LODEN SPORTS

Loden Sports Performance Lab

A Performance Lab in Your Pocket

User Manual and Usage Guide

Version 3.23

Contents

WHAT IS THE LODEN SPORTS PERFORMANCE LAB

The Loden Sports Performance Lab App is a performance lab in your pocket. Available now on the iOS app store, it can be used anytime, anywhere; comes stock with a variety of jump tests; is made for self-use and parent use; provides reliable, lab-quality data; and provides instant, easy-to-understand feedback. Loden Sports has built a performance data solution for your iPhone or iPad.

Loden Sports provides sports performance solutions for the 99% of parents, coaches, and athletes that don't have a PhD in performance science. While most sports performance or sports science products and companies are for the sports scientist, Loden Sports is easy to use and easy to understand, for anyone. Loden Sports is for the layperson.

Data Reliability

Jump performance data captured by the Loden Sports Performance Lab is validated against industry-leading force plate and optical systems. Loden Sports stands by the Loden Sports Performance Lab as a consistent and reliable vehicle for capturing performance data.

Key Features

- Jump test with ease and efficiency.
- Visualizations for tracking and monitoring.
- Metric Comparatives.
- A metric to show physical readiness comparative to 1-week, 1-month, 3-months, and 6-months.
- Get your Loden Score at home.
- Ability to execute the following assessments: Rebound Jumps, Single Leg Jumps, and a Vertical Jump.
- Ability to accurately measure ground contact time, flight time, height or distance, contraction time, peak velocity, peak acceleration, average acceleration, peak ground force, jump used areas (multiple jumps), power generation and reactive strength index (RSI) using proprietary methodologies.
- Ability to represent lower-half asymmetry deltas in power and RSI.
- Ability to input external run times.
- Self-testing Functionality.
- API Connectivity to Database.
- Desktop Athlete Management System (Loden Sports Quarry).

The Loden Sports Performance Lab addresses the many barriers to collecting quality, reliable performance data. It visualizes the data to provide immediate feedback in a clear and concise manner.

REQUIREMENTS

Hardware

The Loden Sports Performance Lab is currently available for iOS users only. The Loden Sports Lab App is currently compatible with: iPhone 12 Pro, iPhone 13 Pro, iPhone 14 Pro, iPhone 12 Pro Max, iPhone 13 Pro Max, iPhone 14 Pro Max, iPad Pro 11-in. (Generation 3 or newer), and iPad Pro 12.9-in.

Connectivity

Collection of performance data using the Loden Sports Performance Lab currently only works with an active Wi-Fi connection or active access to cellular data. Users cannot collect data offline and upload to the cloud at a later time when they gain access to Wi-Fi or cellular data.

SETTING UP AN ACCOUNT

What are your Needs?

When setting up your account, consider your needs when choosing a subscription. Loden Sports has options for individual athletes starting as low as $5 / month; can meet the needs of teams of various sizes; and for unique cases with large organizations, contact Loden Sports via email (info@lodensports.com) for pricing.

Individual	1-3	$5
Medium Team	26-50	$100
Organization	100+	Contact Loden Sports

If you start using the Loden Sports Performance Lab and down the road, find that you need to adjust your subscription based on the number of athletes you are currently servicing, you can do so within the app: ACCOUNT > SUBSCRIPTION.

The Dashboard Explained

The Loden Sports Performance Lab experience was designed to be simple and intuitive. We don't want you spending any more time than you have to within the app. Our dashboard (present across the bottom of your screen when the app is open) has 4 tabs: ACCOUNT, TRACK, COLLECT, and MANAGE.
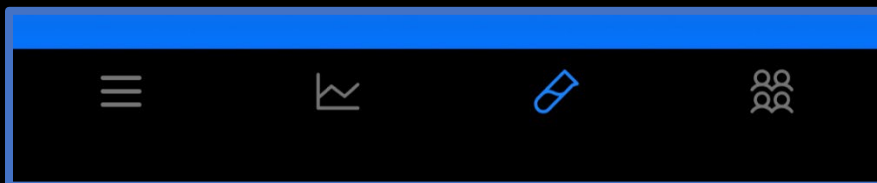
ACCOUNT, TRACK, COLLECT, and MANAGE pictured in order from left-to-right.

