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Wellness Responses During Different Length Match Microcycles in Collegiate Women's Lacrosse

Üniversite Kadın Lakrosunda Farklı Uzunluktaki Maç Mikro Döngüleri Sırasında Sağlık Tepkileri

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ABSTRACT

A key factor in athlete recovery is the time between games, known as the match-to-match microcycle. The purpose of this study was to assess the differences in wellness responses between a short (≤3 days) and long (>3 days) match-to-match microcycle in Division I women's lacrosse. Analysis included data from 24 athletes who provided daily wellness scores on muscle soreness, sleep quality, energy level, and stress level. Means and associated 95% confidence intervals for the subcomponent and overall wellness scores were computed by short/long recovery group for game days and each post-game day. Two-sample Wilcoxon rank-sum tests were conducted to compare the subcomponent scores and overall wellness scores between short/long recovery groups for each day and Cohen's *d* values were computed to assess the between-group effect size. Subcomponent and overall wellness scores decreased directly post game and rebounded over time, but none appeared to rebound to game day levels by day 3 (for short recovery) or even day 6 (for long recovery). No evidence of important differences in the five wellness scores between the short and long microcycles was found, except for day 2 post-game muscle soreness ($p = .0295$). Long microcycles fostered recovery from muscle soreness directly after the game, improving these scores faster than short recovery. This study gives athletes, coaches, and practitioners an insight into how training periodization in between matches can impact athletes' wellness and suggests that wellness should be monitored in recovery to return to game-day levels.

Keywords: Recovery, team sports, well-being

ÖZ

Sporcuların iyileşmesinde önemli bir faktör, maçtan maça mikro döngü olarak bilinen maçlar arasındaki süredir. Bu çalışmanın amacı, Division I kadın lakrosunda kısa (≤3 gün) ve uzun (>3 gün) maçtan maça mikro döngü arasındaki sağlıklı yaşam tepkilerindeki farklılıkları değerlendirmektir. Analiz, kas ağrısı, uyku kalitesi, enerji seviyesi ve stres seviyesi hakkında günlük sağlık puanları veren 24 sporcunun verilerini içeriyordu. Alt bileşen ve genel sağlık puanları için ortalamalar ve ilgili %95 güven aralıkları, oyun günleri ve oyun sonrası her gün için kısa/uzun iyileşme grubuna göre hesaplanmıştır. Her gün için kısa/uzun iyileşme grupları arasında alt bileşen puanlarını ve genel sağlık puanlarını karşılaştırmak için iki örneklemli Wilcoxon sıra toplamı testleri yapılmış ve gruplar arası etki büyüklüğünü değerlendirmek için Cohen's d değerleri hesaplanmıştır. Alt bileşen ve genel sağlık puanları oyundan hemen sonra düşmüş ve zaman içinde toparlanmıştır, ancak hiçbiri 3. gün (kısa iyileşme için) veya hatta 6. gün (uzun iyileşme için) oyun günü seviyelerine geri dönmemiştir. Oyun sonrası 2. gün kas ağrıları dışında ($p = ,0295$), kısa ve uzun mikrosikluslar arasında beş sağlık puanında önemli farklılıklar olduğuna dair bir kanıt bulunmamıştır. Uzun mikrosikluslar, oyundan hemen sonra kas ağrısından kurtulmayı teşvik ederek bu skorları kısa toparlanmadan daha hızlı iyileştirmiştir. Bu çalışma, sporculara, antrenörlere ve uygulayıcılara, maçlar arasındaki antrenman periyodizasyonunun sporcuların sağlık durumunu nasıl etkileyebileceğine dair bir fikir vermekte ve maç günü sağlık düzeylerine dönmek için toparlanma sırasında sağlık durumunun izlenmesi gerektiğini göstermektedir.

Anahtar Kelimeler: İyileşme, takım sporları, esenlik

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Introduction

The typical competitive season in Division I women's lacrosse consists of 1–2 games and 4–5 training sessions per week, with a weekly cap of 20 total hours spent dedicated to team lacrosse. Activities outside of the 20-hour cap include all academic work, community service, and any voluntary training done individually. Speed, agility, long sprints up and down the field with sudden stops and dodging of other players are routine in women's lacrosse. The combination of intense games, consistent preparation for the next opponent, and academic requirements of being a student may make recovery difficult for lacrosse athletes (Sawczuk et al., 2018). Therefore, it is important to allow ample recovery time between training sessions and competitions.

