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Effect Of Anti-Gravity Exercises With Or Without Schroth Therapy On Postural Kyphosis Among Female Adolescents

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Abstract:
Background: *Posture Is The Alignment And Maintenance Of Body Segments In Certain Positions Such As Standing, Lying Or Sitting. Postural Kyphosis Is Caused By The Adaptation Of Wrong Posture. Postural Kyphosis Usually Starts To Show Up In Adolescents With More Females Being Affected Compared To Males. Kyphosis Which Occurs To Compensate The Breast Development In Girls After Puberty Due To Carrying Heavy School Bags, Wrong Posture. Occiput Wall Distance Test Is The Type Of Outcome Measure The Severity Of The Kyphotic Curve. The Present Study Is About Effect Of Anti-Gravity Exercises With Or Without Schroth Therapy On Postural Kyphosis Among Female Adolescents.*
Methods: *The Study Design Was An Experimental Study, 40 Female Students Were Selected From Sri Venkateshwaraa Group Of Institutions (Ariyur Pondicherry). They Were Allocated Into Two Group, Group A(N=20) Anti-Gravity Exercises And Schroth Therapy. Group B(N=20) Anti-Gravity Exercise Alone, 6days/Week For 4 Weeks, The Outcome Measure Occiput Wall Distance Test Were Measured In Pre And Post Test For 4 Week Period.*
Result: *Data Analysis Was Done By Paired't'test For Within The Group And Unpaired't'test For Between The Group Analysis Respectively, The Statistical Analysis Done With Unpaired 'T'test Between The Group A And Group B Analysis Shown Significant (P<0.0001) Which Shows That The Group A Must Be Significant Than Group B, It Has Been Concluded That Group A Shows Improvement In Posture With The Outcome Measure Than Group B.*
Conclusion: *This Study Concludes That The Anti-Gravity Exercise Along With Schroth Therapy For Group A Shows More Significant Improvement In Posture Among Adolescent Females Than The Conventional Treatment In Group B.*
Keywords: *Anti-gravity exercise, Schroth remedy, Posture, Occiput wall distance test.*

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I. Introduction

Posture is the alignment and conservation of body parts in certain positions analogous as standing, lying or sitting[1].Kyphosis is the sagittal deviation of the spine that presents as on anteriorspinal curvature. It is frequent during adolescents[2]. Postural kyphosis generally starts to show up in adolescents, with further ladies being affected compared to males. The limping posture increases the forward wind, which will, in turn stretch the extensor muscles of the reverse and the posterior ligaments of the spine, thereby weakening it over time. Postural kyphosis will generally have normal vertebral structures, and the condition generally has a benign course[3.] Kyphosis which occurs to compensate the bone development in girls after puberty due to carrying heavy schoolbags, wrong posture. Adolescent girls from the age 10 year have a period of rapid-fire bone growth. The onset of mensus contributes to the accession of peak bone mass[1]. Also setup that scholars periods lesser than 15 years had more serious posture problems than scholars progressed lower than 10 years. The reason for the rising trend of incorrect posture rate with aging may be related to the increase of hormone caching and the significant changes of physical development and internal status in adolescence[4]. Multitudinous adolescents are attending academy and sitting for a long time, which may lead to muscular imbalance of their box muscles. therefore adolescence may be a period of high frequence of incorrect posture[5]. Symptoms include, "Poor Posture", mild rear pain, stinginess in hamstrings, " Rounded shoulders", Stiffness in upper back, fatigue, "A visible hump on the rear"[6]. The **SCHROTH remedy** treatment involves correction of the kyphotic posture with the help of proprioceptive and

exteroceptive stimulation in the sagittal plane. The original external force involved in every SCHROTH exercise is extension. With time, the actors use corrective active box muscle forces and learn to raise themselves as far as possible from the depression position, together with the correction the three blocks in the sagittal plane. There latterly , they need to maintain the corrected posture while performing quotidian living activities[7]. SCHROTH THERAPY exercises include a BREATHING fashion, fastening on perfecting the caricature stir and aiming to increase the cases VITAL CAPACITY. (1. Pendulum;2. Corrections in supine-elbows against the floor;3. Semihanging;4. Corrections in sitting: forearms against the knees; and 5. Corrections in standing-against elastic bands)[7]. The **ANTI-GRAVITY exercises** involves five classic exercises (1. Superman;2. Shoulder scapular retraction;3&4. Back extension; and 5. Back strengthening-jeer canine exercise) that relate the whole reverse and are used routinely in posture conventions for hyperkyphosis treatment[7]. The **crown wall distance** is a clinical test for thoracic kyphosis. It has been vastly used in studies. It has been associated with postural insecurity, muscle weakness, respiratory dysfunction. The distance between their crown and wall is measured using inch tape recording. infexibility of kyphosis including mild (<_ 5.0cm), moderate (5.1-8.0cm) and severe (>8.0cm)[8]. Hence, this is a study to find the effect of antigravity exercise with or without schroth remedy on postural kyphosis among womanish adolescents.

