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## Creating an Adaptive In-School Sports Program to Increase Occupational Engagement and Performance in Children with Physical Disabilities: A Resource Manual for Occupational Therapists

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**Creating an Adaptive In-School Sports Program to Increase Occupational Engagement  
and Performance in Children with Physical Disabilities: A Resource Manual for  
Occupational Therapists**

By

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A Scholarly Project

Submitted to the Occupational Therapy Department of the

University of North Dakota

in partial fulfillment of the requirements for the degree of

Master of Occupational Therapy

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**APPROVAL PAGE**

This Scholarly Project Paper, submitted by Bethany Kasberger and Kaylee Loken in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and hereby approved.

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April 12, 2021  
Date

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## Table of Contents

LIST OF FIGURES.....	vi
ACKNOWLEDGEMENT.....	vii
ABSTRACT.....	viii
CHAPTERS	
I. INTRODUCTION.....	1
II. REVIEW OF LITERATURE.....	7
REFERENCES.....	24
III. METHODOLOGY.....	30
IV. PRODUCT.....	33
REFERENCES.....	70
V. SUMMARY.....	74
REFERENCES.....	78
APPENDICES.....	79

## List of Figures

### Figure

1. Quickie Sport All Court (Wheelchair Basketball).....	54
2. Prolite X (Sled Hockey Stick) .....	58
3. Set of 4H Picks (Sled Hockey).....	58
4. Rev Force 1 (Sled Hockey Sledge) .....	59
5. Warrior Games (Seated Volleyball).....	61

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## **Abstract**

Participating in physical activity, including sports programs, has been found to have many positive health benefits both physically and mentally (Moss, Lim, K, Prunty, & Norris, 2020). The purpose of creating adaptive sports programs within schools is to promote engagement in physical activity and achieve the many benefits that sports programs have to offer. Children with and without physical disabilities should have equal access to these benefits for appropriate development. Enabling individuals with physical disabilities to participate in sports can assist in improving their overall quality of life and begin building skills that will benefit them in adulthood.

Creating accessible adaptive sports programs for children can reduce the negative impact that their limitations have on their physical and mental health. Occupational therapists are well-equipped to address the exclusion that children with physical disabilities experience because of their holistic perspective, in-depth understanding of physical and mental health, human anatomy, child development, and education in assistive devices/adaptations. Occupational therapists also have a strong understanding of the impact that engagement in meaningful occupations can have on one's overall well-being and will push to ensure that appropriate programs are created.

An extensive literature review was conducted to gather evidence-based information on the impact of adapted sports on children with physical disabilities. Resources were pulled from scholarly and reputable sources including textbooks, online websites, and research articles from CINAHL and PubMed databases. The occupational adaptation model (OA) was used as the theoretical foundation to guide the authors through the process of creating the product manual, *Creating an Adaptive In-School Sports Program to Increase Occupational Engagement and*

*Performance in Children with Physical Disabilities: A Resource Manual for Occupational Therapists.*

The product, an in-service manual and accompanying PowerPoint, was created to present to and train occupational therapists that work in the school system, who will then use the manual to present the information to school personnel to implement adapted sports. The manual covers an overview of the goals of an adapted sports program, application of the theoretical model, the risks and benefits of adapted sports, training of coaches and officials, funding sources available, a pre/post-test for evaluation of knowledge, advertisement template, sports registration and consent forms, insurance information, and examples of the rules and the equipment needs for sled hockey, wheelchair basketball, and seated volleyball. The participants of the in-service events will receive a handout, watch the PowerPoint presentation, and engage in hands-on activities of the three selected sports, sled hockey, wheelchair basketball, and seated volleyball.

## **Chapter I**

### **Introduction**

#### **Gap in Literature**

Participation in sports programs can offer individuals of all ages many physical and psychological health benefits (Costalonga, Crozier, Stenner, & Baldock, 2020). However, for those with physical disabilities, participation in sports programs can be difficult due to a poor match between occupational demands of the sport, the environment, and the individual's ability levels. To address this, adaptive sports have been created to promote a successful match between these factors through use of adaptive equipment (Tow, Gober, & Nelson, 2020). The adaptive equipment used within adaptive sports is any form of equipment that provides assistance to a person with a disability during activities or occupations to allow a higher level of independence (Adaptive device, 2012).

After learning of adaptive sports and local adaptive sports programs, an extensive literature review was completed to gain an understanding of the risks/benefits of adaptive sports and assess the access that individuals with physical disabilities have to these programs. During the literature review, it was found that adaptive sports programs offer many health benefits to those with physical disabilities of all ages (Sahlin & Lexell, 2015). However, engagement in sports programs at a young age can play a large role in the physical and psychological development of children (Aytur et al., 2018; Frumberg et al., 2019; Moss, Lim, Prunty, & Norris, 2020). Although it was discovered that there is an increasing number of adaptive sports programs for adults with physical disabilities and related research within the United States, there was very little on adaptive sports programs for children with physical disabilities. To address this gap in literature, the factors that impact participation in adaptive sports were further researched to

understand why there was not a larger number of programs when participation in these programs can offer so many benefits. Once these factors were identified, a product was created to overcome barriers to increase accessibility and engagement in adaptive sports programs for children with physical disabilities.

### **Occupational Therapist's Role**

Occupational therapists are well-qualified to address the creation and implementation of a product that promotes engagement in adaptive sports for numerous reasons. OTs have an in-depth understanding of the importance of engaging in meaningful occupations. Additionally they are skilled in assessing demands of occupations (i.e. specific sports programs) and facilitating a match between an individual's abilities and the demands of both the occupation and environment to ensure that the individual can successfully participate in the identified occupation. Creating this match between the occupation, individual, and environment is something frequently done by OTs and can often be achieved through modifications to the environment, occupation, or through use of adaptive equipment. These approaches were considered when creating a product that will allow children with physical disabilities to engage in sports programs that may not have initially been a successful match between their ability levels and the occupational demands.

Almost 1 out of 5 children have special health related needs, often including physical disabilities, that impact their daily lives and overall health (Center for Disease Control and Prevention, 2021). For those with physical disabilities, it can have a negative impact on their physical and mental health, academic performance, social participation and self-perception (Moss et al., 2020). Individuals with physical limitations are at higher risk of being excluded from activities, especially community organized physical activities (Cote-Letlerc, 2017). There is research about the impact adapted sports has on adults with physical disabilities, but there is a

gap in the literature when researching children with disabilities. There is a need to further study the physical and psychological effects of adapted sports programs for children with physical disabilities specifically.

Further research is also needed regarding sports as a leisure occupation within the field of occupational therapy; the positive findings from research studies suggest that this area could provide many benefits to clients including children with physical disabilities. Creating accessible adaptive sports programs for children can reduce the negative impact that their limitations have on their physical and mental health. Occupational therapists are well-equipped to address this issue because of their holistic perspective, in-depth understanding of physical and mental health, human anatomy, child development, and education in assistive devices/adaptations. Occupational therapists also have a strong understanding of the impact that engagement in meaningful occupations can have on one's overall well-being and will push to ensure that appropriate programs are created.

### **Statement of Problem**

Through the literature review, it was found that there is a very limited number of adaptive sports programs for children with disabilities in the United States. A contributing factor to this low number of programs is that there are many barriers to engaging in these programs. Thus, the product created was done so with the intention of addressing common barriers to promote an increase in the number of adaptive sports programs available and an increase in the number of children who participate in these programs.

### **Occupational Adaptation Model**

The occupational adaptation model (OA) was used to guide this scholarly project. OA focuses on a desire for mastery, demand for mastery, press for mastery and role expectations

(Grajo, 2017). The desire for mastery is an individual's desire to master their environment which occurs through participation in occupations (Grajo, 2017). The individual's level of mastery and the environment's demand for mastery create role demands, expectations, and challenges which are referred to as the press for mastery (Grajo, 2017). When looking at children with physical disabilities, there are many occupations that can be impacted due to this mismatch. Engagement in leisure and physical activity is often one of the occupations affected. Applying concepts from OA is beneficial to understanding the match between the demands for mastery and children's level of mastery. When developing our product, it is important to ensure that necessary measures are utilized to enable engagement in adaptive sports programs and ensure that it meets the needs of our target population.

### **Importance of Study**

Adaptive sports programs have a positive impact on both mental and physical health, improved social participation, increased quality of life, and encouraged engagement in meaningful occupations (Aytur et al., 2018; Frumberg et al., 2019; Moss et al, 2020). Many children with physical disabilities have decreased mental and physical health so it is important that they have access to participation in meaningful activities such as sports with their peers (Moss et al., 2020). Individuals with physical disabilities have a basic human right to full and effective participation in society including engaging in sports (Allen, Smith, Côté, Martin Ginis & Latimer-Cheung, 2017). Occupational therapists have the knowledge base for all individuals to participate in occupations they find meaningful. They hold a vital role in promoting inclusion for the individuals with physical disabilities to reduce the stigma throughout the general population by raising awareness for the need of adapted sports programs.

The product created for this scholarly project includes a manual that will be used to train occupational therapists who will then use it to assist teachers in schools to establish adapted sports programs. The occupational therapists will educate the teachers through an in-service on each step needed to implement adaptive sports programs safely and effectively in their facility. During these in-services, an occupational therapist will explain and demonstrate each section of the manual and have the audience engage in activities to ensure that the information is well-understood in order to safely and correctly implement it at their school. It has been found that the learning styles and learning needs often greatly vary for each individual, thus information has been provided in multiple media forms (Bastable, Myers, & Binion, 2020; Kitchie & Arnaud, 2020). The sections in the manual cover an overview of adapted sports, the risks/benefits of adapted sports, the detailed steps needed to implement an adapted sports program, a pre/post-test, advertisements, consent forms, a resource handout, and examples of three adapted sports.

### **Key Terms**

Adapted sports: An adapted sport is any sport that has been adapted to meet the skills and needs of an individual who may have some form of physical limitation (Tow, Gober, & Nelson, 2020).

Adaptive device (equipment): “A tool or piece of equipment that provides assistance in activities of daily living and instrumental activities of daily living to a person with a disability to allow a higher level of independence” (Medical Dictionary for the Health Professions and Nursing, 2012).

Disability: “a physical, mental, cognitive, or developmental condition that impairs, interferes with, or limits a person's ability to engage in certain tasks or actions or participate in typical daily activities and interactions” (Merriam-Webster., n.d., Definition 1).

Occupational adaptation model (OA): An occupational therapy theory based model that focuses on the desire for mastery, demand for mastery, press for mastery and role expectations (Grajo, 2017).

Mastery: “skill or knowledge that makes one master of a subject” (Merriam-Webster., n.d., Definition 2b).

Role: “a socially expected behavior pattern usually determined by an individual's status in a particular society” (Merriam-Webster., n.d., Definition 1a2).

### **Review of Chapters**

The next chapter of this scholarly project, Chapter II, includes a literature review on the research of the impact that adapted sports has on individuals with physical disabilities, and the benefits and barriers those individuals have to engaging in adapted sports. Chapter III of this scholarly project consists of the methodology. The methodology chapter includes the process we took in gathering the information needed in order to create our product. Chapter IV contains the product manual that was created for occupational therapists to use during the in-service training for teachers at the schools where adapted sports programs are being implemented. Chapter V summarizes the purpose of the project, the key information gathered throughout the process, the limitations, and further recommendations for future research.



## **Chapter II**

### **Review of Literature**

An adapted sport is any sport that has been adapted to meet the skills and needs of an individual who may have some form of physical limitation (Tow, Gober, & Nelson, 2020). It was found that there is a very limited number of adaptive sports programs for children with disabilities. A contributing factor to this low number of programs is that there are many barriers to engaging in these programs. Participation in adapted sports has shown to have many physical and psychological effects on adults with disabilities, but there is a gap in the literature and further research needed specifically to research children with disabilities inclusion in sports programs. A product in the form of an in-service for occupational therapists was then created to address the gaps in the literature on participation in adapted sports programs for children with physical disabilities.

#### **Current Literature on Pediatric Adaptive Sport**

Most of the adapted sports studies previously completed to identify the benefits/risks and the supports/barriers of adapted sports involved adults with physical disabilities. Through the literature review, it was found that there is a very limited number of research studies completed regarding adaptive sports for children with physical disabilities. Due to this limited research, there is a continued need to study and compare the physical/psychological effects of adapted sports programs for children with physical disabilities specifically. Costalonga, Crozier, Stenner, and Baldock, (2020) studied the extent, range, and nature of sport as a leisure occupation in peer-reviewed occupational therapy literature. From their research, they found that following removal of duplicates and exclusion criteria, only six studies were available regarding sport as a leisure occupation within all age ranges (Costalonga et al., 2020). Five of the six studies reported

positive results related to physical, social, and general well-being following engagement in sport as a leisure occupation (Costalonga et al., 2020).

Jirikowic and Kerfeld (2016) studied the factors that facilitate and inhibit the amount of sports participation in children with physical disabilities. It was determined that the three main factors that facilitate and inhibit health promoting physical activity in children that utilize assisted mobility devices are: the child's motivation and interests, family support and financial resources, and environmental supports such as universal design and social acceptance (Jirikowic & Kerfeld, 2016). It is important to encourage children to participate in activities they have an interest in, because they will be more motivated, which will result in more successful experiences that will increase their confidence and self-esteem among their peers (Jirikowic & Kerfeld, 2016). The researchers' indicated that there is currently a gap in research related to this topic. Further research should be done regarding sports as a leisure occupation within the field of occupational therapy; the positive findings from research studies suggest that this area could provide many benefits to clients including children with physical disabilities.

### **Occupational Therapy's Role in Adapted Sports**

As previously stated, nearly 1 out of 5 children have special health related needs, which often include physical disabilities (Center for Disease Control and Prevention, 2021). These physical disabilities can have a negative impact on their physical and mental health, academic performance, social participation and self-perception (Moss et al., 2020). Creating accessible adaptive sports programs for children can reduce the negative impact that their limitations have on their physical and mental health. Occupational therapists are well-equipped to address this issue because of their holistic perspective, in-depth understanding of physical and mental health, human anatomy, child development, and education in assistive devices/adaptations. Occupational

therapists also have a strong understanding of the impact that engagement in meaningful occupations can have on one's overall well-being and will push to ensure that appropriate programs are created.

