

LET'S TALK FACTS — WHAT HEALTHCARE PROVIDERS REALLY NEED TO KNOW ABOUT PARALYMPIC ATHLETES

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At the London 2012 Paralympic Games, 4236 athletes strived for sporting excellence in 20 sports. It was the largest multisport event for athletes with an impairment in the world. Less than 18 months later, Sochi hosted the largest Paralympic Winter Games ever, welcoming 547 athletes. Rio expects 4350 athletes competing in 528 medal events, in no less than 22 sports. Competitive sport opportunities for athletes with an impairment – named para-sport – continue to expand rapidly and it is great to see an increased recognition of these athletic achievements.

One should keep in mind that this all started 'only' in the 1940s, when Sir Ludwig Guttmann, a German neurosurgeon who led the spinal injuries unit of the Stoke Mandeville Hospital in Aylesbury, UK, decided to introduce sport as part of the rehabilitation programme of World War

II veterans. This humble initiative laid the foundations of today's Paralympic Movement.

With participation in sport comes an associated risk of injury. Despite the growing awareness and popularity of para-sport, there continues to be a relative paucity of knowledge on the scope of care for these athletes. This article summarises what healthcare providers really need to know when caring for athletes with impairments.

THE PARA-ATHLETE

Today, para-athletes with different degrees of physical, visual and/or intellectual impairment compete in 30 Paralympic sports. Some of these sports are unique to a particular impairment category, while others are open to a broader range of impairment types. A detailed overview on who is entitled to compete in which sport

is provided in Table 1. Within each sport, athletes are 'classified' according to their ability to perform certain movements and tasks. This allows their performance to be compared to other athletes with similar ability, so that the athlete with the best talent, sport strategies and skills wins. Para-sport classification is no different, though perhaps more complex in its operations, from weight, gender or age categories in sport. More detail on classification can be found on the website of the International Paralympic Committee (IPC) under www.paralympic.org/classification.

THE FACTS

It is commonly agreed that para-athletes can experience the same spectrum of medical conditions as their able-bodied peers. For this reason, team physicians, athletic trainers and allied health

TABLE 1

	Impaired muscle power	Impaired range of motion	Limb deficiency	Leg length difference	Short Stature	Hypertonia	Ataxia	Athetosis	Visual impairment	Intellectual impairment
Archery	X	X	X	X		X	X	X		
Athletics	X	X	X	X	X	X	X	X	X	X
Badminton(**)	X	X	X	X	X	X	X	X		
Boccia	X	X				X	X	X		
Canoe(*)	X	X	X	X						
Cycling	X	X	X	X		X	X	X	X	
Equestrian	X	X	X	X	X	X	X	X	X	
Football 5-a-side									X	
Football 7-a-side(***)						X	X	X		
Goalball									X	
Judo									X	
Powerlifting	X	X	X	X	X	X	X	X		
Rowing	X	X	X			X	X	X		
Sailing(***)	X	X	X	X	X	X	X	X	X	
Shooting	X	X	X			X	X	X		
Sitting Volleyball	X	X	X	X		X	X	X		
Swimming	X	X	X	X	X	X	X	X	X	X
Taekwondo(**)	X	X	X	X		X	X	X		
Table Tennis	X	X	X	X	X	X	X	X		X
Triathlon(*)	X	X	X			X	X	X	X	
Wheelchair Basketball	X	X	X	X		X	X	X		
Wheelchair Fencing	X	X	X	X		X	X	X		
Wheelchair Rugby	X	X	X			X	X	X		
Wheelchair Tennis	X	X	X	X		X	X	X		
Alpine Skiing	X	X	X	X		X	X	X	X	
Biathlon	X	X	X	X		X	X	X	X	
Cross-Country Skiing	X	X	X	X		X	X	X	X	
Ice Sledge Hockey	X	X	X	X		X	X	X		
Snowboard	X	X	X	X		X	X	X		
Wheelchair Curling	X	X	X			X	X	X		

(*) New Sports included in the Rio 2016 Paralympic Games programme

(**) New Sports included in the Tokyo 2020 Paralympic Games programme

(***) Sport on the Paralympic Games programme until 2016

Table 1: Impairment types eligible to compete in different Paralympic Sports (further detail on eligible impairments can be found in the IPC Policy on Eligible Impairments in the Paralympic Movement, IPC Handbook, Section 2, Chapter 3.13, www.paralympic.org/The-IPC-Handbook).

professionals should feel comfortable working with this population – but do they?