II. Materials And Methodology:

The study design was an experimental study with Convenient sampling technique, 40 female students were selected from Sri Venkateshwaraa group of Institutions (Ariyur Pondicherry). They were allocated into two group, group A(n=20) anti-gravity exercises and schroth therapy. Group B(n=20) anti-gravity exercise alone, The treatment duration is about 6days/week for 4 weeks, the outcome measure occiput wall distance test were measured in pre and post test for 4 week period.

Study design : Experimental study
Study location : Sri Venkateshwaraa Group of institutions - SVGI
Study duration : 6 months
Sampling size : 40 participants
Sample size calculation **:** Experimental group[n = 20]: Antigravity exercise with schroth therapy &
Control group[n = 20]: Antigravity exercise

Subjects & Selection Method: The study design was an experimental study, 40 female students with postural kyphosis were selected from Sri Venkateshwaraa group of Institutions (Ariyur Pondicherry). They were allocated into two group, group A(n=20) anti-gravity exercises and schroth therapy. Group B(n=20) anti-gravity exercise alone, The treatment duration is about 6days/week for 4 weeks, the outcome measure occiput wall distance test were measured in pre and post test for 4 week period.

Inclusion Criteria:

1. Late adolescent female- age group from 17-19
2. Females who carry back bags
3. Females those who have occiput wall test value as moderate (5.1-8.0 cm)
4. Individuals with round shoulders and back
5. Individuals with stiff back

Exclusion Criteria:

1. Participants who underwent an orthopaedic surgery at the back.
2. Tumours
3. Congenital hyperkyphosis
4. Traumatic hyperkyphosis
5. Any history of fractures
6. Pregnant females
7. Systemic disease
8. Kidney disease
9. High or low blood pressure
10. Irregular heart function
11. Recent head injury

Procedure:

The subject who fullfill the inclusion criteria were participated in the study. Such eligible subject were selected in this study after obtaining informed consent. The subject will be assessed before the treatment and at the end of 4-week by using occiput wall distance test and numerical pain rating scale.The tool of 40 subject will be divided equally into 2 group. GROUP A(n=20) and GROUP B(n=20). GROUP A will receive antigravity exercise with schroth therapy and GROUP B will receive antigravity exercise.

GROUP A: Antigravity exercise with Schroth remedy

Antigravity Exercise: 1. Superman Exercise
2. Shoulder Scapular Retraction
3. Back Extension Exercise
4. Back Strengthening- Bird Dog Exercise

FREQUENCY	6 DAYS/WEEK
REPETITION	3 SETS CONSISTED OF 10 REPETITION
DURATION	30 SEC HOLD DURATION

Schroth Remedy: 1. Pendulum Exercise
2. Supine-Elbow Against The Floor
3. Semi-Hanging
4. Sitting- Forearms Against The Knees
5. Standing- Against Elastic Bands

FREQUENCY	6 DAYS/WEEK
REPETITION	3 SETS CONSISTED OF 10 REPETITION
DURATION	30 SEC HOLD DURATION

Group- B: Antigravity exercise alone
Antigravity Exercise: It is performed with the group of exercise protocol to improve posture, increase muscular strength and flexibility. Relieving pressure in the vertebrae.
1. Superman Exercise
2. Shoulder Scapular Retraction
3. Back Extension Exercise
4. Back Strengthening- Bird Dog Exercise

FREQUENCY	6 DAYS/WEEK
REPETITION	3 SETS CONSISTED OF 10 REPETITION
DURATION	30 SEC HOLD DURATION

III. Statistical Analysis & results

A study **"To find out the effect of Anti-gravity exercises with or without schroth therapy on postural kyphosis among female adolescents"-** the pre-test and post interventional differences within the two groups were analysed using paired 't' test and the interventional difference between the two groups were analysed using unpaired 't' test for the outcome measure. Statistical analysis was set at $p<0.0001$

WITHIN THE GROUP ANALYSIS OF OCCIPUT WALL DISTANCE TEST

Showing the pre and post test values of Group A: (paired t-test values)

