objective information obtained from testing with ForceDecks should guide your decision-making process in relation to the individual. Easily identify strengths, weaknesses and asymmetries and track progress over time across different testing sessions to evaluate the effectiveness of your program.

6.1 Choosing test types with ForceDecks

You can perform a wide variety of tests using ForceDecks. These are usually broken down into four categories: Jump Tests, Isometric Tests, Balance Tests, and Functional Tests.

These categories are listed below, with some general examples of when these test types would be useful in different testing scenarios.

6.1.1 Jump Tests

Jump tests measure the force and power generated during different types of jumps. It provides valuable information about an individual's lower body explosive strength and neuromuscular performance.

Health	Performance
Jump tests in health settings can be used to identify problem areas and deficiencies. Analysing jump phases reveals insights into an individual's movement and potential compensatory patterns.	Jump tests can be used in performance settings for monitoring performance improvements and fatigue. They can also be used to influence training prescription.

6.1.2 Isometric Tests

Isometric tests assess an individual's maximal strength and force production during static contractions. It measures the force output while the muscles are held in a fixed position without any joint movement.

Health	Performance
Tests for early-stage rehabilitation. These movements are less dynamic and much more stable, therefore risk to affected structures is quite low.	Isometric tests in performance spaces are largely used to assess force generating capabilities in a specific joint or system.

6.1.3 Balance Tests

Balance tests evaluate an individual's ability to maintain postural stability during various conditions. It provides insights into proprioception, neuromuscular control, and balance control.

Health	Performance
Balance tests can be used to assess falls risk in geriatric patients, lower limb injury rehab progress, and concussion severity and progress.	Balance tests might be included in rehabilitation for lower limb injury such as an ankle sprain.

6.1.4 Functional Tests

Functional tests assess an individual's movement capabilities and performance during specific functional tasks that simulate real-life activities. It provides insights into functional strength, coordination, and movement quality.

Health	Performance
Functional tests are used to assess more practical movements and uncover deficiencies within areas of the movement, such as concentric and eccentric strength, and stability.	Functional tests such as the Squat Assessment and Land and Hold might be included in rehabilitation setting.

6.2 Common mistakes when testing

The ForceDecks system is easy to set up and begin conducting tests. However, there are certain steps that must be done correctly to get the most accurate readings for your tests.

Zero the ForceDecks before testing

Zeroing the ForceDecks resets the initial reference point of weight. By doing so, you will eliminate any potential errors in the initial measurement when the individual steps on the plates and they are weighed.

Weigh the individual accurately

The individual's weight is extremely important to record accurately before beginning a test, as this is used by ForceDecks to calculate certain metrics for each movement.

If not weighing correctly, you will see inaccurate results for metrics such as "Peak Power / BM" or "Jump Height (Impulse-Momentum)" as the individual's weight is used to calculate these metrics.

Follow the correct protocol instructions

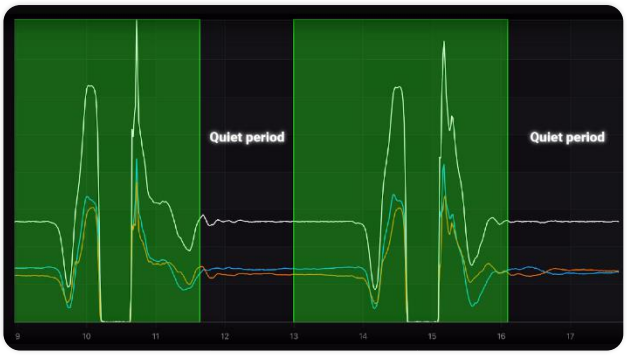
ForceDecks software is designed to detect a test type based on the predicted force trace for that movement. It is extremely critical that the correct protocol is followed to ensure ForceDecks can accurately collect data.

This is particularly important if you are using the **'Auto Jump'** feature, where ForceDecks will automatically detect the relevant test type based on the force trace produced. If the incorrect protocol is followed, this might result in test metrics being incorrectly calculated, the incorrect test type being attributed to the movement, or repetitions not being detected.

Observe a quiet period between reps

It is recommended to observe a short quiet period or rest (2-3 seconds) in between repetitions or movements to allow the ForceDecks software to accurately detect the previous rep.

