

Compare the Effectiveness of Balance Exercise Program and Resistance Exercise Using TheraBand to Improve Balance Skill Among Children with Down Syndrome

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Abstract:

➤ Background:

This study was conducted to compare the effectiveness of balance exercise and Resistance Exercise using TheraBand to improve Balance among children with down syndrome.

➤ Methods:

A quasi-experimental study was conducted to compare the effectiveness of balance exercise and resistance exercise using TheraBand to improve balance. A total of 28 children with down syndrome were selected through convenience sampling and divided into an equal number of two groups for an intervention period of eight weeks (three times per week): group A was given balance exercises, and group B was given TheraBand exercises. The Pediatric Balance Scale was used to examine the effectiveness of the exercises for both groups in the balance score data collected before and after the intervention.

➤ Results:

There were statistically significant variations in the post-test scores based on the Pediatric Balance Scale between Group A and Group B, according to the results of the Mann- Whitney U Test. Comparing the post-test scores of groups A and B on the pediatric balance scale, the p-value was 0.001, which is less than 0.05 which means it is statistically significant.

➤ Conclusion:

The study's findings indicate that both groups' balance has improved; however, the balance exercise group's dynamic and static components of balance have improved more than the participants of the TheraBand group.

Keywords: Down Syndrome, Balance, Balance Exercise Resistance Exercise Using TheraBand.

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I. INTRODUCTION

➤ Down Syndrome

Down syndrome is a genetic disorder marked by typical craniofacial characteristics, intellectual disability, and developmental delay. Trisomy 21, translocation, or mosaicism are the three chromosomal disorders that cause it (1).

Children with Down syndrome tend to exhibit simian creases in their hands, low muscle tone throughout, a

tendency toward cardiac abnormalities, and distinctive facial traits such as slanted eyes, skin folds over the nasal corners of the eyes, small mouths, and projecting tongues (2). According to Roksana Malak (2013), children with Down syndrome often start walking a year later than typical children, and they can walk after the third year of life (3).

Down syndrome children suffer deficits in strength, balance, eye-hand coordination, and visual motor function, according to numerous studies. Dystonia, poor postural control, motor incoordination, and a delayed capacity to react

to environmental changes are further symptoms of Down syndrome (4). They have deficits in postural control, motor speed, and body balance from a young age (6).

According to the author, children with motor impairments show delayed social functioning, decreased gross motor performance, and a lack of learnt motor abilities (5),(7).

There are three main categories of Down syndrome: Trisomy, Translocation and Mosaic. Ninety-five percent of people with DS have trisomy, the most prevalent kind. Out of all the developmental disabilities, including IDs, Autism, and attention deficit hyperactivity disorders (ADHD), the Intellectual disabilities are the most common in the Down syndrome (8).

➤ *Balance*

The ability to adopt and hold a stable position is known as balance. An individual may be influenced by outside factors even while they are in a balanced or stable posture (10).

Deficits in balance performance have been recognized as significant essential factors which increase the chance of falling and getting injured in young children, adolescents, elderly persons and children (11). Balance control also includes both static conditions, where the ground and the basis of support (the feet) stay the same, and dynamic conditions, where the center of mass and the base of support both move, according to Shumway-Cook and Woollacott (12).

Three systems work together to maintain balance: the vestibular, the sensorimotor, and the visual systems (13). The common functional balance issues in this population have been partially explained by the resulting deficiencies in static standing balance. Furthermore, their health condition often leads them to become less active, which makes their problems with postural control worsen (13).

➤ *Balance in Down Syndrome*

The cortical and central processes responsible for balance and posture control mature during childhood, because in both children and adults with down syndrome have reduced size of the corpus callosum and cerebellum, reduced superior temporal gyrus, and reduced brainstem volume are the causes of hypotonia, impaired movement fluency and axial control, and coordination and body balance issues that impair gross motor skills (15). Deletions in motor development and significant abnormalities in cerebrum size are observed in infants with Down syndrome starting in the sixth month of life (16).

Balance and posture control does not reach until 13–14 years of age (17). Similarly, the capacity of adolescents to regulate their orientation and stabilize their bodies is largely dependent on their vision. Children use unique balancing and postural techniques and are unable to achieve postural performance levels that are comparable to those seen in adults. The reason for this is that due to a difference in maturation

from adults, children are not yet able to use the information on plantar cutaneous sensitivity to better their balance and postural control. This implies that during adolescence, the mechanisms underlying balance/postural control are still developing, which may represent a brief period for considering and effectively utilizing the proprioceptive inputs in sensory integration of balance control (18).

