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MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

STUDY ON PROBLEMS RELATED TO TEACHING OF ORTHOPAEDICALLY IMPAIRED CHILDREN

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ABSTRACT: Physical handicaps may cause various degrees of weaknesses and inco-ordination of the limbs which may affect mobility, posture and manual dexterity. Other physical problems such as heart diseases may cause poor exercise tolerance and low level of physical fitness. All these may directly result in pupils' difficulty to cope with ordinary school routine and limit their ability in exploring and understanding the environment. The Federal (IDEA) definition of orthopedic impairment means a severe orthopedic impairment that adversely affects a child's educational performance. The term includes impairments caused by a congenital anomaly, impairments caused by disease (e.g., poliomyelitis, bone tuberculosis), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures).

[Naheed. A., Devi, T. and Devendra. **STUDY ON PROBLEMS RELATED TO TEACHING OF ORTHOPAEDICALLY IMPAIRED CHILDREN.** *Academ Arena* 2023;15(1):1-6]. ISSN 1553-992X (print); ISSN 2158-771X (online). http://www.sciencepub.net/academia. 01.doi:10.7537/marsaaj150123.01.

Keywords: Orthopedically impaired children, Personality

INTRODUCTION:

Orthopedic impairment is defined as a child's disability relating to a bone, joint, or muscle, that is severe enough to directly affect the child's educational performance. It can be caused by many different factors including genetic abnormalities, disorders such as cerebral palsy, or an injury that has caused a missing limb or has impaired a muscle.

The extent to which a child's education is affected can vary greatly, depending on the level of impairment. Many children with an orthopedic impairment do still have normal cognitive abilities, so these children require mainstream education wherever possible and in the least restrictive environment as appropriate.

According to the federal Individuals With Disabilities Education Act (IDEA), an orthopedic impairment is defined as a bone-, joint-, or muscle-related disability that is so severe that it negatively affects a child's educational performance. Causes of orthopedic impairment range from genetic abnormalities (such as those that cause a missing arm or leg) to disorders like cerebral palsy, as well as other issues.

Students are typically evaluated by a healthcare professional to determine if they have an orthopedic impairment that will interfere with their academic progress. Medical professionals may also observe the child in the classroom to get a sense of potential problems the student will face.

Orthopedic impairments can be classified as belonging to one of three different categories: neuromotor impairments, degenerative diseases, or musculoskeletal disorders (Heller &Swinehart-Jones, 2003). Common examples of conditions according to each category include the following:

Neuromotor Impairments: spina bifida, cerebral palsy, spinal cord injuries

Degenerative Diseases: muscular dystrophy, spinal muscular atrophy

Musculoskeletal Disorders: club foot, missing/deformed limbs, scoliosis

The orthopedic impairment must interfere with the student's ability to perform in an educational environment in order to qualify for special services. This disability may interfere with a student's ability to walk, write, or perform other physical tasks in the classroom and laboratory setting. It might also affect the student's ability to communicate with others, hindering their ability to respond to questions orally. Furthermore, they might also have additional disabilities that can affect their educational performance, including mental retardation, learning disabilities, perceptual problems, distractibility, disorganization, visual-motor deficits, restlessness, and visual abnormalities (Heller &Swinehart-Jones, 2003). These various conditions all serve to affect the student's coordination and mobility as well as their ability to communicate, learn, and adjust (Vaughn, Bos, & Schumm, 2007). Orthopedic impairments may also affect the student's endurance in performing various tasks, and they might tire more easily. Due to

the hands-on nature of agricultural education, instructors should plan ahead to meet the needs of learners in their classes with orthopedic impairments.

Orthopedic Impairment Characteristics

Children may be born with an orthopedic impairment or they may acquire it at some point in life.[1]

Hereditary, congenital, and environmental factors can play a role in causing orthopedic impairments that affect the normal functioning of the bones, joints, or muscles.