Subjective fatigue and recovery of athletes can be measured through a daily wellness survey. Wellness encompasses interconnections between several domains (e.g., mental, social, spiritual) that requires regular engagement to achieve balance and positive well-being (Mayol et al., 2017). In student athletes, wellness can be influenced by different physical and psychological factors and can be assessed via self-report with variables such as muscle soreness, stress, fatigue, mood, and sleep quality (Clemente et al., 2019; Duignan et al., 2020; Sawczuk et al., 2018). Pretraining wellness scores are predictive of external load output in collegiate lacrosse athletes (Crouch et al., 2021). Crouch et al. (2021) used a standard basic self-report wellness survey and found that with every 1-point increase in total wellness (on a 100-point scale), female college lacrosse athletes moved 3.5 m more during the following practice, and that getting quality sleep increased total distance and high-intensity distance of athletes' daily output. These findings demonstrated that improvements in sleep and energy had the strongest impact on distance, high intensity distance, and overall external load for collegiate lacrosse athletes. However, it is unknown how these wellness scores fluctuate with the collegiate lacrosse training and competition schedule.

An important factor in managing the volume of the season is the time between one game and another, known as the match-to-match microcycle, which is considered the most important planning unit in team sports training (Clemente et al., 2019). It is critical to give an athlete's mind and body enough time to heal between training sessions and competitions, as an imbalance between workload and recovery has been shown to be a factor in the long-term damaging effects of overtraining (Thorpe et al., 2016). Daily self-report wellness scores in elite male athletes typically peak on game day, followed by a large decline on the first day after a game, with a subsequent slow increase across the several days following a game, returning to game-day values within 3–4 days after a game (Gallo et al., 2016; McLean et al., 2010). Gallo et al. (2016) reported faster return to game-day wellness during shorter recovery cycles (6- and 7-day microcycles) when compared to an 8-day microcycle. Thorpe et al. (2016) demonstrated that 35%–40% of the wellness outcomes were worse on the first day post match versus the pre-match day in elite male soccer players. Self-reported fatigue, sleep quality, and muscular soreness all decreased 1 day post match, and then wellness outcomes then improved by 17–26% between 1 day post match and 2 days post match (Thorpe et al., 2016). Faster returns to match-day wellness have been observed during shorter recovery cycles compared to longer recovery cycles (Gallo et al., 2017; McLean et al., 2010). In professional rugby, overall wellness was dramatically reduced 1-day post-match regardless of the length of the microcycle of 5, 7, or 9 days in between matches (McLean et al., 2010). However, at 2 days post match there were better overall wellness scores for the 5-day microcycle compared to the longer 7-day or 9-day microcycle. Similarly, match-to-match microcycle had a significant interaction with days post match in professional Australian football players (Gallo et al., 2017). Results showed that for 1-day post-match, an 8-day microcycle had a moderate reduction in wellness compared to 6-day and 7-day microcycles followed by a trend where wellness reduced again at 3 days post match for the 8-day microcycle (Gallo et al., 2017). Overall, these athletes showed a faster recovery in several self-reported wellness subscores with a shorter match-to-match microcycle. However, all these studies were conducted in elite male athletes, so it is unknown if these results are externally valid to other populations.

Most of the studies in the literature on wellness response to training load has been conducted in male athletes, and studies on female athletes are sparse (Cowley et al., 2021). Given the limited published information on wellness response to training load in female athletes, it is important to develop a deeper understanding of this athletic population. Further, the strictly regulated training schedules and recovery of collegiate athletes have not been well examined. Important details about the match schedule, training, and athletes' responses may be revealed by analyzing wellness through the match-to-match microcycle. The purpose of this study was to assess the differences in wellness responses between a short (defined as ≤3 days) and long (defined as >3 days) match-to-match microcycles in Division I women's lacrosse. We hypothesized that athlete wellness scores (overall and subscores) would peak on game days then decline sharply the first day after a game, followed by a slow return to peak within 3–4 days of recovery and training for both microcycle durations.