This ensures ForceDecks can accurately detect the start of each separate movement.



7 Record a test

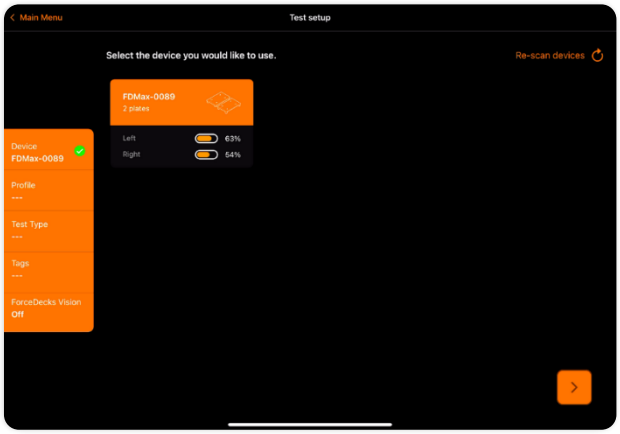
This section will provide a summary of each step involved in recording a test with ForceDecks. For more detailed instructions on conducting tests, **consult the VALD Knowledge Base** using the links below.

- Record a test in ForceDecks iOS
- Record a test in ForceDecks Windows
- Record a test in ForceDecks Jump

1 Connect to ForceDecks

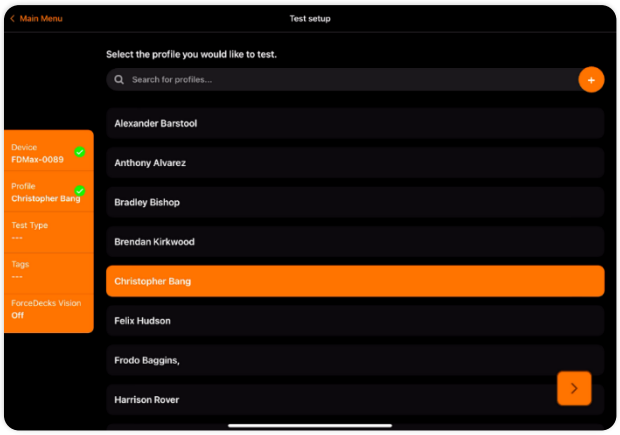
Turn your ForceDecks on by clicking the power button on the left (primary) plate with the interplate cable connected (see Appendix B), then login to your ForceDecks app (iOS or Windows) and connect to your hardware.

In the iOS app, **click Test** to search for and connect to your ForceDecks.



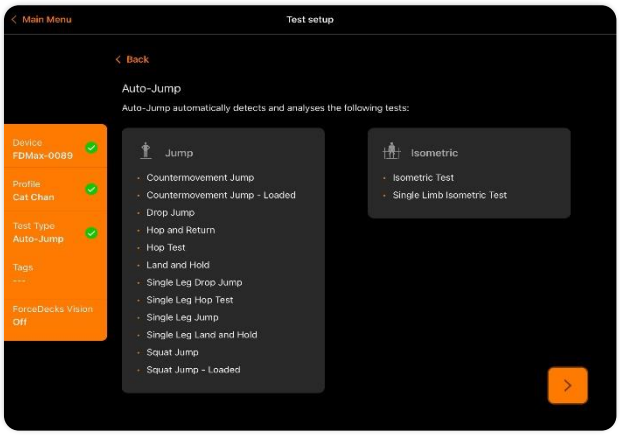
2 Select a profile

Choose a profile from the list to test. If you have a significant number of profiles, you can use the search bar to quickly narrow down your list.



> Haven't created a profile for this individual yet? Create a profile using the Add Profile / orange plus button.

3 Select a test type



Select a single test from the available list of test types, **or select Auto Detect**.

