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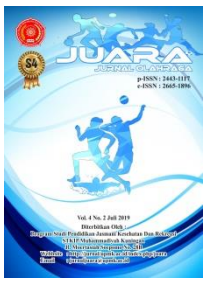

VARIATIONS IN WEEKLY LOAD, TRAINING MONOTONY, AND TRAINING STRAIN IN DBL ACADEMY STUDENTS

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Abstract

The objective of this study was to examine and quantitatively assess the correlation between training load, strain, and RPE adolescent basketball athletes. 10 athletes who were DBL Academy students participated in the study. selected athletes are athletes who are prepared to participate in the DBL championship on the Hoops stage. They practice 3 times in a week for 3 weeks consisting of technical, tactical, physical, and game programs. The ANOVA and Turkey statistic tests were used to see the difference in training results per week divided into weekly training load, monotony training, and training strains, The coefficient of variation (CV) in a week represents the average CV of all players in each week considering all training sessions. The result of this study was that weekly exercise load variation increased by 21% in the first week and decreased by 3% from the second week to the third week while the coefficient of variation in the week was highest in the first week at 19% and feel stagnant by 18% in the second and third weeks. Average monotony training per week was 1.8 AU and training strain 3508.5 and any strength relation between weekly training load and training strain (r=0.990; sig. 0.000). This study concluded that exercises carried out for 3 weeks had a variety of exercises that supported an increase in exercise load per week which also increased exercise tension. Coaches are important in monitoring weekly training loads; monitoring monotony and strain training will help in preparing athletes to participate in championships optimally.

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INTRODUCTION

Basketball is a court-based team sport that involves a variety of physical, mechanical, technical, and tactical demands during practice and competition, for this reason, practitioners must comprehend the stress that a basketball player experiences throughout these activities (Petway, 2020). Therefore, practitioners must possess a comprehensive understanding of the specific requirements of match-play and the associated training load (Svilar, 2018, 2019).

According to (Edwin Putra Surya Prasetyo, 2021), the beginning of the establishment of DBL Academy was on January 25, 2016. DBL Academy itself is a sports academy (school). which has the goal of growing interest in children and parents to improve the personality or positive attitude of children with basketball media. Through basketball sport, DBL Academy provides facilities and infrastructure quality so that children can acquire knowledge from an early age.

The physical development and skills of youth basketball athletes are significantly influenced by two crucial factors: training load and strain (Anderson, 2003; Paulauskas, 2019). The practice of monitoring training load enables practitioners to assess if athletes have adhered to their prescribed training regimen and evaluate their ability to manage the physical demands imposed on their bodies (Impellizzeri et al., 2020). The training strain is a quantitative measure that denotes the level of physiological stress experienced by the athlete over a whole training week (Morales et al., 2019). The optimal performance of athletes relies on the appropriate use of training load and a comprehensive comprehension of the strains they encounter.

Previous research has found several significant factors related to training load and strain in youth basketball players. However, in this study, researchers added Body Mass Index (BMI) and rating of perceived exertion (RPE) indicators as variables that have an overall impact on the athletic performance of youth basketball players. A player's rating of perceived exertion (RPE) is regularly collected to determine their internal training load. RPE can measure a player's overall perceived load after drills and sessions and is affordable and simple to administer (Beato et al., 2023). This study aims to provide valuable insights for coaches and sports professionals in the development of efficient and safe training programs for youth basketball athletes. The findings from this study have the potential to improve athletes' performance on the field.

The objective of this study was to examine and quantitatively assess the correlation between training load, strain, and RPE adolescent basketball athletes. This study seeks to enhance comprehension of the interconnections between these characteristics and how their management can contribute to the enhanced performance of young basketball athletes, utilizing empirical data and statistical analysis.

METHODS

Participants

10 students from DBL Academy participated in this study. They practiced 3 times a week for 3 weeks. A combination of exercises consisting of technical, tactical, and physical training will be given to them. Training duration and RPE indicators will be used in the measurement of training load and training strain (Clemente et al., 2019; Fessi et al., 2016). BMI measurement using body weight and height indicators for each athlete.

This research aims to evaluate the training results of the DBL Academy basketball team which succeeded in becoming champions in basketball competitions. The athletes selected in this study are the main athletes who support the team in participating in DBL matches. 4 types of training consisting of technical, tactical, physical and game training will be analyzed for weekly training load, monotony and strain.

