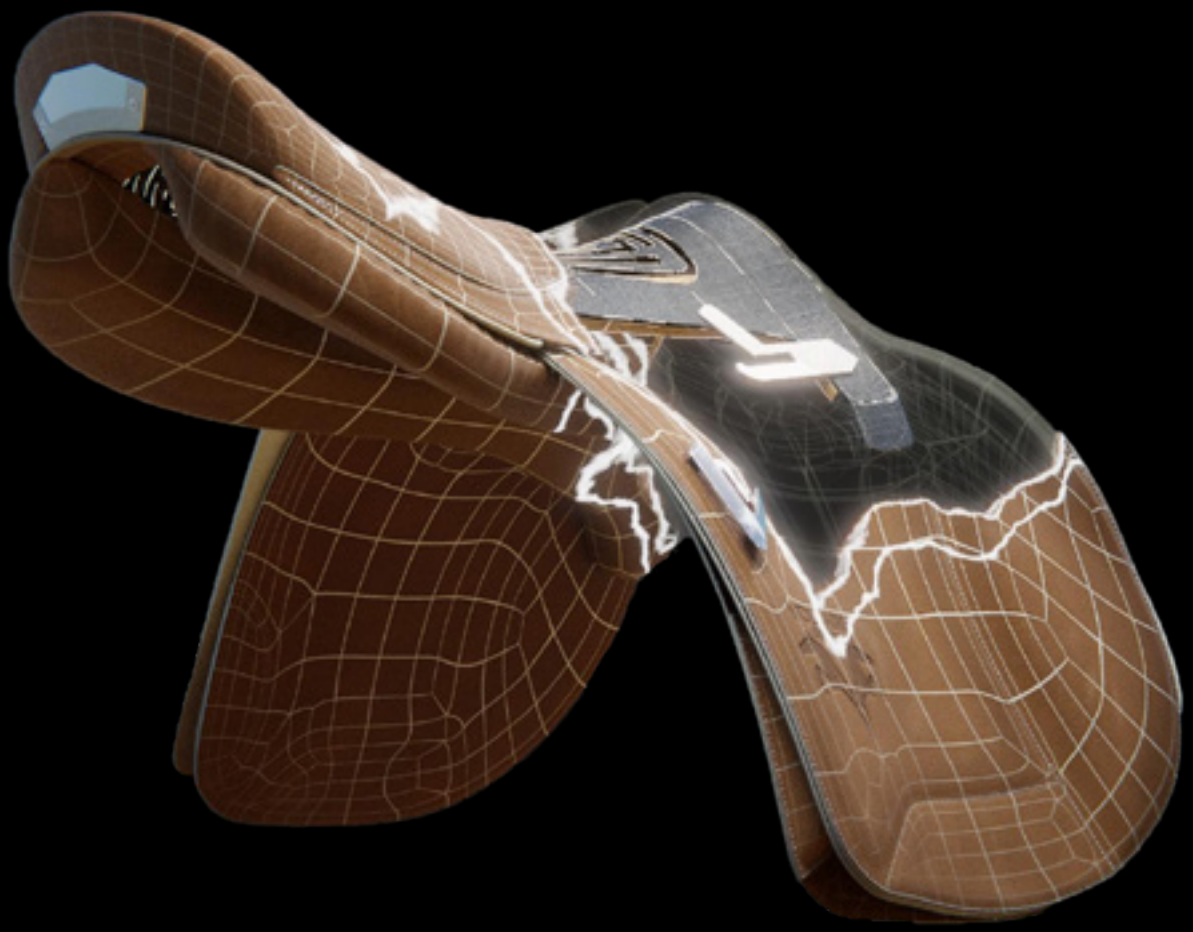
Connecting with our horses



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The Saddle 3.0

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1. CARDIO AND CALORIES

Checking that your horse is healthy should become a daily routine, almost a second nature. Thanks to the cardio/calories section of our application, you will be able to detect the slightest discrepancy in order to react quickly.

The measurement of the heart rate is a method used in almost every sports and yet it struggles to become more democratic in the equestrian world, especially at the amateur level even when monitoring the horse's health and his performance appear both useful and necessary.

1.1. What is the regular heart rate of my horse?

At **rest**, a healthy adult horse has an average heart rate of **30 to 45 beats per minute**. It can go up to 70 for foals. During **training**, the heart rate will **increase** when varying **gaits** and **speed,** and can reach up to **240 beats per minute** at the fastest canter. However, it must quickly **drop** to its regular level after a short **recovery** break. These data should be **adjusted** based on your **horse** and **discipline**. For example, an endurance horse will naturally have a lower heart rate at rest.

Several parameters can affect the heart rate: excitement, stress, fatigue, the ground, an early lameness, local pain (such as abscess or punch) or a systemic disease.

Monitoring your horse's heart rate during each workout will give you an **overall view** of your **horse's health.** However, you should know that the maximum heart rate of a horse can not be **improved** by training.

1.2. Why is it interesting for riders to know their horse's heart rate during training?

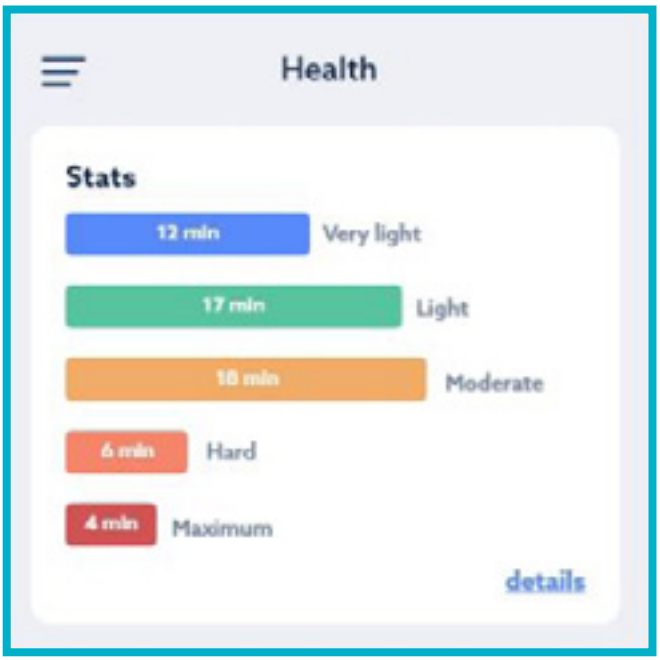
Knowing the intensity of the training

The heart rate is the ultimate indicator of the **effort** provided by your horse and its **intensity**. The **electrodes** integrated inside your Seaver device will allow you to know the **actual intensity** of your **exercise**, and thus to work on the **physical condition** of your horse.

After 3 years of R&D, our **heart rate measurement** has been **approved scientifically.** A comparative test-retest and single-blind study was conducted on 30 horses by two independent researchers from the University of Dijon, France. The objective was to test the **validity** and **reproducibility** of the heart rate measurements collected by our connected system at each gait (walk, trot, canter) compared to an approved sensor such as Polar.

By checking the home screen of your application, you will be able to know the heart rate of your horse in **real time** - i.e. the number of heart beats per minute at that moment.

