

ADAPTIVE RECREATION HANDBOOK

A Guide for Athletes and Advocates

Adaptive Mountain Biking,
Climbing, and Kayaking



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TABLE OF CONTENTS

FOR ATHLETES AND VOLUNTEERS

Adaptive Mountain Biking

Adaptive Kayaking

Adaptive Climbing

Accessibility

Community Partners and Grants

Disability Guideline and Associated Definitions



FOR HEALTHCARE PROFESSIONALS

Application of the HAAT Model for
professional recommendations

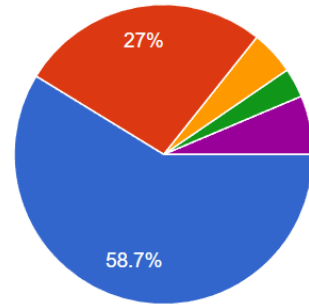
Becoming a better advocate for
adaptive recreation: Risk and
Autonomy



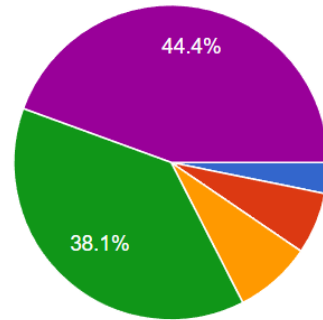
VISION

A Comprehensive Assessment of Adaptive
Equipment, Establishing “Best Fit” between athlete
and activity, and opportunities in the state of
Arizona.

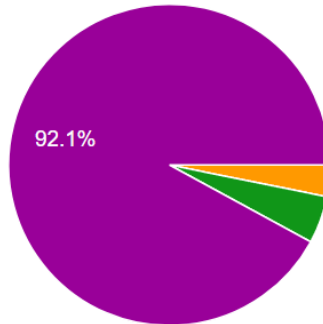
FAST FACTS ON OUTDOOR ACCESSIBILITY : *ESTABLISH YOUR “WHY”*



In a pool of 63 adult participants with disabilities , only 2% (green) believe that their ability to access outdoor recreation is the same as individuals without disabilities



In this same pool of participants, over 80% (purple, green) report having difficulty accessing outdoor parks, trails, and leisure activities due to their disability



Almost all participants (purple, green) strongly agreed or agreed with the idea that outdoor recreation is important for their mental health

SECTION ONE



This section is intended for athletes who intend to enter or become more involved in the adaptive recreation world and/or those who help to support athletes and doing so.

Utilize Section One as a tool for understanding the fundamentals of the included adaptive sports. This section will provide an overview and starting point for understanding how to fit an athlete to an assistive device for each sport, and organizations which support each activity.

01. Adaptive Mountain Biking



Opportunities and Equipment

What are the benefits? aMTB can be impactful for both the mental and physical health of participants. This activity encourages joint motion, circulation, core strength, mind-muscle connection, coordination, and balance. The activity provides equitable access to connection to the outdoors, providing sense of community, improved self-confidence, and autonomy.

Is it safe? each aMTB is fit to person based on level of ability and confidence. While there is innate risk in any outdoor adventure activity for any person, every individual has the autonomy to take risk within reason.

Where can I ride? The state of Arizona is becoming increasingly progressive in its advancements towards creating accessible trails and recreation spaces. This Handbook will include a comprehensive list of accessible trails in the state of Arizona as well as opportunities to ride with state-based adaptive recreation programs.

ESTABLISHING BIKE-ATHLETE FIT LASHER BIKES



KEY FEATURES:

RECUMBENT STYLE, OFF ROAD HAND-CYCLE

ELECTRIC-ASSIST FEATURE

SMOOTH SUSPENSION AND OFF ROAD/ MULTI-TERRAIN ABILITIES

WHO IS THIS BIKE BEST-FIT FOR?

LASHER ADAPTIVE BIKES ARE IDEAL FOR INDIVIDUALS WITH LIMITED LOWER BODY STRENGTH AND/OR MOBILITY. THE BIKE'S ELECTRIC ASSIST FEATURE PAIRED WITH HAND CYCLES AID INDIVIDUALS WITH REDUCED UPPER BODY STRENGTH, ENDURANCE, OR MOBILITY. ADJUSTABLE SEATBACK FOR

WHAT IF I CAN'T USE THE HAND BREAKS?

THE LASHER HAS THE POTENTIAL TO ADAPT TO ATHLETE WITH EACH OF THE FOLLOWING FEATURES

QUAD GRIPS

QUAD STRAPS

WRIST BRAKE, ELBOW BRAKE

WRIST THROTTLE

BLUETOOTH SHIFTING BUTTONS

WHEELCHAIR CARRIER ATTACHMENT NOW AVAILABLE

ESTABLISHING BIKE-ATHLETE FIT

NUKE AND MAKO BIKES



MAKO BIKE: FULL SUSPENSION

KEY FEATURES:

REAR-WHEEL DRIVE

NUKE BIKE: REAR WHEEL SUSPENSION

MAKO BIKE: FULL SUSPENSION

MULTI TERRAIN ROAD ABILITIES

WHO IS THIS BIKE BEST-FIT FOR?

