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# Resistance Trainings for Enhancement in Jumping Performance: A Comparative Analysis

**SANA ULLAH KHAN[1], MUHAMMAD FARHAN TABASSUM[2*], RABIA KARIM[3]**

[1]Sanai Fitness4u, 19 Cheetham Hill Road, Manchester M4 4FY, United Kingdom

[2]Depaertment of Mathematics, University of Management and Technology, Lahore, Pakistan

[3]University of Home Economics, Lahore, Pakistan

[*]Corresponding Author's Email: farhanuet12@gmail.com

## Abstract

*The primary purpose of programming is to organize training factor modifications that will provide the greatest possible improvement in performance. However, the best programming approach that results in enhanced neuromuscular adaptations is still unclear. This research set out to determine how three varying degrees of unpredictability within resistance training programs affected performance gains. Thirty-six people were split into three groups of twelve each: those who would receive training based on a weekly model (WM), those who would receive instruction based on a daily model (DM), and those who would receive training based on a session model (SM); Six weeks of back squat sessions comprised the training intervention. All participants received the same total training load during the course of six-week intervention. We tested the individual's maximum dynamic strength (1RM) in the back-squat, countermovement jump (CMJ), and squat jump (SJ) both before and after the training intervention. Significant gains were observed across the board (p<0.05). The effect size (ES) of the session model in 1RM is just 0.29. Effect sizes for the daily model and session model in SJ are both moderate, at 0.61 and 0.41 respectively. The impact size in the CMJ daily model is quite moderate (0.51), while it is very large (0.99) in the session model. The results of this study show that changing the type of stimulus used in resistance training more often is a significant way to improve both strength and jumping ability at the same time.*

***Keywords:*** *Resistance Training, Programming, Strength, Variability*

## Introduction

According to Issurin (2010), training periodization is perhaps the most widely used concept from the field of training theory in the actual world. According to Cunanan et al. (2018), the term "periodization" refers to the regulation of the whole training process throughout the course of time. Athletes may plan out their fitness phases as they progress through the competition cycle with the help of this tool. On the other hand, programming refers to the more detailed level of preparation that is involved in the training process. According to Cunanan et al. (2018), it entails the management of various training techniques and training elements. According to Bazyler et al. (2018), one of the primary purposes of programming is to organize the greatest possible variation of training parameters in order to minimize the detrimental effects of fatigue and maximize the positive impacts of long-term adaptations.

Because the players' neuromuscular system is activated by the appropriate level of training stress, changes occur in the muscles and nerves after participating in resistance training (Duchateau et al., 2021). There is a substantial amount of curiosity in the scientific community on the ways in which varying training factors impact the aforementioned forms of muscle changes. You need to make deliberate alterations to the training stimulus as well as the rest times in order to keep fatigue under control. This

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reduces the chances of being hurt or overworking oneself. According to the research of Cormier et al. (2020), when athletes approach closer to their peak performance, the programming for their workouts has to become more precise in terms of how it adjusts the kind and amount of training variables. Because of the significant impact that they have on the way in which muscles and nerves adapt to resistance training, training volume and training force are two of the most researched aspects of this type of exercise (Wernbom et al., 2007).

Strength, hypertrophy, power, and endurance are the four most common types of resistance training aims. Training intensity is measured in percentage of one-repetition maximum (RM) and total reps. You can train for maximum strength by lifting heavy weights (>85% 1RM) for a small number of reps (6-8), for muscular hypertrophy by lifting moderate-to-heavy weights (70-85% 1RM) for a slightly larger number of reps (8-12), for muscular power by varying your training volume and intensity, and for muscular endurance by lifting light weights (40-60% 1RM) for many reps (>15) during your resistance training sessions (American College of Sports Medicine, 2009). DeWeese (2015) says that changing the programming factors in the right way will help manage tiredness, get the most out of training adaptations, and maybe even improve performance. In this manner, some writers (Miranda et al., 2011) have said that when volume and energy are changed more during programming, the stimuli and recovery periods change more often, leading to bigger strength gains than with low-variation programming. One thing to keep in mind is that a recent meta-analysis (Harries et al., 2015) found that the change or training diversity was the main reason why resistance training programs made people stronger. But other studies (Painter et al., 2012) have shown that approaches to training with a lot of changes (e.g., daily) are less likely to lead to strength gains than approaches with modest changes (e.g., weekly). So, Harries et al. (2015) still it is not known yet, how often (weekly, daily, or within a session) the training topic should change in strength training programs. This is also clear when looking at how to improve jumping ability, as different ways of writing have shown to have similar effects.

This study aimed to compare three programming approaches to resistance training that differed in how often training variables were changed: the weekly, the daily, and the within-session models, due to the contradictory findings in the literature about the best way to program resistance training to improve strength gains and jumping performance. The authors believe that athletes will benefit most from a more challenging training program (i.e., the within-session model) since it will force them to push themselves to their limits.

