VALD

Practitioner's Guide to Preseason

A comprehensive guide for planning, preparing and executing a successful, data-informed preseason with your team.

Guest Author

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Global Performance Insights

2025 EDITION

Some Words from the **Preseason Experts**

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Jo Clubb
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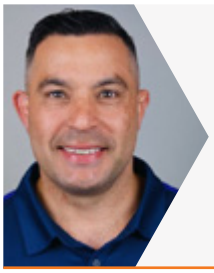
"Preseason preparation is essential for establishing a solid physical foundation for the subsequent season…

It provides the opportunity to assess and profile athletes' physical conditions when they are (or at least, should be!) at their freshest, free from the cumulative fatigue of in-season demands.

Through well-planned and executed preseason testing, practitioners can identify strengths and weaknesses, prescribe targeted training interventions and implement injury risk minimization strategies. The insights gained from preseason assessments guide the training that underpins long-term athlete development and performance throughout the season."



Alex Natera
Performance Science Manager,
New South Wales Institute of Sport
@alex_natera

"Preseason is where we earn our keep! We're often balancing managing players with meaningful adaptation throughout the year. When we are into preseason, the scale shifts to favor adaptation and, with that seizing, the opportunity to make players 'physically better.'

Depending on the sport, what we do or do not do in preseason can often determine many of the physical outcomes experienced in-season.

Effective and accurate data collection through quality technology is imperative in preseason. Understanding exactly where each player is at upon return to the club is critical in planning bespoke and squad-wide training progressions.

The collection and analysis of data to understand the response to training throughout preseason is vital in understanding when and how hard to push individuals and to understand whether the dose provided is appropriate or not."

Ivi Casagrande

High Performance Consultant
Football Association of Ireland Performance Coach

@ivicasagrande

"Preseason is a key period in an athlete's and team's preparation for the season ahead.

It is about the important balance between progressively pushing the physical and mental boundaries of what each athlete can achieve while empowering them with all the tools needed to be successful in those pillars of performance.

Integration of department knowledge as an interdisciplinary team is crucial in order to identify what is worth measuring, how it is measured and how the information is shared with relevant staff members.

Sharing a common language between departments allows data to be used more intentionally and effectively, enabling staff to ask better questions and ultimately, find creative solutions within the complex dynamics of sport."

Ellie Maybury

High Performance Consultant
Founder of Soccer Herformance

@soccerherformance

"One of the primary goals of preseason should be to design programs that allow athletes to adapt physiologically, while minimizing injury risk and maximizing player availability for the upcoming season.

Although preseason is typically when fitness levels see the most significant improvements, this alone may not suffice to withstand the high intensity and stress of a long soccer season, potentially increasing injury risk.

Technology plays a vital role throughout the soccer season, but athlete monitoring technologies are especially crucial during preseason. They provide practitioners with essential insights into whether players are adapting to the demands.

A well-designed performance monitoring process can reveal key insights that align with the physical and tactical goals of your preseason program. Furthermore, to optimize collective buy-in, everyone involved (e.g., coaches, athletes, sports scientists, etc.) should agree on why the monitoring is taking place."

Ian McKeown

Vice President, Athlete Performance & Wellness

Philadelphia Flyers

@IanMackers

"Preseason takes meticulous planning of all elements of the program, going beyond the technical to include the tactical and cultural foundations for a successful season ahead.

The plan must be clearly communicated to inspire the work ahead with the ability to adapt quickly to meet the dynamic needs of players and coaches.

The inevitable increases in training load make it essential that players are in the best position to absorb these increases in volume.

Using relevant, real-time and easy-to-administer testing methods allows this vital information to be part of the decision-making process without any additional stress on the overall program."

Selwyn Griffith

Performance Manager

Melbourne Football Club

@selwyng

"When I first started in Australian Rules Football, preseason could be as long as 16 weeks. This meant there was a substantial amount of time to assess an athlete's physical capacities and determine possible strength and fitness deficits.

Preseason is now 8-10 weeks, increasing the importance of having an aligned performance model to maximise preseason training. Previously, with the longer preseason, we tended to focus our testing on injury mitigation, conditioning, strength and power prescription, with little consideration of the game model.

The benefit of the shortened timeframe is that it has forced us to critically analyze the importance of certain tests, their influence on the training program and how to integrate them into training.

The biggest growth in this process for me has been taking this information and integrating it with the game model to guide our preseason prescription. This ensures athletes are robust enough to thrive in the training program from a physical, technical and tactical perspective."

Prof. Hugh Fullagar

High Performance Consultant

Aspetar Orthopaedic and Sports Medicine Hospital

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"Preseason is that critical time to set the foundation for the season ahead. Although requirements and characteristics vary between sports, the principles of optimizing your preseason often remain the same.

Effective planning and transitions between phases, as well as reliable and accurate monitoring processes, allow us to complement the specific needs of individual players with the team's performance goals."

Why Is Preseason **So Important?**

In team sports, the success of a season can hinge upon the effective execution of a preseason regimen. This critical phase lays the groundwork for physical, tactical and mental readiness ahead of the upcoming season.

Achieving this demands meticulous multidisciplinary coordination.

Zubair Haleem
Physiotherapist, Arsenal F.C

...the success of a season can hinge upon **the effective execution of a preseason regimen.**

Preseason presents an opportunity for performance staff to administer a tailored conditioning overload to the team: one that progresses to volumes and intensities of actual gameplay. This specificity is essential for tissue adaptations to prepare the body's soft tissues for the rigors of the season.

Preseason training should achieve elevated chronic workloads while also developing physical capacities linked to lower injury risks and enhancing performance.

It is a delicate balance, given the training load-injury paradox: while training exposure is necessary for development and performance, it also exposes athletes to potential risks. Yet, research underscores the importance of preseason preparations in mitigating injury risks during the competitive season.

It is a delicate balance... while training exposure is necessary for development and performance, **it also exposes athletes to potential risks.**

Research showed that footballers who completed more preseason sessions were less likely to be injured during the competitive season (Windt et al., 2016; Ekstrand et al., 2020). Therefore, well-planned training loads can enhance performance and mitigate injury risk for the season ahead.

…the preseason serves as a **valuable opportunity to establish baseline data** on various physical capacities …particularly for newcomers to the squad, as previous data is likely unavailable.

Moreover, the preseason serves as a valuable opportunity to establish baseline data on various physical capacities. These baselines guide where athletes should restart their training from a loading perspective.

This is particularly important for newcomers to the squad, as previous data is likely unavailable. For returning athletes, preseason assessments enable practitioners to evaluate the effectiveness of their off-season training.

Furthermore, this data not only aids in tracking developments throughout the season but also informs rehabilitation strategies by providing benchmarks for progress during recovery from injury. Such physical testing information can also be used to cluster individuals into pertinent injury risk minimization programs.

However, the preseason is not solely about physical development. It requires a delicate balance, integrating coaching philosophies to harmonize physical preparation with tactical demands.

An integrated approach ensures that players are not only prepared physically but also strategically prepared for the season ahead, optimizing their overall development on and off the field.

The Role of Technology in Preseason

Sport has undergone a rapid technological transformation in recent times. Advances in testing hardware, wearable technology, data analytics and artificial intelligence have advanced the scientific support offered to athletes, enhancing physical performance and injury risk management.

In the preseason period, technology plays a vital role in augmenting objectivity into athlete screening and facilitating the customization of training programs.

Preseason training is characterized by a high frequency of training sessions and games, with rapid increases in training load from the outset.

Technology serves as a crucial ally during this phase, providing data-driven insights that assist in the development, monitoring and adjustment of effective training plans.

Integral to preseason is the testing of athletes, a process in which technology (such as VALD's objective measurement systems and other assessment technology) takes center stage.

These tools enable the measurement of various physical capacities, including strength, power, asymmetries, range of motion (ROM) and balance, enabling objective assessments of markers that underpin team sport performance.

Integral to preseason is the testing of athletes, a process in which technology takes center stage.

This data empowers support staff to accurately track progress and make data-informed decisions, both across the preseason and throughout the in-season period.

> "***The guessing game is no longer appropriate.*** *We must be using the technology out there to provide us with objective data to make our decisions and get as much as we can out of this crucial period of the season. We apply the 'art' once we have the data in front of us, not before we have the data."*
>
> *Alex Natera*

With the proliferation of technology in sports comes a deluge of data, often likened to a "data tsunami."

Efficient information architecture is paramount in managing this, with seamless storage, access, analysis and dissemination of data from various technological sources required.

Data management systems like Athlete Management Systems (AMS) and VALD Hub centralize data from different sources, putting all your data in one place.

This is particularly crucial during the preseason when time is limited, a large volume of data is collected and rapid reporting is required to support swift decision-making.

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In this document, we will **cover a wide range of topics and answer some common questions**, including:

Tip: Click any heading to jump to section

How Should I Start My Multidisciplinary **Postseason Review?**

How to **Design Testing Protocols?**

Why Do **Radar Plots** Work So Well for Comparisons?

How Do You **Calculate Z-Scores?**

How do I **Identify Relevant Tests?**

Hamstring Testing

Hip and Groin Capacity

Shoulder Testing

Speed and **Change of Direction**

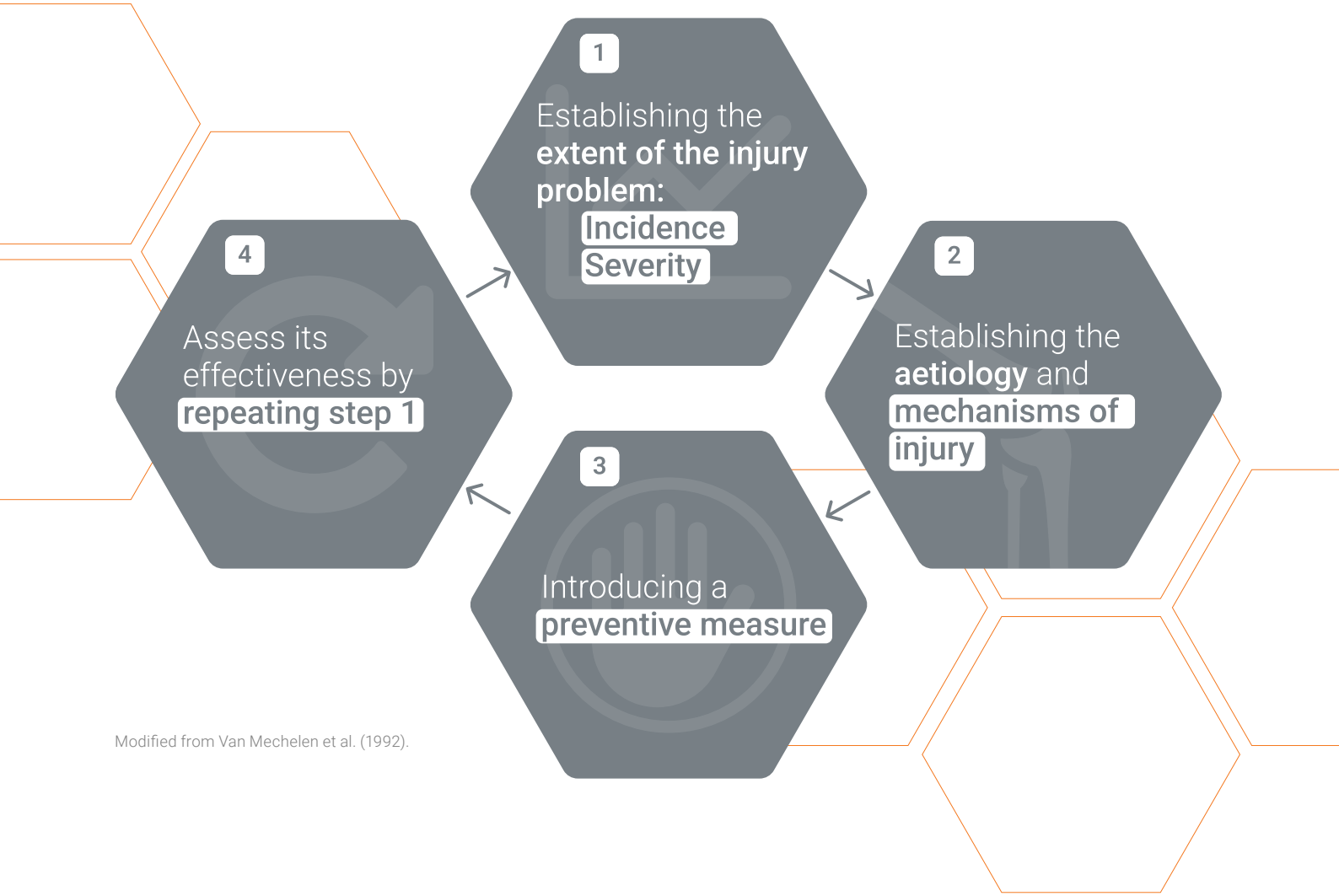
Reviewing **Last Season's Data**

Although it is critical that practitioners use the off-season period to recover and recharge, it is also an opportunity to review and subsequently learn from the season just gone. Auditing the previous year can provide lessons for the upcoming season.

