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An Impact of Postural Corrective Techniques of Lifting Items in Adolescents Physical Activity and Mental Development

Towseef Ahmad Taily [1*], Jai Prakash Bhukar [2]

[1] Research Scholar, Department of Physical Education and Sports, Central University, Haryana, India

[2] Professor, Department of Physical Education and Sports, Central University, Haryana, India

Corresponding Author: Towseef Ahmad Taily*

Abstract

Introduction: Adolescence is a critical period for developing motor skills and healthy habits, making corrective techniques essential for preventing physical ailments and enhancing mental resilience. However, there is a lack of research on the effects of postural correction during lifting tasks on both physical and psychological development in adolescents. This study aims to fill this gap by investigating how postural correction influences physical health and mental well-being. Poor lifting posture, such as a curved spine and straight knees, can result in musculoskeletal issues and negatively impact self-esteem.

Objectives: This study aims to investigate the impact of postural corrective techniques in lifting items on the physical activity and mental development of adolescents aged 12-16 years. It focuses on improving posture through corrective exercises and assessing the resulting changes in physical activity levels and psychological well-being.

Methods: A Total of 30 subjects were selected randomly (15 boys and 15 girls) for this study from the state of Haryana. Posture assessment was conducted using Kinovea software, which revealed poor lifting postures among most of the subjects, such as straight knees and curved backs. A 6-week intervention program was implemented during physical education classes, incorporating corrective exercises focused on improving posture during lifting tasks. The program used various exercises and objects to promote proper lifting mechanics. Participants were evaluated before and after the intervention, focusing on spinal flexibility (extension) and lifting technique. SPSS version 27.0 was used, Paired Sample t-test, to determine whether the statistical difference is significant between pre and post-intervention. The significance level was set at $p<0.05$.

Results: The results show statistically significant differences between pre- and post-intervention assessments ($p<0.05$), confirming the effectiveness of the intervention.

Conclusions: it can be concluded that the specific corrective exercise programs for adolescents will be beneficial in promoting and providing a good health and a better quality of life ahead.

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INTRODUCTION

Postural correction techniques are organized interventions designed to increase movement efficiency and improve body alignment, especially when lifting or performing other duties. By strengthening core and stabilizing muscles, increasing flexibility, and retraining muscle memory, these methods lower biomechanical stress, lower the chance of injury and increase physical performance. These interventions include exercises that focus on the legs, shoulders , and back as well as dynamic motions that replicate everyday tasks. By using these methods in physical education classes, teenagers can improve their motor control and maintain long-term musculoskeletal health. Physical

fitness, athletic performance and quality of life are all impacted by postural alignment and maintaining an ideal postural profile depends heavily on variables like growth and activity levels (Schwanke et al.,2016). When the body is out of line with its ideal posture, the natural curves of the spine are changed. This is known as a postural deviation. People who lead sedentary lives, perform repeated physical labor, or engage in insufficient physical activity are more likely to exhibit these aberrations. Common types include forward head posture, kyphosis (hunchback), scoliosis (sideways curvature of the spine), and lordosis (extreme inward curvature of the lumbar spine). These variations frequently result in musculoskeletal pain, impaired bodily function, and a higher chance of developing long-term illnesses such as degenerative disc degeneration. Teenagers are especially vulnerable because of their fast growth stages, bad ergonomic practices, and lack of postural awareness. To avoid and manage postural aberrations, research emphasizes the importance of corrective interventions, such as focused workouts, ergonomic modifications, and education. These approaches promote long-term musculoskeletal health and improve quality of life (Kendall 2005).

METHODS

Subjects and Variables

The purpose of this study was to investigate how certain physical and psychological aspects of adolescents were affected by postural correction techniques (PT). A total of 30 adolescents between the ages of 12 and 16 were chosen for the study, 15 of whom were male and 15 of whom were female. The World Health Organization (WHO) standards, which define adolescents as those between the ages of 10 and 19, were used to classify the participants as adolescents (World Health Organization, 1986). Randomly chosen from nearby schools, the sample's eligibility requirements were regular attendance in physical education classes and the absence of long-term medical conditions that would impair posture or lifting technique. The focus of the study was on the effects of postural correction techniques on both physical and psychological development, with no screening for BMI. The primary variables of interest included postural alignment during lifting tasks, spinal flexibility, and overall physical well-being.

