



## ‘Baseline to start line’: physical preparation through the Rio Olympiad

Alex Wolf and Dr Emma Ross FBASES provide a perspective from the English Institute of Sport on how practitioners are supporting athletes' physical preparation for the Rio Olympic and Paralympic Games. What has been the focus for sports science and medicine throughout the current Olympiad and what are the current priorities now we're in Games year?

### **The beginning of a new Olympiad**

Preparation for Rio started as soon as the final light went out at London's Closing Ceremony. Immediately post Games is when the biggest change in personnel occurs across high performance sport, including athletes, coaches and support staff. With such change, the biggest challenge is to understand any new coaching direction and philosophy, and the athlete population. What worked for London will not work for Rio if we want to stay ahead of the rest of the world.

The early part of the Olympiad is where we lay the foundations, so that athletes arrive at the Rio Games healthy, in peak physical condition, with the ability to execute winning strategies and tactics, and with an unwavering motivation and belief to succeed. Much was learnt from the London cycle, and much is still to be developed - the job of the science and medicine support team and coaches is to synthesise these reflections and plan to set the course of physical and mental preparation throughout the next 4 years.

### **What it takes to win**

One of the first tasks in a new cycle is understanding 'what it takes to win' (WITTW). This WITTW process begins with establishing what actually has to happen to win - to use hockey as an example, we know that to win our team must score more goals than the other team. But at Rio, for the gold medal, they must also be able to win eight matches in the 13-day tournament period, with no drop off in intensity. Coach insight and intelligence from Performance Analysts will provide further high-level information about the game plan - what characteristics of play are more likely to end in a goal scored. Then an iterative process follows to allow practitioners to establish which determinants will enable this game plan to be executed successfully. For example, to win, a team must have more circle possessions than their opponent, and to do this they must have superior high speed running and turning, and repeated sprint ability. Knowledge of what physical capabilities underpin these skills goes on to inform the type of training,

monitoring, interventions and competition planning throughout the Olympiad. As well as the WITTW model aligning daily delivery to athletes with a successful Olympic performance, it also establishes performance questions which form longer term performance-focused projects. In hockey this might be the recovery strategy needed to compete 8 times in 13 days, or the development of an acclimation strategy that will increase the probability of successful qualification during a tournament in the heat. After a successful London Olympics, hockey underwent changes to its game format from a 70 minute game of two halves, to a 60 minute game of four quarters. This imposes different physiological and mechanical demands on athletes, and a different style of play is required for success. The science and medicine team had to reorganise their focus towards the determinants of successful performance in the new format. This required continuous monitoring and tracking of daily training, wellbeing and performance throughout the entire Olympiad. While physiologists, nutritionists and strength and conditioning coaches can track the physical changes, the performance analysis team can measure its impact on match play. This information and intelligence combined helps inform the coaching process (but does not lead it) and allows support staff to problem solve, optimise physical and mental preparedness and proactively identify potential injury and illness issues.

### **Injury and illness**

It is important to highlight the cost of injury and illness, even during the early part of the Olympiad. When training at the elite level, an athlete walks a fine line between optimal training and performance, and injury. In the London cycle a simple count of number of training days lost due to injury and illness revealed 22 years of missed training over 3 years in the nine Olympic sports surveyed. Working with the medical and physiotherapy team to establish proactive protective physical preparation against injuries commonly affecting athletes in a given sport is important, as is the establishment of

return to play strategies. It is during rehabilitation that we often see just how powerful the multidisciplinary team is in returning athletes to full training.

The coach will dictate the long-term vision for a given event or athlete - the science and medicine team must use that vision to inform the planning of each training week, every training block, and each season throughout the entire Olympiad. By establishing a robust 'what it takes to win' model for each sporting event early on in the cycle, each practitioner can align their work directly to performance. The continuous measurement and tracking of the most appropriate physical and psychological variables can support and inform the coaching process, ensuring all interventions have a clear line of sight to improving performance on the track/pitch/water and that everyone is working in the same direction. It is a simple, yet very powerful concept.