This section outlines the steps required to conduct a successful audit and how they can be used to assist in preparation for the following season.

Injury Auditing

The "Sequence of Prevention" model by van Mechelen and colleagues in 1992 identified the following four steps for injury prevention:



Modified from Van Mechelen et al. (1992).

While this model is intended for research, it is relevant in the applied setting. The first step to establish "the extent of the sports injury problem" is also the starting point for any internal audit.

There are a host of injury epidemiology statistics that are of interest There are a host of injury epidemiology statistics that are of interest. These are outlined in the table on the following page and can be used to analyze injury patterns and trends.

Injury Pattern Assessment

Metric	Definition	Example
Training Availability	The proportion of available training sessions over a given period.	Percentage of training sessions attended for each athlete.
Match Availability	The proportion of available match days over a given period.	Percentage of matches available for each athlete.
Injury Incidence	The rate at which injuries occur within a specific population over a given time period.	Number of new injuries reported per 1,000 hours of exposure to training or matches, including incidence rates for specific injury types.
Injury Severity	The extent of injury, often measured by the time taken for an athlete to return to full participation.	Average number of days lost due to injury.
Injury Burden	The cumulative effect of injuries on a team or athlete over a season, considering both incidence and severity.	Total number of days missed by the team or individual athletes due to injury.
Re-Injuries	Instances where an athlete sustains the same or similar injury after returning to play.	Number of athletes experiencing re-injury within a specific time frame.

General injury trends can be found for some team sports in the published literature, which provides a useful comparison for internal injury epidemiology. For example, in football, the UEFA Elite Club Injury Study has published a multitude of injury surveillance data from both professional male (Ekstrand et al., 2021) and female (Hallén et al., 2023) clubs.

...muscle-specific assessments...may need to be **tailored to population-specific injury trends.**

It is important to consider such injury epidemiology within the context of the specific population, such as sex and age.

For example, between-sex differences in injury trends have shown quadriceps strains, anterior cruciate ligament (ACL) ruptures and ankle syndesmosis injuries are more common in female athletes, whereas hamstring strains and pubalgia cases are more frequent in males (Larruskain et al., 2018).

This highlights that muscle-specific assessments, as we will discuss later in this guide, may need to be tailored to population-specific injury trends.

An internal injury audit, however, will be of most value, especially when contextual nuances of your own environment are integrated. For example, the tactical demands imposed by the Head Coach's style of play and the subsequent positional requirements of certain players may influence your outcomes.

...the **Head Coach's style of play** and the subsequent positional requirements of certain players may influence your outcomes.

By scrutinizing factors like the timing, inciting incident and mechanism of each injury, we can pinpoint trends and identify athletes at heightened risk.

This information not only enhances injury prevention measures but also allows for a comprehensive review of our risk management strategies, as well as implications for athlete recruitment decisions.

By disseminating these findings, stakeholders can cultivate realistic expectations and foster open communication regarding injury risk profiles, thus fostering a proactive approach to injury mitigation.

Effective communication between staff and departments is critical during the preseason and throughout the year. A study of 36 elite football clubs found that lower-quality communication between the medical team and head coach or manager was associated with a greater injury burden, higher incidence of severe injuries and reduced training and match availability (Ekstrand et al 2025).

As part of the end-of-season injury audit, it is valuable to reflect on the quality of communication that occurred throughout the year.

The preseason period then offers a key opportunity to set expectations and standards for communication across and within departments. This includes formal structures, such as daily reports, scheduled meetings and informal, ongoing verbal updates.

As we will explore further in the Dissemination and Communication section, how data is communicated should be tailored to each key stakeholder (where possible), considering their individual needs and preferences, including the athletes themselves.

Conducting a Multidisciplinary **Postseason Review**

A postseason review should extend beyond injury auditing alone. Integrating injury epidemiology within the context of a broader seasonal review is beneficial.

Ideally, this should take a multidisciplinary approach, in which technical, tactical, mental and physical aspects of team and individual performance are reviewed collaboratively.

Practitioners working in high-performance organizations often have limited time available (and need to recharge themselves during the offseason). Therefore, having data streamlined efficiently is critical for the efficiency of a postseason review.

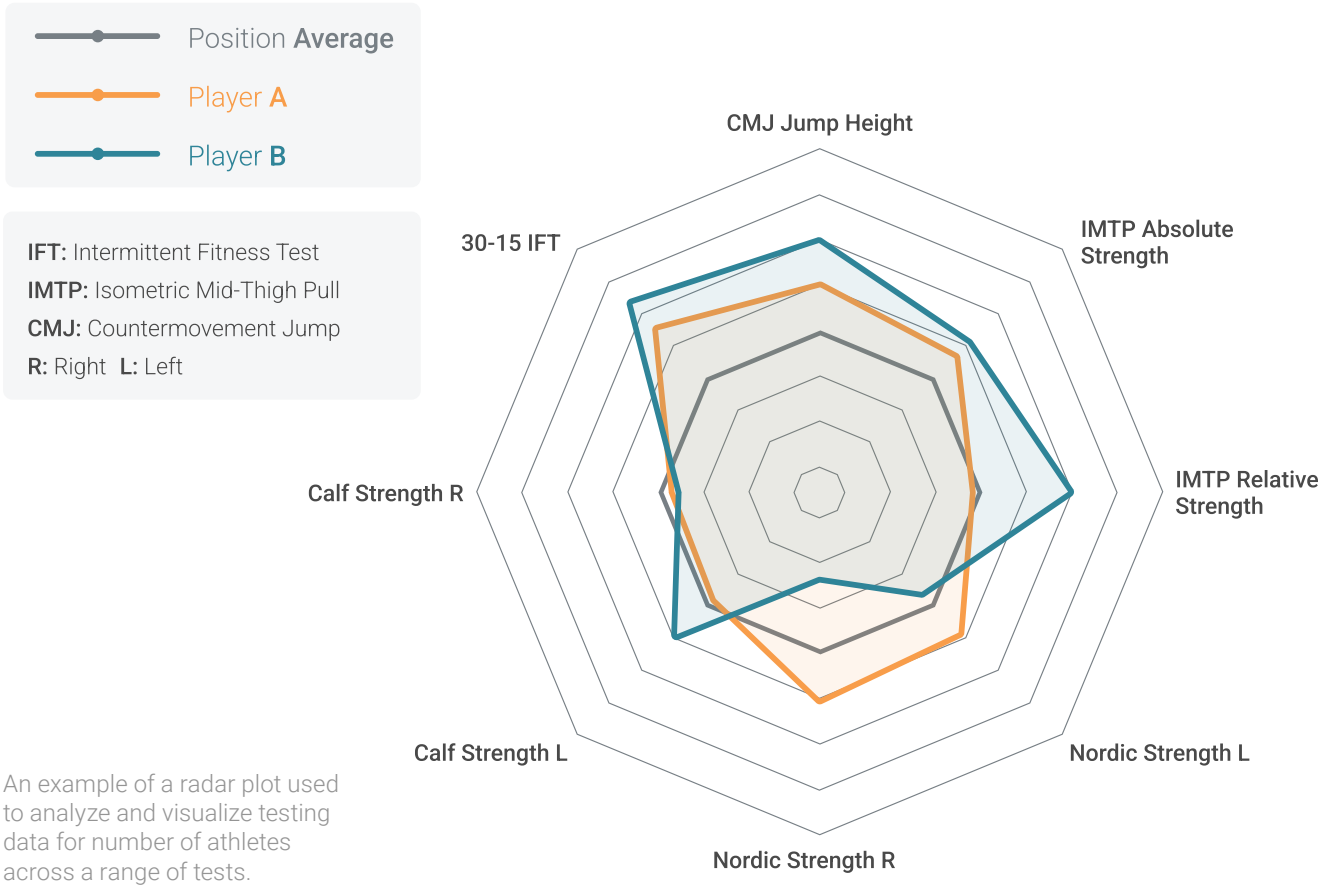
...streamlining and centralizing your data sources should be made a priority.

Centralizing injury reports, performance metrics and training information in one accessible location can significantly enhance this process. If this has not already been done, streamlining and centralizing your data sources should be made a priority.

To achieve this, many organizations implement an AMS that centralizes all athlete data from various sources and vendors.

These systems may be off-the-shelf products from vendors or internally developed solutions tailored to the organization's specific needs.

Additionally, sports science practitioners often aim to enhance their data science skills to better connect, analyze and visualize data.



An example of a radar plot used to analyze and visualize testing data for number of athletes across a range of tests.

Performance in team sports is complex. Unlike individual endurance sports, where performance can be quantified with a single number, team sports require a more nuanced approach.

Your team may use subjective performance systems, such as coach ratings and reviews, to assess performance trends. Advanced statistics and machine learning techniques are increasingly utilized to quantify performance, providing insights into both team and individual player trends over the previous season.

Given the complexity of performance, exploring trends in factors believed to underpin performance is also important. In the physical realm, this includes on-pitch fitness measures and off-pitch physical capacity assessments.

…weight room outputs and physical testing results for each individual can help identify relative successes and areas for improvement…

Reviewing weight room outputs and physical testing results for each individual can help identify relative successes and areas for improvement heading into the new season.

Additionally, gathering qualitative feedback from athletes about their experiences, injuries and perceived effectiveness of training and recovery protocols can provide valuable insights. This qualitative data can complement quantitative performance metrics, offering a more comprehensive view of athlete performance.

…qualitative feedback from athletes about their experiences, injuries and perceived effectiveness of training and recovery protocols can provide valuable insights.

By conducting a comprehensive post-season review, practitioners can understand trends in injuries and performance within their team and athletes, deriving actionable insights to enhance athlete preparation in the preseason and the competitive season beyond.

Considerations for **Preseason Testing**

It is tempting to try to test as much as possible. Instead, a more selective and intentional approach is necessary.

With the multitude of tests and technologies available to today's sports science practitioners, designing preseason testing can be overwhelming. It is tempting to try to test as much as possible. Instead, a more selective and intentional approach is necessary. The following section provides guidance on designing an efficient and effective testing battery.

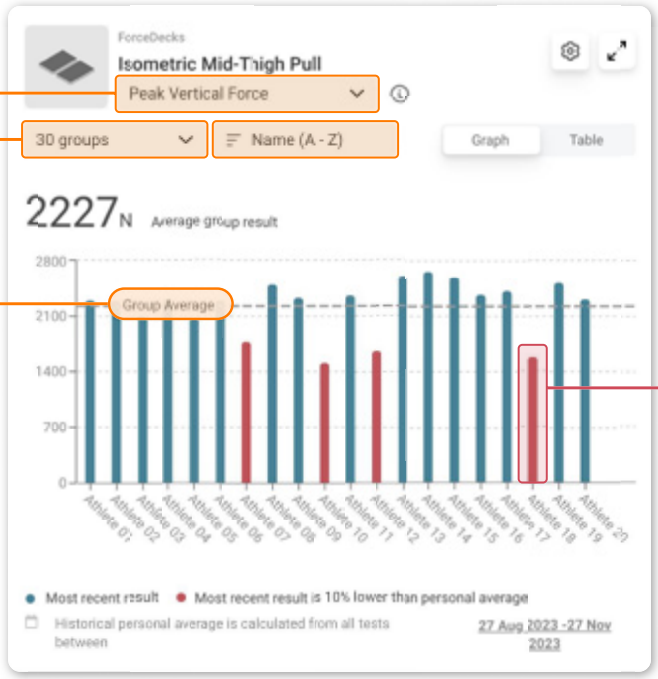
Establishing Objectives for Preseason Testing

Preseason is an ideal time to establish baseline information on athletes. In theory, they should be at their freshest coming out of their off-season break. By testing, before training or competition commences, test results should not be compounded by fatigue effects.

This baseline information…allows for the quantification of **physical development…aids in assessing in-season fatigue levels** and provides a benchmark for tracking **rehabilitation progress…**

Customizable Dashboard: Monitor the groups that matter to you, while customizing the tests and metrics that matter most.

Immediate Comparisons: Identify who is above, below and meeting group averages at a glance.



Flags: VALD Hub compares each individual's assessment to their personal averages, highlighting those who may be fatigued or at increased injury risk.

A group monitoring dashboard in VALD Hub, visualizing data from a team or selected group for any metric - in this case, peak vertical force in the IMTP.

