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# Have Sports Teams Created the Ultimate Health Ecosystem?

Sports medicine and the health ecosystem surrounding professional sports is bucking in the use of integrated care and connected technology thereby setting new standards in monitoring and assessing athletes or patients.



Introduction

Modern healthcare is often accused of lagging behind other industries with regards to integrating technology to improve patient care and outcomes. Sports medicine and the health ecosystem surrounding professional sports is bucking this trend and setting new standards in the use of integrated care and connected technology for monitoring and assessing athletes or patients.

Professional athletes clearly represent an extreme end of the healthcare spectrum but the principles of a fully cohesive, multidisciplinary, connected team looking after an individual's healthcare journey can be learned from. This approach not only encompasses treatment and management of illness (or injuries) but also focuses on prevention of injuries and optimization of the athlete's general health in order to optimize performance.

## Evolution of the Sports Medicine Team

Historically, delivery of medical care for athletes was reactive and injury focused. Care was overseen by GPs, orthopedic specialists and other clinicians with an interest in sport. This type of approach neglected the often deleterious effect of elite, intense training on health and the contribution that chronic or low grade recurrent injuries have to overall function. The first point of contact in this system was the physician who may or may not have a specialist interest in sport.

The newer model of care encompasses a multidisciplinary and multi-specialist outlook and the athlete's primary contact will depend on the specific need. Teams may include a sports physician, team doctor, general practitioner, orthopedic surgeon, physiotherapist, soft tissue therapist, osteopath, chiropractor, podiatrist, nutritionist, sports scientist, strength & conditioning coach, physiologist, psychologist and biochemist; each with their own specialist knowledge and experience benefiting the overall care of the athlete.

The England and Wales Cricket Board are an excellent example of a full, multidisciplinary sport science and medicine department tasked with maximizing the availability and performance of England's best players. Aside from the functions that have already been mentioned above they also employ a Personal Development and Welfare team to support the players in three areas of Well-being, Lifestyle and Personal development; further cementing the holistic approach now being taken by elite teams. These various functions work underneath the Head of Sports Science & Medicine and have responsibility for communicating with their counterparts in the various departments. These teams also use tailored integrated sports science software that records various inputs from different parts of the team helping to build a full picture of the athlete's condition. In addition, they all collaborate on various research and development projects to inform coaching plans and medicine programs.

This approach recognizes the impact that even minor stresses, ailments or complaints (both physical and psychological) can have on athletic performance and also puts into view the overall health spectrum from complete wellness to a state of injury and illness. It allows for a more integrated look at the health and well-being of the person as well as optimizing their performance.



## Multidisciplinary Teams in General Health Systems

In contrast, a single sports specialist physician runs the risk of focusing on the complaints that directly affect performance, within their specialist knowledge, while missing other, equally important but perhaps less obvious health related factors. Similarly, with general health systems, patients may bounce from specialist to specialist with little ongoing interaction between healthcare professionals. Multidisciplinary teams have been set up for cancer care but this is not necessarily replicated across health systems.

Admissions for elective surgery are a good example of where we see a potential disconnect between departments, with GP referrals, surgical clinics, pre-assessment clinics, anesthetic reviews etc. all active independently before eventually coming together in the patient notes. A newer model of care proposed by the Evidence Based Peri-operative Medicine (EBPOM) collaboration has suggested a single healthcare professional (a “peri-operative practitioner”) oversee the entire process while specialists perform their functions collaboratively from referral to post-operative follow up. This allows for continual oversight of the patient pathway which is fully informed by the various specialists; a fully integrated model of care.

## Connected Analysis in Sports

The integrated health and coaching team allows a comprehensive and personalized overview of an athlete's health, development, coaching and wellbeing.

