# Workload Management and Recommendations for Tennis

## A GUIDE OF WORKLOAD MONITORING FOR TENNIS PLAYERS

USTA

USTA PLAYER DEVELOPMENT

# Contents



# Introduction

Tennis is known as a sport that requires many physical and mental skills combined with superb physical conditioning. Monitoring and understanding players' workloads have become essentials for strength and conditioning professionals, tennis coaches and support staff. Based on our findings of a yearlong workload monitoring pilot project, we have developed easy to use workload monitoring tools and methods for tennis. The examples and recommendations provide strategies to monitor tennis players' workloads at all levels.

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# Workload Management

An appropriately managed workload will promote optimum progress and improvement in competitive tennis and physical development. Using the parameters of rating of perceived exertion (RPE) and duration (time in minutes), monitoring workload may be simplified, but requires consistency to show benefit. To easily accomplish this, track the time of activity and Rating of Perceived Exertion (RPE) on court and during physical training. RPE is measured using a 1-10 scale (Table 1) to assess how hard you are working. To be effective, you must be honest about how you feel. Use the scale to measure your own exertion; don't compare exertion levels with others. If it is appropriately applied, RPE accurately represent your effort.

**TABLE 1. RATING OF PERCEIVED EXERTION (RPE) SCALE**

| | |
|---|---|
| 1 | Extremely Easy |
| 2 | Very Easy |
| 3 | Easy |
| 4 | Below Average |
| 5 | Average |
| 6 | Above Average |
| 7 | Somewhat Hard |
| 8 | Hard |
| 9 | Very Hard |
| 10 | Extremely Hard |

**A simple workload may be calculated:**

RPE x duration (minutes)

For an example, if you have an average practice (RPE 5) for 60min, your workload is
5 x 60 = 300.

***Session Workload:***
Total for each session (practice).

***Daily Workload:***
The total for your entire day. For example, a day with multiple sessions can be measured by adding each session workload. For example, 1x tennis session (90min at RPE 6) plus 1x fitness session (45min at RPE 8), the daily workload will be (90 x 6) + (45 x 8) = 900.

***Weekly Workload (Table 2):***
Total workload for your entire week. So as an example, if you practice and train six days a week and your daily workloads are as follows;

| TABLE 2. | |
|---|---|
| Monday | 1080 |
| Tuesday | 810 |
| Wednesday | 720 |
| Thursday | 1770 |
| Friday | 1350 |
| Saturday | 990 |
| Sunday | 0 |
| Total | 6,720 |
| Your weekly workload is | 6,720 |

# Daily and Weekly Workloads Samples (Table 3 & 4)

| TABLE 3. DAILY WORKLOAD | |
|---|---|
| <779 | L |
| 780-1499 | LM |
| 1500-1767 | M |
| 1768-2079 | MH |
| 2080-2599 | H |
| >2600 | VH |

| TABLE 4. WEEKLY WORKLOAD | |
|---|---|
| <2999 | L |
| 3000-4999 | LM |
| 5000-6799 | M |
| 6800-7999 | MH |
| 8000-9999 | H |
| >10000 | VH |

*L = Low, LM = Low-Medium, M = Medium, MH = Medium-High, H = High, VH = Very High*

## APPLYING WORKLOAD INTO YOUR PERIODIZATION PLAN

Periodization principles are used to vary the workload promoting optimal adaptation to training stress while reducing the risk of injury. Periodization also reduces potential overtraining and assists players achieve peak performance during the competition schedule. The workload may be manipulated by day or week. (Table 5 & Figure 1).

| TABLE 5. SAMPLE DAILY WORKLOAD VARIATIONS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
| Workload | Medium | High | Low | High | Medium | Medium | OFF (Low) |