After the training session, you will have access to a detailed chart of the evolution of the heart rate. Colors distinguish between different work intensities to help you make sure you are **properly working** your horse **without altering his health**. Each one of these five work intensity grades relies on the horse's maximum heart rate. This threshold can be adapted if you know your horse's. If you don't know it, a default value of 220bpm is assigned (average heart rate observed on sport horses).



- Very low intensity (blue): until 60% of the HRmax
- Low intensity (green): between 60% and 70% of the HRmax
- Medium intensity (yellow): between 70% and 80% of the HRmax
- High intensity (orange): between 80% and 90% of the HRmax
- Maximum intensity (red): above 90% of the HRmax

Understanding the type of training

In addition to your horse's **average** and **maximum** heart rate for the session, the Seaver app also provides the **time spent training** on **five work intensities**. Blue and green colors represent a **light intensity** of work for the recovery time or quiet activity. The yellow color identifies a **medium intensity** of work, mostly aerobic, which is essential in the sport horse's regular training. It could also be named "cardio training". The **high intensity** of work is characterized by the orange color while a **maximum intensity** of work is highlighted in red color, called anaerobic effort, that you need to reach sparingly not to get to overtraining.

These data will allow you to make sure you are **properly** and **sufficiently** training your horse, avoiding **overtraining**. Some too intense training, on the cusp of the horse's own physical limits, can cause **serious diseases** that will be associated with a **decrease in performance**. On the contrary, any too low-intensity training will not improve the horse's health, but might be important for recovery. Finding the right balance is the key of success.

Understanding the type of training

By monitoring your horse's heart rate it becomes possible to get an overview of and value his **progression.**

You can complete the same exercise with your horse 4 weeks apart, with the exact same pattern (speed, duration, recovery time, number of series and repeats...), and then compare the heart rate. If the heart rate observed during the exercise completed at M+1 has decreased by about 10 bpm, then you can consider that the training you have done over the last 4 weeks was efficient, as your horse is now performing the same exercise better, and thus improved his physical condition.
Let's take a concrete example of an amateur jumping rider. Walking out of the arena after a jumping course, the rider decides to check his horse's heart rate after 2 minutes walking: 110 bpm. 3 weeks later, on another show but after a course of the same difficulty level, the rider sees that his horse's heart rate after 2 minutes walking is 100 bpm. The rider can thus consider that 1) the physical condition and 2) the cardio recovery capacity of his horse have improved.

Please note that the outside temperature and the environment (stress...) can disrupt / affect the cardiac responses.

Knowing the number of calories burned by the horse

Training your horse leads to an **increase** in his **energy expenditure** compared to a rest situation that initially results from the motion of the muscles, and also from the **increased activity** of the respiratory and **cardiovascular systems.**

Knowing the heart rate at all times allow us to deduce the **energy spent** by the horse and thus the **calories burned in real time.**

According to studies carried out by the INRA, a healthy adult **horse trotting** at a speed of 18 km/h spends on average **160 kcal/min**. When the latter canters at a speed of **21 km/h,** his energy expenditure is 210 kcal/min. Of course, these values are representative: they will vary for each horse, depending on factors such as **age, breed, sex** and the **environment.**

On the home screen, you can track the number of calories burned by your horse in **real time**, i.e. the number of calories consumed since the beginning of your session. In the more detailed tabs of the application, you will find the total number of calories burned over your training session, the average energy expenditure of your horse in **kcal/min,** and its evolution over time.

Thus, by measuring the number of calories burned by your horse over time, Seaver provides you the necessary information to properly **adjust** his **diet** if needed.

2. HEALTH +

2.1. ECG

What is an ECG and when do you need to use it?

An ECG (electrocardiogram) is an exam **highlighting the electrical activity** of the horse's **heart**. On horses, the main use is to **help identifying** a **cardiac rhythm disorder**, analyze an **exercise intolerance**, any **decrease in performance** or also a syncope.

It could also be one of the exams required for a purchase visit.

Thanks to the Voltaire Design app, you can easily **share** the **results** with your **vet** for him to get a regular monitoring of your horse. Such steady follow-up can help the vet issue the right diagnosis and determine if complementary exams are needed.

How can the graph drawn up on the Voltaire Design app help your vet?

Thanks to the graph generated by the app, your vet can read pieces of information that will help him building a diagnosis:

- Heart rate
- Heart rate regularity
- If the signal is sinusoidal
- Presence of morphological discrepancies (wave T, P...)
- QRS complexes' duration and amplitude

You have to indicate to your vet the accurate Seaver electrodes' position on your horse (with a picture for example) to let him know which diversion is observed. To collect the ECG signal, your Seaver product uses two external sensors (not the one in the middle). A potential cardiac issue identification will help your vet adapt his diagnosis pattern and adjust a treatment or care program.

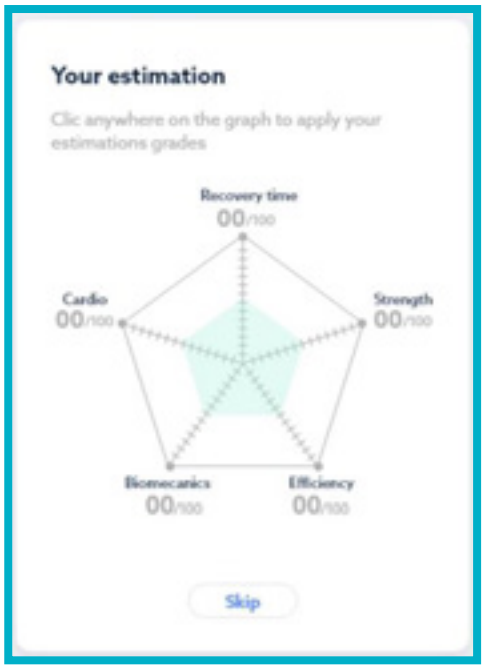
For horses with identified pathologies, it is now possible to **ensure a regular monitoring** of his health with the aim of **optimizing** his training taking into account his **actual physiological abilities**..

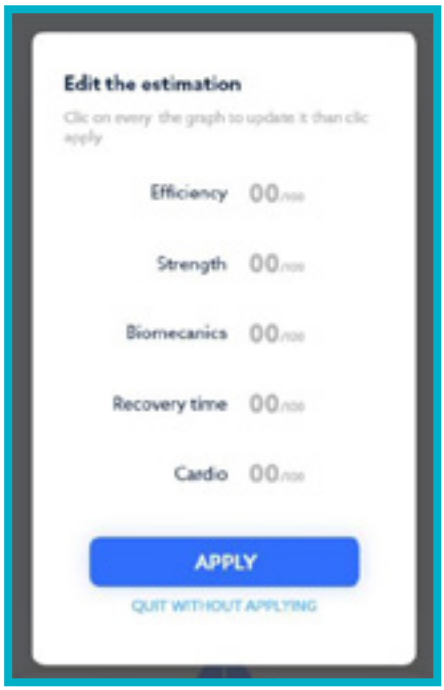
2.2. Fitness Shape Test

Developed in partnership with Véronique Billat (human physiology specialist, writer of more than 130 research articles), this test gives you the opportunity to **quantify your horse's physical condition.** According to several criteria (cardio, recovery time, efficiency, biomecanics, strength,...), you obtain a **global assessment** of your horse's condition and a graph highlighting his **strengths** and **weaknesses.**

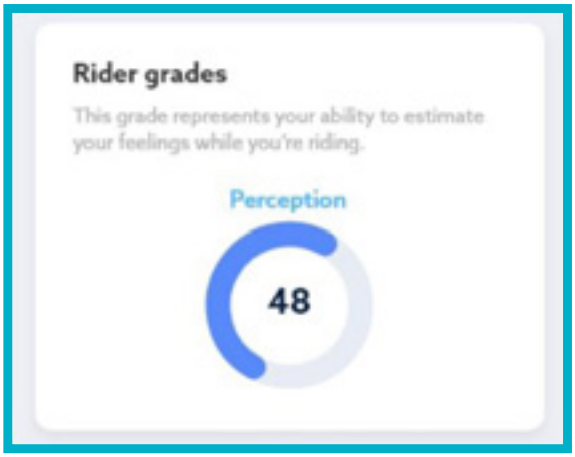
For an **optimum follow-up**, we recommend that you complete this test **once to twice a month**. This will help you evaluate the benefits of your training over time as well as set up objectives.