ACCOUNT is where you'll go for settings, to change your subscription, or to log out. TRACK is where you'll be able to view visualizations for select metrics captured during testing. COLLECT is where you'll be able to execute jump testing, update weights, and input run times for you or your athlete/s. MANAGE is where you'll go to add athletes, edit biographical information, and create groups for greater testing ease and efficiency.

Detailed procedures on how to navigate and utilize each tab on the dashboard are included in this manual.

MANAGE

How to Add an Athlete

You just downloaded the Loden Sports Performance Lab and now you are looking to populate your account with athletes. To add a new athlete:

- Click on the MANAGE tab on the dashboard at the bottom of your screen.
- Click "Add Athlete" under "Shortcuts."
- Fill out the registration information. First Name, Last Name, Date of Birth, Weight, Email, Location, and Gender are required fields.
- Once all information is provided, click submit.
- Navigate back to the MANAGE tab, click "Manage Athletes," and the athlete you just added should appear here on the list.
- You can now begin collecting performance data for this athlete.

Consider the athlete capacity of your subscription. You will only be allowed to add new athletes to an account that has the athlete capacity to do so. For example, if your account is capped at 25 athletes and there are 25 athletes listed, you will be met with an error message when you attempt to add a new athlete. You can add athlete capacity to your subscription under the ACCOUNT tab on the dashboard.

How to Edit an Athlete

All information in the athlete's profile is editable.

- Click on the MANAGE tab on the dashboard.
- Click "Manage Athletes."
- Find which athlete you are looking to edit and click on them.
- Make your changes to the fields you need to update.
- At the bottom of the form, click "Save."
- If you've done this right, a green banner will pop-down from the top of the screen indicating your changes have been saved.
- Click the arrow at top left to return to your list of athletes.

How to Deactivate an Athlete

The Loden Sports Performance Lab allows coaches and administrators to deactivate athletes from their account to make room for new athletes. For example: your account has a capacity of 50 athletes and right now, you are at 46/50. You just graduated a senior class of 8 athletes and you have 8 incoming freshmen. Deactivating athletes allows you to make room for your incoming freshmen without having to increase your subscription size or deleting your 8 outbound seniors.

Inactivate athletes appear in their own tab under "Manage Athletes." If an athlete is inactivate, you will be unable to collect new data for this athlete, however, you can still view their historical data in the TRACK tab on the dashboard. That way, you can make comparisons between your favorite freshman this year and your favorite senior from 4 years ago. How to deactivate an athlete:

- Click on the MANAGE tab on the dashboard at the bottom of your screen.
- Click "Manage Athletes."
- Find which athlete you are looking to deactivate and click on them.
- At the bottom of the form, click on the big red button that says "Deactivate Athlete."
- The app will ask you to confirm that you want to deactivate the athlete.

Proceed with caution: once an athlete is deactivated, you will not be able to reactivate this athlete from within the app, so be careful.

How to Create Groups

Your organization has hundreds of athletes and dozens of teams – it just isn't practical to scroll through your entire organization's directory of athletes every time you want to test a specific team. Loden Sports makes it easy to create and edit groups within the Loden Sports Performance Lab so that you only have to do this once! To create a group:

- Click on the MANAGE tab on the dashboard.
- Under "Shortcuts," click "Add Group."
- From your list of athletes, select which athletes you want to include in your new group.
- Click "Next" at the top right.
- Name your group.
- Review the athlete list to make sure it's accurate and click "Create Group" at the bottom of the screen.
- From the MANAGE tab, click "Manage Groups," and the group you just added should appear here on the list.
- You can now select this group in place of individual athletes on the COLLECT tab when you go to test athletes.

Athletes can be assigned to multiple groups.

COLLECT

Updating Your Weight

Loden Sports highly recommends that athletes who are using the Loden Sports Performance Lab daily, weekly, or monthly to track changes in power output, frequently update their weight within the app.

For teams and organizations that test less frequently, be cognizant of any significant changes in body weight in your athletes from testing session to testing session and adjust accordingly. The usefulness of Loden Power Points and the Readiness Metric is dependent on an (relatively) accurate weight. To update an athlete's weight:

- Navigate to the COLLECT tab on the dashboard.
- Under "Measurements," click on "Update Weights."
- Select which athlete you want to update weight for.
- Update the weight and click "Save."

