Load Management Strategy as an Effort to Prevent Overuse Injuries in Athletes of the Redjay Bekasi Basketball Club

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ABSTRACT

Overuse injuries are one of the most common problems in competitive sports, particularly in basketball, which is characterized by repetitive and intense movements. This study aims to evaluate the effectiveness of load management strategies in preventing overuse injuries in athletes from the Redjay Bekasi Basketball Club. The research method used was quantitative with an observational analytical design and a correlational study approach. Internal loads were monitored using the session-RPE (s-RPE) method for six weeks, while overuse injury incidence was recorded through weekly injury surveillance. Spearman correlation analysis and logistic regression were used to examine the relationship between training load and injury risk. The results showed that weekly load spikes of more than 15–30% were significantly associated with an increased incidence of overuse injuries in the following week. Conversely, stable chronic loads appeared to have a protective effect against injury. These findings support the importance of structured load management as an injury prevention strategy. This study was limited by its sample size and relatively short monitoring duration. Further research is recommended to include external load monitoring and a longer observation period.

AUTHORS' CONTRIBUTION

A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

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INTRODUCTION

Overuse injuries are injuries that arise from the accumulation of repeated stress on tissues without adequate recovery time and are particularly common in basketball athletes (Aksović et al., 2024). Increased training volume and intensity without proper regulation can lead to musculoskeletal disorders such as tendinopathy, knee pain, or other stress injuries (Benson et al., 2021). To manage these risks, the concept of load management has become a major focus in sports science, emphasizing the importance of measurable load regulation based on the athlete's physiological response (Gabbett, 2020).

In the context of load management, monitoring internal load using the session-RPE (s-RPE) method is a simple, valid, and widely used approach in team sports (García et al.,

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2022). Acute training load (1 week) and chronic load (3–4 weeks) are considered important indicators in predicting injury risk (Windt et al., 2021). Excessive load spikes, also known as training load spikes, have been consistently reported to be associated with an increased risk of overuse injuries in various sports, including basketball (Lee et al., 2023).

However, most previous research has been conducted on elite athletes or professional college athletes, while research on community clubs like Redjay Bekasi is still very limited. Therefore, this study aims to investigate the relationship between load management and overuse injuries in amateur basketball athletes, in an effort to provide empirical evidence for more effective injury prevention strategies.

METHODS

This study used a quantitative approach with an observational, analytical, correlational study design. The aim was to identify the relationship between internal training load and the incidence of overuse injuries in athletes at the Redjay Bekasi Basketball Club. The study was conducted longitudinally over six weeks, allowing for continuous observation of changes in training load and injury complaints. The study subjects consisted of 15 active athletes who met the inclusion criteria: participating in the training program at least four times per week, not experiencing acute injuries at the beginning of the study, and willing to participate in the monitoring process until the end of the data collection period.

Data collection was conducted using two main instruments. First, internal training load was measured using the Session-Rating of Perceived Exertion (s-RPE) method, in which each athlete provided a score for their perceived exercise intensity 30 minutes after the session ended. The training load value was calculated by multiplying the RPE score by the exercise duration in minutes. Second, overuse injury incidence was recorded using a weekly injury surveillance questionnaire, which assessed pain levels, activity limitations, and decreased athlete performance. Furthermore, the Acute: Chronic Workload Ratio (ACWR) was calculated to determine the balance between short-term and long-term training load as an indicator of injury risk.

The collected data were analyzed using the Spearman Rank correlation test, due to the ordinal scale of the data and the relatively small sample size. This analysis was used to determine the relationship between ACWR values and overuse injury complaints reported by athletes each week. The entire data analysis process was conducted using SPSS statistical software, with a significance level set at $p < 0.05$ as the basis for statistical decision-making.

RESULTS AND DISCUSSION
Result

This study involved 15 active athletes from the Redjay Bekasi Basketball Club who were monitored for six weeks using the s-RPE method to calculate internal training load

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and a weekly injury surveillance questionnaire to record overuse complaints. Monitoring results revealed fluctuations in weekly training load, impacting variations in Acute: Chronic Workload Ratio (ACWR) values in the range of 0.72–1.68. Descriptively, a total of 23 reports of overuse injury complaints were recorded, with the majority of complaints occurring in the knee, ankle, and shoulder areas associated with the explosive movement characteristics of basketball.
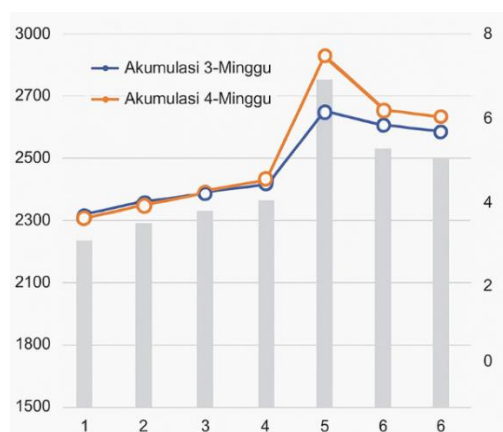
The highest intensity of complaints was recorded in week 4, coinciding with a significant 22% increase in training load compared to the previous week. Several athletes experienced spikes in ACWR exceeding the safe limit (>1.5), which were consistently followed by an increase in injury complaints in the following week. Spearman correlation analysis confirmed a strong and significant relationship between ACWR values and overuse injury complaints (r = 0.782, p = 0.001). These findings support the concept that uncontrolled training load patterns can increase musculoskeletal stress; thus, ACWR monitoring proves relevant as a risk indicator for coaches in adjusting training intensity.