This baseline information serves various purposes throughout the season. It allows for the quantification of physical development across a season as well as specific training blocks, aids in assessing in-season fatigue levels and provides a benchmark for tracking rehabilitation progress if injury later occurs.

For athletes returning to the team, it provides an objective assessment of their status in relation to previous data. For new athletes, it provides baseline information on their capacities.

A cyclical approach to physical preparation (depicted in the Figure below) emphasizes the foundational role of testing.

Objectivity provided by testing helps set appropriate goals, which guide individual training programs.

Regular testing allows for the evaluation of program effectiveness relative to the initial goals.

Consequently, preseason testing should focus on tests that can be repeated in-season.

Testing is driven by two key objectives:

- Injury risk minimization
- Physical performance enhancement

Conveniently, these objectives often overlap in data collection and intervention.

For example, if an athlete exhibits poor hamstring strength, it can be beneficial from an injury risk management and physical performance programming perspective to improve this capacity.

Conveniently, [injury risk minimization and physical performance enhancement] often **overlap in data collection and intervention.**

Let us delve deeper into each of these overarching purposes.

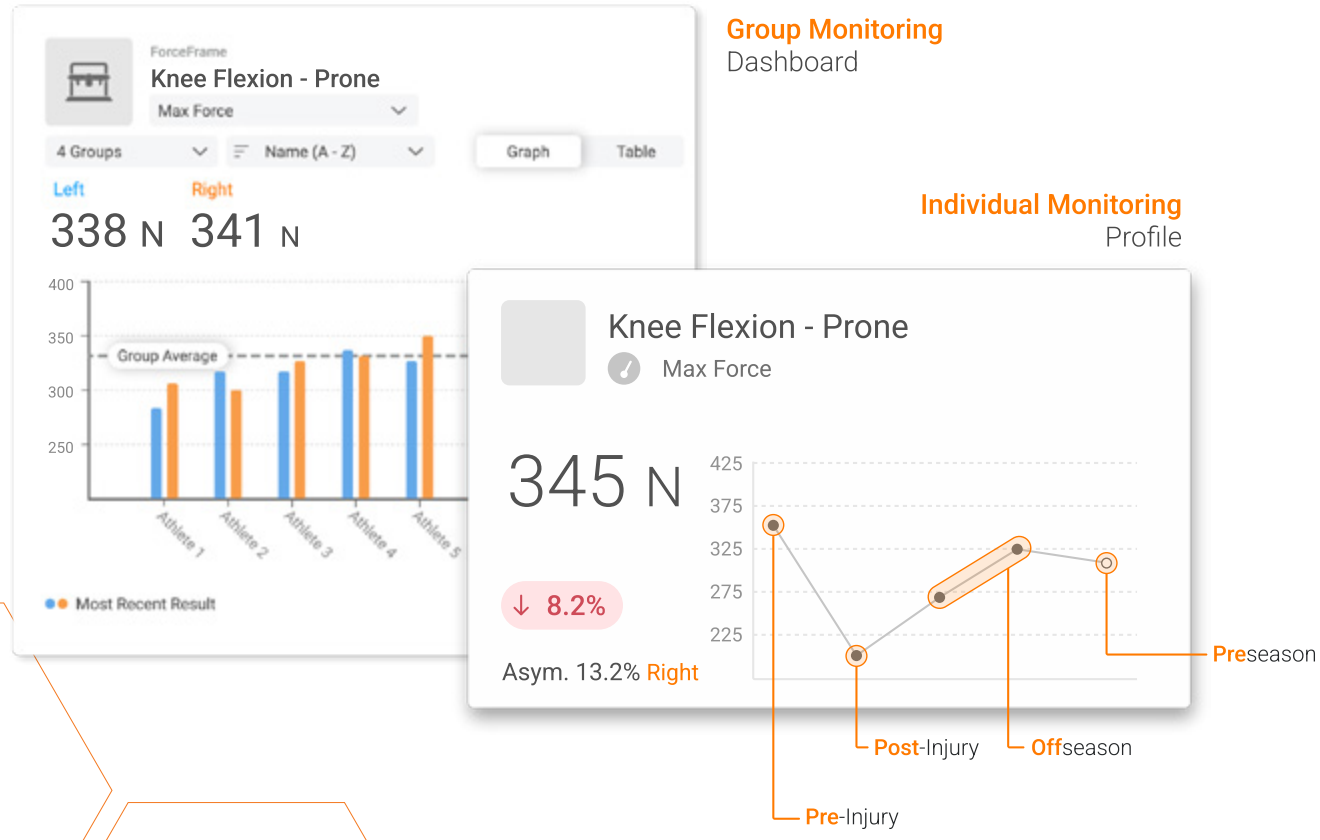
Injury Risk Management

Team sports demand repeated, physically taxing movements like accelerations, decelerations, changes of direction, jumping and landing, kicking/striking and tackling, inherently raising the risk of injury.

While injury risk in team sports is complex and multifaceted, evidence-based practices exist to mitigate these risks, particularly concerning soft tissue injuries.

Preseason testing provides an opportunity to establish healthy baselines for the athletes, aiding in the identification of strengths and weaknesses. Test results should be considered within the context of their sport, playing position, age and injury history.

Notably, previous injury is often a strong predictor of future injury, underscoring the importance of incorporating this information into preseason screening and analysis.

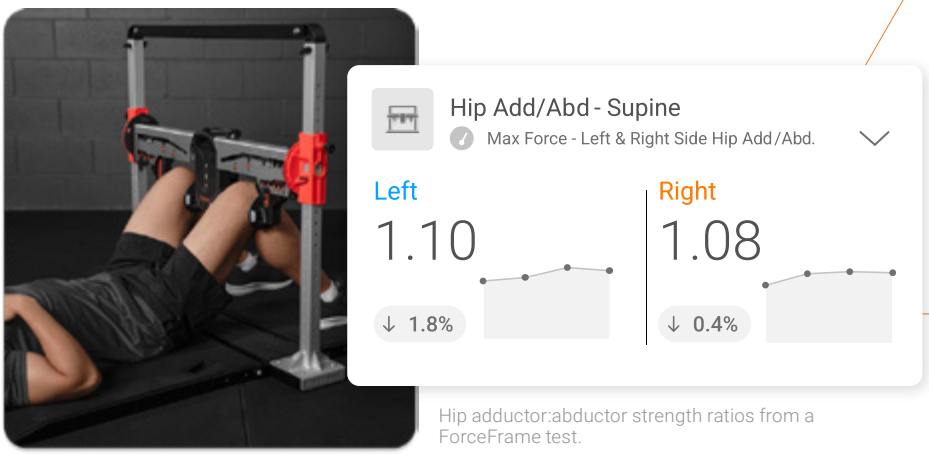


While no single test can predict injury, it can identify athletes at higher risk due to lower capacities in known risk factors. Tailored programming can then be planned to help minimize injury risk and optimize availability.

Moreover, these assessments may also shed light on the capacities that influence the workload-injury relationship through moderation and mediation. For instance, well-developed aerobic fitness may mitigate the heightened risk of injury associated with training load spikes (Malone et al., 2016).

Utilizing the injury audit process described earlier can enhance screening by guiding test prioritization and acknowledging time constraints that may lead to not being able to conduct all desired tests.

...if a team experienced a high incidence of hip and groin-related issues in the previous year, **prioritizing strength tests in this area may be prudent.**



Hip adductor:abductor strength ratios from a ForceFrame test.

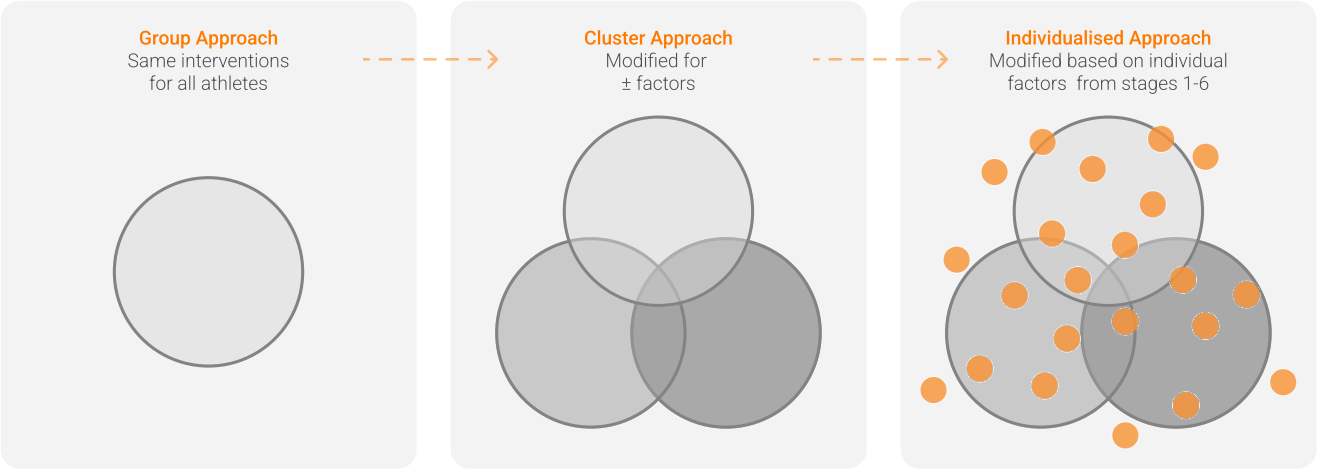
Therefore, adopting a tailored screening approach may prove beneficial. For example, if a team experienced a high incidence of hip and groin-related issues in the previous year, prioritizing strength tests in this area may be prudent.

Similarly, if an athlete has experienced recurring calf strains, targeted testing of calf capacity may be warranted. More information on each of these tests is provided in the next section – Identifying Relevant Tests.

Testing with an injury risk management perspective aims to provide strategies for use in the applied setting. Roe and colleagues (2017) propose employing a mixed-level approach to injury risk management in team sports, encompassing group, cluster and individualized strategies (see over page).

Testing serves as a tool to inform and guide these approaches effectively:

- A group approach may involve implementing a suitable team-wide warm-up.
- A cluster approach might entail position-specific interventions, such as tailored shoulder risk management programs in football goalkeepers or American football quarterbacks.
- An individualized approach may consist of bespoke injury prevention programs based on each athlete's injury history and screening results.



Adapted from Roe et al. (2017).

Performance Enhancement

…high training loads can be associated with increased injury rates, **these same loads provide the necessary stimuli** for beneficial physiological adaptation…

While prioritizing injury risk management, it is essential to also focus on enhancing performance and avoiding excessive risk aversion.

While high training loads can be associated with increased injury rates, these same loads provide the necessary stimuli for beneficial physiological adaptation, such as increased aerobic capacity, strength, repeated sprint ability and body composition.

These capacities are often important underpinning factors to team sport performance, as well as being associated with decreased injury risks.

Understanding the constraints of the preseason period is crucial for effective physical development planning.

For instance:

- A professional English Premier League football team typically has a six-week preseason, with games starting as early as 7-10 days into the period.
- An Australian Rules football team typically undergoes a preseason training phase lasting approximately 16 weeks.

Moreover, scheduling demands within sports can further influence the duration of the preseason.

For example, there were only six weeks between the FIFA Women's World Cup Final in Australia in 2023 and the commencement of the English Women's Super League (WSL) domestic season.

