

Recreation Technology: Opening a World of Opportunity

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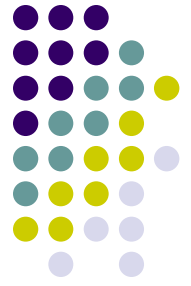


Sports and Recreation are Important Modalities of Rehabilitation



- The more our life is filled with things that interest us, the higher our satisfaction with our quality of life (Kielhofner, 1985).
- Since these volitional factors influence choice about action and behavior they have a key role in enabling an individual to adapt to disability and re-engage in life (Kielhofner, 1985).

Why Encourage Exercise?



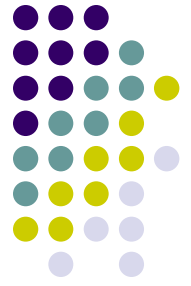
- Learn confidence
- The Need For Exercise Alternatives
 - Nearly 49 million Americans with disabilities (Jassen 1994)
 - Need in disability population (Rimmer 1996)
 - CVD Leading Cause of death (Kennedy 1986)
 - Activity levels decrease after SCI
 - Daily WC propulsion does not maintain fitness (Janssen 1994, Sedlock 1990)

Acceptance and Inclusion



- Recreation is a valuable strategy for inclusion in activities that are culturally valued (Buning, 1996).
- Sports and recreation creates an arena for continuing the gains of medical rehabilitation:
 - challenging personally held ideas about disability and handicap
 - testing out a new self-concept that includes acceptance of disability (Schlein et al., 1997)

Sports and Recreation Opportunities



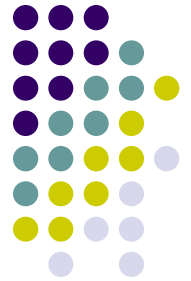
- Lack of opportunity and information about adaptive fitness make it more likely that these same individuals will fall to the negative health consequences of inactivity, repetitive strain injury and obesity (Taylor et al., 1998, Rimmer et al., 1996, Heath and Fentem, 1997)

General Fitness and The Non-Elite Athlete



- Barriers to Exercise:
Physical and Psychological
 - Barriers Experienced by Able-Bodied
 - Availability of Programs
 - Availability of Equipment
 - Transportation
 - Accessibility
 - Functional Limitations (Cardio-respiratory system)
 - Psychological (Depression)

National Veterans Wheelchair Games



- Started in 1981 at the Richmond, VA Medical Center.
- Largest annual wheelchair sporting event.
 - 550-600 participants each year
 - Create a model for accessibility (physical, community, accepting)
- Classes
 - Model after old ISMG and NWAA
- Divisions
 - Novice
 - Open
 - Masters

Super - G



- Premier event at NVWG
 - Qualification required
 - Open competition
- Highlight mobility skills
- Use “extreme sport” model
 - Make attractive to audience
- Set higher mobility goals

National Disabled Veterans Winter Sports Clinic - Skiing



- Largest ski clinic in the world
 - 338 participants in 2006
 - 180 instructors
- Promote rehabilitation and reintegration through overcoming emotional, mental and physical challenges
 - Show possibilities despite and beyond their impairments

National Disabled Veterans Winter Sports Clinic - Activities



- Provide instruction for a broad range of disabilities
- Allow every participant to experience success
- Broad array of equipment available, and constant development
- Fitting and modification on-site

Social Interaction and Athlete Development



- Sports build a sense of confidence and acceptance of disability (Cooper, 1990)
- Teamwork provides opportunities for learning about abilities and adaptations on and off the court.
- NVWG uses a mixed-team model.

Paralympic Movement



- The Paralympics, affiliated with the Olympic games, offers the ultimate adaptive sports competition.
- Paralympic movement has had a positive impact on the perception of society regarding people with disabilities (Steadward and Peterson, 1999).



Paralympic Games

- International Paralympic Committee
 - <http://www.paralympic.org>
- 26 Sports
- Winter Games: 1976 Örnsköldsvik, Sweden
- Summer Games: 1960 Rome, Italy
- World and Regional Championships

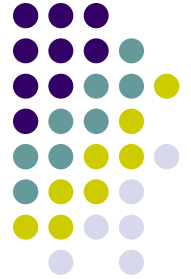


Classification Systems

- Able bodied athletics classification
 - Age
 - Weight
 - Gender
 - Professional /amateur
- Athletes with disabilities classification
 - Same as listed above
 - Ability/disability characteristics
 - (a) The nature and severity of the athlete's disability;
 - (b) The athlete's functional ability to perform skills associated with the sport; and/or
 - (c) The athlete's performances in previous competitions

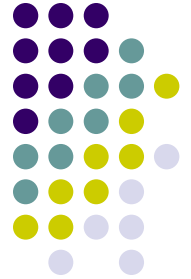
Cooper et. al. (2005)

Paralympic Sporting Events



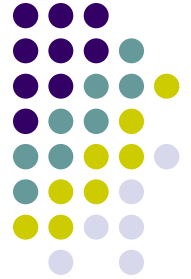
- Summer Sports
 - Archery
 - Athletics
 - Boccia
 - Bowls
 - Cycling

Paralympic Sporting Events



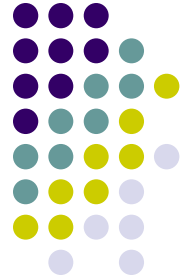
- Equestrian
- Football
- Goal ball
- Judo