Adolescents' ability to maintain a state of equilibrium is often assessed by altering the visual (eyes opened, eyes closed) and/or plantar (hard floor, foam floor) cutaneous sensitiveness inputs in order to challenge the balance and postural control system in either static or dynamic conditions (19). Lauteslager, Vermeer, and Helders (1998) stated that a disorder in the regulation system of balance or postural control could be responsible for the postural balance deficit shown by children with Down syndrome (20).

➤ *Balance Exercise*

Children with Down syndrome may benefit from physical activity. Physical activity can improve the musculoskeletal, metabolic, cardiovascular, and psychological health in individuals of every age (2). Exercise therapies are an effective strategy to enhance balance and postural control in young people with typical development. These therapies involve exercises that activate the neuromuscular components of postural control and balance that are required to keep the body in balance in the face of external forces, unexpected stimulus, or perturbations.

Balance training can improve postural stability and decrease body sway when standing (21). On a neuromuscular level, balance training may have improved the activation of the quadriceps and hamstring muscles in the knee and ankle joints (gastrocnemius and tibialis anterior) (22),(23). These muscle groups are also primarily involved in resistance exercises, which may have improved treatment outcomes (23).

➤ *Resistant Exercise Using TheraBand*

Thera-Band exercise is a revolutionary replacement for traditional static stretching devices. When used with dynamic contraction-relaxation stretches, it helps improve flexibility and muscle strength (24). TheraBand Resistance Exercise is simple and economical and has safety advantages. There is different level intensity of TheraBand that can be used according to functional ability of individual; it is typically used for rehabilitation purposes (25).

Resistant exercises using the TheraBand for the upper and lower limbs have been shown in several studies to enhance balance and strength. According to Arumugam's research on elastic resistance training, the use of TheraBand training has been found to improvements in shoulder and leg strength (24). Guex et al. (2015) found that the use of a TheraBand can improve muscle endurance, maximal strength, and muscular hypertrophy. Thera bands are a great substitute for other strength training session because they work in multiple regions simultaneously, are low-price, and can be utilized by people of all ages (Iversen, 2017). They can also be applied without any issues anywhere.

In order to improve muscle strength and endurance, TheraBand (resistance rubber) workouts have become very popular recently (Mikesky, 1994). It is commonly recognized that using a TheraBand to conduct Exercises increases the mass and strength of the muscles being worked ((26). Consequently, strengthening exercises using a TheraBand in the body make this a suitable home- based exercise program for enhancing balance and strength in daily activities of individual with balance problem (25)

➤ *Aim & Objectives*

• *Aim of the Study:*

To compare the effectiveness of Balance Exercise Program and Resistance Exercise Using Thera-band to improve balance skill among children with Down syndrome.

• *Objectives:*

- ✓ To assess the balance issue of children with down syndrome
- ✓ To Provide Resistance exercise using TheraBand and Balance exercise for the participants.
- ✓ To reassess Balance skills of children with down syndrome after intervention.
- ✓ To Compare the pre and post test Scores to determine the effectiveness of Resistance exercise using TheraBand and Balance exercise Intervention.

➤ *Hypothesis:*

- Null Hypothesis: Balance Exercise Program and Resistance exercise using TheraBand will not have a significant effect on balance in Children with Down Syndrome.
- Alternate Hypothesis: Balance Exercise Program and Resistance exercise using TheraBand will have a significant effect on balance in Children with Down Syndrome.

➤ *Need of the Study:*

Children with Down syndrome are more common in India, they have a higher chance of falling and find it more difficult to carry out everyday tasks due to their difficulty to balance. Several studies have been conducted using a number of techniques and approaches to enhance balance, such as therapy-based exercises (such as swinging & bouncing for vestibular system adaptation) recreational exercises (such as swimming, hopscotch, wheelbarrow walking etc.) and virtual reality exercises.

There are some studies that have focused on balance exercises and resistance exercises using a Thera Band as interventions (independently) to improve balance. Furthermore, there is a need of study that directly comparing the effectiveness of these both interventions. Therefore, this study aims to focus on balance exercises and resistance exercises using a TheraBand as interventions to improve balance in children with Down syndrome and compare the effectiveness of these two interventions.