Methods

Experimental Approach to the Problem

This study explored the wellness responses of collegiate women's lacrosse athletes utilizing an observational study design during a competitive season over 10 weeks. The design and reporting of this study were conducted in accordance with the Declaration of Helsinki and approved by the Campbell University Institutional Review Board (CUIRB-IRB0000515). All participants completed a written informed consent with the opportunity to ask questions regarding the study prior to data collection. All participants indicated that they understood the study and the benefits and risks associated.

Perceived wellness measures were used as the dependent variables and number of days of recovery (short: ≤3 days, long: >3 days) served as the independent variable. Data were collected during the 2021 competitive season of the NCAA Division I women's lacrosse.

Participants

Division I female lacrosse players ($n = 27$) competing for the same team were enrolled in this study. Women on the varsity lacrosse team at the time of the study who were 18 years of age or older were eligible to be included in the study. Clearance for play from a licensed athletic trainer and team physician were also inclusion requirements. Individuals that were removed from the team or chose to withdraw from team participation were excluded from the study. Participants who were injured and missed 30% or more of the practices or were less than 60% compliant in completion of the daily surveys were removed from the data analysis ($n = 3$).

The final analysis included data from 24 team members (19.9 ± 1.0 years of age, 167.0 ± 5.3 cm in height) who were 84.6 ± 8.3% compliant in completing their wellness surveys. Of the 24 participants, 11 were considered key players and 13 were players who typically came off the bench in games.

Procedures

During the observation period, participants used a smartphone to access the VX Sport cloud (Wellington, New Zealand) to input daily subjective wellness scores each morning between 6:00 a.m. and 10:00 a.m. prior to any training. Although there is limited literature on wellness survey validity, subjective wellness surveys are common and an important practice in evaluating athletes (Giles et al., 2020). The Cronbach's alpha for the survey in the present study was calculated to be 0.872 to assess the internal consistency of the daily wellness evaluation, indicating an adequate level of reliability. Further, this survey is similar to those presented in previous literature by questions and wellness dimensions included (Carter et al., 2022; Crouch et al., 2021; Gallo et al., 2017). Athletes were asked to rate the following questions using a 5-point Likert scale (0/25/50/75/100) based on how they were feeling. Each scale was designed with zero representing a negative affect and 100 representing a positive affect. Scores are reported in arbitrary units. Athletes answered the following questions for each daily wellness survey:

1. How are your muscles feeling today?
2. How did you sleep last night?
3. How is your energy level feeling for your training today?
4. How stressed are you?

The competitive season included 15 games, and postgame wellness tracking was included for the first 14 since the season was over after the 15th game. Ten of the games were played on the weekend and all were followed by a day off from training. Four games were played on weekdays and were followed by practice the next day. The number of days to recover between each game was categorized as either short (≤3 days, $n = 8$) or long (>3 days, $n = 6$). Five of the six long recovery games were 6 days of recovery and one had 13 days of recovery. Because this extended recovery was rare (only occurred once), all long recovery was cut off at day 6 for analysis. The average overall wellness score and average scores for each wellness subcomponent were computed for each day, by recovery duration categorization (short vs. long). The team was compliant with the NCAA's rules for hours of training per week and the required days off training each week.

Statistical Analysis

The variables of interest were the wellness subscores obtained from the four aforementioned questions and the overall wellness score that was calculated as the mean of the subscores. Each of these scores were collected from the athletes on each day of the season prior to training or games. The scores reported on a game day were considered as baseline scores. Scores were reported and collected on each subsequent day leading up to the next game, at which point the next game day (baseline) score was reported and the process repeated.

Descriptive statistics for athlete demographics were computed and reported. Two-sample Wilcoxon rank-sum tests were conducted to compare the subscores and overall wellness scores between short/long recovery for each day post match. Although the long microcycles had days of recovery up to 6 days, comparisons could only be made for up to 3 days post match, the maximum of the short-duration microcycle categorization. Data corresponding to recovery days over 10 days from the previous game were not included in the analysis as there was only one such break over the season. Means and associated 95% CIs for the subcomponent and overall wellness scores were computed by short/long recovery group for game days and each post-game day. These means and associated 95% CIs for each day of recovery were then plotted to visualize the scores by recovery group. Cohen's *d* values were computed to assess the between-group effect size. Effect sizes were interpreted as small (0.2), moderate (0.5), and large (0.8). As this was a retrospective, hypothesis generating study, no adjustments for multiple comparisons were made. In addition, aligning with current thinking regarding best practices against significance testing from thought leaders in statistics, *p*-values were provided where appropriate/relevant, but statistical significance was not reported for any results (Wasserstein et al., 2019). All analyses were generated using SAS version 9.4 (SAS Institute Inc, Cary, NC, USA), except for the plots which were constructed using Microsoft Excel (Redmond, WA, USA).