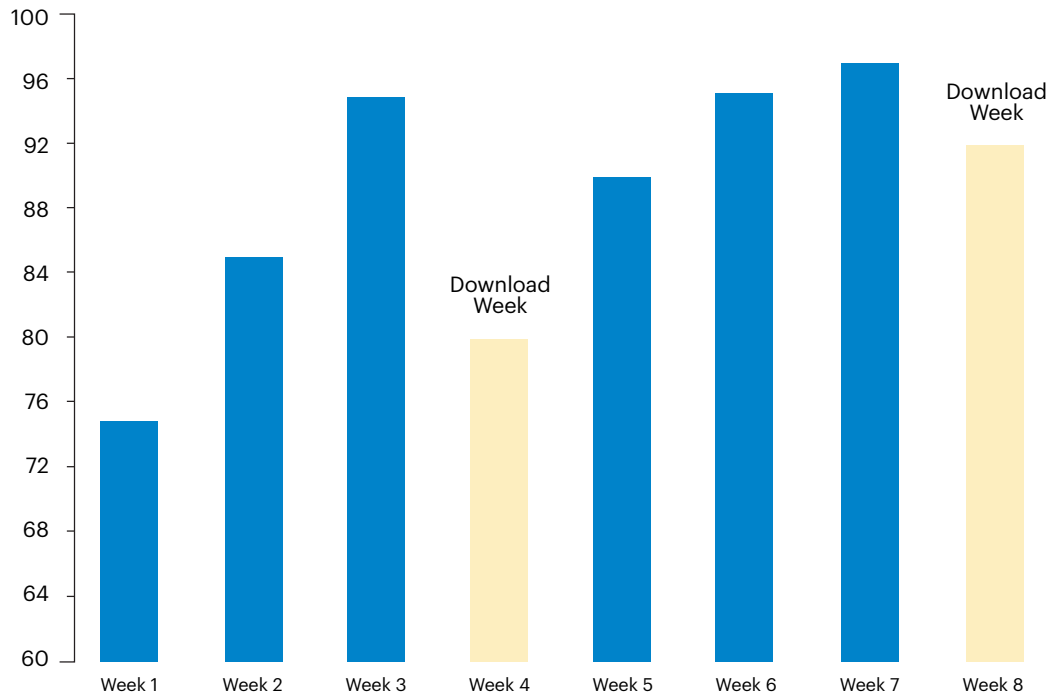


**Figure 1.** Sample 8-week weekly workloads variations (Chart adapted from iTPA)

The planning of training and competition workloads considers training age (sport experience) and previous workloads. This is why it is important to record your workload consistently. To start, you can always estimate your current workload based on your Training Status (Table 5).

**TABLE 5. SAMPLE DAILY AND WEEKLY WORKLOADS BASED ON TRAINING STATUS**

| Training Status | Daily Workload | Weekly Workload |
|---|---|---|
| Beginner | 500 | 2,500 |
| Average | 800 | 4,000 |
| Advanced | 1,300 | 6,500 |

# Sample Daily Workloads Progressions (Table 6, 7, & 8)

**TABLE 6. 49-DAY PROGRESSION FOR BEGINNERS**

| Day | Workload | | Day | Workload | | Day | Workload | | Day | Workload | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 330 | L | 15 | 690 | L | 29 | 1110 | LM | 43 | 1110 | LM |
| 2 | 390 | L | 16 | 705 | L | 30 | 900 | LM | 44 | 945 | LM |
| 3 | 660 | L | 17 | 570 | L | 31 | 615 | L | 45 | 615 | L |
| 4 | 610 | L | 18 | 660 | L | 32 | 1005 | LM | 46 | 1275 | LM |
| 5 | 560 | L | 19 | 645 | L | 33 | 1050 | LM | 47 | 1350 | LM |
| 6 | 120 | L | 20 | 270 | L | 34 | 285 | L | 48 | 510 | L |
| 7 | 0 | L | 21 | 0 | L | 35 | 0 | L | 49 | 0 | L |
| 8 | 630 | L | 22 | 660 | L | 36 | 1110 | LM | | | |
| 9 | 690 | L | 23 | 585 | L | 37 | 900 | LM | | | |
| 10 | 510 | L | 24 | 540 | L | 38 | 615 | L | | | |
| 11 | 690 | L | 25 | 630 | L | 39 | 1200 | LM | | | |
| 12 | 585 | L | 26 | 795 | LM | 40 | 1260 | LM | | | |
| 13 | 150 | L | 27 | 150 | L | 41 | 360 | L | | | |
| 14 | 0 | L | 28 | 0 | L | 42 | 0 | L | | | |

Daily workload should be spread out throughout the week to achieve weekly workload goals. The goal for beginners is to be able to reach a daily workload of 1,000 comfortably. With this sample plan, it will take about a month to build up and hit 1,000 daily workload mark safely and effectively.