II. REVIEW OF LITERATURE

- Christophe Maïano, (2017) did a systematic review study on Do Exercise Interventions Improve Balance for Children and Adolescents with Down Syndrome to evaluate the impact of exercise interventions on balance in children and adolescents with Down syndrome. The interventions primarily consisted of balance exercises, strength training, and motor coordination activities. Findings showed moderate improvements in balance skills, with notable gains in both static and dynamic balance measures. However, the authors noted the variability in study designs, intervention types, and the quality of evidence, which limited the ability to draw definitive conclusions. Despite these limitations, the review suggested that exercise interventions could positively affect balance in this group, though more rigorous studies are necessary to further validate these results and refine intervention strategies.(19)
- Sukriti Gupta -2010 did study on Effect of strength and balance training in children with Down's syndrome: a randomized controlled trial, the researchers found that six weeks of exercise training led to improvements in both balance and strength in children with Down syndrome. Muscle strength in the lower limbs was measured using a handheld dynamometer, while balance was assessed using the balance subscale of the Bruininks-Oseretsky Test of Motor Proficiency (BOTMP). The results showed that exercise training significantly enhanced both strength and balance in the participants.(4)
- Ragab K. Elnaggar, Waleed S. Mahmoud, -2021 reviewed a literature on Effectiveness of a Multi-Modal Exercise Program Incorporating Plyometric and Balance Training in Children with Hemiplegic Cerebral Palsy: A Three-Armed Randomized Clinical Trial, aimed to evaluate the effectiveness of a combined exercise program on balance and motor function in children with hemiplegic cerebral palsy (CP). Participating in the study were 57 children with SHCP (Spastic hemiplegic CP), who were divided into three treatment groups at random: plyometric exercises (n= 19), balance exercises (n = 19), and combined plyometric and balance exercises (n= 19) (PLYO-BAL group). Results showed significant improvements in balance and motor function in both the plyometric and balance exercise group and the balance exercise group, compared to the control group (Plyometric exercise group). The study concluded that multi-modal exercise programs, especially those incorporating plyometric exercises, are effective in improving motor abilities and balance in children with hemiplegic CP, recommending such programs for therapeutic use in this population.(22)
- Kordi- (2016) investigated The effect of strength training based on process approach intervention on balance of children with Developmental Coordination Disorder. Thirty children aged 7–9 years were randomly divided into experimental and control groups. The intervention lasted 12 weeks with 24 sessions using Thera-Band exercises. Balance was assessed with the BOT-2 scale, and muscle strength was measured with a hand-held dynamometer. Findings showed significant gains in

muscle strength and static balance, while no meaningful change was observed in dynamic balance.(39)

III. METHODOLOGY

➤ Research Design:

A quasi-experimental study.

➤ Setting of the Study:

The study was conducted in the Cross-Disability Intervention Center (CDEIC) and College of Occupational Therapy Department, Department of Therapeutics at NIEPMD, Chennai.

➤ Sampling Technique:

- Convenience Sampling

- Sample Size

- (n)=28

➤ Population:

Children who have been diagnosed with Down syndrome.

➤ Duration of Study:

45 minute per session, 3 time a week for a period of 8 weeks.

➤ Variables:

- Dependent Variable:

Balance in Children with Down Syndrome.

- Independent Variable:

Balance Exercise Program & Resistance Exercise Using Thera- band on children with Down syndrome.

➤ Selection Criteria:

- Inclusion Criteria:

- ✓ Children with Downs syndrome having balance problem.
- ✓ Children with age group from 5 to 15 years.
- ✓ Both Gender.

- Exclusion Criteria:

- ✓ Those children who are having physical limitations that prevent participation in exercise, such as contractures.
- ✓ Children who have not ability to understand and follow simple instructions
- ✓ Down syndrome children who are having any medical conditions such as Epilepsy

➤ Scale used

- Pediatric Balance Scale (PBS):

PBS contains 14 items, with a score of 0 to 4, a maximum score of 56 points - in this case, the higher the value, the better the performance.

