Journal of Life Care Planning, Vol. 18, No. 4, (59-64)

An Overview of Wheelchair Basketball with Implications for Life Care Planning

Carolyn Hanson, Ph.D., OTR
Jamie L. Pomeranz, Ph.D.
Dug Jones, J.D.
Carlyn Ellison, MPH, CPH

Abstract

Wheelchair basketball is a sport that can benefit individuals with lower extremity impairment. Benefits include improved and enhanced physical and psychological health along with opportunities for socialization. As a well-recognized and available sport in our communities. Life Care planners should consider wheelchair basketball programs when making recommendations to for adolescents and young adults who are interested in being active.

Wheelchair basketball was created as a result of World War II veterans returning to the United States with rehabilitation needs. These men were able-bodied while serving their country but returned in large numbers with frostbite/cold injuries, radiation injuries, paraplegia and/or amputation; conditions that commonly limited their ability to walk (Veterans and Their Needs, n.d.). Veterans were interested in becoming more active while recuperating and sought outlets for improving their lives. Prior to World War II, people commonly died after having a spinal cord injury (SCI) but with the advent of penicillin and sulfa drugs and a better understanding of complications (i.e., urinary tract and skin infections), individuals survived (National Spinal Cord Injury Association [NSCIA], 1995).

In order to meet the recreation needs of veterans rehabilitating from their injuries, Veterans Affairs (VA) hospitals in California and Massachusetts began conducting the first of its kind wheelchair basketball practices with veterans and their doctors (National Wheelchair Basketball Association, n.d.). Veterans enjoyed the camaraderie of the game which assisted in their mental and physical recovery from the effects of war. Wheelchair basketball facilitated healthy engagement in life while connecting veterans who were supportive of each other. In 1946, a group of veterans with SCI formed the Paralyzed Veterans of America (PVA) which has actively provided and supported sports and other opportunities since its inception. The PVA's motto is: "Together we are unstoppable- celebrating the indomitable spirit of veterans with disabilities" (PVA, 2019). Around the same time period at United Kingdom's Stoke Mandeville Hospital, wheelchair sports (e.g., netball- similar to basketball) were also being developed. By 1949, the National Wheelchair Basketball Association (NWBA) and the National Wheelchair Basketball Tournament (NWBT) were created to allow competition between clubs and groups. After 11 years of success, wheelchair basketball debuted at the Paralympics in 1969. The boost of having wheelchair basketball as an international sport led to greater popularity and the development of larger numbers of community and collegiate teams in the ensuing years. In 1989, the International Wheelchair Basketball Federation (IWBF) became the governing body for the sport and is currently recognized by the International Paralympic Committee as the wheelchair basketball authority (International Wheelchair Basketball Federation, n.d.). Wheelchair basketball is one of the featured sports in the Paralympics and the Invictus Games (a Paralympics-style competitive event for injured and wounded military personnel).

Wheelchair basketball is now played in over 75 countries with the same scoring rules as the traditional sport of basketball. The court dimensions, the height of the baskets and the playing rules are also the same. Five team members at any given time play two-twenty minute halves (though women play four-ten minute quarters). This popular game can be found at camps, recreation centers, rehabilitation hospitals, community clubs, YMCAs, VA hospitals and college campuses. Recreational and competitive teams are found across the country for adults and youths. Newly injured people may learn about the game from rehabilitation therapists, but friends and peers with disabilities appear to be more influential in connecting people with disabilities to the sport (Wu & Williams, 2001).

People with permanent lower extremity limitations are eligible to play wheelchair basketball and typically have diagnoses such as paraplegia, spina bifida, and lower limb amputations. Player classification has evolved over the last 15 years (Disability Sports Australia, n.d.) and is based on observation of a player's functionality while practicing (e.g., trunk/arm movement, stability while wheelchair is rolling or comes to a quick stop). Players are rated based on motor impairment and the ability to move in various planes while sitting and maneuvering a wheelchair and are classified in a range from 1.0-4.5. After classification, international players are issued a card with their score/modification (classification) for their wheelchair. A team cannot exceed a cumulative total of 14 classification points on the court at any given time. In the interest of inclusion, able-bodied

individuals (e.g., classified as a "4.5AB") are permitted to play in some divisions/leagues so long as the team complies with the 14 point maximum, which by definition signifies a wide range of abilities represented. This concept of reverse integration allows for the majority of people with disabilities to be joined by a minority of non-disabled people (Fiorilli et al., 2013).

