Revista Românească pentru Educație Multidimensională
ISSN: 2066-7329 | e-ISSN: 2067-9270
Covered in: Web of Science (WOS); EBSCO; ERIH+; Google Scholar; Index Copernicus; Ideas RePeC; Econpapers; Socionet; CEEOL; Ulrich ProQuest; Cabell, Journalseek; Scipio; Philpapers; SHERPA/RoMEO repositories; KVK; WorldCat; CrossRef; CrossCheck

2022, Volume 14, Issue 1Sup1, pages: 289-298 | https://doi.org/10.18662/rrem/14.1Sup1/551
Submitted: October 28th, 2021 | *Accepted for publication:* February 14th, 2022

Comparative Study of Resistance Training with Different Frequency on the Selected Machine Exercises Among University Males

Kaukab AZEEM[1]

[1] Assistant Professor (v), King Fahd University of Petroleum & Minerals, Saudi Arabia.

Abstract: The purpose of this study was to compare the resistance training groups with different frequency in a week on the selected machine exercises among university males. Method: Hundred participants selected randomly to join and part of this research study.
Participant's ages were in the range of 18-24 years, forty minutes of training per session. These subjects separated into two groups such as; group-A (N=50, two days of training in a week for eleven weeks), group -B (N=50, four days of training in a week for 5 and half weeks). Both the groups had gone through 22 resistance-training sessions. The impact of resistance training protocols with different frequency in a week on the groups in the selected exercises i.e. (leg press, leg extension, leg curls, high pull downs, sitting shoulder press, rear delt, sitting extensions and arm curls) had shown significant improvement. Furthermore, interestingly the group-A had shown greater performance in all the selected resistance training exercises. Group-A performance with regard to the increase by percentages; Sitting leg press performance increased by percent (18.27%). Leg extension performance was increased by percent (15.12%). Leg curls (increased by 14.22%). Lat pull down (increased by 12.78%). Sitting shoulder press (25.16%). Rear delt (increased by 10.04%). Triceps extension (performance increased by 7.83%). Arm curls performance increased by (8.74%). These findings were consistent with the previous studies they are as follows; (M. S. Faigenbaum et al, 1997). In a previous research, study it was investigated with regard to the training frequency comparison for the parallel bench press exercise 03 sessions is profound to 1 or 2 sessions (ACSM 1998).

Keywords: *frequency, training, intensity, performance.*

How to cite: Azeem, K. (2022). Comparative Study of Resistance Training with Different Frequency on the Selected Machine Exercises Among University Males. *Revista Românească pentru Educație Multidimensională, 14*(1Sup1), 289-298. https://doi.org/10.18662/rrem/14.1Sup1/551

1. Introduction

Resistance training (RT) is essential for all athletes and for fitness persons. Moreover, volume and intensity plays an important role in enhancing fitness performance. RT improves strength and increase the hypertrophy of the muscles. RT includes push and pull exercises and various equipment's in the gymnasium for the specific movement and emphasizing on the related muscles. Interestingly, the gym equipment's should be in the proper angle which effects on the specific muscle and if the gym equipment's are not in proper angle then the effect will be on the joints not on the muscles and also the muscles develop in wrong shape.

RT comprises lot of benefits such as; enhanced muscular strength & endurance, and muscle tone increases. RT also has medical benefits i.e. reduces visceral fat, reduced blood pressure, increases good cholesterol and reduces bad cholesterol. Split system training with three session per week results in enhanced performance (Mc Lester et al., 2000). Remarkably, (Kraemer et al., 2002) recommends and suggests that split training programs require the periodization of the training load. Buford, et al. (2007), reveals that whole body training program is better than split training schedule. Anderson et al. (2008), in the previous study it was noticed enhanced performance in muscular strength, power produced in parallel bench press, squat exercises in response to elastic and free weight loaded training. Recommended guidelines by ACSM (2009) for trained persons as follows; six to twelve repetitions, one to two seconds for movement tempo, and rest between the sets 1-2 minutes. Nevertheless, previous research studies is very limited as to the effects of manipulating resistance-training frequency. In an earlier study investigated on healthy men, whole and split RT schedule gives related results in the initial two-months of training program (Arazi & Asadi, 2011). Hackett et al. (2013) stated about the RT is defined such as; RT session in a week, and frequency of training of the muscles in a week. Moran et al. (2017) study and reveals about the eight weeks of RT enhanced isometric strength in lower body (mid-thigh pull) in adolescent's largely than in children. (Schoenfeld et al., 2017) reveals that individuals may perform at-least ten sets in a week to achieve maximum muscular adaptations. Daniel A. Hackett et al. (2018) reveals that the volume plays a significant role in resistance training package for enhancing muscle strength and hypertrophy. Mirmoezzi et al. (2019) reveals that isometric and isotonic water exercises is highly recommended for improving quality of life. The purpose of this investigation was to compare the RT groups with different frequency in a week on the selected machine exercises among university males.