Paralympic Sporting Events



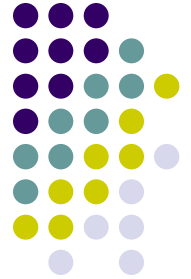
- Power lifting
- Rowing
- Sailing
- Shooting
- Swimming

Paralympic Sporting Events



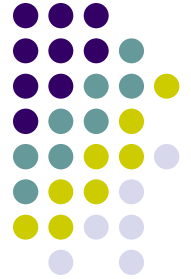
- Table Tennis
- Volleyball
- Wheelchair Basketball

Paralympic Sporting Events



- Wheelchair Dance Sport
- Wheelchair Fencing
- Wheelchair Rugby
- Wheelchair Tennis

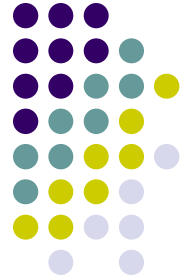
Paralympic Sporting Events



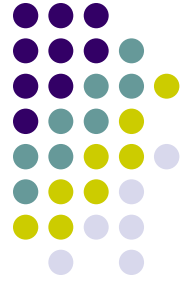
- Winter Sports
 - Alpine Skiing
 - Ice Sledge Hockey
 - Nordic Skiing
 - Wheelchair Curling

Control

- Steering Gear
- Positioning wrt to Competitors
- Stroke Technique
- Hopping - Passing



Sport and Recreation Across the Life-Span



- Sports can improve cardiovascular fitness among PWD. (Cooper et al., 2001)
- Opportunities for healthy sport and recreation are expanding (slowly)
- Adapting healthy life-style including activity is important. (SCI Clinical Practice Guidelines, 2005)



Arm-Ergometry

- Useful for evaluation and exercise for people with lower extremity impairment (Franklin 1985, Ellenberg 1989, Bressel 2004)
- Problem: Can be boring and provide little extrinsic motivation



Example Alternative: GameCycle

- Upper-body Exercise System
- Arm-ergometry + Computer Gaming
- Goal
 - improve overall activity levels of individuals who use wheelchairs as their primary means of mobility and increase their general well being

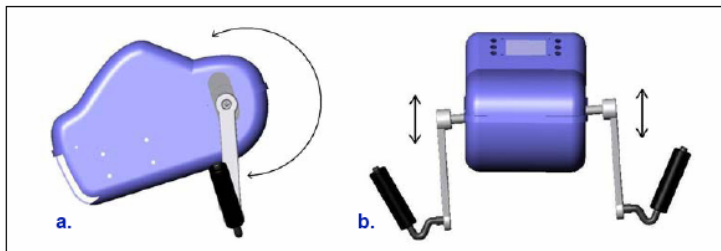
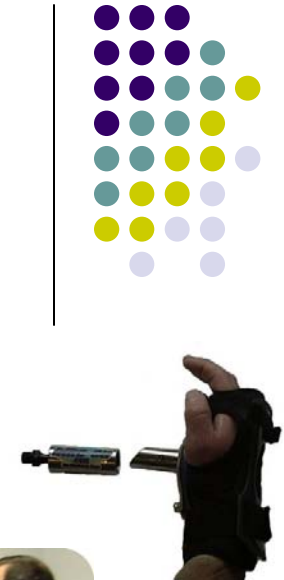
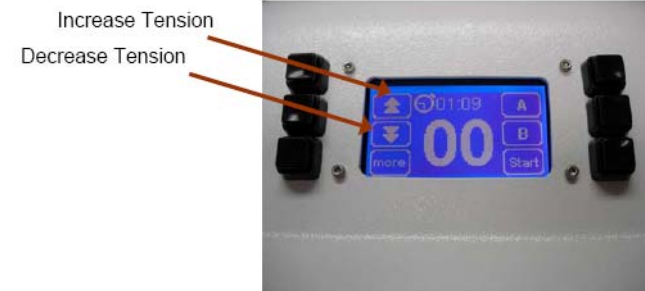


Figure 4.2: a) Moving forward or backward with the GameCycle b) moving left or right using the GameCycle





Development of the GameCycle Exercise System

- Completed
 1. Focus Group to obtain WC user and clinician feedback
 2. Refinement and Documentation of GameCycle
- In Progress
 3. Training Sessions to verify functionality and ease of use of new system
 4. In-Home Trials to evaluate intervention effectiveness



GameCycle Evaluation



- Training Phase

- Goal:

- Train Subjects to use the GameCycle
- Determine if the GameCycle is easy to use
- Determine if subjects can reach their target training zone

- Subjects:

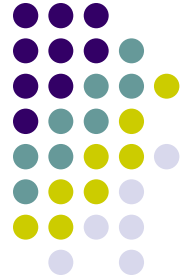
- 14 persons with SCI
- 11 men, 3 women
- Avg Age = 37.5 yr (SD = 6.5)
- paraplegia and tetraplegia (L2 to C4)
- 7 having an injury level above C7

Results:

- All subjects completed training
- 11 (79%) able to reach their target heart rate zones

Conclusion:

- The GameCycle is easy to use
- Users can reach their target aerobic training zones



Thank You!



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