Graham, Mandy, Clarke, and Morriss-Roberts (2019) found that making choices and controlling play were important for children, however, children with disabilities often experience play differently than their peers. Children that face negative experiences growing up, such as a disability, are often excluded from activities and face community biases (Super, Hermens, Verkooijen, & Koelen, 2018). These children are determined to be socially vulnerable, and without engaging in activities such as sports they are more likely to develop adequate social skills much later than their peers (Super et al., 2018). Children connect with others and develop these developmental social skills during play through humor and communication with peers (Graham et al., 2019). Occupational therapists play a role in understanding the embodied unit, recognizing play, enabling expression of each child's imagined self, supporting negotiation of identity and disability, recognizing participation in play through watching, enabling opportunities for belonging, enabling development of component skills for play, and supporting strategies for connection (Graham et al., 2019).

Researchers have also found that engagement in adaptive sports programs can lead to increased function and independence in activities of daily living (ADLs) including dressing, grooming, and functional transfers (Diaz, Miller, Kraus, & Fredericson, 2019). It is within occupational therapy's scope of practice to address participation in adaptive sports programs because performance of leisure and sports are occupations that are often meaningful to an individual and an important part of one's daily life. Additionally, participation in these programs leads to an increase in ADLs and transfers which are important aspects of occupational therapy

and have a significant impact in an individual's quality of life, independence, and safety (Diaz et al., 2019).

### **Accessibility**

As previously stated, engagement in sports programs offers many health benefits, however, children with physical disabilities face many barriers that cause participation in sports programs to be less accessible compared to their peers who do not have physical disabilities (Bloemen et al., 2015; Shields & Synnot, 2016). Occupational justice is focused on providing equal and fair access to all individuals to engage in a variety of meaningful occupations whereas social justice is the ethical distribution of rights and resources for all people and reduction in unjustified inequalities when possible (Wilcock & Townsend, 2014). Community accessibility and inclusion for individuals with physical disabilities is lacking in the areas of physical activity and sports. Not only has it been shown that adapted sports have many physical and psychological benefits for individuals with physical disabilities, but they have a basic human right to full and effective participation in society including sports (Allen, Smith, Côté, Martin Ginis, Latimer-Cheung, 2017). Allen et al., (2017) interviewed individuals with physical disabilities on their experiences with parasports and the impact it has had on their quality of life; the overall theme that resulted from the study was “Without parasport, I wouldn't be who I am today. Participation has empowered me to accept my disability, overcome my fears, and live life to the fullest” (p. 13). Occupational therapists have the knowledge base to adapt sports programs in a way that allows all individuals to participate in occupations they find meaningful in order for them to achieve occupational justice. Occupational therapists hold a vital role in promoting inclusion for the individuals with physical disabilities to reduce the stigma throughout the general population by raising awareness for the need of adapted sports programs.

Having access to adapted sports programs has shown to change a communities' attitude towards individuals that are physically disabled and allows for the opportunity to build a more inclusive social environment which increases overall social justice (Côte-Leclerc et al., 2017). Playing adapted sports allows individuals who have mobility limitations to be more involved in their community and increases their self-esteem while participating in a meaningful activity. Although there are many benefits to participation in adapted sports, there are many barriers individuals with disabilities face (Bloemen et al., 2015; Shields & Synnot, 2016).

### **Considerations and Strategies to Adapt Sports Barriers**

As previously addressed, children with physical disabilities experience many barriers to engagement in adaptive sports programs (Bloemen et al., 2015; Shields & Synnot, 2016). Common barriers identified by Braza et al. (2018), Bloemen et al. (2015), and Shields & Synnot (2016) that limit engagement in adaptive sports and recreation programs were limited transportation, access to equipment, expense, physical limitations, caregiver availability, need for instruction, fear of injury, self-consciousness, caregiver disapproval, children not being interested in physical activity, lack of opportunity, high cost, lack of time, and negative societal attitudes.

Braza, Iverson, Lee, Hennessy, and Nelson (2018) also found barriers to participation in adaptive sports programs through the research studying the partnerships and opportunities related to adaptive sports and recreation for individuals with disabilities. The authors identified that many individuals with physical disabilities and/or their caregivers were not aware of community opportunities for engagement in these adapted sports programs (Braza et al., 2018). This lack of awareness has contributed to the low number of children participating in adaptive sports programs. Other barriers that was discovered were communities having limited resources,

including lack of certified staff, funding, access to adaptive equipment, and available facilities to host adaptive sports programs; these factors often result in a higher reliability on parent time and resources (Braza et al., 2018; Jirikowic & Kerfeld, 2016). Shields and Synnot (2016) also found that as children age, it becomes increasingly challenging for them to engage in adaptive sports programs. The main factors that led to this increase include a widening skills gap between peers their age, increased competitiveness in sports, and greater exclusivity of sports teams and programs (Shields & Synnot, 2016). This gap continues to increase as the child ages due to the relationship between sports and developmental markers of individuals being reciprocal (Super et al., 2018). This reciprocal relationship means that if an individual is delayed in meeting the developmental milestone, they are less likely to participate in a sport and may experience further developmental delays as a result of low activity levels (Super et al., 2018). Along with many environmental factors influencing participation, there are also aspects of the individual that can impact their engagement in sports programs. Three of these aspects, which are highly influential on a child's participation in physical activity, are their functional mobility levels, their motivation, and organization of psychomotor functions (Bloemen et al., 2015; Kolehmainen et al., 2015). From the research, it has been found that there are many different factors that can act as barriers to participation in adaptive sports programs. For this reason, it is essential that supports are also identified to overcome these common barriers.

Supports that were identified through research include physical well-being, health/safety, positive relationships with others, access to adaptive sports programs, physical environment, encouragement from others, one-on-one instruction, modifications/adaptations, and interpersonal beliefs/attitudes (Frumberg et al., 2019; Lape et al., 2018; Shields & Synnot, 2016; Super et al., 2018). These supports have all been found to encourage children's engagement in adaptive sports

programs and ensure that their abilities match the demands of the occupation and the environment that it is performed in to successfully perform skills related to the sport. Another study by Willis et al. (2018) identified themes, mechanisms, and outcomes that were beneficial when creating a program theory that could be used to create adaptive sports programs. The context themes were: safe, learning, social, and family (Willis et al., 2018). It was found that adaptive sports programs that were perceived as safe and offered potential learning were more likely to attract children with physical disabilities to participate in them. It was also found that children who received support from both family and peers within the child's environment were also more likely to engage in adaptive sports programs (Ooms, Leemrijse, Collard, Schipper-Van Veldhoven, & Veenhof, 2018; Willis et al., 2018). The mechanisms found through this study were: choice, fun, friends, specialized health professionals, and time (Willis et al., 2018). These mechanisms are factors that influenced children's and caregiver's interest in participating in these programs. Additionally, it was found that adaptive sports programs often produce the following outcomes: a sense of achievement, increased aspiration, greater independence, enjoyment in physical activity, and improved bodily function/activity level outcomes (Willis et al., 2018). These findings indicate that it is important to have a strong social support group, adequate time, and qualified and educated health professionals to assist school personnel in implementing sports programs in a way that is safe, fun, and promotes learning (Willis et al., 2018).

Motivators to initiating and sustaining engagement in adaptive sports programs have also been identified through research. Common motivators include gaining a sense of accomplishment, improving physical fitness, enjoyment, developing self-confidence, building social connections, and improving health (Braza et al., 2018). It is important to draw upon these

supports, motivators, and factors to promote engagement in adaptive sports programs. A beneficial way to address these and spread awareness of the needs of children with physical disabilities and adaptive sports programs is through in-services for school personnel of children with physical disabilities.

## **Interventions**

Adapted sports programs provide a variety of sport options depending on the community and availability of facilities and equipment. One of the most commonly known adapted sports is wheelchair basketball. Moss et al. (2020) studied the impact of a community based wheelchair basketball program on the participants' physical and mental health. Wheelchair basketball has slightly different rules than the standard game of basketball. During play, players must wheel the chair and dribble the basketball simultaneously to maneuver around the court (International Wheelchair Basketball Federation, n.d.). There is no double dribble rule like traditional basketball (International Wheelchair Basketball Federation, n.d.). Additionally, players are allowed to push twice after picking up the dribble before they are required to pass, shoot, or dribble again (International Wheelchair Basketball Federation, n.d.). Moss et al. (2020) also proposed the implementation of a strategy called reverse integration in which both children with and without physical disabilities participate in adaptive sports to reduce barriers for children with physical disabilities in sports programs and promote social equality, inclusion, and positive interactions with peers. Occupational therapists have the knowledge to properly fit wheelchairs for the participants and can suggest any environmental modifications to grade the activity to best fit the participants' ability levels to increase success. Overall, participants reported happiness when engaging in wheelchair basketball and indicated an increase in social participation, an increased positive perception of their abilities, and an increased quality of life (Moss et al., 2020).



Sled hockey, also known as sledge hockey in Canada and Europe, is a popular adapted sport in the colder regions of the United States including the state of North Dakota. The sport can be played with a wide spectrum of age ranges and ability levels and the rules are the same as the standard game of hockey except the players are seated and propel themselves with two shortened hockey sticks (Aytur et al., 2019). Creating a sled hockey team for children with disabilities allows them to channel their energy into an activity, gives them purpose, and has the ability to grow and develop their abilities to continue to play the sport into their adult lives (Aytur et al., 2019). Participation in adapted sports supports children to develop different social roles including the athlete role in which individuals report an enhanced social image, and a teammate and friendship role that enhances children's relationships with peers (Aytur et al., 2019). When children develop these roles, they feel an increased sense of belonging and challenge the negative stigma portrayed to individuals with disabilities (Aytur et al., 2019). It is important that the access to these sport activities is available throughout communities to enhance the overall quality of life and give people with disabilities feelings of purpose, confidence, and inclusion in their communities. Occupational therapists are educated in the proper fitting of equipment, and can help individuals properly fit their sled in order to prevent injuries. Sled hockey can be introduced to children and occupational therapists can help grade the intensity based on a participant's age level or ability level. Adapted sports can continue to increase competitiveness as an individual ages into adulthood to be a lifelong meaningful activity.

### **Benefits & Risks of Adapted Sports**

Adaptive sports programs have a positive impact on both mental and physical health, improved social participation, increased quality of life, and encouraged engagement in meaningful occupations (Aytur et al., 2018; Frumberg et al., 2019; Moss et al., 2020). Many children with physical disabilities have decreased mental and physical health (Moss et al., 2020).

The timing of physical activity interventions in children may be critical in preventing disease progression or secondary conditions such as obesity (Jirikowic & Kerfeld, 2016). An increased awareness of and focus on providing appropriate equipment and adapted sports in a child's own environment including schools, sport clubs, and community will likely increase the physical activity levels of those with physical disabilities (Bloemen et al., 2015). To address these health disparities, it is essential that more adaptive sports programs are created that draw upon identified supports. Adapted sports have an impact on the quality of life of individuals with physical limitations. The levels of quality of life for individuals with mobility limitations is comparable to that of the general population without physical limitations when they participate in adapted sports (Cote-Leclerc et al., 2017).

### **Adaptive Equipment Available**

There are many types of adaptive equipment for children with physical disabilities. Most sports and recreational activities have some form of adaptive equipment that supports the engagement of individuals' with a variety of abilities. Types of equipment available include sled hockey sleds, sports wheelchairs, monoskis, sitting volleyball poles/nets, and beep baseball equipment (Move United, 2020). Although there are many options for adaptive equipment that allow for engagement in adaptive sports programs, there is often limited access to these items and lack of programming to use equipment. Adaptive equipment can often be costly to purchase by oneself, however, if implemented through schools or extracurricular programs there are many funding options that make equipment more affordable to families. Lucas (2017) discussed the variety of options for acquiring funding sources when developing an adapted sports program including asking for monetary and equipment donations from local groups. The program developers can reach out to local businesses and groups such as The Lions Club, Knights of

Columbus, or high schools and colleges in the community that may be willing to donate money or extra equipment to the program.

### **Types of Programs Available**

There are many types of adaptive sports programs available to individuals of all ages. These programs may be school-based, community-based, or private programs. Individuals also have the option to engage in adaptive recreational or sport activities on their own time if they have access to the appropriate equipment. Some organizations, such as Hope Inc., an organization located in North Dakota, provides various adaptive sports programs to children of all ages and provides adaptive equipment if they cannot afford it themselves (Hope Inc., n.d.). As previously mentioned, individuals can engage in most sports programs if they have access to the necessary facilities in their community and proper adaptive equipment.

### **Contexts/Environments**

Adaptive sports programs can be created and implemented in a variety of contexts and environments. For our product, we have decided to focus on implementation and engagement in adaptive sports programs within schools through an in-service. We chose to focus on schools because common barriers to engagement in adaptive sports programs for children are lack of access, limited transportation, and funding (Shields, & Synnot, 2016). Providing adaptive sports programs that occur at the children's school limits the need for transportation, cuts the cost by providing locations where the programs can be held free of charge, and are easy for the children to access as they will already be at the school where the programs will be held.

### **Precautions & Indication of Risk**

Despite the many benefits to engaging in adaptive sports programs, there are some risks. Individuals with physical limitations are at higher risk of being excluded from activities,

especially community organized physical activities (Cote-Letlerc, 2017). There are many reasons individuals with physical disabilities may not participate in physical activity; these include not having the same access to facilities or programs within their communities, differing physical ability compared to their peers, and not having access to appropriate equipment for the activities. (Bloemen et al., 2015; Lynch, Moore, Edwards, & Horgan, 2019). Because these individuals are not as often involved in the sports and physical activities that their peers are, they are at a higher risk of developing other health conditions in addition to their physical limitations such as obesity and a lower quality of life (Cote-Letlerc, 2017; Jirikowic & Kerfeld, 2016; Ooms, Leemrijse, Collard, Schipper-van Veldhoven, & Veenhof, 2018). Adaptive sports programs have been created to address the gap between occupational demands and ability levels of children with physical disabilities. Although participation in these adaptive sports programs can offer many health benefits, those that are involved also have risks for further injuries. There are multiple factors that impact the level of engagement in adapted sports; these include the level of risk involved with the sport, what adapted sports are available in an individual's community, and the severity of the individual's physical limitations (Lape, Katz, Losina, Kerman, Gedman, & Blauwet, 2018; Moss et al., 2020). An example Darrah et al., (2016) found is that individuals who participate in seated adapted sports such as sled hockey hold a higher risk of developing pressure ulcers if they do not have the appropriate fitting equipment. Additionally, the authors found that the most prevalent risks related to engaging in adaptive sports programs include physical injuries resulting from playing sports and skin breakdown due to equipment not fitting correctly (Bloemen et al., 2015). For this reason, it is essential that when individuals engage in adaptive sports programs, equipment fits properly, and skin integrity is being monitored.