For example, a child may be born with joint deformities, spina bifida, or muscular dystrophy. Acquired causes can include disease, injury, or surgery. (Injury or surgery may lead to the loss of a limb, muscle contractures, or bone loss that can make movement difficult.)

The orthopedic impairment disability category, per IDEA, includes all orthopedic impairments, regardless of cause.[2] Sometimes orthopedic impairments are called physical disabilities or included in the category of "other health impairments."

The Individuals with Disabilities Education Act (IDEA) defines an orthopedic impairment as one that severely and adversely affects a child's school performance. Orthopedic impairments can be caused by congenital anomalies such as club foot, diseases such as osteogenesis imperfecta, or other causes such as cerebral palsy or amputation of limbs. Although IDEA groups orthopedic impairments together, children with these disabilities can actually have orthopedic impairment or neuromotor impairment. Orthopedic impairment involves bones, joints, limbs, and muscles, and neuromotor impairment involves the central nervous system (the brain and spinal cord).

Types of Impairments

Orthopedic and neuromotor impairments are different and separate disability types, but they can cause similar limitations. Orthopedic impairment characteristics involve problems using hands, arms, and legs. Relationships also exist between orthopedic and neuromotor impairments. A child with spinal cord damage (neuromotor) unable to move her legs, for example, may develop bone and muscle disorders in the legs (orthopedic). The same types of therapy and educational and recreational accommodations are often appropriate for children with orthopedic and neuromotor impairments. Physical therapists can help improve gross motor skills, occupational therapists can help improve fine motor skills, and speech-language pathologists work with a student on speech and language difficulties. Adapted physical education teachers work with physical and occupational therapists to provide an exercise program to students with disabilities. **Intellectual Capabilities** While two children may have the same diagnoses, they may have very different physical and intellectual capabilities. Students with neuromotor impairments are more likely to have additional impairments if brain damage is involved. Many students with orthopedic impairments, however, do not have learning, language, perceptual, or sensory problems. Most students with orthopedic impairments will require educational modifications and accommodations, and assistive technology to function as independently as possible.

Although classroom modifications and accommodations will vary depending on a student's individual needs, the following list are some common needs. General classroom teachers and special educators should collaborate to include students with disabilities in the general curriculum. To participate as fully as possible in educational activities, the student may require these **accommodations**:

- special seating arrangements, larger tables;
- note-taking assistance;
- instruction focused on impairments in and the improvement of gross and fine motor skills;
- securing assistive technology and augmentative communication devices;
- extended time to complete assignments, and;
- teacher awareness of student's condition and its affect (such as tiring easily).

Assistive technology devices help students with various levels of severity of orthopedic impairment. These devices enable access to the educational curriculum and may include one or more of the following:

- speech recognition software;
- alternative keyboards and mice;
- augmentative and alternative communication devices;
- word prediction software;
- screen reading software, and;
- academic software for students with disabilities.

Educators should remember that students with these types of impairments should be educated and treated as typical students, while accommodating their physical disabilities. Image by **Ulrike Mai** from **Pixabay**

Individuals with Disabilities Education Act (IDEA)

The Individuals with Disabilities Education Act (IDEA) states that an orthopedic impairment is a severe impairment that adversely affects a child's educational performance. Use of the term, 'orthopedic impairment,' in conjunctions with IDEA includes impairments due to effects of congenital anomalies such as absence of a member or clubfoot, impairments caused by the effects of a disease, and impairments due to other causes such as amputations, cerebral palsy, burns, or fractures. While IDEA uses the term, 'orthopedic impairments,' children who experience physical disabilities can also have neuromotor

impairments such as skeletal system, joint, muscle, or limb disabilities and qualify for IDEA. Neurological and orthopedic disabilities are two distinct forms of disabilities, but they both cause similar limitations in movement, and there is a close relationship between them.

