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Stories from Sochi:
Sun, Sea, Snow and Salt

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STORIES FROM SOCHI: SUN, SEA, SNOW and SALT

By many accounts, the Sochi 2014 Winter Paralympic Games were a smashing success. Evidence of this success can be found in the size of the Games, the wonderful venues, the media attention, the enthusiastic fans and the positive influence of the Games on the host nation and the world.

The Sochi Games were the largest Winter Paralympics to date, with a record 545 athletes from 45 countries participating. The growth in participation and popularity of the Paralympics over the past 20 years has been nothing short of remarkable. It is a testament to the athletes' desire to compete and to their ability to inspire the world with their incredible achievements.

By most measures, the Sochi Organizing Committee did a laudable job of staging the Games. The Russians constructed world-class competition venues where the largely Russian crowds displayed wonderful enthusiasm. The fans cheered for all of the competitors, and of course cheered loudest for the Russian athletes. Many of the 25,000 Russian volunteers at the Games were young, friendly, engaging and anxious to practice their English and meet people from around the world. It was routine to see Russian, Ukrainian and United States flags waving side by side in the spectator areas, the flag bearers sharing the spirit of international sports competition. These types of international interactions are magnificent. One gets the sense that every shared smile has the power to ease tension between the East and West in some small way. The ability of the Olympics and Paralympics to bring people together is truly miraculous.

SEA AND SNOW

Situated on the shores of the Black Sea, Sochi has historically been the tropical paradise of Russia. For centuries it has been a haven where Russians have sought refuge from their long winters and the rigors of daily life. Many generations of Russians have vacationed there: first the Russian bourgeoisie, later the elite of the communist party, and more recently the Russian oligarchs. The geography of the Sochi region is such that the indoor events, such as ice sledge hockey, wheelchair curling and the opening and closing ceremonies could be held in brand new facilities in the coastal cluster, built right on the shore of the Black Sea. A new 40 kilometer long road and railway were built to connect the coastal cluster on the Black Sea with the mountain venues, right in the heart of the truly majestic Caucasus Mountains. In the quaint mountain village of Rosa Khutor, brand new hotels, restaurants, shops,

chairlifts, gondolas and aerial trams have transformed the area almost overnight into a high-end, European style alpine resort. The new sports venues will hopefully benefit elite and recreational athletes for years to come.

PROMOTING DISABILITY AWARENESS

Hosting the Olympic and Paralympic Games can have an enormous influence on the host city and the host nation. In turn, the host city has the opportunity to showcase its people, land and culture on a world stage. Some of the greatest legacies of the Olympic and Paralympic Movement stem from activities that are not directly related to the competition. It is no longer sufficient for the host city to merely stage a sports event. Integral to the responsibility of staging the Games are requirements and expectations that range from initiatives that promote environmental sustainability, equality, free speech, health, physical activity and disability awareness.

This was the first time the Paralympic Games – Winter or Summer – have ever been held in Russia. The Sochi Organizing Committee, in collaboration with the Russian government and the International Paralympic Committee (IPC), advanced several initiatives to promote disability awareness. One such program was a novel project that developed an internet based “Accessibility Map,” which listed all accessible sports venues and clubs for para-sports across the country. An amazing total of 14,600 accessible venues in over 600 cities have been placed on this map. The organizing committee also carried out a “Paralympic Awareness Program,” which was a national program designed to raise awareness about the Paralympic Games and Paralympic values. The Sochi 2014 “Our Champions” program promoted the Russian Paralympic Team and brought public recognition to athletes from all regions of the country. Russian Paralympians made appearances at various cultural, educational and sports events where they spoke about their experiences as para-athletes and about the history and values of the Paralympic Movement. The “Paralympic Lessons Program” specifically targeted Russian school children with educational efforts to enlighten the youth of Russia about the capabilities of people with impairments.

To celebrate the origin of organized para-sports competition, the Paralympic torch relay started in Stoke Mandeville, England before travelling throughout Russia. Over 1,700 torchbearers, many of whom have impairments, were showcased through the media and in person, in 46 cities and all eight regions of the largest country in the world. The Paralympic Games were broadcast live across the 12 time zones of the host nation, bringing awareness of the athletes’ capabilities into the living rooms of the Russian people. All of this attention helped to ensure that the Paralympic Movement will have a positive and lasting effect on the acceptance of people with impairments throughout Russian society, as they have elsewhere around the world.