The assessment of injury risk in Paralympic sport is complicated by the different nature of impairments in the para-athlete. There is an intrinsic risk of oversight and therefore this population requires some special attention. In effect, the functional consequences of injury or illness to an athlete with an underlying impairment can be considerably greater than for an able-bodied athlete. Therefore,

healthcare concepts indeed benefit from greater emphasis on para-sport. However, para-athletes are athletes in the first instance. While precautions should be taken to prevent accidents from occurring and to make the para-sporting environment a safe and positive one, there is also an intrinsic risk of too much concern by caregivers and society towards individuals/athletes with an impairment. Although these concerns arise from best intentions, they may stifle the independence of these athletes.



Figure 1: The functional consequences of injury or illness to an athlete with an underlying impairment can be considerably greater than for an able-bodied athlete

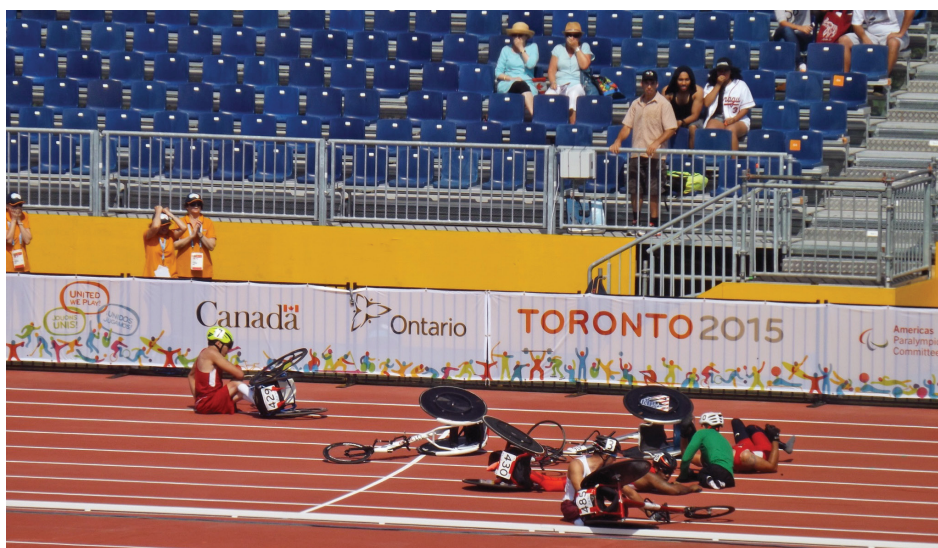


Figure 2: A 10-day event with 100 Paralympic athletes will likely lead to 12-13 injuries, about half of which will be new onset, acute injuries.

There are some excellent recent references on Paralympic (sports) medicine available¹⁻⁴, which should become mandatory reading for all those involved in the healthcare of the para-athlete. A full detailed analysis of these special considerations is not within the scope of this article, it therefore highlights some critical ‘facts’ established in prospective longitudinal studies initiated at a previous Paralympic (Winter) Games⁵⁻⁷ and the experience of the IPC and its Medical Committee.

The value of an epidemiological study performed at a competition is that it gives insight into illness and injury patterns, allowing for the development and implementation of (sport-specific) prevention strategies. The restriction of such a study is that it is a ‘snapshot’ of incidents that happen at the event. It should be complemented with further longitudinal study, in particular with regards to injury and illness patterns during the course of a season. The following facts should be considered within the remits of these values and restrictions:

Fact 1: a 10-day event with 100 Paralympic athletes will likely lead to 12 to 13 injuries, about half of which will be new-onset, acute injuries.