Results

Figures 1-5 show the means and associated 95% CIs by day for both the short and long recovery between game groupings for each of the wellness subcomponent scores and overall wellness scores. Subcomponent and overall wellness scores decreased directly post game and rebounded over time, but none appeared to rebound to game day levels by day 3 (for the short microcycle) or even day 6 (for the long microcycle). Little difference in overall wellness (Figure 1) was seen in the mean levels or patterns over time between the short/long microcycles. Muscle soreness (Figure 2) improved in the long microcycle on day 2 post-match compared to the short microcycle ($p = .0295$). Sleep and energy (Figures 3 and 4, respectively) synchronized together during both recovery periods. Both sleep and energy wellness scores in the short microcycle decreased immediately post game and began to increase by day 3 post match. However, sleep and energy for the long recovery steadily declined after game day, bottoming on day 4 post match with little subsequent improvement by day 6. Stress levels (Figure 5) improved on day 1 in the long microcycle more than the short microcycle ($p = .0203$), followed by a small drop on day 2, and then scores remained stable for the remainder of the microcycle. In the short microcycle, stress scores dropped immediately following games, followed by a steady incline for the remaining 2 days. Stress scores were similar between microcycles by days 2 and 3 post-match.

Table 1 displays Cohen's *d* values with estimated effect sizes between the short and long recovery periods by day for each of the wellness subscores and overall wellness scores. Most of the effect size estimates are negative, indicating a lower score (worse well-being) for the athletes on the respective days for those games with recovery times categorized as short. Reading across the rows of Table 1, the Cohen's *d* values first tend to decrease (bigger negative numbers), indicating decreasing well-being for the between game recovery periods categorized as short compared to those categorized as long. Subsequently, the short and long effect sizes for each of the wellness subcomponent scores as well as the overall wellness scores improved by day 3, with those for energy and stress turning positive. However, the Wilcoxon rank-sum *p*-values suggest few if any statistically discernable differences in any of the wellness subcomponent scores or overall wellness scores between the short recovery time between games and long recovery time between games groupings.

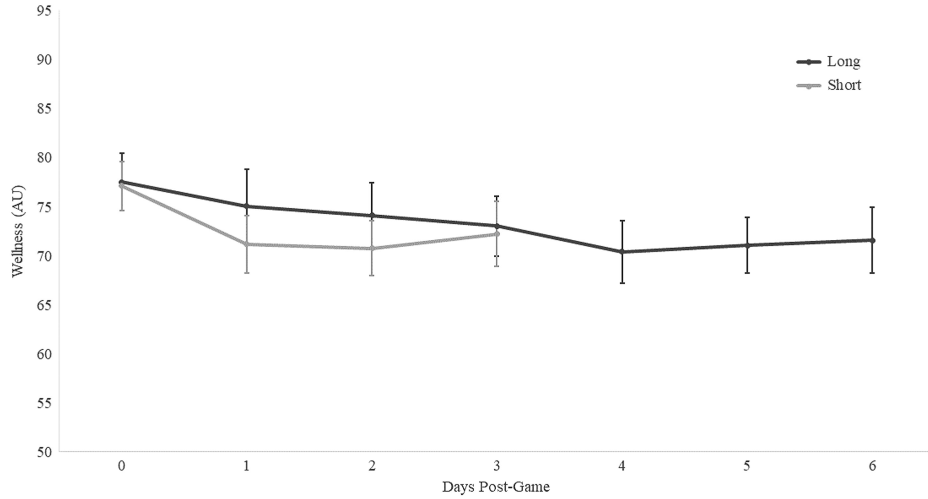

Figure 1.
Daily Means and 95% CIs of Overall Wellness for Short and Long Recovery After a Game. Day 0 Indicates Match Day. AU = Arbitrary Units.