PROMOTING ADAPTIVE SPORTS MEDICINE

Another legacy of the Games is the exchange of medical information that occurs among healthcare providers around the world. The field of rehabilitation medicine is not as well developed in Russia as it is in some other parts of the world. Many Russian physiatrists are still trained and practice primarily with the use of physical modalities, in a manner akin to the early days of rehabilitation medicine in the West. Furthermore, there was little knowledge among the healthcare providers of the Sochi Organizing Committee about the specific musculoskeletal and medical issues that are seen in Paralympic athletes. In fact, we are not aware that a single physiatrist was a member of the Organizing Committee's medical team – either during the Olympics or the Paralympics. The IPC Medical Committee put on several educational symposia for the healthcare providers of the Sochi Organizing Committee to enhance their knowledge of adaptive sports medicine. As has occurred in Beijing and elsewhere, the Paralympic Movement continues to promote an international exchange of knowledge among rehabilitation healthcare providers.

SUN AND SALT

The Sochi 2014 Games re-established the Russians as great builders, extraordinary athletes and enthusiastic sports fans. The Russians embraced the Paralympic Movement and have started to more fully integrate people with impairments into Russian society at large. Yet, as with all Games, there remained issues outside of the control of the local Organizing Committee. Regrettably, certain circumstances drew attention away from the inspiring accomplishments of the athletes.

One of these circumstances was the murder trial of Oscar Pistorius, arguably the most well known para-athlete of all time. The trial of the photogenic, well-spoken, Paralympic champion, Olympian, national hero of South Africa, and inspiration to fans around the world, began on the same day as the Opening ceremonies of the Sochi 2014 Paralympic Games. News of the trial was broadcast in Russia on BBC television, which was available 24 hours a day in all the hotels, athlete residences and athlete lounges in the Paralympic Villages. While everyone at the Games tried to focus on the competition, there was no escaping the fact that one of the Paralympic Movement's greatest representatives was making headlines around the world for the shooting death of his supermodel girlfriend.

Also on the news every day and night of the Games was the escalating conflict just four hundred kilometers to the northwest in Ukraine where, for the first time in Olympic and Paralympic history, the host nation violated the Olympic truce and staged a military invasion of a sovereign country. While the Russian-Ukrainian conflict posed no security threat in Sochi, and the sports competition was unaffected, it was not possible to entirely ignore the nearby geopolitical events. Many western countries, including the United States, Great Britain, the Netherlands, Sweden and others, did not send their dignitary and royal delegations to Sochi. In

protest of the events occurring in their homeland, the Ukrainian Paralympic team boycotted the opening and closing ceremonies, and staged a peaceful march through the Alpine Paralympic Village.

The adverse circumstance that directly affected the competition to the greatest degree was also completely out of the control of the Sochi Organizing Committee. This was the weather. Simply stated, the weather was not conducive to holding outdoor winter sports events. The two indoor sports events, ice sledge hockey and wheelchair curling, were obviously unaffected by the weather. The two disciplines contested at the spectacular Nordic venue, cross-country skiing and biathlon, were moderately affected. Most severely impacted, from both a sport perspective and a medical perspective, were the Alpine ski racing events. Dramatically warm temperatures made the Alpine ski racing downright dangerous.

Temperatures during competitions at the Alpine venue often soared to between 14 and 18 degrees Celsius (57 to 64 Fahrenheit). On one day, the thermometer in the mountains hit 24 degrees Celsius (75 Fahrenheit)! On several occasions, the overnight temperatures at the Alpine race courses did not drop below freezing, which is necessary to maintain a firm snow pack. The warm temperatures created soft, sticky, slushy conditions on the race courses, and several days of fog and rain compounded the situation. A windstorm early in the Paralympics deposited dirt and other debris onto the snow. Despite the fact that three meters of artificial snow had been made on the race courses early in the winter, this could not prevent the surface of the snow pack from being negatively affected by the weather. Nor could it prevent the undersurface of the snow pack from being adversely affected. One day a sinkhole opened up in the race course because of a river of snow melt that was running underneath the snow. This caused the event schedule to be pushed back by 24 hours. The race crew worked up to 18 hours a day trying to keep the race courses suitable for competition. Over 100 tons of salt and other chemicals were applied to the snow during the Olympics and Paralympics in an attempt to stabilize the snow pack! Extra chemicals had to be flown in urgently from Switzerland. One course worker was overheard saying, half-jokingly, "I think there is more salt than snow on the race course!" Despite these efforts, course conditions remained challenging. One of the Alpine skiing race directors commented that had it been any event other than the Paralympic Games, all of the alpine racing would have been cancelled because of the unsafe snow conditions. At the nearby Nordic skiing competition venue, the warm snow conditions turned the racing into a competition that was two parts athlete ability and one part ingenuity of the ski wax technicians.

