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## Module 7- Physical Disabilities and AT

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## **Course Outline**

- Learning Objectives / Outcomes
- Introduction
  - Types of physical disabilities
  - Effects of physical disabilities
  - Characteristics of physical disability
  - Causes of physical disabilities
  - Educational and social difficulties of physical disabilities
  - Educational difficulties of physical disabilities
  - Evaluating and assessing persons with physical disabilities
  - Assistive Technology for Physical Disability
  - Understand how persons with physical disabilities can be included in general education curricula and communities.
- Learning activities/ Instructional strategies
- Assessment Methods
- Resources and additional materials

## **Learning Objectives / Outcomes**

- Define and understand the prevalence of physical disabilities.
- Causes of physical disability and classification of types of movement disabilities
- How to evaluate and assess persons with physical disabilities
- Assistive technologies available to support communication and mobility.
- Understand how persons with physical disabilities can be included in general education curricula and communities.

## **Introduction**

Traditional definitions of physical disability refer to long-term or permanent malfunctions of the motor system or other organs that result in impaired movement. Physical disability can affect a person's motor, cognitive, and emotional functions since they are all closely interwoven. Physical limitations may impact self-esteem and self-confidence.

In general, it is difficult to identify who belongs to the category of physically disabled individuals since physical disabilities are conceptualized in diverse ways by different scientific fields and individuals.

According to the definition of physical disability given by the medical profession, physical disability is the "loss of a body part" or "absence of a characteristic bodily function" responsible for movement, sensation, coordination, or speech. This, of course, does not include intellectual disabilities of any kind. According to this definition, "disabled" describes individuals who do not possess or cannot perform a specific skill or ability.

From the educational viewpoint, physical disabilities may refer to children, youths, and adults who have difficulties learning, socializing, communicating verbally, or demonstrating psychomotor abilities, making participation in school and social life more difficult. You can see how the extent of their disability affects their involvement in school-related activities and how that impacts their participation in other social activities.

In addition, there is a perspective known as socio-critical, which describes this group as "anyone whose physical attributes are perceived as deviating from culturally acceptable norms. In this sense, the built environment and society are designed for those who meet the socially constructed biological bar. At the same

time, those who do not do so are labelled as physically disabled. Rather than individual characteristics, the setting determines who is disabled from participating in society.

## **Types of physical disabilities**

Several orthopaedic, motor, neuromuscular, and cerebral movement disorders may cause physical disability. Amongst these are multiple sclerosis, muscular dystrophy, and cerebral palsy.

They usually fall into one of two categories:

1. Hereditary/congenital - when a person was born with a physical disability or due to inherited genetic problems - he had it at birth.
2. Acquired - an acquired physical disability may be due to an accident, infection, or disease or as a side effect of a medical condition.

Let us now examine the most common conditions:

**Cerebral palsy** encompasses the broadest range of physical impairments. Prenatal, perinatal, and postnatal disorders, as well as brain traumas, infections, and degenerative diseases, are the most common causes of cerebral palsy. Cerebral palsy comes in various forms, depending on which portion of the brain is affected. In one of the following sessions of this chapter, we will take a closer look at this circumstance.

**Spinal cord palsy:** many conditions can cause it, but the most prevalent cause currently is spinal cord damage from automobile accidents and injuries sustained in so-called adrenalin sports. The degree of spinal cord injury, as well as the location of the damage, affects one's health and motor skills. The wounded person's health state becomes more serious the closer they get to the cervical

spinal cord. Chronic injury to the lumbar or sacral parts of the spinal cord may result in paraparesis or paraplegia of the lower limbs, as well as a loss of sensation in the lower limbs and damage to the upper section of the cervical spinal cord.

**Spina bifida** is a congenital disability characterized by injury to the spinal cord or spinal canal. The improper closure of the spinal canal causes this disease. Neurosurgery is performed on individuals while they are noticeably young. Paresis or plegia of the lower limbs and palsy of the constrictor muscles are common symptoms of more severe forms of spina bifida.

**Poliomyelitis** is a viral infection that causes muscle weakness. The virus that causes this condition affects the spinal cord of children aged 2 to 10 years old.

**Muscular dystrophy** is a degenerative disease characterized by muscle tissue loss and muscle strength reduction. It has a genetic foundation. A person's motor abilities steadily decrease over time. Medication and exercise can help delay the progression, but some kinds of Muscular Dystrophy can ultimately damage the essential functions of the lungs and heart muscles.

**Osteogenesis imperfecta** is another intrinsic irregularity that prompts cracks in bones.

**Postural imperfections** are gained disfigurements of body pose. The most known are scoliosis and kyphosis. These imperfections of body stances are related to unusual vertebral arches.