## Optimized Performance

Leicester City Football Club, current Premier League Champions in England, used the fewest number of players last season and experienced the fewest number of injuries despite the highest number of high speed counterattacks and high intensity sprints in the league. This is a remarkable statistic given that it has been established that players who perform very high speed running are nearly 3 times more likely to sustain a non-contact soft tissue injury than players with low sprint running loads. This is down to the conditioning of the players in a way that is comparable to game situations thus preventing injuries as a

result of unusual strain. The catalyst for the type of conditioning required was data from GPS (*Catapult*) and automated camera systems (*Prozone*) that allowed analysis of player positions and situations where a sprint may be required and what positions the body gets into. Replicating these situations in training and adapting training for specific needs in specific positions allows the conditioning to be tailored to the individuals, helping to prevent injuries and maximize performance. This type of analysis and plan would involve sports scientists, technical coaches, strength and conditioning coaches as well as medical staff who would look at injury patterns and medical histories in order to bring the data together.

### Injury Prevention and Prediction

League clubs also use a number of wearable, connected devices to monitor player aspects like distance run, acceleration, deceleration, changes of direction and other positional parameters. At Leicester City the players are asked to complete a questionnaire asking them how their bodies feel, looking for patterns of complaints which can then be used to adjust the next session. They are also asked about their sleep and all of this data is integrated with blood tests, urine analyses, diet etc. in order to build a holistic picture of each individual and pick up on any abnormalities as well as adjust for any potential injury tendencies. The data can also be used by sports psychologists to look for any patterns of behavior that might affect performance and where they may be able to have a positive impact.

The Toronto Raptors NBA basketball team's sports science and medicine department use slightly different wearable technology (*OptimEye*) to monitor jump loads, jump ranges, acceleration, deceleration and a number of other variables in order to help predict and assess for unseen injuries. For example, the device can report any imbalances in a player's movement such as favoring one leg over the other while jumping, which can be extremely difficult to spot with the naked eye. This type of imbalance, detected by the sports scientists, may indicate a weakness in the muscle or incomplete recovery from an old injury which can then be further examined by medical staff and/or physiotherapists before appropriate action is taken.



### Injury Management and Improved Recovery

Traditional rehabilitation programs were designed to ensure an athlete returns to their previous levels, focusing on physical fitness, but the importance of also addressing the psychological responses within the rehabilitation process is now well recognized. Most athletes will be psychologically affected when injured and these psychological responses can have a significant influence on the quality and speed of the sport-injury rehabilitation process. An integrated approach using sports psychologists alongside specifically trained sports medicine practitioners is integral to a successful and faster recovery. In the NBA, nearly half of the teams have one or more sports psychologists working full time or as a consultant on call.

The United States Olympic Committee has investigated the effects of sleep and sleep deprivation on its athletes. Studies have shown that elite athletes have less total sleep time than non-athletes. Inadequate sleep duration has been associated with a number of negative health effects. To illustrate, a study found that judo athletes who endured 4 hours of sleep deprivation had decreased muscle strength and power the following day.

## Connected Health

Whilst the principles of this type of connectivity and integrated technology in athletics are increasingly being adopted by health services, it is still in its infancy and is yet to be seen as a widespread solution. The opportunity to utilize technology and connectivity represents an opportunity to entirely shift the traditional paradigm of the patient traveling to institutions to see various healthcare staff for intermittent checks and monitoring. With the advances in technology the majority of monitoring and assessments could theoretically be carried out at home and, in certain situations, continuously.

**Moving Towards Personalized Care** The appetite for an integrated and connected healthcare system is growing and there is a good argument that this future should be partly modeled on the holistic, multidisciplinary, technology-embracing sports science and medicine format that elite teams have already adopted. This is by no means solely restricted to the use of technology and I would suggest that the integrated and multi-functional teams that are in place in elite sports environments have set an aspirational target for health systems in general. Putting the patient at the center of (and in charge of) their own care represents a significant shift in current practice and connected technology is one powerful tool that can help to enable this. If healthcare is going to maximize resources and optimize patient care, the systems in place must change in order to replicate the integrated healthcare ecosystem that elite sports teams have already adopted. The talent and expertise already exists and with better utilization we can dramatically improve patient care and the patient experience.

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