## TABLE 7. 42-DAY PROGRESSION FOR AVERAGE PLAYERS

| Day | Workload | | Day | Workload | | Day | Workload | |
|---|---|---|---|---|---|---|---|---|
| 1 | 660 | L | 15 | 1200 | LM | 29 | 1200 | LM |
| 2 | 675 | L | 16 | 1140 | LM | 30 | 1110 | LM |
| 3 | 750 | L | 17 | 705 | L | 31 | 615 | L |
| 4 | 885 | LM | 18 | 1065 | LM | 32 | 1395 | LM |
| 5 | 885 | LM | 19 | 1140 | LM | 33 | 1560 | M |
| 6 | 150 | L | 20 | 360 | L | 34 | 510 | L |
| 7 | 0 | L | 21 | 0 | L | 35 | 0 | L |
| 8 | 975 | LM | 22 | 930 | LM | 36 | 1365 | LM |
| 9 | 840 | LM | 23 | 840 | LM | 37 | 1260 | LM |
| 10 | 615 | L | 24 | 540 | L | 38 | 705 | L |
| 11 | 1005 | LM | 25 | 1200 | LM | 39 | 1395 | LM |
| 12 | 1050 | LM | 26 | 1260 | LM | 40 | 1560 | M |
| 13 | 285 | L | 27 | 360 | L | 41 | 585 | L |
| 14 | 0 | L | 28 | 0 | L | 42 | 0 | L |

Daily workload should be spread out throughout the week to achieve weekly workload goals. The goal for average players is to be able to reach a daily workload of 1,300 comfortably. With this sample plan, it will take about six (6) weeks to build up and hit 1,300 daily workload mark safely and effectively.

## TABLE 8. 22-DAY PROGRESSION FOR ADVANCED PLAYERS

| Day | Workload | | Day | Workload | |
|---|---|---|---|---|---|
| 1 | 1200 | LM | 12 | 1620 | M |
| 2 | 1110 | LM | 13 | 510 | L |
| 3 | 780 | LM | 14 | 0 | L |
| 4 | 1395 | LM | 15 | 1680 | M |
| 5 | 1560 | M | 16 | 1455 | LM |
| 6 | 510 | L | 17 | 885 | LM |
| 7 | 0 | L | 18 | 1620 | M |
| 8 | 1530 | M | 19 | 1725 | M |
| 9 | 1395 | LM | 20 | 585 | L |
| 10 | 795 | LM | 21 | 0 | L |
| 11 | 1560 | M | 22 | 1860 | MH |

Daily workload should be spread out throughout of the week to achieve weekly workload goals. The goal for advanced players is to be able to reach a daily workload of 1,900 comfortably. With this sample plan, it will take about three (3) weeks to build up and hit 1,900 daily workload mark safely and effectively.

# Sample Weekly Workloads Progressions (Table 9)

**TABLE 9. SAMPLE WEEKLY WORKLOADS PROGRESSIONS**

| 7-week progression for Beginners | | | 6-week progression for Average Players | | | 3-week progression for Advanced Players | | |
|---|---|---|---|---|---|---|---|---|
| | Workload | | | Workload | | | Workload | |
| Week 1 | 2670 | L | Week 1 | 4005 | LM | Week 1 | 6555 | M |
| Week 2 | 3255 | LM | Week 2 | 4770 | LM | Week 2 | 7410 | MH |
| Week 3 | 3540 | LM | Week 3 | 5610 | M | Week 3 | 7950 | MH |
| Week 4 | 3360 | LM | Week 4 | 5130 | M | | | |
| Week 5 | 4965 | LM | Week 5 | 6390 | M | | | |
| Week 6 | 5445 | M | Week 6 | 6870 | MH | | | |
| Week 7 | 5805 | M | | | | | | |
| The goal here for the beginners is to build up the total weekly workload safely and effectively to around 5,800. | | | The goal here for the Average Players is to build up the total weekly workload safely and effectively to around 6,850. | | | The goal here for the Advanced Players is to build up the total weekly workload safely and effectively to around 7,900. | | |

# Acute to Chronic Workload Ratio (ACWR)

Figure 2. Guide to interpreting and applying acute:chronic workload ratio data (adapted and modified from Gabbett 2016).