This test must be completed thanks to the accurate protocol provided in the app. In order to get the most **accurate results** possible, you need to **perform carefully** each required **step**. At the end of this training, before checking the results page, you must evaluate your session and the expected horse physical condition.





In addition to the grade of the horse, two other marks are assigned for the rider: one about the protocol completion and another about the likeness between your feelings and the reality. For horse riding is a sport of sensation, Voltaire Design aims to help you **increase your feeling capacity.**



2.3. Cardiac frequency at rest

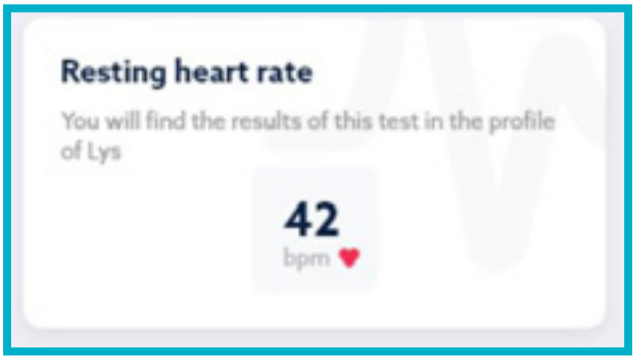
Directly linked to the ECG feature, this indicator must be taken into account as **it reflects** your **horse condition** at a **specific given time.**

At **rest**, the heart rate is normally between **25bpm** and **40bpm.** It is higher for a foal and some ponies and can reach up to 60-70bpm.

In case of fever or colic, the heart frequency gets higher. This might be **key indicator** for your vet to assess any issue or situation. For example in case of colic, if the heart rate reaches more than 100bpm, it could be an emergency.

Another example, if your horse does not show fever but appears to have a high heart rate, he needs to be controlled by a vet as soon as possible.

You must however remain **careful** and you need to **consider** all the **environmental indicators** in the measuring process (temperature, season, new stable, confusion, stressful situation,...) as well as the period of the day you complete this test.



For greater coherence in results interpretation, we advise **taking** these **measures** at **regular hours**, preferably in the morning before an effort. The horse should **not move**, **keep quiet** and **know the environment** for an **optimal measuring process.**

Another example, if your horse does not show fever but appears to have a high heart rate, he needs to be controlled by a vet as soon as possible.

2.4. Stress estimation

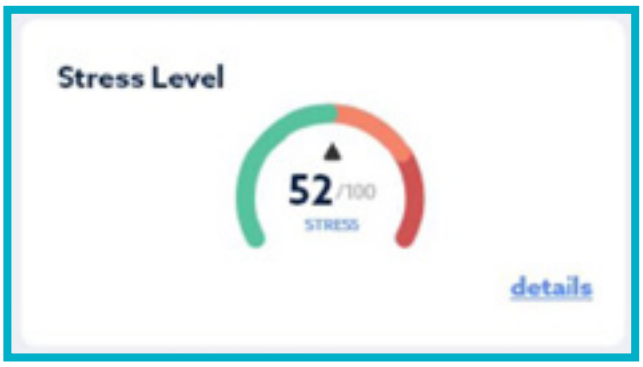
This feature will allow you to check the **evolution of stress** on your horse over a specific training and identify tough situations.

The app issues a global grade of your training session and a graph that can be reviewed more accurately.

In order to make your understanding of this feature easier, the stress level is divided in three colors:

- Green for the quiet periods
- Orange for moderate stressful periods (above 50/100)
- Red for critical stressful periods (above 75/100)

The heart rate analysis combined with another couple of indicators allow the app to **quantify the stress level grade minute per minute.** A really **quiet horse** should stay **under 15/100**. Obviously, an isolated peak is not alarming but a global grade of **50/100** and higher is reflecting a **high level** of stress. It might happen that your own actions, riding, or even the type of exercise performed generate stress on your horse. To reach harmony and progress, we must consider these indicators. The lower the stress is on a horse, the smaller is the risk of gastric ulcers.



2.5. Recovery time

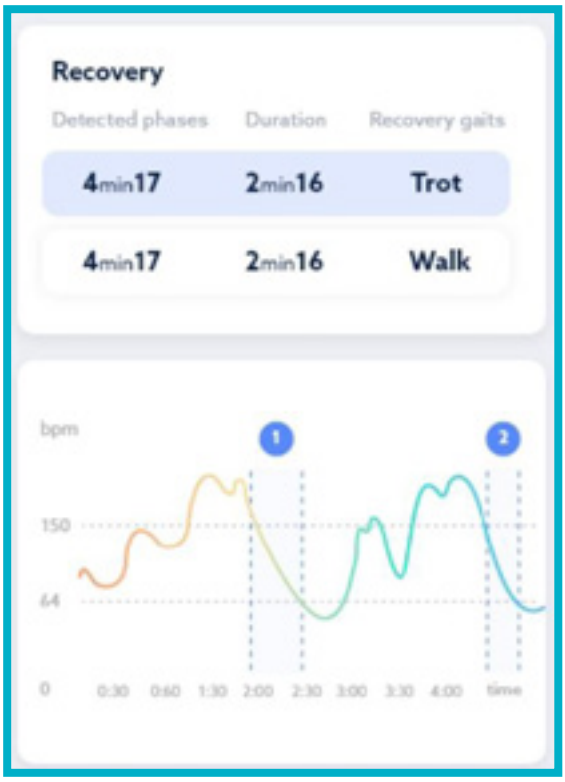
This feature shows the **periods of recovery** of your horse over a **work session.**

By default, the **effort threshold** is set at **150bpm** and higher and the "**recovery" threshold** is set at **64bpm** and less. You can change these two thresholds if you want to analyze light efforts (reducing the effort threshold) or an active recovery at the trot (increasing the recovery threshold).

Your Seaver device **detects an effort** when your horse is above the effort threshold during **more than 30sec**. Then, it measures the time needed to get back to a regular rate, under the determined recovery threshold. Such time period constitutes the « recovery time » of your horse. If several periods are detected, the app displays **the average recovery time** and the detail for each phase. The **main gait** at which you complete the **recovery** is a **significant indicator**: at the trot, the duration will be longer than at rest, but an active recovery is better to reduce lactate.

Walking at least 10min at the end of each training should help to **lower the rate down to 64bpm and less**, and have at least **one recovery period** collected in the app if the work was not too intense to get over the effort threshold.