## **Adaptive Sports Program in Schools**

### **Purpose**

The purpose of adaptive sports programs within schools is to promote engagement in physical activity and achieve the many benefits that sports programs have to offer. Participating in physical activity, including sports programs, has been found to have many positive health benefits both physically and mentally (Moss et al., 2020). It also promotes the development of many important skills such as teamwork, communication skills, emotional regulation, and problem-solving (Bloemen et al., 2015). Children with and without physical disabilities should have equal access to these benefits for appropriate development. Enabling individuals with physical disabilities to participate in sports can assist in improving their overall quality of life and begin building skills that will benefit them in adulthood.

According to Bloemen et al. (2015) and Braza et al. (2018), there are many barriers that limit access to adaptive sports programs including transportation, limited number of programs, and lack of awareness of available programs. There is greater access for all students, increased transportation opportunities, and an increased community awareness of these programs when adaptive sports programs are implemented in schools. Implementing the adaptive sports program in the schools also saves money by allowing free use of facilities and equipment which allows more individuals the opportunity to participate.

### **Funding Options**

As previously mentioned, there are many types of adaptive equipment that can be used to support engagement in adaptive sports programs. If schools and/or caregivers cannot purchase the adaptive equipment, there are many programs that provide alternate funding or equipment options (Lucas, 2017). Additionally, certain types of equipment, such as sports wheelchairs, can

be used to engage in a variety of different adaptive sports programs. Program developers can reach out to grant organizations or local clubs for possible donations and volunteers. By utilizing volunteers for the program, the program developers are lowering the cost of the program, enabling more lower income families to be involved in the adaptive sports program, and it also gives high school and college athletes the opportunity to gain community service hours in the role of coaching one of the adaptive sports teams. Adaptations to current equipment can be made in some cases, while in others, specialized equipment is needed.

To incorporate adaptive equipment and adaptive sports programs into schools, it is important that children, caregivers, and staff are educated on how to use adaptive equipment, how to properly fit the adaptive equipment, any precautions for the sports, and the overall implementation process of the programs. This education includes becoming familiar with any differences in rules of how to play the various types of adaptive sports compared to standard sports that are available for children with physical disabilities.

### **Organization of Manual**

The manual will include many different topics related to the implementation of adaptive sports programs within schools. The manual will begin by providing information regarding the need and importance of promoting engagement in adaptive sports programs for children with physical disabilities and will address the many benefits that this provides. Following this, the manual will include definitions of relevant terms to ensure a strong understanding of how to implement these programs. Once terms have been defined, there will be a section identifying ways that the programs can advertise to recruit as many children and families in the community as possible along with people and organizations who would like to volunteer their time. There will be information regarding the registration process. Different funding sources including

insurance or grant funding will be discussed to ensure children have access to the necessary equipment. Lists of different types of adaptive equipment will be included along with where they can be purchased, prices, and what sports programs they can be used with. Further information will then be provided on different types of adaptive sports programs, how to implement these, and any rules or adaptations related to each sport. Precautions and proper fitting of equipment will then be addressed to ensure children's safety while engaging in adaptive sports programs.

### **Use and Target Audience**

The manual was created with the intention of being used by occupational therapists to present an in-service to educate teachers at schools about each step needed to implement adaptive sports programs safely and effectively in their facility. During these in-services, an occupational therapist will explain and demonstrate each section of the manual and have the audience engage in activities to ensure that the information is well-understood in order to safely and correctly implement it at their school. The sections in the manual cover an overview of adapted sports, the risks/benefits of adapted sports, the detailed steps needed to implement an adapted sports program, a pre/post-test, advertisements, consent forms, a resource handout, and examples of three adapted sports. The in-service will explain an overview of three adapted sports including wheelchair basketball, sled hockey, and seated volleyball. The rules of the game are explained along with any of the adapted equipment that is needed for each of the sports. The occupational therapists will then educate the teachers on how to properly fit each of the adapted equipment pieces and provide the audience with an informational handout. Occupational therapists have the education to properly fit equipment for individuals in order to promote safety and prevent injuries such as pressure sores.

To ensure that the learning of our target audience is promoted, principles of adult education and learning have been applied while creating the manual and in-service. It has been found that the learning styles and learning needs often greatly vary for each individual, thus information has been provided in multiple media forms (Bastable et al., 2020; Kitchie & Arnaud, 2020). To support those who are visual learners, images of various types of adaptive equipment, adaptive sports, and safety procedures have been included. The manual includes detailed steps that are written out and state how to create and implement adaptive sports programs and related information on how to do this safely. During the in-service, the learning methods used will address both passive and active learner roles. Lectures and demonstrations from occupational therapists are provided to use a variety of educator styles to enhance the learning for those who are auditory learners and those who learn best from observations (Fitzgerald & Jacobs, 2020). Learners will be encouraged to practice implementing the content learned during the in-service to support kinesthetic learning. Although this product was created with the intention of being utilized by OTs and teachers, it is essential to provide information in as simple and straightforward of a manner as possible to ensure understanding of the information provided so that the steps of creating and implementing an adaptive sports program are easy to follow and safety precautions are considered.

### **Occupation-Based Model**

The model selected to guide the creation and implementation of this product is the model of occupational adaptation (OA). This model focuses on a desire for mastery, demand for mastery, press for mastery and role expectations (Grajo, 2017). The desire for mastery is an individual's desire to master their environment which occurs through participation in occupations (Grajo, 2017). The individual's level of mastery and the environment's demand for



mastery create role demands, expectations, and challenges, which are referred to as the press for mastery (Grajo, 2017). When looking at children with physical disabilities, there are many occupations that can be impacted due to the mismatch of their abilities and environmental demands. Engagement in leisure and physical activity is often one of the occupations affected. As previously mentioned, participation in sports programs can have many physical, psychological, and social benefits. However, variances in the ability levels of children with physical disabilities can impact their ability to successfully engage in these programs. When using OA, an important role of occupational therapists is eliciting adaptive responses from individuals and enabling them to participate in meaningful occupations. When applying this to sports programs, this often means changing the way occupations are completed, such as changing the rules of the sport/game. It may also mean changing how these occupations are completed by utilizing adaptive devices/equipment including the types of adaptive sports equipment mentioned above so that children can meet the environmental demands for mastery. Applying concepts from OA is beneficial to understanding the match between the demands for mastery and children's level of mastery. This is necessary when developing a product, such as ours, to ensure that necessary measures are utilized to enable engagement in adaptive sports programs and ensure that it meets the needs of our target population.

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## Chapter III

### Methodology

The purpose of this chapter is to provide an overview of the process taken to create this scholarly project of implementing adapted sports programs in schools to promote inclusion for children with disabilities. The first step taken to develop this scholarly project was to review the existing literature regarding the impact of adapted sports on individuals with physical disabilities. Resources were pulled from scholarly and reputable databases including CINAHL and PubMed. Literature from the *American Journal of Occupational Therapy* (AJOT) on the American Occupational Therapy Association (AOTA) website was also utilized throughout the research process. The search terms that were utilized included: “adapted equipment,” “adaptive equipment,” inclusion, intervention, “mental health,” “occupational therapy,” “mental health,” sports, disabilities, “Special Olympics,” “quality of life,” children, pediatric, adolescence, and “physical activity”. The authors then completed critical review forms to assess reliability, credibility, and relevance of the literature to the scholarly project. Research was also collected from other internet sources including: Moveunited.com, merriam-webster.com, medical-dictionary.com, Unique Inventions, Inc.Hub.permobil.com, Cen2.sportngin.com, Iwbf.org, sadlersports.com, sportsabilities.com, and challengedathletes.org. The focus of the web searches was to determine the definitions of key terms, the official rules of the adapted sports, available funding options, and insurance information for individuals participating in adapted sports. The two textbooks used throughout the literature review included *Health Professional as Educator: Principles of Teaching and Learning* by Bastable, Myers, and Binion, (2020) and *Perspectives of Human Occupation: Theories Underlying Practice* by Grajo (2017). Based on our research findings, there was an evident gap in the literature for adapted sports programs implemented in



schools for children with physical disabilities. The gap in literature supported our idea of creating a manual that occupational therapists will implement at an in-service to educate teachers on the benefits of adapted sports programs and provide guidance on how to implement them in schools.

When creating this product, the occupation based model chosen to guide the process was occupational adaptation (OA) because it focuses on individuals' desire and demand for mastery to meet their role expectations. This model helps to better understand how an individual's environment, skills, and occupational demands can affect their engagement in occupations. Children with physical disabilities have the desire to engage in sports like their peers in order to fulfill roles as an athlete, teammate, and friend. Adapting the different aspects of a sport to fit the unique needs of each individual allows the individuals to achieve their desired social roles and achieve mastery in the sport.

The product designed for this project was created to present to other occupational therapists, specifically occupational therapists who work with the school system. Once the occupational therapists are educated on the content, the intent is for them to then present the product to school personnel to educate teachers on implementing adapted sports programs at their school. The product consists of an in-service manual that the occupational therapists will use when educating teachers during an in-service on the need for implementing adapted sports programs in schools. The manual covers an overview of the goals of an adapted sports program, the risks/benefits of adapted sports, training of coaches/officials, funding sources available, a pre/post-test, advertisement template, sports registration and consent forms, insurance information, and examples of the rules and the equipment needs for sled hockey, wheelchair basketball, and seated volleyball. The participants of the in-service events will receive a handout,

watch the PowerPoint presentation, and engage in hands-on activities of the three selected sports, sled hockey, wheelchair basketball, and seated volleyball.

## **Chapter IV**

### **Product**

Participation in adaptive sports programs offers many health benefits, including improved mental and physical health, enhanced social participation, greater quality of life, and increased engagement in meaningful occupations (Aytur et al., 2018; Frumberg et al., 2019; Moss et al., 2020). Despite offering many benefits, children with physical disabilities often do not participate in adaptive sports programs due to many barriers such as cost, few programs, limited access, and lack of awareness of available programs (Bloeman, 2015; Braza et al., 2018). The product for this scholarly project is intended to be used to train occupational therapists affiliated with the school systems on the steps needed to implement adapted sports programs in their schools. Once the occupational therapists are trained, they will use this manual to educate school personnel so that they can begin to implement adaptive sports programs within their schools to ensure that children with physical disabilities can participate in these and access the many health benefits that this participation can offer. This manual can also be provided to caregivers for further information on adaptive sports programs, including risks, benefits, adaptive equipment, and funding.

#### **What Are Adapted Sports**

An adapted sport is any sport that has been adapted to meet the skills and needs of an individual who may have some form of physical limitation (Tow et al., 2020). Nearly all sports can be adapted in some way in order for individuals to participate in that sport; for this reason there are an extensive number of possible adaptive sports programs that can be created. The programs created will depend on location, resources, funding, interest from individuals, and number of people involved. Common adaptive sports programs include adaptive basketball,

baseball, bowling, and football (Tow et al., 2020). It is important to offer as many adaptive programs as possible because the interests of children vary, and it is important to reach as many children as possible so that they can access the many benefits that these programs can offer.

### **Benefits and Risks**

Engagement in adaptive sports provides many health benefits. Adaptive sports programs have a positive impact on both mental and physical health, improved social participation, increased quality of life, improved function in ADLs and encouraged engagement in meaningful occupations (Aytur et al., 2018; Diaz et al., 2019; Frumberg et al., 2019; Moss et al., 2020).

Engagement in physical activity such as participating in adaptive sports can be effective in preventing disease progression and secondary conditions such as obesity (Jirikowic & Kerfeld, 2016). Engagement in adaptive sports programs can also lead to increased self-efficacy and self-esteem, which can lead to greater engagement and performance in other areas within their lives including various ADLs and IADLs (Tow et al., 2020). Improved performance in ADLs, greater physical health, increased social participation, and enhanced mental health all result in an overall increase in the quality of life of individuals with physical limitations (Tow et al., 2020; Cote-Leclerc et al., 2017). The levels of quality of life for individuals with mobility limitations is comparable to that of the general population without physical limitations when they participate in adapted sports (Cote-Leclerc et al., 2017).

Despite there being many benefits to engaging in adaptive sports programs, there are some risks. The most prevalent risks related to engaging in adaptive sports programs include physical injuries resulting from playing sports and skin breakdown due to improper fitting equipment (Bloemen et al., 2015). An increased awareness of and focus on providing appropriate equipment and adapted sports in a child's own environment including schools, sport clubs, and

community will likely increase the physical activity levels of those with physical disabilities (Bloemen et al., 2015).

### **Program Development**

There are multiple steps to complete when developing an adapted sports program. These steps include but are not limited to: creating goals for the program, different funding options, advertisement for players and volunteers, training for parents and volunteers, registration process and consent forms, insurance for the program, and how to obtain and fit the proper equipment needed to ensure safety of the players. These steps in developing an adapted sports program are the basics and may look different depending on location and population size in the community the program is being implemented in. The in-service provided by occupational therapists will educate teachers and caregivers on how to implement each of these steps when developing an adapted sports program in their school.

### **Description of the Product**

The manual for our product will include many different topics related to the steps that are required when implementing an adaptive sports program within schools. The manual begins by providing information regarding the need and importance of promoting engagement in adaptive sports programs for children with physical disabilities and will address the many benefits that this provides. Following this, the manual includes definitions of relevant terms to ensure a strong understanding of how to implement these programs. Once terms have been defined, there is a section identifying ways that the programs can advertise to recruit as many children and families in the community as possible along with people and organizations who would like to volunteer their time to hold the roles of coaching or officiating the sports teams. There is information regarding the registration process for the parents and how to fill out the consent forms that will

be obtained before the child's participation in the sports. Different funding sources including insurance or grant funding are discussed to ensure children have access to the proper equipment needed to promote safety. Lists and images of different types of adaptive equipment and their prices are included in the in-service lecture along websites where they can be purchased. Further information and training is provided on different types of adaptive sports and any rules or regulations related to each sport. Precautions and proper fitting of equipment are also addressed during the in-service training to ensure children's safety while engaging in the adaptive sports programs.

### **Occupation-Based Model**

When creating this product the theory of occupational adaptation (OA) was used as a guide and provided an understanding on how an individual's environment, skills, and occupational demands can affect engagement and function within occupations. The OA model emphasizes the desire for mastery, demand for mastery, press for mastery and role expectations (Grajo, 2017). When an individual has a desire to master their environment, this is considered one's desire for mastery and this occurs through participation in occupations (Grajo, 2017). A press for mastery is created through an individual's level of mastery and the environmental demand for mastery; this press for mastery includes role demands, expectations, and challenges (Grajo, 2017). A mismatch between the press for mastery and an individual's abilities can lead to limited participation and function in meaningful occupations. In the case of children with physical disabilities, many meaningful occupations that are typical in a child's daily life can be negatively impacted; this includes engagement in leisure and physical activity. To address mismatches between press for mastery and an individual's abilities, occupational therapists focus on eliciting adaptive responses from individuals and enabling them to participate in the

occupations that are meaningful to them (Grajo, 2017). To elicit these responses and enable participation in sports programs, aspects of the occupation such as the rules, equipment, and adaptive equipment, and environment may be changed for a greater match (Grajo, 2017).