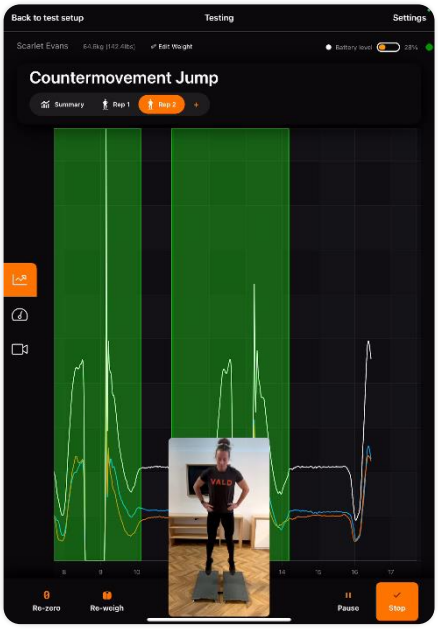
Auto Detect will automatically detect most test types (see Appendix A) by analysing the movement performed by the individual.

4 Add tags

Tags are an ***optional feature*** that can assist you with labelling and grouping different ForceDecks tests together, similar to how you would group profiles using the Categories and Groups system.

Knowledge Base Guide: ForceDecks Tags

5 Enable ForceDecks Vision (iPad users only)

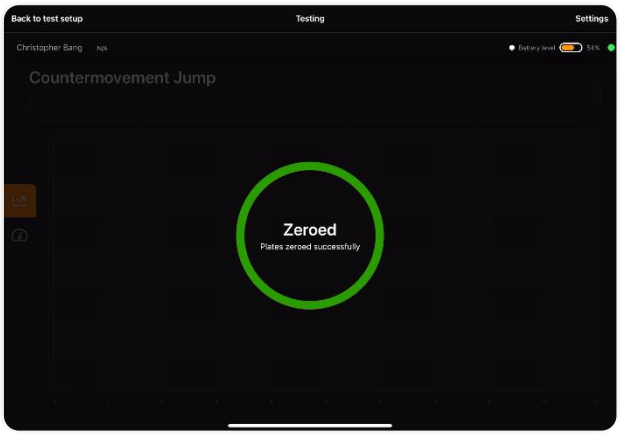


ForceDecks Vision is an iOS-specific feature that enables you to capture video footage of an individual (only for profiles 14 years or older), which is then analysed and linked to the force trace data for the movement.

This identifies key moments and phases during each rep performed. These can be selected and viewed after the assessment, enabling you to conduct a deeper analysis of the movements performed during a test.

Knowledge Base Guide: Using ForceDecks Vision

6 Zero the plates

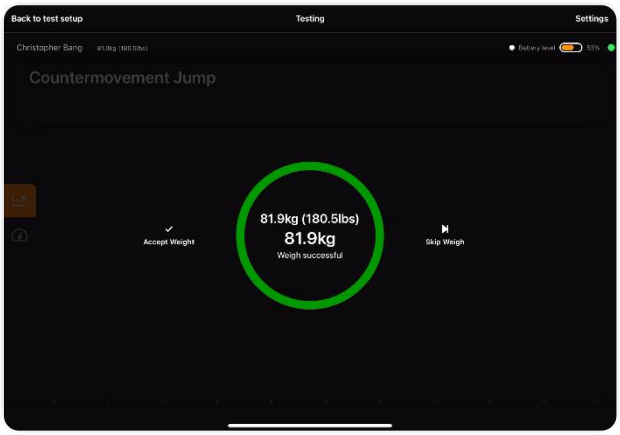


Press **Start** (ForceDecks Windows: Zero Now) to begin the process of zeroing the plates. Ensure that nothing is touching the plates while the zeroing completes.

This will **reset the point of zero weight** and cancel out any potential errors in the starting measurement.

Knowledge Base Guide: Zeroing ForceDecks

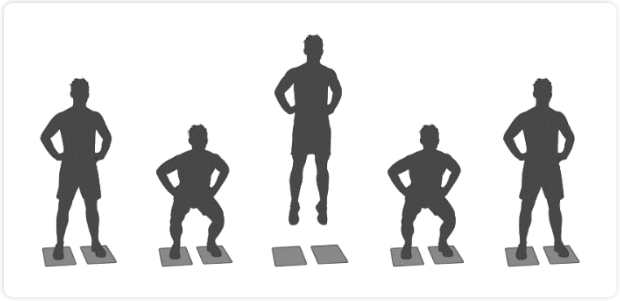
7 Weigh the individual



Have the individual step onto the plates and hold as still as possible, allowing ForceDecks to **accurately measure and record their weight**. This step is extremely important as the individual's weight is used in calculating a wide variety of metrics.