Children might either be born with or acquire problems with their joints, bones or muscles. Orthopedic problems can be the result of diseases, deformities, surgeries or injuries. Orthopedic issues that a child faces may be ones from birth such as osteogenesis imperfect, cerebral palsy, spina bifida, muscular dystrophy, or joint deformities. Surgery or injury can result in loss of bone or muscle tissue, or include the amputation of a limb. Broken bones and burns may also lead to damage to either muscles or bones. Orthopedic problems vary - children may experience trouble using their hands, arms, or legs. Some of these children will make use of assistive devices and technologies in order to function as independently as they can.

The United States Department of Education reports that there were five million, nine-hundred and seventy-one thousand, four-hundred and ninety-five students receiving special education services during the 2003 through 2004 school year. Of these students, about one point one percent received special education services based on a classification of orthopedic impairments. A number of students who have orthopedic impairments do not experience learning, cognitive, language, perceptual, or sensory difficulties. Students with neuromotor impairments do have a higher incidence of other disabilities, particularly if there is brain involvement.

Educational Orthopedic Impairment (OI)

Educational Orthopedic Impairment (OI) means there is a motor disability stemming from, a medical condition such as cerebral palsy, spinal bifida, muscular dystrophy or a traumatic injury that adversely affects the child's ability to access their education.

OI is a medical diagnosis and only becomes an IDEA disability if the OI adversely affects the students access to education. Not all students who have disabilities require specialized instruction. For students with disabilities who do require specialized instruction, the Individuals with Disabilities Education Act (IDEA) controls the procedural requirements, and an IEP is developed. The IDEA process is more involved than that of Section 504 of the Rehabilitation Act and requires documentation of measurable growth. For students with disabilities who do not require specialized instruction, but need the assurance that they will receive equal access to public education and services, a document is created to outline their specific accessibility requirements. Students with 504 Plans do not require specialized instruction, but, like the IEP, a 504 Plan should be updated annually to ensure that the student is receiving the most effective accommodations for his/her specific circumstances. (DO-I&, 2022)

Impact on Education

Students with orthopedic impairments typically have the same cognitive abilities as their peers without disabilities. Because of this, school staff should try to include these students in mainstream classes as much as possible. The IDEA law states that students should be educated in the least restrictive environment when appropriate.[3]

For example, impairments such as amputations and fractures can impact attendance, making it harder for kids to keep up academically. Other impairments that have accompanying brain involvement such as birth trauma and cerebral palsy may lead to learning difficulties resulting from sensory and cognitive issues.

APPLICATION IN THE LEARNING ENVIRONMENT

Just as each student who is cognitively affected by a learning disability varies in the range and depth of their disability, students with orthopedic impairments vary widely as well. Some of the more common orthopedic impairments include cerebral palsy, muscular dystrophy, spinal cord injury, and spina bifida (Vaughn, Bos, & Schumm, 2007). The instructor needs to meet with the case manager of the student and with the parents/guardians of the student in order to best prepare for meeting the needs of the student. Students with orthopedic impairments will likely have a variety of needs influenced by the type of limitations they experience with their disability. Heller and Swinehart-Jones (2003) developed the following model which depicts the impact of orthopedic impairments on educational performance.

The model illustrates how the type of orthopedic impairment, as well as the psychosocial and environmental factors, all can affect the functional limitations of the educational performance of students with orthopedic impairments. Furthermore, the instructor should determine how the functional limitations of the student affect the amount of instructional delivery time. Motor limitations and neurocognitive impairments may increase the amount of time necessary to provide students with meaningful learning experiences, requiring the instructor to modify the time management of their classroom.

