

Training load measured in soccer with an innovative approach

Original Article by Mauro Testa



Mauro Testa

Biomechanic in Biomove for cycling , tennis, volley, basket, golf, soccer, etc.

It's possible to describe our athlete as a chair. We have four legs, each one of them represent the main features that determine the talent.

The four legs are: Mechanical or Biomechanical aspects (external load), physiological items (internal load), psychological aspects and technique and tactics items.

In this article I'd like to show how we record, with an innovative tool, two of these fundamental aspects of our player: biomechanical aspects related to injuries prevention and physiological states related to internal load or muscle load. Reading this article, you can discover that with this new approach, it's possible to record data related to the others two legs of the symbolic chair.

There are many debates about training load and how to monitor it using GPS or similar instruments. In this article I don't wish to express my opinion related it or suggest an alternative (even because it's not an alternative but a complementary tool) but simply to present



an alternative and innovative way to analyze training load by reading muscle load or activities.

Mbody by Myontec is an innovative short, wearable technology, able to be used during training without player' discomfort or disturbance to the training and be able to catch data related muscle activity. Let's see how it work.



Tool Description and Use

It's possible to monitor muscle load, balance and other variables in real time using our mobile phone. Myontec Mbody translates our players' bio-signals into simple user interface and analyzes. Recording exercise is made easy without any mobile device also. Just push the button in MCell and it records athlete every move. Download test or exercise afterwards into cloud service, we can analyze and compare any progress.

Tool Enables: Combination of Muscle Load with heart rate, cadence, speed, distance & other conventional performance data, taking data also from conventional GPS

What we can read and collect with Mbody 's use?

- Objective muscle training monitoring, thus training load
- Screening
- Kinesiologic analysis of movement disorders
- Gait and posture disturbances evaluating
- Muscle imbalance detection
- Technique analysis and more



Properly used, Myontec data may help to assess, evaluate and spot a risk of injury. Variations in Myontec data may also help to determine not to train as hard as planned.

The big advantage of this technology is that is wearable. Thanks to this aspect any analysis is possible even in a contact sport as soccer.

Use of Mbody in collecting and analyzing data in an actual training environment opens up a new dimension in objective muscular performance monitoring. Feedback from Mbody answers the questions of what is happening with muscles during the game or training, how muscles are behaving under different conditions and where majority of observed injuries occur.

Speaking more in deep about the importance to have one tool able to record internal load and in the same way able to give data in order to prevent injuries, Mbody is able to do:



Mbody Data

Muscle overload analysis; in other words thanks the special software it is possible record many training session during season and having player trend.

Another positive aspect of this tool is the possibility to add laps. In this way we can divide the work done in gym respect what is done on the field or warm up respect the planned training activities.

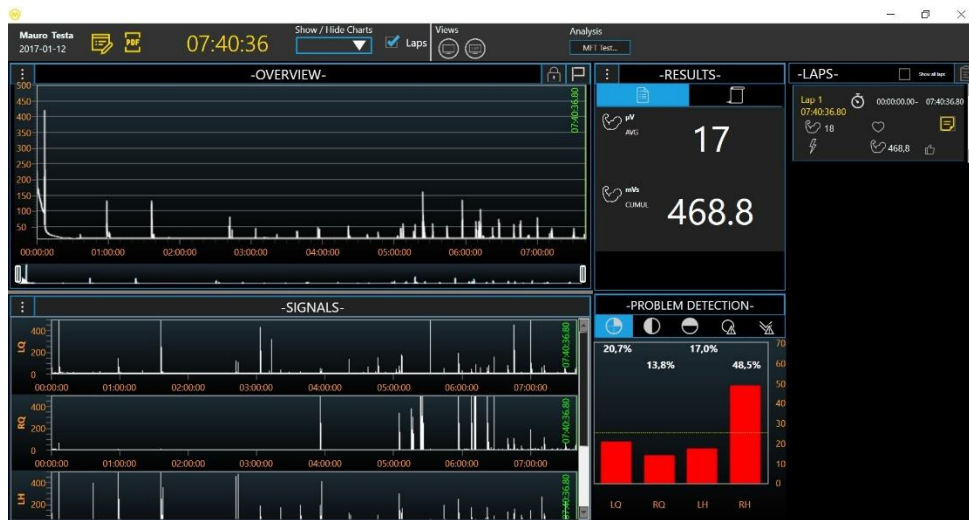


Example of Multiple players in Muscle Monitor software for Mbody.