Utilizing the OA model is an essential part of this product as it ensures that necessary measures are utilized to enable engagement in adaptive sports programs and meets the needs of our target population.

**A Resource Guide for Occupational Therapists for the  
Implementation of Adapted Sports Programs in Schools**

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**&**

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## Table of Contents

<b>GOALS OF THE PROGRAM.....</b>	<b>41</b>
<b>COACHES / OFFICIALS TRAINING .....</b>	<b>41</b>
<b>ADAPTED SPORTS EQUIPMENT.....</b>	<b>42</b>
<b>FUNDING SOURCES.....</b>	<b>43</b>
<b>PRE-TEST / POST-TEST.....</b>	<b>45</b>
<b>TEST KEY.....</b>	<b>47</b>
<b>ADAPTED SPORTS PROGRAMS.....</b>	<b>49</b>
<b>OCCUPATIONAL ADAPTATION.....</b>	<b>49</b>
<b>BASKETBALL.....</b>	<b>52</b>
<b>EQUIPMENT.....</b>	<b>52</b>
<b>RULES.....</b>	<b>53</b>
<b>FITTING EQUIPMENT.....</b>	<b>53</b>
<b>EQUIPMENT VENDOR .....</b>	<b>54</b>
<b>HOCKEY.....</b>	<b>55</b>
<b>EQUIPMENT.....</b>	<b>55</b>
<b>RULES.....</b>	<b>56</b>
<b>FITTING EQUIPMENT.....</b>	<b>57</b>
<b>EQUIPMENT VENDOR .....</b>	<b>58</b>
<b>VOLLEYBALL.....</b>	<b>59</b>
<b>EQUIPMENT.....</b>	<b>59</b>
<b>RULES.....</b>	<b>60</b>
<b>EQUIPMENT VENDOR.....</b>	<b>61</b>

<b>INSURANCE .....</b>	<b>61</b>
<b>ADVERTISEMENT.....</b>	<b>62</b>
<b>STUDENT REGISTRATION FORM.....</b>	<b>65</b>
<b>INFORMED CONSENT &amp; ACKNOWLEDGEMENT FORMS.....</b>	<b>66</b>
<b>RESOURCE HANDOUT.....</b>	<b>68</b>
<b>REFERENCES .....</b>	<b>70</b>

## **Goals of the Program**

1. Demonstrate need for adaptive sports programs within the school system
2. Provide all needed forms and information necessary to create and implement adaptive sports programs
3. Introduce commonly adapted sports, define key terms, develop a strong understanding of equipment, rules, and safety
4. Ensure all in-service participants are confident and competent in creating/implementing adaptive sports programs that encourage a level of mastery from all children who participate
5. Promote creation of adaptive sports programs to increase engagement of children with physical disabilities through creating a successful match between each child's level of mastery and the demand for mastery

## **Coaching / Officials Training**

The schools implementing the adapted sports program will provide the coaches and officials needed for the program. The coaching and officiating staff will be required to complete training courses to become certified in the adapted sports offered at their school. There are multiple training options for coaching and officiating adapted sports. The American Association of Adapted Sports and The National Federation of State High School Associations are two of the organizations that offer training for coaches and officials in different adapted sports. Individuals can partake in the courses and earn certificates in order to be a coach or official for the adapted sporting events. Receiving this training allows for schools to be more inclusive to the children with physical disabilities that want to participate in sports with their peers. It is important to complete these training sessions before taking on a role as a coach or official of an adapted

sports team in order to promote safety for the individuals that are participating in the sporting event.

## **Adapted Sports Equipment**

Occupational therapists have the knowledge and skills to take on the role of training individuals to properly fit the adapted sports equipment. Occupational therapists are well equipped to measure and fit individuals with a wheelchair or other equipment needed for adapted sports to best fit individual needs. The occupational therapists presenting the adapted sports in-service will provide education and training on how to properly fit equipment by introducing the information, demonstrating each step of the fitting process in an activity, and providing the participants with an educational handout for each step that they can keep for future use. Once the adapted sports program is implemented, the occupational therapists at the school will have the long-term role of assisting school personnel in fitting equipment to the children and grant writing for funding the program. With any new sports being implemented at the schools, the occupational therapists will play a consultative role in modification of the environment and fitting any new equipment to the participants.

The equipment needed for adaptive sports programs will vary with each sport. However, there are many sources that provide access to a variety of types of adaptive equipment. An organization called Move United, which also provides grants for adaptive equipment and related costs, also includes a list of adaptive equipment common to a variety of sports and links to suppliers where this equipment can be purchased from (Move United, n.d.). Another source for adaptive equipment is the Challenged Athletes Foundation; this foundation also provides grants for related costs and equipment and are partnered with a variety of organizations that provide adaptive equipment and prosthetics that allow children to engage in adaptive sports programs

(Challenged Athletes Foundation, n.d.). There are also resources that provide information related to purchasing a wide variety of adaptive equipment in each state. One such resource is called Sports Abilities, and the website for this organization provides lists of both grants and adaptive equipment available in each state and indicates what the adaptive equipment can be used for (Sports Abilities, n.d.). Additionally, members of the community or local organizations may donate adaptive equipment or equipment that can be modified for children with physical disabilities to use. The websites for equipment and funding options are listed on the resource handout in the manual.

## **Funding Sources**

There are many costs associated with having a child with a physical disability in general, and high costs of adaptive sports programs can act as a deterrent from participating (Bloemen et al., 2015; Shields & Synnot, 2016). Implementing the adapted sports programs through the school district will allow children of all socioeconomic statuses to participate due to the school district covering the majority of costs. Because the adaptive sports programs will be created within schools, the programs will have free access to necessary spaces such as gyms, ice rinks, and tracks. There are a variety of funding sources that can be utilized for the extra sport expenses, equipment, prosthetics, and other costs related to participating in adaptive sports programs (Challenged Athletes Foundation, n.d.). There are grants available at both the state and national levels. Grant eligibility can vary based on location of city and state. One grant program available at the national level is the Challenged Athletes Foundation. The Challenged Athletes Foundation provides annual funding for individuals with permanent physical disabilities to support their engagement in sports and promote physical fitness (Challenged Athletes Foundation, n.d.). Another national grant program that can provide funding is through the Move

United organization, which assists over 60,000 children in costs related to participation in adaptive sports to encourage the development of independence, confidence, and physical health (Move United, n.d.). Along with grants varying based on the location of the adaptive sports program, the grants available may also vary based on the sports or equipment needed as well as the physical disabilities of the individuals who are involved. For example, there are grants available specifically to individuals who have experienced spinal cord injuries or TBIs. A list of grant resources is located on the resource handout in the product manual.

Name: \_\_\_\_\_

### PRE/POST-TEST

#### Fill out BEFORE and AFTER in-service on implementing adapted sports programs

Please circle the letter for the BEST answer to each question.

1. What is the definition of adapted sports?
  - a. Wheelchair sports
  - b. Sports played only by people with physical disabilities
  - c. Sports than are inclusive of those with physical disabilities
2. What sports can be adapted?
  - a. Basketball
  - b. Volleyball
  - c. Track
  - d. Hockey
  - e. All the above
3. Adapted sports are more dangerous than standard sports.
  - a. True
  - b. False
4. Adapted sports are shown to have a positive effect on what population?
  - a. Adults with physical disabilities
  - b. Children with physical disabilities
  - c. Adults with psychosocial disabilities
  - d. Children with psychosocial disabilities
  - e. All of the above
5. Where can adapted sports equipment be purchased?
  - a. Sportsimports.com

- b. Sunrisemedical.com
  - c. Uniqueinventionsinc.com
  - d. All of the above
6. What type of risks can occur with participation in adapted sports?
- a. Pressure sores
  - b. Fractures
  - c. TBI
  - d. Bruises
  - e. All of the above
7. Individuals without physical impairments can participate in adapted sports.
- a. True
  - b. False
8. Benefits of participation in adapted sports include:
- a. Increased confidence
  - b. Increased social skills
  - c. Decreased societal stigma towards those with disabilities
  - d. All of the above
9. Rules of adapted sports are the same as standard sports.
- a. True
  - b. False
10. Do you feel prepared to implement an adapted sports program in your school?
- a. Yes
  - b. No



Name: \_\_\_\_\_

### TEST KEY

Please circle the letter for the BEST answer to each question.

1. What is the definition of adapted sports?
  - a. Wheelchair sports
  - b. Sports played only by people with physical disabilities
  - c. **Sports than are inclusive of those with physical disabilities**
2. What sports can be adapted?
  - a. Basketball
  - b. Volleyball
  - c. Track
  - d. Hockey
  - e. **All the above**
3. Adapted sports are more dangerous than standard sports.
  - a. **True**
  - b. False
4. Adapted sports are shown to have a positive effect on what population?
  - a. Adults with physical disabilities
  - b. Children with physical disabilities
  - c. Adults with psychosocial disabilities
  - d. Children with psychosocial disabilities
  - e. **All of the above**
5. Where can adapted sports equipment be purchased?
  - a. Sportsimports.com
  - b. Sunrisemedical.com

- c. Uniqueinventionsinc.com
  - d. All of the above**
6. What type of risks can occur with participation in adapted sports?
- a. Pressure sores
  - b. Fractures
  - c. TBI
  - d. Bruises
  - e. All of the above**
7. Individuals without physical impairments can participate in adapted sports.
- a. True**
  - b. False
8. Benefits of participation in adapted sports include:
- a. Increased confidence
  - b. Increased social skills
  - c. Decreased societal stigma towards those with disabilities
  - d. All of the above**
9. Rules of adapted sports are the same as standard sports.
- a. True
  - b. False**
10. Do you feel prepared to implement an adapted sports program in your school?
- a. Yes
  - b. No

## **Adapted Sports Programs**

The programs implemented at each school may vary based on the location of the school and the interests of the students at these schools. The product manual created includes three commonly adapted sports programs that are relevant within the state of North Dakota as examples. The examples listed below include a brief introduction to the sport, the rules, equipment, and how to properly fit the equipment. This information has been included to ensure there is a basic knowledge of the sport, understanding of the materials needed, and ability to properly fit equipment to prevent injuries. The adaptive sports programs provided at each school will be open to children of all ability levels to decrease the marginalization of children with physical disabilities, encourage social interaction between similar aged peers, and ensure that there are large enough numbers to support the implementation and success of the programs implemented.

### **Occupational Adaptation Model**

The creation of this product was guided by concepts from the occupational adaptation model. The model considers the interaction between the individual and the environment that occupations are performed in (Grajo, 2017). This model was selected due to the focus on this interaction; when creating and implementing adaptive sports programs, it is essential to consider how the abilities of an individual abilities and their environment interact or fit to ensure successful engagement in meaningful occupations. This model asserts six guiding principles which were each considered when forming this; these principles are listed below (Grajo, 2017).

6 Principles of OA (Grajo, 2017, pp. 91-292):

1. “The person is an occupational being who has a desire to master their environment”
2. “The occupational environment demands mastery from the person”
3. “The person’s level of mastery and the environment’s level of demand for mastery creates roles, role demands, challenges, and responses”
4. “To navigate the press for mastery, the person goes through the process of occupational adaptation”
5. “During participation in occupations within a given environment, the person may experience an occupational performance breakdown and will either produce an adaptive or maladaptive response”
6. “The role of the occupational therapist is to elicit an adaptive response from the person, facilitate the environment, and use occupations to promote the occupational adaptation process”

These principles can be applied to children with physical disabilities and their engagement in adaptive sports programs. As stated within the principles, there is both a desire by the individual to master their environment and demands from the environment that must be met in order to achieve this mastery (Grajo, 2017). In order to successfully master an occupation, the individual will go through a process of occupational adaptation which either results in an increased level of mastery or a maladaptive response (Grajo, 2017). When considering how this applies to children it is important to consider that as they age, they often have increased involvement in a variety of occupations and a growing desire to achieve independence within their daily lives (Vroman, 2015). Children begin to become more involved in occupations such as Activities of Daily Living (ADLs), education, social participation, and leisure (Vroman, 2015).

Engagement in sports programs falls into the category of both leisure and social participation as playing sports is typically done for one's own enjoyment and is performed with similar-aged peers. Children have a desire to master their environment due to an increased desire to conform to peer groups (Vroman, 2015). If a child's abilities to perform a sport do not match the environmental demands of the occupation, the child will not be successful in achieving desired mastery which may lead to the previously mentioned consequences (Grajo, 2017). When a child has difficulty during social participation, including fitting in with peers, this can lead to maladaptive responses including behaviors such as engaging in illegal activities and abusing substances (Vroman, 2015). This difficulty fitting in with peers can also have a negative impact on their overall health and lead to long-term psychosocial consequences including poor self-esteem, eating disorders, and depression (Vroman, 2015). To prevent the development of these negative consequences during children's essential formative years, it is necessary to promote success within all meaningful occupations.

In order to promote success within adapted sports, adaptations can be made to allow a child to achieve a level of competence and mastery in the sport, which increases inclusion with peers. Adaptations to sports are made through the use of adaptive equipment; common forms of adaptive equipment are further described below. Not only does use of adaptive equipment allow children with physical disabilities to achieve mastery in sports programs, it also promotes inclusion and creates an equal playing field for children of all ability levels. In seated volleyball, a teenage girl with disabilities may have difficulty dealing with exclusion from activities and her body image when compared to her peers, and engaging in seated volleyball and finding herself successful will increase her self-confidence and social roles with her peers. These adaptations allow for increased inclusion of children with disabilities, which fulfills their role demands and

desire of becoming occupational beings.

## **Basketball**

The sport of basketball is one of the most commonly adapted sports programs; when adapted, this sport is frequently termed “wheelchair basketball” (Moss, Lim, Prunty, & Norris, 2020). It is termed wheelchair basketball because the main adaptation made to this sport is the use of a specialized sports wheelchair that allows players with a variety of ability levels to engage in the sport.

### **Equipment:**

It is essential that wheelchairs are properly fitted for each player to ensure that their range of motion is not limited by the wheelchair and so they can effectively propel themselves on the court using their chair. Additionally, wheelchairs can cause bruising, skin breakdown, pressure sores, and other related injuries from contact with portions of the wheelchair. Along with ensuring a proper fit of the chair, wheelchair cushions are also beneficial to use as this reduces pressure on the player’s bottom and decreases the likelihood that pressure sores will form.