**Chronic diseases** can also affect a person's physical functioning and movement, such as Rheumatic disorders affecting joints and connective tissue.

## **Effects of physical disabilities**

Physical disabilities can affect persons with limited mobility in general. These effects can be summarised into three groups: waning strength, poor stamina, and limited movement.

## **Characteristics of physical disability**

Many characteristics define the physical disabilities:

- The presence of a defect in all the organs responsible for this disability, whether it is nerve, bone, or muscle.
- Loss of the ability to perform the body's functions and related to its bodily life activities.
- Need medical, social, and professional intervention.

## **Causes of physical disabilities**

When it comes to the causes of physical disabilities, they can be classified into two categories: prenatal and postnatal.

- Prenatal:
  - Genetic or inherited defect from the background family history
  - Being struck or falling from a high place or stairs
  - Accidents during pregnancy
  - Alcohol abuse and smoking
  - Malnutrition
  - Lack of oxygen during childbirth
  - The use of medical devices, such as forceps and suction, disrupt brain cells.
- Postnatal:

- Infections that affect the child at the beginning of the stage of development, such as inflammation of the brain and spinal cord
- Eating toxic or chemical substances
- Exposure to shocks, falls, and accidents.

### **Educational and social difficulties of physical disabilities**

The impact of physical disabilities on children and students in education can be presented in many ways, such as:

- Struggle with eating and dressing habits
- Urination problems and bladder and bowel control
- Social withdrawal, lack of social interaction, withdrawal, and self-defeating thoughts
- They suffer from society's negative view of their inferiority.
- Showing signs of dependency, shyness, and isolation
- Presenting difficulties in language, senses, and learning

### **Educational difficulties of physical disabilities**

There is no vital direct connection between the level of actual disabilities and the powerlessness to adapt to the school educational plan, aside from the components, including active work. Understudies with extreme absolute inability might have insignificant uncommon instructive necessities, while those with negligible actual incapacity might have genuine adapting needs. Real access can be a significant worry for understudies with actual disabilities, such as those who use wheelchairs, supports, bolsters, rollators, sticks, or prostheses, or individuals who may experience issues moving around school grounds.

There are common areas of difficulty that can be summarised as follows:

- Attention, distraction, difficulty concentrating, remembering, recalling, memorizing, and forgetting.
- Decreased coordination of body movements
- Learning difficulties as students do not learn easily and do not learn quickly.
- Students with physical disabilities need unique educational curricula and strategies that consider their disabilities so that they depend on simplification and moving from easy to difficult and from simple to complex.
- Students rely on modelling, indoctrination, shaping, and sequencing behaviour, providing positive reinforcement and positive and biological feedback.
- Students will require unique educational curricula and strategies based on simplification and moving from easy to difficult and from simple to complex.
- They always rely on modelling, indoctrination, shaping and sequencing behaviour, and providing positive reinforcement.
- Students in need of positive and biological feedback
- Students with physical disabilities are in the segmentation of the skills and tasks required of them.

## **Evaluating and assessing persons with physical disabilities**

Evaluating and assessing persons with physical disabilities involves a multidimensional approach that focuses on understanding their abilities, needs, and the impact of their disability on daily functioning. This process is crucial for identifying appropriate interventions, accommodations, and support strategies. Below are key steps and considerations in this process:



## **1. Initial Assessment**

### **1.1 Medical History Review**

Obtain detailed medical information to understand the nature and extent of the disability.

Review any medical diagnoses, surgeries, and ongoing treatments.

### **1.2 Functional Assessment**

Evaluate the individual's motor skills, mobility, strength, endurance, and coordination.

Determine how the physical disability affects daily activities, including self-care, mobility, and communication.

## **2. Interdisciplinary Approach**

### **2.1 Collaboration with Healthcare Professionals**

Work with doctors, physical therapists, occupational therapists, and other specialists.

Use their insights to understand the individual's physical capabilities and limitations comprehensively.

### **2.2 Family and Caregiver Interviews**

Gather information about the individual's daily routines, challenges, and support systems.

Understand the family's perspective on the individual's needs and abilities.

## **3. Holistic Evaluation**

### **3.1 Cognitive and Emotional Assessment**

Assess cognitive functioning, as it can impact learning and adaptation strategies. Evaluate emotional well-being, including coping strategies and psychological resilience.

### **3.2 Social and Environmental Assessment**

Understand the individual's social interactions and support networks.

Evaluate the accessibility and suitability of their living and learning environments.

#### **4. Use of Standardized Assessment Tools**

##### **4.1 Selection of Appropriate Tools**

Choose standardized assessment tools relevant to the type of disability and age of the individual.

Examples include the Gross Motor Function Measure for motor skills or the Barthel Index for daily living activities.

##### **4.2 Adapting Tools When Necessary**

Modify assessment tools to accommodate the individual's specific needs or limitations.