THIS SERIES OF BIKES ARE RECUMBENT HAND CYCLE BIKES IDEAL FOR INDIVIDUALS WITH LIMITED LOWER BODY STRENGTH/MOBILITY. THE HANDCYCLE FEATURE REQUIRES MOBILITY OF THE SHOULDERS AND ARMS, HOWEVER THERE ARE SEVERAL ADAPTIVE FEATURES WHICH MAKE THE BIKE CUSTOMIZABLE TO MOST BODIES. SEATBACK IS ADJUSTABLE FOR INDIVIDUALS WITH LIMITED TRUNK CONTROL

ADDITIONAL ADAPTIVE FEATURES:

QUAD BREAKS

QUAD GRIPS

ADDITIONAL ELECTRIC ASSIST

ESTABLISHING BIKE-ATHLETE FIT

BOMBER AND HAMMERHEAD BIKES



HAMMERHEAD BIKE: FULL SUSPENSION

KEY FEATURES:

LIGHTWEIGHT

ABLE TO WITHSTAND MULTI TERRAIN RIDES WITH DOWNHILL

SPEED CONTROL

INCREASED GROUND CLEARANCE

WHO IS THIS BIKE BEST-FIT FOR?

THIS BIKE IS UNIQUE IN ITS FORM. ATHLETES LAY IN PRONE POSITION WITH CHEST PAD TO PROVIDE ADDITIONAL POWER FOR HAND CRANK SYSTEM. LAYING COMFORTABLY IN PRONE POSITION REQUIRES TRUNK CONTROL AND STRENGTH. THE BIKE IS STEERED THROUGH TWO MECHANISMS: A “SINGLE STOCK” MOUNTAIN BIKE HANDLEBAR AND A SECONDARY STEERING CHEST PAD.

ADDITIONAL ADAPTIVE FEATURES:

ADDITIONAL ELECTRIC ASSIST

BIKE-ATHLETE FIT

RIG BIKES



KEY FEATURES:

LIGHT WEIGHT

USER-FRIENDLY

FULL ELECTRIC ABILITIES

SPEED UP TO 12 MPH

DISTANCE RANGE 10-20 MPH

WHO IS THIS BIKE BEST-FIT FOR?

THE RIG UTILIZES MANUAL BREAKS AND STEERING WHEEL. FOR THIS REASON, THE BIKE IS BEST FIT FOR INDIVIDUALS WITH MOBILITY AND STRENGTH IN BOTH HANDS.

BIKE-ATHLETE FIT

BOWHEAD ADVENTURE E BIKES



ROGUE BIKE: FULL SUSPENSION

KEY FEATURES

ENTRY LEVEL BIKE WITH FULL SUSPENSION

DELTA HANDCYCLE BUILD

FULL CLEARANCE

ELECTRIC ASSISTANCE



BOWHEAD REACH

KEY FEATURES

FULL ELECTRIC

FULL SUSPENSION

MODIFIABLE QUAD HANDELBAR WITH BRAKES AND THROTTLE

BIKE-ATHLETE FIT

STINGER ADAPTIVE BIKES



KEY FEATURES

APPROPRIATE TRACTION AND GROUND CLEARANCE FOR ROCKY TERRAIN

FOOT PEDALED RECUMBENT BUILD

DERAILERS UNIQUELY POSITIONED TO AVOID TRAIL COLLISIONS

CONTOUR SEAT BACK FOR POSITIONING AND COMFORT

ADDITIONAL ADAPTIVE FEATURES:

FAT TIRE OPTION

GPS ASSISTANCE

CUSTOMIZABLE ELECTRIC ASSISTANCE

OPTIONAL HITCH RACK FOR VEHICLE PULLING TO TRAIL

WHO IS THIS BIKE BEST FIT FOR?

THIS BIKE IS BEST FIT FOR INDIVIDUALS WITH INTACT LOWER LIMBS

DUE TO ITS RECUMBENT FOOT-PEDAL BASED BUILD

MOBILITY AND STRENGTH OF THE LOWER LIMBS IS NECESSARY FOR

USERS INTERESTED IN FULL UTILIZATION OF FOOT PEDAL FEATURE



RIDER VOCABULARY

Recumbent Cycles: Athlete is in leaned back position with legs out stretched in front of them. The rider utilizes handcycles simultaneously with or without additional electric assistance. A three wheeled biking experience with two wheels in front and one in back.

Handcycles: Athlete propels bike using internal rotation and extension of the shoulder to complete repeated circular motions.

Delta Bikes: Bikes with one wheel in the front and two in the back

Tadpole Bikes: Bikes with two wheels in the front and one in the back

Electric Assistance: A battery and motor system which provides assistance in propelling bike. Level of assistance and form of assistance will depend on model of bike and user preference



Quad Grips: Allow a rider with limited fine-motor strength and/or coordination to pull cranks on adaptive bikes.