Knowledge Base Guide: Weighing in ForceDecks

8 Perform the movement



Have the individual perform the test, ensuring they are following the correct protocol instructions. Protocols for each test type can be found here:

ForceDecks Test Protocols

Allow for a small rest (2-3 seconds) in between reps. This ensures the individual regains a stable position and ForceDecks can accurately record the start of each movement.

A live force trace will display in the app as they complete the test. In ForceDecks iOS, each individual rep will be highlighted in green.

9 Finish recording and view results

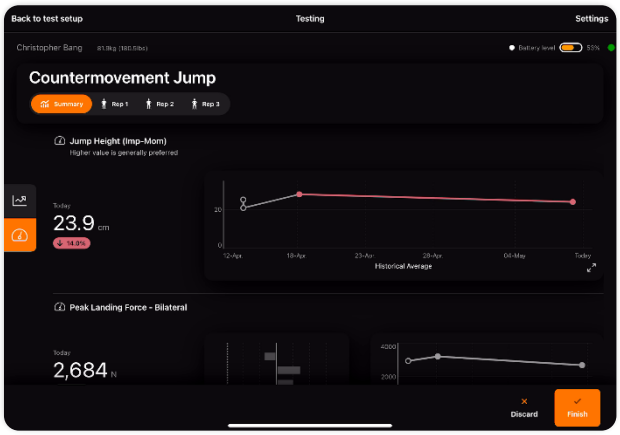
After the individual has completed the movement, **stop the recording**.

ForceDecks provides a graph display that highlights each rep and shows three separate lines for **Left Force** (blue), **Right Force** (orange), and Vertical Force (white). You can use this display to identify asymmetries and differences in force between repetitions.

The results display offers interchangeable metrics data for immediate assessment summary or rep-by-rep analysis, with comparisons to previous tests for tracking progress.

ForceDecks Vision (available on iOS) includes video recordings with key moments and phases highlighted, aiding in connecting the metrics data with visual movement.

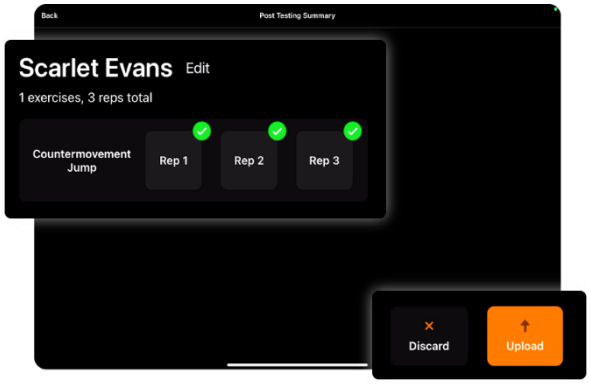
Knowledge Base Guide: Viewing results in ForceDecks iOS



10 Upload results to VALD Hub

Click **Upload** (ForceDecks Windows: Analyse & Save) to upload your results directly into VALD Hub.

You can then access this data anywhere, anytime, by logging into your VALD Hub account.



8 Example testing scenarios

To assist with understanding how ForceDecks can be utilised in different situations, we have collated a selection of different scenarios you might encounter.

This is intended as a guide for what test types to perform and metrics to use when presented with a patient with specific physical impairments, or an athlete with specific sports-orientated goals.