#### **5. Ongoing Assessment and Monitoring**

##### **5.1 Regular Follow-Ups**

Continuously monitor the individual's progress and changing needs.

Adjust care plans and interventions as needed.

##### **5.2 Goal Setting and Evaluation**

Establish short-term and long-term goals based on the assessment.

Periodically evaluate these goals to track the progress and effectiveness of interventions.

#### **6. Documentation and Reporting**

##### **6.1 Detailed Record Keeping**

Maintain thorough records of assessments, interventions, and progress.

Ensure documentation is accurate, up-to-date, and confidential.

##### **6.2 Communication with Stakeholders**

Share relevant information with educators, therapists, caregivers, and the individual (as appropriate) to ensure a coordinated approach.

## **7. Incorporating Feedback**

### **7.1 From the Individual**

Consider the person's perceptions of their abilities and challenges.

Involve them in decision-making processes related to their care and support.

### **7.2 From the Support Network**

Consider feedback from family, educators, and caregivers to tailor support strategies effectively.

Assessment of individuals with physical disabilities should be an ongoing, dynamic process that adapts to the evolving needs of the individual. It requires a collaborative, respectful approach that values the perspectives of the individual and their support network, ensuring interventions are person-centred and effective.

## **Assistive Technology for Physical Disability**

People with physical disabilities struggle every day to perform some tasks that the rest of the world finds easy and require no second thoughts. Assistive technologies are those arrangements and devices that intend to make life more accessible to those people by removing barriers and enhancing their physical and mental capabilities. They significantly improve their quality of life, optimism, and mood.

Below, we will show some examples of assistive technology devices designed to help people with physical disabilities of any kind:

- **Assistive technology for daily living activities:**

Smart Home assistants like Google Home or Amazon Echo help people with limited use of their arms and hands to use their computer or phone easily. These

devices can perform routine tasks like making an appointment, playing music, telling you the weather, making movie recommendations, and responding to essential questions expressed aloud by the user about events, persons, or any data available on the Internet.

- **Environmental Control Devices:**

It is easy nowadays for people with physical disabilities to use some alternative input method to remotely control electronic appliances at home like lights, heaters, A/C, or, for example, electronically controlled doors.

- **Personal Emergency Response System:**

These devices can help a person with physical disabilities. Usually, these devices come as a wearable bracelet, pendant, or pin attached to clothes. The person in need can alert a selected caregiver in any emergency by pressing a button on the device.

- **Robots:**

It can be one of the fantastic assistive technology tools, as they can be used for home care and maintenance, something as standard today as cleaning. They help keep the house floors clean and require almost no attention from the user, as they are practically autonomous from the moment they are installed at home.

- **Adaptive tools**

Tools like utensils, keyboards, or switches can allow people with physical disabilities who have limited motor skills to eat, write, cook, dress, groom, play games, or use their smartphones, tablets, and computers.

Some of these are specialized handles and grips. These devices extend the reach and allow these people to hold objects like spoons, pencils, or toothbrushes. There are, for example, handcuff clips or writing supports.

- **Adaptive switches**

Devices that enable activating and operating any switch-enabled device, like smartphones, tablets, or computers. These switches can be activated by pressing them with body parts such as the hand, head, forehead, chin, and legs... etc.

- **Mouth stick**

Assistive technology devices can be placed in the mouth of a person with a physical disability to manipulate a trackball mouse or even type in a keyboard or a touch screen.

- **Head wands**

Allow the same things as mouth sticks by strapping the bar to the head wand.

- **Automatic page-turners or book holders**

Help people to read.

- **Sip-and-puff systems**

Devices for people with paralysis or fine motor skill disabilities to help with operating computers, mobile devices, or even wheelchairs with their mouths. The sip-and-puff system behaves like a joystick that is moved in any direction with the mouth. They can even interpret the breath of the user like on-off operations. The on-screen keyboard allows the user to type anything using the same movements.

### - **Adaptive keyboard**

For people turning off dependable muscle control in the hands to do accuracy developments. These keyboards have brought regions up in the middle of the keys to permit the client to accurately put the hands on them and track down the correct key by sliding the fingers toward it instead of striking it. Another choice is to utilize keyboard overlays over a typical one; the utilization and results are fundamentally similar. Particular programming to work with word completion may accompany this versatile console, allowing the client to utilize fewer keystrokes to type their messages.

### ○ **Eye Trackers**

Frameworks that follow the development of the eyes and permit people with inabilities that limit discourse to explore through their PC or mobile phones with just eye movement. Unique programming allows the individual to type by gazing at control symbols or information on a screen and may incorporate word-culmination innovation to accelerate the interaction. People with physical disabilities would then be able to produce discourse by composing the message or looking over a determination of expressions.