Experimental Design

A pretest-posttest experimental design was used in the investigation. For a six-week training program, thirty participants were split into three subgroups: group one (PT; n = 15), group two (CON; n = 15). While the control group was not allowed to participate in any particular training, group one was exposed to the experimental treatments of PT.

Inclusion criteria

To be included in this study, the subjects could not have been participating in any exercise program or any other posture training program.

Exclusion criteria

Subjects with injury or any impairments, those who used orthoses/prostheses or orthopedic equipment and any subject with a history of orthopedic surgical treatment were excluded.

Interventions

Children of two schools from Mahendergarh, Haryana, were chosen for the study and split into two groups: one treatment group (PT) (n=15) and the other control group (CG) (n=15). Since the intervention was carried out close to the school grounds, the schools were selected based on similar features to reduce the possibility of sociodemographic confounding factors and to guarantee that the kids could continue their full-time activities. The six-week intervention regimen involved three 30-minute sessions each week for individuals in the PT and CG groups. Participants used tools like dumbbells, Swiss balls, foam rollers, resistance bands, and goblets to do a range of stretching and strengthening exercises.

Data Collection

The joint angles were measured by a tool, namely Kinovea. A Nikon camera D5400, with a tripod, was used to capture the video from sideways, the subjects were patched with reflective markers at the joints like ankle, knee, Hip, and Shoulder on the lateral side. The camera is positioned at a place where the whole body is captured in the video. Pre-data is taken without any intervention program, after that experimental group is given training and the two groups are given random training. After the intervention, post data was collected again, and the angles were measured again in the software Kinovea.

Statistical Analysis

The data were stored in SPSS Statistics 22.0. The samples were described using descriptive statistics, such as percentages and frequency values. The Mann-Whitney test for nonparametric data and the independent samples t-test for parametric data. Data were used to compare groups by gender as well as the PT and CG groups at the pre- and post-intervention time points. We employed the 95% confidence interval and delta value (D: mean post-intervention means pre-intervention) to analyze changes in the variables over time for the CG and PT.

To confirm differences between pre- and post-intervention, the Wilcoxon test and the paired t-test were employed. A p-value of less than 0.05 was deemed statistically significant for all analyses.

RESULTS

Changes in motor behavior, strength, flexibility and posture among the PT and CG groups were evaluated by analyzing the outcomes of the six-week intervention program. Changes in joint angles, strength measurements, and posture correction, as assessed during the pre and post-tests, were the main results. Age, height, weight, and initial joint angle measures did not significantly differ between the three groups at baseline ($p > 0.05$). The study participants' descriptive data are shown in Table 1.

Group	Age Range (Years)	Mean Weight (kg)	Mean Joint Angle (Degrees)
PT	12–16	50.3 ± 3.5	172.5 ± 5.3
CG	12–16	49.8 ± 3.4	171.9 ± 5.0

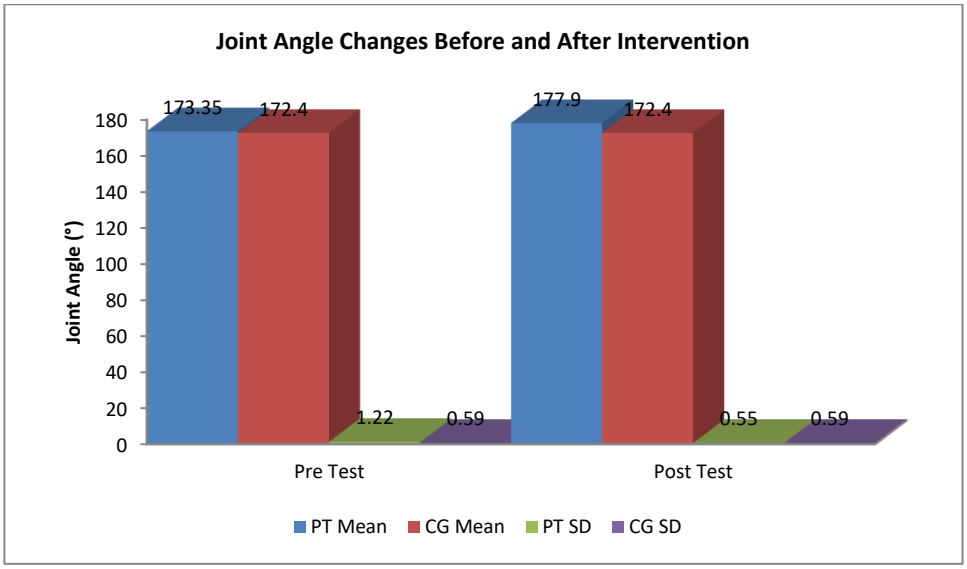
Table 1: Baseline characteristics of the Postural Training (PT) and Control Group (CG) participants, including age range, mean body weight, and mean joint angle (in degrees) before intervention

Comparison of pre- and post-test results within and across groups, as well as findings on primary outcomes.