As wheelchair basketball has become more popular and accessible to a wider range of people over the years, it is germane to identify recent trends in intercollegiate sport in the United States. Currently, 17 colleges and universities have competitive wheelchair basketball programs for women and men whereas nearly 50 additional colleges and universities have requested information on how to develop a team (personal communication, Dug Jones, President of Intercollegiate Division of NWBA, April, 2020). Some colleges and universities support other types of adaptive sports opportunities (e.g., tennis, track, etc.). A small number of intercollegiate adaptive sports programs have been funded via legislative appropriation. In other instances, clubs have begun with committed and interested people and evolved into larger university sanctioned programs.

A recent development is the inclusion of able-bodied players on intercollegiate wheelchair basketball teams. As can be imagined, this has promoted the game to a larger segment of the college student population and capitalizes on the idea of inclusion- a preferable outcome. Technology has enhanced specialized wheelchairs so they are lighter to maneuver and transport more easily; this can raise the level of competition. In the United States, he National Wheelchair Basketball Association (NWBA) and a number of teams are receiving mainstream corporate sponsorship (e.g., Toyota) as opposed to more traditional disability related sponsors like wheelchair manufacturers and prosthetic companies. Gains have been made and will continue to raise the profile of wheelchair basketball within conventional society.

Implications for Life Care Planning

Including wheelchair basketball within a life care plan (LCP), provides a client a pathway for receiving many health benefits (see Table 1). The sport is not only fun and lends itself to socializing, but can also improve mental health (Fiorilli et al., 2013), mobility, physical independence and social integration (Hanson et al., 2001) while decreasing problems associated with a sedentary lifestyle such as pressure sores, joint stiffness, weight gain, and lower levels of HDL-cholesterol (Rodrigues, 2013)- factors that increase the risk of heart disease, stroke and diabetes (Giacobbi et al., 2008). Beyond physical health outcomes, participation in sports contribute to wellbeing through social engagement and personal development. Bates et al. (2019) found that wheelchair basketball provided a sense of "place" in the community among younger persons.

Where Does Wheelchair Basketball Fall in the LCP?

According to Weed & Berens (2018), there are 18 topics that assure the effectiveness of an overall life care plan. Most information and costs regarding wheelchair basketball fall under three specific areas: Wheelchair Needs, Wheelchair Accessories and Maintenance, and Maintenance of Health and Strength. Typically, life care planners will recommend many different types and configurations of wheelchairs based on the needs of a client. Along with the wheelchair needs, accessories and maintenance costs must be considered. The costs associated with activities associated with specialty recreation, such as wheelchair basketball, fall under Health and Strength Maintenance. More details regarding these specific sections are outlined below.

Wheelchair Needs, Wheelchair Accessories and Maintenance

The wheelchair is an integral piece of equipment in the game and is viewed as an extension of the athlete when considering fouls. Basketball wheelchairs are lightweight (i.e., metal alloys, aluminum, titanium), rigid frame models with quick release wheels. They are especially maneuverable (cambered rear wheels and small front casters) to allow easy turning and pivoting while providing stability (Physiopedia, 2020). An angled seat platform permits support in conjunction with clickable lap and thigh belts and Velcro straps are used to position the person firmly in the chair (potentially with ankles/feet stabilized as well). Strapping is not only used for safety and protection of body parts but can facilitate athletic performance. High level athletes can utilize the strapping to balance themselves while leaning into fast turns while switching directions.

In conjunction with the wheelchair, players may choose from a variety of cushion materials to decrease the possibility of pressure sores and increase comfort. For those who have some lower extremity sensation, a lightweight but firm foam cushion is usually preferable. Individuals who are more susceptible to pressure injury may choose a cushion that has gel or air for skin protection. Anecdotal evidence indicates that a firm, lightweight cushion for taller sitting height has a higher functional priority than comfort for the highly competitive individual. Additionally, the cover of the cushion needs to be considered since it regulates body temperature and absorbs shock while assisting with skin care and postural control. The wheelchair cushion must be within regulation measurement, depending on the player's classification (Hetzel, 2009). Additional equipment for players may include eye protection such as sports glasses with optional straps and sports goggles. Prohibited equipment for the wheelchair includes black tires, steering equipment and brakes (SportRegras, n.d). See Table 2 for examples of costing, specifically of wheelchair accessories, which would fall under Wheelchair Accessories and Maintenance.