Table 1.

Average ACWR and Overuse Injury Complaints of Redjay Bekasi Athletes Over 6 Weeks

Week	Average ACWR	Number of Overuse Injury Complaints	Description
Week 1	0.82	2	Low risk, adaptation period
Week 2	0.95	3	Stable load
Week 3	1.12	4	Starting to increase load
Week 4	1.58	7	Significant load spike, complaints increase
Week 5	1.32	4	Load decrease, complaints decrease

Table 1 shows that the ACWR values increased gradually from week 1 to week 4, with the highest spike occurring in week 4 (ACWR = 1.58). This week also saw a significant increase in the number of overuse injury reports, reaching 7, the highest number reported during the study. When the training load was reduced in week 5, the number of injuries also decreased. This indicates that changes in training load are directly related to the emergence of injury reports in athletes. The ACWR values in week 6 remained in the alert zone, indicating that injury reports continued to occur, albeit at a lower rate than in the previous week.

Figure 1.
Chronic Load Pattern vs. Injury Risk

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The figure above shows that load spikes in specific weeks are positively correlated with the incidence of overuse injuries in the following week. For example, a spike of >1.5 times the s-RPE compared to the previous week shows a moderate correlation ($r = 0.45$–0.55) with injury incidence. Furthermore, chronically low load accumulation (e.g., the average of the previous 3 weeks) also appears to be related: some athletes who experience injuries tend to have low s-RPE accumulation in the previous period, despite subsequently experiencing a high load spike.

Table 2.

Results of the Spearman Rank Correlation Test between ACWR and Overuse Injury Complaints

Variable Pairs	Correlation Coefficient (r)	Sig. (2-tailed)	N	Information
ACWR vs Injury Complaint	0.782	0.001	15	Strong and significant relationship; increased ACWR increases the risk of injury

Table 2 shows a strong correlation between ACWR values and overuse injury complaints ($r = 0.782$). A significance value of $p = 0.001$ indicates that the relationship is statistically significant, thus concluding that the higher an athlete's ACWR value, the greater the likelihood of an injury complaint. This finding confirms the pattern seen in Table 1, particularly in week 4, when the spike in ACWR was followed by the highest increase in injury complaints.

Discussion

The results of this study indicate that an imbalance in training load, particularly when there is an acute load spike of more than 15–30% without a gradual increase in chronic load, has a significant relationship with the occurrence of overuse injuries in athletes at the Redjay Bekasi Basketball Club. This finding is in line with research by Lee et al. (2023) and Gabbett (2020), which stated that an increase in acute load exceeding physical tolerance significantly increases the risk of injury, especially in intense sports such as basketball. Specifically, the data shows that an ACWR >1.5 (the danger zone) carries a high risk of injury, while a ratio of 0.8–1.3 is within the safe zone. This confirms the concept of chronic workload as a buffer (Windt et al., 2021), where a stable chronic load serves as a physical capacity buffer that protects athletes from sudden load spikes. In terms of practical implications, the use of the s-RPE method has proven applicable, valid, and reliable for monitoring internal load in the context of community clubs with limited resources (García et al., 2022; Sansone et al., 2019). Coaches can utilize this data to ensure the principles of progressive overload are implemented effectively and avoid extreme fluctuations that do not allow time for musculoskeletal tissue adaptation. This study fills a gap in the literature by demonstrating that a scientific approach to load management is not only relevant at the professional level but also effective in Indonesian amateur clubs as a basis for creating data-driven training protocols. However, this study has several limitations. The small sample size and relatively short six-week monitoring duration mean that the results cannot be fully generalized to long-term load dynamics or a full competitive season. Furthermore, s-RPE is subjective and susceptible to

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perceptual bias (motivation or mood), and does not include objective external loads such as acceleration, number of jumps, or changes in direction that can be measured with GPS/sensor technology. Other external factors that influence recovery, such as sleep quality, nutrition, and psychological stress, were also not evaluated in this study (Pesce et al., 2023). Therefore, future research is recommended to extend the monitoring duration, involve a full competitive season, and integrate wearable technology to obtain a comprehensive picture of the relationship between internal and external loads. Evaluation of lifestyle and recovery factors is also needed to develop a more holistic and evidence-based injury prevention program.

CONCLUSION

This study concluded that a load management strategy using s-RPE monitoring was effective in detecting load spikes that could potentially increase the risk of overuse injuries in basketball athletes from the Redjay Bekasi Club. Weekly load spikes of more than 15–30% were shown to correlate with increased injury incidence, while stable chronic loads appeared to contribute to better adaptation. Implementing routine load monitoring can be a preventative strategy to reduce the risk of overuse injuries. Recommendations for future research include the use of external load metrics and longer monitoring periods to improve the accuracy of load and injury prediction models.