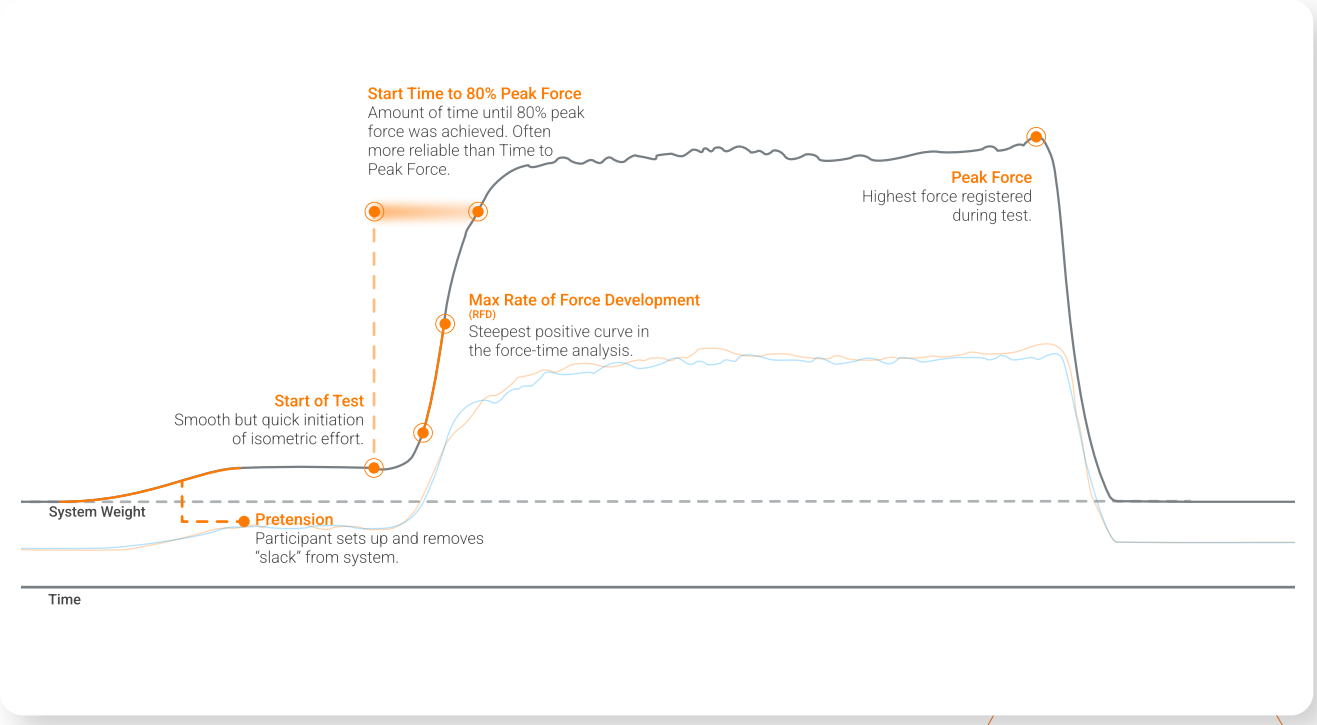
Balancing rest and recovery with preseason preparation becomes particularly challenging in such cases, necessitating careful consideration of periodization models, overload structures, training load progressions and tapering strategies both on and off the pitch.

Testing outcomes play a pivotal role in guiding physical performance enhancement approaches. Ideally, the objectives are also guided by input from the coaching staff regarding the physical performance attributes they observe on the pitch.

Resources do not always allow for fully individualized training programs in team sports, so clustered approaches...may be adopted.

The blending of these objective and subjective assessments informs the customization of physical training plans in terms of both immediate priorities during the preseason period as well as longer-term objectives across the season.

Resources do not always allow for fully individualized training programs in team sports, so clustered approaches, as described in injury risk management, may be adopted.



For instance, the IMTP test conducted on force plates offers a safe and non-fatiguing method to assess strength capacities. The force capacity measured during this test, both absolute and relative to body weight, can be compared to an individual's previous scores as well as those of their position group and the wider team.

An example DSI result from an athlete performing an IMTP test followed by a CMJ test with ForceDecks.

Combined with a CMJ test also conducted on force plates, the force capacities can be compared using the dynamic strength index (DSI).

The DSI may serve as a valuable tool for programming and identifying athletes who may benefit from ballistic, concurrent or maximal strength training approaches.

The DSI is not without limitations, however, especially as a ratio, so it is always useful to assess the underpinning measures and to consider the data within the context of other objective metrics as well as subjective appraisals of an individual.

Rehabilitation Baselines

Asymmetries, for instance, are common in athletes and **it should not be assumed that a post-injury goal must be to achieve complete symmetry.**

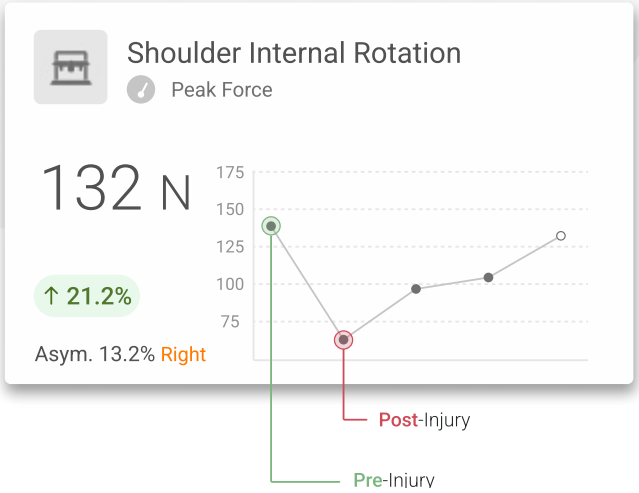
Preseason testing is also crucial for establishing rehabilitation baselines, which are essential for managing athlete recovery and return-to-play protocols following an injury.

Rehabilitation baselines provide a benchmark for an athlete's physical condition at the beginning of the season, allowing practitioners to monitor progress accurately and adjust rehabilitation programs as needed if an injury occurs.

Preseason is the ideal time to establish such baselines. It is vital to have pre-injury baselines to understand the individual's profile prior to a specific injury.

Many athletes have adapted to their sport, position and potentially their previous injuries. Asymmetries, for instance, are common in athletes and it should not be assumed that a post-injury goal must be to achieve complete symmetry.

Understanding their baseline profile is important to enable suitable rehabilitation goals and individualized rehab plans to be established.



An example of shoulder internal rotation peak force test results in VALD Hub, including longitudinal data for trend analysis.

Such objective information also helps to support communication and collaboration between medical staff, fitness professionals, technical coaches and the athletes themselves, enhancing alignment on rehabilitation goals and progress.

By incorporating comprehensive preseason testing to establish rehabilitation baselines, practitioners can enhance the effectiveness of their injury management and rehabilitation efforts, ultimately supporting athlete health and performance throughout the season.

Identifying **Relevant Tests**

Planning preseason testing can be challenging due to the plethora of available tests and the continuous emergence of new technologies and methodologies.

There is not necessarily a definitive answer to which tests should be included; however, a strategic approach combined with an understanding of your specific context and testing constraints can help establish an effective testing battery.

Planning preseason testing can be challenging due to the plethora of available tests and the continuous emergence of new technologies and methodologies.

As outlined earlier, it is essential to first identify the physical capacities and injury risk factors most pertinent to your sport, team and athletes. Some assessments, like blood tests and concussion baseline tests, may be mandatory from a medical standpoint and should be prioritized accordingly in the testing schedule.

Identifying the most relevant tests is dependent on your individual environment, but some overarching considerations apply:

- Which qualities underpin the physical and injury risk characteristics of interest?
- What valid and reliable approaches exist for assessing them, both in terms of the technology, the metrics and the testing protocol?
- Which will you be able to retest, track and change over the season?
- What are the fatigue effects of the tests themselves?
- How much time do you have allocated for testing?

In the subsequent section (Designing Testing Protocols), we will delve deeper into the design of testing protocols. However, it is essential to explore some of the capacities that are typically of interest in preseason testing for team sports environments.

While this list is not exhaustive and each area has numerous sub-categories, a critical approach is necessary to determine the suitability of specific tests.

Test Identification **Table**

Capacity	Potential Test Examples
High-Intensity Intermittent Running Performance	30-15 Intermittent Field Test, Beep Test, Yo-Yo Intermittent Endurance Test, Yo-Yo Intermittent Recovery Test
Speed	20m/30m/40m Sprints
Acceleration	10m Sprint, 5-10-5 Shuttle Test
Deceleration	5-10-5 Shuttle Test, Modified 505
Change of Direction	Modified 505
Lower Body Strength	Isometric Belt Squat, IMTP
Lower Body Power	CMJ, Squat Jump
Hamstring Strength	Nordic Hamstring Exercise, 9090 McCall Test
Hip & Groin Strength	Adductor and Abductor Squeeze
Shoulder Strength	Internal and External Rotation Strength, Athletic Shoulder (ASH) Test
Calf Capacity	Calf Raise Test, Calf Isometrics
Functional Movement Screening	Internal and External Rotation Strength, Athletic Shoulder (ASH) Test
ROM	Joint-Specific Active Range of Motion (AROM) Testing
Body Composition	Skinfold Measurements, Bioelectrical Impedance Analysis (BIA), Dual-Energy X-ray Absorptiometry (DEXA)

To cover every potential area of preseason testing would fill a guide in and of itself. Therefore, we will spotlight several key areas of testing that represent areas of common acute issues and key performance characteristics for most football teams.

Hamstring Testing

Hamstring injuries persist as a prevalent concern among team sport athletes, with recent evidence from the male UEFA Elite Club Injury Study suggesting a potential increase in incidence rates (Ekstrand et al., 2022).

...hamstring injury risk can be influenced by modifiable factors, such as strength, which **also correlates with sprint performance.**

While multifactorial in nature, hamstring injury risk can be influenced by modifiable factors, such as strength, which also correlates with sprint performance.

Exercises, including the Nordic hamstring exercise (NHE) and Upright-hip-extension, have demonstrated sprint-specific benefits in terms of horizontal force production (Prince et al., 2020).

Given the prevalence of hamstring injuries in team sports, screening for hamstring strength becomes crucial. Eccentric hamstring strength, most commonly assessed by performing a NHE on the NordBord, may be particularly important.

However, practitioners must consider scheduling due to the potential delayed onset of muscle soreness (DOMS) associated with eccentric exercise.

NORDBORD
HAMSTRING TESTING SYSTEM

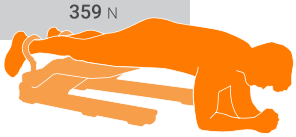
Normative Data

NORDIC HAMSTRING CURL

Percentile	Males	Females
10th Percentile	321 N	235 N
25th Percentile	372 N	271 N
50th Percentile	421 N	306 N
75th Percentile	469 N	341 N
90th Percentile	515 N	375 N

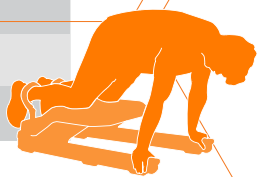
ISO PRONE

Percentile	Males	Females
10th Percentile	257 N	198 N
25th Percentile	303 N	226 N
50th Percentile	357 N	263 N
75th Percentile	416 N	312 N
90th Percentile	473 N	359 N



ISO 30°

Percentile	Males	Females
10th Percentile	257 N	214 N
25th Percentile	303 N	248 N
50th Percentile	357 N	287 N
75th Percentile	416 N	326 N
90th Percentile	473 N	358 N



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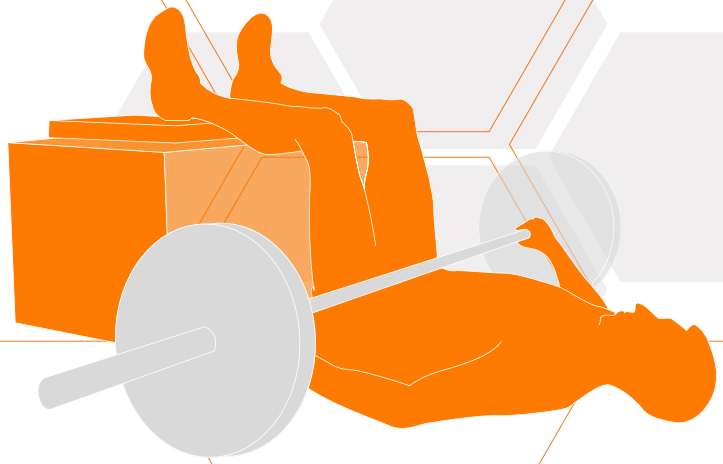
As explored in the recent Practitioner's Guide to Isometrics, isometric exercises have become popular due to their ability to assess and train force application in almost any position and are also more efficient than resistance training. Isometric testing options also exist with hamstring assessment.

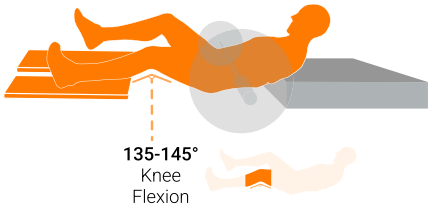
...isometric tests may be particularly relevant in rehabilitation when range is limited. Therefore, establishing **healthy preseason baselines for these positions can be particularly valuable.**

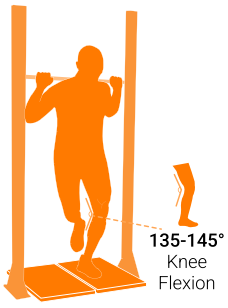
The McCall 9090 test, conducted on force plates such as ForceDecks, assesses isometric force and offers insight into hamstring muscle activation patterns.

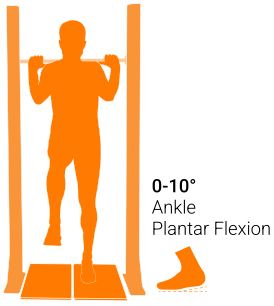
It involves pushing down into the force plate from specific knee flexion angles, with reliability and sensitivity to change demonstrated in research (McCall et al., 2015).



