



Development of a Physical Therapy–Based Exercise Program for Adults with Down Syndrome

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Introduction

In adults with Down syndrome, the combination of low physical activity and fitness levels with the high prevalence of musculoskeletal co-morbidities stresses the need for specialized exercise programs.





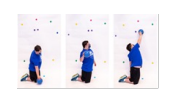




Aim

We aimed to create a physical therapy-based exercise program that addresses the common impairments, functional limitations, and participation restrictions in people with Down syndrome (Ds). Using a systems review basis, we developed a PT-based exercise approach.

Methods

- We performed a literature search starting with the World Health Organization “Body Structure and Function” of the ICF model to support a physical therapy-based “systems review”, with an overview of “Impairments” that impact “Activities” for individuals with Ds.
- A “systems review” is the framework that physical therapists use to examine their patients.
 - It organizes impairments in cardiovascular, pulmonary, integumentary, musculoskeletal, and neuromuscular systems, as well as the patient’s cognitive, language, and learning abilities.
- We searched the following databases between December 2021 and December 2022: Pubmed, Embase, and CINAHL.
 - We used wide search terms referring to these systems combined with “Down syndrome” or “Trisomy 21”.
 - We used review papers that resulted from this search to find original papers and used reference lists of all papers to find other applicable work; however, the literature was scarce on many of the systems and/or impairment for adults with Ds.

The Mann Method PT-Based Exercise Program

Foundational Exercises: multi-joint movements that target abdominal activation, gluteal activation, hip stabilization, neuromuscular sequencing	Hip Strengthening Exercises: specific exercises that target gluteal and lateral hip musculature to improve hip strength and stability	Visual-Vestibular Coordination Exercises: balance and body coordination exercises that target the visual-vestibular systems and integrate stabilization challenges to improve balance	Cardiovascular Endurance: sequencing exercises and progressions that enhance cardiovascular endurance over the course of the session	Stretches: targeted positions and movements that address muscle tightness, postural asymmetry, postural musculature, especially calves, hamstrings, hip flexors, and lumbar extensors
Squats 	Quadruped with reach 	Lateral Tilts 	Squat Jump 	Overhead Reaches 
Push Ups 	Standing-Marches 	Anterior/Posterior Tilts 	Side Jumps 	Single Knee to Chest 
Planks 	Tall Kneeling Rainbows - PNF D1 Flexion 	Rotational Ball Passes/Taps 	Diamond Jumps 	Hurdler Stretch 
Bridges 	Half Kneeling (Split Stance Surrenders) 	Over-Under Passes/Taps 	Squat and Reach 	Calf Stretch - with strap 

Results

- This resulted in a detailed exercise program addressing Ds-specific impairments in the Body Structure and Function Domain of the ICF model, in addition to targeting strength, endurance, and balance.
- The Mann Method™ PT Principles include a categorization of PT-based exercises in the areas of:
 - Foundational Exercises
 - Hip Strengthening Exercises
 - Visual-Vestibular Coordination Exercises
 - Cardiovascular Endurance
 - Stretches

Discussion

We used a systems-based physical therapy approach to design an evidence-based exercise program for individuals with Down syndrome (Ds).

- This development strategy enhances the ability of the exercise program to improve fitness, as well as promote successful motor planning and sequencing of movement patterns, increase functional independence, and improve participation.
- The mode of delivery explicitly focuses on the learning strengths of adults with Ds, facilitating participant success, confidence, and experience of mastery.

