Striving for fairness in Paralympic sport: Support from applied sport science

The 'para' in Paralympics stands for parallel (equal to).

ELIZABETH BRESSAN, *PhD*
Associate Professor, Department of Sport Science, Stellenbosch University

After 16 years in the USA, specialising in children's movement programmes and motor control, Elizabeth Bressan joined the staff at Stellenbosch University. The excitement surrounding disability sport at Stellenbosch soon caught her interest. She consequently shifted her focus slightly to incorporate adapted physical activity. She currently represents Africa on the International Paralympic Committee's Sport Science and Research Committee, and participates in several international research projects dealing with Paralympic sport. Her next goal is to establish an African universities co-operative Master's degree in adapted physical activity.

In 1948, Sir Ludwig Guttmann organised a sports competition involving World War II veterans with spinal cord injuries in Stoke Mandeville, England. Dr Guttmann worked towards rehabilitating World War II soldiers by involving them in competitive sports. Four years later, competitors from the Netherlands joined the games and an international movement was born. Olympic-style games for disabled athletes, currently called the Paralympic Games, were organised for the first time in Rome in 1960. The Paralympic Games take place after the Olympic Games at the same venues and facilities.

The Paralympic Summer Games is the second-largest sporting event in the world, second only to the Summer Olympics.[1]

The 'para' in Paralympics stands for parallel (equal to), not paraplegic, as many people think. The movement has grown dramatically since its inception. The number of athletes participating in the Paralympic Summer Games has increased from 400 (from 23 countries in Rome in 1960) to 3 806 (from 136 countries in Athens in 2004). The Paralympic Summer Games is the second-largest sporting event in the world, second only to the Summer Olympics.[1]

The Paralympic Games is an international competition among elite athletes with physical disabilities. It offers competition to athletes who are blind or visually impaired, to those with amputated limbs or similar impairments, to those with spinal cord injuries and to those who have motor impairments due to cerebral palsy, traumatic brain injury, or stroke. In certain sports, athletes with other physical disabilities may also compete.

Classification of athletes for competition

To make the competition fair, it was initially decided that athletes should be grouped into different 'classes' according to their disability and the extent of their disability, e.g. a tetraplegic would be in a different class than a paraplegic, so the two would not have to race against each other in a 100 m wheelchair sprint, but would compete only against other athletes with the same diagnosis. This is defined as 'classification according to disability'. While some sports are open to most disability groups, competition in certain sports

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may be restricted to athletes with a specific type of impairment, e.g. members of a judo team must be legally blind, and sitting volleyball players must have a disability that impairs one or more limbs.

Fairness in competition is critical in all sports, not just in Paralympic sports. The need to classify athletes according to some of their physical characteristics is not unknown in non-disabled sport, e.g. weight classes in sports such as boxing and wrestling. However, classification is extraordinarily challenging in Paralympic sport because the considerations range far beyond simply the weight of athletes.

Classification aims to ensure that competitive success is determined by the same factors that determine success in non-disabled sport.

Classification systems in Paralympic sport

In Paralympic sport, the classification of athletes serves two major purposes:[2]

1. To determine eligibility to compete, for which both of the following conditions must be met:

    • The impact of an impairment on performance must be considered to be permanent (i.e. it will not resolve in

Table I. Examples of how different approaches to classification are used for different Paralympic sports

Cycling

Cycling is open to amputees, *les autres*, cerebral palsy and visually impaired athletes who compete in individual road race and track events	All classes of visually impaired athletes compete against each other because they compete on tandem bikes with a sighted lead rider as a guide.
	Amputee, spinal cord injury and *les autres* athletes compete within one of the following groups, depending on their level of function:
	LC1: Riders with upper limb disabilities
	LC2: Riders with disabilities in one leg but who can pedal normally
	LC3: Riders with an impairment in one lower limb (they usually pedal with one leg only)
	LC4: Riders with impairments affecting both legs