Force plates are also commonly used for Alex Natera's Run-Specific Isometric Assessments, which are also covered extensively in the further detailed Practitioner's Guide to Force Plates.







Additionally, fixed-frame dynamometers such as NordBord and ForceFrame provide alternative positions for isometric hamstring testing, including tests at various knee flexion angles (60°, 30° and 0°) and – in the NordBord's case – the quasi-eccentric razor exercise.

Such isometric tests may be particularly relevant in rehabilitation when range is limited. Therefore, establishing healthy preseason baselines for these positions can be particularly valuable.

Hip and Groin Capacity

Hip and groin injuries pose significant challenges in many team sports due to a substantial injury burden. The complex and overlapping anatomy in this area, coupled with diagnostic ambiguities, further complicates management.

Biomechanical assessment, strength, asymmetry and ROM are established risk factors for hip and groin injuries and, therefore, are worth considering for preseason testing.

Research in one NHL team...found a player was **17 times more likely to sustain an adductor muscle strain** if their adductor:abductor strength ratio was less than 0.8.

Early investigations into hip and groin strength testing as a risk factor for injury were conducted in ice hockey, where such injuries are prevalent due to the movement demands of ice skating.

Research in one National Hockey League (NHL) team across two consecutive seasons found a player was 17 times more likely to sustain an adductor muscle strain if their adductor:abductor strength ratio was less than 0.8 (Tyler et al., 2001).

This work has transferred across to other sports, which also have multidirectional movement demands, although it is important to consider the specific demands of each sport or playing position.

Assessing hip adductor and abductor strength and imbalance can be beneficial in team sport athletes to screen for those who might benefit from a strengthening intervention.

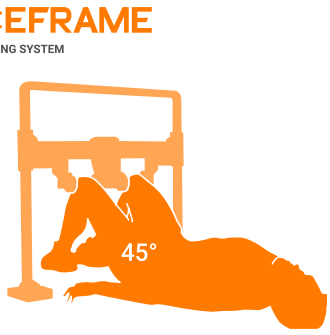
This can be measured using dynamometry, either through a fixed-frame solution such as ForceFrame or a handheld device such as DynaMo.

ABDUCTION FORCE

Percentile	Males	Females
10th Percentile	304 N	240 N
25th Percentile	354 N	283 N
50th Percentile	404 N	320 N
75th Percentile	455 N	364 N
90th Percentile	507 N	408 N

ADDUCTION FORCE

Percentile	Males	Females
10th Percentile	276 N	269 N
25th Percentile	340 N	310 N
50th Percentile	413 N	351 N
75th Percentile	479 N	392 N
90th Percentile	534 N	435 N



ADD:ABD RATIO

Percentile	Males	Females
10th Percentile	0.74	0.89
25th Percentile	0.86	0.99
50th Percentile	1.00	1.09
75th Percentile	1.14	1.20
90th Percentile	1.27	1.32

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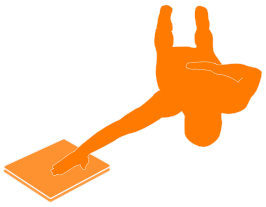
Shoulder Testing

While shoulder testing may not be the highest priority for many team sport athletes, it may be particularly pertinent for certain playing positions (e.g., goalkeepers, quarterbacks), as well as sports with throwing or tackling demands (e.g., baseball, cricket, Rugby Union, Rugby League, American football). In those cases, a shoulder testing battery that incorporates both measures of ROM and strength is likely to be important to include along with existing preseason testing measures.

Unlike lower limb testing, upper limb asymmetries are often of less concern… **Of more concern is the balance between agonists and antagonists…**

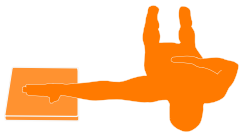
1 ASH Test I*

Grading	Absolute	Relative
Poor	< 150 N	< 1.47 N/kg
Good	> 180 N	> 1.85 N/kg
Excellent	> 200 N	> 2.1 N/kg



2 ASH Test Y

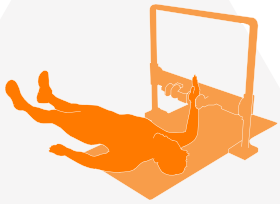
Grading	Absolute	Relative
Poor	< 125 N	< 1.25 N/kg
Good	> 155 N	> 1.6 N/kg
Excellent	> 170 N	> 1.76 N/kg



3 ASH Test T

Grading	Absolute	Relative
Poor	< 115 N	< 1.15 N/kg
Good	> 135 N	> 1.4 N/kg
Excellent	> 150 N	> 1.58 N/kg

* ASH Test benchmarks have been sourced from Ben Ashworth's research and consultancy.



4 Shoulder ER/IR*

Grading	External Rotation	Internal Rotation
Poor	< 115 N	< 120 N
Good	> 150 N	> 160 N
Excellent	> 200 N	> 220 N

* ER/IR data retrieved from VALD's normative database from the 2019-2020 Major League Baseball season.

Unlike lower limb testing, upper limb asymmetries are often of less concern given the arm dominance and different loads in throwing athletes. Of more concern is the balance between agonists and antagonists on each side.

For example, this can be assessed via the external: internal rotation (ER:IR) ratio, in which the isometric force capacities in each position are quantified through fixed-frame or handheld dynamometry and compared. Commonly, force in ER is greater than IR and, therefore, results in an ER:IR ratio of less than one. However, this is greatly sport- and position-specific.

More recently, the ASH test has been popularized as a tool to further assess and monitor long-lever shoulder isometric strength in multiple positions.

Developed by Ben Ashworth, this novel test evaluates the neuromuscular activity of the shoulder girdle and may be particularly useful in sports involving contact and overhead actions (Ashworth et al., 2018).

Speed and Change of Direction Testing

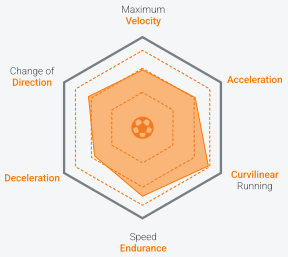
Speed is critical for performance in football and many other team sports. Sprints are often required at game-defining moments in gameplay and rarely in a straight line. In fact, 85% of maximum velocity maneuvers in Premier League Soccer are made in a curvilinear fashion.

Building (and maintaining) speed capacity is necessary for performance. However, high-speed running can be an injury risk, both in terms of training load and exposure, as well as sprinting mechanics.

Assessing speed in preseason is ideal when athletes are fresh; however, the execution must be done with care and intention. The injury risk may be greater if athletes have not had much exposure to high-speed running over the off-season period; therefore, scheduling is crucial.

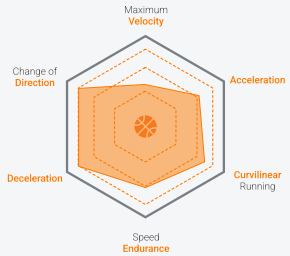
Formally testing speed and change of direction during preseason with timing gates allows for precise assessment of speed, acceleration, change of direction and agility. In addition, engagement and buy-in are increased by providing immediate feedback.

Combining timing gate assessments with video assessments can also be useful in rehabilitation to identify impaired mechanics when performing high-force activities such as high-speed running and change of direction.



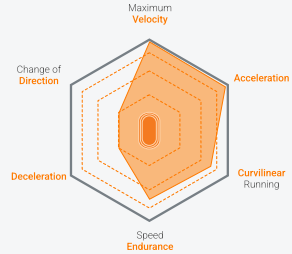
Soccer

Soccer is a reactive and dynamic sport with high volumes of curvilinear running, endurance and change of direction tasks. It is played on a large field that also allows for maximum velocity breakaway plays.



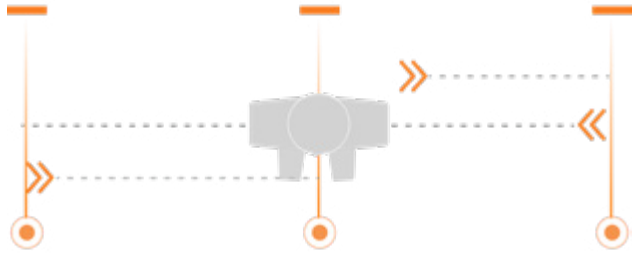
Basketball

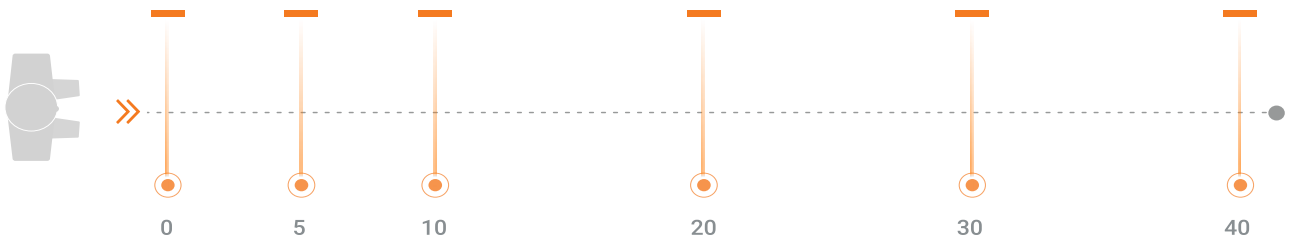
Basketball is a reactive sport with moderate volumes of curvilinear running and high demands for acceleration, deceleration and change of direction tasks due to its smaller court size compared to field-based sports.



Track

Track sprinting is almost exclusively focused on velocity and acceleration, with very little need for change of direction or deceleration. Speed, endurance and the curvilinear running demands change by event.





An example of a timing gate (such as SmartSpeed Pro) set up to assess acceleration over 40 meters.

Designing Testing Protocols

Preseason testing should be planned with the technical coaching staff, especially if fatiguing protocols are involved.

For example, the NHE, given its eccentric demand, can cause DOMS in the 1-2 days following, so this needs to be considered.

Despite DOMS being common during the preseason due to heightened training loads, it is crucial to approach testing design with transparent communication and discussion of potential implications with key stakeholders, particularly the coaching staff.

As mentioned earlier, there may be mandatory tests, often medical, that must be conducted on the testing day.

Additionally, the players may have obligations with other departments, such as coaching, kit or equipment and performance analysis, which also need to be factored into the logistical planning of the testing battery.

Value and Burden

It is imperative that Performance staff consider the Value-Burden matrix when designing preseason testing protocols, both for the players and the staff themselves. As regularly discussed on the Global Performance Insights blog, the goal is to collect data that yields high value while imposing minimal burden.

This requires careful consideration of **which tests will offer the most significant return on investment.**

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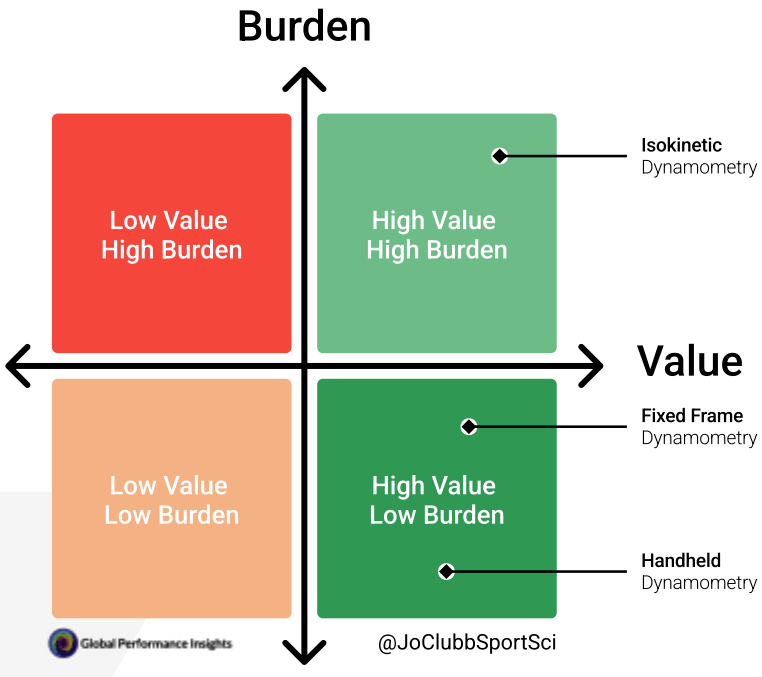

Ideally, data should be collected through methods that are minimally burdensome for both athletes and staff, although high-burden data collection may be justified if the value is substantial, such as with blood testing, concussion testing or DEXA scans.

However, low-value data collection should be avoided, necessitating reflection and critical evaluation of the proposed testing approach.

It is essential to assess how the data will benefit the team and athletes, focusing on the specific advantages it will bring rather than simply accumulating more data. Clearly outlining how this information will inform preseason interventions and beyond is paramount.