Presenting Pathologies	Performance Goals
• Lateral Ankle Sprain • ACL Injury • Hip Replacement	• Sprint Faster • Jump Higher • Change Direction Faster

Presenting Pathology: Lateral Ankle Sprain		
STAGE ONE		
Test types	**Single Leg Stand**	**Squat Assessment**
	Provides an early-stage assessment of static balance.	Lower extremity range of movement and strength asymmetry.
Metrics	• *CoP Range – Medial-Lateral* • *CoP Range – Anterior-Posterior* • *Total Excursion*	• *Maximum Negative Displacement* • *Eccentric Peak Force [N] (Asym)* • *Concentric Peak Force [N] (Asym)*
	Measure ankle stability in the frontal and sagittal plane, as well as multidirectional stability.	Measure squat depth, as well as strength and asymmetries in both phases.
STAGE TWO		
Test types	**Single Leg Squat**	**Single Leg Range of Stability**
	Assess dynamic stability and range of motion in the lower extremity.	Assess ankle range of motion and dynamic balance.
Metrics	• *Maximum Negative Displacement*	• *CoP Range – Medial-Lateral* • *CoP Range – Anterior-Posterior* • *Total Excursion*
	Measure lower extremity dynamic balance and range of movement.	Measure ankle stability in the frontal and sagittal plane, as well as multiplanar range of movement.
STAGE THREE		
Test types	**Hop and Return**	**Single Leg Hop Test**
	Assess medial and lateral stability, as well as take-off and landing ability.	Assess lower body plyometric capacity.
Metrics	• *Contact Time [s]* • *Time to Stabilisation [s]*	• *Contact Time [s]* • *Time to Stabilisation [s]*
	Measure change of direction ability and dynamic stabilisation.	Measure unilateral ballistic capacity.

Presenting Pathology: ACL Injury		
STAGE ONE		
Test types	**Squat Assessment**	**Single Leg Squat**
	Lower extremity range of movement and strength asymmetry.	Assess unilateral endurance and asymmetry.
Metrics	• *Maximum Negative Displacement* • *Eccentric Peak Force [N] (Asym)* • *Concentric Peak Force [N] (Asym)*	• *Maximum Negative Displacement* • *Number of Reps** **Compare bilaterally.*
	Measure squat depth, as well as strength and asymmetries in both phases.	Measure unilateral lower extremity range of movement and endurance.
STAGE TWO		
Test types	**Squat Jump**	**Land and Hold**
	Assess concentric power.	Assess eccentric and landing ability.
Metrics	• *Concentric Mean Force [N] (Asym)* • *Jump Height (Imp-Mom)*	• *Time to Stabilisation [s]* • *Peak Drop Landing Force [N] (Asym)*
	Measure symmetry of lower extremity concentric power.	Measure ability and symmetry in bilateral landing.
STAGE THREE		
Test types	**Hop and Return**	**Single Leg Drop Jump**
	Assess medial and lateral stability, as well as take-off and landing ability.	Assess unilateral lower body plyometric capacity.
Metrics	• *Contact Time [s]* • *Time to Stabilisation [s]*	• *Active Stiffness* • *RSI (Flight Time/Contact Time)*
	Measure change of direction ability and dynamic stabilisation.	Measure unilateral landing and power production.

Presenting Pathology: Hip Replacement		
STAGE ONE		
Test types	**Quiet Stand**	**Squat Assessment**
	Assess weight distribution ability in standing.	Assess strength asymmetry and range of movement.
Metrics	• *Total Excursion (Bilateral Total)* • *Mean Force [N] (Asym)*	• *Maximum Negative Displacement* • *Eccentric Peak Force [N] (Asym)* • *Concentric Peak Force [N] (Asym)*
	Measure static balance and weight distribution.	Measure squat depth, as well as strength and asymmetries in both phases.
STAGE TWO		
Test types	**Single Leg Stand**	**Sit to Stand to Sit**
	Assess static unilateral balance.	Assess asymmetry and endurance.
Metrics	• *CoP Range – Medial-Lateral* • *CoP Range – Anterior-Posterior* • *Total Excursion*	• *Time to Stand [s]* • *Peak Standing Force [N] (Asym)* • *Peak Sitting Force [N] (Asym)*
	Measure stability in the frontal and sagittal plane, as well as multidirectional stability.	Measure power and symmetry in a functional task.
STAGE THREE		
Test types	**Single Leg Squat**	**Single Leg Range of Stability**
	Measure unilateral lower extremity range of movement and endurance.	Assess dynamic balance and range of movement.
Metrics	• *Maximum Negative Displacement* • *Number of Reps** **Compare bilaterally.*	• *CoP Range – Medial-Lateral* • *CoP Range – Anterior-Posterior* • *Total Excursion*
	Measure unilateral lower extremity range of movement and endurance.	Assess dynamic balance and range of movement.