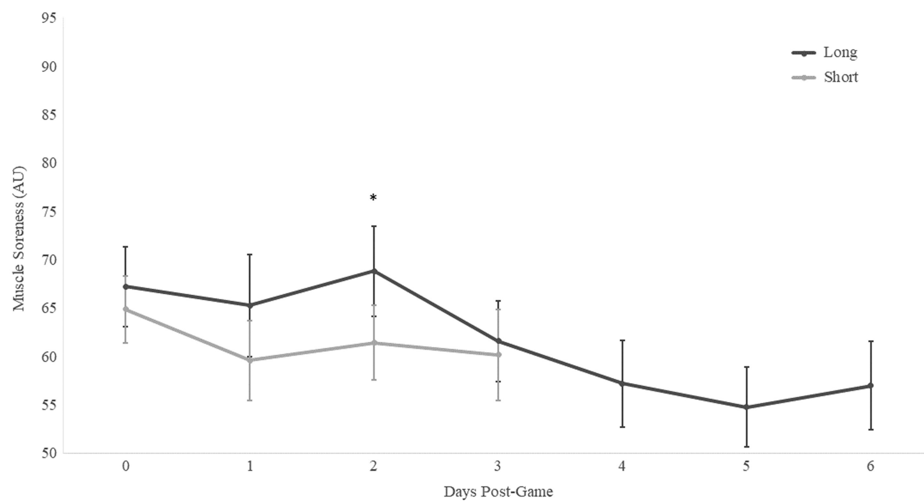

Figure 2.
*Daily Means and 95% CIs of Muscle Soreness for Short and Long Recovery After a Game. Day 0 Indicates Match Day. AU = Arbitrary Units. *Indicates a Difference Between Short and Long Microcycles; p < .05.*

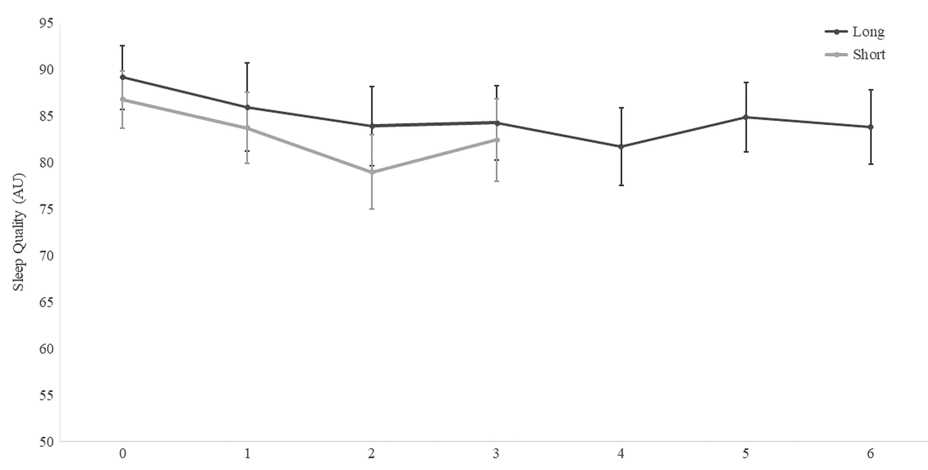

Figure 3.
Daily Means and 95% Confidence Intervals of Sleep Quality for Short and Long Recovery After a Game. Day 0 Indicates Match day. AU = Arbitrary Units.

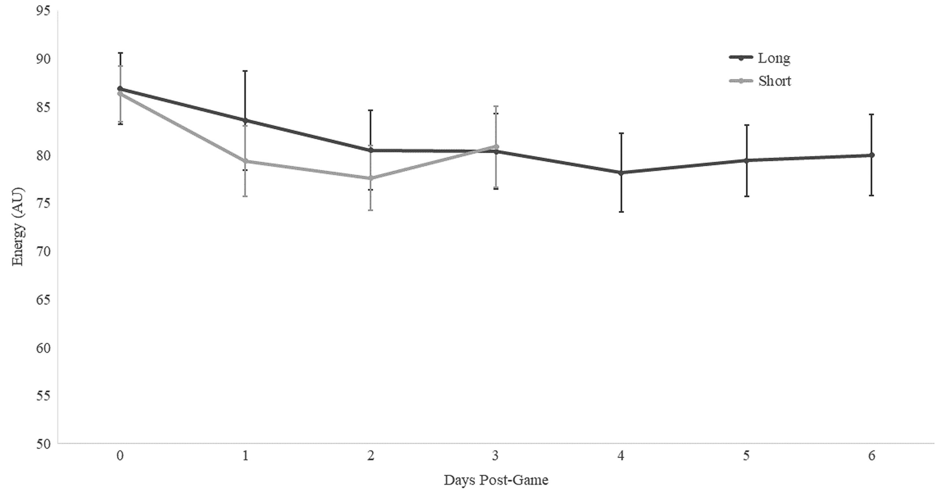

Figure 4.
Daily Means and 95% Confidence Intervals of Energy for Short and Long Recovery After a Game. Day 0 Indicates Match Day. AU = Arbitrary Units.