Protocol Planning

We can apply the "5W1H" approach from project planning to our testing protocols. This is shorthand for "**Who, What, When, Where, Why** and **How**."

This checklist ensures clarity of a preseason testing battery and when each will be conducted. It is recommended to discuss and disseminate this plan among key stakeholders, including the athletes themselves.

An example is shown in the Table below. Please note that this is not a fixed guideline but an illustration of how the 5W1H might be used to help develop a preseason testing protocol. The specifics of each of these depend on the context of your own environment.

Who	What	When	Where	Why	How
All	CMJ	**Day 1** AM Testing 9-11am	**Gym**	Power and asymmetry baselines	After standardized warm-up, 3 reps min.
	30-15 IFT	**Day 1** PM Training 2pm (Start of the first on-pitch training session)	**On-pitch**	Conditioning baseline	Integrated into on-pitch warm-up.
	NHE	**Day 5** PM Gym Session (Before day off)	**Gym**	Eccentric strength and asymmetry baselines	During accessory exercises, 3 reps min.
GKs	ASH	**Day 1** 1:30pm Before first on-pitch session, during GK activation	**Gym**	Shoulder strength and asymmetry baselines	After standardized warm-up, 3 reps min.
Groin Hx	Add/Abd strength test	**Testing Day** 9-11am	**Gym**	Isometric hip and groin strength and imbalances	During accessory exercises, 3 reps min.

CMJ: Countermovement Jump, **30-15IFT**: 30-15 Intermittent Fitness Test, **NHE**: Nordic Hamstring Exercise, **ASH**: Athletic Shoulder test, **Hx**: Injury History, **Add: Abd**: Adductor: Abductor Ratio, **GK**: Goalkeeper.

> *"**Planning where tests fall in relation to training sessions, as well as other tests, is critical.** We have to be careful with data quality if we are interpreting results of strength assessments after fitness tests that are maximal and include decelerations and changes of direction.*
>
> *One way I have circumnavigated is by programming certain tests later in the week, before a mid-week day off or even at the end of the week before a day off."*
>
> *Alex Natera*

Even with such a plan, things may go wrong! It is important to set up and prepare everything as best as possible while still having flexibility and adaptability should something go awry (e.g., technology issues, schedule changes, injuries, athlete availability, etc.).

Designing the **Testing Environment**

Designing an appropriate testing environment requires consideration of the general testing setup and the specific test in question. Consistent testing conditions are required to ensure any changes in outcome are real and not due to differences in how the test was conducted.

Consistent testing conditionings are required to **ensure any changes in outcome are real** and not due to differences in how the test was conducted.

This includes aspects such as the following:

- **Use consistent testing protocols** each time you test. It is useful to write these down and refer to established protocols recommended by the provider. For example, VALD's Knowledge Base includes effective and easy-to-understand protocols for every test on every VALD system, designed to help practitioners perform their tests consistently.
- **Use simple and consistent cues.** The instructions should be the same each time. Research has shown that drawing attention to an external focus (focusing on the movement in relation to the environment) rather than internally to their body can improve performance (Wulf, 2013), so the attentional focus must remain consistent.
- **Use consistent levels of encouragement and feedback.** "Banging the drum" can influence test results, which is acceptable so long as the same approach is used every time. For example, in his run-specific isometric testing battery, Alex Natera consistently uses maximal encouragement.

There is a range of more detailed resources available online to help practitioners get the most out of their testing.

For example, the Practitioner's Guide to Force Plates and the Practitioner's Guide to Isometrics both feature helpful "Golden Rules" for force plate and isometric testing, respectively.

These methodological considerations are vital for accurate and reliable testing across these methods. This ensures that any changes can be established as true changes in test performance.

Alex Natera cues an athlete performing the **Run-Specific Ankle Iso-Push** test.

Additional Considerations for Preseason Testing

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Prof. Hugh Fullagar, PhD, ESSAM, ASpSL2, has worked with elite athletes in Europe, Asia, North America and Australia – including NFL, NCAA, FIFA and Olympic sports – for the past 15 years. He also has extensive leadership experience in tertiary education, medical research and health sectors.

Travel

Preseason often involves notable travel demands, which pose numerous challenges to testing. Here are a few considerations to be aware of for testing when travel is a part of your preseason.

Effects of Travel Fatigue on Performance

Travel fatigue is a combination of physiological and cognitive tiredness, usually occurring following any individual long journey (regardless of time zone), resulting from cramped conditions, mild hypoxia and reduced physical activity. Athletes should attempt to obtain sufficient sleep and movement during travel, available hydration and food strategies soon after arrival and treat fatigue post-travel (e.g., utilizing napping and caffeine; Janse van Rensburg et al., 2020).

Travel fatigue should be considered a potential confounder of preseason testing, and therefore, if possible, baseline testing should be avoided on days immediately following long journeys (unless you are assessing players' post-travel physical condition).

Travel fatigue should be considered a potential confounder of preseason testing, and therefore... **testing should be avoided on days immediately following long journeys.**

Travel and Jetlag

Jetlag occurs when athletes travel across time zones, causing desynchronization between the internal human circadian system and the time at the new destination. These shifts to the body's "internal clock" can impact performance and assessment outcomes such as maximal and intermittent sprint performance in the 72 hours post-travel (Fowler et al., 2017).

To ensure accurate speed, strength and power measurements, it is crucial to support your athletes in maintaining proper sleep, syncing their exercise routines with light exposure, adjusting meal timing and composition and using melatonin wisely when traveling across time zones to a new destination.

Portability of Equipment

Often overlooked, one of the biggest challenges of travel is transporting your team's luggage, equipment and accessories! Planning trips meticulously and having a thorough understanding of your technology requirements is essential.

If testing is required on the road, make sure to pack all necessary hardware, including power converters and backup chargers. It is also important to consider local internet access in the location. If traveling abroad, there may also be luggage and customs considerations.

STAGE 4 - POST-TESTING (IMMEDIATELY AFTER TRAVEL)

STAGE 3 - ON LOCATION (DURING TESTING)

STAGE 2 - PREPARATION (<1 WEEK BEFORE TRAVEL)

STAGE 1 - PLANNING (1-2 WEEKS BEFORE TRAVEL)

✓	Activity	Considerations	Owner
☐	Define Testing Objectives	What are you aiming to test (e.g., readiness)?	
☐	Select Protocols	Choose assessments that require minimal equipment, setup space and time.	
☐	Confirm Equipment Needs	List all testing hardware needed.	
☐	Arrange Travel Logistics	Confirm travel case size with airline if needed.	
☐	Customs and Luggage	Prepare for customs declarations (if international).	
☐	Create Packing List	Include all critical hardware, accessories, backup items and protective packaging.	
☐	Power Requirements	Research local voltage and plug types. Pack power adapters and surge protectors.	

Download **full Checklist here**

Sleep

Many elite athletes and coaches view sleep as the most crucial recovery strategy, recognizing it as essential for peak performance. However, preseason brings with it many challenges, such as larger training loads, different sleep environments and increased pain and soreness from high physical contact, all of which potentially impact sleep (Fullagar et al., 2015).

For instance, Rugby Sevens players show reductions in sleep quantity and quality during higher loads of training in the preseason (Leduc et al., 2019), while players and staff wake up earlier than normal during the preseason (Caia et al., 2017).

...Rugby Sevens players show **reductions in sleep quantity and quality during higher loads of training** in the preseason...

The impact of sleep on different aspects of performance testing is not one-size-fits-all. For instance, while some studies show a reduction in jump height following sleep loss (Skein et al., 2011), others show no change (Cabarkapa et al., 2024). This variation is based on factors such as the type of sport, scheduling, season timing and individual sleep needs (Fullagar et al., 2023).

Such factors warrant consideration when interpreting preseason testing results. Understanding your athletes' normal sleep patterns and analyzing these in conjunction with testing information helps strengthen the accuracy of your data and your confidence in the decisions that follow.

In addition to sleep, there are several other factors that can influence physical performance, including processes that follow an approximately 24-hour cycle, such as blood pressure, body temperature, hormone levels and nutrient energy metabolism.

For example, research shows superior performance in the afternoon when muscle action, hormones and body temperature are best promoted, compared to the morning (Ayala et al., 2021).

...research shows superior performance in the afternoon when muscle action, hormones and body temperature are best promoted...

Similar to jetlag, these fluctuations can influence force assessments. In addition, an athlete's circadian phenotype (whether someone is a morning or evening person) can also indicate when they prefer to perform at their best.

As per the Protocol Planning previously discussed, planning your tests is critical to interpreting the results of various strength assessments. To avoid unwanted influences of circadian rhythms, which may mask performance effects, try to schedule testing (where possible) at the same time of day.

Tips For Minimizing Sleep And Circadian Disturbances To Your Testing

Encourage Good Sleep Hygiene Habits

Recommend focusing on maintaining a regular sleep routine, optimizing their sleep environment and steering clear of stimulants (e.g., coffee and alcohol) before bedtime.

Collect Sleep Data

If sleep may be an issue and resources are available, collect sleep data via questionnaires or actigraphy. Tracking one's sleep often helps to educate players and minimize interference with testing data.

Consistent Testing

Try to conduct testing at the same time of day. If unavoidable, account for added variation when calculating meaningful change statistics to best inform your decision-making.

Recovery and Nutrition

A typical preseason requires high doses of training and physical preparation. Integrating recovery into the preseason plan presents a conundrum: specifically, how to balance the need to maximize adaptations but minimize injury risk.

The use of the same recovery strategy might also have different effects and intentions. For example, you may prefer cold water immersion during a long season to recover from gameplay but avoid prolonged use in the preseason, where it may blunt skeletal muscle adaptations (Roberts et al., 2015).

Similarly, your choice of recovery strategy matters when it comes to preseason testing, as different recovery methods will alter test performance. Cold water immersion will improve strength recovery following endurance exercise performed in cool-to-temperate conditions and enhance sprint performance recovery following resistance exercise (Choo et al., 2023).

...your choice of recovery strategy matters when it comes to preseason testing as **different recovery methods will alter test performance.**

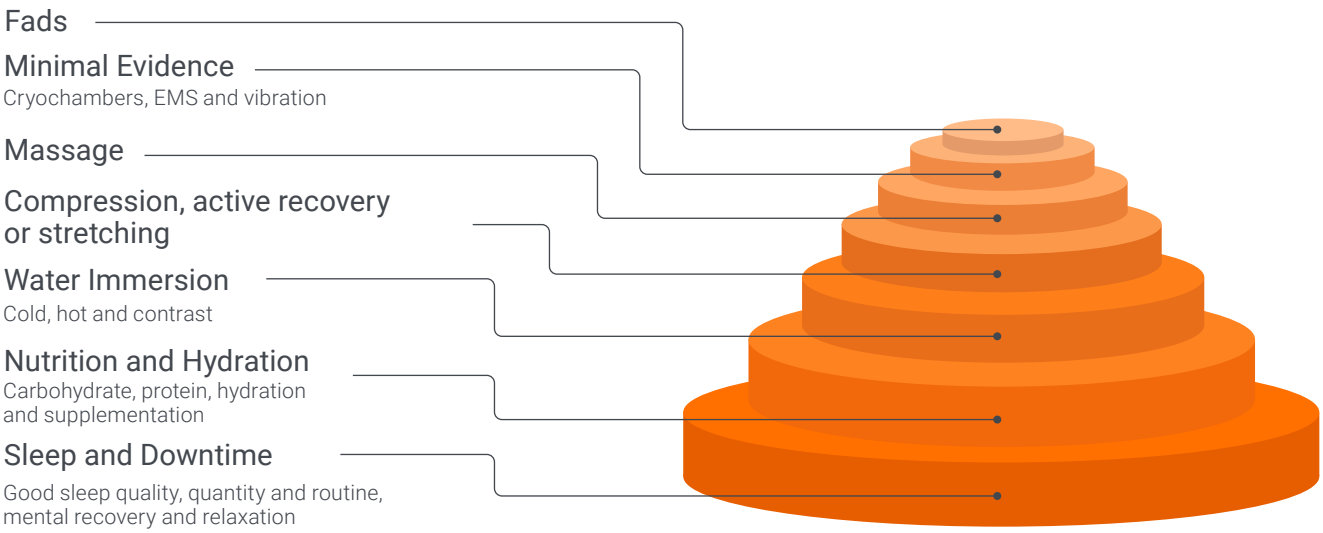
A recent study showed a dynamic warm-up can improve drop jump height and reactive strength index (RSI) by 15% and squat jump height by 12% (Ferrari et al., 2023).

When scheduling your testing, consider the recovery programming surrounding the pre-test period and the potential implications (cost-benefit analysis) of these strategies on test performance. In addition, try to match the warm-up or pre-activity of each athlete (at least within-athlete comparisons) prior to each testing session to maximize accuracy.