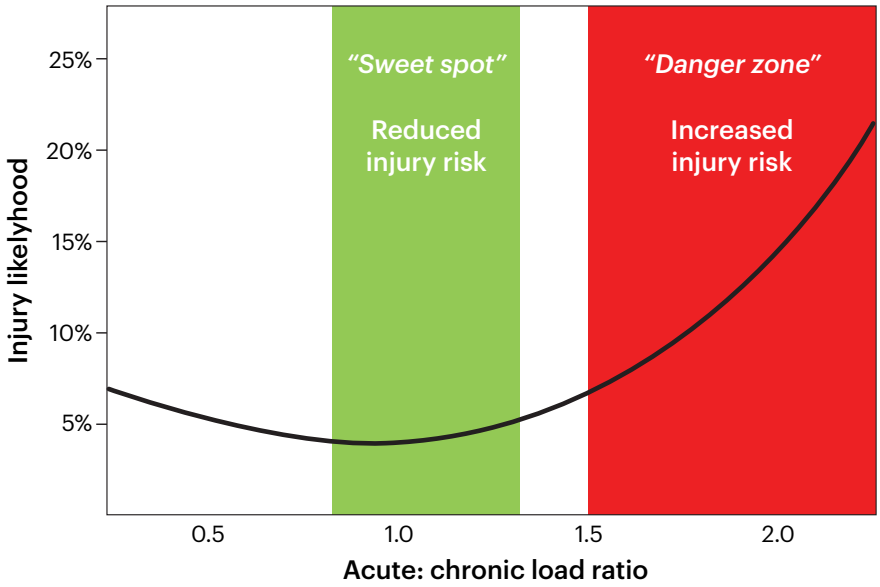


Figure 2. Guide to interpreting and applying acute: chronic workload ratio data *(adapted from Gabbett 2016).*

The goal of workload management is to appropriately apply practice and training stressors over time to your training schedule resulting in improvement. Rapidly increasing the intensity and time of practice and training may not allow proper recovery. The gains achieved through practice and training result from a breakdown/build-up process that occurs during recovery. Too much stress too soon, does not permit proper recovery. Conversely, too little stress does not result in improvement and adaptation to training. The ACWR has been researched and used for soft tissue injury monitoring and management and it gives us a good guideline for using workload measures.

**It is recommended to keep the ACWR between 0.8 and 1.3 for optimal adaptation and injury prevention (Figure 2).**

The Weekly Acute to Chronic Workload Ratio (Table 10) as described by Gabbett (among others) is calculated by totaling the workload of the last seven days and dividing it by the previous seven-day average for the last 28 days (note: this is a guide and a lot variability exists in this model).

**TABLE 10. SAMPLE CALCULATIONS OF WEEKLY ACWR**

| | Weekly Workload | Avg. Weekly Workload | Weekly Acute to Chronic Workload Ratio for week 4 |
|---|---|---|---|
| **Week 1** | 2,670 | Total Workload for 4 weeks / 4<br>2670+3255+3540+3360/4=3,206.25 | Week 4 Workload /Avg. Weekly Workload<br>3,360/3,206.25 = 1.05 |
| **Week 2** | 3,255 | | |
| **Week 3** | 3,540 | | |
| **Week 4** | 3,360 | | |

Daily Acute to Chronic Workload Ratio (Table 11) is calculated by the rolling seven days (previous seven days) average divided it by the rolling 28 days (previous 28 days) average.

**TABLE 11. SAMPLE CALCULATION OF DAILY ACWR**

| Day | Workload | Day | Workload | Day | Workload | Day | Workload | Daily ACWR on the Day 28 |
|---|---|---|---|---|---|---|---|---|
| 1 | 390 | 8 | 690 | 15 | 705 | 22 | 585 | |
| 2 | 660 | 9 | 510 | 16 | 570 | 23 | 540 | Avg. Daily Workload of Day 22-28 |
| 3 | 610 | 10 | 690 | 17 | 660 | 24 | 630 | Avg. Daily Workload of Day 1-28 |
| 4 | 560 | 11 | 585 | 18 | 645 | 25 | 795 | |
| 5 | 120 | 12 | 150 | 19 | 270 | 26 | 150 | 544.29 / 485.89 = **1.12** |
| 6 | 0 | 13 | 0 | 20 | 0 | 27 | 0 | |
| 7 | 630 | 14 | 690 | 21 | 660 | 28 | 1,100 | |
| | | | | | Avg. Day 22-28 | | 544.29 | |
| | | | | | Avg. Day 1-28 | | 485.59 | |

## TOURNAMENT PREPARATION FOR HIGH PERFORMANCE TENNIS PLAYERS

Workload management is crucial for high performance tennis players competing in a long season of multiple tournaments each year. Proper workload management will guide a player to perform well and reach his/her peak at the most important events. Here are two examples of weekly workloads using ACWR for multiple tournaments scheduled in 10 weeks (Table 12):