GROUP-A	**Mean**	**SD**	**'t'- value**	**'p'- value**
Pre test	6.68	0.97	10.5305	<0.0001
Post test	3.72	0.78		

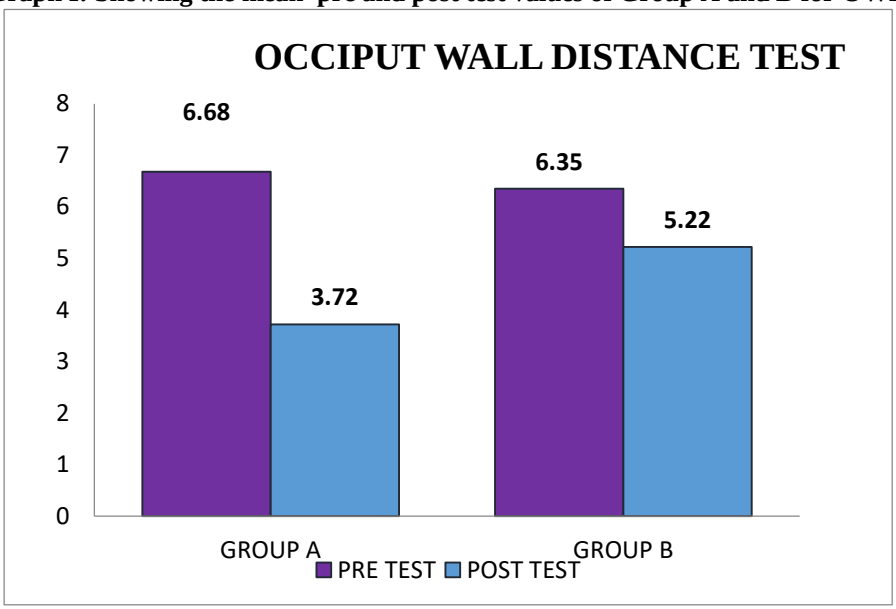
The 't' value OCCIPUT WALL DISTANCE TEST in Group A is 10.5305with 9 degrees of freedom and considered statistically significant **('p' < 0.0001)**

Showing the pre and post test values of Group B: (paired t-test values)

GROUP-B	**Mean**	**SD**	**'t'- value**	**'p'- value**
Pre test	6.35	0.88	4.4578	<0.0001
Post test	5.22	0.69		

The 't' value OCCIPUT WALL DISTANCE TEST in Group B is 4.4578 with 9 degrees of freedom and considered statistically significant **('p' < 0.0001)**

Graph I: Showing the mean pre and post test values of Group A and B for OWD



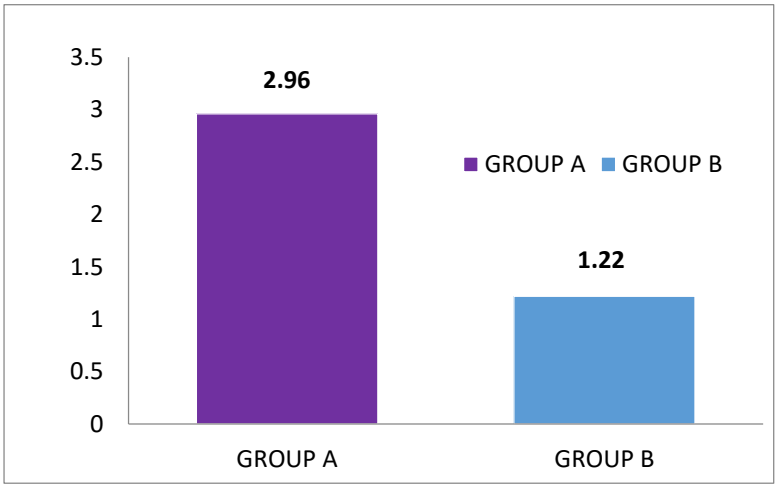
BETWEEN THE GROUP ANALYSIS OF OCCIPUT WALL DISTANCE TEST

Showing the mean of differences of group A & B: (unpaired t-test values)

	Mean	**SD**	**t- value**	**'p'- value**
GROUP-A	2.96	0.36	10.16245	<0.0001
GROUP-B	1.22	0.67		

The 't' value of OCCIPUT WALL DISTANCE TEST between the groups is 10.16245 with 18 degrees of freedom and considered statistically significant **(p < 0.0001)**

Graph II: Showing the mean of differences between pre and post test of Group A and B for OWD



OWD for Group A

The pre test and post test value of OWD for group A is analyzed using paired t test. The t value is 10.5305 for 9 degree freedom and considered statistically significant **('p' < 0.0001)**

OWD for Group B

The pre test and post test value of OWD for group B is analyzed using paired t test. The t value is 4.4578 for 9 degree freedom and considered statistically significant **('p' < 0.0001)**

ON ANALYSIS:-

It has been found that pre and post values of OWD denoting the postural correction showed significant improvement in both experimental and control group and has shown a higher improvement in experimental group A.

