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Effectiveness of Pilates Exercise and Conventional Exercise on Trunk and Postural Stability in Collegiate Basketball Players

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KEYWORDS

Athletic performance, Pilates, Core strengthening, Postural stability

ABSTRACT:

Introduction: To study the effects of Pilates exercise and conventional exercise on trunk and postural stability in collegiate basketball players.

Objectives: To determine the effects of pilates exercise on trunk and postural stability in collegiate basketball players. To determine the effects of conventional exercise on trunk and postural stability in collegiate basketball players.

Methods: This is a quasi-experimental design of pre and post-test type. The study duration was for 6 weeks, age between 18-25 years and the study conducted on university players. The modified star excursion balance test and double leg lowering test was used as the outcome measures to evaluate the postural control and core muscle strength. Subjects were explained about the training protocols.

Procedure: Subjects in Group-A underwent Pilates exercise and Group-B underwent conventional exercise. The data was collected prior to the training program as well at the end of the training program. A combination of mobility and stability is required by active people for optimal functional performance and for the correction of poor posture, muscle imbalances and poor biomechanics. The concept of trunk mobility and stability contributing to improved performance was used in training and rehabilitating athletes today.

Conclusions: The Pilates exercise shows better improvement than the conventional exercise in trunk and postural stability. So, it is concluded that Pilates exercise training is recommended to improve trunk and postural stability of collegiate basketball players.

1. Introduction

Pilates is a popular form of exercise training program which includes stretching and strengthening exercise with proper trunk control and breathing [1]."Joseph Pilates" described his methods of exercises as a "set of healthful lifestyle changes and corrective exercises". This method has become popular with a wide variety of athletes and people seeking fitness and rehabilitation [2]. Basketball is a high-demand sport activity with a high prevalence of lower limb injuries, namely knee and ankle sprains [16]. It is a sport which involves mainly jumping and landing [17]. Disequilibrium can be found in every specific movement of basketball, such as in the twisting movement of feet, jump shots as well as offensive and defensive rebounds [18].It is very important to have good balance while executing these skills. Balance or postural stability is a necessary component in both daily activities and sport [6, 7].

The trunk stabilization is the basis for many trunk stability programs because both upper and lower extremity muscles have proximal anchors at the shoulder and pelvic girdles respectively [13-15]. Conventional exercise programs are commonly involved in those exercise that target specific muscles or muscles groups

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that are recruited during sports specific technique. The modified star excursion balance test is used to measure a dynamic balance with 90 degree (PM-PL) and 135 degrees (ANT-PM, ANT-PL) to developed standardize which requires the athletic to balance on one leg whilst simultaneously reaching as far as possible with the other leg in three separate directions: anterior (ANT), Postero-medial (PM) and Postero-lateral (PL) to measure the test of stability, strength and balance in various directions.

2. Objectives

To determine the effects of Pilates exercise on trunk and postural stability in collegiate basketball players. To determine the effects of conventional exercise on trunk and postural stability in collegiate basketball players. To compare the effects of Pilates exercises and conventional exercises on trunk and postural stability in collegiate basketball players.

3. Methods

The study design was an experimental study with pre and post-test study type. Whereas study duration was 6 weeks with 3 sessions per week. The Convenient sampling was chosen with sample size of 30 subjects and it was conducted in chennai. Inclusion criteria: Only males under the age of 18-25 years, Basketball players. Exclusion criteria: Recent injuries in both upper limb and lower limb, acute inflammation, recent fractures or surgeries in extremities and spine, Pain or disability in both upper and lower limb, Hypermobility of joint. Outcome measures: Modified star excursion balance test (MSEBT).Double leg lowering test (DLLT). Measurement tools: Mats, Chalk, Measuring tape, Stop watch and Goniometer.

Procedure

A total of 30 subjects were selected and divided into two groups based on the inclusion criteria. The benefits of the study were explained to them and asked to sign the inform consent. Subjects in Group-A received Pilates exercise training whereas Group-B received conventional exercises. The subjects were then assessed for the outcome measures. Both the groups received intervention for 30 minutes which was conducted 3 sessions per week and finished in 6 weeks. Warm-up and cool down exercises were included prior to the training sessions.

Group-A: Pilates training programme:

- Hundreds.
- Articulating bridge.
- Plank.
- Reverse plank
- Side plank.

FIG: 1. Hundreds ***FIG: 2. Articulating bridge***

Exercise training programme: Warm-up for 5 minutes, specific exercise for 30 minute and 60 seconds rests in between for each and every exercise followed by cool downs for 5 minutes.

