# Studying the effect of 8 weeks corrective exercise program on student's scoliosis changes.

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**Abstract:**Present research studies the effect of 8 weeks corrective exercise program on student's scoliosis changes in primary school. 330 students screened randomly using New York test. Among them, 48 students had scoliosis deformity with different intensities. Then, Adams test delineated that among them 41 students were type II scoliosis (functional). Among students with functional scoliosis, 20 and 23 students selected to control and experiment groups respectively, and experiment group participated in a corrective exercise program for 8 weeks, 3 sessions per week. Results from post-test analyzed by using T-student test at 95% confidence level. Results showed that there are significant relationship between scoliosis intensity of experiment and control groups, and rate of scoliosis outbreak and students age ($P \leq 0/05$).

Key words: scoliosis, students, corrective exercise program.

## 1. Introduction

Children and adolescents expose to postural deformity of spine due to being in sensitive position of growth and having special properties of body. Spine is an important part of body and form central axis of body which includes numbers of bone called vertebra that connect together by number of cartilage-fibrosis tissue called disk. Spine forms from four arcs. These arcs decrease vertical pressure from force of body weight, this force is tenfold more than status without arcs (1, 13). When study spine from backward view, spines should be in one direction and without minor slip to sides. Any case of vertebra dislocation from its natural position to sides titled deformity, and this deformity called scoliosis in today sciences, it has different types and is made for a variety of reasons. Type I is diversion that is created due to structural changes in spine and type II is diversion that created due to weakness of conservator muscles, these arcs form because of mistake position in sitting, standing, sleeping and carrying things. According to studies, type II scoliosis showed more corrigibility to corrective exercise program, so that it is called functional or moving scoliosis (1, 4, 5, and 8). Scoliosis usually appears before 14 age and two third of it is postural scoliosis and its outbreak rate in adolescence age is more in girls than boys (1, 13). Ellapen et al (2011) identified 70/44% and 73/94% incidence of scoliosis among the male and female students respectively ($P<0/05$) in the frontal plane (7). Zhang Shou et al (2003) showed that 17 students were definitely diagnosed to have scoliosis, with a prevalence of 20% in males and 21% in females. They

concluded that the investigation of scoliosis among school-age population is of great importance for early diagnosis and effective prevention and treatment of scoliosis (15). Ghanbarzade (2002) and Yazdanifar (1995) reported the outbreak rate of scoliosis in students 12/1% and 16% respectively. In all studies, based to kind and intensity of scoliosis deformity, different methods have been recommended for correction and treatment of scoliosis and the most specialists recommend surgical operation for correction and treatment of structural scoliosis with high intensity. But using appropriate corrective exercise and comprehensive and lasting program can treat type II scoliosis by strengthening the weak muscles and stretching shortened muscles and cause increased muscular endurance and improvement of spine mobility (3, 6 and 14). Since in every design, planning and organizing is based on scientific studies and using true planning can gait important steps in diagnose, prevent and correction of skeletal deformity and impart the society of having health and dynamic generation (11). Here of the present study want to investigate initially the outbreak rate of scoliosis deformity in students and then using a corrective exercise program, it investigates the effect of this program on decreasing scoliosis deformity intensity.

## 2. Material and Methods

Using Newyork test, 330 boy students in 8-11 years at primary school, were screened. 48 students have scoliosis deformity with different intensity. Then using Adams test, students with type II scoliosis (functional) determined, number of them were 41 students. Among functional students, 18 students with

average age of 10/14±1/04 years, average scoliosis intensity of 9/23±1/4 in Newyork test scale for control group, and 23 students with average age of 9/63±1/21 and average scoliosis intensity of 9/07±1/61 for experiment group were selected. Then a period of corrective exercise program performed on experimental group for 8 weeks, 3 sessions per week, and 30 minutes per session.

For evaluating and gaining research data used tools such as chess plane and Newyork test. Subjects stood backward in front of chess plane, so plumb line passed on spine and leg middle and divided body into equal parts. Subjects were asked to stand in front of chess plane without minor muscle contraction. Subjects were evaluated from back at 6 m distance (1, 13).

Because of doing pilot study and work background of researcher with measuring tools and also evaluating a deformity alone, screening performed in short time. For gaining statistical data to concluding, observed positions in the screen phase by Newyork test called as good (5 score), moderate (3 score) and weak (1 score) positions. Then every one of above positions graded as good from 10-12, moderate from 7-9 and weak from 4-6 (3).

In pretest phase for evaluating flexibility of spine muscle, subjects stood normally and distance between middle finger to land was measured by tape line in convexity side. Then same distance was measured in lateral flexion position in convexity side. Then data from measurements minus from each other and result considered as flexibility of spine muscle in concavity side shortened muscle (2). In post-test and in end of corrective exercise program, subjects of two groups were evaluated as former method and gained data analyzed by $x^2$ and T-student test (P≤0/05).

## 3. Results

1- From 330 screened students using Newyork test with average age of 09/71, 48 (14/5%) had scoliosis with different intensities. Distribution rate of all subjects have presented at age and outbreak rate of scoliosis in table

2- Rate of scoliosis intensity in different ages estimated by using Newyork test 4/06% in 8 years, 4/31% in 9 years, 4/53% in 10 years and 5/03% in 11 years (graph 1).

3- Scoliosis intensity compared between ages of 8-9 and 10-11 using independent T-student test (P≤0/05), so that there was no significant difference between scoliosis intensity between age of 8-9 and 10-11 (hypothesis 1)(table 2).

