

GETTING STARTED WITH

# WORKLOAD MANAGEMENT



Avoiding Common  
Workload Management  
Errors

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**AthleteMonitoring**

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## Introduction

This section presents simple and effective workload management strategies that will help you build stronger athletes, and keep them fit, healthy, ready to win.

### Make sure athletes are adequately prepared to sustain the requested workload

Athletes are often injured in the last part of a game, see their performance drop during tournaments, make tactical errors at the end of a race, or become sick at the end of an intensive training camp.

Many times, these issues are entirely predictable. They occur because athletes are not adequately prepared for the physical and psychological demand imposed by the training or competitive task<sup>3,4</sup>. This lack of readiness produces excessive fatigue, which in turn reduces motor control, impairs concentration, and makes athletes more vulnerable to injuries and infections<sup>2,4,5</sup>.

### What to do

To ensure athletes are adequately prepared for the task at hand, follow these steps:

- 1) Accurately assess the competitive or training task and identify the key performance indicators (KPI). KPIs are both objective (how many sprints, how many throws, magnitude and duration of power output, etc.) and subjective (what the athlete is finding the hardest to do during the targeted event).
- 2) Administer KPI-specific tests to compare the athlete's current levels of fitness and performance with the task requirements.
- 3) Progressively increase load to enhance the athlete's performance capacity, up to the level required by both the overall competitive task and specific KPI's
- 4) Monitor the Acute:Chronic Workload Ratio carefully for both internal and external load (one to two key sport-specific metrics), and make sure that it remains in the 0.8-1.3 range<sup>2</sup>. A ratio higher than 1.3 indicates that the athlete's weekly load is much more than what he/she is prepared for and will significantly increase the risk of injury or illness.

### Increase weekly load VERY slowly

A fast increase in workload is a major risk factor for injuries. The risk is particularly high when athletes:

- 1) Return to sports following an injury
- 2) Return to full training after a long period of inactivity (e.g., the off-season)
- 3) Are subjected to an unusual, quick and steep increase in load (e.g., tournament, training camp, congested schedules, etc.)

Spikes in injury rates are consistently observed during periods of increased training volume following breaks from organized training<sup>20</sup>. For example, a recent Norwegian study<sup>1</sup> has demonstrated that all athletes who return to sport less than five months after an ACL reconstruction suffered a knee reinjury<sup>1</sup>.

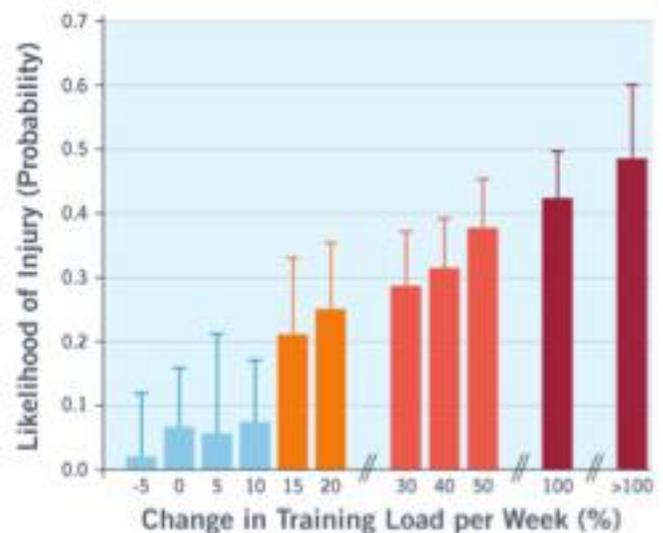


Figure 1 - Likelihood of injury with different weekly changes in load (from reference 3)

Another study from Gabbett<sup>2</sup> has demonstrated that when workload increases by 15% or more from one week to the next, the risk of injury jumps by up to 50%. Increasing load too fast is therefore a major risk factor.

### What to do

To reduce the risk, return-to-sport decisions should be based on the latest sports medicine research and, even when external pressures are mounting for a faster return to competition, should allow the injured athlete the recommended recovery time.

Increase workload progressively (<10%/week), using the athlete’s feedback and perceived wellness scores to guide load progression<sup>3</sup>.

One of the best preventive measures for athletes returning from the off-season is to have athletes continue to train and stay fit through the off-season.

Plan your off-season training program so that the load of the last week of the off-season will be about 15-20 % lower than the first week of the pre-season. In this case, the change in load will be in the moderate risk zone and will make return to pre-season training much less risky.