Executing Jump Tests

Executing jump tests using the Loden Sports Performance Lab is simple and easy. See below for a full walkthrough on how to collect jump test data using the app:

- From the COLLECT tab, click "Select Athletes and Tests" under "Start Testing."
- Select the athletes you are looking to test (or select a group/s) and click "Next."
- Select the test/s you are looking to execute (descriptions and tutorial videos are included on this screen) and click "Start" at the bottom of the screen.
- Instructions for the selected test will appear on screen.
- Make sure the athlete is standing straight up with their hands at their sides and click the record button to start the capture of the jump.
- Let the athlete know it's time to jump and instruct them appropriately.
- Once they have jumped, click the record button again to stop the collection of jump data.
- Review your data and click "Save" at the bottom of the screen.

For detailed instructions on how to best execute jump tests, see the following section: COLLECT; Best Practices for Executing Jump Tests. Video from jump tests automatically saves to your camera roll.

Best Practices for Executing Jump Tests

This section will cover specific instructions for each jump test featured in the Loden Sports Performance Lab. As a general rule of thumb:

- Make sure the athlete's shirt is tucked into their waistband and that they don't have any loose or baggy clothing. A loose shirt can mess with the devices ability to capture clean data on the jump.
- When the athlete jumps, make sure no part of their body leaves the screen.

- Make sure that the athlete is standing straight up when you hit record so the device can register the origin point for the hip at rest.
- Make sure that the athlete's arms are at their side when you hit record. *If an athlete starts with their arms in the air, you can encounter a data collection error.*
- Portrait mode is always best.
- In an ideal world, the device you are using should be situated on a tripod, but if you don't have a tripod available, holding the device upright and still, at about chest height, will work just as well.
- Try to avoid backgrounds that are of similar color to what the athlete is wearing. The device may struggle to discern between the athlete and the background.
- Make sure there aren't other athletes, moving persons, animals, or moving objects within the frame while the athlete is jumping. For this reason, it is highly encouraged to avoid jumping in front of mirrors.

Rebound Jumps (Use for Readiness)

For the Rebound Jumps test, the athlete is instructed to jump as high as they can, as quick as they can, three times – similar to pogo jumps. The athlete's legs should remain straight while in the air. The athlete should load up on the first jump and the emphasis on the next two should be bouncing as quickly as they can back up to the height of the first jump.

Review and follow the best practices outlined earlier in this section and make sure the device is about 8-10 feet back from where the athlete is jumping. In the case of a common test environment, when you find an ideal set-up for your tripod with sufficient distance to the jump spot, it may not be a bad idea to mark both spots with a piece of tape on the ground for easy and consistent set-up.

Frequency: With a primary use-case of this test being the monitoring of athlete health and physical readiness, Loden Sports recommends utilizing this test weekly. For the competitive athlete, this test can be used as frequently as daily during the competitive season.

Single Leg Jumps (Left and Right) – Symmetry

For the Single Leg Jumps test, the athlete is instructed to jump as high as they can, as quick as they can, five times on a single leg – like a pogo stick. The leg the athlete is jumping with should remain straight while in the air. The emphasis on this test is for the athlete to remain in control of their body to the best of their ability.

Review and follow the best practices outlined earlier in this section and make sure the device is about 8-10 feet back from where the athlete is jumping. In the case of a common test environment, when you find an ideal set-up for your tripod with sufficient distance to the jump spot, it may not be a bad idea to mark both spots with a piece of tape on the ground for easy and consistent set-up.

Frequency: With a primary use-case of these tests being the monitoring of athlete health, Loden Sports recommends utilizing these tests twice per month. For the competitive athlete, this test can be used as frequently as 1-2 times per week during the competitive season.

Vertical Jump

For the Vertical Jump test, the athlete is instructed to jump as high as they can, one time. This test is adaptable. Athletes can be instructed for their arms to free swing or, alternatively, to isolate the legs, instruct the athlete to keep their hands on their hips. For the purposes of tracking over time, Loden Sports recommends that, whichever method is chosen or instruction is given, it is consistent for that athlete.

Review and follow the best practices outlined earlier in this section and make sure the device is about 8-10 feet back from where the athlete is jumping. In the case of a common test environment, when you find an ideal set-up for your tripod with sufficient distance to the jump spot, it may not be a bad idea to mark both spots with a piece of tape on the ground for easy and consistent set-up.

Frequency: This test is a good benchmark for progress in athletic development. Utilize this test at the start, during, and post-training periods.