The results help you assess the horse physiological efficiency during an effort and to further optimize this performance.



2.6. Performance: V140/V200

Using this feature, you are able to **evaluate the horse cardiac performance**. At the end of the training, you get the speed (m/min) at which your horse was moving when his **heart rate** was **140bpm** and **200bpm.**

With a **regular follow-up** and an **adapted training**, the **speed** of each one of these **cardiac frequency thresholds** must **increase**. This is an **indicator** of some improvement of the **horse heart efficiency**. For example, if after one session the horse reaches 350m/min at 140bpm and one month later this speed is of 400m/min; this shows that your training program is adapted: his cardiovascular system and his muscles are more efficient and get him able to work at a faster pace when staying at the same cardiac frequency.

To get those data at the end of a session, the horse needs to **reach 140bpm** and/or **200bpm.** So it should galop: often during a flatwork training, the horse does not go above 110bpm and the performance indicators cannot be collected.

3. Locomotion and organization of the training session

3.1. Trot symmetry

What is the symmetry of my horse?

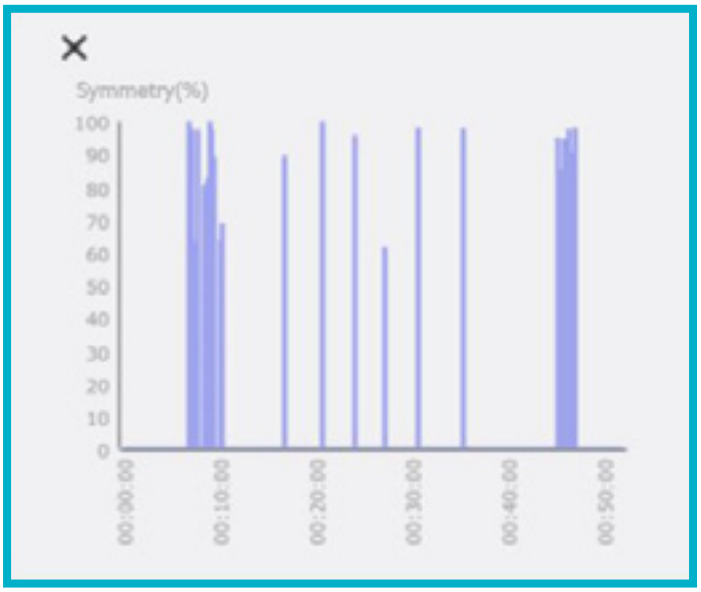
Symmetry implies that **both forelimbs** and **both hind limbs** are **used equivalently.** A sound horse moving in a **straight line** and on a **flat surface** should have **symmetrical movements.** Indeed, he should apply the same weight to the left and right forelimb, and the same goes for the hind limbs.

What does my Voltaire Design connected equipment measure?

Symmetry in relation to half strides

Seaver measures the symmetry of your horse at the **trot** and in a **straight line**, in order to compare the **two half-trot strides.** They should be as similar as possible.

This datum is calculated every **10 seconds of straight line consecutive trotting**, and is represented by a grade in % that evolves during the session. For a sound horse, the score is usually between **70 and 100%**.



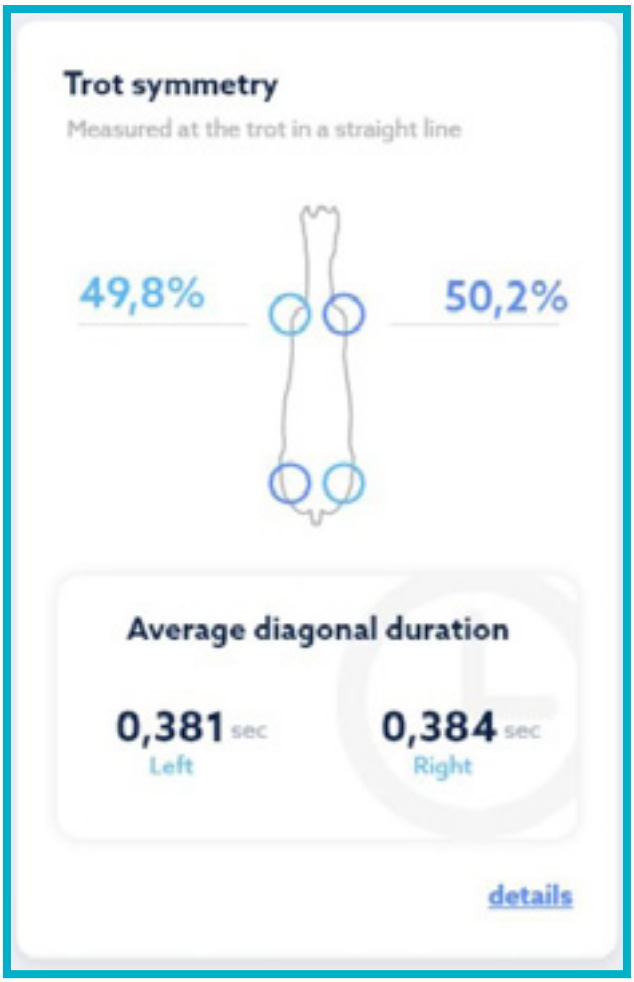
It should be mentioned that calculations are made only when your horse is trotting for at least 10 seconds in a straight line. In other cases, this grade has no meaning and will have a value of 0 on the graph.

For example, when working in a small space (20x60m indoor riding arena), this duration can only be reached on a perfectly straight diagonal. So do not worry if no score is obtained during this kind of session. It is the same for a **lunging session** or **liberty training** where it is rare to put the horse on a straight line long enough, even when changing circles.

Symmetry for diagonal pairs

You will also find, for each training session performed, an **average grade** (in %) corresponding to the **symmetry** on each of your horse's diagonal pairs of legs. The ideal horse has a **50-50 distribution** on each side, and thus has a symmetry grade of 100%

We also give you the **average duration in milliseconds** of each of the **half-strides**; it allows a more **precise comparison** between the **two diagonal pairs**. The length of the right half-stride corresponds to the elapsed time between the moments the right diagonal pair (right foreleg and left hind leg) and then the left diagonal pair hit the ground.



The interest of this data for the rider

Is my horse moving symmetrically?

Ideally, symmetry should **increase** throughout the session (horses are often less at ease at the beginning of the warm-up), and with **training**; the better trained the horse will be, the better he will be able to counterbalance his natural dissymmetry.

The symmetry figures will allow you to check if your horse moves symmetrically, and see the evolution of symmetry as you work and from one session to another.

In case of **sudden decrease** of symmetry over several sessions, it might be interesting to ask a **professional** (coach, vet, osteopath) for their opinion.

Lateral work and outdoor training on deep or hard grounds can alter the symmetry grade.

No foot, no horse

The major benefit of the «symmetry» feature for any rider is to be able to detect a **weakness** or **lameness** before it is visible, and therefore act to prevent the problem from getting worse and allow for a faster recovery.

Indeed, the diagonal pair with the lowest percentage of the two is the one that spent the least time touching the ground. It is thus the 'weak' diagonal, on which the horse bears the least weight. Below **40%**, it is likely that the horse is suffering from **lameness**.