An overall injury incidence rate of 12.1 per 1000 athlete-days has been reported for the Paralympic Summer Games (20 sports)^{5,6} and an overall incidence rate of 26.5 per 1000 athlete-days for the Paralympic Winter Games (5 sports; unpublished data). However, for both summer and winter games the incidence rates are very much sport- and impairment-specific. Summer sports with the highest injury risk include: five-a-side football, powerlifting, goalball, wheelchair fencing and wheelchair rugby. Alpine Skiing is the most risky winter sport. In these sports, team physicians and event medical services should be prepared for higher volumes of work.

Acute onset injuries account for about 50% of the injuries reported, implying that another 50% of the injuries at an event relate to pre-existing, more chronic or overuse-type injuries. This means that event medical services need to be prepared for some work from day 1 onwards.

In addition, emergency medical services should not only focus on the injuries that happen on the field of play or during training, but they should also be prepared for non-competition/non-sport related medical incidents (see example under Fact 3).

Fact 2: you have to be prepared to diagnose and treat primarily upper limb injuries during multi-sport events.

Although very much sport-specific, upper limb injuries account for about 40% of all injuries in para-sport and, of these, most are shoulder injuries^{5,6}. This finding may not be surprising given that a significant proportion of para-athletes use wheelchairs in their sport (e.g. wheelchair basketball, wheelchair rugby, wheelchair tennis, wheelchair fencing, wheelchair racing, boccia) and an even larger population uses a wheelchair or crutches for daily mobility.

Fact 3: athletes with visual impairment are more vulnerable to injury.

The highest injury incidence rates reported so far are for athletes with visual impairments^{5,6}. These are however not necessarily sport-related. A significant number of injuries are common mobility-related minor incidents due to the fact

that these athletes need to re-orientate themselves in a new environment. With this data at hand, event medical services should actively engage in the long-term planning and implementation of a barrier-free and accessible competition environment.

Fact 4: most illnesses in para-athletes are due to infections.

The incidence rate of illness is somewhat in the same range as that of injury^{5,7} and as in the case of injury, the incidence of illness varies in different sports, with equestrian, powerlifting, table tennis, (road) cycling and wheelchair tennis leading the table. By far the most illnesses reported are of a respiratory nature, with over half of them deemed to be due to infection, while infection accounted for over 40% of skin and subcutaneous tissue illness and for over 80% of genito-urinary illnesses. Environmental conditions (including allergens and environmental pollution) accounted for 30% of the respiratory conditions. One should be aware that nearly one in five illnesses results in significant time loss in training and competition.

Special attention should be given to wheelchair users who suffer from loss of sensation and prolonged contact pressure and who might therefore also be more

susceptible to urinary tract infection due to e.g. neurogenic bladder and prolonged or intermittent urinary catheter use.

Fact 5: para-athletes report late to the doctor!

Medical staff should be aware that in many cases of reported infection, symptoms were already present the day before the athlete sought medical care⁸. Though it is expected that para-athletes practice routine preventive measures to maintain optimal health to achieve maximal performance, it is known that they often do not seek medical consultation for problems considered inherent to their impairment. Consequently, they too often try to 'work through' an illness or discomfort. Unfortunately, such self-management and delayed reporting of symptoms to medical staff could have important clinical implications in a team's medical care as it is during this period when athletes are more likely to be contagious^{1,2}.

Fact 6: medication may impact para-athletes' performance.

The pharmacological management of illness and injury in athletes holds unique considerations when compared to the general population. This might be even more the case for para-athletes with potentially altered physiological

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responses to pharmacokinetics. There is neither a large body of literature available concerning the effects of medication on exercise performance in para-athletes, nor is there a lot of data on medication use in this athlete group. Some of the frequently used medications include: anti-spasticity medication, botulinum toxin, analgesics, glucocorticoids, diuretics and pain medication¹. Medical staff working with para-athletes should consider whether any medication is prohibited as per the current World Anti-Doping Agency Prohibited List and, where applicable, advise the athlete on the Therapeutic Use Exemption provisions. Although an increasing number of national governing bodies now bring physicians as part of their delegation to major events, it is worth noting that para-athletes may not necessarily enjoy the same level of medical support by national bodies as their able-bodied counterparts throughout a season. Therefore, event physicians become much more of a primary resource for these athletes.

Fact 7: (long haul) travel has an impact on para-athletes.