The following equipment is needed for wheelchair basketball:

- Two backboards each with a basket attached which is comprised of pressure release rings and nets
- One Basketball
- Playing court
- Wheelchair

**Rules:**

Each game will consist of two teams each with 5 players on the court at a time (IWBF, 2021). The purpose of the game is to get the ball into the basket on the opposing team's side and prevent the other team from making baskets on your own net (IWBF, 2021).

Each game consists of four quarters that are each 10 minutes in duration (IWBF, 2021).

Throughout the game, all players must remain seated in their wheelchairs and if they have the ball must dribble once every two pushes (IWBF, 2021). For the safety of all players a term called the "cylinder principle" is applied at all times; this principle applies to the space around each player that can be visualized as a vertical cylinder around the player in which other plays may not cross (IWBF, 2020). This space can be defined as the following:

- Front: Palms of hands and footrest/horizontal bar of wheelchair
- Rear: The outside edge of the wheels
- Sides: The outside edges of the wheels where they contact the floor of the court

Additional measures are also taken to protect all players and ensure that players without physical disabilities do not have an advantage over those who do (IWBF, 2021).

Violation of rules related to these concerns either result in a personal foul if the player holds, blocks, pushes, charges, or trips a player or a physical advantage foul if the player does not remain seated in their wheelchair (IWBF, 2021).

**Fitting Equipment:**

When fitting someone for a wheelchair, the 90-90-90 rule should be followed (Permobil, 2019):

- 90 degree bend in the hips
- 90 degree bend in the knees
- 90 degree bend in the ankle

The person's bottom should be all the way to the back of the chair with contact on the back of the wheelchair with their thighs parallel to ground and knees in line with hips (Permobil, 2019). Additionally the seat should be wide enough to comfortably fit their hips without the sides of the chair rubbing on their body (Permobil, 2019). The height of the wheelchair back will vary based on the height of the person and the level of support they need but should not block their range of motion (Permobil, 2019). If footrests are used, their footrests should not contact the floor, nor should they be raised too high as this can lead to a pelvic tilt which can cause discomfort and lead to injury (Permobil, 2019).

#### **Equipment Vendor Options:**



(Sunrise Medical. n.d.). Used with written permission of photographer

Cost: \$3009

Vendor: Sunrise Medical

Link: <https://www.sunrisemedical.com/manual-wheelchairs/quickie/sports-wheelchairs>



# Hockey

## Equipment:

The sport of ice hockey can be adapted to a modified version of the sport which is referred to as sledge hockey (Hawkeswood, Finlayson, O'Connor, & Anton, 2011). The term “sledge” comes from the name of the adaptive equipment used in this sport, which is typically called either a sled or sledge; players sit on this equipment and propel themselves on the ice (Hawkeswood et al., 2011). The sledge consists of two steel hockey blades approximately 3 mm in width. On top of this sits a frame and rounded metal front to protect the feet (Hawkeswood et al., 2011). Per USA Hockey (2020) guidelines, sled frames can be constructed from steel, aluminum, titanium, or magnesium. The frame of the sled must be rounded and be 1.5 cm- 3 cm in diameter (USA Hockey, 2020).

Straps are connected to the frame of this sledge and are used to secure the players' feet, ankles, and knees (Hawkeswood et al., 2011). Along with use of a sledge, players also utilize two hockey sticks, which are used on both sides of the body to maneuver themselves on the ice and handle the puck (Hawkeswood et al., 2011). Typically, players use the proximal end of the stick for propulsion and distal end for handling and shooting the puck (Hawkeswood et al., 2011). Along with the adaptive equipment needed for this sport, the standard equipment and materials are also needed. This includes the following:

- One puck
- Two nets
- One ice rink that is between 185-200 feet long and 85-100 ft wide with the ends rounded (USA hockey, 2020) The rink is to be marked with two blue lines and three red lines.

**Rules:**

Each game will consist of three 13-minute time periods and each team is allowed one 60-second time out (USA Hockey, 2020). During play, each team may only have a total of six players on the ice at a time, not including pushers (USA Hockey, 2020). Pushers are individuals who assist players by propelling and/or maneuvering themselves if they are unable to do so on their own; pushers are not allowed to interact with the puck or interfere with other players (USA Hockey, 2020). Additionally, the following actions are prohibited to protect the safety of all players (USA Hockey, 2020):

- High-sticking: When a player raises a stick above shoulder height
- Holding: When a player holds the sled or body of someone on the opposing team
- Checking: Hitting a player from the opposite team using the own player's body
- Tripping: When a player hits, pulls, or hooks the blade out from under another players sled
- Butt-ending: When a player uses the shaft of their stick above hand level, to check/hit another player
- Teeing: When a player makes contact with the front aspect of their slide into the side of an opposing players sled.

If any player violates these rules by performing any of the actions listed above, this will result in a penalty during which the player's team is shorthanded for a specified amount of time with 2-minutes for minor, 5-minutes for major, and 10-minutes for misconduct (USA Hockey, 2020). The term "shorthanded" is defined as "having, working with, or done with fewer than the regular or necessary number of people." (Merriam-Webster., n.d., Definition 1).

**Fitting Equipment:**

Ensuring proper fit of equipment is essential to maximize each player's ability to engage in the adaptive sport. If a player's stick or sled is not the right size, it may inhibit the player's ability to maneuver on the ice, propel themselves, and handle the puck.

Additionally, if equipment does not fit correctly, it can lead to skin breakdown such as pressure sores, lead to discomfort, cause joint pain, and increase likelihood of contact related injuries due to protective forms of equipment not serving their intended purpose.

**Stick:**

- Measure from floor to chin when seated in the sled, then add 4 inches (Unique Inventions Inc., 2000).

**Sled:**

Fitting for the sled should be completed with the individual seated at 90 degrees with their back against the wall with both legs extended, with a slight bend in knees for comfort (Unique Inventions Inc., 2000)

- Frame length: Measure from wall to the bottom of the feet (Unique Inventions Inc., 2000).
- Frame width: Sit with feet together and measure width of the bottom of the feet at the widest part of the heel (Unique Inventions Inc., 2000).
- Bucket width: Put a book on each side at the widest part of the hips and measure between the books (Unique Inventions Inc., 2000).
- Bucket length: Measure from wall to just above the knees (Unique Inventions Inc., 2000).

## Equipment Vendor Options:

Sticks:



**Top View**

(Unique Interventions Inc. n.d.). Used with written permission of photographer

Cost: \$105.00

Vendor: Unique Inventions Inc.

Link: Sticks & Accessories – Unique Inventions ([uniqueinventionsinc.com](http://uniqueinventionsinc.com))

Picks:



(Unique Interventions Inc. n.d.). Used with written permission of photographer

Cost: \$28.50

Vendor: Unique Inventions Inc.

Link: Sticks & Accessories – Unique Inventions ([uniqueinventionsinc.com](http://uniqueinventionsinc.com))

Sled/Sledge:



(Unique Interventions Inc. n.d.). Used with written permission of photographer

Cost: \$629

Vendor: Unique Inventions Inc.

Link: <https://www.uniqueinventionsinc.com/rev-force-1/>

## **Volleyball:**

The standard game of volleyball can be adapted to seated volleyball to be inclusive of those with physical disabilities. During seated volleyball there are still six players on the court for each team separated by a net across the center. The players are required to be seated and the net is at a lower height than the standard game of volleyball.

### **Equipment:**

The equipment required for seated volleyball is the same as standard volleyball to include a net and a ball. The main difference between standard and seated volleyball is that the net height is lower for seated volleyball. The net height can be increased or decreased based on the skill level of the individuals that are participating. The nationally recognized standards for seated volleyball include the net height reduced to 80cm (Move United, n.d.). There are different regulations for men's and women's leagues for net height. In regulation play for men, the net is raised to 1.15m, or approximately 3 ft., 9.28 in. and for women, 1.05m, or approximately 3 ft., 5.34 in. (Move United, n.d.).

Players are seated on the floor of the court unless they require a wheelchair, which usually involves those with spinal cord injuries. The size dimensions of the court are also reduced for seated volleyball. The regulation court size for seated volleyball is 32 feet, 9.7 in. x 19 ft 8.22 in. with a 6 ft, 6.73 attack line (Move United, n.d.).

Another way that seated volleyball can be adapted is the use of a training volleyball. A training volleyball is larger than a standard volleyball, but is lighter in weight. It is easier to control the movements with a training volleyball than the standard volleyball and is commonly used for beginners in the sport.

**Rules:**

Like standing volleyball, there are six players on the court for each team. The position of each player is determined and controlled by the position of their bottoms. A player's hands and legs may lie in the attack or free zone outside the court (Move United, n.d.).

The object of the game is still to hit the ball over the net with a maximum of three touches and land it in the opposing team's court to score a point (Move United, n.d.). The games are played up to 25 points and a team must win by 2 or more points (Move United, n.d.). Although there are similarities between standing and seated volleyball, there are also important differences during seated volleyball that allow for children with a wider range of ability levels to participate in the sport. These differences include smaller court dimensions, players' bottoms remaining in contact with the floor when completing any type of hit, and players being permitted to block or attack an opposing team's serve (Move United, n.d.). Additionally, back row players can hit but cannot touch or cross over the attack line with their bottom (Move United, n.d.). Finally, the only parts of a

player's body that may cross the centerline of the court are the player's hands (Move United, n.d.).

### **Equipment Vendor Options:**



(Sports Imports. n.d.). Used with written permission of photographer

Vendor: [sportsimports.com](https://www.sportsimports.com)

Link: <https://www.sportsimports.com/indoor-volleyball/steel-net-systems/del11-sitting-steel-volleyball-upright/>

## **Insurance**

The adapted sports program will have liability insurance covered through the school as well as additional insurance for disabled sports also covered by the school since there is a higher risk of injury to those who have existing physical disabilities. One company called Sadler Sports and Recreation provides liability insurance for organizations who have participants that are disabled and participate in adapted sports (Sadler, n.d.). There are different types of coverage and rates based on the type of program, ages of individuals participating, and severity of disability

(Sadler, n.d.). The school will require parental consent to be obtained prior to the child participating in the adapted sports program. Coaches and officials will have a duty to prioritize the safety of the participants and will need to be knowledgeable of when to stop the play. Even though the program will have insurance, it is important to note that coaches and officials can still be held accountable for their actions or non-actions.

## **Advertisement**

The following advertisement was created to spread awareness of the adaptive sports programs available at each school; these can be altered to include the specific programs and costs for each school. Increasing awareness of adaptive sports programs will encourage more children to engage in these programs, thus accessing the many benefits that they have to offer. The advertisements can be placed online on a school's website or printed and displayed around the community, at parent support groups in the community, physical/occupational therapy rehabilitation sites, community newspaper, churches, and at the schools where the programs will be implemented. Possible sources when recruiting children with physical disabilities include special education teachers in the school and Special Olympics programs from the community. Additionally, an increased number of children interested in these programs will lead to larger teams and the ability to offer a larger variety of adaptive sports in each school.





<https://theconversation.com/superhip-to-supercrip-the-trickle-down-effect-of-the-paralympics-9009>

# JOIN ONE OF OUR ADAPTIVE SPORTS PROGRAMS

**Meet new friends, build lifelong skills, and play a sport you love!**

**Adaptive sports offer many benefits including greater social skills, promoting mental health, confidence, independence, and increased physical health**

**Sports Offered:**

**Cost:**

**Start  
Date:**

**To join our team,  
volunteer, or donate  
please call, email, or  
visit our website!**

School Name  
City, ST ZIP Code  
Telephone

Web Address

Dates and Times

# Student Registration Form

## Student Name:

First name: \_\_\_\_\_ Last name: \_\_\_\_\_

Birth Date (mm/dd/yyyy): \_\_\_\_\_ Gender: Male or Female

## Address:

Street address 1: \_\_\_\_\_

Street address 2: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

## Parent information:

First name: \_\_\_\_\_ Last name: \_\_\_\_\_

Email address: \_\_\_\_\_ Phone number \_\_\_\_\_

## Emergency contact information:

First name: \_\_\_\_\_ Last name: \_\_\_\_\_

Relationship to student: \_\_\_\_\_ Phone number: \_\_\_\_\_

Please list and describe any allergies or medical conditions the student has: \_\_\_\_\_

\_\_\_\_\_

---

## **Informed Consent and Acknowledgement**

I hereby consent for my child (\_\_\_\_\_) to participate in activities involved in the adapted sports program. By consenting, I understand that I assume all risk and hazards incidental to the conduct of the activities, and release, absolve and hold harmless all its respective staff and volunteers from any and all liability for injuries to said child arising out of traveling to, participating in, or returning from sporting events.

In case of injury to said child, I hereby waive all claims against the adapted sports program including all coaches and affiliates, all participants, sponsoring agencies, and owners of premises used to conduct the event. There is a risk of being injured that is inherent in all sporting activities. Some of these injuries include, but are not limited to, the risk of fractures, skin breakdown, paralysis, or death.

### **Medical Release and Authorization**

As Parent and/or Guardian of the named athlete, I hereby authorize the diagnosis and treatment by a qualified and licensed medical professional, of the minor child, in the event of a medical emergency, which in the opinion of the attending medical professional, requires immediate attention to prevent further endangerment of the minor's life, physical disfigurement, physical impairment, or other undue pain, suffering or discomfort, if delayed.

Permission is hereby granted to the attending physician to proceed with any medical or minor surgical treatment, x-ray examination and immunizations for the named athlete. In the event of an emergency arising out of serious illness, the need for major surgery, or significant accidental injury, I understand that every attempt will be made by the attending physician to contact me in the most expeditious way possible. This authorization is granted only after a reasonable effort has been made to reach me.

Permission is also granted to the school and its affiliates including Directors, Coaches, and Team Parents to provide the needed emergency treatment prior to the child's admission to the

medical facility.

Release authorized on the dates and/or duration of the registered season.

This release is authorized and executed of my own free will, with the sole purpose of authorizing medical treatment under emergency circumstances, for the protection of life and limb of the named minor child, in my absence.