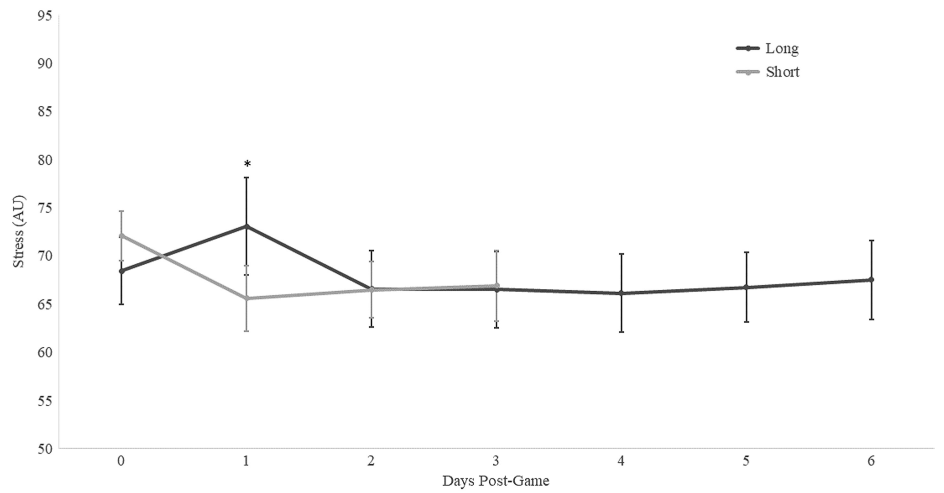

Figure 5.
*Daily Means and 95% Confidence Intervals of Stress for Short and Long Recovery After a Game. Day 0 Indicates Match Day. AU = Arbitrary Units. *Indicates a Difference Between Short and Long Microcycles; p < .05.*

Table 1.
Cohen's d and Wilcoxon Rank-Sum p-Values by Day Comparing Short Versus Long Recovery Periods

	Cohen's *d* Estimate Associated 95% CI (Short Minus Long); Wilcoxon Rank-Sum *p*-Value for Short vs. Long			
		Recovery Day		
Wellness Question	**Game Day**	**Day 1**	**Day 2**	**Day 3**
Sleep	−0.114 (−0.346, 0.118) 0.3080	−0.097 (−0.390, 0.196) 0.8597	−0.189 (−0.425, 0.046) 0.1851	−0.081 (−0.337, 0.174) 0.5271
Energy	−0.030 (−0.262, 0.202) 0.6316	−0.189 (−0.482, 0.105) 0.2083	−0.128 (−0.366, 0.109) 0.3118	0.018 (−0.237, 0.273) 0.8406
Muscle soreness	−0.103 (−0.335, 0.129) 0.3680	−0.228 (−0.522, 0.066) 0.1378	−0.285 (−0.524, 0.047) 0.0295	−0.061 (−0.316, 0.194) 0.7254
Stress	0.201 (−0.031, 0.434) 0.0793	−0.351 (−0.646, −0.056) 0.0203	0.044 (−0.194, 0.281) 0.8509	0.019 (−0.236, 0.274) 0.9441
Overall wellness	−0.024 (-0.256, 0.208) 0.7697	−0.202 (−0.470, 0.065) 0.1775	−0.203 (−0.441, 0.035) 0.1017	−0.045 (−0.301, −0.210) 0.7783