2. Method

2.1. Experimental Design

Hundred University male participants age between 18 to 24 years were selected randomly from the classes of Physical Education PE-102 at King Fahd University of Petroleum & Minerals, during the year 2019-20. The selected subjects segregated into two groups namely; RT group-A (N=50), and RT group-B (N=50).

2.2. Training Method

RT group-A was given 11 weeks (22 classes of RT program), two times in a week, and training was given for 40 minutes per session. RT group-B was given 5.2 weeks (22 classes of RT program), weekly four times, and training was given for 40 minutes per session. Furthermore, the intensity for both the groups was fixed at 70% maximum with 15 repetitions, and two sets with one-minute rest between the sets. Moreover, the following resistance training was given for both the groups; leg press, leg extensions, leg curls, sitting shoulder press, pull downs, sitting triceps extension and arm curls.

Selected resistance training exercises for the test

The test considered for the resistance training exercises as follows for both the groups; leg press, leg extensions, leg curls, sitting shoulder press, pull downs, sitting triceps extension and arm curls. Both the groups has to perform one set with 15 repetitions during the test for all the selected exercises. The data was collected for the test and recorded at Building-36, at King Fahd University of Petroleum & Minerals, Saudi Arabia.

Table 1. Details of the selected variables

Sl. no	Resistance training exercises	Variables
1	Leg press	Dependent Variables
2	Leg extensions	
3	Leg curls	
4	Lat pull downs	
5	Sitting shoulder press	
6	Rear delt	
7	Sitting triceps extension	
8	Arm curls	
1	Resistance Training. Gr-A	Independent Variables
2	Resistance Training Gr-B	

Source: Authors' own conception

Table 2. The details of the Training Program

Sl.no	Description	Targets GROUP-A	Targets GROUP-B
1	Training program	11 weeks	5.2 weeks
2	In a week	Two-times	Four-times
3	In a session	40-Minutes	40 min
4	RT (group-A) & (group-B)	08 exercises	08 exercises
5	Total training Classes	22	22
6	Test (Test was conducted after the 22 resistance training protocol for both the groups)	08 machine exercises test	08 machine exercises test
7	Resistance training program was based on	FITT principle	FITT principle

Source: Authors' own conception

2.3. Statistical Analysis

Analyzing data to find out the mean differences in the groups mean, standard deviation, and the help of SPSS-16 software calculated t-test. Furthermore, an online calculator was used to find the percentages.

3. Result

Data analysis was done for the Group A and B for the selected exercises of RT among the participants from the base level to the post- test.

Table 3. The analysis of data for the selected resistance exercises among the groups

Exercises	Groups N=50	Test		P Value
		Mean	S.D	
Sitting Leg press	Group-A	78.58	17.91	0.00
	Group-B	64.22	18.22	
Leg extension	Group-A	63.53	14.56	0.00
	Group-B	55.62	9.09	
Leg curls	Group-A	63.85	15.57	0.00
	Group-B	54.77	10.43	
Lat pull down	Group-A	48.73	7.80	0.00
	Group-B	42.50	6.63	
Sitting shoulder press	Group-A	44.72	5.74	0.00
	Group-B	33.47	9.98	
Rear delt	Group-A	51.87	9.10	0.00
	Group-B	46.66	7.40	