➤ Intervention Protocol

Exercises will be given for 40-45 minutes thrice in a week for 8 weeks. The participants were divided into two group, group A balance exercise (n=14) and group B TheraBand exercise(n=14). Each session commenced with a 5-10 minutes warm up phase (like sit to stand, Bending, slow jogging and marching in place to increase heart rate gradually) followed by intervention protocol. (22)

➤ Balance Exercise

Balance Exercises are divided into 2 sets, each set exercises will be provided for continuous four weeks.

Table 1 Intervention Protocol-Balance Exercise

SET-1 (1 st ,2 nd ,3 rd & 4 th weeks)	SET-1 (1 st ,2 nd ,3 rd & 4 th weeks)
1) Static balance: children stood with feet shoulder-width apart, arms outstretched, and held for 20- 30seconds with eyes open and closed.	1) Balance beam activities: children traveled along the beam picking up objects from side- to- side; walked forward, sideways, and backward; walked stooped, and picked an object up and threw at a particular goal; went back and forth on an inclined beam.
2) Stand on a line or stick: stand with hands- on-hips (eyes open and closed) on a line for as much time as possible.	2) Partner balance: child and therapist were partners. With hands placed together, children tried to rock forth and back or push their partner off balance, without feet movement.
3) Balance board activities: children tried to maintain balance for 30-seconds without letting the board's edges touching the ground; held a ball and tried to balance a bean bag on the head.	3) Switching from one knee to the other in position: children placed the right knee on the mat with the left leg straight back, squat, and then tried to switch the left forward and kneel on that knee and draw the right leg backward.
4) Walking between two parallel lines: children attempted to walk 10-steps forth and back without the lines being crossed; walk while balancing a bean bag on the head, walk while bouncing a ball between lines, with the line width progressively reduced.	

➤ Resistance Exercise Using Thera-Band (Modified Protocol of Strength Training, Hasan Kordi,2016), (38,39)

The resistance exercise using TheraBand was created using the moderate load training program that the American Academy of Pediatrics recommends. Strengthening the lower

limb muscles involved in both static and dynamic balance, such as the leg abductors and adductors, knee flexors and extensors, abdominals, back extensors, and plantar flexors, was the main goal of the resistance exercise using TheraBand (38).

During the intervention program total 4 primary TheraBand exercises were used. The duration of intervention was 40-45min twice in a week for total 8 weeks. TheraBand was used in the consideration of body weight in supine or

prone positions. Participants performed 2 sets of exercise with 10 repetitions on all primary exercises 1st week and during the 8th week training period they progressed from 2 to 3 sets and from 10 to 15 repetitions on the exercise.

Table 2 Intervention Protocol - Resistance Exercise Using Thera-Band

SI. No.	1st Week	2nd Week	3rd Week	4th Week	5th Week	6th Week	7th Week	8th Week
1.	2*10	3*10	3*10	3*12	3*12	3*10	3*15	3*15
2.	2*10	3*10	3*10	3*12	3*12	3*10	3*15	3*15
3.	2*10	3*10	3*10	3*12	3*12	3*10	3*15	3*15
4.	2*10	3*10	3*10	3*12	3*12	3*10	3*15	3*15