**TABLE 12. APPROPRIATE WORKLOAD MANAGEMENT FOR 10 WEEKS WITH TOURNAMENTS*.**

| Example A | | | | | Example B | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Week | Event | Workload | | ACWR | Week | Event | Workload | | ACWR |
| 1 | training | 7425 | MH | | 1 | tournament | 6992.5 | MH | |
| 2 | tournament | 8175 | H | | 2 | training | 7740 | MH | |
| 3 | tournament | 9770 | H | | 3 | training | 7020 | MH | |
| 4 | training | 7020 | MH | 0.87 | 4 | training | 8120 | H | 1.09 |
| 5 | tournament | 8205 | H | 0.99 | 5 | tournament | 7095 | MH | 0.95 |
| 6 | tournament | 8580 | H | 1.02 | 6 | tournament | 10340 | VH | 1.27 |
| 7 | tournament | 7500 | MH | 0.96 | 7 | training | 5540 | M | 0.71 |
| 8 | training | 7425 | MH | 0.94 | 8 | tournament | 7935 | MH | 1.03 |
| 9 | tournament | 9345 | H | 1.14 | 9 | tournament | 7257.5 | MH | 0.93 |
| 10 | tournament | 8220 | H | 1.01 | 10 | tournament | 7670 | MH | 1.08 |
| This example shows consistent workloads through the 10 weeks maintaining the ACWR between 0.8-1.3. | | | | | This example shows variability in weekly workloads however, it is realistic since a player may play extremely well in a tournament winning every tough match. Note: Despite a workload spike in week 6, the ACWR remains in the 0.8-1.3 range. | | | | |

*Please note, these are examples for high performing Tennis Players (advanced) who have been training for a long time and have been putting in sufficient workloads.

## IMPORTANCE OF TRAINING DURING THE TOURNAMENTS

Since the match count during a tournament is unknown at the beginning, it is essential that the player plans and prepares for training during tournament play. Maintaining a consistent workload throughout a tournament ensures adequate training stimulus for conditioning and injury prevention.

Also, every match is unique with a different impact on a player's workload. A workload will be low in a match won in straight sets, whereas a tough three set match may be intense lasting over three hours resulting in a high workload. Therefore, it is important to monitor the daily workload each day during the tournament and make adjustments in your training and recovery plans. Table 13 shows an example of potential acute workload spike due to inappropriate workload management during the tournaments.

**TABLE 13. EXAMPLE A-1**

| Week | Event | Workload | | ACWR |
|---|---|---|---|---|
| 1 | training | 7425 | MH | |
| 2 | tournament | 8175 | H | |
| 3 | tournament | 9770 | H | |
| 4 | training | 7020 | MH | 0.87 |
| **5** | **tournament** | 4000 | LM | 0.55 |
| **6** | **tournament** | 4000 | LM | 0.65 |
| 7 | tournament | 7500 | MH | 1.33 |
| 8 | training | 7425 | MH | 1.30 |
| 9 | tournament | 9345 | H | 1.32 |
| 10 | tournament | 8220 | H | 1.01 |

This example is modified version of Example A (Table 12). A player losing in the 1st round of consecutive tournaments (week 5 & 6) may require additional practice and training. As a result, ACWR spikes, reaching 1.3+ in weeks 7,8, and 9, could increase the injury risk and have difficulty recovering.

This strategy may be used by college tennis players and coaches. Applications and strategy for college tennis players are in the next section.

# Workload Management for College Tennis Players

College tennis players have unique challenges, especially for their team events in the Spring Season. As a team, everyone has the same match schedule. However, each player will have different workloads on their dual match day. With the current format of the college tennis, often time some of the players in the same team do not complete their matches after one of the teams clinches the match. Also, not always all of the players in the team plays both singles and doubles. Some plays only singles, some might only play doubles, some of them may not even play at all. Therefore, it is Important to monitor each individual player's workload separately. Then on the day of or the following days' workloads need to be adjusted for each individual based on their workload and ACWR (Table 14 & 15).