Swimming

All swimmers, regardless of their disability, are classified according to the same criteria, i.e. those with limb loss, cerebral palsy, spinal cord injury, etc. will compete against each other if they are classified into the same group for swimming	Swimming classification is organised according to the stroke that the swimmer will use in competition:
	S: There are 10 'S' classes for swimmers who compete in the freestyle, backstroke and/or butterfly
	SB: There are 9 'SB' classes for swimmers who compete in the breaststroke
	SM: There are 10 classes for swimmers who compete in the individual medley
	A swimmer may have a different S class (e.g. S2) than an SB class (e.g. SB1)
	Swimmers with visual impairments compete separately and are classified into three groups according to vision loss: B1 is the most severe, followed by B2 and then B3 (the least severe)

Wheelchair basketball

Basketball is open to all wheelchair users. Players are classified according to their performance on sport-specific tests of shooting, passing, rebounding, pushing and dribbling, rather than on a medical diagnosis or muscle function examination	There are eight classifications based on functional ability to play basketball (classes 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0 and 4.5), with higher classification numbers representing greater basketball skills
	Athletes are given a point value based on their performance capabilities. The maximum allowable total of points for a team to have among players on the floor at one time is 14.0

the foreseeable future regardless of physical training, rehabilitation or other therapeutic interventions).

- The impairment causes a sufficient level of activity limitation: simply having an eligible type of impairment is not sufficient – it must cause a reasonable degree of difficulty in a specific sport, i.e. the Minimum Disability Criterion for that sport. It is possible that an athlete could be eligible to compete in one Paralympic sport, but not in another.

2. To minimise the impact of the impairment on the outcome of competition:

- Classification aims to ensure that competitive success is determined by the same factors that determine success in non-disabled sport. Athletes of similar functional abilities should succeed because they have reached higher levels of skill and fitness by legitimate means such as training, diet, practice of technique, fitness training and legal technical aids (e.g. strapping, prosthetics, equipment design).

Classification was originally based on medical opinion of the nature and extent of an athlete's disability, but the process has shifted to a functional assessment completed by a panel of qualified classifiers. This was because of the importance of considering the effect of the impairment or disability on performance in a particular sport. As disabled athletes became more and more devoted to training seriously for their sport, it became apparent that their impairment might have a different impact on performance in different sports. A functional assessment is geared towards assessing the degree to which an athlete's impairment will have an impact on his/her performance in a specific sport. Consequently, different classification systems were developed for each sport as it is characterised by a unique set of rules and demands on physical proficiency, e.g. cycling, swimming and wheelchair basketball each have different approaches to classifying their athletes (Table I).

The purpose of classification is to facilitate fair competition among athletes with disabilities by minimising the influence of their impairment on the outcome of the competition, i.e. to ensure that those with a more severe impairment are not prevented from achieving success simply because they are more disabled than their fellow competitors.[3] Athletes with 'higher classifications' are generally less impaired, while those with 'lower classifications'

are more impaired. One-point players in basketball, for example, have little or no controlled trunk movement and severely impaired balance to the extent that they must use their arms to return to an upright position when losing balance, while a four-point player has normal trunk movement but difficulty with controlled sideways movements on either the right or left side (usually as a result of a lower limb problem on a specific side, such as an amputation).