Self-Record

The Loden Sports Performance Lab provides athletes with the capability to self-test if there isn't another person around to execute the testing for them. The process is very similar to testing with someone else operating the device, but requires an additional step to turn "Self Record" on. A walkthrough on how to self-test:

- From the COLLECT tab, select your name as the athlete you are looking to test.
- Select the test you are looking to execute and click "Start."
- At the bottom of the screen toggle "Self Record" on.
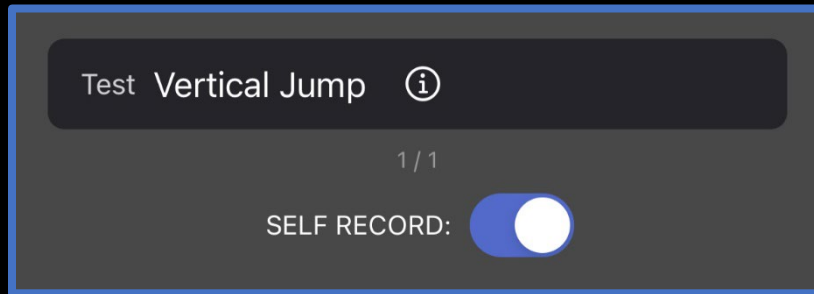
- Set your device up in portrait mode with the camera facing towards the spot you plan to jump, about 8-10 feet away from the tripod.
- Make sure your shirt is tucked in.
- Make sure your volume is up on your device and click the record button to start the capture of the jump.
- You will have 8 seconds to position yourself to jump. The device will click 8 times and then chime (sound on). When you hear the chime, the jump capture will be live and you can complete your jump test.
- Once you have jumped, walk back over to your device and click the record button again to stop the collection of jump data.
- Review your jump data and click "Save" at the bottom of the screen.

Self-testing requires a tripod.

Inputting Sprint Times

The Loden Sports Performance Lab has the capability to record certain run splits collected using external methods (laser timers highly suggested). You can input the following run splits: 10-yard, 20-yard, 30-yard, 40-yard, and 60-yard. The process for inputting run times is similar to that of testing an athlete:

- Navigate to the COLLECT tab on the dashboard.
- Under "Measurements," click on "Input Sprint Times."
- Select which athlete you want to input sprint times for.
- Enter run times and click "Save" at the bottom.

In order to calculate a Loden Speed Score for inclusion in a Loden Score, it is required that a 10-yard and 20-yard or 10-yard and 30-yard are inputted for an athlete as outlined in the section: Unofficial Loden Score; How to Generate an Unofficial Loden Score using the Loden Sports Performance Lab.

Unofficial Loden Score

The Loden Sports Performance Lab allows users to generate an unofficial Loden Score. The reason why the score is unofficial is because Loden Sports currently has no way to regulate collection methods for run time inputs. With that being said, we do want to provide the opportunity for anyone to get an idea of where they're at with an "unofficial" Loden Score.

Loden Sports stands behind Loden Power and Quickness scores captured by users as accurate depictions of how the athlete would score during an official Loden Sports dynamic performance evaluation.

What is the Loden Score System

The Loden Score System is a conglomerate of a power, quickness, speed, and overall metric. The series of proprietary algorithms were developed as a means of concisely communicating the results of each standardized Loden Sports dynamic performance evaluation. The metrics are strongly correlated to indicators of success on-field. The Loden Score System is backed by research and is battle-tested.

Human performance data is largely foreign to most parents, coaches, and athletes and for this reason, the Loden Score System was created to benchmark and answer the question "was that good?" In total, each athlete that completes a Loden Sports dynamic performance evaluation receives a Power, Quickness, Speed, and Loden (overall) score. These scores allow athletes and talent evaluators to track physical progress as the athlete matures. Each score is on a 0-12 scale.

Loden Score System Inclusivity

Loden Sports has three separate Loden Score Systems: the Loden Score System, the Female Loden Score System, and the Junior Loden Score System. While the Loden Score System provides a comparative for the male athlete that is close-to or at physical maturity, the Female Loden Score System is, intuitively, benchmarked against the physically mature female athlete; and the Junior Loden Score System is benchmarked against the pre-growth spurt athlete. Using date of birth and gender designation from the registration process, the Loden Sports Performance Lab will show an athlete their Loden Score on the appropriate scale:

- Male athletes aged 14+ = Loden Score System
- Female athletes aged 14+ = Female Loden Score System
- All athletes aged 14 or younger = Junior Loden Score System

How to Generate an Unofficial Loden Score

A full walkthrough on generating an unofficial Loden Score using the Loden Sports Performance Lab:

- Using the COLLECT tab on the dashboard, select which athlete/s or group you want to test.
- Execute the Rebound Jumps test for each selected athlete.