Performance Goal: Sprint Faster		
STAGE ONE		
Test types	**Single Limb Isometric Test (Standing Calf Raise)**	**Squat Jump**
	Assess unilateral isometric strength.	Assess concentric power.
Metrics	• *Start Time to 80% Peak Force [s]* • *Peak Vertical Force [N]*	• *RSI-modified* • *Jump Height (Imp-Mom)* • *Concentric Peak Velocity*
	Measure rate of force development and overall unilateral strength.	Measure jump height and concentric power.
STAGE TWO		
Test types	**Single Leg Jump**	**Countermovement Jump**
	Assess single limb dynamic balance / ballistic strength.	Assess stretch-shortening cycle utilisation.
Metrics	• *Jump Height (Imp-Mom)* • *RSI-modified*	• *Peak Power / BM* • *RSI-modified*
	Measure unilateral jump height and efficiency.	Measure bilateral elastic power production.
STAGE THREE		
Test types	**Single Leg Drop Jump**	**Single Leg Hop Jump**
	Assess stiffness with eccentric overload.	Assess plyometric endurance.
Metrics	• *RSI (Flight Time/Contact Time)* • *Peak Drive-Off Force [N]*	• *RSI (Flight Time/Contact Time Fatigue) [%]* • *Stiffness Fatigue [%]*
	Measure unilateral reactive force and efficiency.	Measure unilateral landing and power production.

Performance Goal: Jump Higher		
STAGE ONE		
Test types	**Isometric Mid-Thigh Pull**	**Countermovement Jump**
	Assess maximal strength.	Assess force velocity and dynamic strength index.
Metrics	• *Peak Vertical Force / BM* • *Start Time to Peak Force*	• *RSI-modified* • *Jump Height (Imp-Mom)* • *Countermovement Depth*
	Measure overall strength capacity.	Measure jump height and technique.
STAGE TWO		
Test types	**Drop Jump**	**Squat Jump**
	Assess reactive strength and bilateral plyometric capability.	Assess concentric power.
Metrics	• *RSI (Flight Time / Contact Time)* • *Peak Drive-Off Force [N]* • *Jump Height (Imp-Mom)*	• *RSI-modified* • *Jump Height (Imp-Mom)*
	Measure plyometric capacity.	Measure concentric power.
STAGE THREE		
Test types	**Single Leg Jump**	**Abalakov Jump**
	Assess unilateral jumping (hop) ability.	Assess overall jumping ability.
Metrics	• *RSI-modified* • *Jump Height (Imp-Mom)*	• *RSI-modified* • *Jump Height (Imp-Mom)*
	Measure unilateral jumping ability.	Measure overall maximal jumping ability.

Performance Goal: Change Direction Faster		
STAGE ONE		
Test types	**Single Leg Squat**	**Single Limb Isometric Test (Standing Calf Raise)**
	Assess unilateral dynamic balance and strength.	Assess unilateral isometric strength.
Metrics	• *Maximum Negative Displacement* • *Peak Force [N]*	• *Start Time to 80% Peak Force* • *Peak Vertical Force [N]*
	Measure unilateral strength and stability.	Measure unilateral max strength and RFD.
STAGE TWO		
Test types	**Single Leg Jump**	**Single Leg Land and Hold**
	Assess single limb dynamic balance / ballistic strength.	Assess single leg landing and eccentric control.
Metrics	• *Jump Height (Imp-Mom)* • *RSI-modified*	• *Time to Stabilisation [s]* • *Peak Drop Landing Force [N]*
	Measure unilateral jumping ability.	Measure unilateral landing ability.
STAGE THREE		
Test types	**Single Leg Hop and Return**	**Single Leg Drop Jump**
	Assess change of direction.	Assess plyometric capacity.
Metrics	• *Contact Time [s]* • *Eccentric Duration [ms]* • *Concentric Duration [ms]*	• *RSI (Flight Time / Contact Time)* • *Peak Drive-Off Force [N]*
	Measure unilateral change of direction ability.	Measure unilateral vertical plyometric capacity.