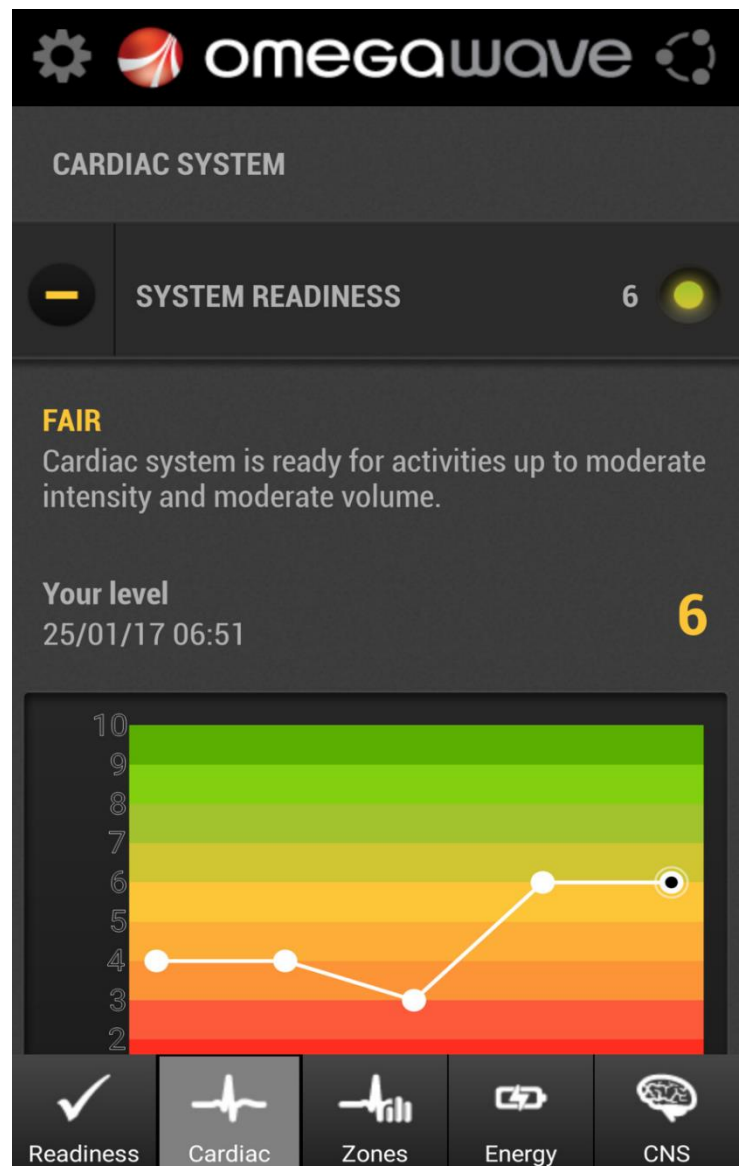
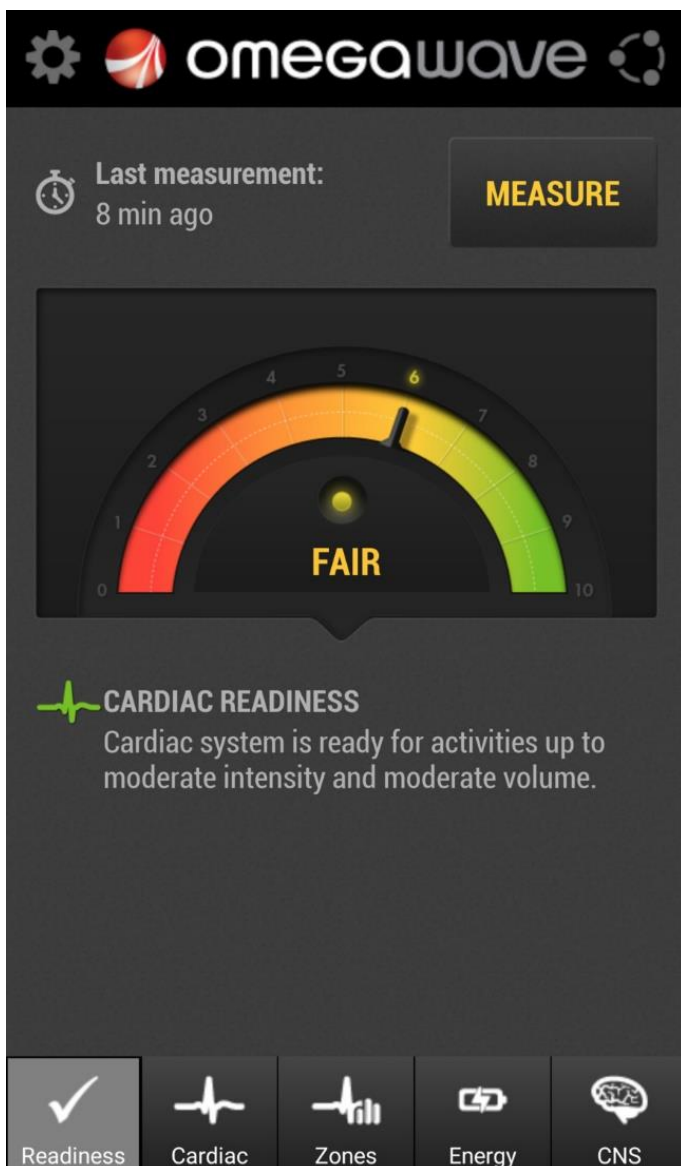
Other possibilities:

- Training readiness based on warm-up monitoring
- Fatigue detection from EMG
- Recovery and relaxation monitoring, even psychological aspect could be detected
- Technique feedback for efficiency and balance
- Analyze for imbalance and injury prevention
- Sleep quality and sleep recovery; this is possible to do wearing the short during sleeping.

Sleep analysis pictured below. Any muscle movement is detected and it's possible to compare this night activity with others night or adding others information about physical and mental aspect.



To do this I'm using an Omegawave tool before and after sleep reading heart variability and other parameters from the instrument. Pictures below.



Customized Comparisons

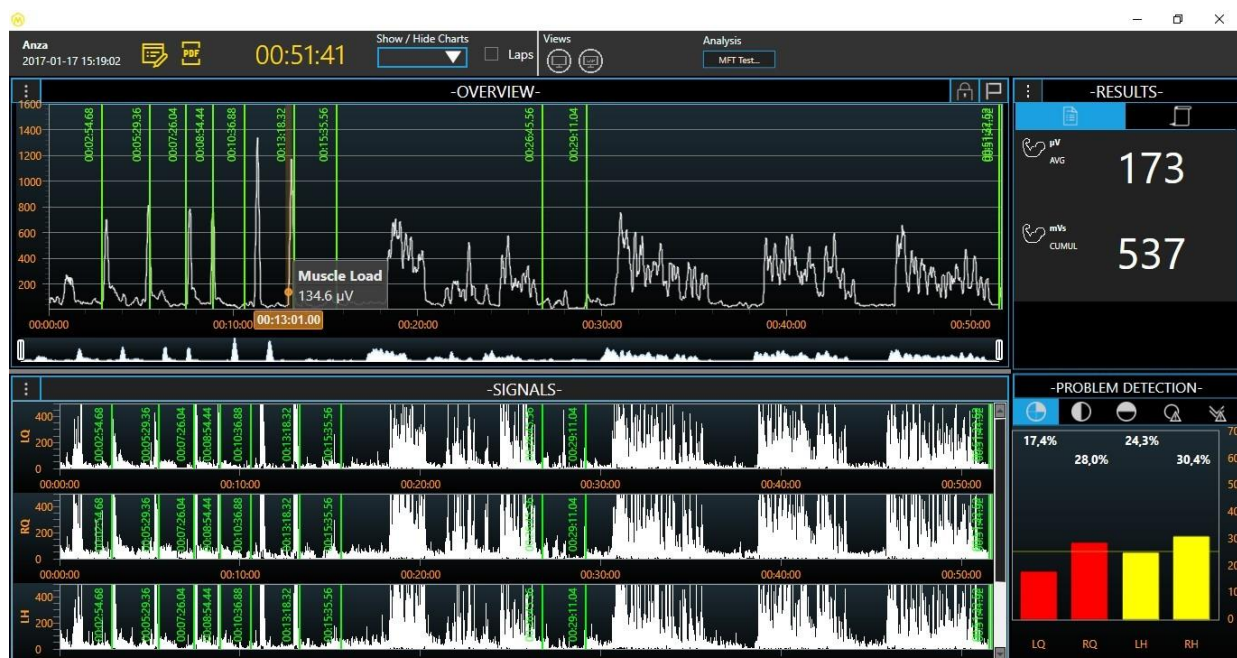
Real-time muscle activity measurement, Muscle load, Muscle load distribution, Muscle imbalances, Muscle condition, Muscle Metabolic Power, Cadence (number of muscle activation and deactivation for minute for leg), Heart rate, GPS data (in order to have these two last data is necessary link to Myontec software our tools normally used).

Exercises example

In our planned activity using Mbody we can sometimes include repeatable exercises (even the perfect repeatability is impossible) in order have the more reliable comparison. We do this, for instance, not only to analyze players' muscle activities and load but also how different pitches influences training with different weather condition.