It is useful to **monitor the evolution** of symmetry within the same session thanks to the graph. In addition, with the average you will be able to see this evolution for the different training sessions performed. The grade itself is of little importance, except to monitor the evolution, unless it falls below 40% in which case a lameness will likely to appear. It is important to monitor the evolution of symmetry within the same session (with the curve), and between the different sessions (with the average).

3.2. Time spent at each gait

We all know that there is no ideal distribution of working time at each gait. It depends on various factors such as the physical condition of your horse or the objective you set for your session, and can be changed from one training session to another if needed.

In the locomotion tab, you will see the **total time you spent at each gait** in % during your last training session. Therefore, this gives you a good understanding of the different training phases, such as **warm-up** and **cool-down** or **recovery**, and allows you to have a better idea of the **intensity** level of your training session.

The relevance of such data for riders

We often tend to overestimate the time spent trotting and in particular cantering, especially because we reflect in terms of distance covered, which is necessarily more important at these gaits, and not time. It is common to go for one-hour trotting and realize that in the end we spent only 20 minutes trotting or during a jumping session, the gait that prevails is the walk not since we finally canter not that much.

Thanks to Voltaire Design, you will have an overall idea of the **time you spent at each gait** and thus become aware of whether one gait **prevailed** to make potential **adjustments** in your next sessions.

3.3. Time spent at each lead

We often tend to spend more time at one particular lead. Insisting too harshly on one side because of a **difficulty** or **stiffness** your horse might have can cause **stress**, **early fatigue** and even a **muscular asymmetry** in your horse in the long run.

By giving you a breakdown of the time spent at each lead, Seaver allows you to have a **better-balanced training** at **each lead**, which will then contribute to your horse's **good muscular balance**. This function will help you **better organize** your sessions, and **respect the recommendations** made by your **coach** or by your **veterinarian** in case of a problem such as a locomotion anomaly for instance.

In the app, you will find the **total time spent** at **each lead** and in a **straight line** during your last session, in % as well as a **breakdown** of the time spent at the different **gaits** at each lead (given in % and minutes). The gait distribution is important; even if you did spend half of your session at each lead, if you only trotted tracking right or only canted tracking left, then your training was not well distributed.

3.4. Cadence

What is the cadence of my horse?

The cadence is the **number of strides per minute** at a given gait. A stride represents all movements separating two successive poses of the same limb at a given gait. The cadence measures the regularity of the gait. It is about the **rhythm** of the horse.

Changing the cadence thus means doing more or fewer strides in a given time. Having a **regular** cadence allows the horse to **balance** well and **bounce** in his gaits. He will then better **engage** his hindquarters and therefore better respond to your requests.

The interest for riders: working the regularity of their horse

In order to evaluate the regularity of your horse, we give you the **evolution of the cadence**, i.e. the number of strides per minute, during your training session, distinguishing each gait by colors: blue for walk, orange for trot and red for canter. You can find this curve by clicking on the « detail » button.

In the app, you will also find an **average** for **each gait**. These are interesting values to compare from one session to another to assess the **effect** of **training** and **exercises performed**.

A horse performs, on average, between **35 and 60 strides per minute** when **walking**, between **55 and 100 strides per minute** when **trotting** and between 80 a**nd 130 strides per minute** when **cantering**. These are of course averages. Some horses may sometimes be above or below these ranges. For example, a trotter can easily exceed 120 strides per minute.

Within each gait, a grade assessing the regularity out of 100 is also provided. The more the cadence varies in the gait, and the more the regularity grade decreases. We generally seek to have a **cadence** as **stable** as possible, so a **high regularity.**

The lateral and longitudinal work (extension, collection) can reduce the regularity, as well as a change of soil outdoor.

Some tips to implement

When taking a class with your coach, it may be interesting to observe the cadence data obtained for a given pace or exercise. Thus, when you work alone at home, the goal will be to find the same values.

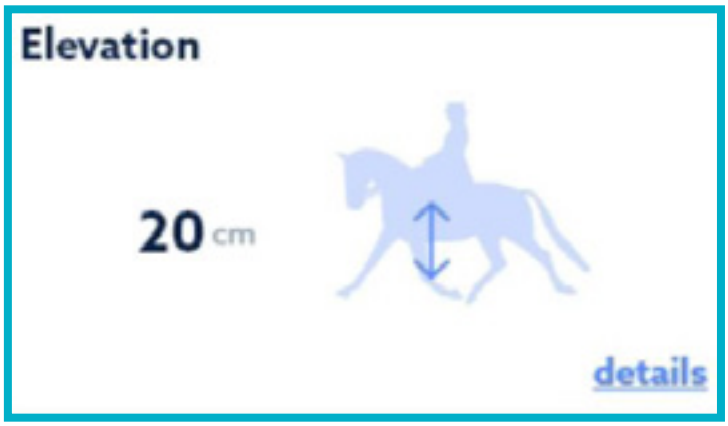
Cadence data can also help you **validate extensions**. To do this, you will need to check that the cadence does not vary significantly and does not increase during your extension, as is often the case for green horses or riders.

3.5. Elevation

Elevation corresponds to the **range of your horse's vertical displacement.** It enables gait **verticality** training; the higher the elevation at a gait will be, the bouncier your horse will be.

In order to evaluate your horse's elevation, we measure and provide you with the **evolution of the dorsoventral displacement in centimeters** throughout your session, distinguishing each gait by colors: blue for walk, orange for trot and red for canter. You will find this curve by clicking on the «detail» button. It is interesting to watch the evolution of this data during the session according to the exercises performed. You will also find an **average** for **each gait.**

A horse has an average elevation of between **1 and 5 cm** when **walking**, between **5 and 15 cm** when **trotting** and between **10 and 25 cm** when **cantering.** Again, these are averages. Variations in elevation can be observed according to the **breed**, the conformation or the **height** of the horse. Some horses may have an elevation lower or higher than these values without worrying.



It is worth noting that if a dressage rider tries to increase these values through work, other disciplines require a « skimming » horse with a low elevation, such as endurance (to limit fatigue) or the Western Pleasure

Comparing the elevation during your different exercises is useful to understand what will help you improve it. It should be remembered that elevation tends to **increase** with work on **ground poles** or **cavaletti.**

4. JUMP WORK

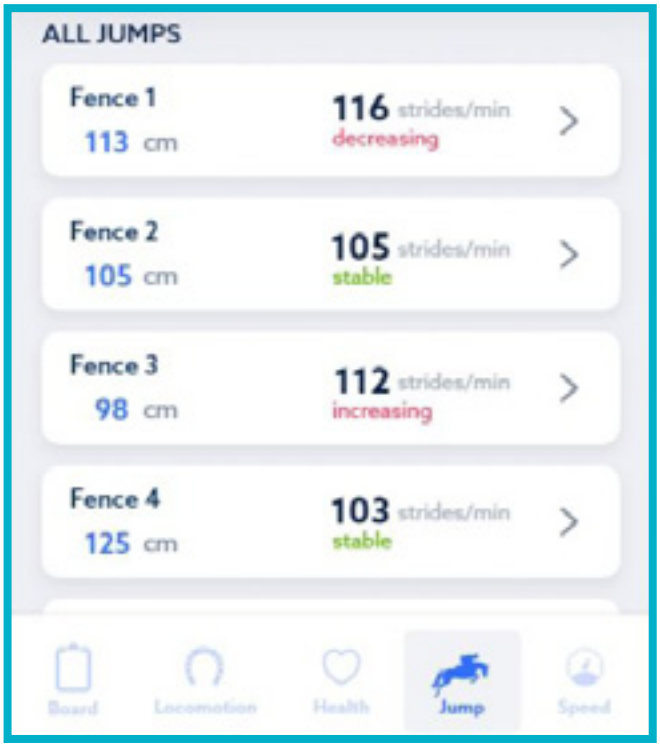
Many riders do not work in terms of «number of fences jumped»; they keep going until they get the perfect jump, and often do not realize how many jumps they made their horse go over during the session. As a result, Seaver decided to give riders the possibility to monitor and analyze their jumping sessions down to the smallest details.