Triceps extension	Group-A	55.15	9.72	0.01
	Group-B	50.83	8.76	
Arm curls	Group-A	41.40	8.06	0.00
	Group-B	37.78	6.60	

Source: Authors' own conception

Details of the Group - A

Sitting leg press with mean and standard deviation were (78.58, 17.91). Leg extension with mean and standard deviation were (63.53, 14.56). Leg curls with mean and standard deviation were (63.85, 15.57). Lat pull down with mean and standard deviation were (48.73, 7.80). Sitting shoulder press with mean and standard deviation were (44.72, 5.74). Rear delt with mean and standard deviation were (51.87, 9.10). Triceps extension with mean and standard deviation were (55.15, 9.72). Arm curls with mean and standard deviation were (41.40, 8.06).

Details of the Group - B

Sitting leg press with mean and standard deviation were (64.22, 18.22). Leg extension with mean and standard deviation were (55.62, 9.09). Leg curls with mean and standard deviation were (54.77, 10.43). Lat pull down with mean and standard deviation were (42.50, 6.63). Sitting shoulder press with mean and standard deviation were (33.47, 9.98). Rear delt with mean and standard deviation were (46.66, 7.40). Triceps extension with mean and standard deviation were (50.83, 8.76). Arm curls with mean and standard deviation were (37.78, 6.60).

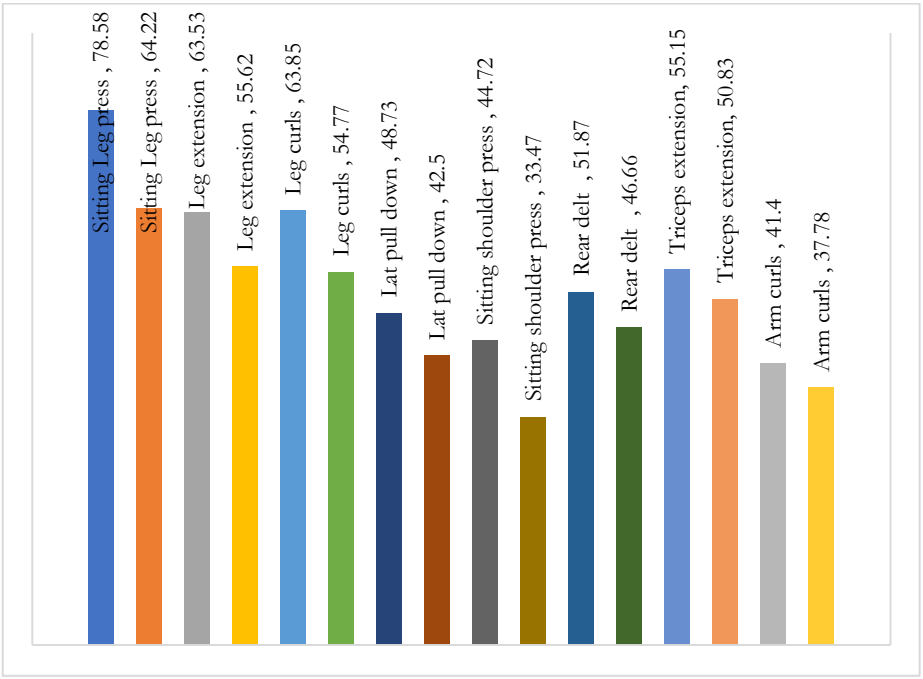


Figure 1. The mean differences of both the groups
Source: Authors' own conception

Table 4. Comparison of increase or decrease in percentages with regard to the selected resistance exercises between Group-A and Group-B

Exercises	Percentages	Increase/Decrease
Sitting Leg press	18.27%	Group-A - Increase
Leg extension	15.12%	Group-A - Increase
Leg curls	14.22%	Group-A - Increase
Lat pull down	12.78%	Group-A - Increase
Sitting shoulder press	25.16%	Group-A - Increase
Rear delt	10.04%	Group-A - Increase
Triceps extension	7.83%	Group-A - Increase
Arm curls	8.74%	Group-A - Increase

Source: Authors' own conception

Resistance training, Group -A, had shown increase in performance in all the selected resistance exercises in compare with Group-B. Sitting leg press performance increased by percent (18.27%). Leg extension performance was increased by percent (15.12%). Leg curls (increased by 14.22%). Lat pull down (increased by 12.78%). Sitting shoulder press (increased by 25.16%). Rear delt (increased by 10.04%). Triceps extension (performance increased by 7.83%). Arm curls performance increased by (8.74%).