## Materials & Methods

***Subjects:*** In the study, 36 people (18 men and 18 women) who were involved in strength training one way or the other (more than one year of experience and a 1RM to body weight ratio of more than 1.5) took part. To avoid differences between groups at the pre-test, the subjects were ranked based on the ratio of their 1RM to their body weight. They were then randomly assigned to one of three training groups: weekly model (WM; six men and six women), daily model (DM; 6 men and 6 women), or session model (SM; six men and six women). Table 1 shows what each group looks like and what it does. Before taking part, subjects were informed about how the experiment would work and what risks might be involved. An informed written consent was received from all the participants. The process was finalized by Sanai Fitness4u institutional review group. All of the subjects were asked to stick with their normal daily routine. During the study, subjects were asked to keep with their normal dietary and nutritional routine and avoid any food supplements.

***Testing:*** Before being tested, each person did a general warm-up that included running for five minutes, dynamic stretching, and core movements. Furthermore, two nearly maximum tries were made at both the squat jump (SJ) and the countermovement jump (CMJ). After the warm-up, the subjects did the CMJ, SJ, and 1RM tests, in that order, three minutes later. For each testing session, tests were given under the same settings and at the same time.

***1RM squat:*** For the one repetition maximum (1RM) test, the participants were required to gradually increase the amount of weight they lifted with each attempt until they hit their 1RM. There had to be at least three minutes of break in between each set, and the number of attempts to accomplish the 1 repetition maximum was predetermined to be five. The participants were instructed to place the bar on their trapezius in order to perform the back squat exercise. After reaching the parallel position, which was indicated when the greater trochanter of the thigh was at the same level as the knee, they were to stand back up. The placement of marking tape at the beginning of the movement ensured that the repetitions would go far enough into the action.

***Jumping performance:*** A touch stand was used to measure SJ and CMJ's height. Following formula: h = gft2/8, where h is the jump height in meters, g is the force of gravity which is (9.81 $m/s^2$), and ft is the flight time in seconds. In the SJ test, jumps were done with knees bent 90 degrees, while CMJ jumps were done at a depth chosen by the jumper. Everyone jumped with their hands on their sides and was told to jump as high as they could. Each person took each test three times, with one minute of rest between each try; the best performance was chosen.

***Training intervention:*** In a six-week training program, all three groups did 12 rounds of resistance exercise. The back squat was the practice that was used to train during all of the lessons. The training sessions were focused on (a) big loads (85% of 1RM), (b) muscle growth (75% of 1RM), and (c) power (30% of 1RM). After six weeks of training, each group did the same amount of training for each of the three load directions. Table 1 shows that the three training groups had different plans for how the training would be run.

**Table 1**
*Training plan*

| Group | 1st period | 2nd period | 3rd period |
|---|---|---|---|
| WM Sessions | Hypertrophy (6 sets into 8 reps) | Power (6 sets into 8 reps) | Heavy load (6 sets into 4 reps) |
| DM Sessions | Power (2 sets into 4 reps) | Hypertrophy (2 sets into 6 reps) | Heavy load (2 sets into 3 reps) |
| SM Sessions | Hypertrophy (4 sets into 10 reps) | Heavy load (4 sets into 10 reps) | Power (4 sets into 10 reps) |

Table 1 shows the training plan for all three groups which are weekly model group, daily model group and sessional model group. In second column of the table first period of all three groups is being shown. While in second column, the second period for all three groups. And the third column shows the third period for all three groups. It is being shown that six to eight reps for weekly model, two to four reps for daily model and 4-10 for sessional model.

***Statistical analysis***

The SPSS statistical package version 23 (SPSS Inc., Chicago, IL, USA) was used for all of the statistical studies. After using the Shapiro-Wilk test to make sure the data were normal, showing the demographic factors, then the descriptives, and then using a paired sample t-test to look at changes in 1RM values, SJ performance, and CMJ performance. Cohen's d effect size (ES) was used to figure out how big the changes were, and error bar graphs also show how performance got better.

## Results

Table 2 is showing the result of a Shapiro-Wilk test of normality. It summarizes the results for 3 trainings. The "Statistic" column shows the test statistic for each variable, and the "Sig." column shows the p-value of the test. A small 0p-value (generally less than .05) indicates that the variable does not follow a normal distribution.

**Table 2**

*Normality of different resistance trainings (n=36)*

| Group | | Shapiro-Wilk | | |
|---|---|---|---|---|
| | | Statistic | df | Sig. |
| Weekly Model | 1RM Pre | 0.93 | 12 | 0.37 |
| | 1RM Post | 0.93 | 12 | 0.44 |
| Daily Model | 1RM Pre | 0.91 | 12 | 0.21 |
| | 1RM Post | 0.90 | 12 | 0.18 |
| Session Model | 1RM Pre | 0.92 | 12 | 0.31 |
| | 1RM Post | 0.88 | 12 | 0.09 |
| Weekly Model | SJ Pre | 0.92 | 12 | 0.36 |
| | SJ Post | 0.94 | 12 | 0.54 |
| Daily Model | SJ Pre | 0.93 | 12 | 0.38 |
| | SJ Post | 0.93 | 12 | 0.47 |
| Session Model | SJ Pre | 0.92 | 12 | 0.32 |
| | SJ Post | 0.93 | 12 | 0.46 |
| Weekly Model | CMJ Pre | 0.89 | 12 | 0.11 |
| | CMJ Post | 0.87 | 12 | 0.08 |
| Daily Model | CMJ Pre | 0.96 | 12 | 0.79 |
| | CMJ Post | 0.97 | 12 | 0.94 |
| Session Model | CMJ Pre | 0.88 | 12 | 0.10 |
| | CMJ Post | 0.92 | 12 | 0.32 |

All the training models with pre and post intervention having the value greater than 0.05 which shows that the data is normally distributed and parametric testing have been implemented. Figure 1-3 presenting the age, height and weight of the participants in weekly, daily and sessional model.

