



Using Noraxon to effectively screen and monitor high level athletes

ADVANCED ATHLETE SCREENING

Integrating research grade equipment into team and clinical settings was a challenge in the past. Noraxon is leading the industry with turnkey solutions that work seamlessly with coaches, trainers, and sports medicine professionals

Currently the direction of sports medicine and sports performance is collaborative in nature instead of opposing and or segregated. Facing the same injury rates as ten years ago, professional organizations are looking for better options in reducing injuries and maximizing performance.

The most common need among performance coaches and medical staff is the need to decrease trauma or impairment, specifically the ones without contact (tackles and collisions) or overuse. A popular approach is to evaluate athletes for predisposing factors that can cause injury. Many teams have hired medical professionals to complete orthopedic

evaluations and medical screenings. On occasion coaches and athletic trainers are adopting these strategies, integrating them within existing scenarios. However this approach is still arbitrary in nature and very subjective. In addition, the lack of objective data is one of the reasons that teams still find themselves losing athletes to preventable injuries.

At first glance, the idea of adding more information to the screening system can be perceived as something that would be a challenge with teams with limited time. However, a revised approach will allow better use of time to facilitate injury avoidance.



Optojump in Screening

The Microgate system allows practitioners to quickly and effectively collect data and report the findings within seconds. Medical and Performance data can be acquired simultaneously, saving valuable time.

SPORTS MEDICINE



Evidence Based Medicine

With the influence of data being the focal point of sport, the same standard of need for evidence for decisions and evaluation is currently requested from management and athletic directors. With the time crunch of clinics and medical professionals, adding more testing and methodologies is simply not realistic, and getting better and more rapid results with the right technologies and tools is the future. If organizations invest correctly, athletes will be able to stay and perform on the field.

Evidence based screening and sports medicine and teams

The etiology of non contact injuries is the roadmap to reducing the occurrence of muscular and joint injury. Every injury has a cause or series of predisposing factors that increases the potential for risk. Most research reveals the biomechanics of the injury are in categories of joint mobility, muscle weakness, and sometimes coordinative impairments.

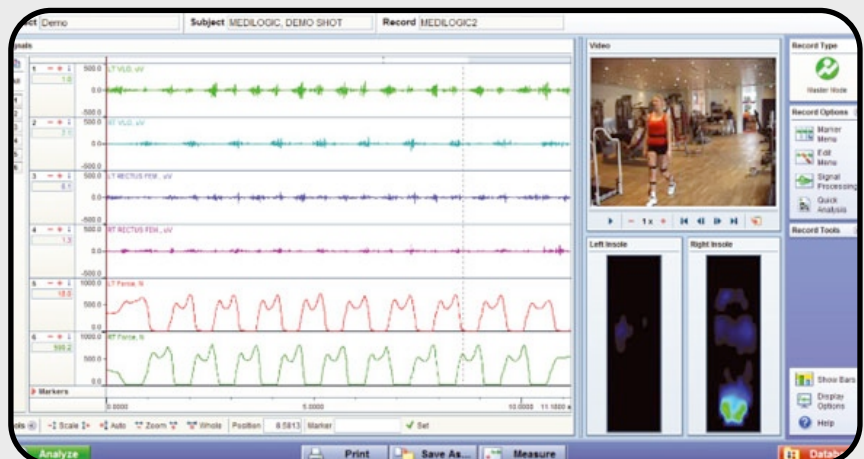
Research or evidence of potential causation is the gold standard, and movement screens try to address the same problems in a simple system. A gross movement screen is an effective way to diagnose problems, but limitations exist as scoring systems are based on the current medical literature. On the other hand, they are usually very effective addressing what functional movements are compromised and are very graphic visually, making it reliable for less experienced medical staff and coaches to use it effectively.

Unfortunately injury rates are still problematic, and much of this is due to inadequate training of athletes as well as complicated injuries that compound new problems from either compensations or reduced fitness levels.

To utilize time and resources, teams need to combine current approaches with

objective tools that can reveal more detail and add more precision to the tests they are using. In addition to improving accuracy and precision, one of the key benefits of using the holistic Noraxon solutions is gaining new, in-depth perspective. When data is collected using traditional tests with a different viewpoint, additional and useful data medical data can be collected from what had previously considered performance tests. With more powerful tools, tests that were formally not used by sports medicine can be integrated provided the information is valid.

With Noraxon's human performance measurement solutions, organizations that create a fusion between sports medicine and performance testing can identify more key factors than the traditional approach. With limited time constraints and personnel, the challenge is often not having enough of the right information in a timely manner. Further, making the existing approaches more effective is a better option than trying to invent a new one. Sports medicine professionals need to be able to use high velocity athletic actions; going beyond standing or lying movement screens to identify risk factors. If the medical team does invest in objective tools, more suitable interventions may be implemented to decrease injury occurrence.