- Input sprint times for each selected athlete.
- In order to calculate a Loden Speed Score and a Loden Score, you must enter some combination of the following:
  - A 10-yard split and a 30-yard split.
  - A 10-yard split and a 20-yard split.
  - A 10-yard split, 20-yard split, and a 30-yard split.
- Update each athletes weight if necessary.
- You will now be able to view your athlete's Power, Quickness, Speed, and Loden Scores using the TRACK tab on the dashboard.

Best Practices for Generating Your Unofficial Loden Score

For the most accurate representation of an athlete's Loden Score, Loden Sports recommends making sure their weight is accurate and run times are captured using electronic timing gates.

Get your Official Loden Score

If you or your athlete/s are interested in an official Loden Score, contact Loden Sports at info@lodensports.com or send us a DM on Twitter or Instagram (@LodenSports).

TRACK

How to Navigate

After completing jump testing or inputting sprint times using the Loden Sports Performance Lab, you have the ability to view the results in real-time to track changes and make comparisons in an athlete's performance.

- Navigate to the TRACK tab on the dashboard and then select the athlete you want to track results for.
- Use the drop down to select which test or metric you want to view.

Readiness

Loden Sports uses the Rebound Jumps test to determine how ready an athlete is to perform on any given day (*see right*). Understanding how ready the body is to perform can be critical information for an athlete entering competition. It can be a great tool for athletes and coaches to know when to push harder and when to ease up. If an athlete's readiness score is in the yellow or red, don't expect to be at peak performance. The higher the athlete's readiness score is in the green, the more primed they are to perform at their best.
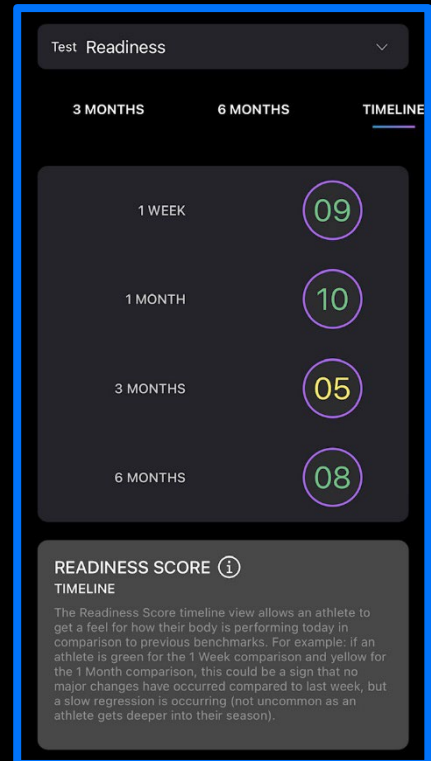
Rebound Jumps

Height – The average height (in inches) of the three rebound jumps (*see right*).

RSI – The average RSI (reactive strength index) of the three rebound jumps. Loden Sports uses a flight time divided by ground contact time ratio for RSI.

Power – The average amount of Loden Power Points generated during the three rebound jumps. Loden Power Points are Loden Sports measure of power. Loden Sports has found strong relationships between power output measured in Loden Power Points for this test and key on-field performance indicators.

Single Leg Jumps

Power – The average amount of Loden Power Points generated during the five single leg jumps. Loden Power Points are Loden Sports measure of power.

RSI – The average RSI (reactive strength index) of the five single leg jumps. Loden Sports uses a flight time divided by ground contact time ratio for RSI.

See below left for an example of how Loden Sports visualizes RSI for both legs in-app.

Height – The average height (in inches) of the five single leg jumps.

