



Effect of Circuit and Interval Training on Flexibility of School level Players

Chandresh Champaneria

Ph.D. Scholar

Shri Govind Guru University, Godhra

Dr. Navinchandra N. Patel

Research Supervisor

Department of Physical Education

Smt. C. R. Gardi Arts College, Munpur,

Ta. Kadana, Dist. Mahisagar

Abstract: The purpose of the study was Effect of Circuit and Interval Training on Flexibility of School level Players. Players of Basketball, Football and Skating selected at school level in Surat City was selected in the present study. Total 90 players was selected as subjects for the sample of the present study, in which 30 players will included in the Circuit Training group, 30 in Interval Training group and 30 players was included in the control group. The male players of 13 to 17 years age group was included in the present study. Twelve weeks Training Programme was conducted in the present study. The standard of measurement was a Sit and Reach test to measure Flexibility. Statistical technique such as analysis of covariance was applied to know the effects on circuit training group and interval training group. Mean difference was examined at 0.05 levels by using Least Significant Difference (Post Hoc) Test. The conclusion was as follows. Remarkable improvement was found in Flexibility of selected subjects by 12 weeks systematic Circuit training and Interval training programmes.

Introduction:

Circuit training is a systematic and effective method of physical conditioning in which a series of exercises are performed in a fixed sequence with minimal rest between them. Each exercise is known as a “station,” and when all stations are completed once, it is called one circuit. This training method is widely used in physical education, sports training, and general fitness programs because it helps develop multiple components of physical fitness such as muscular strength, muscular endurance, cardiovascular endurance, flexibility, and coordination within a single session. Due to its simplicity, adaptability, and efficiency, circuit training has become one of the most popular conditioning methods in modern physical training.

A typical circuit training program consists of 6 to 12 stations arranged in a logical order so that the same muscle group is not overworked consecutively. For example, an upper-body exercise like push-ups may be followed by a lower-body activity such as squats, and then by a cardiovascular exercise like skipping or jumping jacks. Each station is performed either for a fixed number of repetitions or for a specific duration, usually ranging from 20 seconds to one minute. After completing all stations, a short rest may be given before repeating the circuit. Depending on the training goal and fitness level, two to four circuits may be performed in a single session.

One of the major advantages of circuit training is its ability to improve overall physical fitness efficiently. Resistance exercises help develop muscular strength, while repeated performance with limited rest improves muscular endurance. Continuous movement from one station to another increases heart rate and enhances cardiovascular endurance. Flexibility and coordination can also be improved by including stretching and agility-based exercises. In addition, circuit training burns a significant number of calories, helping in weight management and improving body composition by reducing body fat and increasing muscle tone.

Circuit training is highly adaptable and can be designed according to specific training objectives. For beginners, low-intensity exercises with longer rest periods are recommended, while advanced athletes may perform high-intensity exercises with added resistance and shorter rest intervals. Sports-specific circuit training can also be designed by selecting exercises that mimic movements of particular sports such as football, basketball, athletics, and kabaddi. This makes circuit training useful for improving both general fitness and sport-specific performance.

Interval training is a scientific and effective method of physical conditioning in which periods of high-intensity exercise are alternated with periods of rest or low-intensity activity. This method is widely used to improve cardiovascular endurance, speed, stamina, and overall physical performance. Unlike continuous training, interval training allows individuals to perform exercise at higher intensities because recovery periods help the body regain partial energy before the next effort. Due to its flexibility and proven effectiveness, interval training is commonly used in sports training, physical education, and general fitness programs.

The development of interval training is closely associated with German coach Woldemar Gerschler and physiologist Herbert Reindell in the early twentieth century. Their research showed that repeated bouts of exercise followed by controlled recovery improved heart efficiency, stroke volume, and oxygen utilization. Initially, this method was applied in middle- and long-distance running, but later it became popular in many sports such as football, hockey, swimming, cycling, and athletics. Today, interval training is recognized as one of the most efficient methods for improving both aerobic and anaerobic fitness.