4- Using independent T-student test (P≤0/05), corrective exercise program had significant effect on scoliosis treatment (hypothesis 2) (table 2).

5- Evaluating flexibility of subject's spine muscles in pre and post test using dependent T-test and comparison of results from two tests efficacy of corrective exercise program for scoliosis treatment confirmed (hypothesis 3)(table 2).

**Table 1. Distribution rate of the subjects at age and scoliosis outbreak**

| Age | 8 | 9 | 10 | 11 | Total |
|---|---|---|---|---|---|
| Distribution rate of the subjects | 52 | 89 | 109 | 80 | 330 |
| Subjects distribution percentage | 15/7 | 26/9 | 33/03 | 24/2 | 100 |
| Outbreak rate of scoliosis | 8 | 10 | 18 | 12 | 48 |
| Outbreak percentage of scoliosis | 2/4 | 3/03 | 5/4 | 3/6 | 14/5 |

**Table 2. Hypothesis results**

| Hypothesis results | N | d.f | $t_{obs}$ $\chi^2_{obs}$ | $t_{cri}$ $\chi^2_{cri}$ | Sig. P<0/05 |
|---|---|---|---|---|---|
| Hypo 1 | 48 | 46 | 2/43 | 2/02 | * |
| Hypo 2 | 20 | 19 | 5/16 | 2/09 | * |
| Hypo 3 | 20 | 1 | 7/23 | 2/09 | * |
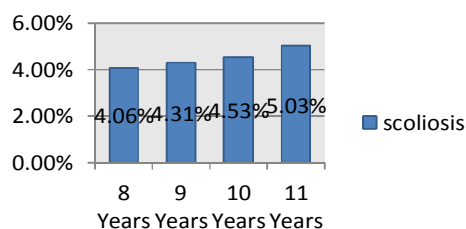


Graph 1- rate of scoliosis intensity in subjects.
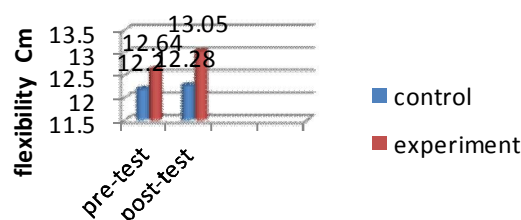


Graph 2- flexibility in experimental and control groups spine in two phases.

## 4. Discussion and Conclusion

The present study investigated not only the effect of a corrective exercise program on scoliosis in 8-11 years primary school students, but also rate and intensity of scoliosis outbreak. For evaluating postural and scoliosis intensity in subjects, Newyork test and chess plane were used. Results from statistical analysis of this research studied and compared with other studies. Because in majority of studies related to

scoliosis have been used Newyork test and chess plane, and comprehensive view to special properties of every one of these studies show that although these tools are not an exact scale, but provided true use and enough experience of the tester, they can have relatively high reliability. However, for assuring of validity and reliability of used tools, after selecting sample for experiment group, researcher selected randomly 7 students among experiment group and after receiving testimonial from parents 3 of 7 students went to radiography and confirming by specialist physician; the result showed that there was scoliosis in 3 students with different grades. But in post test, subjects did not tend to radiography again.

Roberts et al (1988) performed a 10 weak training program on 120 patients with pain in back because of spine postural deformity such as scoliosis.After 10 weeks; they observed significant difference in physical abilities, mobility and efficacy (6). Daneshmandi et al (2003) performed a corrective exercise program for 8 week, 3 session/week on 20 students with scoliosis deformity, and observed that present corrective exercise had significant effect on scoliosis changes. Flexibility of spine muscles also had increased after training program. Rahnema et al (2009) studied the effect of 8 week regular corrective exercise on spine status (kyphosis, scoliosis and lumbar lordosis) of girls students, results show that rate of kyphosis and scoliosis in girls decreased significantly after training program, that is consonant to result of present study (12). Nisainen et al (1989) performed study on scoliosis and asymmetry trunk measurement in students. They screened 1060 students with average age of 8-10 years using chess plane and Network test, outbreak rate of scoliosis was 4/1%, this is consonant to present study results. Roberts (1993) performed study titled trunk symmetry, postural, growth and scoliosis danger on 896 students in age of 10/8-13/8 without scoliosis before. He evaluated them year by year and observed that during first 3 years, 24 boys and 41 girls had scoliosis deformity. In this study he studied outbreak rate and increased risk existing scoliosis with increasing age in two genders (9). Lasjuri et al (2005) in study titled study and recognition of 11-13 boy students deformity and its relationship with age, weight and height; reported outbreak rate of scoliosis 7/5% (10). Vaseghi (2005) reported outbreak rate of scoliosis 15/23% in his study that showed corrective exercise had significant effect on corrective exercise, and regarding to increased scoliosis outbreak and training effectiveness, it agree with the results of this study (14). It is probably that differences in scoliosis outbreak rate in existing studies related to variety in number of statistical population.

Regarding to already study results and also result of the present study can conclude that using

stretching and strength exercises effect on scoliosis deformity treatment. On the other hand, regarding to outbreak rate of scoliosis and effectiveness of this deformity on other physical factors of person with scoliosis, serious attention to this problem and the effect of corrective exercise in preventing and treating this deformity especially among students is distinctive. Also special attention to problem by physical education teachers who dealing with students physical status can play an important role in identifying and correcting of deformity by coordination with students parents.

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