Applied sport science and practical performance enhancement in team environments

One of the most demanding and public challenges performance coaches have is the responsibility of reducing injuries and optimizing performance without compromising either component. Reducing injury through preparation is the first line of defense medically, and a team's performance staff is accountable for this task.

In order to adequately impact and decrease the level of injury frequency to team sport athletes, a program must include the necessary elements of conditioning, speed, power, strength, and flexibility. However, joint restriction and neuromuscular recruitment weaknesses, key factors in performance, often fall within a grey area. Many programs place such a priority on specific joint function or muscle weakness that an individual's proper overall development and training is

compromised to the point of inadequate athletic preparation.

To improve outcomes of both performance and medical models, coaches need ways to use proven athletic training methods in order to solve problems in body function. The renaissance of using training in both exercise selection and programs designed to address joint and muscle dysfunction is gaining momentum through the use of objective tools that provide added value to the coach. Coach access to medical information allows the addressing of injury reduction from mining information from training, allowing more time to implement exercises and preparation that aids in injury reduction.

Coach involvement with the medical team is increasing in importance. They are the first line of defense due to their knowledge of the player, his abilities and their personal observations, and the perfect weapon against injury is accurate information.



SPORTS PERFORMANCE



Evidence Based Performance

Coaches have the unique challenge of proving that their methodologies are improving performance while reducing injury. Conventional approaches paired with the right technologies can identify risk, benchmark improvements, and decide on appropriate interventions. Leveraging classic approaches with modern tools, training becomes part of the rehabilitation and prevention process instead of a compromise or competitive element for time and expertise.

ATHLETE CASE STUDY

A Division I Men's Soccer athlete suffered a rash of injuries to the lower extremity and lumbar spine. After a comprehensive screen and clinical tests, he was finally back on the field.

The most common injuries in soccer are those of the lower extremity, and the injury cascade from compensation increases the statistical risk for re-injury or secondary injury. A 21 year old soccer player on a nationally ranked Division I program was chronically injured with soft tissue injuries and joint pain. After failed attempts to get back playing for extended periods a more comprehensive screening process was recommended to identify the underlying factors that were predisposing to him of injury.

Common medical evaluations revealed nothing wrong with his muscle and joint flexibility or strength, and his running mechanics appeared typical for an experienced soccer player. After his orthopedic evaluation was analyzed he was screened for gait analysis and traditional jump tests.

The athlete was tested for power and symmetry in both single leg and double leg tests with the Optojump system. The double leg tests revealed solid power tests with both the squat jump and counter movement jump but his unilateral hop tests revealed an array of problems. The testing

was assisted by the Noraxon Wireless EMG system and revealed typical gluteal recruit issues with the unilateral hop. Conventional thinking would conclude that the left medial gluteal was weaker, but the isolated tests revealed no asymmetry with strength.

The athlete repeated the same battery of tests with the Medilogic in-shoe pressure mapping system and the findings revealed foot and ankle function that was asymmetrical in nature; this impacted muscle recruitment throughout the lower extremity and up to the lower spine. Based on the summary of all of the information, the finding strongly suggested that the closed chain ankle dorsiflexion on the right foot coupled with a series of foot restrictions on the left were the culprit. A combination of joint mobilizations as well as a slight padding adjustment to the athletes cleats were created.

The athlete continued to manage the training demands with general sports massage and a home stretching program



with no reported problems. His season was completed and no further lower extremity injury occurred.

Follow up testing for monitoring purposes included the Optojump testing for both foot and ankle mechanics and gross lower extremity power. While power was not increased during the season, what did improve was indicators of symmetry in both frontal and sagittal planes bilaterally. Subjective reported muscle soreness was normal and evenly distributed and joint range of motion was preserved. While the off-season conditioning program was limited, the fitness level established from the late summer, a key factor in preventing the injury cascade, was maintained.

About the Tests

Integrating jump testing with Optojump, Medilogic in-shoe pressure mapping system, and the Noraxon wireless surface EMG system is one of the most comprehensive ways to effectively screen, monitor athlete power, and evaluate cause of dysfunction. Gait analysis is often a very demanding

approach with athlete injury and screening, but jump and hop tests are much more pragmatic to teams trying to get the most out of their equipment and time. Integrating multiple data sets is an effective way to provide a plethora of relevant information to both sports medicine and performance staff of teams.

Equipment Used in Testing

- Optojump (2 x 2 meters)
- Noraxon Wireless EMG
- Medilogic In-shoe system
- HD Camcorder
- Windows 7 OS Laptop