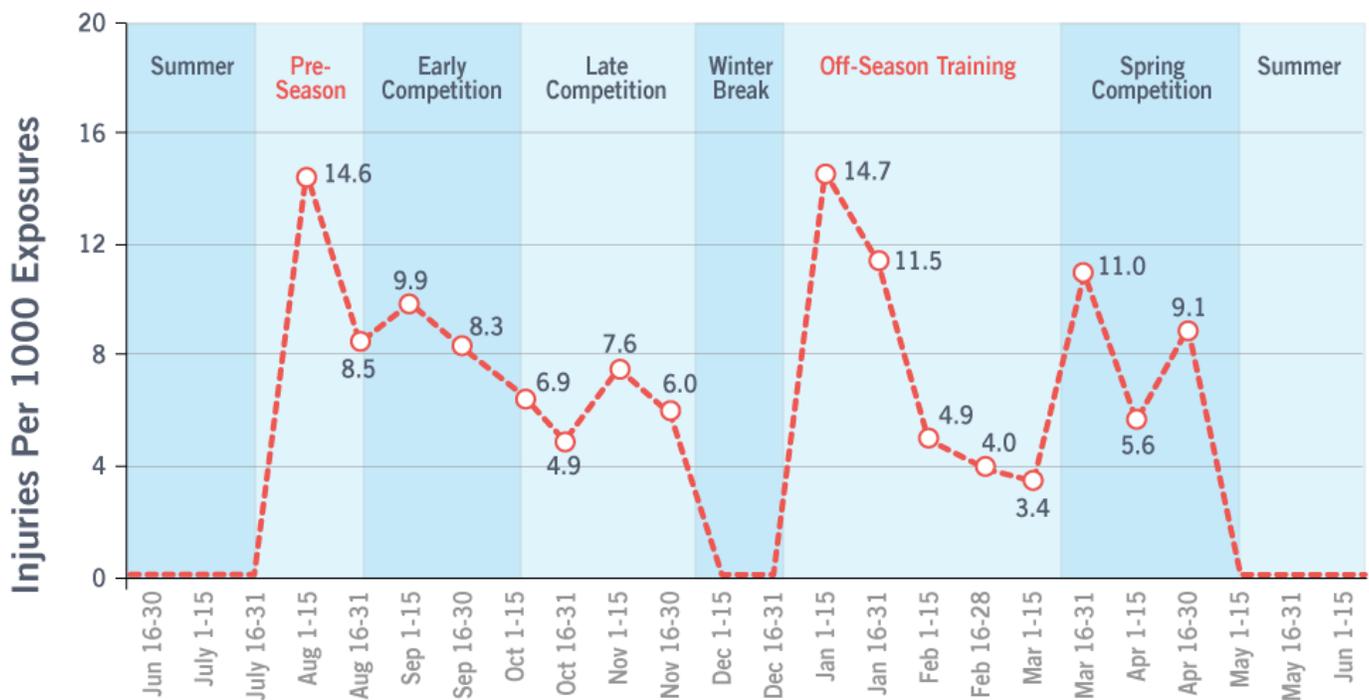


Figure 2 - NCAA Div 1 volleyball seasonal injury rates. From reference 20

When athletes are reluctant to train during the off-season, a fitness testing session scheduled at the first pre-season session can act as a strong motivator. In any case, keep week-to-week load increases under 15% to keep risk to minimal levels.

### Use age appropriate workloads

When overall training and/or competition load exceed the athlete's recovery capacity, burnout and overuse injuries are likely to occur. This often affects young athletes competing on multiple teams or in multiple sports.