### ○ **Speech generation and voice recognition devices**

It is helpful for those individuals with actual incapacities who cannot enter information onto the PCs with consoles or contact screens. Some specific voice transcription programming is utilized for ordering information or directions to the PC, and this permits individuals with various capacities to use their PC or mobile phones productively by just conversing with them. Speech-generating devices can allow people with physical disabilities to communicate aloud using an electronic device to create speech from text, icons, or images.

- **Mobility aids**

people with physical disabilities might require assistance with mobility. Gadgets planned to assist with mobility incorporate wheelchairs, walkers, bikes, bolsters, sticks, and orthotic devices. Contingent upon the seriousness and kind of disability, an alternate device might be utilized by a person. For instance, a person with quadriplegia might use an electric wheelchair constrained by a versatile switch, a mouth stick, or a head wand, and a harmed veteran might use a prosthetic gadget.

- **Other communication devices**

Other communication devices like hearing aids to help people hear or hear more clearly, closed captioning to allow people with hearing impairment to watch movies, television programs, and other digital media, screen readers or screen enlargement applications to help people with mobility and sensory impairments to use computers and mobile devices.

## **Understand how persons with physical disabilities can be included in general education curricula and communities.**

Incorporating individuals with physical disabilities into general education curricula and communities requires thoughtful planning, adaptation, and a commitment to inclusive practices. Here are key strategies and considerations for achieving this:

### **1. Inclusive Education Principles**

**Universal Design for Learning (UDL):** Implementing UDL principles to create a flexible learning environment that accommodates the varied needs of all students, including those with physical disabilities.

**Individualized Education Programs (IEPs):** Developing tailored education plans that address the specific needs and abilities of each student with a disability.

**Collaborative Planning:** Involving teachers, exceptional education professionals, parents, and students in the planning process.

## **2. Accessible Classroom Environments**

**Physical Accessibility:** Ensuring classrooms, restrooms, and other facilities are wheelchair-accessible and barrier-free.

**Adaptive Equipment:** Providing specialized desks, chairs, computer equipment, or other learning tools.

**Assistive Technology:** Utilizing speech-to-text software, audiobooks, or screen readers to aid learning.

## **3. Curriculum Adaptation and Modification**

**Flexible Teaching Methods:** Using diverse instructional strategies to cater to learning styles and abilities.

**Adjusted Assessment Methods:** Modifying assessments to fairly evaluate the knowledge of students with physical disabilities.

**Hands-On Learning Opportunities:** Incorporating experiential learning that can be adapted for physical abilities.

## **4. Teacher and Staff Training**

**Awareness and Sensitivity Training:** Educating staff and students about physical disabilities to foster an inclusive and understanding school culture.



**Professional Development:** Providing ongoing training for teachers in inclusive teaching strategies and assistive technologies.

## **5. Peer Support and Social Inclusion**

**Buddy Systems:** Pairing students with physical disabilities with peers for support and social interaction.

**Inclusive Activities:** Ensuring extracurricular activities and events are accessible and inclusive.

**Promoting Positive Interactions:** Encouraging social interaction and friendship development among all students.

## **6. Community Integration**

**Accessible Community Facilities:** Advocating for and ensuring public spaces and transportation are accessible.

**Public Awareness and Education:** Promoting understanding and acceptance of physical disabilities in the broader community.

**Inclusive Employment Opportunities:** Supporting transitions to employment with adequate accommodations and support.

## **7. Family and Caregiver Involvement**

**Active Participation:** Encouraging family members to participate in educational planning and school activities.

**Resource Provision:** Offering resources and support for families to aid their child's education and social inclusion.

## **8. Policy and Advocacy**

Legislation Compliance: Adhering to laws such as the Americans with Disabilities Act (ADA) and the Individuals with Disabilities Education Act (IDEA) in the U.S.

Advocacy Groups: Collaborating with advocacy organizations to promote inclusive practices and policies.

Inclusion of persons with physical disabilities in general education curricula and communities is not just about physical access but also about creating an environment of acceptance, respect, and opportunity. It involves a community-wide effort, embracing diversity and empowering individuals with disabilities to participate fully in educational and community life.

## **Learning activities/ Instructional strategies**

- Target different senses within the session
- Share my strengths and weaknesses.
- Implement reflection and goal setting exercises.
- Analyse and differentiated instruction strategy regularly

## **Assessment Methods**

- Pre & post survey
- Online polling
- Dynamic questions

## **Resources and additional materials**

1. <https://hwa.org.sg/general-information-on-physical-disabilities/>
2. <https://www.sciencedirect.com/topics/medicine-and-dentistry/physical-disability>

3. <https://guides.library.illinois.edu/c.php?g=533633&p=3651132>