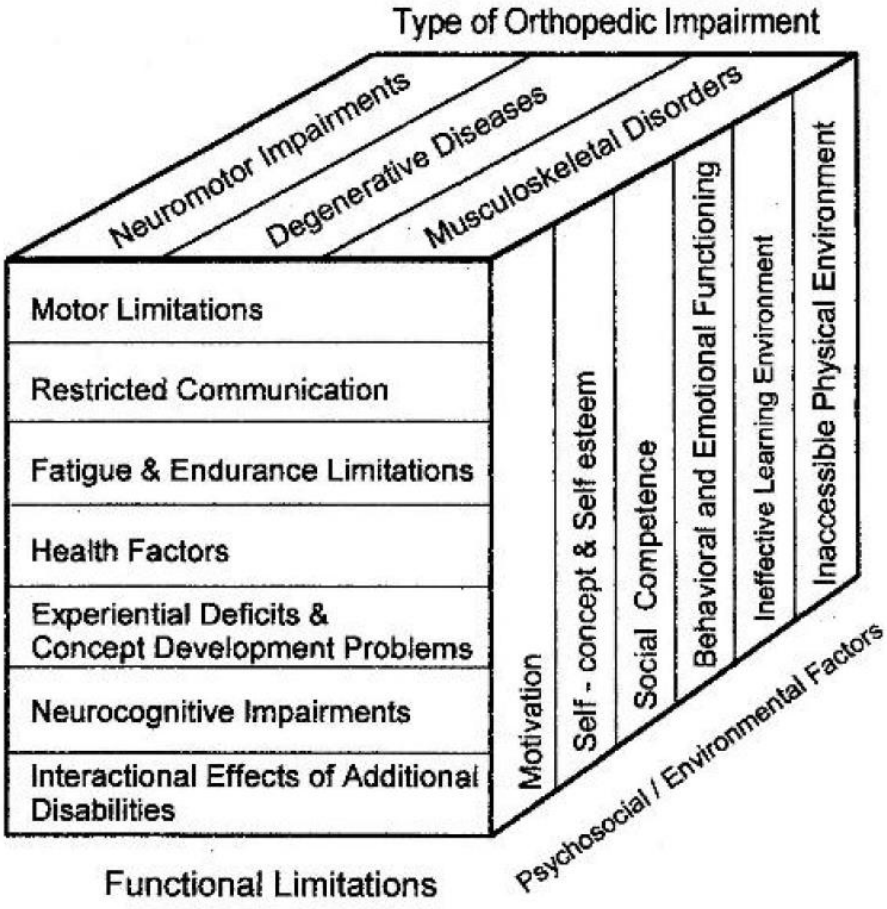

Figure 1. A model depicting the impact of orthopedic impairments on education performance. Credit: Heller and Swinehart-Jones (2003, p. 7)

Consideration should be given to the psychosocial/environmental factors when tailoring instruction to students with orthopedic impairments. Instructors can use three basic principles when accommodating students with orthopedic impairments: (1) use others as resources, (2) be flexible in your planning, and (3) be ingenious and creative. Students with orthopedic impairments often have a large support team assigned to work with them to ensure that they are receiving appropriate educational services. For example, students might be given assistance from special education teachers, an occupational or physical therapist, or a speech and language pathologist. If the severity of the impairment is far less or temporary, the assistance may be from an adaptive physical education teacher (Vaughn, Bos, & Schumm, 2007). Involve the various members of this support team to gain clearer idea of what educational strategies will be appropriate for the student. The instructor should also be made aware of specific indicators of student health problems and have the ability to respond appropriately should an emergency situation arise (Heller &Swinehart-Jones, 2003). The manner in which the instructor should respond to these situations will vary among school districts, so it will be imperative that the instructor seek out this information. Ultimately, it is the responsibility of the instructor to provide a safe and healthy environment for all students.

SCLASSROOM ENVIRONMENT

Students with orthopedic impairments may have assistive technologies that allow them to communicate, read, record notes, or physically move around the room. Conversing with the members of the student's support team, who are familiar with these technologies, can help the instructor learn how these technologies can be incorporated into instruction. Instructors should work closely with special education teachers in order to provide appropriate modifications to tests, quizzes, and other assignments. For example, a student might be better able to respond to questions orally rather than writing a response or using assistive

technology, or the number of questions on a test might be reduced if the student tires easily. Structured graphic organizers, which limit the amount of visual processing or physical writing, may also be useful modifications for students with orthopedic impairments. Since these students might also be affected by mental retardation and learning disabilities that might affect their ability to learn, students with orthopedic impairments may have modified expectations for knowledge and skills they are expected to acquire (Heller &Swinehart-Jones, 2003). For example, a student may be exempt from taking a class if it is determined that a particular subject might be too abstract for them to grasp. It would be wise for the agriculture instructor to meet with the special education teacher to determine unit content appropriate for the student's abilities.