---

Parent / Guardian Signature

---

Date

## Resource Handout

### Research on the Benefits of Adapted Sports Programs

Cote-Leclerc, F., Duchesne, G. B., Bolduc, P., Gelinias-Lafreniere, A., Santerre, C., Desrosiers,

J., Levasseur, M., & Boileau Duchesne, G. (2017). How does playing adapted sports affect the quality of life of people with mobility limitation? Results from a mixed-method sequential explanatory study. *Health & Quality of Life Outcomes*, 15, 1-8. Doi:

10.1186/s12955-017-0597-9

Super, S., Hermens, N., Verkooijen, K., & Koelen, M. (2018). Examining the relationship

between sports participation and youth developmental outcomes for socially vulnerable youth. *BMC Public Health*, 18 (1), N.PAG. Doi: 10.1186/s12889-018-5955-y

	<b>Organization</b>	<b>Link</b>
<b>Funding Sources</b>	<ul style="list-style-type: none"> <li>- Challenged Athletes Foundation</li> <li>- Sports Abilities</li> <li>- Move United</li> </ul>	<ul style="list-style-type: none"> <li>- <a href="https://www.challengedathletes.org/grants/">https://www.challengedathletes.org/grants/</a></li> <li>- <a href="https://www.sportsabilities.com/adaptive-equipment">https://www.sportsabilities.com/adaptive-equipment</a></li> <li>- <a href="https://www.moveunitedsport.org/chapters/chapter-grants/">https://www.moveunitedsport.org/chapters/chapter-grants/</a></li> </ul>
<b>Online Training Options</b>	<ul style="list-style-type: none"> <li>- American Association of Adapted Sports Programs</li> <li>- National Federation of State High School Associations</li> </ul>	<ul style="list-style-type: none"> <li>- <a href="http://adaptedsports.org/coaches-training/">http://adaptedsports.org/coaches-training/</a></li> <li>- <a href="https://nfhslearn.com/">https://nfhslearn.com/</a></li> </ul>

## **Equipment Fitting:**

### Wheelchair Sports (Basketball):

- When fitting someone for a wheelchair, the 90-90-90 rule should be followed:
  - 90 degree bend in the hips
  - 90 degree bend in the knees
  - 90 degree bend in the ankle
- The person's bottom should be all the way to the back of the chair with contact on the back of the wheelchair
- Thighs are parallel to ground and knees in line with hips
- Seat width: Wide enough to comfortably fit hips with sides of chair touching the body
- Seat depth: two inches from the back of the knee
- Height of wheelchair back: this will vary based on each players' needs
- Footrest: Avoid dragging of feet on floor or dangle from chair; footrests should not be raised to high as this can lead to a pelvic tilt

### Sled hockey:

- Stick length: Measure from floor to chin when seated in sled, then add 4 inches
- Frame length: Measure from wall to the bottom of the feet
- Frame width: Sit with feet together and measure width of the bottom of the feet at the widest part of the heel
- Bucket width: Put a book on each side at the widest part of the hips and measure between the books
- Bucket length: Measure from wall to just above the knees

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## **Chapter V**

### **Summary**

As previously stated, there are many health benefits, both physical and psychological, that engaging in sports programs can offer children (Aytur et al., 2018; Frumberg et al., 2019; Moss et al, 2020). It has also been mentioned that many barriers currently prevent children with physical disabilities from participating in these sport programs, preventing them from achieving the many benefits that they can offer (Bloemen et al., 2015; Lynch et al., 2019; Shields & Synnot, 2016). To address this, we have created a product with the intention of reducing common barriers to provide children with disabilities greater access to sports programs to promote physical and mental health, as well as increase social inclusion with similar aged peers. The product created is an in-service for occupational therapists that provides the resources and information needed to create and implement adaptive sports programs within school systems. This in-service includes the definition of key terms, information on advertising, funding sources, insurance, a pre/post-test, an overview of three of the most commonly adapted sports, equipment options, and fitting of equipment.

### **Limitations of the Product**

Although the product offers many benefits, there are some limitations to the product. Limitations of the product include a limited age range targeted and only addressing three adaptive sports. In the future, it would be beneficial to expand this product so it includes children of all ages and to include a greater number of adaptive sports so that new programs can be easily created to meet children's interests. Another limitation of this product is that it is time consuming, lasting approximately eight hours. Completing this in-service in one day may be difficult and unappealing for some personnel as it would need to be completed outside of work

hours, and thus, limit the number of people who attend. To address this, the in-service could be broken down into a shorter time each day and spread out throughout the week so that more people could attend. A final limitation of the product is that it was designed with the intention of being implemented as an in-person in-service. However, this may not be possible in the near future due to the current global pandemic. If in-person in-services cannot be held, it can occur through online methods such as Zoom. Unfortunately, this will inhibit the hands on learning that had been intended, particularly when covering how to properly fit adaptive equipment.

### **Proposal for Implementation**

To implement the product created, local schools can be contacted to see if they are interested in incorporating adaptive sports programs within their schools. When the schools are contacted, they will be provided information on the benefits that adapted sports offer, an overview of how programs would be implemented, and how the programs would be funded. After this has been completed, the next step will be to verify if the school already has occupational therapists employed or if they would need to be recruited from an outside source. As a further incentive to attend the in-service and implement adaptive sports programs, the in-service can be counted as continuing education for those who attend. After local occupational therapists have been reached, facilities in the community in which the in-services will be held will be determined; this will likely be at the school that the program will be implemented at. At the in-service, those who attend will be provided the necessary resources and information needed to initiate and maintain adaptive sports programs within schools. Participants will be encouraged to complete hands-on activities including practicing fitting adaptive equipment that has either been donated or has been obtained for future use in adaptive sports programs. It is necessary to practice fitting this equipment to ensure the safety of the children who participate in the adaptive

sports programs. At the start of the in-service, participants will complete a pre-test survey and at the end will complete a post-test survey. These surveys will be used to assess the effectiveness of the in-service and the need for further improvements. Participants will also complete a survey approximately one month after completing the in-service to follow up on the process of implementing and maintaining adaptive sports programs and address areas of concern that may have arisen to address in the future.

### **Conclusions**

Through extensive research, a great area of need was found for this population. For this reason, we created the product previously discussed. The creation of this product was guided by the occupational adaptation theory to ensure that all necessary areas were considered to provide the best fit between children with physical disabilities and the occupational demands of the sports programs they would be participating in. The product also incorporates aspects of teaching and learning theories to support the learning of all those who attend the in-service to facilitate the carry-over of knowledge when implementing adaptive sports programs. Although as previously mentioned, there are some limitations to this product, it offers many benefits and can be easily implemented by occupational therapists to improve the physical and mental health of children with physical disabilities by providing them access to participate in adaptive sports programs.

### **Recommendations for Future Action, Development, or Research**

Publication of this product is desired so that it can be implemented and provide the many benefits it has to offer to children with physical disabilities. Further research can be completed to follow-up on the adapted sports programs that have been implemented in schools to determine what has been successful and what changes needed to be made to be more appropriate for the specific schools. If the programs have been successful in the schools, it would be extremely

beneficial to expand this product by addressing more sports programs including both team sports and individual sports to support the interests of a greater number of children. It is also suggested that further research is done on implementing adaptive sports programs with a variety of ages and creating programs that reach a larger number of people of all ages. Additionally, research should be done on the best methods to utilize to implement the in-service online to reach a larger number of individuals and to ensure that the in-service can be completed even when in-person interactions are restricted due to precautions related to the current pandemic.

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## Appendix A

### PowerPoint Presentation

# **Creating an Adaptive In-School Sports Program to Increase Occupational Engagement and Performance in Children with Physical Disabilities: A Resource Manual for Occupational Therapists**

## **Product Overview**

This in-service was created to reduce common barriers children with physical disabilities experience related to participation in sports programs

The in-service was created to educate occupational therapists on adaptive sports programs and provide all necessary information and resources needed to implement these programs within schools

## **Theoretical Foundation: Occupational Adaptation**

- This model was selected because it considers the interaction between an individual's abilities and the demands of both the occupation and environment
- The interaction between these factors can determine if an individual is successful in engaging in desired occupations

Many children cannot participate in sports programs because there is a discrepancy between the individual's abilities and the demands of the occupation and the environment that it is performed in. This discrepancy prevents children with physical disabilities from participation in sports programs which can have significant physical and psychological health benefits including decreased obesity rates, increased self-confidence, and greater social inclusion. Using OA, this match between these factors is assessed and adaptations are made so the individual can still be successful in the occupation and achieve mastery (Grajo, 2017).

## Six Principles of Occupational Adaptation

1. “The person is an occupational being who has a desire to master their environment”
2. “The occupational environment demands mastery from the person”
3. “The person’s level of mastery and the environment’s level of demand for mastery creates roles, role demands, challenges, and responses”
4. “To navigate the press for mastery, the person goes through the process of occupational adaptation”
5. “During participation in occupations within a given environment, the person may experience an occupational performance breakdown and will either produce an adaptive or maladaptive response”
6. “The role of the occupational therapist is to elicit an adaptive response from the person, facilitate the environment, and use occupations to promote the occupational adaptation process”

(Grajo, 2017, pp. 291-292)

When referring to sports programs, children have the desire to master their environment which occurs through participating in the identified sport (Grajo, 2017). However, when a child has physical disabilities, the person’s abilities or level of mastery doesn’t meet the environmental demands of the environment. When this mismatch occurs, the child will either have an adaptive or a maladaptive response (Grajo, 2017). This product was created to educate occupational therapists on how to ensure that children with physical disabilities experience adaptive responses through use of adaptive equipment and grading of activities as needed to ensure that each child can successfully engage in desired sports programs (Grajo, 2017).

## Key Terms

Press for mastery

Demand for mastery

Relative mastery

Occupational environment

Adaptive capacity

Adaptation gestalt

**Press for mastery:** The roles, role demands, challenges, and responses that result from an individual's level of mastery (skill/ability level) and the environment's demand for mastery

**Demand for mastery:** The demands or necessary skills and abilities need to successfully perform an occupation within a given environment

**Relative mastery:** An individual's level of mastery in an occupation. This is composed of three properties:

**Effective participation:** How well the individual achieves their goals of participating in the occupation. When looking at sports programs, this is how well the child can perform the skills/tasks necessary to participate in the sport.

**Efficiency:** This is an individual's use of available resources. This can include use of adaptive equipment, energy/energy conservation, and social supports including peers, caregivers, and coaches.

**Satisfaction:** This is the extent to which an individual is content with their ability levels. This includes a child's level of satisfaction with their performance within standard and adaptive sports programs.

**Occupational environment:** The environment that the occupation being performed occurs

**Temporal context:** use of time or balance of time performing various occupations. This can impact a child's performance as limited time due to school, health related appointments, and schedules of caregivers can inhibit access to participating in sports programs. Creating adaptive sports programs within school systems can reduce amount of time spent traveling and reduce amount of time caregivers need available to support engagement in sports programs.

**Physical context:** The physical environment where the occupation is performed. This can impact participation in sports programs as a result of standard aspects of sports environment may not support the use of equipment being used by children (i.e. use of wheelchairs on grass or ice) and objects within the environment may impact a child's ability to participate based on their ability levels. For example, using standing courts and net heights may make it difficult for children using wheelchairs to perform the demands of the sport at the same level of their peers. To overcome this, changes to the environment can be made and the types of adaptive equipment used can be modified to ensure that the individual's level of mastery and the demand for mastery are a successful match.

**Social context:** Relationship with family, friends, and peers. Many children participate in sports programs and socialize with their peers when doing so. Children with physical disabilities may have decreased social participation with peers because of decreased ability to participate in standard sports programs. However, when adaptive sports programs are implemented within schools and include children of all ability levels, it promotes social inclusion and provides greater social support to children with physical disabilities.

**Cultural context:** Beliefs, customs, and practices that influence participation and performance of occupations. Culture can also impact performance and press for mastery. For example in some cultures and within some families, there is a push for children to participate in sports. However, this push for participation can lead to maladaptive responses if the child's level of mastery does not meet the demands of the occupation and environment.

**Personal context:** An individual's age, socioeconomic status, education, and ability levels. These factors can impact a child's press for engagement in and mastery of sports. For example, the child's socioeconomic status can impact their ability to participate in sports programs if they cannot afford related fees such as adaptive equipment. However, because the program is to be implemented through the school system, many of these fees will be covered by grants and other funding sources. Additionally, ability levels of the individual will affect their ability to perform sports and can be limiting unless adaptive equipment and/or modifications to the sport are made.

**Adaptive capacity:** An individual's ability to understand the need for change to overcome occupational challenges within their environment. Occupational therapists are skilled in understanding the need for changes and thus, can assist children with overcoming occupational challenges they may face through provision of adaptive equipment, grading the occupation, and modifying the environment to promote success of the child.

**Adaptation gestalt:** the cognition levels, sensory/motor abilities, and psychosocial functioning that are needed to perform an occupation with a level of mastery. When applying this to sports programs, this involves understanding what a child's ability levels are and considering what changes need to be made to promote an adaptive response and achieve mastery within that sport.

## **Implementation of In-service**

Each in-service will follow the same guidelines as provided below

In-services will last approximately 8 hours with time dedicated to covering necessary content related to the benefits of children participating in adapted sports, the steps needed to implement the adaptive sports programs, the most commonly played adapted sports, role-playing/case scenarios of the sports, and any questions the participants have

## **In-service Schedule**

8:00 am-9:00 am: Introduction, provision of handouts, pre-test survey, overview of objectives, and need for this product

9:00 am- 9:50 am: Overview of how to create adaptive sports programs, related forms, and advertisements

10 minute break

11:00 am-12:00 pm: Introduction to wheelchair basketball including key-terms, equipment, rules, and safety. Case-scenario and practice utilizing and fitting equipment

12:00 pm-1:00 pm: Lunch break

1:00 pm-1:50 pm: Introduction to sled hockey including key-terms, equipment, rules, and safety. Case-scenario and practice utilizing and fitting equipment

10 minute break

2:00 pm-3:00 pm: Introduction to adapted volleyball including key-terms, equipment, rules, and safety. Case-scenario and practice utilizing equipment

3:00 pm-3:30 pm: Funding sources and guide to training of staff

3:30 pm-4:00 pm: Wrap up, questions, and completion of post-test

## **Handouts**

- Equipment: Retailers
- Instructions for fitting equipment
- Research on the benefits of adapted sports
- Funding sources
- Training sources
- Contact information

## Objectives

1. Demonstrate need for adaptive sports programs within the school system
2. Provide all needed forms and information necessary to create and implement adaptive sports programs
3. Introduce commonly adapted sports, define key terms, develop a strong understanding of equipment, rules, and safety
4. Ensure all in-service participants are confident and competent in creating/implementing adaptive sports programs that encourage a level of mastery from all children who participate
5. Promote creation of adaptive sports programs to increase engagement of children with physical disabilities through creating a successful match between each child's level of mastery and the demand for mastery

These objectives were all created with the intention that children with physical disabilities could participate in adaptive sports programs at a higher frequency for increased overall health, well-being, and quality of life

## Pre-test

## **Supports and Barriers to Adapted Sports**

### **Supports**

- Increased physical well-being
- Access to adapted sports programs in community
- Positive relationships with peers
- Improved interpersonal beliefs
- Trained personnel
- Safe learning environment
- Strong family support

### **Barriers**

- Not interested in the sport
- Lack of transportation
- Lack of funding for equipment
- Lack of opportunity in the community
- Limited physical ability
- Limited social support
- Negative societal attitudes

(Bloemen, 2015; Frumberg, Gerk, Autruong, Flynn, Zhaoxing Pan, & Chang, 2019; Lape, Katz, Losina, Kerman, Gedman, & Blauwet, 2018; Shields & Synnot, 2016; Super et al., 2018).