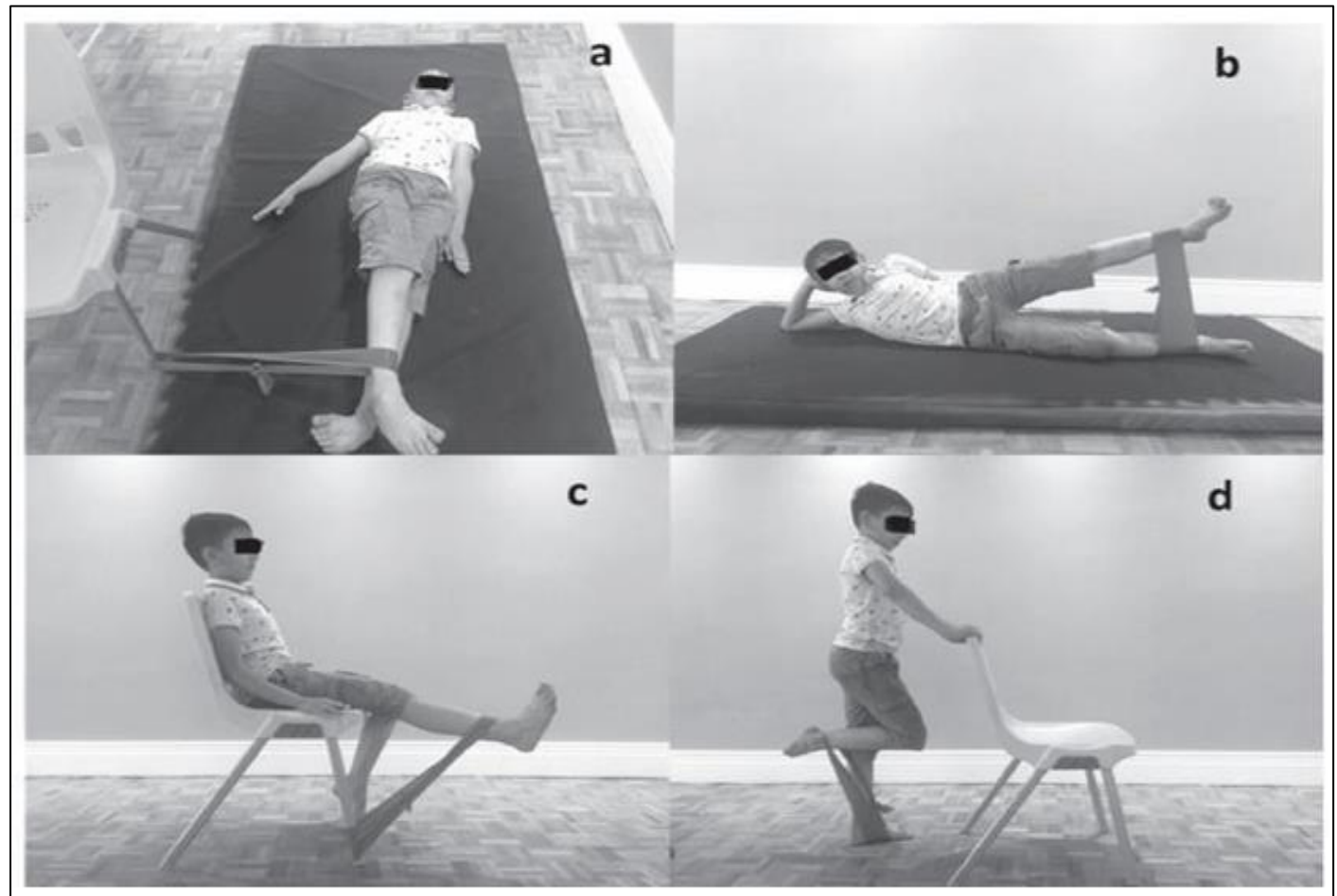


Fig 1 Plan of Resistance Exercise Using Thera-Band

- Supine position unilateral hip adduction (a)
- Side lying hip abduction (b)
- Seated unilateral knee extension (c)
- Standing position unilateral knee flexion (d)

➤ *Procedure:*

A Convenience sampling was used for the study. The study was conducted in College of Occupational Therapy, Department of therapeutics; Cross Disability Early Intervention Center (CDEIC) at National Institute for Empowerment of Persons with multiple Disabilities, Chennai. The parents of the children were explained about the purpose of the study. Then the written consent was obtained from the parent of the participants prior to the study. It was assured to them that all the information would be kept

confidential. 32 children were selected for the study; 4 children did not participate in the study because one child was not fulfilling the inclusion criteria of the study and 3 children's parents were not willing to participate. Thus, the Pediatric balance Scale was used to evaluate 28 children with Down syndrome who met the inclusion criteria of the study and they were divided into two group, group A = balance exercise, group B= TheraBand exercise. The participants were given 8 weeks of intervention thrice in a week, each session was 40-45 minutes for each child. Then the using Pediatric balance scale reassessment was done for all 28 participants. The collected data was analysed and estimated using the SPSS 27 version software. The results were obtained.

IV. RESULTS

➤ Age and Gender Distribution

Table 3 The Average Age for Each Group is Approximately 10.4 Years for Group A and 9.8 Years for Group B.