We create a protocol of exercises included constant speed as warm up, shuttle test, an intensive exercises with ball and three matches of 5 minute (short field) the first with 3 ball touches, after brief recovery the second with 2 and the last with free touches.

This training is planned for an hour and it's not necessary to do it every week and these exercises are workout.



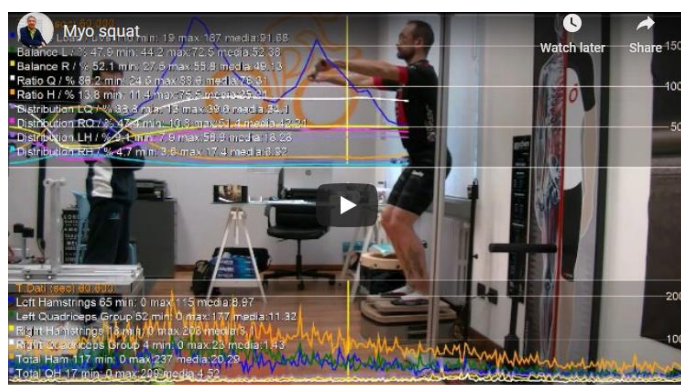
We can analyze any moment of the training for example the 3 matches with intensity of work (215 microvolts) and the muscle load paid by the player (289 millivolts).



One example is a Shuttle test example on YouTube.

Other video examples

In 20 meter run and stop, deceleration it's one of the higher work from the biomechanical point of view. Below is also a link to a motor control test.



Conclusion

Thanks to the help of new technologies we can see our training in a different way. The new understanding opens our mind to the new solutions, new solutions create new methods, new methods create a high number of solutions to the different problems occurred during training session.

Mauro dr Testa



Links

- ⇒ Mauro Testa <https://www.linkedin.com/in/mauro-testa-8173229/>
- ⇒ Original Article, published 2017 on LinkedIn <https://www.linkedin.com/pulse/training-load-innovative-approach-mauro-testa/>
- ⇒ Mbody by Myontec <https://www.myontec.com/>
- ⇒ Omegawave <https://www.omegawave.com/>