Make use of statistical words such as p-value, mean, and SD. For instance:

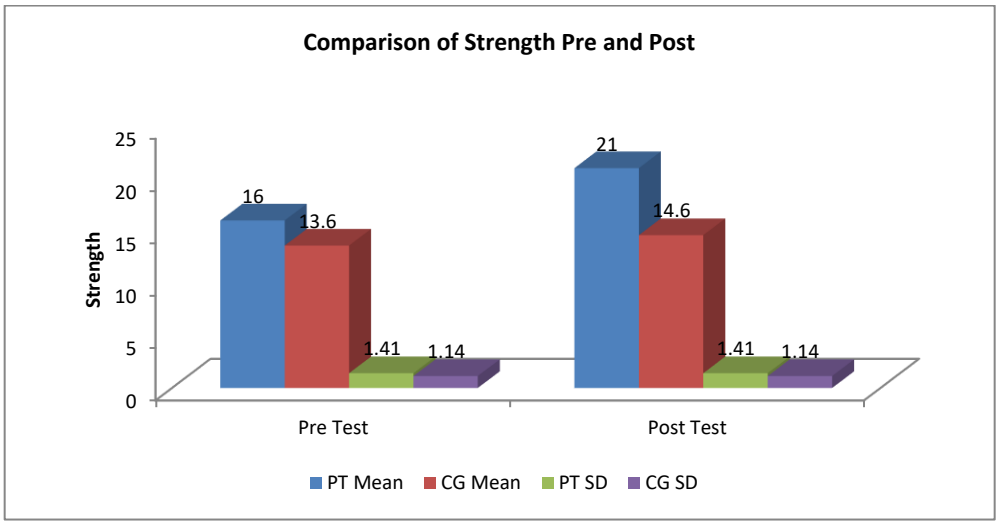
Joint Angle Changes

When compared to the CG group, the joint angles for the PT group showed notable improvements after six weeks. The ideal lifting angle for the PT group increased from 172.5° ± 5.3° to 178.2° ± 3.4° ($p < 0.01$). The CG group, however, did not exhibit any discernible change ($p = 0.34$).