**Figure 1**

*Age of the participants in weekly, daily and sessional model*

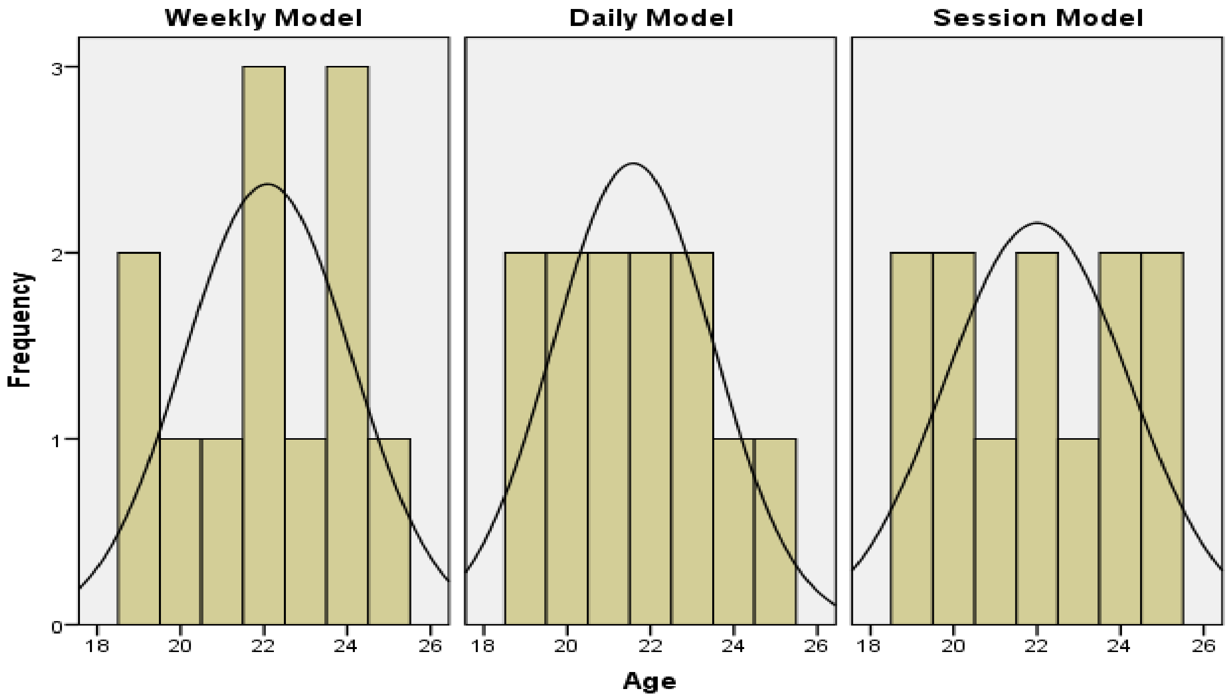



**Figure 2**

*Weekly, daily and sessional models of participants' height*

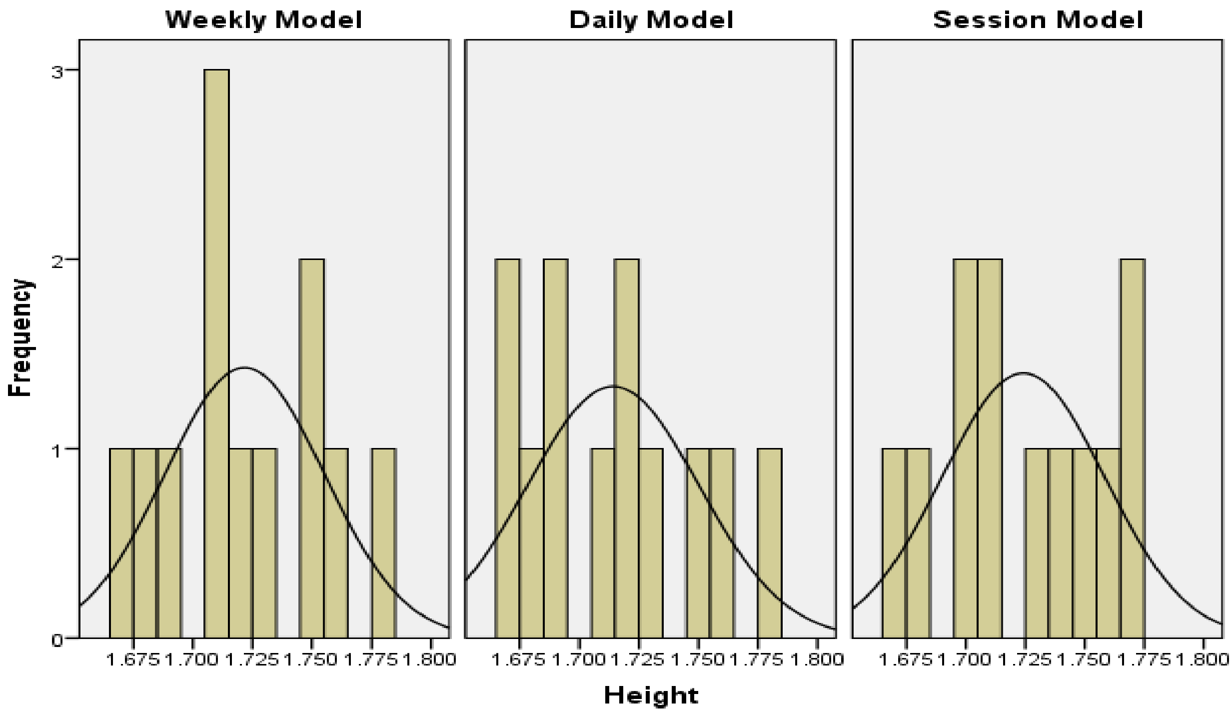


**Figure 3**

*Weight of the participants in weekly, daily and sessional model*

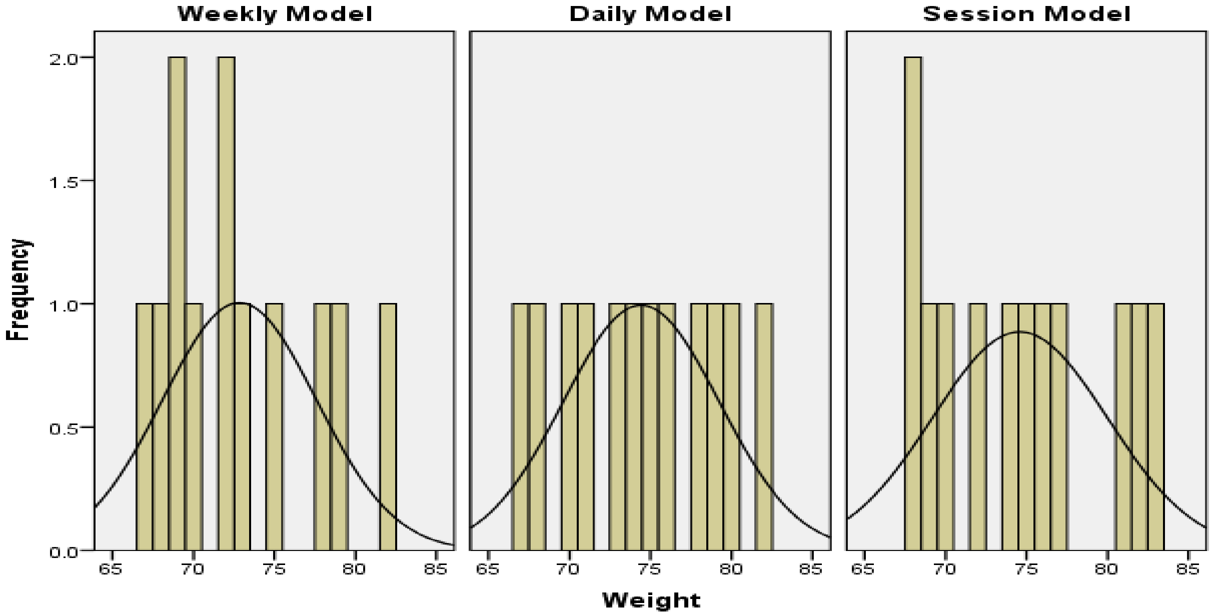



Table 3 shows the descriptive of 1RM back-squat in which the Mean ± Std. Deviation of the of the participants is 108.58±15.89, 111.33±18.71 and 114.91±16.14 before and 110.41±15.37, 114±18.3 and 119.5±15.42 after six-week training program for weekly model, daily model and session model respectively, median ± interquartile range is 105.50±28.00, 109.5±36 and 115.5±31.75 before and 107.5±26.75, 111.5±36 and 119±32.75 after six-week training program for weekly model, daily model and session model respectively. In a similar fashion minimum, maximum, range, skewness, kurtosis and Std. error mean of before and after six-week training program