Unpaired't'test :

The pre and post value of T test for postural kyphosis between group A and B is analyzed using unpaired T test for 18 degree of freedom with the t value 10.16245 and considered statistically significant.

The statistical analysis was done using **unpaired't'test** between the groups and shows statistical **significance** of **(p<0.0001).** between the group analysis of the mean of the post values show that the experimental group is significant than the control group . there is more improvement of posture in experimental group A than control group B.

IV. Discussion

This present experimental study has been conducted to find out the effect of Anti-gravity exercises with or without schroth remedy on postural kyphosis among womanish adolescents. The council scholars were named as study population as there is important established reports for high frequence of postural kyphosis affecting the posture.

Pre and post values were assessed before and after 4 weeks for postural correction using the outgrowth measure similar as crown wall distance test. There values were statistically analysed using repeated measure of paired't'test. The present data indicate that group A is more significant than group B.

There are further studies which prove that antigravity exercise and schroth remedy shows high impact on reducing kyphotic wind in colourful kyphosis. In my experimental study, I set up out the significance and which is further effective between antigravity exercise with schroth remedy and antigravity exercise alone in reducing kyphotic wind and perfecting posture in postural kyphosis.

Relationship of Anti-gravity exercise on postural kyphosis:

The anti-gravity exercises involve five exercises in which the whole back is used. The body is in the prone position (the face is parallel to the floor), the exercises are performed against the gravitational force. The anti-gravity exercises includes 1) superman, 2) shoulder scapular retraction, 3,4) back extension 5) back strengthening-jeer canine exercise.

Relationship of schroth therapy on postural kyphosis:

The schroth therapy program incorporates corrective therapeutic exercises, special breathing techniques and re-education of the neuromuscular system. The treatment program involves correction of the kyphotic posture with the help of proprioceptive and exteroceptive stimulation in the sagittal plane. The initial external force involved in every schroth exercise is extension. It corrects active trunk muscle forces and learn to raise themselves as far as possible from the slump position. The exercises include a breathing technique, focusing on improving the rib motion and aiming to increase the patients vital capacity; 1) pendulum, 2) supine-elbow against the floor, 3) semi-hanging, 4) sitting forearms against the knees, 5) standing – against elastic bands.

The result of this study demonstrated that four weeks of anti-gravity exercise and schroth therapy showed an improvement in correcting kyphotic posture and reducing the kyphotic curve for the adolescent females. But finally it concluded that the anti-gravity exercise with schroth therapy (experimental group) is more effective than anti-gravity exercise without schroth therapy (control group).

Leonid kalichman et al (2019) A study to evaluate the efficacy of schroth therapy on thoracic curve angle, pain, and self-perceived body image of the back in scheuermanns patients in comparison with the efficacy of classic anti gravitational exercises. Total of 50 young adults participated. The study showed that the schroth therapy had significantly greater improvement than the classic anti gravitation exercise[9].

Tsushima et al (2020) the study was to examine the changes in postural alignment and kyphosis-correlated factors after 6 months of back extensor strengthening exercise in a group of community dwelling older adults. The study concluded that exercises showed best improvement[10].

ZabiholahTarasi et al (2019) The purpose of this study was to investigate the effectiveness of multimodal spine strengthening exercises and posture training in young individuals with functional thoracic hyperkyphosis. 97 young individuals participated in this study. They concluded that the multimodal spine strengthening exercise on postural training had a significant effect on reduction of the thoracic kyphosis angle.

W B Katzman et al (2017) the purpose of the study is to determine in a randomized controlled trial whether spine-strengthening exercise improve kyphotic in community-dwelling adults. Results suggest that spine-strengthening and postural training may be an effective treatment option for adults with hyperkyphosis[11].

V. Limitation

- Study duration is very short.
- Age group between 17-19 were only taken.
- College students were only taken.

VI. Conclusion

The study concludes that the anti-gravity exercises with schroth therapy(experimental group A) is more effective in treating postural kyphosis than anti-gravity exercise alone (control group B) after the 6 weeks of training. Therefore, the Null-hypothesis is rejected.

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