Used Area – The used jump area is a measure of dynamic stability. This metric is determined by tracking and recording the landing position for each of the five single leg jumps. Once the five landing points are determined, the best way to "visually" explain how used area is determined is to consider the five landing points to be nails in a board. If you were to stretch a rubber band around all of the nails on the board and then let go, it would snap into place around all the outermost nails – enclosing all other nails within its interior (see right). Lower numbers mean more dynamic stability (especially coupled with higher jump heights).
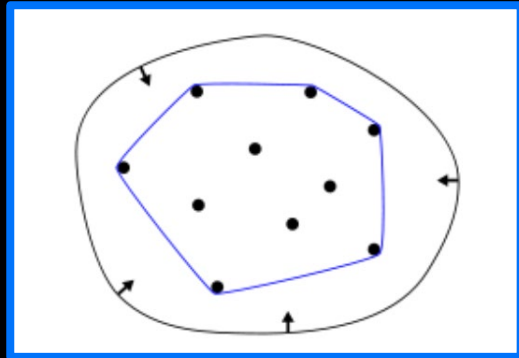
See below middle for an example of how Loden Sports visualizes used area in-app.

Power Asymmetry – Power asymmetry is the average percent-difference between an athlete's left leg and right leg power metrics.

RSI Asymmetry – RSI asymmetry is the average percent-difference between an athlete's left leg and right leg RSI metrics.

See below right for an example of how Loden Sports visualizes RSI Asymmetry in-app.

Height Asymmetry – Height asymmetry is the average percent-difference between an athlete's left leg and right leg height metrics.
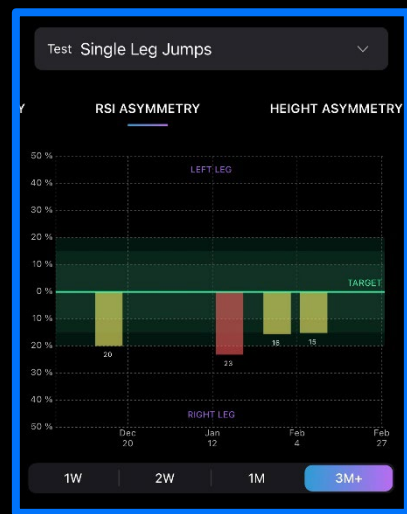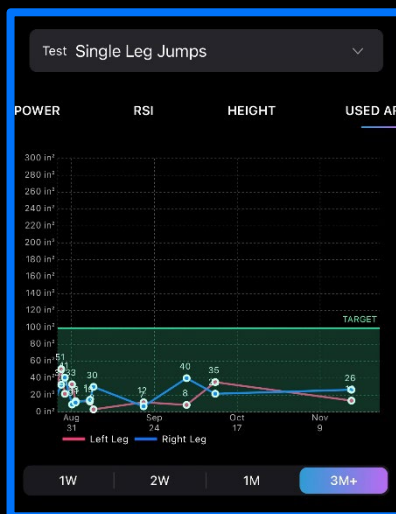
Vertical Jump

Power – The amount of Loden Power Points generated during a single vertical jump. Loden Power Points are Loden Sports measure of power.

Height – The height (in inches) of a single vertical jump.

Sprint

The 10-yard, 20-yard, 30-yard, 40-yard, and 60-yard run splits are popular across a range of different sports. Loden Sports allows users to input and track whichever run splits are most relevant to their sport or training.

Loden Sports provides comparatives for 10-yard, 20-yard, and 30-yard splits based off of thousands of run splits captured using consistent protocols and timing-gate technology.

Loden Score / Female Loden Score / Junior Loden Score

A couple of notes on the Loden Score System. The Loden Score System was created as a simple way to quickly benchmark an athlete against their peers with metrics that are heavily correlated to things that matter in competitive sports. The Loden Score System was built using thousands of data points on athletes across the most popular sports in the world. Loden Sports stands by the Junior Loden Score System, Loden Score System, and Female Loden Score System as accurate, universal benchmarks of raw athleticism.

- The Junior Loden Score System should be used for athletes aged-14 and younger. This scale is used to monitor developmental progress in athletes prior to their growth spurt.
- The Loden Score System is used for the physically maturing or mature, male athlete. This scale was built using a data set comprised of elite, physically mature athletes. If your 12-year-old scores a 0 on the Loden Score System, well, of course they did.
- The Female Loden Score System is used for the physically maturing or mature, female athlete. This scale was built using a data set comprised of elite, physically mature athletes.