4.1. Number and height of jumps

Following your training, you will get the **total number of fences jumped**, as well as their **average and maximum height.**

It should be noted that the height data obtained correspond to the position of the girth in comparison to the ground and not the actual height of the fence.

Depending on the **generosity** and the **'jumping' style** of the horse particularly regarding the forelegs, the sternum will rise more or less above fences. For the same fence jumped clear, two different horses can absolutely jump at different heights that can vary up to 80 cm. For a clear jump, the sternum will go **from 15 cm** (for forward and flat trajectory with forelegs tucked in) **to 75 cm above the fence on average.** With a young horse who was surprised by the jump or a high jump, the height difference can be even higher.



While navigating between the different jumps, you will be able to bring out the details of the height data, jump by jump.

The relevance of such data for riders

The point of this data is to **quantify the effort provided** by the horse. The height of the jump is of course not the only relevant data, but it does give a good indication on the **energy required** by the horse to **rise** and **jump the fence** and it also enables riders as they usually know the approximate height of the fence to understand their horse's **jumping habits** and **capacities.**

Sometimes, a rider may be distorted by sensations of power and speed when riding an energetic horse with a good propulsion and thus overestimate the height at which the horse jumped, or on the contrary underestimate the height at which a less tense horse jumped. The sensor allows the **objective quantification** of this data, to which riders would otherwise only have access through a video analysis with prior calibration.

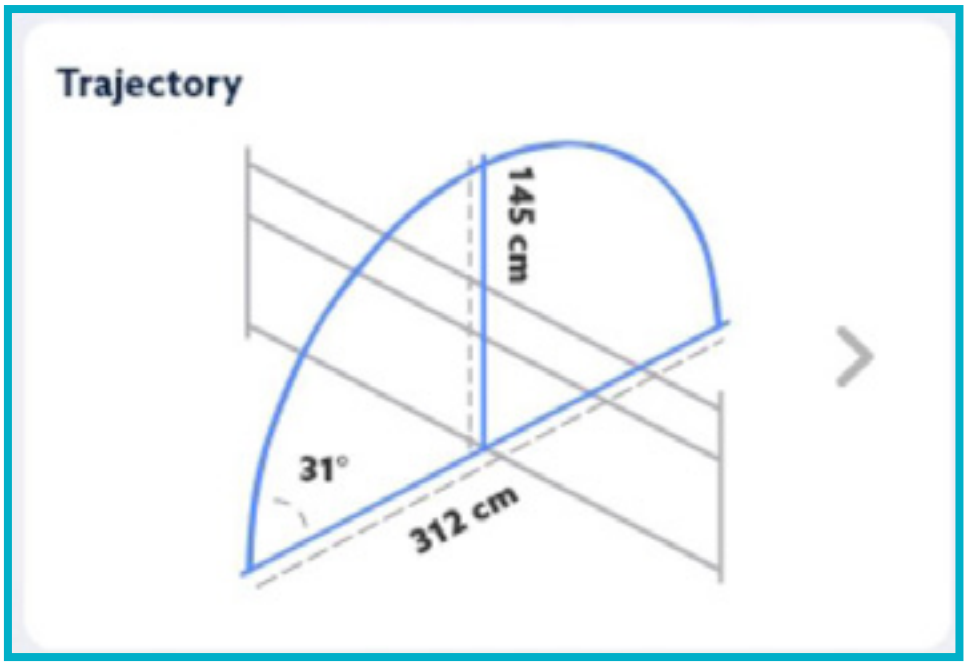
It is important to note that jumps under 70 cm might not be detected if the horse does not have a real bascule movement while going over the jump and 'swallows' it in his canter stride. On the contrary, a very expressive flying change or a big buck might be interpreted as jumps by the device. On cavaletti, with a horse that articulates correctly, it is not unusual to obtain jump heights in the order of 110 cm.

Jumps in varied terrains, and particularly jumps with the landing lower than the take off, such as downhill jumps, drop fences, banks, etc. can **distort the calculation** of jump heights. Indeed, as they are estimated from the heights of the peak of the trajectory and the landing, they are thus too high in these cases. On the contrary, uphill jumps and uphill banks might be underestimated.

4.2. Angle and amplitude of the jump

You will also have access to the **angle of your horse's jump**, i.e. the tilt angle of the girth during take off, when the horse pushes off his hind legs. This will help you evaluate whether the **jump** was more in **height** or rather more in **length.**

Generally speaking, the angle will be **smaller** for an **oxer**, a **triple bars fence** or a **water jump,** than for a **vertical**. The angle also depends on the height of the jump compared to that of your horse, and the spot of the horse's take off stride (the closer he will come to the fence, the bigger the jump angle will be).



In addition to the jump height, and the angle when taking off, we measure for each jump its amplitude, that is to say the distance between the hindlimbs when taking off and the forelimbs when landing.

The relevance of such data for riders

This distance on the ground allows you to have a better take of your horse's trajectory, in order to **adapt** it at best and to be **more comfortable** in **combinations** and other lines.
There is of course no perfect value; it all depends on the fences and what you want. Thus, for a vertical of **1m** (the height measured by your Seaver girth will be about 115cm for an «ordinary» horse), we will have an amplitude of about **130cm**, whereas it will exceed **250cm** for a **triple bar** of same height.

We can easily reach 450cm when jumping an oxer at 160cm, while on the cross-country, a 130cm flying fence will reach trajectories close to 6 m.

The importance of properly measuring your horse

Finally, the required **measurements** to create a **horse** in the application are **essential** for the algorithm that determines **jump heights**. If they are not properly taken and recorded in the app, or if you choose to keep the preset settings of the application when you create your horse's profile, the results provided by the algorithm might be **distorted**. Indeed, our algorithms adapt to these measurements to give you **precise** and **accurate data**, as **adapted** to your horse as possible.

4.3. Cadence in approach

The **regularity** of the strides when approaching a fence, and the **absence of break** in rhythm, are important elements to qualify the **quality** of the **approach**. We measure the cadence on the **last 5 strides**, and also determine if the cadence is **stable, increases** or **decreases** on these last strides.

Numerical values strongly depend on the **style** and the **locomotion** of the horse: thus a horse of 1m70 with a large amplitude will often be comfortable in a galloping cadence of about 100 strides/min, while a pony of 1m40 will be more often in cadences of 120-130 strides/min.

The important thing is the **regularity**, but it all also depends on your goal: we may wish to approach a fence with an increasing or decreasing cadence, depending on what we are working on.

> Note that your app gives the evolution of the cadence, that is to say the rhythm, and not the amplitude of strides in approach.