Demographic Variables		Group				Total	
		Group A		Group B			
		N	%	N	%	N	%
Age	< 10	5	35.7%	6	42.9%	11	39.3%
	> 10	9	64.3%	8	57.1%	17	60.7%
	Mean ± SD	10.429 ± 3.2037		9.807 ± 3.2233		10.118 ± 3.1693	
	Min - Max	5 - 15		5 - 15		5 - 15	
Gender	Male	7	50.0%	8	57.1%	15	53.6%
	Female	7	50.0%	6	42.9%	13	46.4%

Table 4 Mann-Whitney U - Test was Performed to Compare the Group A and Group B Regarding Pre Test (Components) Scoring in Down Syndrome Children at 5% Level of Significance was Observed

Pre-Test	Group	N	Mean	Std. Deviation	Z – Value (P - Value)
Sitting to Standing	Group A	14	2.71	.469	-0.507 (0.612)
	Group B	14	2.57	.646	
Standing to Sitting	Group A	14	2.71	.726	-0.420 (0.674)
	Group B	14	2.57	.852	
Transfers	Group A	14	2.50	.519	-0.891 (0.373)
	Group B	14	2.29	.825	
Standing Unsupported	Group A	14	2.93	.267	-1.809 (0.070)
	Group B	14	2.64	.497	
Sitting Unsupported	Group A	14	2.50	.519	-1.297 (0.195)
	Group B	14	2.14	.770	
standing with eye close	Group A	14	1.29	.726	-0.798 (0.425)
	Group B	14	1.07	.730	
Standing with feet Together	Group A	14	1.43	.646	-0.026 (0.980)
	Group B	14	1.36	.842	
standing with one foot in front	Group A	14	.36	.497	-1.286 (0.199)
	Group B	14	.14	.363	
Standing on one Foot	Group A	14	1.07	.267	-0.982 (0.326)
	Group B	14	.93	.475	
Turning 360 degrees	Group A	14	1.71	.469	-1.140 (0.254)
	Group B	14	1.50	.519	
Turning to look behind	Group A	14	1.29	.469	-0.953 (0.341)
	Group B	14	1.07	.616	
Retrieving Object from Floor	Group A	14	2.00	.784	-0.587 (0.557)
	Group B	14	1.79	.893	
Placing alternate foot on stool	Group A	14	1.21	.699	-0.054 (0.957)
	Group B	14	1.14	.663	
Reaching forward with outstretched arm	Group A	14	1.29	.825	-0.910 (0.363)
	Group B	14	1.00	.679	

Table 5 Mann Whitney U - Test was Performed to Compare the Group A and Group B Regarding Post Test (Components) Scoring in Down Syndrome Children at 5% Level of Significance was Observed

Post Test	Group	N	Mean	Std. Deviation	Z – Value (P - Value)
Sitting to Standing	Group A	14	3.93	.267	-2.186 (0.029) *
	Group B	14	3.43	.756	
Standing to Sitting	Group A	14	3.86	.535	-2.865 (0.004) *
	Group B	14	3.14	.770	
Transfers	Group A	14	3.86	.535	-3.761 (0.001) *
	Group B	14	2.64	.929	
Standing Unsupported	Group A	14	3.86	.535	-3.416 (0.001) *
	Group B	14	3.00	.679	

Sitting Unsupported	Group A	14	3.79	.579	-4.041 (0.001)*
	Group B	14	2.64	.633	
standing with eye close	Group A	14	2.29	.825	-3.427 (0.001)*
	Group B	14	1.14	.663	
Standing with feet Together	Group A	14	2.57	.756	-2.710 (0.007)*
	Group B	14	1.57	.938	
standing with one foot in front	Group A	14	1.64	.633	-4.067 (0.001)*
	Group B	14	.29	.469	
Standing on one Foot	Group A	14	2.00	.555	-3.700 (0.001)*
	Group B	14	1.07	.475	
Turning 360 degrees	Group A	14	2.50	.650	-3.203 (0.001)*
	Group B	14	1.64	.497	
Turning to look behind	Group A	14	2.36	.497	-3.431 (0.001)*
	Group B	14	1.50	.519	
Retrieving Object from Floor	Group A	14	2.36	.497	-1.654 (0.098)
	Group B	14	1.86	.864	
Placing alternate foot on stool	Group A	14	2.29	.611	-3.049 (0.002)*
	Group B	14	1.36	.745	
Reaching forward with outstretched arm	Group A	14	1.71	.611	-2.129 (0.033)*
	Group B	14	1.14	.663	

V. DISCUSSION

This study aimed to compare the effectiveness of a Balance Exercise Program and a Resistance Exercise Program using TheraBand in improving balance skills in children with Down syndrome.