Under the TRACK tab for the Loden Sports Performance Lab, you will have the option to view the Junior Loden Score System or the Loden Score System. Again, if your athlete is aged-14 or younger, male or female, we encourage your focus to remain on the Junior Loden Score System. If an athlete is designated "male" during registration, the Loden Score System will populate with the male Loden Score System. If an athlete is designated "female" during registration, the Loden Score System will populate with the Female Loden Score System.

As a female athlete, there is no way to view what your male Loden Score would be and vice versa. In a unique case where a female athlete is interested in what her male Loden Score would be, contact Loden Sports directly at info@lodensports.com or via DM on Twitter or Instagram (@LodenSports).

Power Score – Loden Sports uses the Power Score to benchmark lower-half power production. The Power Score is on a 0-12 scale. Age averages in the table below.

Quickness Score – Loden Sports uses the Quickness Score to benchmark the relationship between time spent in the air and ground contact time. The Quickness Score is on a 0-12 scale. Age averages in the table below.

Speed Score – Loden Sports uses the Speed Score to benchmark top-end speed. The Speed Score is on a 0-12 scale. Age averages in the table below.

Loden Score – Loden Sports uses the Loden Score as a measure of overall raw athleticism. The Loden Score is on a 0-12 scale. Age averages in the table below.

Age	Junior Loden Score				Female Loden Score				Loden Score			
	Power	Quickness	Speed	Loden Score	Power	Quickness	Speed	Loden Score	Power	Quickness	Speed	Loden Score
7	-	-	-	-	-	-	-	-	0	1	0	0
8	0	4	1	1	-	-	-	-	0	1	0	0
9	1	4	2	2	-	-	-	-	0	1	0	0
10	2	4	2	2	-	-	-	-	0	1	0	0
11	2	5	2	3	2	5	4	4	0	1	0	0
12	3	4	3	4	2	5	5	5	0	1	0	0
13	5	5	5	5	3	6	6	5	0	1	1	0
14	6	6	6	6	4	6	7	6	0	2	2	1
15	-	-	-	-	5	6	7	6	1	3	4	2
16	-	-	-	-	5	7	7	7	3	4	5	3
17	-	-	-	-	5	7	8	7	3	5	5	4
18	-	-	-	-	-	-	-	-	4	5	6	4
19	-	-	-	-	-	-	-	-	4	6	6	5
20	-	-	-	-	-	-	-	-	5	6	6	6
21	-	-	-	-	-	-	-	-	6	6	6	6
22	-	-	-	-	-	-	-	-	6	6	6	6
23	-	-	-	-	-	-	-	-	6	7	7	6
24	-	-	-	-	-	-	-	-	6	6	6	6
25	-	-	-	-	-	-	-	-	6	6	6	6
26-30	-	-	-	-	-	-	-	-	4	6	5	4

Loden Sports collects additional metrics that aren't currently displayed within the Loden Sports Performance Lab TRACK tab. There are plans to incorporate the presentation of inputted run times, and for select jump tests, ground contact time, flight time, contraction time, peak velocity, peak acceleration, average acceleration, and peak ground force into future offerings from Loden Sports.

Comparatives

For a number of metrics, Loden Sports provides a "Collegiate Comparatives" toggle. This toggle is available to any athletes aged-15 and older. The middle of the zones that appear when the toggle is on (see right) represent the average for a high-level collegiate athlete. The comparatives are designed to give aspiring high school athletes a target-zone and a means to track their progress towards their goals. Male comparatives will display for male athletes and female comparatives will display for female athletes.

In addition to "Collegiate Comparatives," any athletes aged-14 or younger (male and female) will see a "Junior Comparatives" toggle. The middle of the zones that appear when the "Junior Comparatives" toggle is on represent the average for a 14-year-old athlete. The comparatives are designed to provide a benchmark for younger athletes against their peers.

ACCOUNT

Subscription

"Subscription" allows you to view the account type and the current number of athlete licenses allowed on the account. Additionally, you can edit or cancel your subscription from here depending on your needs as outlined in the section: *Setting Up An Account; What are your Needs?*

About this Version, Terms of Use, Privacy Policy, About Us, Contact Us

Under the ACCOUNT tab on the dashboard, you can view version information, terms of use, our privacy policy, an about us, and an email pop-up to contact us.

Log Out

If you are signed into your account on a device that you do not own; are looking to sign into an alternate account; or for whatever other reason, you can log out of your account using the "Log Out" button on the ACCOUNT tab of the dashboard.