for weekly model, daily model and session model are also reported in above table. Similarly, Table 4 and 5 presented the descriptive analysis of squat jumping and counter movement jump before and after six-week training program respectively.

**Table 3**

*Descriptive of 1RM back-squat before and after six-week training program*

| Statistics | Weekly Model | | Daily Model | | Session Model | |
|---|---|---|---|---|---|---|
| | 1RM Pre | 1RM Post | 1RM Pre | 1RM Post | 1RM Pre | 1RM Post |
| Mean ± Std. Deviation | 108.58±15.89 | 110.41±15.37 | 111.33±18.71 | 114±18.3 | 114.91±16.14 | 119.5±15.42 |
| Median ± IQR | 105.50±28.00 | 107.5±26.75 | 109.5±36 | 111.5±36 | 115.5±31.75 | 119±32.75 |
| Minimum | 88 | 90 | 88 | 91 | 93 | 100 |
| Maximum | 136 | 137 | 140 | 141 | 138 | 139 |
| Range | 48 | 47 | 52 | 50 | 45 | 39 |
| Skewness | 0.48 | 0.47 | 0.21 | 0.27 | 0.06 | 0.07 |
| Kurtosis | -1.11 | -1.09 | -1.51 | -1.60 | -1.60 | -1.75 |
| Std. error of mean | 4.58 | 4.43 | 5.4 | 5.28 | 4.66 | 4.45 |