In addition to determining appropriate instructional strategies and curricular expectations, it is vital that the instructor evaluate the physical classroom environment when planning to work with students with orthopedic impairments. Consideration should be given to seating (e.g., desk with attached chairs vs. tables), floor traction, lighting, board visibility, width of aisles, work surface accessibility, location of classroom supplies, and location of the student in the classroom. Creating a physical environment that allows a student to easily interact with their peers is the first step toward creating a welcoming, safe space for learning to occur.

LABORATORY ENVIRONMENT

Student accessibility is likely to be the biggest concern for instructors planning to meet the needs of students with orthopedic impairments in the laboratory setting. Agricultural education laboratories vary widely and can include environments such as food science labs, chemistry labs, large animal handling facilities, small animal care and grooming labs, agricultural mechanics facilities, gardens, greenhouses, and more. Since these laboratory settings vary so widely, instructors will need to assess the physical layout of their own particular lab settings to determine what areas need to be addressed when instructing a student with orthopedic impairments. Agricultural-specific assistive technology is increasingly available from the National AgrAbility Project and may be available for school systems to implement into programs. The instructor should have conversations with the special education staff and possibly even the administration regarding the types of modifications that might be made to existing laboratory environments or equipment in order to make it accessible for students with orthopedic impairments. The instructor needs to explain the activities associated with working in the laboratory setting to the learner's case manager, paraprofessional, and parents before having the learner engage in such activities in order to decide which activities are appropriate and safe for the learner.

NON-FORMAL ENVIRONMENT

Agricultural education takes advantage of a variety of non-formal learning environments, including class field trips to area farms and businesses, FFA conferences and workshops, and Supervised Agricultural Experience projects (SAE). Students with orthopedic impairments will possibly have walkers, wheelchairs, or motorized equipment to help them move around independently; these will need to be accounted for when transporting students. Some agriculture education programs have activity vehicles such as pickup trucks, vans, or busses that are used to transport students. If an instructor is taking a class field trip, then it will be important to account for how students with orthopedic impairments will travel. The instructor may need to request a school bus with handicap accessibility to transport the student. The instructor should consult the special education department and the administration about the particular processed needed to ensure that students with orthopedic impairments can still participate in class or FFA field trips.

Students with orthopedic impairments may also have vocational goals written into their Individualized Education Plans (IEP) that expressly outline knowledge and skills that the students should develop in order to help prepare them for life after public education. The SAE requirements for students with orthopedic impairments can be modified to meet these goals and the student's ability. For example, a student might help sort mail and files at a veterinary office or stock produce at a grocery store. These students may also be assigned a workplace mentor by the special education department as part of addressing the vocational goals of the students' IEP. This mentor is frequently a paraprofessional the student may work with throughout the school day already, and who accompanies the student to their place of work. This person can give the instructor valuable feedback regarding the student's performance. Additionally, students with orthopedic impairments might conduct their own agriscience research project or entrepreneurship project at school or home in order to enrich their vocational skill development and augment their agricultural education.

CONCLUSION

Learners with orthopedic impairments are affected by their disability in unique ways and by a variety of conditions. In tandem with physical disabilities, these students might also be affected by other conditions such as developmental disorders, mental retardation, learning disabilities, or visual processing disabilities. Of primary difficulty for students with orthopedic impairments is the physical interaction with their

environment. Agricultural education instructors should work closely with the special education department and other members of the support team for a student with orthopedic impairments to ensure that their instruction and instructional environments meet the needs of the learner. Resources for adaptive agricultural technology can be found from Extension or AgrAbility. Additionally, other resources for instructional strategies or supplies designed for individuals with disabilities are available from various websites listed below.

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12/25/2022