### Games year

Whilst the focus over the previous years has been on long-term physical and psychological development, as 2016 arrived, the priorities of practitioners supporting potential Rio athletes and coaches have shifted. First and foremost, despite the presence of the Games looming large, it is important not to get distracted by the bigger goal, since in many aspects, it is still business as usual. In the 8-month period from the start of 2016 until the opening ceremony, each athlete still has over 700 meals to eat until their Olympic or Paralympic event, 500 training sessions to complete, 250 nights sleep, and most importantly they still might need to qualify. Therefore, ensuring athletes are getting the fundamentals of nutrition, training and recovery right is still really important.

### Athlete health

Injury and illness are again, a significant risk to peak performance at this stage of the Olympic cycle. A multidisciplinary and individualised approach is paramount, with effective communication between the multidisciplinary support team to ensure the right performance metrics are monitored and meaningfully evaluated to allow both proactive and reactive support where necessary. The technology and diligence with which these metrics have been collected consistently across the Olympiad now allows early identification of when an athlete deviates from their 'healthy norm' and intervene appropriately. With improved technology and data management systems it would be easy to measure everything, but inform nothing. Here the WITTW model once again brings clarity - if it's not important for performance - why are you measuring it? If it is, how will you use the data to inform scientific support or the coaching process?

Certain illness and injury strategies get a system wide boost nearer Games time. A renewed focus on hand-washing, from education on washing techniques to athlete behaviour (avoid hand shaking, carry sanitising gel) and an emphasis to all athletes and support staff to stay off-site if you are ill, all help to reduce the incidence of illness, and therefore time away from training in the run up to the Games.

### Putting it into practice

Qualifying events allow competition strategies to be tried and tested. By now, on-the day priming and preparation strategies will have been optimised by physiologists, strength and conditioning coaches and nutritionists. Performance analysts will have provided analytical insight to improve race/event techniques and tactics. Nutritional and physiological recovery interventions will have been developed and individualised. In order to abide by the golden rule of not doing anything on the big day that you haven't tried before, the World Cups, international meets and test events provide excellent opportunities to rehearse all of these competition strategies.

Research programmes that have been ongoing throughout the cycle finally have an opportunity to provide cutting-edge interventions that will be 'unveiled' at Games time, but would have been investigated, trialled and refined in the preceding years. Remember the cyclists' 'hot pants' in London 2012? These muscle warming garments were the culmination of 3 years of research and application, which meant our athletes were uniquely prepared for their Olympic and Paralympic races in the velodrome. The physiological and biomechanical work that underpinned the development of these garments, also gave our athletes a huge psychological advantage over competitors. During the Rio cycle, in physiology for example, research has been ongoing in the areas of altitude training, recovery, sleep and tapering. This year will see the output from this work integrated into the optimisation of an athlete's preparation.

### Specific challenges for Rio

Whilst some Rio-specific questions will have been answered earlier on in the cycle, there are still several Games time challenges that need to be addressed. When the Rio competition schedules were released, several sports had performance questions around the timing and frequency of their rounds/heats and finals. For example, some sports have the challenge of late night matches or very little recovery between an evening race and another the next morning. In all cases, practitioner teams will work together to provide evidenced-based, feasible and practical solutions for each specific situation. These solutions must take into account not just race or match scheduling but logistics of how and when athletes will travel between the venue and the athlete village. For practitioners, the ability to be creative, problem-solve and have the scientific integrity to know how to deliver robust solutions in the real world is uniquely tested around Games time.

### The travelling athlete

Much time is being spent in the lead up to Rio ensuring optimal travel strategies. This is the first time in 8 years that we have had to prepare for a long haul flight into the holding camp or Para/Olympic venues. Physicians and physiologists work closely together to establish the effects of long haul travel, time differences and the competition environment on both recovery from travel and sleep quality whilst competing at the Games. For Paralympians, long haul travel can have greater impact than for able-bodied athletes, and practitioners will be managing impairment-specific risks amongst their cohort of athletes - once again requiring an individualised and multidisciplinary approach.

As an athlete approaches the start line of their Olympic or Paralympic event, it is their moment to shine. As a practitioner support team, it is our moment to stand back into the shadows, knowing that we have done all that we can to support that athlete through their extraordinary journey that culminates at The Greatest Show on Earth. It's giving us goosebumps already... ■

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