Discussion

This study explored the differences in wellness responses between short and long match-to-match microcycles in Division 1 collegiate women's lacrosse. Two major findings were made: (1) none of the five wellness scores recovered to match-day levels within either the short or long microcycles and (2) the short microcycle scores were typically lower than the corresponding long cycle scores, but only day 1 stress and day 2 muscle soreness showed a difference between microcyles. Although none of the wellness scores were restored to game day levels even after up to 6 days post-match, all five measures of wellness showed very similar scores by the third day after a game for the short and long microcycles. The results for overall wellness, sleep quality, and energy were consistently similar across microcycle duration: early decreases in scores, followed by a moderate rebound. However, while stress scores improved in the first day of recovery in the long microcycle, they worsened on day one and remained essentially flat out to 3 days post match in the short microcycle. Muscle soreness showed a similar pattern to the stress scores: the long microcycle scores improved by the second day of recovery only to drop precipitously and remain low while the short microcycle muscle soreness scores worsened on day one and remained stable out to 3 days post match. We consider each of the wellness score patterns over time separately here.

For both the long- and short-duration microcycles, overall wellness scores decreased immediately after match day, decreasing more in the short-duration microcycle, but rebounding after day 2 post match, recovering to almost the exact same level as the long-duration microcycle by day 3 post match. Similarly, in a study of professional male Australian football players it was discovered that on 1 day post match, an 8-day microcycle had a moderate reduction in self-reported wellness compared to a 6-day and 7-day microcycle (Gallo et al., 2017). Athletes' day 3 and 4 post match wellness reports improved no matter the length of the microcycle. In contrast, the present study showed an improvement in the average overall wellness score from day 2 to day 3 post match for the short microcycle, while for the long microcycle, average overall wellness was still decreasing into day 4 post match before showing any improvement. It was previously proposed that a player's perception of wellness is related to days to game, meaning players will perceive faster recovery in shorter microcycles to mentally prepare for the next game (Gallo et al., 2017; McLean et al., 2010). Taking this a step further, if players know that coaches make game decisions based on athlete recovery, there is a chance they report higher wellness in an attempt to receive more playing time. The coaches in the present study did have access to athlete wellness data throughout the study, but this information was used only to introduce a conversation with the athlete if there was a substantive change in their scores. The data were used neither punitively or to award athletes. Rather, the coaches and athletes viewed the wellness scores more as a communication tool to invoke further discussion if needed. Gender, league, sport, and team competitiveness differences could all play a role in this. Gallo et al. (2017) indicated a trend toward wellness being reduced at 3 days post match for the 8-day microcycle in male Australian footballers, analogous to the results observed here in female collegiate lacrosse players. This may be a result of the high volume and intensity of training required to prepare for the next game or due to other stresses such as academic load. This study did not include specific assessment of either, but future studies should consider evaluating why overall wellness scores did not improve in the long microcycle.

Average energy and sleep levels both decreased into day 2 post match before improving on day 3 in the short microcycle, while in the long microcycle, persistent declines for both were noted into day 4 post match before moderate improvement was observed. Wellness responses in Gallo et al. (2017) followed similar decreasing slopes in the first 2 days after a game regardless of microcycle length. The declines in wellness subscores into day 4 of the long microcycle could be a result of more intense training on day 3 of longer cycles, or a possible off day hindering recovery due to athlete complacency (poor nutrition/hydration) as Gallo et al. (2017) noted. In elite male soccer players, differences in ratings of sleep quality were observed across the week, where the highest and lowest levels of sleep quality were during the evening of the fifth day post match and immediately after a match, respectively (Thorpe et al., 2016). In the present study, only the long microcycle for sleep quality followed a similar pattern where sleep levels decreased to day 4 post match before increasing on day 5 post match. Previous literature in the current population has shown that improved sleep quality and energy resulted in improved external load performance from the athletes (Crouch et al., 2021). Other studies on energy and performance capacity in elite male soccer players revealed minor to strong correlations between fatigue and high intensity distance (Thorpe et al., 2016). Therefore, there may be an inherent connection between sleep quality and energy levels, emphasizing the need to address and more rapidly improve wellness in these dimensions more quickly post matches. Additionally, match location (home versus away) has the potential to influence sleep patterns and should be considered in future research.