In Table 3. Group A and B demographic statistics are shown. Both groups' age distributions are comparable, with the majority of children (64.3% in Group A and 57.1% in Group B) being older than ten years. For Group A, the average age is almost 10.4 years, whereas for Group B, it is 9.8 years.

Table 4. shows the comparison of Group A and Group B's pre-test results for several pediatric balance scale (PBS) components in children with Down syndrome. Every component, including "Standing Unsupported," "Sitting to Standing," and "Turning 360 degrees," is examined for statistical variations. There are not significant distinctions between Group A and Group B, as indicated by the majority of components having p-values more than 0.05, such as "Sitting to Standing" ($p = 0.612$) and "Standing on One Foot" ($p = 0.326$). However, the p-value for the "Standing Unsupported" component was 0.070, which is near the significance level but not quite significant at the 5% level. Overall, the data indicates that the two groups' baseline performance across activities is similar, with the majority of pre-test components showing no significant variation.

Table 5. presents a comparison of the post-test findings for several PBS components between Groups A and B of children with Down syndrome. Testing includes "Sitting to Standing," "Transfers," and "Standing Unsupported." Nearly all of the components show statistically significant differences between the two groups (p -values < 0.05). Group A outperforms Group B in the following significant differences: "Sitting to Standing" ($p = 0.029$), "Transfers" ($p = 0.001$), and "Standing on One Foot" ($p = 0.001$).

Group A, showed significant improvement in postural control, particularly in static and dynamic balance tasks such as standing unsupported and standing with one foot in front, which could be due to the effect of balance exercise and age-related balance skill development pattern. These results align with existing literature, emphasizing the role of task-specific neuromuscular training in enhancing postural stability and body awareness(39). Studies such as Maïano et al. (2019) have highlighted the efficacy of balance training in improving static and dynamic balance through neuromuscular activation and postural control mechanisms(39).

In contrast, Group B, which underwent resistance exercises using a TheraBand, also exhibited improvements but to a lesser extent than Group A in several components. This outcome partially reflects findings by Yu et al. (2013), who noted that resistance exercises enhance functional mobility and balance in older adults(25).

Resistance training primarily enhances muscle strength, which indirectly supports balance improvement, as evidenced by the work of Guex et al. (2015), who reported significant gains in muscular endurance and functional mobility (40).

However, the specificity principle of training explains why balance exercises had superior outcomes; they directly target neuromotor components responsible for maintaining equilibrium against external perturbations (Shumway-Cook & Woollacott, 2023)(12). Statistical analysis revealed a significant difference in post-test scores, favoring the balance exercise group. This suggests that neuromuscular activation through balance-specific training has a superior impact on improving both static and dynamic balance compared to resistance exercises, as supported by Woollacott et al. (2005)(23).

Furthermore, the age-related delays in sensory integration and proprioceptive feedback in children with Down syndrome, as noted by Viel et al. (2009), may limit the

effectiveness of resistance exercises, which primarily rely on muscle strength development(18). Balance exercises, on the other hand, actively stimulate and integrate sensory input from the visual, vestibular, and proprioceptive systems, leading to more pronounced improvements in functional balance (Ayres & Robbins, 2005)(14)

VI. CONCLUSION

This study aimed to compare the effectiveness of Balance Exercise and Resistance Exercise using TheraBand in improve balance skills among children with Down syndrome. The results revealed that both interventions led to significant improvements in balance, but the Balance Exercise Program showed superior outcomes in both static and dynamic balance tasks. This can be attributed to the targeted activation of neuromuscular systems and sensory integration involved in balance-specific training. While Resistance Exercises improved muscle strength, their impact on balance was less pronounced. The findings underscore the importance of task-specific training for enhancing postural stability and reducing fall risk in children with Down syndrome. Incorporating balance-focused exercises into rehabilitation programs can significantly improve functional mobility and quality of life.

VII. LIMITATION

- The intervention period was Shorter

RECOMMENDATIONS

- Further research can be conduct with larger sample sizes and longer intervention durations to explore the long-term effects of these programs.
- This study can be done with other condition with balance problem

➤ Declaration by Authors

- Ethical Approval: Approved

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