Interval training consists of four main variables: intensity of work, duration of work, duration of recovery, and number of repetitions. The intensity of exercise may range from moderate to very high depending on the training objective. The work interval may last from a few seconds to several minutes, followed by a recovery period that allows the heart rate to partially return toward normal. Recovery can be active, such as walking or slow jogging, or passive, such as complete rest. The number of repetitions and sets is determined according to the individual's fitness level and training goal. Proper adjustment of these variables makes interval training highly adaptable and effective for different individuals.

In conclusion, interval training is a versatile and powerful training method that alternates periods of intense work with controlled recovery to improve cardiovascular endurance, speed, and overall fitness. Its scientific foundation and adaptability make it suitable for athletes, students, and general fitness participants. With regular practice and proper guidance, interval training contributes significantly to improved health, performance, and well-being.

Flexibility is an essential component of physical fitness that refers to the ability of a joint or a group of joints to move through their full range of motion without discomfort or injury. It is influenced by the elasticity of muscles, tendons, and ligaments, as well as the structure of the joints. Flexibility plays a crucial role in maintaining proper posture, improving movement efficiency, and preventing injuries. It is important not only for athletes and sports performers but also for individuals in their daily activities, as it enhances functional fitness and overall quality of life.

Flexibility varies from person to person and is affected by several factors such as age, gender, body composition, muscle strength, and level of physical activity. Generally, children and females tend to have greater flexibility than adults and males due to differences in joint structure and muscle elasticity. With increasing age, muscles and connective tissues lose elasticity, leading to reduced flexibility. However, regular stretching exercises and physical activity can help maintain and improve flexibility at any age. Therefore, flexibility training is an important part of a balanced fitness program.

There are two main types of flexibility: static flexibility and dynamic flexibility. Static flexibility refers to the ability to hold a stretched position for a period of time without movement, such as touching the toes while sitting. Dynamic flexibility, on the other hand, refers to the ability to perform movements with a full range of motion during activity, such as high kicks in athletics or gymnastics. Both types are important for physical performance and injury prevention. Static stretching is commonly used to improve muscle length and relaxation, while dynamic stretching is often included in warm-up routines to prepare the body for physical activity.

Flexibility is especially important in sports and physical education. Athletes with good flexibility can perform movements more efficiently and with less risk of injury. For example, gymnasts, dancers, swimmers, and martial artists require a high degree of flexibility to execute complex movements smoothly. Even in sports such as football, basketball, and athletics, flexibility improves stride length, coordination, and overall performance. Lack of flexibility can lead to muscle tightness, poor posture, and a higher risk of strains, sprains, and joint injuries.

The Purpose of the Study:

The purpose of the study was Effect of Circuit and Interval Training on Flexibility of School level Players.

Selection of the Subject:

Players of Basketball, Football and Skating selected at school level in Surat City was selected in the present study. Total 90 players was selected as subjects for the sample of the present study, in which 30 players will included in the Circuit Training group, 30 in Interval Training group and 30 players was included in the control group. The male players of 13 to 17 years age group was included in the present study. Twelve weeks Training Programme was conducted in the present study.

Measurement Criterion

No.	Variable	Test	Measurement
1	Flexibility	Sit and Reach	Cm.

Research Design

Total 90 subjects were selected randomly for each group in the present study. The pretest of aspects of flexibility was conducted on each group. Then, Group A was provided circuit training and group-B, interval training for 12 weeks. Group – C was accepted as the control group. Finally, the posttest was executed on all three groups.

The circuit training group was made to take exercises like rope jump, bent knee sit-ups, step-up, zigzag run, standing broad jump and climbing up-down step etc. Whereas the interval training group was made to take exercises like step up, squat, ice exercise, jumping, push up, planks.

Statistical Process

Statistical technique such as analysis of covariance was applied to know the effects on circuit training group and interval training group. Mean difference was examined at 0.05 levels by using Least Significant Difference (Post Hoc) Test.