The present study showed that for both short and long microcycles, muscle soreness decreased into the first post-match day, followed by a rebound into day 2 and a subsequent decline. This is different from previous literature in elite male athletes where perceived ratings of fatigue and delayed onset muscle soreness remained stable over the second and fourth day post match (Thorpe et al., 2016). One possibility to explain this illogical consistency, is that players may perceive themselves as needing to be recovered and ready for the upcoming match in a short microcycle, and their motivation and focus on the game may override any subconscious physiological response (Gastin et al., 2013). Since wellness has previously been shown to be sensitive to external load, this could also be the result of a lighter training day or an off-day on day 1 post match to promote recovery followed by higher intensity training on post-match day 2, as the wellness survey in the current study was taken in the morning, reflecting the body's response to the previous day of training (Crouch et al., 2021; Gallo et al., 2017). Additionally, collegiate athletes experience different external factors, such as academic stress, social stress, and poor diet, when compared to professional athletes which can also affect recovery (Clemente et al., 2019). Future research should consider incorporating distinct categories of stressors (academic, sport related, social) into wellness surveys.

Assuming any standard adjustment for multiple comparisons, there were no statistically discernable differences in the effect sizes between the short and long microcycles for any of the wellness measures up to and including 3 days post-game day (as evidenced by the 95% confidence intervals for the Cohen's d estimates all crossing one and the Wilcoxon rank-sum *p*-values testing for differences in the mean wellness scores between the short- and long-duration microcycles, noting the exception of the stress wellness subcomponent on day 1 post game and the muscle soreness component on day 2 post game). Further, the long-duration microcycle wellness was typically better in the long-duration microcycles than in the short-duration microcycles, as indicated by the negative Cohen's d estimates in Table 1. The difference in effect sizes was typically seen to increase early in the post-game-day recovery period (by days 1 and 2 post game) before shrinking into days 2 and 3 post game. This suggests that the wellness for the lacrosse athletes during short microcycles would worsen faster compared to those in the long microcycle recovery periods, but then recover to levels comparable between the two duration microcycles. This is likely due to the training schedule differences between the long and short microcycles. Athletes had a day off for day 1 post game during the long microcycles but needed to train on this day during the short microcyle. As anticipated, the day off helped the athletes recover from the game faster, whereas training may exacerbate the decline in wellness (Gallo et al., 2017; McLean et al., 2010; Thorpe et al., 2015).

While this study adds to the sparse literature and increases understanding of the relationship between recovery periods and athletes' wellness in female athletes, there are limitations worth noting. Although wellness surveys like the one used in this study are commonly implemented in sports science literature, limited research on their validity and reliability exists. External load measures (i.e., distance traveled, distance traveled at high-intensity, number accelerations and decelerations, number of sprints), known to be important in describing athletes' well-being and recuperation were unavailable for the athletes included in this study. Any potential influence of such measures on the internal stress markers obtained throughout training sessions for this study is therefore unknown and potentially limiting. The limited validity of using subjective wellness surveys to monitor athletes is also seen as a limitation, as all the athletes were aware that the coaches monitored their scores daily throughout the season. This could potentially skew the responses in hopes of getting more playing time or having a lighter training day. While it might be more informative to be able to study a team over multiple seasons or multiple similar teams within a single season (or both), this study was limited to the analysis of a single team during a single athletic season. Finally, incorporating the assessment of the academic load of collegiate athletes into the models constructed to evaluate well-being could improve understanding of additional sources of any stress, poor sleep quality and reduction in energy observed.

Although little evidence of meaningful differences in overall wellness or subcomponents of that combined measure were observed between microcycles in the present study, insight on how training regimens affect athletes' wellness was gained. Similar to professional Australian football players (Gallo et al., 2017), women's lacrosse wellness scores decreased immediately after game day. However, the recovery of wellness observed in the women's lacrosse athletes was more muted and followed a different pattern. Thus, the data from this study suggest there is a difference in recovery-related wellness between elite male professional and collegiate female athletes. Future research in female athletes across the collegiate and professional levels is needed to better evaluate if the differences noted are gender related, due to experiential and expectation differences, such as academic load in collegiate athletes, or other unidentified factors. The present study provides athletes, coaches, and practitioners an insight into how training periodization and training load in between matches can impact athletes' wellness and suggests that wellness monitoring needs to be improved and refined to return wellness to game-day levels prior to the end of between-match microcycles.

Ethics Committee Approval: The design and reporting of this study were conducted in accordance with the Declaration of Helsinki and approved by Campbell University's Institutional Review Board (Date: January 15, 2020, CUIRB-IRB0000515).

Informed Consent: All participants completed a written informed consent with the opportunity to ask questions regarding the study prior to data collection.

Peer-review: Externally peer-reviewed.

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