Another important consideration for preseason testing is nutrition, given the effect it can have on performance, the risk of injury and acceleration of the body's ability to repair and adapt. The timing and quantity of nutrient intake play a significant role in this process, particularly when focusing on refueling, rehydration and protein synthesis.

For example, ingestion of caffeine can improve muscular strength, sprinting and vertical jump performance, with the most commonly used timing 60 minutes pre-exercise (Guest et al., 2021).

When trying to control factors of recovery and nutrition and their influence on testing performance, consider Shona Halson's Pyramid of Recovery. The base of the pyramid is made up of the foundations of recovery (sleep and nutrition) and will likely have the biggest impact on performance. Those towards the top of the pyramid have less evidence and are less likely to disrupt your athlete's performance and subsequent testing profile. Try to match the foundation of the pyramid as best as possible when conducting testing sessions for comparable results.



Shona Halson's Pyramid of Recovery (Halson, 2021, from *NSCA Essentials of Sport Science*).

Environment

Preseason Camps at Altitude or in Hot Conditions

Changing the environment where athletes train or live is a common way to help them improve their physical fitness and performance during preseason. Heat (to increase plasma volume) or altitude (to increase red blood cell production) are common methods incorporated into preseason (Girard et al., 2024).

The immediate effect of these environmental conditions can be both physically and mentally taxing, thus impacting performance. Heat acclimation often includes training for 7-14 days in hot conditions, causing increased sweating, electrolyte imbalance and physical and mental fatigue.

Comparatively, training at altitude can cause some athletes to report headaches, nausea, dehydration and sleep disturbances. Coupled with reduced oxygen availability and increased heart rate, many athletes can experience increased strain and fatigue – factors that will impact testing outcomes and accuracy.

If performing your preseason testing in hot or high-altitude conditions, aim to schedule your data collection around rest periods and cooler times of day and ensure athletes are well hydrated and monitored appropriately.

...in hot or high-altitude conditions...**schedule your [testing] around rest periods and cooler times of day and ensure athletes are well hydrated and monitored appropriately.**

Illness and Immunity

One of the challenges is not only keeping your player injury-free but also reducing the risk of illness. Common illnesses such as upper respiratory tract infections can hinder training, performance and testing outcomes. The higher training loads of preseason can affect immune function by activating the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system, leading to the release of immunoregulatory hormones (Walsh, 2018).

Further risk factors for illness include training in cold conditions, long-haul air travel, low energy availability and high levels of psychological anxiety and stress. To minimize the interference of illness occurrence on your preseason testing, monitor athlete training loads, life stresses and potential sleep disruptions, all within the context of possible environmental extremes and nutritional deficits.

Tips For Minimizing Illness In Athletes

- Eat a nourishing well-balanced diet
- Good hand hygiene
- Monitor stress
- Appropriate vaccinations
- Manage exercise training and recovery
- Incorporate sleep hygiene practices

Adapted from Walsh, 2018.

Utilizing Testing Results

With relevant and accurate preseason testing data in hand, the focus shifts towards converting it into actionable insights.

Turning data into information, knowledge and wisdom requires suitable analysis, visualization and data dissemination…

Preseason testing gathers **data**, which then needs to be transformed into **information** – data that has been processed, organized and structured in a meaningful and useful manner.

In the context of athlete testing, this information could involve comparing results to population norms and evaluating outcomes relative to previous seasons or testing periods.

Subsequently, **knowledge** is derived from information through interpretation, analysis and synthesis.

In testing analysis, knowledge might entail recognizing the implications of test results for training program design, injury prevention strategies and individual physical development plans.

Finally, **wisdom** involves the ability to apply knowledge effectively in real-world situations, integrating critical thinking, judgment and intuition.

Wisdom might entail using insights gained from test results to make informed decisions about training priorities, workload management, injury risk mitigation and overall performance enhancement.

Turning data into information, knowledge and wisdom requires suitable analysis, visualization and data dissemination – all crucial steps in integrating a preseason testing battery effectively.

Analysis and Interpretation

Some metrics have an innate interpretation baked into their methodology, making analysis and interpretation straightforward.

The DSI, for example, offers training recommendations based on outcomes. Specifically, less than 0.6 recommends ballistic training, greater than 0.8 maximal strength training and scores in between a concurrent approach.

However, many test outcomes may stand alone, necessitating some form of analysis to provide context. Analysis approaches should enable practitioners to identify areas of strength and weakness and recognize trends and patterns in the data.

...presenting some form of interpretation along with the data is essential. **Ultimately, the "so what?" should be clear...**

An overview of analysis techniques available to practitioners is shown in the table below.

Method	Explanation/Calculation	Example
Descriptive Analysis	Simple statistics including mean, median, mode, range, SD and interquartile range.	The mean, SD and interquartile range for jump height.
Effect Sizes	Cohen's *d* represents the standardized effect size and is calculated by dividing the mean difference by pooled SD.	To assess the change in 30-15 IFT score in the squad at the start and end of preseason.
Percent Difference	Calculated by dividing the mean difference by the mean of a control group and multiplying by 100.	To compare the percent improvement in sprint times before and after a specific training intervention.
Smallest Worthwhile Change (SWC)	The smallest change in a measurement that signifies a meaningful improvement or deterioration. Typically calculated as 0.2 times the between-subject standard deviation.	To determine if an improvement in IMTP strength across preseason is meaningful.
Standard Ten (STEN) Score	A standardized score ranging from 1 to 10 with a mean of 5.5.	To rank athletes on their acceleration test results on an intuitive scale for coaches.
T-Score	Converts a z-score to a scale between 0 and 100, with an average of 50.	To illustrate where an athlete's jump performance compares to the team.
Z-Score	A standardized score indicates how many standard deviations a data point is from the mean.	To create a radar plot that standardizes all test results onto the same scale.

SD: Standard Deviation, 30-15 IFT: 30-15 Intermittent Field Test, IMTP: Isometric Mid-Thigh Pull

Moreover, presenting some form of interpretation along with the data is essential. Ultimately, the "so what?" should be clear:

- What are the implications for the athlete based on the testing information?
- How did they perform and what areas require focus?

Linking the data to training goals and recommendations is crucial during the preseason period. These recommendations can include physical preparation and injury risk minimization interventions, ideally with explanations elucidating the rationale behind these recommendations.

Spotlight: Z-Scores

One of the most useful analysis techniques for testing information is the z-score. A z-score, also known as a standardized score, indicates how many standard deviations an athlete's score deviates from the mean.

It is calculated using the formula:

> ***z-score =*** *(X-μ) / σ*
> ***z-score =*** *(raw score – mean) / standard deviation*

Approximately 68%, 95% and 99.7% of values for a given test fall within 1, 2 and 3 standard deviations of the mean, respectively.

...a z-score of **2 or -2 indicates that an athlete's score falls within the top or bottom 5%** of the comparative dataset, respectively.

Therefore, a z-score of 2 or -2 indicates that an athlete's score falls within the top or bottom 5% of the comparative dataset, respectively. This comparative dataset may be an individual athlete compared to the squad (A) or an individual athlete on a given day compared to the rest of their individual data set (B).

> **A.** ***z-score =*** *(individual athlete's test score – squad mean test score) / squad standard deviation for the test score*

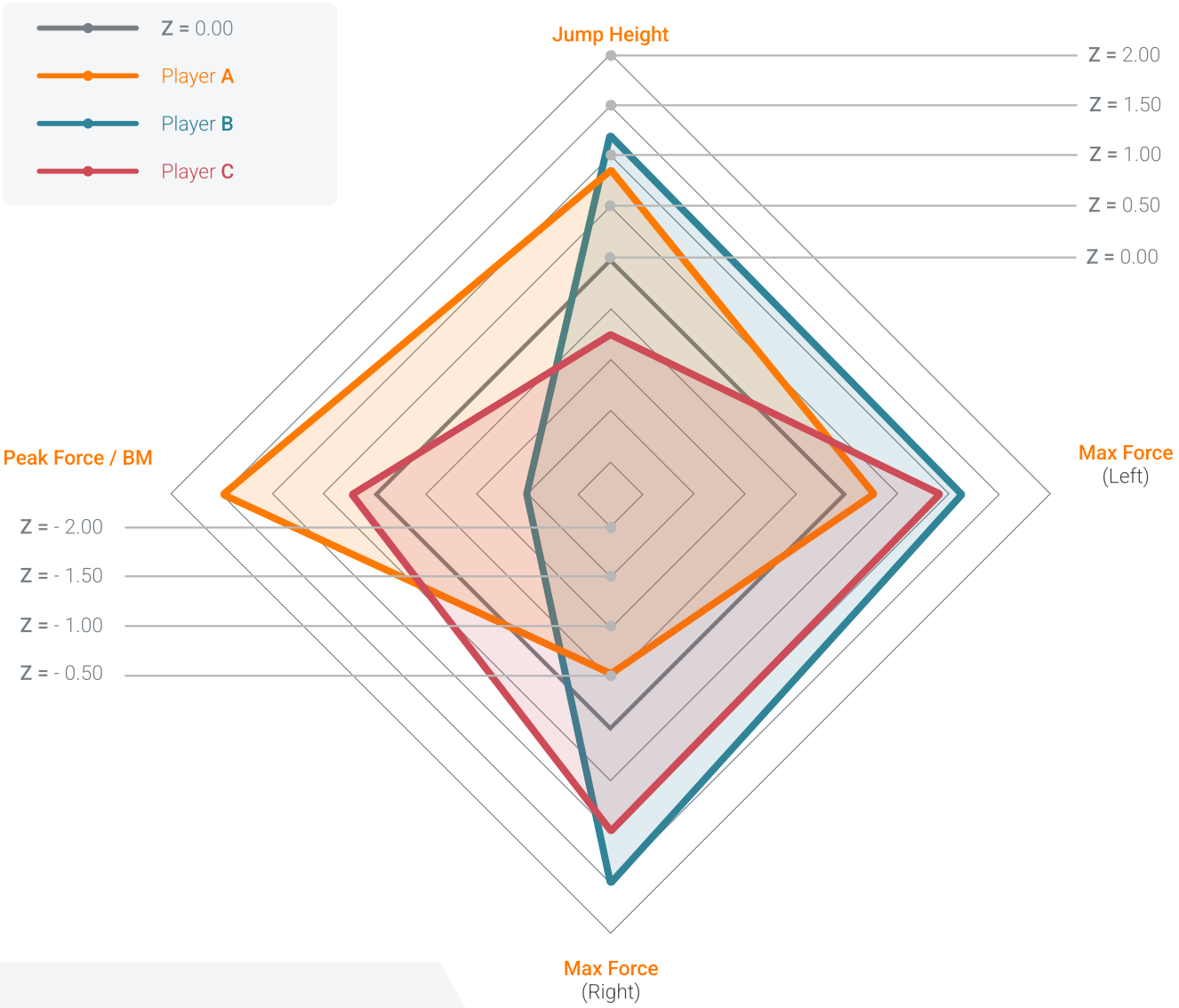
> **B.** ***z-score =*** *(individual athlete's test score – individual athlete's historical mean test score) / individual athlete's historical standard deviation for the test score*

While negative z-scores are typically undesirable, they may be preferred for certain performance tests, such as sprint times, so it is important to consider the direction of your data. Such tests may require multiplying by -1 to reverse the sign and make the outcome comparable to other types of tests.

Name	Jump Height (cm)	L Max Force (N)	R Max Force (N)	Peak Force / BM (N/Kg)
Player A	17.08 in 43.4 cm	528 N	510 N	35.1 N/Kg
Player B	18.9 in 48.2 cm	431 N	406 N	38.9 N/Kg
Player C	20.4 in 51.9 cm	541 N	540 N	30.2 N/Kg

Z-Score Calculation	Jump Height %	L Max Force %	R Max Force %	Peak Force / BM
Player A	-0.75	0.93	0.97	0.18
Player B	0.33	-0.20	-0.72	1.48
Player C	1.16	1.07	1.46	-1.53

Multi-Athlete Countermovement Jump Comparison
Using Z-Scores



Dissemination and Communication

There is no single, universal method for communicating testing results to an athlete or key stakeholders. The most effective approach often varies depending on factors such as stakeholder expertise, team communication dynamics and individual preferences.

It is advisable to tailor the mode of data dissemination and visualization to **suit the preferences of the audience.**

It is advisable to tailor the mode of data dissemination and visualization to suit the preferences of the audience. For example, some coaches may prefer verbal debriefs, while others may prefer printed reports or online access to comprehensive data sets.

During preseason, the speed of reporting is paramount. Training and preparation decisions may rely heavily on the objective information collected during testing. Therefore, results with actionable insights must be delivered promptly to allow stakeholders to make necessary adjustments to training regimens.