The snow conditions led to an extraordinarily high Did Not Finish (DNF) rate in the Alpine skiing events. A preliminary analysis of the Sochi DNF rates compared with the three prior Paralympic Winter Games (SW, unpublished date), show that the DNF rates in Sochi were 50 – 100% higher than in the three prior Games. Although the official injury rates are still undergoing analysis at the time of this manuscript preparation, preliminary injury data indicate that the injury rates in Alpine skiing were also substantially higher in Sochi compared with the three prior Winter

Paralympic Games. There were many horrific crashes, especially in the speed events (Downhill and Super G), and an untoward number of helicopter evacuations of athletes from the race courses. Injuries included a hip fracture, a tibia fracture in an amputee, a spine fracture above a prior spine stabilization, facial fractures and numerous concussions, among others. There were two athletes who had the very unfortunate experience of sustaining injuries while skiing to the race course in foggy, slushy conditions, one of whom was unable to continue with competition because of his injury.

Similar soft snow conditions plagued the Alpine skiing courses during the Olympic Games in Sochi. However, the soft snow, ruts and bumps caused by the temperate climate near the Black Sea affected the Paralympians to an even greater degree, because these athletes have less ability to absorb the irregularities in the snow surface compared with their Olympic counterparts.

FUTURE GAMES SELECTION

The International Olympic Committee (IOC), which is responsible for awarding the Olympic and Paralympic Games to the host city, has a goal of spreading the Games around the world. The IOC and IPC work collaboratively to promote public health, sports participation, sustainability and disability awareness in the host nation and around the world. These legacies of the Games are virtuous and commendable. However, it is becoming increasingly more challenging for any city to host the games. For the Winter Games in particular, it is necessary to have a medium to large sized city, great infrastructure, a large pool of enthusiastic volunteers and big mountains. It has also become evident from the last two Winter Games that high elevation or far northern latitudes are necessary to ensure cold weather. It rained so much during the first week of the Vancouver 2010 Winter Olympics that the Organizing Committee had to refund 20,000 tickets because part of the spectator area at Cyprus Mountain, site of the freestyle skiing and snowboarding events, became unsafe for the spectators. Holding the Winter Games in or near summer resort cities (Sochi has palm trees!) is risky business, with negative implications for the competition and the safety of the competitors. The IOC must weigh the geopolitical and financial advantages of their decisions against the ever more prevalent influences of global climate change.

The next Winter Olympic and Paralympic Games will be held in 2018 in Pyeongchang, South Korea. The Alpine skiing events will be held at approximately the same altitude as in Sochi, but at a slightly lower latitude. Hopefully there will be lots of snow, and the Games will be unaffected by the warm winds from the nearby Sea of Japan and the heat from the tension with North Korea, just 100 kilometers away.

CONCLUSION

The vision of the International Paralympic Committee is "*To enable Paralympic athletes to achieve sporting excellence and inspire and excite the world.*" The Sochi 2014 Paralympic Winter Games followed the success of prior Paralympic Games to help realize that vision. As rehabilitation professionals, we all strive to maximize our patients' function. Paralympic sport represents the pinnacle of physical functioning for individuals with impairments. Paralympic athletes have found a way to maximize their functional status to the point where they are able to travel all around the world, see new places and make new friends as they participate in international sports competitions. The accomplishments of these extraordinary athletes provide lessons that are applicable to all patients going through the rehabilitation process.

While we all have much to learn from the fortitude, resilience and accomplishments of Paralympic athletes, at the same time the readers of this journal have much to offer the Paralympic movement. There exists enormous opportunity to get involved in para-sport at various levels. The Paralympic Movement is in need of physicians with expertise in disability and sports medicine, as well as physical therapists, athletic trainers and classifiers from all areas of medicine and sports science.

We hope that this special supplement on Paralympic Sports Medicine and Science stimulates thought and discussion, and motivates readers to get involved in the Movement!