RIDER RESOURCES

Organizations, Community, and Funding

National Resources:



THE NATIONAL LEADER IN ADAPTIVE SPORTS. MOVE UNITED SPREADS ACROSS 45 STATES WITH MORE THAN 239 MEMBER ORGANIZATIONS. FIND ADAPTIVE PROGRAMS NEAR YOU AND EXPERIENCE A “ONE STOP SHOP” FOR NATION-WIDE HAND CYCLING OPPORTUNITIES



A RESOURCE FOR FINDING ADAPTIVE BIKE RACES, EVENTS, AND INFORMATION ABOUT AVAILABLE EQUIPMENT. THIS PLATFORM POSTS USED EQUIPMENT AS AVAILABLE TO PROVIDE MORE AFFORDABLE OPPORTUNITIES FOR ATHLETES



AN ORGANIZATION DEDICATED TO SUPPLYING ADAPTED BIKES TO INDIVIDUALS WHO HAVE BEEN INJURED DURING SERVICE. ELIGIBLE TO ALL ACTIVE OR RETIRED SERVICEMAN.

State-Based Resources:

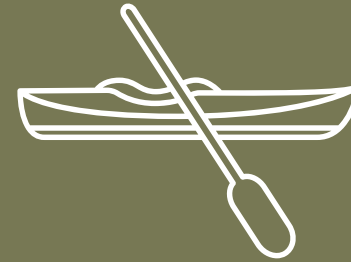


ARIZONA-BASED ADAPTIVE SPORTS SITES DEDICATED TO GENERATING COMMUNITY OPPORTUNITIES TO ENGAGE IN ADAPTIVE BIKING AT A LOW COST.

02.

Adaptive Kayaking

Opportunities and Equipment



What are the benefits? Kayaking is a low impact sport which improves both cardiovascular and physical strength as well as mobility with engagement of muscles of the core, arms, back, shoulders in wrists. The sport promotes relaxation and quality of life in providing access to beautiful spaces which would otherwise be difficult to reach.

Is it safe? Kayaking is a generally low risk sport and is encouraged for individuals who are comfortable within water and/or swimming. While there is innate risk in any outdoor adventure activity for any person, every individual has the autonomy to take risk within reason.

Where can I ride? Kayaks can be adapted to best fit individual and then enjoyed in any of the same spaces as non-adapted kayaks. A comprehensive list of adaptive sports opportunities within the community will be included within this handbook.

KAYAK ADAPTABILITY: What's out There?

Seating and Positioning



BASIC UNIVERSAL SEAT:

OFFERS LATERAL AND CORE SUPPORT AND ADJUSTABLE TO INDIVIDUAL FIT. IDEAL FOR INDIVIDUALS WITH HIGHER LEVEL SPINAL CORD INJURY AND/OR ANY INDIVIDUAL WITH LIMITED POSTURAL STABILITY. EASILY ATTACHABLE TO CANOE OR KAYAK.



HIGH SEATBACK

TALL, PADDED SEATBACK WITH ADDITIONAL NECK SUPPORT. THIS SEAT INCLUDES A PADDED CUSHION FOR COMFORTABLE SEATING. IDEAL FOR INDIVIDUALS WITH LIMITED TRUNK AND NECK CONTROL.

KAYAK ADAPTABILITY: What's out There?

Seating and Positioning



GEL SEAT PAD

GEL FILLED SEATING PAD ALLOWS INDIVIDUALS WITH PRESSURE SORES AND/OR THOSE WITH DIFFICULTY SELF- ADJUSTING TO SIT MORE COMFORTABLY. PAD ADJUSTS RELATIVE TO INDIVIDUAL'S OWN FORM



SWEET CHEEKS

SELF-INFLATABLE CUSHION WHICH IS EASY TRANSPORTABLE AND ADAPTABLE TO INDIVIDUAL FIT AND NEEDS. CONFORMS TO PERSON'S BODY DURING WEIGHT-SHIFTS THROUGHOUT KAYAK EXPERIENCE

KAYAK ADAPTABILITY: What's out There?

Safe and Comfortable Transfers



TRANSFER BENCH

PROVIDES A SMOOTH, EVEN SURFACE FOR TRANSFER FROM
WHEELCHAIR TO KAYAK. PROVIDES INCREASED OPPORTUNITY FOR
INDEPENDENCE AND OVERALL SAFETY



CHARIOT WHEELS

ALLOWS INDIVIDUALS WITH LIMITATIONS TO STRENGTH TO MORE
EASILY TRANSFER KAYAK FROM FLAT SURFACE SUCH AS PARKING LOT
TO THE WATER.

KAYAK ADAPTABILITY: What's out There?

Modifications for the Hand and Wrist



HAND GRIPS

PROVIDES ADDITIONAL SUPPORT FOR INDIVIDUALS WITH ABILITY TO OPEN AND CLOSE THE HAND BUT HAVE LIMITATIONS TO STRENGTH. ALLOWS INDIVIDUALS TO GRASP THE PADDLE FOR EXTENDED PERIODS OF TIME WITHOUT HAND FATIGUE. ATHLETES ARE ABLE TO SLIDE HAND IN AND OUT OF THIS ADAPTATION AS NEEDED.



WRIST GRIPS

PROVIDES ADDITIONAL SUPPORTS FOR INDIVIDUALS WITH LIMITED HAND OR WRIST MOBILITY/ STRENGTH OR SPASTICITY. REMOVES PRESSURE FROM THE WRISTS IN MAINTAINING STABILITY OF THE PADDLE WHILE

KAYAK ADAPTABILITY: What's out There?