Support from sports science

Scientifically sound systems of classification are critical for Paralympic sport to encourage beginners to become involved as well at to ensure the integrity of competition at the elite level. Decisions about where to draw the line between classes are extraordinarily challenging, yet it is a task that must be done if Paralympic competition is to be fair. Sports scientists with expertise in biomechanics, sports physiology and motor control have been conducting research to determine the validity and reliability of classification systems in the different sports. In 1996 Brasile and Hedrick's[4] research identified problems with the wheelchair basketball
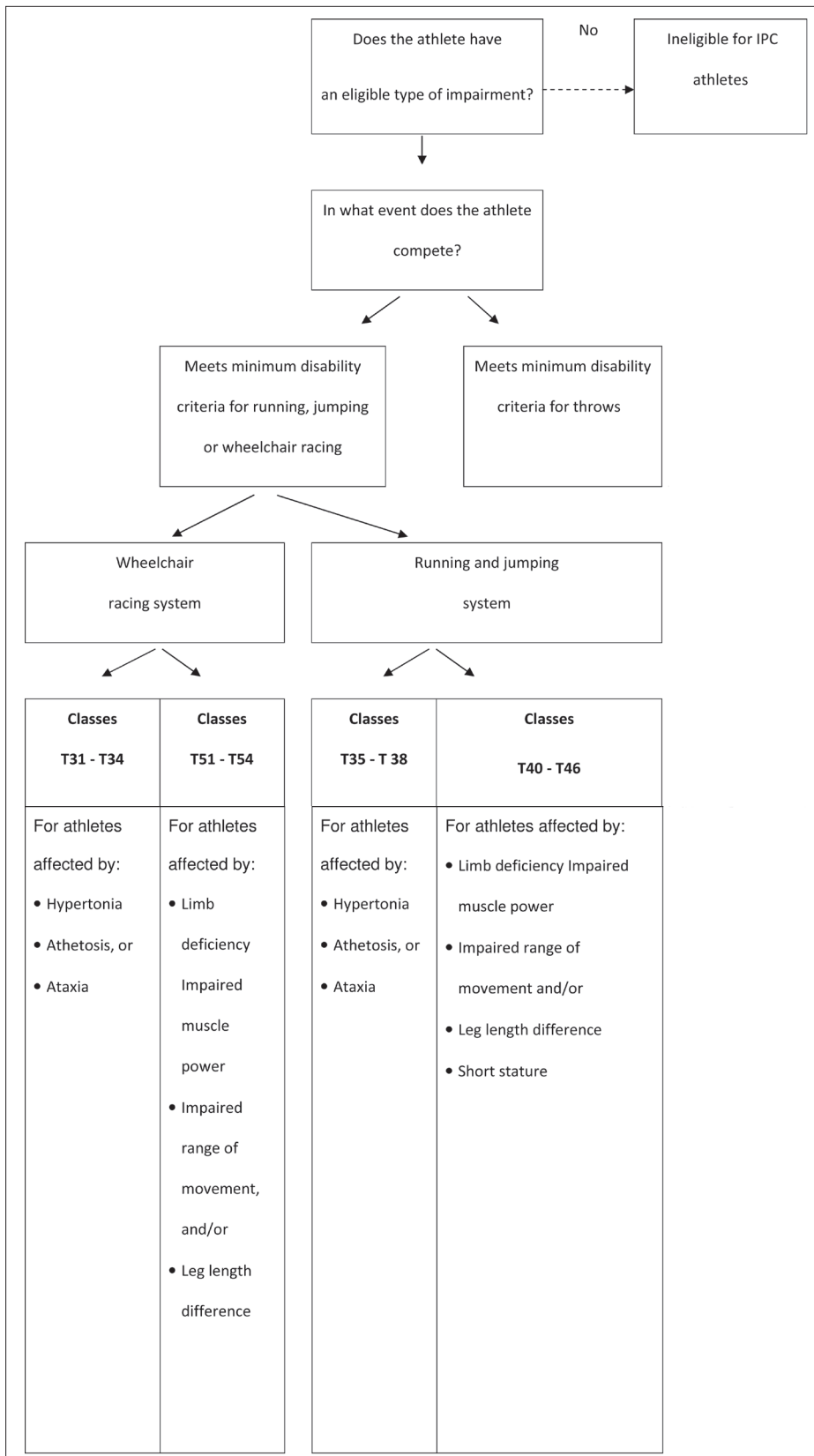
Fig. 1. An adaptation of the current approach to classification of athletes for the running and jumping and wheelchair racing events.

project aims to develop a new system based entirely on the functional capacities of athletes.[3] They will still be physically assessed, but the core of the process will be a set of standardised test batteries comprising quantifiable tests developed specifically to evaluate the impact of factors such as loss of range of movement, loss of strength and increased muscle tone on ability to run, throw, jump or push a wheelchair. Therefore, the new system will assign athletes to classes according to the extent of activity limitation caused by their impairments. The impairment must have an adverse effect on the biomechanical execution of running, throwing, jumping or pushing a wheelchair. In the new system, it might be possible to see athletes with different disabilities competing against one another (Fig. 2), providing that their respective impairments have a similar impact on performance.