**Table 4**

*Descriptive of Squat jumping before and after six-week training program*

| Statistics | Weekly Model | | Daily Model | | Session Model | |
|---|---|---|---|---|---|---|
| | SJ Pre | SJ Post | SJ Pre | SJ Post | SJ Pre | SJ Post |
| Mean ± Std. Deviation | 32.28±3.65 | 32.83±3.80 | 32.87±3.79 | 34.41±3.72 | 31.85±3.85 | 34.25±3.64 |
| Median ± IQR | 31.43±6.33 | 32±6.5 | 33.57±6.61 | 35±6.75 | 31.29±7.37 | 33.5±5.75 |
| Minimum | 27.91 | 28 | 27.91 | 29 | 27.25 | 29 |
| Maximum | 39 | 40 | 39 | 40 | 38.21 | 40 |
| Range | 11.09 | 12 | 11.09 | 11 | 10.96 | 11 |
| Skewness | 0.58 | 0.58 | 0.05 | -0.00 | 0.31 | 0.17 |
| Kurtosis | -0.82 | -0.64 | -1.38 | -1.14 | -1.34 | -1.33 |
| Std. error of mean | 1.05 | 1.10 | 1.09 | 1.07 | 1.11 | 1.05 |

**Table 5**

*Descriptive of Counter Movement Jump before and after six-week training program*

| E | Weekly Model | | Daily Model | | Session Model | |
|---|---|---|---|---|---|---|
| | CMJ Pre | CMJ Post | CMJ Pre | CMJ Post | CMJ Pre | CMJ Post |
| Mean ± Std. Deviation | 32.66±2.55 | 33.80±2.60 | 33.96±2.97 | 35.5±3.03 | 32.94±3.21 | 37.75±2.37 |
| Median ± IQR | 31.85±4.26 | 32.0±4.5 | 33.85±4.98 | 35.5±4.75 | 32.20±6.18 | 35±4 |
| Minimum | 29.74 | 30 | 29.74 | 31 | 29.37 | 32 |
| Maximum | 37.89 | 38 | 39.20 | 41 | 38.03 | 39 |
| Range | 8.15 | 8 | 9.46 | 10 | 8.66 | 7 |
| Skewness | 0.99 | 0.88 | 0.32 | 0.24 | 0.49 | 0.06 |
| Kurtosis | -0.00 | -0.48 | -0.92 | -0.74 | -1.38 | -1.32 |
| Std. error of mean | 0.73 | 0.75 | 0.85 | 0.87 | 0.92 | 0.68 |

The Table 6 appears to show the results of a study that investigated the effect of three different models (weekly model, daily model, and session model) on some outcome variable. The data were collected pre and post of the model's implementation. 1$^{st}$ column lists the different models that were tested in the study, namely weekly model, daily model, and session model. Next columns represent the mean (M) and standard deviation (SD) of the outcome variable before and after the models were implemented. The t-value associated with a paired-samples t-test comparing the pre-implementation and post-implementation data for each model. The t-value indicates the size of the difference between the means relative to the variability in the data. the p-value associated with the t-test for each model.

**Table 6**

*Mean comparison of 1RM back squat of Pre and Post-test in weekly, daily and session model*

| Variables | Pre-Data | | Post-Data | | t(11) | P | Cohen's d |
|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | | |
| Weekly model | 108.58 | 15.89 | 110.41 | 15.37 | -7.60 | <.001 | 0.11 |
| Daily model | 111.33 | 18.71 | 114.00 | 18.30 | -7.09 | <.001 | 0.14 |
| Session model | 114.91 | 16.14 | 119.50 | 15.42 | -8.91 | <.001 | 0.29 |

***p<.001.

The p-value represents the probability of observing the observed t-value or more extreme values if there were no true difference between the pre and post data. In this table, all the p-values are <.01, which indicates that the differences between pre and post data for each model are statistically significant. Lastly, Cohen's d effect size, which quantifies the magnitude of the difference between the pre and post data. Cohen's d values of 0.2, 0.5, and 0.8 are often considered small, medium, and large effect sizes, respectively. In this table, all the Cohen's d values are small, with the largest being 0.29, indicating relatively small effect sizes for the changes caused by the models. Similarly, Table 7 and 8 presented the mean comparison of squat jumping and counter movement jump before and after six-week training program respectively.