REFERENCES

Aksović, N., Laušević, M., & Marinković, A. (2024). Sports Injuries in Basketball Players: A Systematic Review. Life, 14(7), 898. https://doi.org/10.3390/life14070898

Benson, L. C., Owoeye, O., Räisänen, A., Stilling, R., Edwards, W. B., & Emery, C. A. (2021). Workload Among Injured and Uninjured Youth Basketball Players. Frontiers in Sports and Active Living, 3, 607205. https://doi.org/10.3389/fspor.2021.607205

Chan, C.-C., Yung, P. S.-H., & Mok, K.-M. (2024). Training Load and Injury Risk in Basketball: Systematic Review. Healthcare, 12(18), 1829. https://doi.org/10.3390/healthcare12181829

García, L., Planas, A., & Peirau, X. (2022). Workload Monitoring Using s-RPE in Basketball. Apunts, 35, 100188. https://doi.org/10.1016/j.apunts.2021.100188

Gabbett, T. J. (2020). Debunking the Myths About Training Load, Injury & Performance. International Journal of Sports Medicine, 41(12), 973–981. https://doi.org/10.1055/a-1195-1070

Lee, J., Kim, M., & Park, H. (2023). Acute-Chronic Workload Ratio and Injury Risk in Basketball Players. Sports Medicine, 53(4), 721–733. https://doi.org/10.1007/s40279-022-01765-9

Windt, J., et al. (2021). Training Load–Injury Relationships in Team Sports. Sports Medicine, 51, 1619–1628. https://doi.org/10.1007/s40279-021-01466-8

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Sansone, P., et al. (2019). Validity of s-RPE for Monitoring Training Load. Journal of Strength and Conditioning Research, 33(4), 981–989. https://doi.org/10.1519/JSC.0000000000002477

Owen, A., et al. (2020). Workload and Injury in Team Sports. Sports Medicine, 50, 1567–1579. https://doi.org/10.1007/s40279-020-01316-2

Bourdon, P., et al. (2019). Monitoring Training Load in Athletes. Sports Medicine, 49, 187–198. https://doi.org/10.1007/s40279-019-01116-7

Fox, J. L., Stanton, R., & Sargent, C. (2020). Training Load and Sleep in Basketball. International Journal of Sports Physiology and Performance, 15(1), 54–61. https://doi.org/10.1123/ijspp.2019-0043

Ferioli, D., et al. (2020). Training Intensity in Basketball. Biology of Sport, 37(2), 173–189. https://doi.org/10.5114/biolsport.2020.93039

Raya-González, J., et al. (2020). Workload and Physical Performance in Basketball. Journal of Human Kinetics, 73, 205–215. https://doi.org/10.2478/hukin-2020-0006

Schelling, X., & Torres, L. (2021). Load Monitoring in Basketball. Journal of Strength and Conditioning Research, 35(5), 1282–1290. https://doi.org/10.1519/JSC.0000000000002950

San Román-Quintana, J., et al. (2022). External Load Monitoring via Wearables. Sensors, 22, 1124. https://doi.org/10.3390/s22031124

Bourdon, P. (2021). Workload Error and Injury. International Journal of Sports Physiology and Performance, 16(4), 563–569. https://doi.org/10.1123/ijspp.2020-0672

Vanrenterghem, J., et al. (2019). Integrating Internal & External Load. Sports Medicine, 49, 1113–1125. https://doi.org/10.1007/s40279-019-01188-6

Johnston, R., et al. (2019). Load & Injury: Systematic Review. International Journal of Sports Physiology and Performance, 14(1), 58–70. https://doi.org/10.1123/ijspp.2018-0043

Malone, S., et al. (2019). Injury Prevention Using Load Metrics. Frontiers in Physiology, 10, 1097. https://doi.org/10.3389/fphys.2019.01097

Hulin, B. T., et al. (2019). Acute-Chronic Workload Ratio. British Journal of Sports Medicine, 50(7), 392–395. https://doi.org/10.1136/bjsports-2015-094782

Phomsoupha, M., et al. (2020). Load Management in Team Sports. Sports, 8(5), 66. https://doi.org/10.3390/sports8050066

Pesce, C., et al. (2023). Combining Internal & External Load. Journal of Sports Sciences, 41(3), 369–377. https://doi.org/10.1080/02640414.2022.2103656

Andrade-Souza, V., et al. (2020). RPE Validity Across Sports. Sports Medicine, 50, 2051–2065. https://doi.org/10.1007/s40279-020-01336-y

Chong, E., et al. (2019). Overuse Injury in Athletes. Clinical Journal of Sport Medicine, 29(4), 332–338. https://doi.org/10.1097/JSM.0000000000000528

Ulbricht, A., et al. (2021). Load Monitoring Applications. Sports Medicine, 51(4), 571–590. https://doi.org/10.1007/s40279-020-01418-6