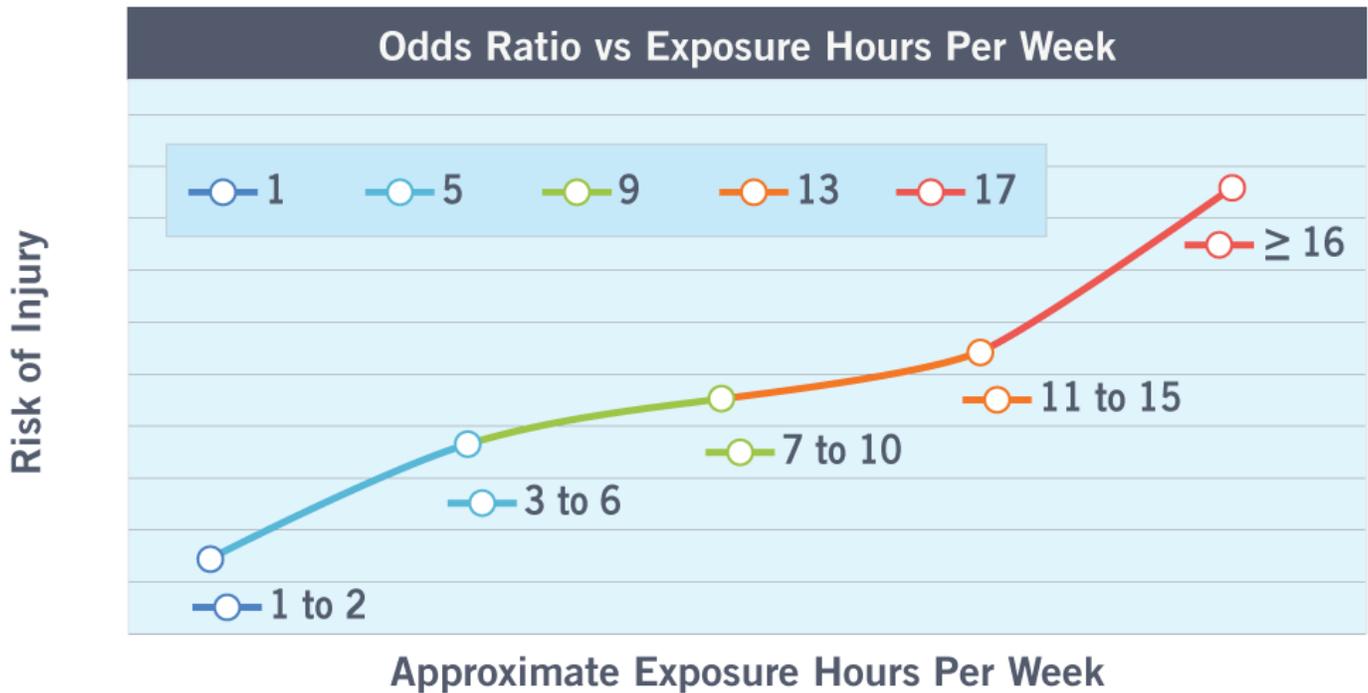


Figure 3 - Relationship of injury to exposure hours in high school athletes (from reference 17)

Recent research<sup>6</sup> indicates that when young athletes train or compete more hours per week than their age (e.g.: when a 12-year-old trains or completes more than 12h/week), the risk of overuse injury can increase by up to 70 %.

Although the ability to sustain high loads while staying healthy is a prerequisite to reach top performance, building tolerance to high loads takes time. This a multi-year process, and trying to rush this process will likely lead to negative outcomes.

Also, the ability to sustain high workloads decreases with age. Older athletes (even at the professional level) are often less able to tolerate the high workloads they used to do a few years earlier. While most can still perform extremely well, make sure to adjust the workload individually, based on their internal load response and wellness scores.

### What to do

Monitor training and competition weekly volume (in hours), rest days, and daily wellness. Ensure that weekly schedules include at least one day of complete rest. Because intensive training combined with a high Monotony Index (>2) is an important risk factor for illness and overtraining<sup>7</sup>, alternate hard, easy, rest, and moderate days.