We all know that sitting in the same position for long periods can be rather unpleasant, particularly on long-haul flights. The associated discomfort applies even more to para-athletes who increasingly engage in international competition. It should be good practice for athletes to perform key health checks upon arrival (hydration status, swelling, skin redness), which can, on occasion, reveal the need for follow-up care with event medical services¹.

Athletes and their support teams are advised to take a supply of medication that is used daily or regularly in their carry-on luggage in case of delayed delivery of checked-in luggage.

In addition, legislation on the import of medication, even for personal use, is different by country (e.g. medical cannabis) and event medical services should advise athletes and delegations on the appropriate procedures. When reaching out to athletes in advance of an event, one should take the opportunity to remind them of any required immunisations and to check that routine medication is brought in sufficient quantity.



Figure 3: Medical staff should be familiar with extrication of athletes from adaptive equipment.

Fact 8: being familiar with equipment and advancing technology is essential.

The advances in the use of assistive propulsion and protective devices, as allowed by the sport's technical rules (orthotics or prosthetic devices, wheelchairs, throwing chairs, sitskis, sledges, goggles etc.), brings an additional component of medical care which should be considered throughout (e.g. extrication from equipment; the influence of running forces on stump-socket interface). Familiarisation with the different types of equipment is essential to enable the rapid and safe extrication and transport of the athlete⁹.

The stump-socket interface is a high-risk area in athletes with amputation, as this area is subject to high forces, hot/moist conditions, sweating during exercise and possible bacterial contamination in the sport setting.

Fact 9: prevention strategies can be effective in para-athletes.

One significant finding of the Salt Lake City 2002 Paralympic Winter Games injury survey was a high incidence of traumatic lower limb injury in ice sledge hockey¹⁰. Comparing the survey findings with footage of the competitions revealed that many of those were due to collision with an opponent or with the boardings of the field of play. It was concluded that these injuries could have been prevented, had

the athletes been required to use protective clothing over their legs or if the design of the sledge had incorporated a protective shell. Both these recommendations were taken on board by the governing body of the sport and no further acute injuries in the lower limbs were reported in the sport afterwards. With more detailed analysis of sport-specific injuries forthcoming, the IPC and the IPC Medical Committee will be in a position to advise sport governing bodies and event organisers on more efficient preventive strategies.

Fact 10: listening to your athletes improves your care.

Considering all of the above, one might reasonably conclude that it makes sense to engage the para-athlete in a continuous dialogue on healthcare. Aside from the self-management and the individual display of symptoms and response to treatment, para-athletes furthermore tend to demonstrate resilience and are accustomed to adversity. Pain is but one example where para-athletes tend to have higher thresholds compared to their able-bodied counterparts. Promoting athlete participation in the presence of an injury should not be advocated, but event medical staff should be prepared to listen carefully to the athlete and to revise their views with respect to musculoskeletal issues in para-athletes.



Figure 4: Protective leg clothing and sledge design modifications eliminated traumatic lower limb injuries in Ice Sledge Hockey

THE MORE THEY KNOW, THE MORE HEALTHCARE PROVIDERS WANT TO CARE FOR PARA-ATHLETES

The field of Paralympic sports medicine has emerged as an exciting and innovative area of medicine and science. Optimising athlete health and safety is important for both enhancing sports performance and preventing injury. This has been recognised by the Paralympic Movement, who identified the need to have an overarching athlete health and safety policy, resulting in the IPC Medical Code¹¹. Nevertheless, despite the best planning and precautions, accidents and incidents will continue to occur. Organisers need to recruit qualified and experienced medical staff, carefully establish contingency plans and act in a multidisciplinary environment centred around the athlete.

Para-athletes are able to achieve extraordinary levels of performance, embodying and showcasing the values of the Paralympic Movement: courage, determination, inspiration and equality. Para-sport is an agent for change, able to break down (social) barriers of discrimination for impaired individuals. Therefore, the provision of healthcare to para-athletes is both challenging and rewarding. Myths and prejudice disappear not only with familiarisation and exposure to para-sports, but also with further knowledge and scientific study: an invitation difficult to decline for any healthcare provider.

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