Paddle Modifications and Others



PADDLE PIVOT

PROVIDES SUPPORT AT THE BASE OF THE PADDLE. RIDERS ARE ABLE TO AUTONOMOUSLY DECIDE HOW MUCH THEY WOULD LIKE TO PHYSICALLY MANIPULATE THE PADDLE ACCORDING TO THEIR STRENGTH AND ENERGY LEVELS. RIDERS CAN MANIPULATE THE PADDLE WITH JUST ONE ARM WITHOUT FEAR OF DROPPING THE PADDLE INTO WATER.



OUTRIGGERS

PROVIDE STABILIZATION OF THE KAYAK. IDEAL FOR INDIVIDUALS WHO MAY BE FEARFUL TO TRAVERSE THE WATER INDEPENDENTLY OR WATERS WHICH ARE MORE AGGRESSIVE

RIDER RESOURCES

Organizations, Community, and Funding

National Resources



ATHLETES CAN SIFT THROUGH OPPORTUNITIES FOR ADAPTIVE KAYAKING ACROSS STATES AND POPULATIONS



A RESOURCE FOR ADAPTIVE KAYAK OUTFITTING, 1:1 CONSULTATIONS, AND RESOURCES AND GUIDEBOOKS



PROVIDES ACTIVE DUTY MEMBERS AND VETERANS AN OPPORTUNITY TO EXPERIENCE PADDLING WITH A GROWING NATIONAL CHAPTER

Statewide Resources



ARIZONA-BASED RESOURCES WHICH SUPPORTS ADAPTIVE ATHLETES IN WATER SPORTS AT ALL ABILITY LEVELS

03.

Adaptive Climbing

Opportunities and Equipment



What are the benefits? Indoor rock climbing provides physical and psychosocial benefits to the athlete. The sport provides opportunities to develop trust in oneself and others, bravery, and utilize the muscles of the upper body. The sport is excellent for sequencing associated with cognitive processes essential to day to day life.

Is it safe? Indoor climbing can be performed with and without a belay. While climbing with a belay is inherently more safe as it involves several layers of security, every individual has the autonomy to decide how to climb so long as they are informed of associated risk.

Where can I climb? Most climbing gyms can be made adaptive with the aid of necessary assistive tools depending on a climber's level of independence. Community-based adaptive climbing organizations and opportunities will be listed at the end of this section.

CLIMBER SUPPORT:

Posture and Positioning



CHEST SUPPORT SYSTEM

A SUPPORTIVE CHEST HARNESS HELPS CLIMBERS TO REMAIN UPRIGHT AND SECURE WHILE CLIMBING. THIS HARNESS IS IDEAL FOR CLIMBERS WHO MAY LACK POSTURAL STABILITY ASSOCIATED WITH HOLDING THE TRUNK UPRIGHT.



SIT HARNESS

THIS HARNESS ALLOWS INDIVIDUALS WITH LIMITED STRENGTH AND/OR CONTROL OF THE LEGS TO SIT COMFORTABLY WHILE CLIMBING. THE HARNESS HOLDS THE MAJORITY OF THE CLIMBERS WEIGHT TO ALLOW FOR IMPROVED RESPIRATION AND ARE WELL-PADDED FOR PREVENTION OF PRESSURE SORES. THIS HARNESS IS IDEAL FOR CLIMBERS WITH PARAPLEGIA AND INCOMPLETE QUADRAPLEGIA

CLIMBER SUPPORT:

Posture and Positioning



MOUNTAIN EASY SIT HARNESS

THIS HARNESS COMBINES THE BENEFITS OF THE SIT HARNESS WITH THAT OF THE CHEST SUPPORT TO PROVIDE SECURITY FOR CLIMBERS WHO MAY HAVE IMPACTED LOWER BODY STRENGTH AND/OR MOBILITY. THE CHEST SUPPORT PROVIDES SOME TRUNK CONTROL BUT DOES NOT HAVE FULL BACK SUPPORT



SIT HARNESS WITH HIGH BACK

HARNESS WITH GREATEST SUPPORT. IDEAL FOR INDIVIDUALS WITH HIGHER LEVEL SPINAL CORD INJURY WHO HAVE LIMITED CONTROL OF MUSCLES OF THE UPPER TRUNK AND NECK.

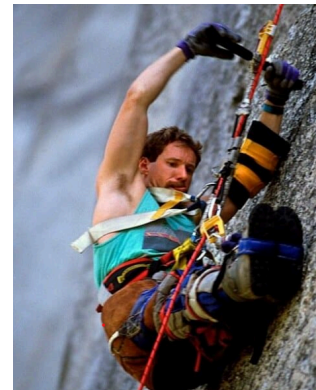
CLIMBER SUPPORT:

Hand and Wrist Modifications



ACTIVE HANDS

THESE GLOVE-LIKE GRIP AIDS CAN HELP PARTICIPANTS WITH LIMITED HAND GRIP AND/OR DEXTERITY TO ASCEND COMFORTABLY.