4. Discussion

The purpose of this research was to compare the group-A and group-B with different volume in a week to find out the best training protocol in enhancing the performance with regard to the selected machine exercises. This is evident that both the training protocols has its own benefits on the various machine exercises. At the baseline of the training program both the groups had started with very low intensity of exercise. Moreover, the participants were novice and they do not have any earlier experience of exercise. Both the groups had shown lot of interest and also improve a lot from the baseline of the training program. Interestingly, the findings of this study reveals that both the groups has shown significant differences in all the selected machine exercises such as; leg-press, leg-extensions, leg-curls, sitting shoulder push, pull-downs, triceps extension and arm curls. Both training protocols i.e. group-A and group-B resistance training with different volume in a week is important aspect of training regime.

Evidently, both of these training protocols are vital for the athletes for the higher performance and also assumed that these training is effective in enhancing strength among the University students. Furthermore, it is find that group-A (2 days training in a week for 11 weeks, and total 22 classes of training program) effective training in increasing strength level compared to the counterpart group-B (4 days of training in a week for 5.2 weeks and total 22 days of training classes). This is evident that more number of weeks and patience is important part of the training schedule for enhancing greater performance with regard to muscular strength and endurance. In an earlier research, study it was compared the effects of total-body and upper-body RT with regard to endurance training performance, and find the same improvements in the squat, push-ups, and sit-ups test (Kraemer et al., 2001). Impact of resistance training in an earlier study indicates no separation based on the periodization model seen in early phase training (Buford et al., 2007). These findings were consistent with the previous studies they are as follows

(Faigenbaum & Pollock, 1997) in a previous research study it was investigated with regard to the training frequency comparison for the parallel bench press 03 sessions are better than 1 or 2 sessions. ACSM (1998) reveals greater strength in arms and legs training three sessions in a week as compared to two sessions in a week. Aranzi and Asadi (2011) whole and split weight-training program had shown similar outcomes in the first two months of training program, with minimal significant differences between the groups. Oranchuk et al. (2019) reveals that effect of long muscle length training had shown greater performance.

5. Conclusion

It is concluded that the two days of RT group in a week for eleven weeks duration has greater impact on the improved performance among the participants in enhancing performance in the selected resistance exercises. Moreover, find significant differences between these two groups. Moreover, this is evident that time and patience is important in enhancing significant performance in increasing muscular strength.

Acknowledgement

The author thanks the authorities of "King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia" and the participants for the help in completion of this study.

Conflict of interest & funding

This research work is free of conflict of interest, financial support is exclusive to the author.

Committee Approval

The Physical Education Departmental research committee, King Fahd University of Petroleum & Minerals, Saudi Arabia, approved this study, ref ID PE-107-2021.

References

American College of Sports Medicine (ACSM). (1998). The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in healthy adults. *Medicine and Science in Sports and Exercise, 30*, 975-991. https://doi.org/10.1097/00005768-199806000-00032

American College of Sports Medicine (ACSM). (2009). American College of Sports Medicine position stand. Progression models in resistance training for

healthy adults. *Medicine and Science in Sports and Exercise,* 41(3), 687. https://doi.org/10.1249/MSS.0b013e3181915670

Anderson, C. E., Sforzo, G. A., & Sigg, J. A. (2008). The effects of combining elastic and free weight resistance on strength and power in athletes. *Journal of Strength and Conditioning Research, 22*, 567-574. https://doi.org/10.1519/JSC.0b013e3181634d1e

Arazi, H., & Asadi, A. (2011). Effects of eight weeks equal volume resistance training with different workout frequency on maximal strength, endurance and body-Composition. *International Journal of Sports Science & Engineering, 05*(02), 112-118.