Thus, we may have approached an oxer with an "increasing" stride, that is to say, by covering an increasing distance at each stride, but with a decreasing cadence: each stride lasts longer and longer.

4.4. Cadence in approach

We calculate the propulsion, that is to say the **vertical acceleration deployed** by the horse when **taking off** to defy the earth's pull and rise above the fence. We measure this value in g («gé»), as accelerations experienced by pilots during cars or rockets accelerations.

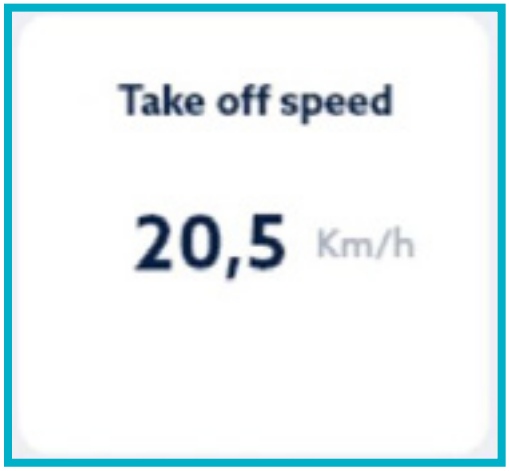
The propulsion will always be between **1 g** (acceleration necessary to defy gravity and take off from the ground) and **2 g** (limit observed for the horse). The propulsion depends of course on the **height of the jump**, but also on the «**explosiveness**» of the horse.

For fences of about 1m, we will typically have propulsion values around 1.1 g to 1.2 g. For fences of 1m60, we can reach 1.8 g or more. For the same effort, we will often have higher propulsive values for a vertical profile than for a larger fence.

4.5. Take off speed

The Voltaire Design girth also measures the **speed reached** by the horse during the **ascending phase** of the jump. This speed depends on the ground speed of the horse when taking off, but also the strength he develops. It will typically be between **10km/h and 20km/h**. We will often have higher values during jump-off, or on flying fences of a cross-country course, and lower on vertical profiles.

A low take off speed may indicate a horse that takes the time to jump (it is positive), or a horse that « stops himself » in the air. A high speed may correspond to a horse that throws himself onto the fence and rushes, but also to a horse that uses his kinetic energy to overcome difficulties. The **perception** of the rider (or the coach) remains **essential** in these cases.



4.6. Shift in jump

We measure, in **degrees of angle**, the shift in jump of the horse, that is to say the **difference** between his **spatial orientations** when **taking off** and when **landing**. This measure absolutely does not reflect the perpendicularity to the fence: we can jump diagonally but by keeping the horse perfectly straight, as we can have a horse that shifts strongly on one shoulder as we approach perpendicularly and in the middle of the fence.

The shift in jump must be as low as possible. The horse can be considered straight between 0 and 5°. Beyond 10°, the shift in jump is significant. The most important thing is to check if this shift is constant.

Thus, a horse that shifts only once during a session won't have any problem on this side, while we will try to find out more if the horse shifts specifically to one side on more than 50% of jumps. Many reasons can cause such a shift: an **asymmetrical rider** in his sit, his **legs** or **hands,** an **apprehension** of the **landing**, **pain** or **discomfort** in a **hindlimb** or **back**, or simply a **natural dissymmetry** of the horse. A young horse will often shift by a simple lack of straightness, but we must always try to minimize the shift values.

4.7. Hindlimbs push symmetry

A **dissymmetric** hindlimbs **push** is at the root of the shift in jump. We compare here the push of both hindlimbs, to warn you in case of strong difference.

Values between **45%** and **55%** for each hindlimb are quite satisfactory. Below or above, you will have to start **keeping a close eye** on your horse, especially if the phenomenon tends to repeat on more than half of the jumps on the same side.

The «weak» hindlimb is the one where the percentage is the lowest, therefore the one that is on the side of the shift. Remember to carefully **watch** the **weak hindlimb** and **back** if an asymmetry suddenly appears on a horse usually straight.

4.7. Hindlimbs push symmetry

This value represents the **energy absorbed** by the horse when **landing,** mainly by his **forelimbs**. It is measured in **kilo Joules** (kJ). The higher the value, the more the horse has dispersed energy when touching the ground. These **repeated** impacts can cause **joint** or **tendon problems**, so try to **minimize** as much as possible the amount of energy absorbed, jumping lower, less often or fewer times per session.

Of course, monitoring the quality of the ground, neither too hard nor too deep, is important. In practice, among other factors, the higher the jump and the higher the propulsion, the lower the energy absorbed.

For fences of about 1m, we will typically have values between 0.8kJ and 1.2kJ, not much damaging, while we will exceed 4kJ for fences of about 1m50. During a session, we will try not to exceed **50kJ in total** (about 50 small jumps, or a dozen big jumps).

A summary of the session is provided at the end of your training. On this page, you will find the average and maximum jump data. Thus, you get an overview of your jumping session.

5. SPEED AND GPS

5.1. Speed

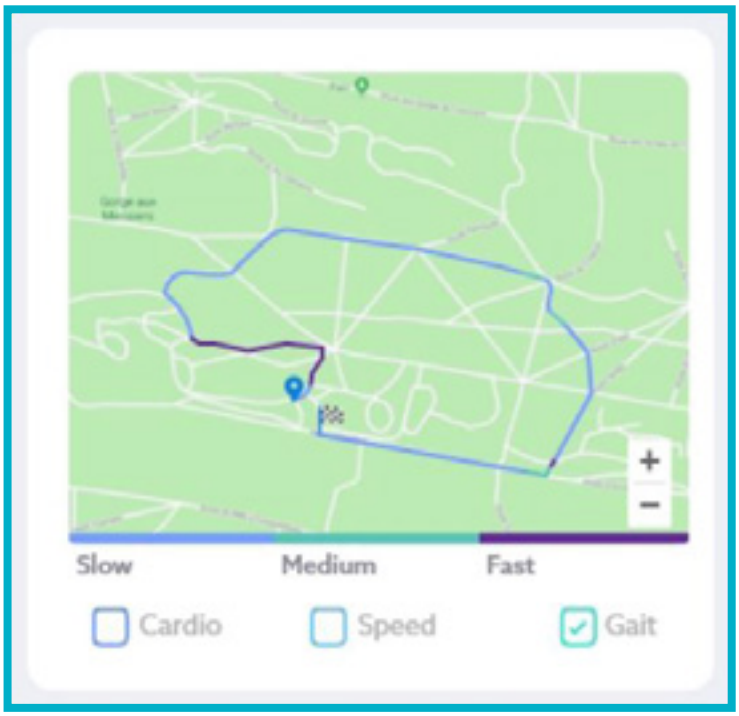
Speed is an essential indicator to assess the horse's **heart condition** and **physical abilities**. On average, a **horse at canter** moves at a speed between **20 and 30 km/h.** This value may vary according to his **age, training** and **fitness.**

After the session, the riders will get the evolution of the speed over time, the average and maximum values obtained, as well as the total distance covered. On the home screen of the application, it is possible to know the evolution of the distance covered in real time.

Please note that we use the GPS of the phone to calculate the speed and distance covered. Thus, you have to ride with your phone on you to get this data. In addition, when in an indoor arena, the GPS accuracy decreases significantly and satellite signals have difficulty in identifying a precise position. As a consequence, this data shall be unreliable indoors.