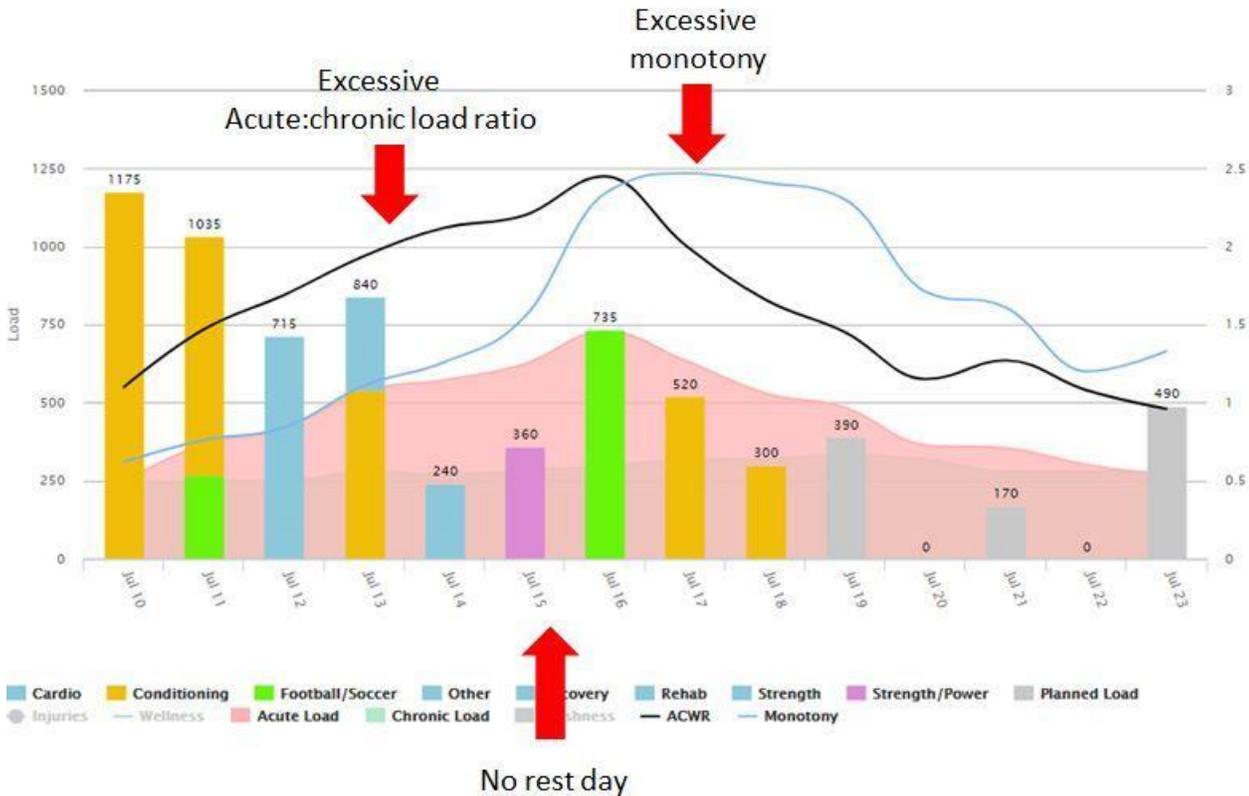


Figure 4 - A recipe for injury - Excessive acute:chronic workload ratio, high monotony and lack of rest day.

Increase weekly training volume gradually over the course of several months but ONLY when wellness measures are reflecting a positive adaptation to load (no excessive fatigue, good sleep quality, low stress, stable mood state, etc.).

In the case of young athletes, use the athlete's age to guide the weekly training and competition volume. This is a simple and effective approach to maximize performance while preserving the athlete's health.

Finally, proactively reduce training load (by 40-50%) during exam period, back-to-school season, and other stressful periods of which you are aware.

Last, but not least, educate athletes, coaches and parents about the risks associated with too much or too little training and the need to keep weekly loads to age-appropriate levels. You can do this during meetings, by explaining the impact of excessive loads or undertraining on injuries, fatigue, and underperformance using printed material, slide shows or Internet sites.

## Adjust workloads on a daily basis

Without the daily monitoring of response to load and subsequent program adjustments, even the most carefully crafted training program will have a strong chance of producing unexpected negative outcomes.

The reason is simple: each athlete's tolerance to load fluctuates on a daily basis and is affected by multiple factors, such as training level, fitness, health, nutrition, sleep, stress, fatigue, etc. When loads are not adjusted daily, large differences between planned and real training effects are likely to occur. This discrepancy will often translate into athletes getting sick before or after a competition, getting injured, or failing to achieve peak performance as planned.

## What to do

As coaches, we often forget that non-sport activities and external stressors<sup>3</sup> (such as work, friends, school, financial challenges, and family-related stressors) play a large role in determining an athlete's pre-training fatigue, sleep quality, recovery, motivation, and, ultimately, performance.