Training Load Monitoring

Tabel 1 Three weeks Training Program DBL Academy Students

DAY	Week	TRAINING SESSION
MONDAY	1	Passing and move to 1v1, 3v3 (Tactics)
THURSDAY		Passing and move to 1v1, 3v3 (Tactics)
SATURDAY		Final Internal Competition (Game 3v3)
MONDAY	2	Passing and move to 1v1, 2v2, 3v3 (Tactics)
THURSDAY		Physical Fun and Footwork
SATURDAY		Ball Handling and Triple Threat (Technique)
MONDAY	3	Ball Handling and Triple Threat (Technique)
THURSDAY		Passing and move to 1v1, 2v2, 3v3 (Tactics)
SATURDAY		Physical Fun and Footwork

Athletes train 3 times for 3 weeks, training consists of physical, technical, tactical and game. During the training process, athletes will explain of the stress experienced after training with Rated Perceived Exertion (RPE) norms. Researchers use a scale of 1 – 10 in assessing RPE. The RPE value obtained will later be multiplied by the training duration so that it will provide monotony and strain data (Foster, 1998; Haddad, 2017).

Tabel 2 Rate of RPE Scale and Intensity Level for The Sample (Academy, 2019)

RPE SCALE	INTENSITY LEVEL
9 – 10	Maximum Intensity
7 – 8	Vigorous Intensity
5 – 6	Moderate Intensity
3 – 4	Light Intensity
1 – 2	Very Light Intensity

The RPE data were collected after each training session using a scale of 1 - 10. To collect subjective estimations of the physiological loads during each session, each player was asked: “How did you perceive exertion during training?” The session training load was then calculated by multiplying the RPE value by the session duration. The weekly training load equals the sum of the training load for all training sessions performed in a given week. The weekly training monotony, which is a measure of day-to-day training variability, was calculated from the average weekly training load divided by the standard deviation (SD) of the weekly training load. The training strain, which is useful for monitoring training when players are undertaking a high training load, was calculated as the product of weekly training load and weekly monotony (Fessi et al., 2016).

Statistic

Results are presented with descriptive data to explain the sample characteristics. Different tests will be carried out to see differences in weekly training load, training monotony, strain, and RPE using ANOVA and Turkey. Correlation Test to see the relationship between variables. All statistical tests were tested using SPSS 21 software. The form of data that will be presented is in text and table form.

FINDINGS AND DISCUSSION

Findings

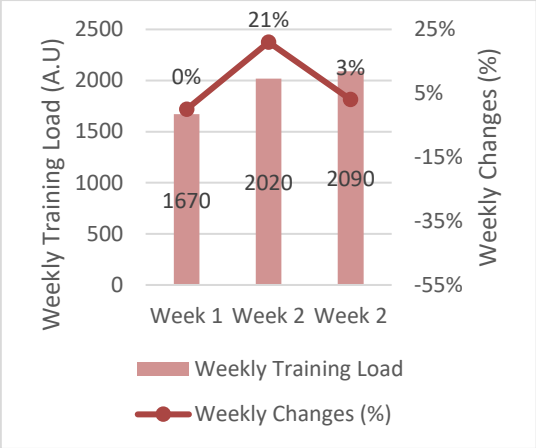
Tabel 3 Characteristic of Participats

Variables	Participants
Age (years)	9,4±0,52
Weight (Kg)	33,32±8,28

Height (m)	131±0,04
Body Mass Index (BMI (Kg.m^{-1})	19,27±3,78

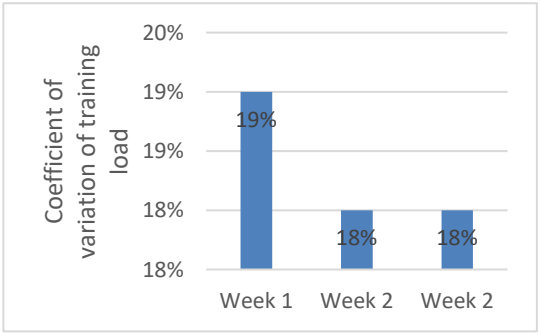
Table 3 provides an overview of the characteristics of athletes from DBL Academy where the average age is 9 years, weight 33 kg, height 131 cm and BMI 19.27.

Graph 1 Weekly Training Load and Percentage Change



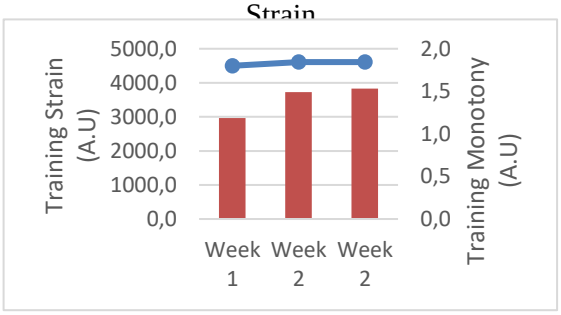
Graph. 1. Provides information variation of the highest weekly training load reaching 21%, namely from the accumulated training load from the 1st to the 2nd week, then there was a decrease in the increase in the weekly training load by 3% in the 3rd week.