Group-B: Conventional training programme:

Trunk and postural stability exercise:

- Trunk twist
- Sit-up.
- Bird dog.
- Single leg stance.
- Trunk rotation.

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FIG: 3.Trunk twist. ***FIG: 4.Sit-up.***

Exercise training programme: Warm-up for 5 minutes, specific exercise for 30 minute and 60 seconds rests in between for each and every exercise followed by cool downs for 5 minutes.

4. Results

On comparing the Mean Values of Group A & Group B on SEBT (Anterior, Postero - Medial & Postero - Lateral) Score, it shows a significant increase in the post test mean values in both groups, but (Group A - Pilates) shows 69.39 ± 1.27, 97.16 ± 1.12 & 89.02 ± 1.21 which has the higher mean value is more effective than (Group B -Conventional Exercises) 66.40 ± 1.67, 94.96 ± 2.59 & 84.88 ± 1.83 at $P \leq 0.05$. Hence the null hypothesis is rejected. On comparing the Mean Values of Group A & Group B on Double Leg Lowering Test Score, it shows a significant decrease in the post test mean values in both groups, but (Group A - Pilates) shows 30.00 ± 7.79 which has the lower mean value is more effective than (Group B -Conventional Exercises) 37.00 ± 7.74 at $P \leq 0.05$. Hence the null hypothesis is rejected. On comparing Pre-test and Post-test within Group A & Group B on MSEBT (Anterior, Postero - Medial & Postero - Lateral) Score and Double Leg Lowering Test Score shows significant difference in the mean values at $P \leq 0.05$.

5. Discussion

Statistical analysis revealed that there was a significant difference between the groups and proved that the pilates exercise was more effective than the conventional exercise in the training intervention programme which was supported by previous studies by:Kyeongjin Lee et al. (2021):Stated that pilates is an effective exercise method for rehabilitating musculoskeletal disorders.Shavikloo J et al. [2018]: Showed that the result of the study consistent with the findings concluded that 6-weeks of Pilates training programme was more effective than conventional training in improving anterior, posterior-medial and posterior-lateral components of dynamic measured by modified star excursion balance test in basketball players.

Samir Lofty El-Sayed et al, [2010]: States that one of the principles of Pilates is breathing control which makes awareness of one's own breathing during dynamic activities. By improving the work of back and abdominal muscles with balance and integration between them is considered as the important factor for improving the muscular ability of legs. Therefore, it improved the jumping performance. Gallagher S, et al. [2002]: Stated that in any of sporting activities, the performance is influenced by the psychological status of the athlete. Da Cruz et al. (2014): Stated that 6 weeks of Pilates training were not sufficient to cause significant changes in physical fitness and body composition in young basketball athletes. Thus, the study has suggested that a longer training period (>6 weeks) is necessary to detect physical fitness changes in basketball players.

Singh et al. (2015): Stated that plyometrics training group had shown better performance than Pilates training group and control in sargent jump test. The results of present study are consistent with a previous study of which found that 6 weeks of plyometric shows significantly improved. In this study, on comparing the Mean Values of pilates & conventional exercise on MSEBT (Anterior, Postero - Medial & Postero - Lateral) Score, it shows a significant increase in the post test mean values in both groups, but (Pilates) shows 69.39 ± 1.27, 97.16 ± 1.12 & 89.02 ± 1.21 which has the higher mean value is more effective than (Conventional Exercises) 66.40 ± 1.67, 94.96 ± 2.59 & 84.88 ± 1.83 at

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P ≤ 0.05. Hence the null hypothesis is rejected. On comparing the Mean Values of pilates & conventional exercise on Double Leg Lowering Test Score, it shows a significant decrease in the post test mean values in both groups, but (Pilates) shows 30.00 ± 7.79 which has the lower mean value is more effective than (Conventional Exercises) 37.00 ± 7.74 at P ≤ 0.05. Hence the null hypothesis is rejected.

On comparing Pre-test and Post-test within pilates & conventional exercise on MSEBT (Anterior, Postero - Medial & Postero - Lateral) Score and Double Leg Lowering Test Score shows significant difference in the mean values at P ≤ 0.05.From the data analysis, it showed that there was statistically significant improvement in trunk and postural stability in pilates. The concept of trunk mobility and stability contributing to improve the performance is being used in the training and rehabilitating athletes. In basketball, the proximal strength, scapular, pelvic girdles and trunk coupled with appropriate mobility is important in reaching the optimum performance levels. The outcome is to improve trunk and postural stability. The values of pre and post-test mean values were compared. In this study, Pilates exercise has showed significant increase in subject with basketball players.

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