**TABLE 14. A COLLEGE PLAYER EXAMPLE — PLAYER X**

| | Workload | | ACWR |
|---|---|---|---|
| **Match Day 1** | **1940** | **MH** | **0.91** |
| Training | 550 | L | 0.97 |
| **Match Day 2** | **2110** | **H** | **1.13** |
| off | 180 | L | 1.01 |
| Training | 1512 | M | 1.11 |
| Training | 1805 | MH | 1.16 |
| Training | 1080 | LM | 1.22 |
| Training | 550 | L | 1.01 |
| **Match Day 3** | **1575** | **M** | **1.13** |
| Training | 720 | L | 0.96 |
| **Match Day 4** | **1696.5** | **M** | **1.13** |
| off | 0 | L | 0.99 |

This is an example of college Spring Dual matches schedule (two matches per week in two weeks). This player X played both single and doubles for all four dual matches in the two weeks. Because Player X had put in appropriate workloads prior to the first dual match day as well as after the first two match days, Player X maintained the ACWR within the recommended ranges (0.8-1.3).

**TABLE 15. A COLLEGE PLAYER EXAMPLE PLAYER Y: SCENARIO I AND II**

| *Scenario I* | Workload | | ACWR |
|---|---|---|---|
| Match Day 1 | **780** | **LM** | **0.79** |
| Training | 550 | L | 0.85 |
| Match Day 2 | **690** | **L** | **0.87** |
| off | 180 | L | 0.72 |
| Training | 1512 | M | 0.85 |
| Training | 1805 | MH | 0.90 |
| Training | 1080 | LM | 0.96 |
| Training | 550 | L | 0.91 |
| Match Day 3 | **2222.5** | **H** | **1.11** |
| Training | 720 | L | 1.12 |
| Match Day 4 | **1860** | **MH** | **1.31** |
| off | 0 | L | 1.17 |

| *Scenario II* | Workload | | ACWR |
|---|---|---|---|
| Match Day 1 | **780** | **LM** | **0.79** |
| Training | 1125 | LM | 0.91 |
| Match Day 2 | **690** | **L** | **0.93** |
| Training | 1635 | M | 0.95 |
| Training | 1512 | M | 1.06 |
| Training | 2040 | MH | 1.13 |
| Training | 1270 | LM | 1.21 |
| Training | 550 | L | 1.15 |
| Match Day 3 | **2222.5** | **H** | **1.25** |
| Training | 720 | L | 1.26 |
| Match Day 4 | **1860** | **MH** | **1.26** |
| off | 0 | L | 1.13 |

Player Y is Player X's teammate. They both practiced and trained with the team and put similar workloads up till the first dual match day. Player Y had easier matches for the first two dual matches. So the workloads were significantly lower than Player X for the first two match days. Coach decided to keep both Player X and Y in the same workloads schedule after first two dual matches. The third and fourth dual matches, Player Y had tough matches and as the result, the ACWR spiked (>1.3) on the fourth dual match day.

To avoid the potential workload and ACWR spike for the Player Y, after the first dual match day and second match day, player Y needed to add more workloads than Player X.

For the individual college tennis season and tournaments, college players should be able to utilize previously mentioned recommendations for the high performance tennis players (Table 12). It is still important to monitor each player's workload individually to make adjustments for each players practice and Strength and Conditioning programs.

College student-athletes and coaches have many different challenges. Monitoring each athlete's workload will help to understand athlete's physical status. To make adjustments for each player's training workload may require creativity and support from other performance staff. Coaches have to follow rules and regulations and sometimes it limits practice and training times with their athletes. Workloads could be from any physical activities and it could be done safely by minimum supervisions. Also, understanding outside of the physical workloads might be even more important for college athletic programs. Students Athletes have experienced and are going through many different stressors. Living away from home, academic requirements, and social stress are few examples. Maintaining proper nutrition, sleep quality and hours are often times challenges for many college student-athletes. Workload and Well-being monitoring should be a part of overall support system for student-athletes.

# Monitoring Overall Well-being

A competitive tennis player is subject to many different stressors (amount of sleep, quality of sleep, social, academic, family, and financial stress, etc.) affecting performance. As a 24-hour athlete, it is helpful to monitor overall well-being and other stress levels. Similar to the "session RPE" scale, a well-being scale may be used to monitor overall well-being; how do you feel this morning? "1 – Felt well rested and fresh" to "10 – Very sick/ injury". There are also downloadable scales in different category and many health and fitness apps that are capable to monitor other common stressors. These additional metrics may confirm the session workload (session minutes x RPE) metrics and provide even more data to help with decision making (day off, etc.).

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