ASCENDING PULL UP BAR

THESE BARS PROVIDE A MECHANICAL ADVANTAGE FOR INDIVIDUALS WHO HAVE LIMITED HAND GRIP AND/OR DEXTERITY. THIS PULL UP BAR PROVIDES A 3:1 MECHANICAL ADVANTAGE.

CLIMBER RESOURCES

Organizations, Community, and Funding

National Resources



LEARN ABOUT SUCCESSFUL ADAPTIVE CLIMBERS AND THE MODIFICATIONS THEY USE FOR THEIR SPORT. ACCESS A LIST OF ADAPTIVE ACCOMMODATIONS AND STATE-BASED RESOURCES



OFFERS NATION-WIDE OPPORTUNITIES TO CLIMB AND FOSTERS COMMUNITY FOR ADAPTIVE CLIMBERS



A PARA-CLIMBING ORGANIZATION WHICH PROVIDES NATIONAL OPPORTUNITIES FOR ADAPTIVE CLIMBERS TO COMPETE IN TEAM-BASED OPPORTUNITIES

State Resources

ABILITY360



ARIZONA-BASED ORGANIZATIONS WHICH PROVIDE OPPORTUNITIES AND SUPPORT TO CLIMBERS OF ALL ABILITIES

04.

Disability Guideline and Associated Deficits



The following guideline is adapted from the doctoral capstone project of Kylie Foster, OTDS.

This is not a comprehensive list of disability but instead a general resource for volunteers to better understand some disabilities they may encounter as they support adaptive athletes

Note: All individuals with disability are unique in their experience and presentation. No guideline is a “one size fits all” model for application.

Relevant HCAS Disabilities & Associated Deficits

9

Ataxia

- **Definition:** Lack of coordination resulting in a loss of muscle control in the upper and lower extremities. This may result in poor balance, coordination, and difficulty with ambulation (Ataxia, n.d.).
- **Possible Areas of Deficit:** Ataxia may affect the fingers, hands, arms, legs, body, speech, and even eye movements.
- **HEP Suggestions:** Someone with ataxia may benefit from a combination of aerobic exercise, resistance training, and balance/flexibility work. Consider closed chain movements before trialing open chain. Ask the client what their goals are to help determine which section of the HEP is most relevant.
- **Possible Considerations:** Consider trialing adaptive equipment to increase independence.

Attention Deficit/Hyperactivity Disorder (ADHD)

- **Definition:** A neurobehavioral developmental disorder resulting in ongoing patterns of inattention, impulsivity, and hyperactivity (Professional Ski Instructors of America [PSIA], 2013).
- **Possible Areas of Deficit:** Some children with ADHD with executive function deficits may demonstrate difficulties appropriately modulating motor responses. This may result in issues with dynamic balance and an “overflow” of gross motor movements.
- **HEP Suggestions:** Dynamic balance, any muscle group relevant for the athlete.

Relevant HCAS Disabilities & Associated Deficits

Autism Spectrum Disorder (ASD)

- **Definition:** Neurodevelopmental disorder characterized by impairments in social communication, social interaction, restricted, repetitive behavior, interests, or activities.
- **Areas of Deficit:** Executive functioning and muscle strength.
- **HEP Suggestions:** Research supports general exercise with a reduction of ASD-related executive dysfunction by improving overall muscle strength (Ludyga et al., 2021).

Blind/Visually Impaired (VI)

- **Definition:** Partial or total loss of vision.
- **Possible Areas of Deficit:** Individuals with blindness or visual impairments are more likely to have reduced cardiovascular endurance, muscle endurance, flexibility, and balance (Skaggs, 1996).
- **HEP Suggestions:** All aspects of this HEP are relevant for this population. Assess the individual and ask about their goals to determine the most relevant exercises.



Relevant HCAS Disabilities & Associated Deficits

Cerebral Palsy (CP)

- **Definition:** A non-progressive disorder characterized by muscle tone abnormalities and voluntary motor control difficulties. It often results in delayed motor development. Cognitive impairment is a common secondary condition (PSIA, 2013).
 - **Common CP classifications:**
 - **Spastic:** Difficulty with relaxation due to increased muscle tension. Individuals may not have full mobility at some joints and may experience tense muscle contractions.
 - **Athetoid/Dyskinetic:** Fluctuating muscle tone from high to low resulting in inconsistent motor control. Uncontrolled movements may also be present.
 - **Ataxic:** Difficulty with control of movement and balance resulting in a lurching gait. Jerky, uncontrolled movements may also be present.
 - **Mixed CP:** A combination of CP types.
- **HEP Suggestions:** Engaging in prolonged slow stretching during the warm-up and cool-down will help to reduce/prevent spasticity and optimize the range of motion resulting in improved performance. Complete core activation exercises and some bodyweight strength work targeting specific muscle groups (Fit For Life, n.d.).
 - If bilateral movements (e.g. moving both arms at the same time during a bicep curl) are difficult, consider alternating sides to complete the movement unilaterally.
 - All aspects of this HEP are relevant for this population. Assess the individual and ask their goals to determine the most relevant exercises.