5.2. GPS tracking

The GPS tracking further allows you to **review your outdoor exercises in your training program.** For each outdoor session (hacks, cross,...), you can review the **path** completed, as well as **gaits, cardio** and **speed** for each section.



As well as being benefic to the mood of your horse, **working outsid**e helps you to **optimize his physical condition**. Thanks to the combination between your path and the heart rate, you are able to **identify** which are your **horse's strengths** and **improvement points.**

6. SHARE A HORSE

You are able to **share your horse's profile** with your **coach**, your **veterinarian**, the **owner**, your **friends** ... This person can access from his/her own account the **record** of your horse and his **trainings**. However, this one will not be able to start a session. Thus, you will have the opportunity to monitor together the horse's progress.

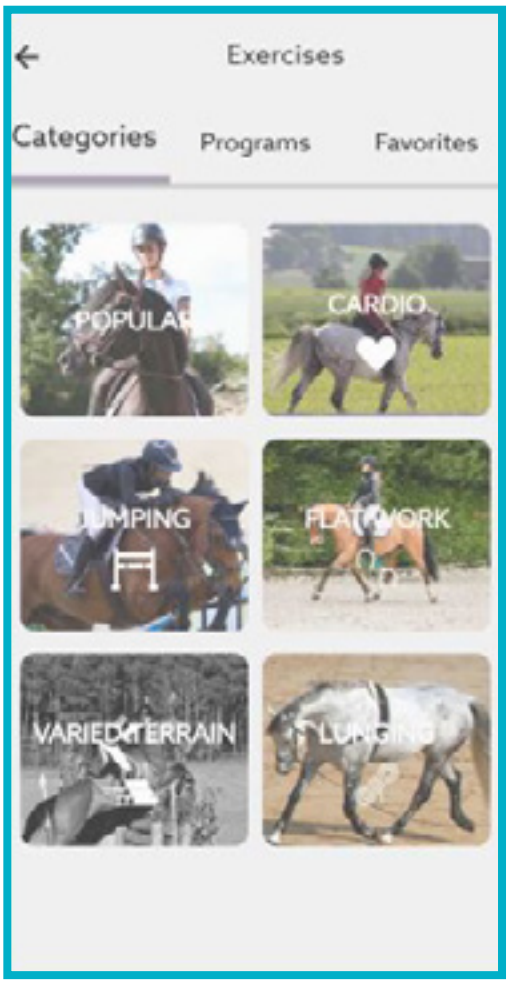
7. TRAINING WITH A CONNECTED WATCH

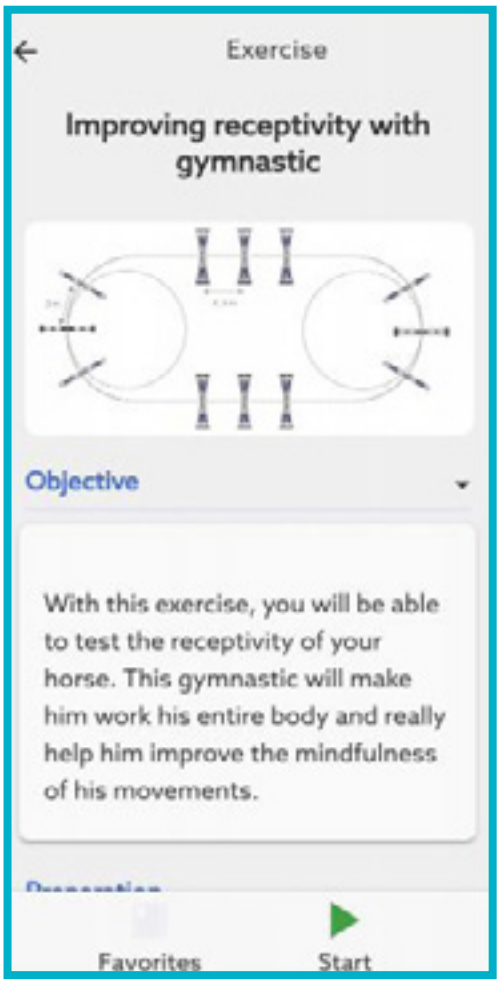
Our application is now available also for **connected watches** (iOS and Android watches). You can **launch** and **stop** each one of your trainings and also seeing in **real time** the **heart rate**, **calories burned, speed** and the **duration** of your training session.

8. EXERCISES AND TRAINING PROGRAMS

Regularly, **news exercises** realized by our **partner professional riders** are added to the application and are presented in **various categories**: cardio, flat work, jumping, varied terrain and lunging.

We provide also **training programs** with precise objectives in order to reach them.

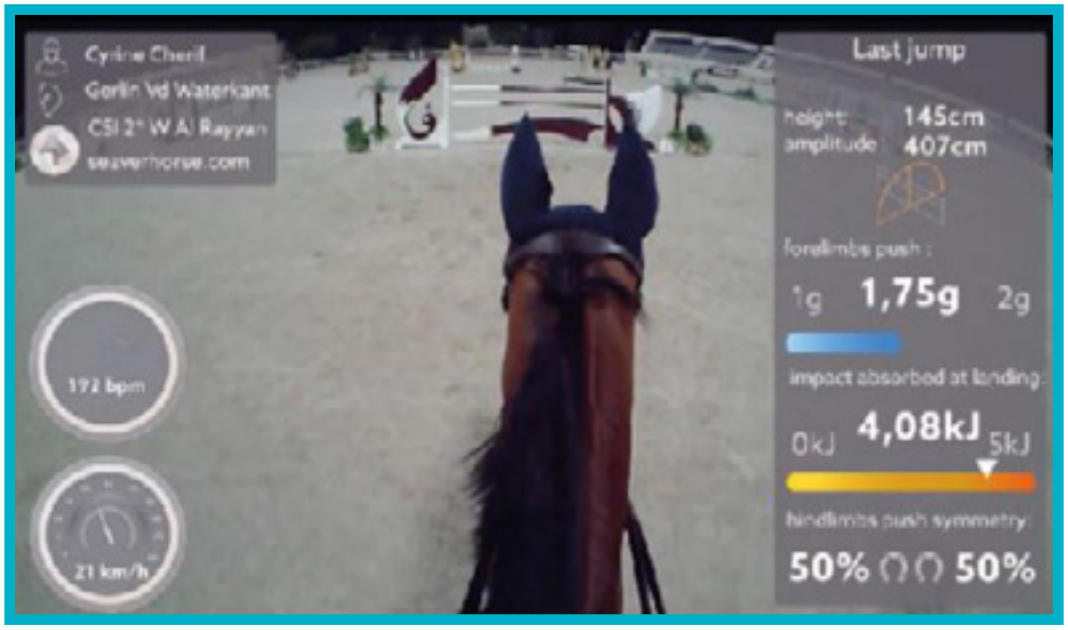




9. VIDEO

Relive your **course** with precision thanks to our video feature. Our technology allows to **embed** the **data** collected by your connected device on your **video**, giving you the opportunity to **analyze** your **performance** down to the smallest detail.

In order to do this, film your training with the device of your choice (Cambox, Smartphone, GoPro...). Ride with your Seaver equipment during this training then go on our platform to download your video with embedded data. You will also receive a detailed analysis of your data afterwards.



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