Result of the Study:

Table – 1

Analysis of covariance of mean scores of flexibility of two experimental groups and a control group

Test	Groups			Analysis of variance				
	Circuit	Interval	Control	Sum of classes (SS)	df	MSS	'F'	
Pretest mean	18.433	18.767	19.167	A	8.089	2	4.044	0.873
				W	402.900	87	4.631	
Post-test mean	24.033	25.100	19.333	A	564.822	2	282.411	45.982*
				W	534.333	87	6.142	
Adjusted mean	24.312	25.117	19.037	A	645.498	2	322.749	96.673*
				W	287.117	86	3.339	

*Significance criterion at 0.05 levels 'F' = 0.05 (2,87) = 3.101 & (2,86) = 3.103

In table – 1, Flexibility pretest of Circuit group, Interval group and control group was found 0.873, which was not significance with the tabular value (3.101) at 0.05 levels. The mean scores on Flexibility final test of Circuit group, Interval group and control group was found 45.982, which was significance with the tabular value (3.103) at 0.05 levels. It proved that performance of subjects was improved at significant level by the training given to them. Moreover, adjusted mean of Circuit group, Interval group and control group was found 96.673 which was significance with the tabular value (3.103) at 0.05 levels. Significance between adjusted means of all three groups

was found significance. Effectiveness of experimental treatments on Circuit training group and Interval group and adjusted mean difference were examined with critical difference. The detail is presented in table – 2.

Table – 2

Critical difference of mean scores of Flexibilities of two experimental groups and a control group

Mean			Mean difference	Critical difference
Circuit Training	Interval Training	Control Group		
24.312	25.117		0.806	0.938
24.312		19.037	5.274*	
	25.117	19.037	6.080*	

* Significance at 0.05 levels

Table – 2 that higher significant improvement (6.080) was found in Interval group with compared to the control group. Then, higher significant improvement (5.274) was found in Circuit group with compared to the control group. Significant effect of experimental treatment was found higher in Interval training group than Circuit training group. Significant effect of experimental treatment was found higher in Circuit training group and Interval training group with compared to control group.

Conclusion

- Remarkable improvement was found in Flexibility of selected subjects by 12 weeks systematic Circuit training and Interval training programmes.

Reference :

1. Alter, M.J., Science of Flexibility, 3rd Edition, Champaign, USA: Human Kinetics, 2004.
2. Bompa, T.O. & Buzzichelli, C., Periodization Training for Sports, 3rd Edition, Champaign, USA: Human Kinetics, 2015.
3. Dick, F.W., Sports Training Principles, 4th Edition, London: A&C Black Publishers, 2007.
4. Hoeger, W.K. & Hoeger, S.A., Principles and Labs for Physical Fitness, 6th Edition, Belmont (USA): Wadsworth Publishing, 2009.
5. McArdle, W.D., Katch, F.I. & Katch, V.L., Exercise Physiology: Nutrition, Energy and Human Performance, 7th Edition, Philadelphia: Lippincott Williams & Wilkins, 2010.
6. Nelson, A.G. & Kokkonen, J., Stretching Anatomy, 2nd Edition, Champaign, USA: Human Kinetics, 2014.
7. Powers, S.K. & Howley, E.T., Exercise Physiology: Theory and Application to Fitness and Performance, 8th Edition, New York: McGraw-Hill, 2012.
8. Sharkey, B.J. & Gaskill, S.E., Fitness and Health, 7th Edition, Champaign, USA: Human Kinetics, 2013.

9. Sharkey, B.J. & Gaskill, S.E., Fitness and Health, 7th Edition, Champaign, USA: Human Kinetics, 2013.
10. Wilmore, J.H. & Costill, D.L., Physiology of Sport and Exercise, 3rd Edition, Champaign, USA: Human Kinetics, 2004.
11. Wilmore, J.H., Costill, D.L. & Kenney, W.L., Physiology of Sport and Exercise, 4th Edition, Champaign, USA: Human Kinetics, 2008.