Graph 2 Coefficient of Variation of Training Load



Graph. 2. The coefficient of variation within a week was highest in the first week (19%) and then decreased and stagnated at 18% in the 2nd and 3rd weeks.

Graph 3 Monitoring Training Monotony and Strain



Graph 3. shows that the training carried out for 3 weeks was still at a varied level with a training monotony value of 1.8 and a training strain value that continued to increase from the first to the 3rd week.

Tabel 4 Variance Variable

Nomor	Variable	F	Sig.
1	Mean Daily Training load	4,518	0,020
2	Training Monotony	3,774	0,036
3	Training Strain	6,295	0,006

Table 4 shows that all variables (mean daily training load, training monotony, training strain) have a mean that is different from the sig. < 0.05.

Tabel 5 Variable Mean Differences Each Week

No	Variable	Homogeneity	Sig.
1	Mean Daily Training load 1	Mean Daily Training load 2	0,067
		Mean Daily Training load 3	0,024
2	Training Monotony 1	Training Monotony 2	0,035
		Training Monotony 3	0,137
3	Training Strain 1	Training Strain 2	O,022

	Training Strain 3	0,008

Table 5 is the result of the Turkey HSD test. Only the mean daily training load in the first and third weeks is significantly different, training monotony in weeks 1 and 2 has a significant difference and the training strain for each week is significantly different. < 0.05.

Discussion

Training in sports is a very complex activity, with various indicators to be evaluated by a coach and coaching team. Under and overtraining have an impact on the performance of an athlete, especially overtraining which will lead to a high risk of overtraining (T. O. Bompa & Buzzichelli, 2019). In addition, the variety of training loads provided each week will improve athlete fitness, reduce the risk of injury and improve athlete performance (Gabbett, 2016).

In this study, it was found that the average weekly training load increased progressively so that it was by the principle of progressive training load (T. Bompa & Buzzichelli, 2015). The use of progressive training loads will have a positive impact on improving athlete performance. This study also found that the highest increase in training load was from week 1 to week 2 which was 21% and then the percentage increase decreased in week 3 which was only 3%. This finding is in line with research (Fessi et al., 2016; Lago-Peñas & Sampaio, 2015). which focused on high training loads in the first and second weeks. In this study, the coach focused on tactical training programs, games and improving physical components. Furthermore, in the last week, there was a decrease in the percentage of weekly training load, this is following by previous research which states a decrease in the percentage of training load (Coutinho et al., 2015; Stevens et al., 2017). In week 3 the coach focused on improving the quality of Ball Handling and Triple Threat (Technique), Passing and moving to 1v1, 2v2, 3v3 (Tactics), and Physical Fun and Footwork.

This study also provides the results of calculating training monotony which is less than 2 AU, training monotony values that exceed 2 AU are very at risk of overtraining (Foster, 1998). The development of training monotony must be monitored by the coach, changes in training monotony are also influenced by the athlete's psychological condition (Cristina-Souza et al., 2019), so in the week leading up to the match a coach is obliged to monitor the athlete's psychology. Monitoring the training load using monotony and strain monitoring in this study was carried out 3 weeks before the athlete competed in the hoops stage and ended up becoming a champion. Interestingly, training strain tended to increase each week. This increase in training strain has a relationship with the increase in weekly training. In this study, there was a very strong relationship (r=0.990; sig. <0.000) between weekly load and training strain.

The adverse effects of injury in young athletes can be identified not only during competitive activities such as matches. However, injuries can also occur during sports, physical activities such as training (Issn, 2022; Kerr et al., 2018). The creation of training data such as noticing training monotony and strains in each athlete's training can be used to measure the risks associated with changes in training load. Reviewing this data should be done regularly and recorded daily to create maximum results and benefit both the coach and the athlete. All decisions relating to athletes should increasingly be based on data evidence whether it is about performance, training load or injury. For this reason, we as coaches must manage young athletes well as it reduces the likelihood of injury and overtraining (Murray, 2017).

CONCLUSION

The study found that there is a strong relationship between weekly training load and training strains. Trainers need to pay attention to monitoring variations in training load by

looking at exercise variations from monotony training analysis. This study resulted in the calculation of monotony training below 2.0 AU which made DBL Academy athletes continue to be motivated in training for matches despite an increase in weekly training load and training strains. Through this research, coaches will be greatly helped in seeing the achievement of the training load given each week along with the variety of training and psychological tension received by athletes, especially the training program prepared for the competition. It is recommended for future studies to look at the relationship of pre-season training to pre-match to provide a broader picture of weekly training loads, training variations and training strains that occur each week.

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The research was carried out by analyzing, the weekly training load, training monotony and training strain to determine the level of child fatigue through RPE. I gratefully thank the principal of DBL Academy, Head Coach for allowing me to conduct the research there. I hope this research can be used as a reference to be included in the training program at DBL Academy Surabaya.

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