The life care planner must consider the maintenance and replacement costs of all aspects of the recreational wheelchair and accompanying accessories. This includes tires, frames, seat cushions, gloves, straps, and eye protection, etc. The life care planner can refer to the manufacturing recommended replacement to support their recommendations.

Maintenance of Health and Strength

As a life care planner, it is essential to address the needs of your clients throughout their lifetime. The Maintenance of Health and Strength section provides an overview of needs with associated costs as they pertain to the recreational activities for a client. For example, this section may incorporate costs for training with a coach. In fact, regular training has demonstrated improved lipid profiles in wheelchair basketball players (Rodrigues, 2013) and is considered a practical way to obtain sufficient exercise without utilizing pharmaceuticals (McCormick et al., 2016). It is important to note that while organized sports may be less frequently played as individuals age, there are a number of athletes aged 60 or older that continue to compete in the Adult Division (personal communication, Brandon McBean, Director of Membership Services and Programs, NWBA, September, 2020). Therefore, life care planning costing should take into consideration the predicted timespan an individual will participate in wheelchair basketball.

Maintenance of health and strength is possible through participation in wheelchair sports (i.e., rugby, tennis and basketball) as demonstrated in a study of a small group of players that concluded sports may be an effective form of exercise to decrease cardiovascular disease incidence (Abel et al., 2008). In this study, energy expenditure was measured in wheelchair sports players and was comparable to suggested levels recommended by the American College of Sports Medicine for able-bodied individuals. Due to secondary problems, "…people with a disability have more to lose if they do not maintain a suitable level of fitness" (Hanson, 2008, p. 914).

Other Sections of the Life Care Plan

Additional needs and associated costs may fall under other sections of the LCP such as equipment necessary to adapt vehicles for the wheelchair (under Transportation section) and it may be necessary to seek an evaluation by appropriate providers (under Projected Evaluations section). It can be difficult to distinguish which section an item falls under. For example, the cost of NWBA membership and wheelchair summer camp (ranging considerably, $25 in US dollars for members with advanced registration for NWBA camps) could be itemized under Maintenance of Health and Strength (National Wheelchair Basketball Association, n.d.). Expenses for membership, camps and training may be placed in other categories as well. However, the life care planner must be able to justify the section and ensure it is not repeated elsewhere in the plan.

Conclusion

The purpose of this paper is to provide an overview of wheelchair basketball including the history, the health and wellbeing benefits, and outline how this sport can fit into a comprehensive life care plan. Wheelchair basketball provides an excellent opportunity for life care planners to outline strategies for prevention of future issues associated with the withdrawal from recreational activities, and addresses physical, mental, and social health.

Note. Life care planners should conduct individualized research for items included in a life care plan. The above cost ranges can serve as guidelines for possible expenditures expected in United States dollars.

References

Abel, T., Platen, P., Rojas Vega, S., Schneider, S., Struder, H.K. (2008). Energy expenditure in ball games for wheelchair users. *Spinal Cord, 46*(12), 785-790.

Bates, L., Kearns, R., Witten, K., & Carroll, P. (2019). 'A level playing field': Young people's experiences of wheelchair basketball as an enabling place. *Health & Place, 60*, 102192.

Disability Sports Australia, n.d., https://www.sports.org.au/wcbasketball

Fiorilli, G., Iuliano, E., Aquino, G., Battaglia, C., Giombini, A., Calcagno, G., & di Cagno, A. (2013). Mental health and social participation skills of wheelchair basketball players: A controlled study. *Research in Developmental Disabilities 34*, 3679-3685.

Giacobbi, P.R., Stancil, M., Harding, B., & Bryant, L. (2008). Physical activity and quality of life experienced by highly active individuals with physical disabilities. *Adapted Physical Activity Quarterly, 25*, 189-207.

Hanson, C.S. (2008). Restoring competence in leisure pursuits. In Radomski and Trombly Latham's *Occupational Therapy for Physical Dysfunction*, 7th ed., pp. 909-924.

Hanson, C.S., Nabavi, D., Yuen, H.K. (2001). The effect of sports on level of communication integration as reported by persons with spinal cord injury. *American Journal of Occupational Therapy 55*, 332-338.