Relevant HCAS Disabilities & Associated Deficits

Cerebrovascular Accident (CVA)/Stroke

- **Definition:** A CVA is a sudden impairment of cerebral circulation in one or more of the blood vessels supplying the brain, causing an interruption or disruption of oxygen supply. The location of injury in the brain determines the type of symptoms expressed, and the severity of the disability (PSIA, 2013).
- **Possible Areas of Deficit:**
 - Hemiplegia (one-sided paralysis) of either the upper or lower extremities or both
 - Balance
 - Speech or processing auditory input.
 - Aversion to the affected side of the body
 - Visual deficits
- **HEP Suggestions:** Balance, forced use of the affected side (constraint-induced therapy), and resistance training as tolerated.

Cognitive Disability & Developmental Delays

- **Definition:** Damage to any portion of the brain that affects one's ability to process information, control, and coordinate the body. With developmental delays, one may present with delays in learning and mastering developmental milestones extending beyond the time period experienced by typically developing children (PSIA, 2013).
- **Possible Areas of Deficit:** Difficulties with learning and processing new information, delays in reaching developmental milestones, gross and fine motor delays
- **HEP Suggestions:** Provide PDF HEP with images and simple instructions. All aspects of this HEP are relevant for this population.

Relevant HCAS Disabilities & Associated Deficits

13

Down Syndrome

- **Definition:** A genetic condition affecting the 21st chromosome that results in mild to severe physical and developmental challenges and delays (Begum, 2017).
- **Possible Areas of Deficit:** Loose joints, weak muscle tone and joints, atrioventricular septal defect, and delayed motor development.
- **HEP Suggestions:** The Physical Activity Guidelines for Americans (2008) suggest engaging in at least 150 minutes of moderate-intensity aerobic activity each week or vigorous-intensity aerobic activity of 75 minutes per week. It is also important this population participates in muscle strengthening at least twice a week targeting all major muscle groups (DHSS, 2008).

Epilepsy

- **Definition:** A disorder that disrupts the electrical signals transmission inside the brain (PSIA, 2013).
- **Possible Areas of Deficit:** Young children with epilepsy may experience difficulties with gross motor, fine motor, and coordination skills (Motor Skills, n.d.).
- **HEP Suggestions:** All aspects of this HEP are relevant for this population. Assess the individual and ask about their goals to determine the most relevant exercises. If the individual begins showing signs of fatigue or becomes disoriented, discontinue exercise immediately.

Relevant HCAS Disabilities & Associated Deficits

14

Multiple Sclerosis (MS)

- **Definition:** A progressive disease resulting in scarring of the myelin sheath around nerve cells. In doing so, the sheath disappears causing the nerves to no longer transmit the necessary signals (PSIA, 2013).
- **Possible Areas of Deficit:** Spasticity, weakness, tremor, ataxia, and visuomotor deficits, resulting in difficulty with balance, and gait (Younger, 2023).
- **HEP Suggestions:** Research recommends adults with mild to moderate MS participate in aerobic and resistance exercise 2-3 days per week. Aerobic exercise should last for a duration of 10-30 minutes while resistance training should range from 1-3 sets and 8-15 reps of each exercise (Kim et al., 2019).

Muscular Dystrophy (MD)

- **Definition:** A group of progressive, degenerative diseases that cause weakness of voluntary and skeletal muscles, which are responsible for movement. There are nine main types of MD all varying in severity, symptoms, and prognosis (PSIA, 2013).
- **Possible Areas of Deficit:** Deficits will depend on the type of MD, but common issues include general muscle weakness and wasting, with progression typically being slow (Johns Hopkins Medicine, 2020).
- **HEP Suggestions:** Slowly increase the duration of participation in aerobic and resistance training. Engage in a warm-up/cool-down as well as a stretching routine.

Relevant HCAS Disabilities & Associated Deficits

1!

Sensory Processing Disorder (SPD)

- **Definition:** A neurological disorder in which sensory signals are not correctly processed and organized resulting in inappropriate responses. SPD may cause an over-response or under-response to sensation.
- **Possible Areas of Deficit:** Balance, gross motor and fine motor coordination, and the ability to perform skilled, familiar, and/or novel motor actions (Wolfsdorf, 2020).
- **HEP Suggestions:** Work to regulate their sensory system before engaging in exercise to avoid an over-response or under-response to the movements. (i.e. provide deep pressure if overstimulated or a space to “crash” if they are understimulated). All aspects of this HEP are relevant for this population

Spina Bifida

- **Definition:** A congenital abnormality in which the spinal column doesn't close completely around the spinal cord typically occurring at L5-S1 level (PSIA, 2013). This condition usually affects the extremities and in some cases can result in paraplegia.
 - **Possible Areas of Deficit:** Motor issues linked with spina bifida include decreased sensation in the lower limbs, muscle weakness that can result in difficulties with learning to sit and walk, and deformities of the spine such as scoliosis (Stern et al., 2020).
 - **HEP Suggestions:** Research recommends adults should engage in at least 150 minutes a week of moderate-intensity, or 75 minutes a week of vigorous-intensity aerobic physical activity. Adults should also include muscle-strengthening training that involves all major muscle groups on two or more days a week (Vanderbom et al., 2020). All aspects of this HEP are relevant for this population.
-

Relevant HCAS Disabilities & Associated Deficits¹⁶

Spinal Cord Injury (SCI)