	5	4	3	2	1
<b>FATIGUE</b>	Very fresh	Fresh	Normal	More tired than normal	Always tired
<b>SLEEP QUALITY</b>	Very restful	Good	Difficulty falling asleep	Restless sleep	Insomnia
<b>GENERAL MUSCLE SORENESS</b>	Feeling great	Feeling good	Normal	Increase in soreness/tightness	Very sore
<b>STRESS LEVELS</b>	Very relaxed	Relaxed	Normal	Feeling stressed	Highly stressed
<b>MOOD</b>	Very positive mood	A generally good mood	Less interested in others &/or activities than usual	Snappiness at teammates, family and co-workers	Highly annoyed/irritable/down

Figure 5 - Example of wellness questions (from reference 18)

A simple, reliable and scientifically validated solution to identify non-sport stressors<sup>8,9,10</sup> is to ask athletes to complete a short daily wellness questionnaire and use the wellness scores to adjust daily load<sup>3,8,9,10</sup>.

To maximize compliance, use a short questionnaire that contains five to six questions associated with symptoms of overreaching (mood changes, poor sleep quality, soreness, excessive fatigue, etc.). Once athletes have completed the questionnaire, analyze the answers to detect athletes who are in need of recovery and rest; also identify those who are adapting well to the workload.

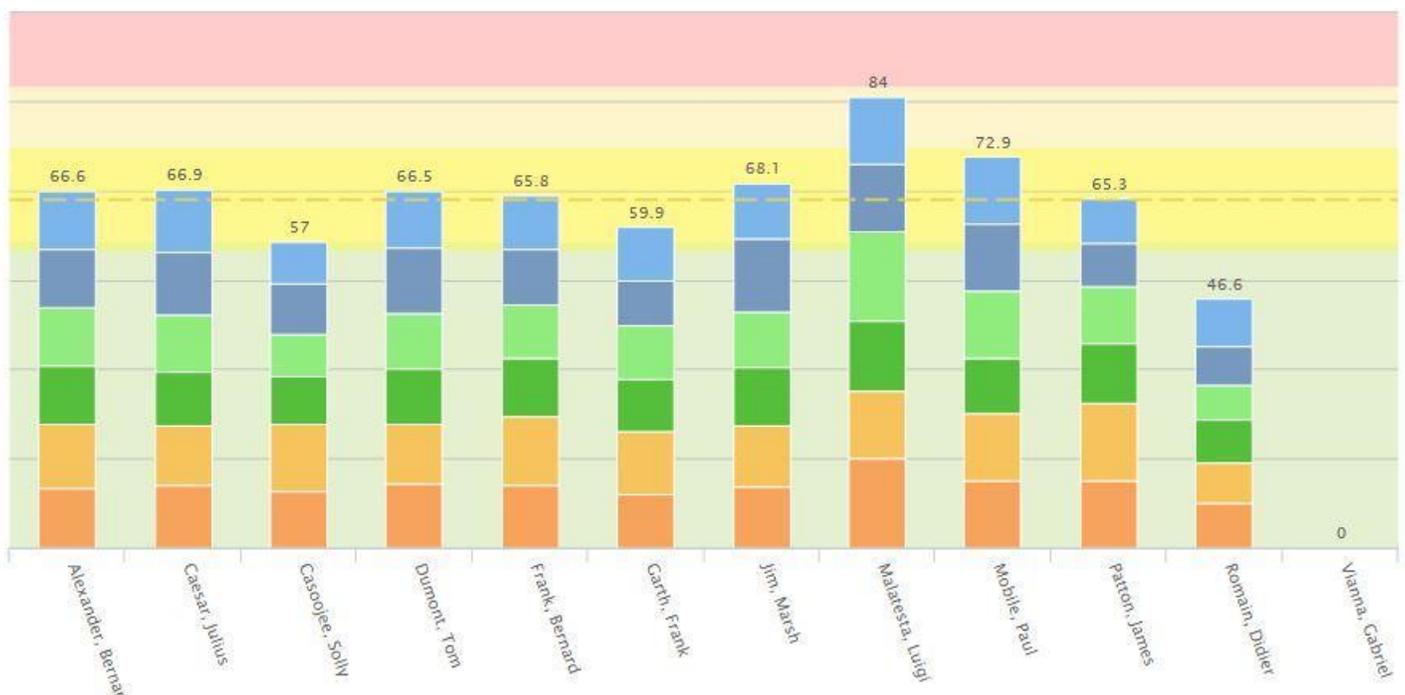


Figure 6 - Visualization of daily wellness results (courtesy of AthleteMonitoring.com)



When an athlete reports poor wellness measures, reduce the planned daily load (e.g., replace a hard session with an easy one, reduce the number of intervals, etc.). If symptoms persist for more than two to three days, reduce load by 40-50% for the next seven to 10 days and have a discussion with the athlete to identify potential lifestyle, training, or environmental stressors. When an athlete's wellness scores are good and reflect a positive adaptation to workload, increase the next week's load slightly (4-5%).