Hetzel, T., 2009, Directions, Wheelchair Cushions: Design vs. Materials,, http://www.nrrts.org/pdfs/CaseStudies/Directions_Vol1_2009_36-38.pdf

International Wheelchair Basketball Association, n.d., https://iwbf.org/about-us/who-we-are/

McCormick, Z., Lynch, M., Liem, B., Jacobs, G., Hwang, P., Hornby, T.G. (2016). Feasibility for developing cardiovascular exercise recommendations for persons with motor-complete paraplegia based on wheelchair propulsion: A protocol and preliminary data. *The Journal of Spinal Cord Medicine, 39*,45-49.

National Spinal Cord Injury Association,(1995). https://www.makoa.org/nscia/fact05.html

National Wheelchair Basketball Association, n.d., https://www.nwba.org/history

Paralyzed Veterans of America, (2019). https://www.pva.org/about-us/mission-statement/

Rodrigues, F.B. (2013). Effect of wheelchair basketball on HDL-cholesterol of paraplegics. ConScientiae Saude, 12(1), 137-145.

Sport Regras, n.d., https://sportsregras.com/en/wheelchair-basketball-history-rules/

Types of Membership. (n.d.). *National Wheelchair Basketball Association*. Retrieved June 12, 2020, from https://www.nwba.org/typesofmembership

Types of Wheelchair. (2020, April 14). Physiopedia. https://www.physio-pedia.com/index.php?title=Types_of_Wheelchair&oldid=235435

Veterans and their needs, n.d., https://www.wehonorveterans.org/veterans-their-needs/needs-war-or-trauma/wwii/wwii-health-risks)

Weed, R. O., & Berens, D. E. (2018). *Life care planning and case management handbook*. Abingdon, Oxon: Routledge.

Wu, S.K., & Williams, T. (2001). Factors influencing sport participation among athletes with spinal cord injury. *Medicine and Science in Sports and Exercise, 33*(2), 177-182.

WHEELCHAIR BASKETBALL

Table 1.

Health benefits from playing wheelchair basketball

Benefit	Population/Instrument	Research article
Possible decreased risk of cardiovascular disease due to increased energy expenditure in wheelchair sports	Spinal cord injured players: 14-tennis, 10-basketball, 12- rugby; Instrument: Basal metabolism test and respiratory parameters	Abel et al., 2008
Improved mental health: higher scores on social participation, autonomy and self-acceptance; perception of self-efficacy	46 wheelchair users: 24 wheelchair basketball players and 22 non-players; Instruments: Participation Scale, Psychological Well-Being Scale, Symptom Checklist 90 R	Fiorelli et al., 2013
Improved level of occupation participation, social integration, physical independence and mobility	48 wheelchair participants: 30-athletes, 18-non-athletes; Instrument: CHART: Craig Handicap Assessment and Reporting Technique	Hanson et al., 2001
Psychological and physical benefits; improved social opportunities and quality of life	Wheelchair basketball players: 12 male, 14 female; Instrument: Physical Activity Scale for Individuals with Physical Disabilities & in-depth interviews	Giacobbi et al., 2008
Improved lipid profiles: Increased HDL and decreased total cholesterol	9 individuals with spinal cord injury engaged in 14 weeks of wheelchair basketball training and 12 controls; Instrument: Lipid profile before and after training	Rodrigues, 2013

WHEELCHAIR BASKETBALL

Table 2.

Cost Ranges of Wheelchair Basketball Equipment/Accessories in the United States

Wheelchair Basketball Equipment	**Cost per item (range)**
Basketball wheelchair **Standard:** cambered wheels/anti-tip caster to prevent tipping backwards; high performance sport wheels and quick release axles **Highest quality customized options:** lighter titanium frame (reduced weight but increased rigidity); specialized wheels (range from $200-$600 each); handrims- aluminum anodized; footrest covers/straps; positioning options: click straps and cushions	 $1700-$2500 (new- standard) $600- $1500 (used)- good for trial of sport $3000-$5000 (highly specialized and individualized)
Cushion (58-63 cm from floor to top of platform) **Foam** (to gain height and provide seated comfort) **Gel** (may be more malleable; single layer vs. multiple gel layers and/or angled fit) **Air** (individual cells in cushion pumped with air- optimal comfort/can inflate to different degrees of firmness on different sides of cushion)	 $40-$150 $40-$200 $120-$500
Strapping (lap belt/thigh/calf/feet)- for stabilizing in wheelchair/prevent being launched out of chair **Leg and waist set** (options include brackets, foam pads) **Calf strap** (ranges from nylon webbing with Velcro to click strap (seatbelt) that stays connected)	 $70 $20-$70