- **Definition:** Injury to the spinal cord caused by some type of insult/injury, such as trauma, infection, or a tumor. A person may have an incomplete spinal cord injury, meaning there is some level of motor and/or sensory function below the level of injury. Verses a complete spinal cord injury, when there is no motor or sensory function below the level of injury (PSIA, 2013).
- **Possible Areas of Deficit:** The severity of sensory and motor impairment will depend on the individual's level of injury. Damage to the cervical region is described as quadriplegia or quadriparesis, as it involves function to all four quadrants of the body. While damage in either the thoracic, lumbar, or sacral region is considered paraplegia or paraparesis (PSIA, 2013).
- **HEP Suggestions:** Meet the person where they're at. Prescribe them exercises based on their level of injury. Use adaptive equipment when necessary to promote as much functional independence as possible.

Autonomic Dysreflexia

- A physiological response to noxious stimuli below the level of injury that causes a spike in blood pressure.
- **How to treat:** Sit the person upright and remove any tight clothes or devices. Typically identifying the trigger will alleviate the person and their blood pressure will return to normal.



ACCESSIBILITY ETIQUETTE



*Meet every individual as an individual. There is no “one size all” for inter-abled interactions. Ask questions to the individual you are working with. *

- Every individual has their own relationship with disability. While some identify closely with their disability and related culture, other’s consider this just a small facet of their lives.
- Always assume ability.
- Utilize person-first language.
- Speak at eye level with individuals whenever possible.
- Always ask before touching an individual. During transfers, ask clearly “is it okay if I...”
- Many individuals with disability have personal preference or systems for transfers. Before assuming a person’s preferred transfer method, try asking “how do you like to be transferred?”

SECTION TWO



FOR HEALTHCARE PROFESSIONALS AND DIRECT SERVICE PROVIDERS

This section is intended for Healthcare Professionals seeking insight on professional recommendations on adaptive recreation.

This section will include an application the HAAT MODEL in a multi-level case study so that practitioners may better understand reasonable considerations for recommending adaptive equipment. This section will also address concepts of autonomy as related to individuals with disability and the concept of “risk.”

01.

APPLYING THE HAAT MODEL TO PRACTICE

For Occupational Therapists

Context



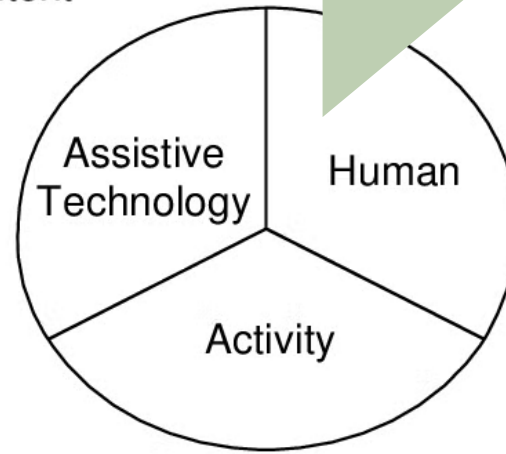
THE HAAT MODEL IS UTILIZED IN PRACTICE TO DETERMINE BEST FIT BETWEEN INDIVIDUAL AND MECHANISM OF ASSISTIVE TECHNOLOGY. THE RELATIONSHIP BETWEEN PERSON AND DEVICE IS REPRESENTED AS A SYSTEM WHERE HUMAN, ACTIVITY, AND ASSISTIVE DEVICE EXIST WITHIN THEIR RELATIVE CONTEXT.

CASE STUDY 01.

LASHER ADAPTIVE BIKES

Peter is a 45 year old man C4 QUADRIPLEGIA (AIS D), with incomplete motor loss resulting in weakness in all 4 limbs and trunk, abnormal tone in left side more than right, sensory abnormalities, neuropathic pain, and balance and mobility impairments. Prior to his injury, he was a recreational mountain biker and is currently experiencing depression as he has been unable to ride. He recently learned of adaptive mountain biking and is unsure of whether or not he can safely participate in the sport. As a practitioner, apply the HAAT Model to make a best recommendation for Peter as he shops for an adaptive mountain bike.

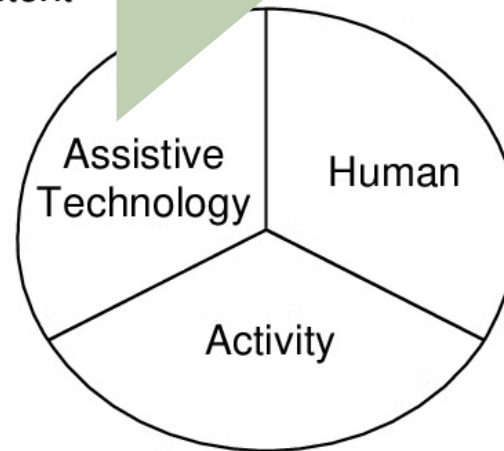
Context



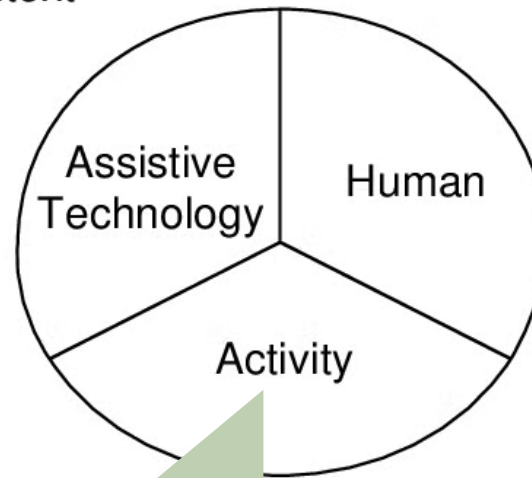
45 years old
Former experience Mountain Biking
Global weakness
Balance and Mobility Impairments
Cognition Intact
Weakened Grasp Left Side