**Table 7**

*Mean comparison of squat jumping of pre and post-test in weekly, daily and session model*

| Variables | Pre-Data | | Post-Data | | *t(11)* | *P* | *Cohen's d* |
|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | | |
| Weekly model | 32.28 | 3.65 | 32.83 | 3.80 | -7.39 | <.01 | 0.14 |
| Daily model | 32.87 | 3.79 | 34.41 | 3.72 | -15.16 | <.01 | 0.41 |
| Session model | 31.85 | 3.85 | 34.25 | 3.64 | -11.44 | <.01 | 0.64 |

***p<.001.

**Table 8**

*Mean comparison of counter movement jump of pre and post-test in weekly, daily and session model*

| Variables | Pre-Data | | Post-Data | | *t(11)* | *P* | *Cohen's d* |
|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | | |
| Weekly model | 32.66 | 2.55 | 33.08 | 2.60 | -5.24 | <.01 | 0.16 |
| Daily model | 33.96 | 2.97 | 35.50 | 3.03 | -16.29 | <.01 | 0.51 |
| Session model | 32.94 | 3.21 | 35.75 | 2.37 | -8.13 | <.01 | 0.99 |

***p<.001.

Figure 4-6 shows the mean comparison of 1RM back squat, squat jumping and counter movement jump of pre and post-test in weekly, daily and session models through error bar diagram. The error bar diagrams in figure 4 shows mean comparison of 1RM back squat of pre and post-test, in weekly model the value for pre test is 110.58, while in post test it is 110.42. Similarly in daily model the value for pre test is 111.33 and for post it is 114. In sessional model the value for pre test is 114.92 and post-test value is 119.5.

In figure 5, comparison of squat jumping is shown for pre and post results separately. For weekly model value for pre-test for squat jumping is 32.28 while the value of post-test for squat jumping is 32.83. For daily model, the value of pre-test for squat jumping is 32.87 and for post results of daily model for squat jumping value is 34.1. similarly, for sessional model the value for pre-test for squat jumping is 31.85 while the value for post-test of sessional model for squat jumping is 34.25.

Figure 6 shows the counter movement jump pre and post analysis of participants. For weekly model, the value for pre-test of counter movement jump is 32.66 while the value of weekly model of counter movement jump in post-test is 33.08. Similarly for daily model, the pre-test value of counter movement jump is 33.96 while the post-test value for daily model of counter movement jump is 35.5. Similarly, the values for sessional model of counter movement jump in pre-test are 32.94 while the value of sessional model in counter movement jump is 35.25. The graphical representation of all three models is given below.

**Figure 4**

*Mean comparison of 1RM back squat of pre and post-test in weekly, daily and session model through error bar diagram (n=36).*

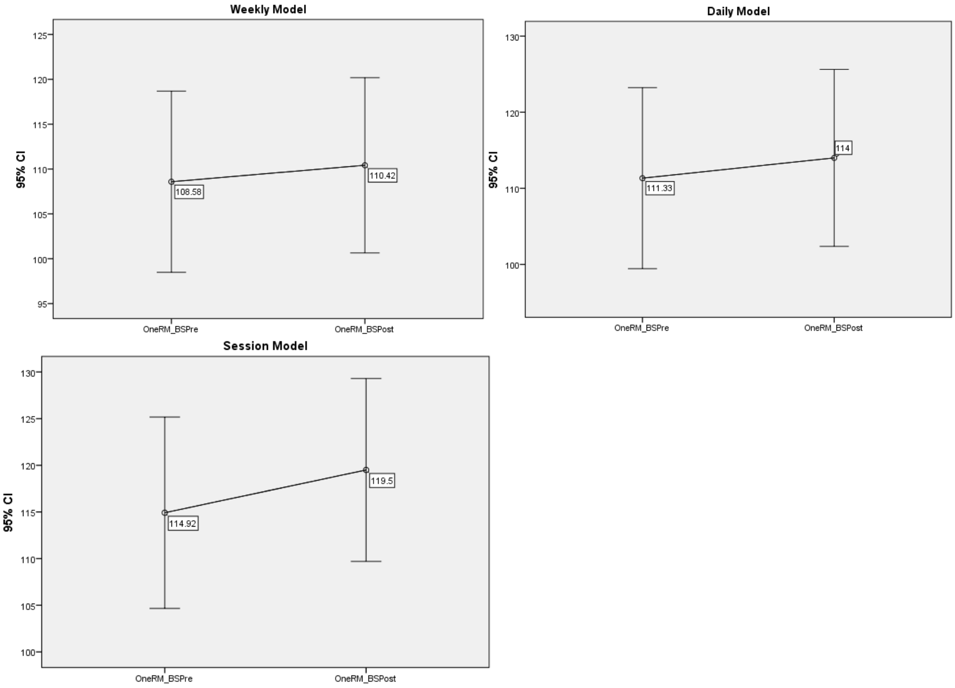



**Figure 5**

*Mean comparison of Squat jumping of pre and post-test in weekly, daily and session model through error bar diagram (n=36).*