Challenges to classification and the notion of disability

Some Paralympic athletes feel that they have been misclassified and, as a result, find themselves competing against others who, in their opinion, are much 'more able' than they are. There is a very sophisticated protest protocol developed by the IPC to deal with these circumstances. The increasing number of disabled athletes who compete in non-disabled sport also presents a challenge. Are all the classes really necessary or can some athletes with disabilities compete fairly in non-disabled sport? Other challenges to classification and the notion of disability have come from within the Olympic Games:[7]

- In 1938 Karoly Takacs from Hungary was a world champion shot. Then, an army grenade exploded in his right hand (with which he shot). Ten years later, he won two gold medals in rapid pistol fire at the London Olympics, shooting with his left hand. Four years later in Helsinki, he defended his Olympic title successfully.

- Liz Hartel from Denmark won silver medals in dressage in the 1952 and 1956 Olympic Games. An accomplished equestrian before she was paralysed with polio in 1944, she only recovered partially. She had to be lowered into her saddle and assisted to the podium to receive her medals.

- Marla Runyan of the USA became the first legally blind athlete to compete in the Olympics, where she ran the eighth fastest time in the 1 500 m.

Both Liz Hartel and Marla Runyan would have qualified for Paralympic competition. Karoly Takacs probably would not have met the minimum eligibility requirements for

classification system. Dummer[5] completed a critical analysis of the classification system for swimming, as did Wu and Williams.[6]

Perhaps the most ambitious application of sports science to Paralympic classification is currently under way in the form of the International Paralympic Committee (IPC)'s Athletics Classification Project that began in 2003 and will run until 2010. The current system in athletics still reflects a focus on the

type of disability of the athlete (Fig. 1), e.g. athletes in the track classes T31 - T34 and T35 - T38 often have cerebral palsy. Brain-injured individuals can manifest some similar characteristics, but may bring additional functional problems to competition that are not accounted for in the current system.

Under the leadership of Dr Sean Tweedy, School of Human Movement Science, University of Queensland, Australia, the

Fig. 2. If classification is based on functional abilities, athletes with different disabilities might be able to compete against each other in the same event (an athlete with a double below-knee amputation, an athlete with cerebral palsy, and a visually impaired athlete).

pistol shooting events. The question now arises about the validity of the classification systems for Paralympic sport, and it clearly sets the stage for sport scientists to join with classifiers in the Paralympic movement to adjust and refine their classification systems in order to promote fairness in competition.

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In a nutshell

- The 'para' in Paralympics stands for parallel (equal to), not paraplegic as many people think.
- The Paralympic Games offer competition to athletes who are blind or visually impaired, to those with amputated limbs or similar impairments, to those with spinal cord injuries and to those who have motor impairments caused by cerebral palsy, traumatic brain injury, or stroke.
- In Paralympic sport, the classification of athletes serves two major purposes: to determine eligibility to compete, and to minimise the impact of the impairment on the outcome of competition.
- Classification was originally based on medical opinion with regard to the nature and extent of an athlete's disability, but the process has shifted to a functional assessment completed by a panel of qualified classifiers.
- The purpose of classification is to facilitate fair competition among disabled athletes by minimising the influence of their impairment on the outcome of the competition.
- Scientifically sound systems of classification are critical for Paralympic sport in order to encourage beginners and to ensure the integrity of competition at the elite level.

Single Suture

Homebound elderly often undernourished

A study published in *The Gerontologist* shows that nearly three-quarters of 230 homebound elderly people were found to be undereating, i.e. not taking in enough calories to maintain their body weight. Perhaps, not surprisingly, those most at risk were men and anyone who received either infrequent or, interestingly, very frequent care by a caregiver. Other risk factors were having been hospitalised just before home care services were started and having a higher body mass index.

Locher JL, *et al. Gerontologist* 2008; 48: 223.