Client is currently a
wheelchair user
There are several available
adaptive bikes tailored
towards individuals who are
quadriplegic
Quad Grips are available for
several bike options
Bikes and additional AT are
highly expensive

Context



Context

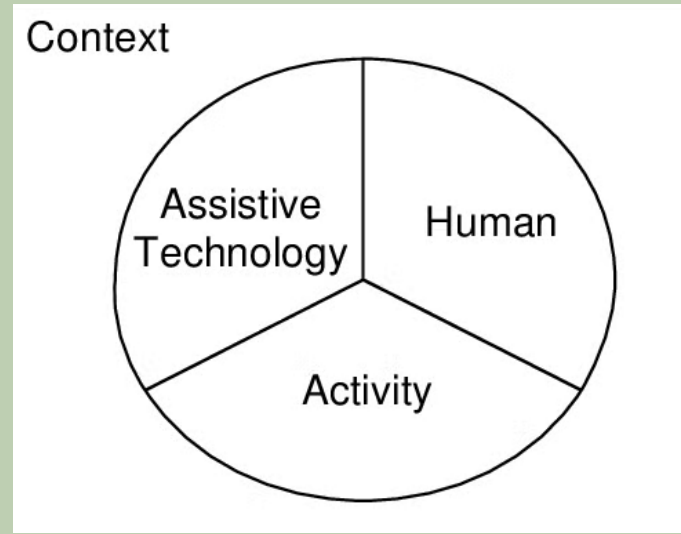


Safe adaptive mountain biking involves ability to weight shift trunk from left to right, appropriate cognition and sequencing, sustained attention to task, and musculature associated with holding up the head and neck

Athlete lives in state of Arizona with developed
Adaptive Programs

There are several adaptive-friendly trails within
twenty mile radius of athlete's home

Athlete lives with family who are supportive of his
needs



Relevant healthcare providers are interested
in idea but concerned about degree of
associated risk

Athlete travels in accessible van within
county which has accessible parking lots

APPROPRIATE RECOMMENDATIONS

- *Establishing Bike-Athlete Best Fit:*

For Peter, The Rig bike would likely be the best fit for his his body and ability level. The Rig provides adequate support through its build and level of electric assistance to allow Peter to best participate in desired activities. Establishing best fit should be an open conversation between an athlete, advocate, and professionals. Analyzing bike order forms allows for a deeper understanding of levels of customizability for each model.

- *Affordability:*

For clients interested in engaging in adaptive sports, it is important to be mindful of cost and opportunities for community engagement. The Rig bike begins at \$5,099. Prices can be adjusted through utilization of grants and occasional available discounts. For Clients unable to afford a purchase of this scale, investigate local and state-wide adaptive sports networks for community based opportunities to participate in the sport.

- *Education:*

Peter's past healthcare providers have been unsure of his ability to participate in adaptive sports due to concerns surrounding his safety.

While it is important to form mindful and appropriate recommendations to clients, it is equally important to maintain mindfulness of personal autonomy. Peter is an adult and able to decide individually if he wants to participate in risk related to his sport of interest, much like he did prior to his injury.

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RISK AND OCCUPATIONAL JUSTICE

Excerpts from Relevant Research

Constraints to Outdoor Recreation: Exploring the Effects of Disabilities on Perceptions and Participation

“No constraint or type of constraint is experienced with equal intensity by everyone, although time-related and cost-related constraints rank among the most widely and intensely experienced inhibitors of the achievement of leisure goals and a balanced lifestyle.”

Risky bodies in risky spaces: disabled people’s pursuit of outdoor leisure

“Disabled people are often seen as being ‘at risk’ in the outdoors, and this can limit what they do and is used as a form of psycho-emotional disablism.”

“Engaging in risk enables disabled people to confront psycho-emotional disablism.”

“Where disabled people are concerned, risk management ‘frequently turns into wholly disproportionate steps to attempt to completely eliminate risk, leading to diminished opportunities across life’

WHAT IS OCCUPATIONAL JUSTICE?

“Occupational justice ... is concerned with enabling, mediating and advocating for environments in which all people’s opportunities to engage in occupation are just, health-promoting and meaningful.”



As healthcare practioners, it is our responsibility to support individuals in aligning with their individual identities. Quality of life and occupational justice are interconnected in this way. Advocating for opportunities for individuals with disabilities to reconnect to the healing benefits of the outdoors is an act in alignment with the occupational justice movement.

References

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