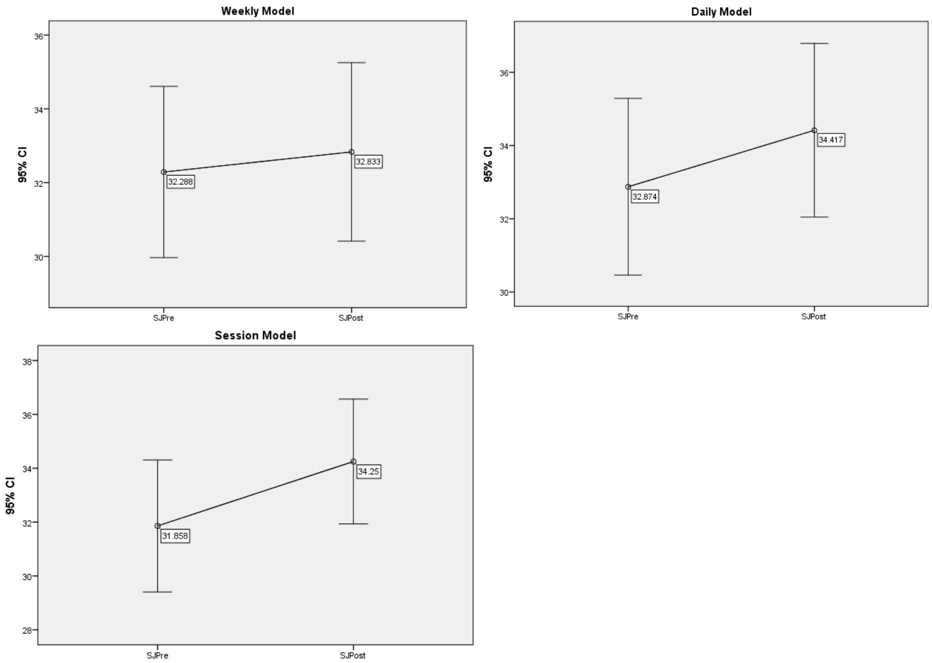
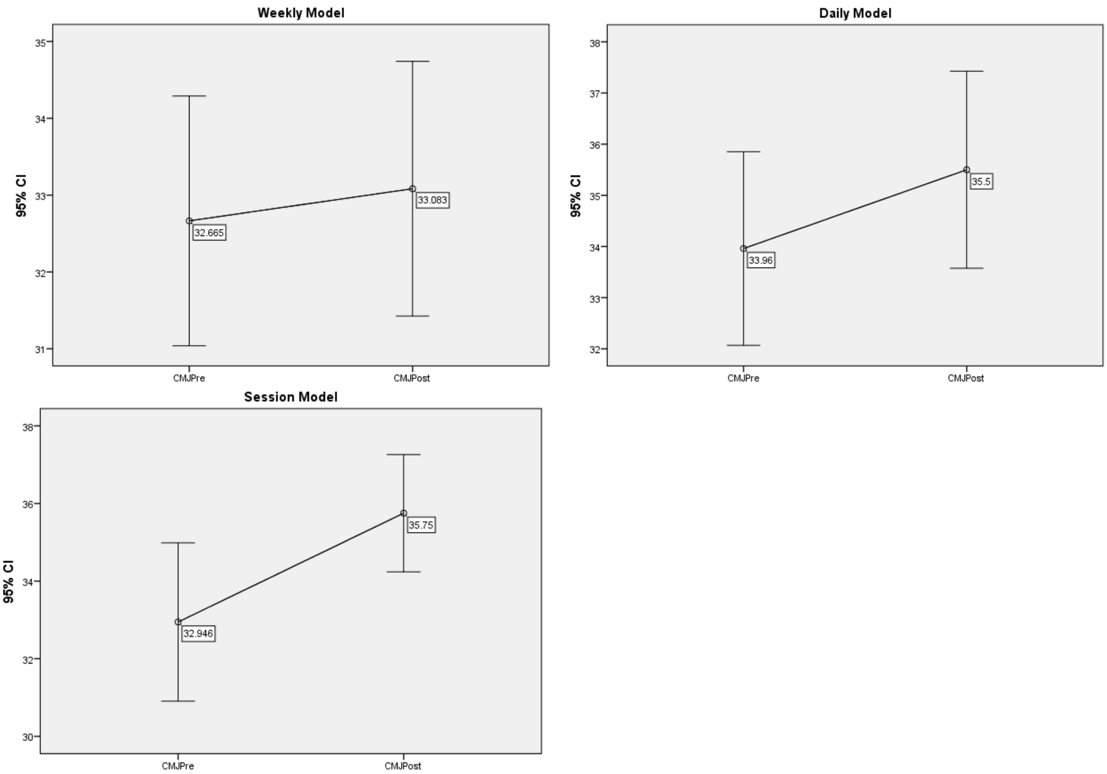


**Figure 6**
*Mean comparison of counter movement jump of pre and post-test in weekly, daily and session model through error bar diagram (n=36).*




## Discussion

The effectiveness of three different approaches to the design of resistance training was evaluated in terms of its impact on dynamic peak strength as well as the subject's capacity to jump higher. The key conclusion of this study was that the SM model was superior to the other two methods (WM and DM), despite the fact that all three methods (WM, DM, and SM) were able to make significant improvements in either the 1RM squat, SJ, or CMJ.