## **Benefits of Adapted Sports Programs**

- Positive impact on mental health
- Increased physical health
- Increased social participation
- Increased quality of life
- Increased self-confidence

OA: Participants have the desire to achieve these benefits and adaptations to the sports and equipment to fit their individual needs allows them to do so

(Aytur et al., 2018; Frumberg, Gerk, Autruong, Flynn, Zhaoxing Pan, & Chang, 2019; Moss et al, 2020)



## Need for Increasing Participation in Adapted Sports

- Increase accessibility of adapted sports
- Increase inclusivity of children with physical disabilities
- Decrease negative societal beliefs of those with disabilities
- Increase mental and physical well-being
- Increase overall quality of life
- Implementing an adapted sports program in school decreases many of the barriers and increases the accessibility of sports to those with disabilities

## Wheelchair Basketball

### **What is it?:**

Wheelchair basketball is an adaptive form of basketball in which players play entire game seated in wheelchair

### **Objective:**

Score the most points by getting basketball into the opposing team's basket.

(IWBF, 2021)

All players both with and without physical disabilities utilize wheelchairs throughout the game; modifications to wheelchairs can be made as needed to address each player's need to support the engagement in the sport

## Key Terms

Basketball

Court

Wheelchair

Basket

Tap-off

Dribble

Pass

Travel

Foul

Turnover

**Basketball:** Round inflated ball that is 27.5-29.5 inches in diameter and is used to score points during the game (Haefner, 2021)

**Court:** The surface that the game is played on, this is typically hardwood and must allow for easy maneuver of wheelchairs. The standard basketball court is 28 m in length and 15 meters in width and is marked by lines on the sides, ends, and center to indicate boundaries of the court

**Wheelchair:** Typically, sports wheelchairs are used in this sport which are more easily maneuverable. The main components of a wheelchair are the seat, backrest, and two wheels. Further detail on the wheelchairs used will be covered during the equipment portion of this in-service.

**Basket:** When a team gets the basketball into the opposing teams net it is termed a basket and the team is awarded 1-3 points based on the distance and circumstances during which the basket is made (IWBF, n.d.)

**Tap-off:** When the official throws the ball into the center between two players (one from each team) to start the beginning of each quarter

**Dribble:** The method players use to progress ball down court by bouncing ball onto court using one hand.

**Double dribble (not allowed):** when a player uses both hands to dribble or picks up the ball and then continues to dribble

**Pass:** The act of throwing the ball to another player of the same team which is used to move the ball down the court and maintain the team's possession of the ball

**Travel:** Holding ball without dribbling it which results in the other team receiving the ball

**Foul:** Violation of rules related to sportsmanship or physical contact with another player

**Turnover:** Team loses possession of the ball due to violation of rules including being out of bounds, carrying, or double dribble

(IWBF, 2021)

## Basic Rules of Adapted Basketball

- One game is made up of 4 quarters which are each 10 minutes
- 5-12 players per team
- All players must remain seated in wheelchair at all times
- Each quarter will begin with a tap-off
- Players and the ball must remain in boundary lines at all times
- The cylinder principle is applied to all players when considering physical contact
- Points are awarded to a team after making a basket in the opposing teams net

(IWBF, 2021)

- One game is made up of 4 quarters which are each 10 minutes
  - Allow for 20 minute warm-up, 2 minute interval between 1st and 2nd quarters and 3rd and 4th quarters and 15 minutes at half time (between 2nd and 3rd quarter) (IWBF, n.d)
- Each team consists of no more than 12 players with 5 players from each team on the court at a time (IWBF, n.d.) Players may substitute in and out for each other throughout the game so that all players get playing time.
- Players must utilize a wheelchair to participate in the game; this includes children with and without physical disabilities. All players are required to utilize wheelchairs to limit differences between those of varying abilities levels, encourage inclusion of children with physical disabilities, and reduce any disparities in ability levels of players during the game
- Tap-offs are utilized to start play and ensure fair opportunity for both teams to gain possession of the ball (IWBF, n.d.).
- Cylinder principle is the space around each player that can be visualized as a vertical cylinder around the player in which other plays may not cross. This space can be defined as the following:
  - Front: Palms of hands and footrest/horizontal bar of wheelchair
  - Rear: The outside edge of the wheels
  - Sides: The outside edges of the wheels where the contact the floor of the court
- One-three points are awarded for each basket:
  - One point is given from free throw line
  - Two points when made between basket and three point line
  - Three points are given when made from or behind the three point line(IWBF, n.d.)

## Basic Rules of Adapted Basketball

- The wheelchair is considered part of the player's body.
- A player must dribble the ball once for every two pushes of his/her wheelchair.
- Personal Foul (PF): Players cannot hold, block, push, charge, or trip player on the opposing team
- Physical Advantage Foul (PAF): Players must remain seated in the wheelchair at all times. If a player does not remain seated, this results in a technical foul.
- A turnover occurs if both large wheels of the chair come off the ground when the player has possession of the ball

(IWBF, 2021)

If a foul is committed on a player not in the act of shooting, the game will resume with a throw-in by the other team where the foul occurred.

If a foul is committed while a player is in the act of shooting, 2-3 free throw attempts are allowed; if the shot was made, no further attempts are given

When a turnover occurs, the other team is given the ball

When a physical advantage foul occurs, the other team is awarded two free throws

(IWBF, 2021)

## Grading the Sport

Grading can be used to create a better fit between a player's abilities and the demands of the sport

Ways to grade wheelchair basketball:

- Raise or lower height of the hoop
- increase/decrease size of ball
- Decrease court size or play on half of the court
- Increase/decrease number of players on the court at a time

## Equipment

- Basketball
- Two Backboard/nets
- Court
- Wheelchairs

The only equipment that is adapted from typical basketball are the wheelchairs that all players utilize. There are regulations regarding the design and features of the wheelchairs. Additionally, wheelchairs should be fit to players to ensure appropriate fit to prevent injuries including skin breakdown.

## Wheelchairs

All wheelchairs used must follow these requirements:

- If the wheelchair has a protective horizontal bar across the front, it must be 11 cm from floor of court
- If a protective horizontal bar is not used, footrests must be 11 cm from floor
- The bottoms of footrests must not cause damage to the surface of the playing court
- Wheelchairs may have 1-2 anti-tip castors
- The height of the wheelchair seat must not exceed 63 cm
- Each chair must have 3-4 wheels
  - The two large wheels must have hand rims
- If arm rests/trunk supports are used, they must not protrude past the players legs or trunk
- Padding on the backrest of the chair must be at least 1.5 cm thick

(IWBF, 2021)

The protective horizontal bar may be curved, straight or angled but the external angle cannot exceed 200 degrees. Additionally, wheelchairs with foot plates behind castors must have a protective horizontal bar that protects the legs/feet

Roller bars can often be utilized on the bottom of wheelchairs to prevent damage to the surface beneath the wheelchair.

Anti-tip castors must be attached to either the frame or rear axle, and the width between each castor must be no wider than the two large wheels

The height of the seat is measured from floor to the top of the cushion when used

Wheelchairs must have two large wheels in the back and 1-2 small wheels at the front of the chair

The diameter of the large wheels cannot exceed 69 cm

The fitting of arm rests and trunk/upper body supports is taken in the natural sitting position and should not protrude past the players body for the safety of all players

The padding located on the horizontal bar on the back of the backrest must be at least 1.5 cm thick, and allow for indentation of  $\frac{1}{3}$  of its thickness but cannot exceed 50% of original thickness to prevent skin breakdown and pressure sores or injury to other players

Cushions should also be used as needed for children with physical disabilities to ensure appropriate pressure distribution to promote skin integrity and prevent formation of pressure sores

(IWBF, 2021)

## Wheelchairs



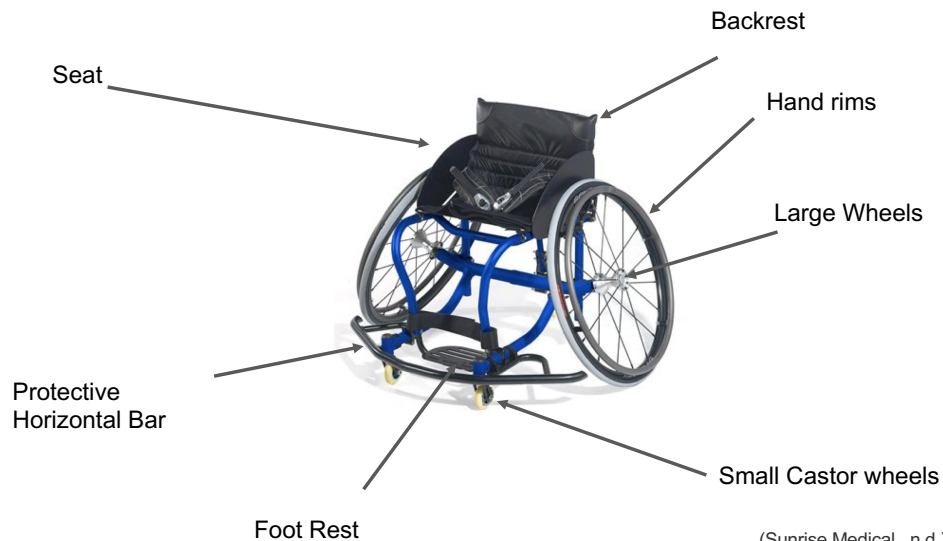
(Sunrise Medical., n.d.). Used with written permission of photographer.

Cost: \$3,009

Vendor: Sunrise Medical

Link: <https://www.sunrisemedical.com/manual-wheelchairs/quickie/sports-wheelchairs>

Wheelchairs used for wheelchair basketball can also be utilized for other adaptive sports such as tennis and track



(Sunrise Medical., n.d.). Used with written permission of photographer.

Backrest: provides support and stability to the player's trunk  
Protective horizontal bar: Protects lower extremities of the player during the game  
Foot rest: Provides support to the players foot and promotes safe alignment of the lower body  
Small castor wheels: Helps propel the wheelchair and provides stability  
Large wheels: Used to propel the player during the game  
Hand rims: Used by player grabbing with hand to turn wheels in order to propel themselves  
(IWBF, 2021)

## **Equipment Fitting Activity**

- Basketball wheelchairs are available and all participants are encouraged to test out equipment and practice fitting the equipment with a partner
- When fitting someone for a wheelchair, the 90-90-90 rule should be followed:
  - 90 degree bend in the hips
  - 90 degree bend in the knees
  - 90 degree bend in the ankle
- The person's bottom should be all the way to the back of the chair with contact on the back of the wheelchair
- Thighs are parallel to ground and knees in line with hips

Wheelchair fitting promotes safety of players and helps to prevent injuries including pressure sores, skin breakdown, and joint pain/problems

## **Equipment Fitting Activity**

Seat width: Wide enough to comfortably fit hips without sides of chair touching the body

Seat depth: two inches from the back of the knee

Height of wheelchair back: this will vary based on each players' needs

Footrest: Avoid dragging of feet on floor or dangle from chair; footrests should not be raised too high as this can lead to a pelvic tilt

(Permobil, 2019)



## **Sled Hockey**

### ***What is it?:***

Sled hockey or sledge hockey is an adaptive form of ice hockey in which all players utilize a sled and two hockey sticks to play the game

### ***Objective:***

Score more points than opposing team by putting puck in the other team's net

(USA Hockey, 2020)

## Key Terms

Sled/Sledge

Stick

Net

Puck

Helmet

Shoot

Pass

Goal

Penalty

**Sled/Sledge:** a form of adaptive equipment which players sit on and propel themselves on the ice

**Stick:** Long wooden or fiberglass piece of equipment which the player holds and used to propel self and move puck across the ice

**Net:** Equipment that sits at the end of each teams side of the ice; goals are scored by getting the puck into the net of the opposing team

**Puck:** A circular piece of rubber that is flat on the top and bottom, which is used to score points during the game

**Helmet:** Plastic equipment with padding that is worn on the head to prevent head injuries while playing the game

**Shoot:** When a player uses this stick to push the puck at the net in an attempt to score a goal

**Pass:** Occurs when a player uses their stick to move the puck to another player on their team

**Goal:** When a player gets the puck into the net of the opposing team; making a goal results in the team receiving a point

**Penalty:** Occurs when a player violates the rules; this violation results in a penalty which can range from 2-10 minutes based on severity

(USA Hockey, 2020)

## Basic Rules of Sled Hockey

- One game consists of three, 13-minute time periods
- Each team is allowed one 30 second time-out
- There may only be 6 players per team on the ice at one time
- Face-offs occur at face-off circles to initiate the start of play with one player from each team at the circle
- Pushers are allowed on the ice as needed
- High sticking, holding, checking, tripping, butt-ending, handling puck with hands and teeing are all prohibited and will result in a penalty

Pushers are individuals on hockey skates who push players who cannot propel themselves in sleds

High sticking: When a player raises a stick above shoulder height

Holding: When a player holds the sled or body of someone on the opposing team

Checking: Hitting a player from the opposite team using the own player's body

Tripping: When a player hits, pulls, or hooks the blade out from under another players sled

Butt-ending: When a player uses the shaft of their stick above hand level, to check/hit another player

Teeing: When a player makes contact with the front aspect of their slide into the side of an opposing players sled.

These actions are prohibited to promote the safety of all players

(USA Hockey, 2020)

## Grading the Sport

Sled hockey can also be graded to meet the needs of each individual

Ways to grade sled hockey:

- Use of pushers
- Size of the puck and net
- Length and width of the rink

Grading the sport allows for a large number of children with physical disabilities to engage in this form of an adaptive sports programs

Pushers can be used by those who cannot easily propel themselves or maneuver the sleds

Games can be played at half ice to decrease the distance players must travel to each end

(USA Hockey, 2020)

## Equipment: Sticks

- Each player uses two sticks
  - The handle of the stick or pick of the stick is used to propel self while the blade is used to pass and shoot the puck
- Sticks must not exceed 100 cm in length
  - The shaft must be between 2-2.8 cm in thickness
  - The blade must be at most 32 cm in length and 7.5 cm in width
  - The curve of the blade must not exceed 1.5 cm
  - Sticks may have one pick at the top of the shaft
- Goalie sticks must be between 30 cm-38 cm in length and no greater than 9 cm in width
  - The goalies stick may have an additional pick

(USA Hockey, 2020)

Sticks cannot be attached to player or the sled

## Equipment: Sticks



Cost: \$105.00

Vendor: Unique Inventions Inc.