9 After a test

You can view and analyse data at any time in VALD Hub. VALD Hub provides you with more freedom than ForceDecks, allowing you to display up to 20 different metrics at a time for a single test.

Results for an individual profile can be viewed directly from their Profile page, or within the Results Export dashboard. You can view and compare:

- a profile over time;
- multiple profiles for the same test session; and
- multiple profiles over time.

Open VALD Hub (https://hub.valdperformance.com) and log into your account.

10 Next steps

Now that you have completed the beginning steps of testing with ForceDecks, you can delve deeper into interpreting your results and make objective, informed decisions when creating training or treatment programs.

Incorporating ForceDecks tests into your regular programming and assessments can assist you with more accurately monitoring progress and tailoring your client sessions accordingly.

11 Appendices

11.1 Appendix A: ForceDecks test types

Test Name	Auto-Detected	Description
JUMP TESTS		
Abalakov Jump	No*	Jump for maximum height.
Countermovement Jump	Yes	Jump for maximum height.
Countermovement Jump – Loaded	Yes	Jump for maximum height with external load.
Drop Jump	Yes	Starting from a box, dropping onto force plates then a rebound jump for maximum height.
Hop and Return	Yes	Jump from one plate to the other and return, on a single leg.
Hop Test	Yes	Starting with a sub-maximal jump, followed by 5-10 consecutive hops using ankles only (no knee flexion).

Single Leg Drop Jump	Yes	Starting from a box, dropping onto force plates on a single leg, then a rebound jump for maximum height, landing on the single leg being assessed.
Single Leg Hop Test	Yes	On a single leg, starting with a sub-maximal jump, followed by 5-10 consecutive hops using ankle only (no knee flexion).
Single Leg Jump	Yes	Jump for maximum height on a single leg.
Squat Jump	Yes	Jump for maximum height, starting from a paused squat position.
Squat Jump – Loaded	Yes	Jump for maximum height, starting from a paused squat position, with external load.
ISOMETRIC TESTS		
Isometric Mid-Thigh Pull	No	Maximum force exerted against an immovable object at the midpoint of the thigh.
Isometric Squat Hold	No	Hold a squat position without movement.
Isometric Test	Yes	Static maximal strength test.
Shoulder ISO-I	No	Isometric contraction of the shoulder with the testing arm straight overhead and non-testing arm by their side.
Shoulder ISO-Y	No	Isometric contraction of the shoulder with the testing arm abducted to 135 degrees and non-testing arm behind their back.
Shoulder ISO-T	No	Isometric contraction of the shoulder with the testing arm abducted to 90 degrees and non-testing arm behind their back.
Single Limb Isometric Test	Yes	Static maximal strength test on a single limb.
BALANCE TESTS		
Quiet Stand	No	Stand as stationary as possible for the set amount of time.
Single Leg Range of Stability	No	Control and stability assessment during a single leg stand.
Single Leg Stand	No	Balance on a single leg without movement.
FUNCTIONAL TESTS		
Land and Hold (LAH)	Yes	Starting from a box, dropping or jumping onto force plates, then holding in a landing position until completely stable.
Push Up (PUSHUPT)	No	Perform a push up movement with hands positioned on each force plate.

Single Leg Land and Hold (SLLAH)	Yes	Starting from a box, dropping or jumping and landing with a single leg on a force place, then holding in a landing position until completely stable.
Single Leg Squat Assessment (SLSQT)	No	Loaded or bodyweight squats on a single leg.
Sit to Stand to Sit (STSTS)	No	Stand up from a seated position, and then return to a seated position.
Squat Assessment (SQT)	No	Loaded or bodyweight squats.

11.2 Appendix B: Hardware setup and installation considerations

ForceDecks are delivered to you preassembled, calibrated, and ready to use. There are a few things to consider when setting up your force platforms for testing, namely:

- Proper floor placement
- Crosstalk prevention
- Connecting the interplate cable
- Charging ForceDecks
- General cable care

11.2.1 Proper floor placement

ForceDecks can be placed either:

- freestanding on any flat, hard surface, or
- set into the floor (e.g. into weightlifting platforms).