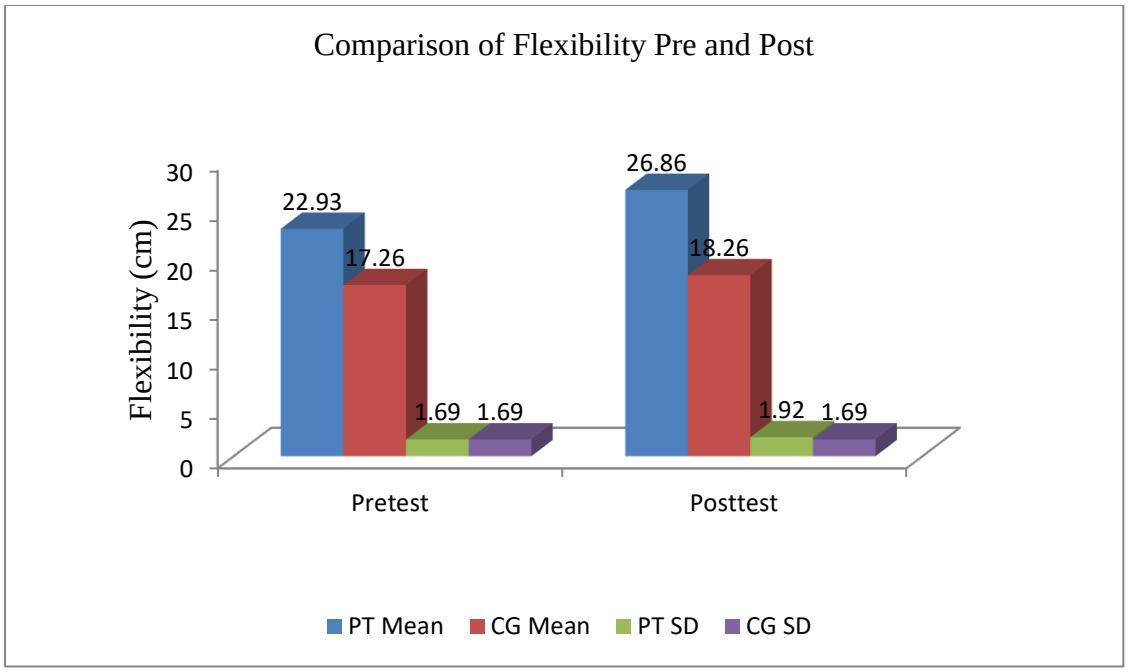
Strength Gains

Repetitions of dynamic workouts were used to gauge strength increases. By week six, the PT group had increased from a baseline of 10 ± 2 reps to 20 ± 3 reps ($p < 0.01$). The CG group showed no discernible changes.



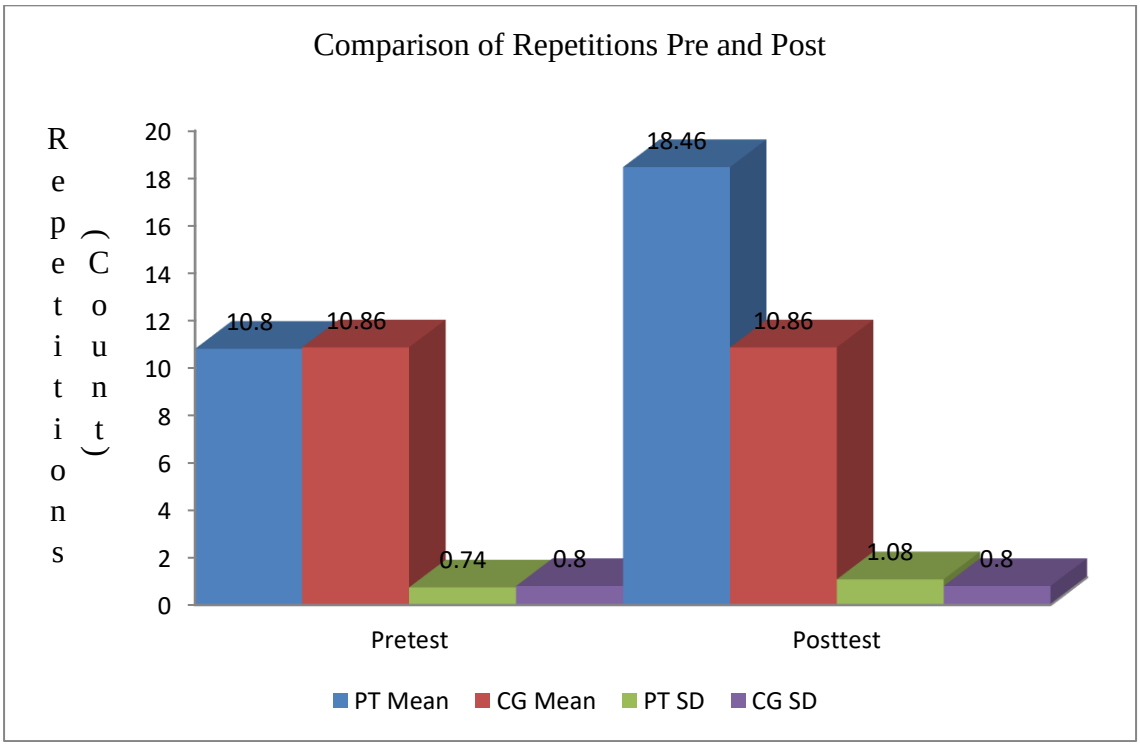
Flexibility Improvements

Participants' levels of flexibility were assessed both before and after the exercise. Over six weeks, the PT group's flexibility increased dramatically from 22.9 ± 1.7 cm to 26.8 ± 1.9 cm ($p < 0.01$). On the other hand, the CG group didn't show any statistically significant improvement, going from 17.3 ± 1.7 cm to 18.3 ± 1.7 cm ($p = 0.28$).



Repetitions of Lifting

Performance improvements during lifting activities were evaluated using repetition counts. After six weeks, the PT group's performance significantly increased from 10.8 ± 0.7 reps to 18.5 ± 1.1 reps ($p < 0.01$). Conversely, the CG group maintained a baseline of 10.9 ± 0.8 reps ($p = 0.31$) and showed no progress.



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