Down Syndrome

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ETIOLOGY

Down syndrome (DS) is a congenital genetic condition that results from an extra full or partial chromosome 21, due to failure of that chromosome to separate during the formation of the egg or sperm. Most individuals with Down syndrome have Trisomy 21, but two other forms of DS are mosaicism and translocation. Additional genetic material causes disruption to growth and development and causes cognitive, physical, and developmental characteristics. At present, there is no definitive known cause for DS (Genetic and Rare Diseases Information Center, 2021; Mayo Clinic, 2018).

GENERAL CHARACTERISTICS

Down syndrome may impact individuals in a variety of ways, including but not limited to: intellectual disability, hearing loss, congenital heart defects, visual impairment, speech and language disorders, atlantoaxial instability, and decreased resting metabolic rate. Common physical characteristics of people with DS include poor muscle tone, lax ligaments with poor joint stability, short stature, small hands and feet, small ears, short neck, flattened face including the bridge of the nose, and almond shaped eyes. Additionally, individuals with DS are at a greater risk for obesity, leukemia, dementia, celiac disease, gastric reflux disorder, gastrointestinal disorders, immune disorders, and obstructive sleep apnea (Allison et al., 1995; Centers for Disease Control and Prevention, 2021; Include Project, 2018).

VISUAL IMPAIRMENT AND DOWN SYNDROME

Individuals with Down syndrome have a variety of visual impairments including, but not limited to: refractive errors such as myopia, hyperopia, and astigmatism; oculomotor functioning difficulties like nystagmus, strabismus, esotropia, and exotropia; and congenital conditions like glaucoma and cataracts. Refractive error is the most common cause of visual impairment, resulting in myopia (nearsightedness), hyperopia (farsightedness), and astigmatism (inability for the eye to focus sharply). Some individuals with DS have eyes that are misaligned (strabismus), eyes that drift toward the nose (esotropia), or eyes that drift outward (exotropia). Nystagmus, an involuntary back and forth movement of the eye, infant glaucoma, and congenital cataracts are also common for individuals with Down syndrome. Glaucoma may cause light sensitivity, blurry vision, and eye pain, while cataracts may result in decreased visual acuity. Individuals with Down syndrome may also experience blepharitis (inflammation of the eyelids) or keratoconus (cone shaped distortion of the front layer of the eye), as well as excessive tears or watering of the eye (American Association for Pediatric Ophthalmology and Strabismus, 2020; Henderer, 2019).

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DIFFERENTIATED INSTRUCTION IN A UNIVERSALLY DESIGNED PHYSICAL EDUCATION LESSON

- Provide a range of distances to a variety of sized targets for throwing and kicking activities.
- Offer varying colors of equipment that contrast to the background or playing surface color.
- Add sounds such as a doorbell, kitchen timer, buzzer, or music behind targets.
- Provide a wide range of sizes, colors, and weights of bats, balls, rackets, sticks, and other manipulatives.
- Give priority seating during demonstrations and explanations. Priority seating does not always mean sitting up front; it can be any distance or location that allows the individual to absorb the lesson best.
- Use large print, sans serif font (such as Arial 18pt or larger) without cursive, on all signs, quizzes, and task cards.
- Provide an iPad with a video demonstration on repeat loop, and station it where all students can review what the demonstration looks like or zoom-in, if they need an up-close view.
- Utilize a 3D model, such as an artist's mannikin or doll, to provide tactile demonstrate of body positions in motion.
- Suspend brightly colored balls that have an auditory component from basketball backboard or volleyball standard for those who need a striking task slowed down.
- Utilize a white board that has listed the key components of what will happen during the class written in large print letters.
- Utilize small groups for instruction and game play.
- Create a tactile map, or raised representation of the space, using waxy pieces of string (Wikki Stix) or pipe cleaners glued to a clipboard for anyone who would like a closer look or a tactile version of a game
- Use words in sign language during teaching for emphasis and access.
- Have all students work in pairs for support and socialization.
- Use concise but descriptive wording as you demonstrate skills and activities,
- Provide a safe place to put communication devices when two hands are needed.
- When assessing, consider those who need alternative assessment such as pictures, videos, detailed description, or more specific breakdown of skills.
- Provide any student who needs it with a picture agenda of the class or activity or post one for the whole class.
- Give all students feedback that reflects positive behavior support.
- Offer the opportunity to sit or stand for some skills when it is safe to do so.
- Provide floor tape arrows, in contrasting colors, for any student who needs additional visual cues.
- Pre-teach the skills during an open-gym time for students who want or need additional instruction.
- Provide additional task meaningfulness through task cards and posters. Visual depictions should use large photos of actual children in the class performing the skills, as well as large photos of the activities and assessment.

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- Provide additional 'checks for understanding' for all by asking yes/no questions, having students say or use sign language cue words when requested, or having students demonstrate before they are assessed.
- Use floor tape, dome cones, or other soft barriers, to designate an 'area of play' for students who need that extra information.
- Provide paraeducators and classroom teachers with specific actions and words they should use to support the students during physical education class.
- Utilize peer buddies for anyone who might need additional demonstrations or motivation to stay on task.
- Allow students to select their speed of movements.
- Provide a second demonstration to all who would like that and include more detailed breakdown of the task.
- When assessing using worksheets, provide means of expression such as pointing to pictures, using a communication device, answering yes/no questions, sending home worksheets to be transcribed in text to talk, using a scribe, reading out loud, and using braille when requested.
- Have equipment accommodations available for anyone to use, such as: larger ball size; tee for putting the ball on; taping the ball to a string and suspend string/ball on basketball net; using ball with bells or rattles in them; providing a chair for those who need to sit.

CONTRAINDICATIONS

- For students with atlantoaxial instability, restrict head contact activities such as tumbling, heading a ball in soccer, the butterfly stroke, and diving into a pool.
- For students with low immunity, clean equipment regularly, have the student use their own basket of equipment, and avoid hand holding.
- For students with gastrointestinal disorders, do not give food or drink, unless provided by the family.
- For students with congenital heart conditions, provide submaximal exercise testing that includes measures of blood pressure, heart rate, perceived exertion, and instructor observation of fatigue. Provide family and physician with exercise progression information for feedback.

SPECIFIC RESOURCES

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