When you first receive ForceDecks you should place the plates flat with feet down on a surface that is **as rigid and as flat as possible** (e.g. concrete is ideal, carpet or grass is not ideal). It is recommended to use a spirit level to identify an even part of your floor and marking out the space if you intend on moving the plates.

Each ForceDecks plate features three fixed feet and one adjustable foot. This adjustable foot can be raised or lowered to account for any variations in floor surface flatness. Simply lift the plate and twist the foot to adjust the height.

11.2.2 Crosstalk prevention

You should always leave a small gap between the left and right plate when testing to minimise crosstalk (i.e. unwanted transfer of force between plates). Crosstalk is caused when two plates are in contact, transferring force between them. This will result in inaccurate readings.

11.2.3 Connecting the interplate cable

While the ForceDecks plates are identical, connecting the interplate cable will determine which plate is left (primary) and which plate is right.

To connect the plates, insert the interplate cable into the **“Plate Out”** port on the **left plate**, and the other end into the **“Plate In”** port on the **right plate**.

11.2.4 Charging ForceDecks

Each individual plate contains a rechargeable battery that will be partially charged upon delivery. Two USB cables will be supplied to allow you to charge each plate, either as one unit or individually.

Charging ForceDecks individually

With the provided wall adapter, plug one plate directly into the wall and the other into a USB port on your computer.

Charging ForceDecks as one system

If the interplate cable is connected and you plug only the primary plate in to power, the secondary plate will trickle charge (i.e. charge at a slower rate).

It is recommended to connect each ForceDecks platform to a power source for **at least one full day every month,** as the batteries will slowly discharge over time when not in use.

Charging will cease after 10 hours of continuous charging to protect the battery from overcharging. Unplugging and re-plugging the charging cable will re-initiate charging.

The battery life and recharge time per system is as follows:

Approximate battery life (from full charge)	
FDMini	20+ hours
FDLite, FDMax	50+ hours
Approximate charge time (from empty charge)	
FDMini, FDLite, FDMax	24 hours

3 2nd Generation force plates only. 1st Generation ForceDecks contains a battery in the wireless adapter.

11.2.5 General cable care

Ensure that cables (interplate and charging) are routed to prevent their being stepped on or caught underneath the platform (e.g. under feet or circuit box). This can cause instability, potentially affecting measurements and increasing the likelihood of cable damage.

Take extra care with the interplate cable when moving platforms. When moving plates one at a time, you should disconnect the interplate cable before transport. If moving plates together, rotate one plate 180 degrees and place directly on top of the other so that the interplate cable remains on one side. Failure to do so can result in damage to the interplate cable and, in extreme cases, complete failure of the system.

11.3 Appendix C: Software compatibility

The below table provides an indication of which software options are compatible with each ForceDecks system.

	ForceDecks iOS		**ForceDecks** Windows		**ForceDecks Jump** Windows		**VALD Hub**
System	**Bluetooth**	**USB**	**Bluetooth**	**USB**	**Bluetooth**	**USB**	
FDMini	Yes	No	Yes	Yes	Yes*	Yes	Yes
FDLite v2	Yes	No	Yes	Yes	Yes*	Yes	Yes
FDMax	Yes	No	Yes	Yes	Yes*	Yes	Yes
FDLite v1	Yes#	No	Yes#	Yes	Yes*#	Yes	Yes
FD4000	Yes#	No	Yes#	Yes	Yes*#	Yes	Yes
3rd-party plates	No	No	No	Yes	No	Yes	Yes

* ForceDecks Jump Bluetooth connection limited to one set of ForceDecks at a time (compared with up to four sets via USB).

\# Requires additional ForceDecks Wireless Adapter.

11.4 Appendix D: System requirements

iOS ForceDecks iOS		**Windows** ForceDecks Windows | ForceDecks Jump Windows	
Operating system	iOS 12 or later	**Operating system**	Windows 10 64-bit or later
Bluetooth	BLE 4.2*	**Processor**	Intel i5 / i7 / i9
For optimal performance of your ForceDecks application, it is recommended to be running the latest iOS version on your device.		**Memory (RAM)**	8GB or greater
		Storage	500MB minimum for install
		Ports	1 x USB 2.0 / USB 3.0