Given the limited time available for key stakeholders to review testing data, particularly with the increasing scope of preseason testing, it is essential to consolidate multiple data streams into a concise yet impactful report.

...it is essential to consolidate multiple data streams into a **concise yet impactful report.**

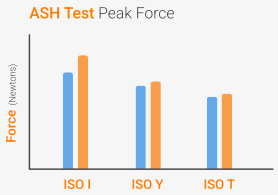
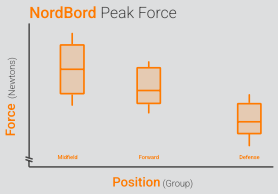
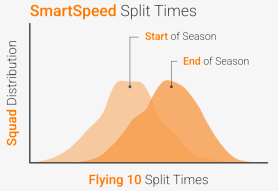
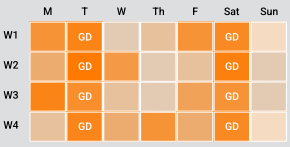
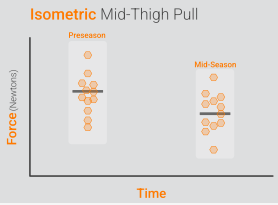
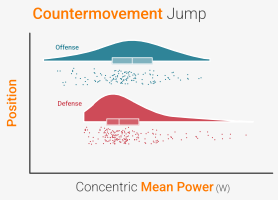
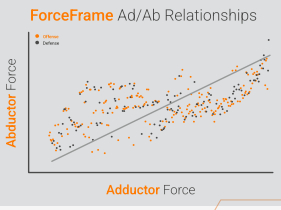
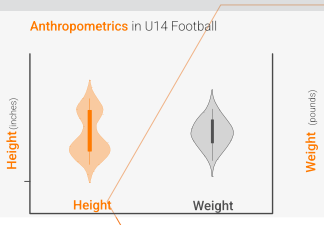
Interactive dashboards, such as those available on VALD Hub, can facilitate engagement by allowing users to select and explore different athletes, tests and timeframes. However, it is important to acknowledge and respect that not all stakeholders may prefer this method of information consumption.

When presenting such results to key stakeholders, clarity and simplicity are paramount. For example:

- **Tables** are frequently used.
- **Minimizing repetition** and unnecessary decimal points can aid clarity.
- **Conditional color formatting** (such as a red, amber or green traffic light system) can help interpret the data.

These approaches can be particularly useful with preseason testing information, given their intuitive nature.

Beyond tables, practitioners can use data visualizations to convey meaningful insights. It is, however, imperative that these communicate in clear and accurate ways to be effective. Several commonly employed data visualizations and example use cases are shown in here.

Method	Explanation/Best Use Cases	Example Visualizations	
Bar Plot	Most appropriate for counts and sums i.e., when the variable represents an accumulation.	An individual's force output for the I, Y and T position in the ASH test, with left and right sides on different series.	
Box Plot	Show the middle 50% data points and range, including outliers.	Compare the spread of testing outcomes according to position, e.g., absolute NordBord force according to position.	
Density Plot	Show where most of the data points fall for a continuous variable. Also used to show the degree of overlap between two groups.	Range of SmartSpeed sprint test results across a squad, split into start and end of preseason for comparison.	
Heat Map	Represents the magnitude of a data point across different categories using color-based conditional formatting.	Average high-speed running volume in each training session across preseason, displayed as a calendar-style heat map.	
Line Plot	More frequently used with time series data. Multiple series can be plotted, using the third (z) axis where necessary.	Wellness data for an individual athlete plotted over preseason with different variables represented as different series.	
Point Plot	Shows the underlying data by plotting every data point captured. Can be used for time series data and variation in a measurement.	IMTP force output is displayed and grouped along the x-axis according to position.	
Raincloud Plot	Combine density plots and jittered raw data points, with mean and standard deviation error bars also displayed. The underlying density is visualized along with the summary statistics.	Power outputs from ForceDecks jump tests are displayed and grouped along the x-axis according to position.	
Scatter Plot	Like a point plot but with continuous variables on both axes to show how the two correlate.	Abductor and adductor force plotted against each other for each athlete, with points color-coded according to position.	
Violin Plot	The wider the plot at a given point, the more data points fall there. Best used to show the range and density of data.	Height and weight by age group in an Academy setting.	

Spotlight: **Radar Plots**

Radar plots (sometimes referred to as spider plots) allow three or more test results, usually expressed as a z-score, to be presented on axes with an equal origin.

This can be used for a number of comparisons:

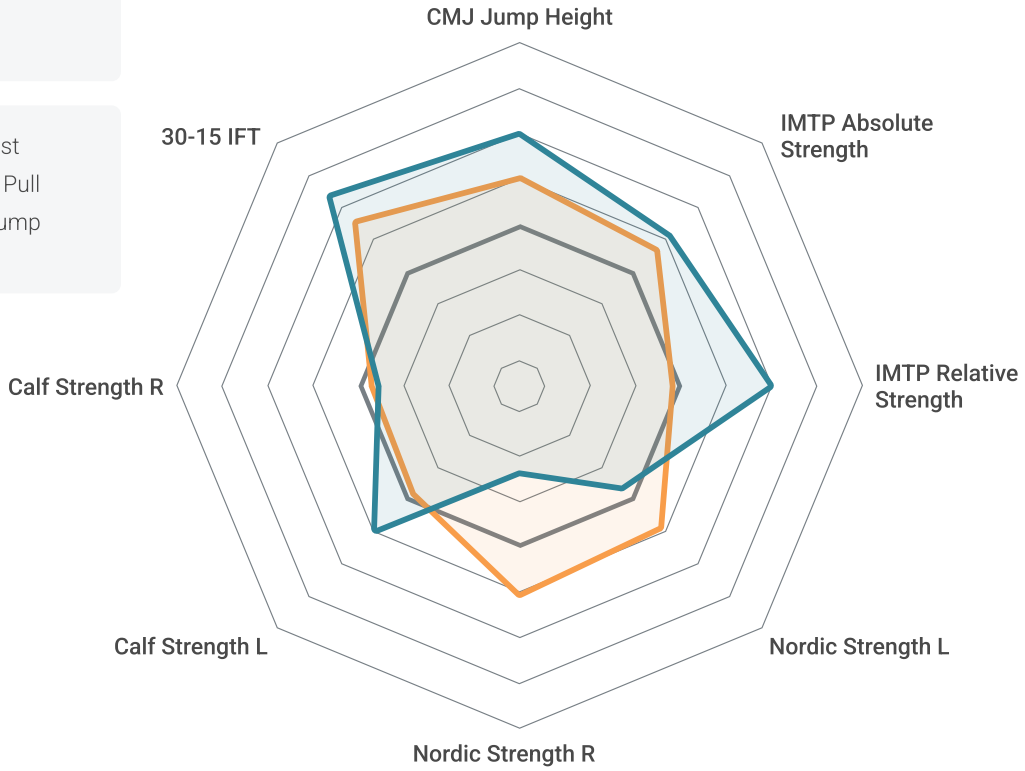
- A single athlete, compared to their own individual data
- Comparing multiple athletes, each as an individual series, to the rest of the squad or position group
- An athlete compared to the squad or position group
- Comparing different time points as different series, i.e., an individual athlete compared to themselves at the start and end of preseason

Position **Average**

Player **A**

Player **B**

IFT: Intermittent Fitness Test
IMTP: Isometric Mid-Thigh Pull
CMJ: Countermovement Jump
R: Right **L:** Left



Integration with Preseason Training

Physical preparation and injury risk management strategies should not be executed in isolation. While these are typically designed and overseen by the performance staff, promoting performance while managing injury risk requires a collaborative approach across the entire sports or healthcare organization, especially during preseason.

…promoting performance while managing injury risk requires a **collaborative approach across the entire sports or healthcare organization…**

Preseason testing serves as a valuable tool to objectively evaluate the team's physical condition compared to previous seasons (especially preseason periods) and relevant testing blocks throughout the year.

This information aids coaching staff in understanding the team's physical readiness.

Preseason training must strike a delicate balance. If excessively demanding, players are more likely to be injured or, at the very least, start the season being fatigued.

Conversely, if the preseason program is too light, players may be ill-prepared for the rigors of the in-season period, potentially increasing the subsequent risk of injuries and fatigue.

Preseason training must strike a delicate balance. If excessively demanding, players are more likely to be injured…too light, players may be ill-prepared…

This balance is particularly critical when considering the demands of high-speed running. Poorly planned high-speed running sessions can heighten injury risk. However, a well-structured preseason program, with appropriately progressed loads, can help mitigate the risk of speed-related soft tissue injuries.

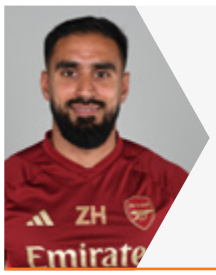
Moreover, preseason testing enables the identification of players at higher risk of soft tissue injuries associated with high-speed running demands. Tracking high-speed running exposure, from both a load and peak velocity progression, is an important responsibility of sports science staff in preseason.

Continued testing enables the quantification of physical progress, particularly towards the end of preseason when training loads are tapered to prioritize physical freshness for the competitive season.

...it is crucial to educate both staff and players about the significance and application of this information.

For these reasons, preseason testing should not sit in isolation but be integrated throughout preseason planning, load monitoring and athletic development, as well as structured injury prevention programs to support the multidisciplinary staff and players to achieve a successful preseason.

Therefore, it is crucial to educate both staff and players about the significance and application of this information. By gaining buy-in from all stakeholders, a shared understanding of how preseason testing contributes to overall performance and injury prevention strategies can be achieved.



Zubair Haleem
Senior Academy Physiotherapist,
Arsenal F.C.

@ZubairHaleem7

"Preseason is always a hectic period in the football calendar. It's an essential time for practitioners to gather relevant health and performance information from both current and new players.

Showing players where they rate against their previous scores or the squad with real-time analysis technology can create healthy competition and 'buy-in' to tailored programmes.

The use of technology is now fundamental in the preseason physical screening process. A combination of isometric, eccentric and jump testing is utilized to provide objective markers on relevant metrics.

This data is then combined with pitch-based GPS metrics, body composition scores, wellness and psych screens, fitness testing, injury history and availability to create an overview of the player's athletic profile."

What **Next?**

Preseason preparation is a critical phase in an athlete's annual training cycle, offering the opportunity to lay the foundations for a successful season.

While this guide has provided an overview of the considerations for preseason, it is the translation of this information into implementation in your specific setting that now becomes critical.

As you move forward, consider how the principles and practices outlined in this guide can be tailored to your specific context. We have focused primarily on football, but many of the concepts are applicable to other sports – particularly other team sports.

The sport and population in question are central considerations as you plan, conduct and review preseason.

Similarly, the fundamentals discussed here apply across age spans, but it should be noted that there may be specific considerations when dealing with youth populations (e.g., maturation, safeguarding) that have not been addressed.

Ultimately, successful preseason planning depends on context-driven application and ongoing adaptation. By aligning key principles with the unique demands of your sport, population and environment, you can better prepare athletes for the season ahead.

Other Great Preseason Resources

Global Performance Insights
Athlete Testing Series

Sportsmith

Jo Clubb
Founder and Sports Science Consultant
Global Performance Insights
@joclubbsportssci

Ivi Casagrande
High Performance Consultant,
Football Association of Ireland
@ivicasagrande

Ellie Maybury
High Performance Consultant in Female Sports,
New South Wales Institute of Sport
@soccerherformance

Alex Natera
Performance Science
Manager, New South Wales Institute of Sport
@alex.natera

Ian McKeown
Philadelphia Flyers
@IanMackers

Selwyn Griffith
Performance Manager
at Melbourne Football Club
@selwyng

Prof. Hugh Fullagar
High Performance Consultant
Aspetar Orthopaedic and Sports Medicine Hospital
hughfullagarperformance.com

VALD

“Preseason is when we earn our keep”

Alex Natera
Performance Science Manager, NSWIS
Creator of Run-Specific Isometric Strength Training

This guide covers the fundamentals of planning and executing a successful preseason.

From reviewing last season’s performance and results to selecting the most valuable tests for the upcoming preseason, guest author **Jo Clubb** shares valuable insights from her years of experience in the English Premier League, NHL, NFL and more, for practitioners to implement in their organizations.

Some questions we’ll answer in this guide:

Q: What is the **value of preseason**?

Q: What is the **role of technology** in preseason?

Q: What **tests should we perform** in preseason?

Q: Is there **normative data** for testing soccer players?

Q: How do I **communicate the results**?

Q: How do we **balance our goals** with the goals of our coach?

Want to learn more? We are here to help.

info@vald.com