Strength is a factor that directly affects an athlete's vertical jump, according to the research carried out by Comfort et al. (2014). According to this school of thinking, one of the most prevalent goals in team sports is to increase one's maximal strength as well as one's jumping ability concurrently, and resistance training is a typical technique of doing this (Cormier et al., 2020). In this particular investigation, the one repetition maximum (1RM) squat was significantly improved by all three training methods. However, as a result of the mismatch in the size of the changes, the WM group was able to achieve a lower level of success than the SM group. When comparing a weekly training model to a daily training model, Buford et al. (2007) found no significant difference in 1RM increases using a paradigm that was more linear (for example, each phase lasted for three weeks). These data do not support that assertion at all. Because each stage lasted only two weeks, it's probable that the WM group didn't make as much gain in strength as the other groups did. According to Issurin (2010), the brief duration of this phase impeded a full realization of the potential advantages that may be gained by residual training. Due to the fact that the WM group only participated in low-load training sessions (i.e., 30% 1RM) in the two weeks leading up to the post-test, it is possible that their 1RM did not increase as much as the other groups. The different phases should be organized in this order, according to one school of thought (Zourdos et al., 2016): development, authority, and strength. Last but not least, the more significant gains in 1RM that were seen in the SM group could be related to the format of the training sessions. The strength of the load changed drastically from one set to the next. According to the findings of a meta-analysis that was carried out by Bauer et al. (2019), the impacts of difficult training strategies on peak strength are greater than those of inefficient training approaches. According to Monteiro et al. (2009), the reason for these larger increases in muscle strength is because the neuromuscular system is significantly impacted by the essential role that load variation has on the system (Harries et al., 2015).

According to Jeras et al. (2019), athletes that participate in team sports, such as volleyball, basketball, rugby, and football, must have the ability to do a powerful vertical leap. It has been hypothesized that traditional strength training routines (such as squats) can improve jumping ability; however, the strategy that is most likely to be the most successful in improving this quality is yet unknown. Throughout the duration of the investigation, substantial gains were observed in both the SJ and CMJ scores obtained by all three groups (WM, DM, and SM). Only McNamara and Stearne (2010), to the authors' knowledge, compared and proved the effectiveness of two non-linear ways to boosting a subject's leaping ability. Both of these methods are aimed at increasing the subject's vertical leap. This hypothesis is supported by the findings of this study, which reveal significant and similar improvements in SJ and CMJ between DM and SM. The ES values for these two variables range from 0.85 to 1.14. Despite the fact that the gains in SJ and CMJ height in the WM were rather small (ES = 0.23-0.57), they were nonetheless significant. According to the values of the impact size, higher shifts in training load may be responsible, at least in part, for larger changes in DM and SM. This hypothesis is supported by the findings of the study. According to the findings of a recent study (Cormier et al., 2020), alternating between lifting heavy and light weights is a very efficient method for improving one's vertical jump performance. Both isolated power training, like what the WM has been doing for the previous two weeks (e.g., employing the 30% 1RM), and isolated heavy-load training have the same effect on jump performance (Cormie et al., 2010). The larger improvements shown in the DM and SM groups imply that mixing heavy and light training loads from day to day or even within a session is essential for maximizing jumping performance. This can be done either during a session or between sessions. A recent meta-analysis conducted by Cormier et al. (2020) reveals that diverse and contrasting training methods are preferable for raising one-repetition maximum (1RM) and vertical leap.

This piece of art has a few problems that need to be addressed. It was hypothesized that the order in which the various activities comprising the program were carried out may have played a role in determining the results of the research. This is especially true for 1RM values, when a very moderate training load in the final two weeks might potentially change the WM. The fact that all of the people who took part in this study were casual exercisers also means that the findings cannot be applied to those who compete in significant athletic events. The single exercise that is included in the schedule is the back squat, which is not precisely regarded as one of the most effective exercises for strength training. The findings of this study showed that weekly, daily, and even within-session training models can be effective in increasing maximum dynamic strength as well as jumping ability. The SM group had the most substantial gains in terms of their 1RM, SJ, and CMJ scores.

## Conclusion

Athletes' adaptations can be improved by proper programming, which aims to arrange the best possible variability in training elements. The most effective algorithm leading to enhanced neuromuscular adaptations is, however, yet unclear. The purpose of this research was to compare performance gains made during resistance training with varying degrees of intra-session variability. Thirty-six people were split into three groups, each with a distinct frequency of training material rotation: weekly (12), daily (12), and session (12). The training program consisted of six weeks of twice-weekly back-squat workouts. All participants received the same total training load (volume and intensity) during the course of the six-week intervention. Before and after a training program, athletes were tested on their one repetition maximum (1RM) for the back squat, countermovement jump (CMJ), and squat jump (SJ). The 1RM, SJ, and CMJ of all groups increased significantly. The session model in 1RM is small effect size of 0.29. Daily model in SJ has a moderate effect size (0.61), whereas the session model is only slightly smaller (0.41). The effect size in the CMJ daily model is modest (0.51), whereas in the session model it is quite substantial (0.99). This shows that changes in training input beyond those that are commonly employed in strength training programs are essential for eliciting the required neuromuscular adaptations in order to achieve the desired results. According to the findings of this study, programming models that vary the training material more frequently (more frequently than weekly) are more successful for shorter training programs (less than six weeks) and those who merely exercise for the fun of it. By switching up the exercises at different points during the duration of the plan, these programming methodologies deliver consistent high-intensity training throughout. It would appear that this is essential for maximizing strength while also moving forward in terms of performance gains.

**Conflicts of interest:** There is no conflict of interest.

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