## Don't forget the fun factor

Young athletes have identified "lack of fun" as the number one reason for quitting their sport<sup>12</sup>. Coaches often focus on the technical, tactical and physiological aspects of training and physical preparation but sometimes forget that enjoyment is a crucial determinant of intrinsic motivation, which is a direct predictor of effort and persistence<sup>13</sup>.

Peak performance requires athletes to be fit, motivated, and ready to compete, both physically and mentally. Enjoyment plays a large part in the performance equation. Regardless their age and level of performance, when athletes dislike what they do, they will not be motivated to train hard, and will not be able to train and compete to the best of their ability.

### What to do

A simple way to maximize athletes' engagement, motivation, and performance is to ask them to self-report enjoyment of training sessions and then tweak your programs and sessions to allow them to have an enjoyable sport experience.

Work with the highest professional standards, but do not take yourself too seriously. Smile often, chat (but do not fraternize) with athletes, be open to last-minute program changes, and add some fun to your sessions. Adding fun to a session does not have to result in elaborate changes. Fun can take the form of warm-up games, a challenge, team relays, or athlete-directed cool-downs at the end of the session.

Be careful when using extremely hard workouts, circuits, and army-like workouts. They can be motivating once in a while, but they are rarely fun for all, are mentally hard, and increase the risk of injury and illness, including rhabdomyolysis, significantly<sup>19</sup>. If you must use them, these extreme workouts should be used sparingly AND only with very fit athletes who are adequately prepared for them.

## Actively seek feedback from athletes, coaches and health professionals

The success of any monitoring program depends on collaboration among the athletes, coaches and the medical team, including a willingness to share feedback. Without athletes' will to provide honest and regular feedback and your openness to adapt programs based on their suggestions, your monitoring program will not work<sup>14</sup>.

We have much to learn from athletes, coaches and health professionals. Experienced athletes often have more training and direct competition experience than most sport scientists and strength and conditioning coaches. Experienced athletes and head coaches know what works well for them and what does not. Their feedback and suggestions will make your program better and more effective. It should be actively sought.

When athletes share personal feedback and you do not act upon it, or if the information provided is used against them (through punishment, mockery, shunning during team selection, etc.), they will stop sharing it. When head coaches share feedback, recommendations, or suggestions with you and you do not respond adequately, they might start looking for someone else to replace you



Activity trackers will not detect these individual differences, and are unable to measure how the high-speed running was truly tolerated by each athlete. The session-RPE method is the tool of choice to measure the athlete's internal load.

### Heart rate monitoring for volleyball

Similarly, using heart rate to measure the internal load of volleyball players often leads to erroneous load estimations. The reason is simple: heart rate measures underestimate the internal load of short-duration, high-intensity/anaerobic activities (such as volleyball)<sup>16</sup>. They cannot accurately measure the internal load of volleyball players. The session-RPE method will be more effective. Additionally, a measure of external load (e.g.: number of jumps, spikes, etc.) will be an useful addition.

### What to do

Use tech tools for what they are designed for: measuring external load, or internal load (usually heart rate monitors) but only for specific situations (aerobic activities of 3 minutes or more). Using them for other purposes will likely generate meaningless data and lead to wrong decisions.

To monitor the athlete's individual response to external load in most sports, the session-RPE method is one the best tool available today.

## Conclusion

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Managing workload and optimizing athlete performance while promoting injury-free participation is relatively simple. To optimize performance and minimize injury risk:

1. Start with the right tools
2. Monitor the key metrics
3. Increase weekly loads progressively
4. Avoid spikes in load
5. Alternate hard, moderate, and easy training days
6. Use the athlete's wellness data to guide daily load adjustments
7. Proactively manage training and competition loads during stressful periods
8. Make sure athletes have an enjoyable sport experience

## About the author

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**Francois Gazzano** is a performance coach and athlete monitoring specialist who graduated from the Université de Montreal with a degree in Exercise Science. As a full-time strength and conditioning coach and performance consultant in Europe and North America for more than 15 years, François has helped dozens of youth, elite and professional athletes across a wide range of sports reach their highest performance goals. Francois is the founder & CEO of AthleteMonitoring.com (<http://www.athletemonitoring.com>), an evidence-based athlete data management and workload optimization system used elite sport organizations worldwide.

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