
Monitoring Fitness & Performance

Part 2: Internal Load

with Dr. Chad Anderson & Dr. Kokes

Welcome back to Part 2 of Monitoring Fitness and Performance (if you have not checked out Part 1, we strongly suggest heading there first). Now that we have defined the terms, it is time we looked at different methods for monitoring internal load. As previously defined, the internal load responds to the external load and drives adaptation. Internal load depends on nutrition, genetics, stress, and training status. When looking at tracking internal load, we can divide methods into two categories: subjective measurements and objective measurements.

Objective measurements have focused on using heart rate to determine exercise intensity as wireless heart monitors have become more accessible. This has been based on the linear relationship between heart rate and the volume of oxygen consumed (O_2) over a wide range of steady-state submaximal workloads. In other words, during exercise, our need for oxygen increases to help supply our muscles, necessary for muscle contraction. To get oxygen to our muscles, the heart pumps oxygenated blood through our body. As we increase our oxygen demand, the heart rate increases, to help pump the oxygen through our body faster. But how does this relate to internal load? The most commonly used objective measurement is heart rate variability (HRV).

Check these video from Dr. Nikole MacLellan to understand more:

<https://youtu.be/790lxVjxnww>

https://youtu.be/PqHHH9_m7DA

<https://youtube.com/shorts/SDGMIXXsFeI?feature=share>

The other side of monitoring internal load is subjective measurements, an individual's perception of workload intensity. The rating of perceived exertion (RPE) is a scale based on an individual's physical sensations during an activity.

These sensations are increased heart rate, increased respiratory rate, and muscle and joint fatigue among others. The original RPE scale was developed by Gunner Borg and based on 15 points (Figure 2), beginning at 6, "no exertion at all", to 20, "maximal exertion".

Borg Scale

Rating	Perceived Exertion
6	No Exertion
7	Extremely Light
8	
9	Very Light
10	
11	Light
12	
13	Somewhat Hard
14	
15	Hard
16	
17	Very Hard
18	
19	Extremely Hard
20	Maximal Exertion

Over time, to help with limitations, a 0 to 10 category scale was established, CR10 Scale (Figure 2), 0 being “no exertion at all”, and 10 being “maximal exertion”. No matter what scale you decide to use, tracking how your body feels, it will become easier to adjust intensity during training or activity.

CR10 Scale

Rating	Perceived Exertion
0	No Exertion
0.5	Extremely Light
1	Very Light
2	Light
3	Moderate
4	Somewhat Hard
5	Hard
6	
7	Very Hard
8	
9	Extremely Hard
10	Maximal Exertion

Recently, RPE has been integrated with other measurements to produce session-RPE to quantify training loads in athletes. This would involve multiplying the 10-point scale by the training duration in minutes. This will give value to the internal training load for each training session, which can be termed an impulse score or load. From here we can create a value for each day and the weekly load (the mean daily load multiplied by seven). The advantage of using RPE over other objective measurements is the ability to apply it without expensive equipment. Furthermore, as mentioned with Dr. MacLellan, this method may be more valid during high-intensity exercises such as sprints, and strength and plyometric exercises.

All in all, effectively tracking internal load is a great way to monitor personal fitness and performance. It helps create better consistency in workouts and set personal goals. As athletes, knowing how your body responds to the external load can help you gauge how you should plan workouts and rest intervals in the future. Therefore, choosing an internal load method should depend on the type of training you participate in. With this knowledge of methods for monitoring internal loads covered, be ready for the next post that will talk about tracking external load so that you can unlock your full potential for fitness improvement.



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