Link: [Sticks & Accessories – Unique Inventions \(uniqueinventionsinc.com\)](http://uniqueinventionsinc.com)

(Unique Interventions Inc., n.d.). Used with written permission of photographer.

**Pick:** A pick can be used at the end of the shaft of the stick and can help players grip the ice in order to propel themselves

**Shaft:** This is the body of the stick and is the part of the stick that the player holds onto throughout the game

**Blade:** This curved part of the stick is used to carry, pass, and shoot the puck

## Equipment: Picks

- The depth of teeth on the pick must not exceed 4 mm
- The minimum width of picks must be 3.2 cm
- Picks must be attached to the shaft end of the stick
- Picks cannot extend more than 1 cm beyond the stick and can be no longer than 10.2 cm

(USA Hockey, 2020)

## Equipment: Picks



Cost: \$28.50

Vendor: Unique Inventions Inc.

Link: [Sticks & Accessories – Unique Inventions \(uniqueinventionsinc.com\)](https://www.uniqueinventionsinc.com)

(Unique Interventions Inc., n.d.). Used with written permission of photographer.

## Equipment: Sled/Sledge

- The sled consists of a frame, rails, seat, blade, and skag
- Sled frames must be made of cylindrical materials and have a diameter between 1.5 cm-3 cm
- The side rails of the sled must be at least 15 cm wide but not exceed width of sled
- The rear of sled may not protrude more than 1 cm from seat
- Side rails may be tapered but cannot exceed 45 degrees of tapering
- The frame of the sled must not protrude more than 1 cm beyond the blade

(USA Hockey, 2020)

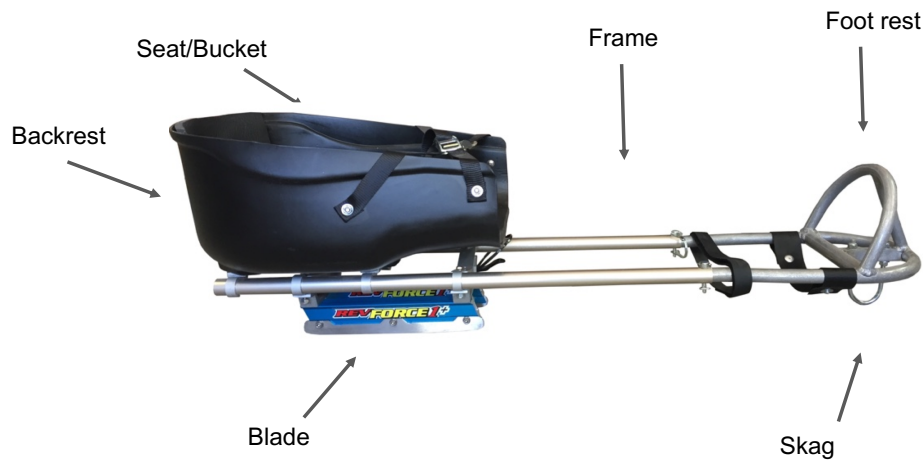
## **Equipment: Sled/Sledge**

- Cross member rails can be used for support but each sled may not have more than four and must have a diameter between 1.5-3 cm
- The height of the frame must be between 8.5-9.5 cm and the seat must be at least 5 cm from the ice
- The skag must be attached within 3 cm from the front of the frame and measure between 7 cm-9.5 cm
- 1-2 blades can be used on each frame
- Foot guard rails are also recommended to protect the legs and feet of players
- Cushions in the seat of the sled must not exceed 5 cm in height

(USA Hockey, 2020)

The skag is a piece of metal attached to the bottom of the sled which allows it to glide on the ice during play (USA Hockey, 2020)  
Specifications for equipment are made for the safety of those using the equipment as well

## Equipment: Sled/Sledge



(Unique Interventions Inc., n.d.). Used with written permission of photographer.

Cost: \$629  
Vendor: Unique Interventions Inc.  
Link: <https://www.uniqueinterventionsinc.com/rev-force-1/>

**Backrest:** The back of the seat which provides the player trunk support and protection during the game

**Seat/bucket:** The place where the player sits, a cushion may be used on top on the seat to prevent pressure sores and promote comfort

**Blade:** The blade is used to carry the player across the ice when seated in the sled

**Frame:** The structure of the sled which provides support and a point of attachment for all other pieces

**Skag:** Assists in propelling the sled across the ice

**Foot rest:** Used to promote safe alignment of lower extremities, support feet, and protect them from injury during play

(USA Hockey, 2020)

The type of sled/sledge utilized can vary depending on size, skill level, and individual needs.

Typically, children's adapted sports programs utilize sleds similar to those listed above.

However, they can also be specially made to fit the individuals needs including sleds for double amputees and spinal cord injuries (Unique Interventions, n.d.).



## Fitting Equipment Activity

Participants are encouraged to try out available sleds and hockey sticks; they will also practice fitting the equipment with a partner

Stick length: Measure from floor to chin when seated in sled, then add 4 inches

Frame length: Measure from wall to the bottom of the feet

Frame width: Sit with feet together and measure width of the bottom of the feet at the widest part of the heel

Bucket width: Put a book on each side at the widest part of the hips and measure between the books

Bucket length: Measure from wall to just above the knees

(Unique Inventions Inc., 2000)

Fitting for the sled should be completed with the individual seated at 90 degrees with their back against the wall with both legs extended, with a slight bend in knees for comfort (Unique Inventions Inc., 2000)

In an article by Darrah, Dicianno, Berthold, McCoy, Haas, & Cooper, (2016) it was found that sledge hockey players were at a higher risk for pressure sores. They found that pressure distributions while seated in sledges significantly exceeded clinically acceptable values regardless of cushioning and seating angles (Darrah et al., 2016). Researchers found that a significantly lower average pressure occurred when a cushion was used and legs were extended compared to when their knees were flexed (Darrah et al., 2016). This research shows the importance of ensuring a proper fit of equipment prior to engaging in a sledge hockey program.

## **Seated Volleyball**

### ***What is it?:***

Seated volleyball is an adapted form of volleyball in which players are either seated on the floor of the gym or in wheelchairs depending on their ability level

### ***Objective:***

To score more points than the opposing team by getting the ball over the net and hitting the floor inside the court on the other teams side

The standard game of volleyball can be adapted to seated volleyball to be inclusive of those with physical disabilities. During seated volleyball there are still six players on the court for each team separated by a net across the center. The players are required to be seated and the net is at a lower height than the standard game of volleyball.

## Key Terms

Volleyball

Net

Poles

Pass

Hit

Set

Serve

Out of bounds

Volleyball: Round inflated ball used to “volley” back and forth over the net to opposing team.

Net: Is placed directly above the center line with a top height of 1.05 Meters above the floor. The net has a cable running through the top to fasten to the poles on each side.

Poles: The poles on each side of the net hold the net taut.

Pass: The players are required to pass the ball to another player if they are not returning the ball over the net to the opposing team.

Hit: Any contact with the ball by a player in play. A team can have a maximum of 3 hits to return the ball to opposing team. A player cannot hit the ball two times consecutively.

Set: To win a team must win the best of 5 sets. Each set goes up to 25 points, with a team winning by at least 2 points.

Serve: A player starting in the service zone outside the boundary lines, tosses the ball in the air and hits the ball with 1 hand aiming to serve the ball over the net in the boundary lines to the opposing team.

Out of bounds: When all parts of the ball which contact the floor are completely outside the boundary lines on the court, the ball touches the antennae, or when the ball touches an object outside of the court.

Sitting volleyball World Para Volley. (2018, January 16). Retrieved February 12, 2021, from <https://www.worldparavolley.org/disciplines/sitting-volleyball/>

## **Basic Rules of Seated Volleyball**

Like standing volleyball

- 6 players on the court for each team
- Games up to 25 points (win by 2)
- Object of the game is to hit the ball over the net and land it in opposing team's court
- The team has up to 3 touches before it has to go over the net

(Move United, n.d.).

## **Rules of Seated Volleyball**

Differences from standing volleyball

- Smaller court dimensions
- Players bottom/torso has to be in contact with the floor at all times when completing any type of hit
- It is permitted to block or attack opponent's serve
- A player's hand is permitted to touch across the centerline but any other part of the body is forbidden
- Back row players can hit, but cannot touch or cross over the attack line with their bottom

Ways to grade: height of net, weight & size of ball

(Move United, n.d.).

## Equipment Used

- Net
- Standard or training volleyball
- Players with a spinal cord injury may be in a wheelchair

A standard volleyball net may be used upside down

A badminton or pickleball net can also be utilized in schools to engage in seated volleyball

## Equipment Vendors

Vendor: Sports Imports

Link: <https://www.sportsimports.com/indoor-volleyball/steel-net-systems/de11-sitting-steel-volleyball-upright/>



(Sports Imports., n.d.). Used with written permission of photographer.

## **Interactive Volleyball Activity**

### **LET'S PLAY!**

- 12 volunteers on the volleyball court
- Standard and training volleyball
- Play a game up to 25 points

Engaging in a game of seated volleyball allows individuals to experience an adapted sport that gives individuals with physical disabilities an equal playing field to the abled individuals

## **Education & Training**

American Association of Adapted Sports Program

- [American Association of adaptedSPORTS® Programs, Inc. | Training](#)

National Federation of State High School Associations

- <https://nfhslearn.com/>

It is important that coaches and officials are properly trained for adapted sports in order to promote safety during sporting events. Included on the handout are these websites that offer coaching and officiating training for adapted sports

## Funding Options

For things not covered by the school

- Challenged Athletes Foundation

<https://www.challengedathletes.org/grants/>

- Sports Abilities

<https://www.sportsabilities.com/adaptive-equipment>

- Move United Organization

<https://www.moveunitedsport.org/chapters/chapter-grants/>

Implementing the adapted sports programs through the school district will allow children of all socioeconomic status to participate due to the school district covering the majority of costs. Because the adaptive sports programs will be created within schools, the programs will have free access to necessary spaces such as gyms, ice rinks, and tracks. There are also statewide and national grants available for excess funding needs that won't be covered by the school. The funding organizations are listed on the handout.

## Post-test

## **Contact Information**

Bethany Kasberger, MOTS

- Email: [bethany.easthouse@und.edu](mailto:bethany.easthouse@und.edu)
- Phone: (218) 343-2610

Kaylee Loken, MOTS

- Email: [kaylee.loken@und.edu](mailto:kaylee.loken@und.edu)
- Phone: (218) 469-9674

## **Questions?**



## References

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## **Appendix B**

### **Permissions**

Prompt:

Hello,

I am contacting you regarding images of your adaptive sports equipment. My research partner and I are graduate students of occupational therapy and are creating a product and presentation related to the implementation of adapted sports programs within school systems. We are wondering if you would grant us permission to use photos of your equipment within our product and presentation given that we provide proper citation and will include the links to your website so that those interested can purchase your equipment. This presentation will occur at the University of North Dakota and could potentially have 100+ people present. The presentation, product, and resulting information will also be posted into a database called the Scholarly Commons which provides free access to all individuals and reaches thousands of people worldwide. We also hope to implement the product we create which would lead to an increased number of adaptive sports programs in schools and thus, increase the need to purchase your equipment.

Thank you for your time and consideration,

Bethany Kasberger, MOTS & Kaylee Loken, MOTS

## Sunrise Medical: Permission to use sport wheelchair photos

FW: SunriseMedical.com Question (en)



**Gallik, Karen**  
To You

5:54 PM



Hi Kaylee,

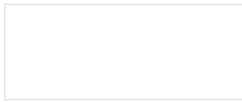
Thank you for reaching out and we would love it if you were to use our images. All of our images are available to you via our Image Library found here:

<http://imagelibrary.sunrisemedical.com/asset-bank/action/viewHome>

It's quick & easy to create an account and when you download it automatically grants you permission.

Best of luck on your presentation and let me know if I can help.

Thanks,  
KG



**Karen Gallik**

Marketing Communications  
Manager

Ph: 303-218-4463

[Karen.Gallik@sunmed.com](mailto:Karen.Gallik@sunmed.com)

## Unique Interventions Inc: Permission to use sled hockey sleds, stick, and pick photos

Re: Permission to Use Photos

Unique Inventions Inc <uniqueinventions@hexicom.net>

Thu 3/11/2021 12:32 PM

To: Kasberger, Bethany <bethany.easthouse@und.edu>

Hi Bethany,

Thank you for your explanation. I've spoken with the owner and he is happy to allow you to use our photos and provide a link to our website.

Please do not include the Frontier sledge hockey sticks. Our supplier is having a difficult time getting them for us and we will most likely not be carrying them for much longer. (Also, we can't provide permission to use this product)

The Prolite X is our own brand of sticks so please feel free to use them.

Also, we'd prefer you use the Rev Force 1 sledge as opposed to the Icey 1. The Rev Force 1 is designed more for sledge hockey. The Icey 1 is just designed for recreational skating. The seat design on the Icey 1 does not offer adequate protection when playing sledge hockey.

When you are completed your project, if there's anyway to provide us with access to the work you've completed we'd appreciate that.

Best Regards:

Heather Gabriel

Operations Manager

Unique Inventions Inc.

705-743-6544

888-886-0881

Office Hours:


Monday - Thursday ~ 9am-3:30pm

Fridays ~ 9am to 12pm

Saturday-Sunday - Closed

## Sports Imports: Permission to use sitting volleyball photo

RE: Sitting Volleyball Images Request

 Bethany Evans Mar 29  
To You ...

Kaylee,

Hi! I received your inquiry on our website about photos of our sitting volleyball net system. I would be happy to provide you with a few images. Please let me know if this is something you are still interested in.

Best,


**BETHANY EVANS**  
Marketing Director

[\(800\) 556-3198](tel:(800)556-3198) office X 229

[\(614\) 832-3529](tel:(614)832-3529) cell

**sports imports**  
[sportsimports.com](http://sportsimports.com)

 Bethany Evans Apr 2  
To You ...

 Warrior\_Games\_07  
jpg - 714 KB

Kaylee,

This is a photo from the Warrior Games sitting volleyball match. We provide sitting volleyball net systems for many different organizations. I hope this helps. Please let me know if you need anything else!

Best,

**BETHANY EVANS**  
Marketing Director

[\(800\) 556-3198](tel:(800)556-3198) office X 229

[\(614\) 832-3529](tel:(614)832-3529) cell

**sports imports**  
[sportsimports.com](http://sportsimports.com)