Buford, T. W., Rossi, S. J., Smith, B. M., & Warren, A. J. (2007). A comparison of periodization models during nine weeks with equated volume and intensity for strength. *Journal of Strength and Conditioning Research, 21*, 1245-1250. https://doi.org/10.1519/R-20446.1

Buford, T. W., Rossi, S. J., Smith, D. B., & Warren, A. J. (2007). A comparison of periodization models during nine weeks with equated volume and intensity for strength *Journal of Strength and Conditioning Research, 21*(4), 1245-1250. https://doi.org/10.1519/R-20446.1

Faigenbaum, M. S., & Pollock, M. L. (1997). Strength training: rationale for current guidelines for adult's fitness programs. *Physician and Sports Medicine, 25*, 44-64. https://doi.org/10.3810/psm.1997.02.1137

Hackett, D. A., Amirthalingam, T., Mitchell, L., Mavros, Y., Wilson, G. C., & Halaki, M. (2018). Effects of a 12-Week Modified German Volume Training Program on Muscle Strength and Hypertrophy—A Pilot Study. *Sports, 6*(1), 7. https://doi.org/10.3390/sports6010007

Hackett, D. A., Johnson, N. A., & Chow, C. M. (2013). Training practices and ergogenic aids used by male bodybuilders. *The Journal of Strength & Conditioning Research, 27*, 1609-1617. https://doi.org/10.1519/JSC.0b013e318271272a

Kraemer, W. J., Adams, K., Cafarelli, E., Dudley, G. A., Dooly, C., Feigenebaum, M. S., Fleck, S. J., Franklin, B., Fry, A. C., Hoffman, J. R., Triplett McBride, T. (2002). Progression models in resistance training for healthy adults. *Medicine and science in sports & exercise, 34*(2), 364-380. https://doi.org/10.1097/00005768-200202000-00027

Kraemer, W. J., Mazzetti, S. A., Nindl, B. C., Gotshalk, L. A., Volek, S. J. , Bush, J. A., Marx, J. O., Dohi, K., Gomez, A. L., Miles, M., Fleck, S. J., Newton, R. U., Hakkinen, K. (2001). Effet of resistance training on womens strength-power and occupational performance. *Medicine and science in sports and exercise, 33*, 1011-1025. https://doi.org/110.1097/00005768-200106000-00022

Mc Lester, John R. J. R., Bishop, E., & Guilliams, M. E. (2000). Comparison of one day and three days in a week of equal volume resistance taining in experienced subjects. *Journal of Strength and Conditioning Research, 14*(3), 273-281.

Mirmoezzi, M., Yousefi, M., & Salmanpour, M. (2019). The Effects of Aquatic Isometric and Isotonic Resistance Exercises on Fatigue Index of Aged Men. *A Journal of Clinical Neuroscience and Psychopathology. Sleep Hypnosis, 21*(1), 44-50. http://dx.doi.org/10.5350/Sleep.Hypn.2019.21.0171

Moran, J., Sandercock, G., Ramirez-Campillo, R., Wooller, J., Logothetis, S., Schoenmakers, P., & Parry, D. A. (2017). Maturation-related differences in adaptations to resistance training in young male swimmers. *The Journal of Strength & Conditioning Research, 32*(1), 139-149. https://doi.org/10.1519/JSC.0000000000001780

Oranchuk, D. J., Storey, A. G., Nelson, A. R., & Cronin, J. B. (2019). Isometric training and long-term adaptations: Effects of muscle length, intensity, and intent: A systematic review. *Scandinavian Journal of Medicine & Science in Sports, 29*(4), 484-503. https://doi.org/10.1111/sms.13375

Schoenfeld, B. J., Ogborn, D., & Krieger, J. W. (2017). Dose-response relationship between weekly resistance training volume and increases in muscle mass: A systematic review and meta-analysis. *Journal of Sports Sciences, 35*, 1073-1082. https://doi.org/10.1080/02640414.2016.1210197