



An Athletic and Academic Partnership for Progress and Performance

How the Horizon[®] DXA System and body composition analysis creates a symbiotic relationship between collegiate research and athletics

Dr. Dengel has more than 25 years of experience using dual-energy x-ray absorptiometry (DXA) and fully understands the benefits the technology offers when it comes to detailed body composition measurement. As a university professor, he has been able to forge an innovative partnership with the school's sports teams in recent years, helping to advance academic research as well as athletic performance.



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For more information, email SkeletalHealth@Hologic.com and visit DXAPerformance.com.

A Higher Degree of Accuracy

First introduced over 30 years ago, dual-energy x-ray absorptiometry (DXA) has enabled physicians to accurately and cost effectively assess bone mineral content. While DXA is crucial to the detection and treatment of osteoporosis, the technology has also become the gold standard for body composition analysis, providing detailed measurements in terms of bone density, lean mass and fat mass. The data produced by the Horizon DXA System can also be exported and further analyzed to satisfy the needs of the end user.

"DXA is a three-compartment model, which provides a higher degree of accuracy in comparison to other body composition measurement techniques such as bioelectrical impedance or hydrostatic underwater weighting," explained Dr. Dengel.

As the world of collegiate and professional sports has become increasingly data-driven, coaches, trainers and nutritionists have also turned to DXA for actionable insights regarding athlete performance, recovery and responsiveness to tailored programs. At the University of Minnesota, Dr. Dengel works alongside the athletics department to help the school's players and coaches take full advantage of the information provided by DXA.

"Body composition measurement provides great value in the athletic arena as far as monitoring athletes and their training programs, as well as developing their workout regimens and projecting their future development. On our campus, we provide body composition analysis for

our football, basketball, volleyball, track and hockey teams."

Partnering for Progress

Although Dr. Dengel has been utilizing DXA to analyze body composition data for nearly two decades, leveraging the technology and information to help the university's athletic teams is a somewhat new application. As the partnership has developed, an essential component to ensuring athletic personnel could effectively apply the insights was helping them understand and interpret the body composition measurement results.

"Coaches had a difficult time going through the clinical data, so we worked to package the results into a more digestible format and athletics-style report," said Dr. Dengel. "It was an educational process to help their department understand how DXA testing worked and what it could do. Once those things clicked, they realized that their current body composition measurement techniques couldn't provide this level of insight and that allowed us to really move forward with the relationship."

In addition to impacting player performance on the field, the growing partnership helped to build and strengthen the relationship between the academic research and athletic departments off of the field.

"Perhaps five to ten years ago, the relationship between my department and the athletic program was non-existent, and at times even adversarial. Now that we're testing and working with athletes and coaches, we see each other as

partners and have been able to form a much better working relationship at the university.”

Maximizing Measurements

Working with a wide variety of teams and athletes, it's essential for Dr. Dengel and his department to closely coordinate with athletic personnel. When it comes to presenting the results and analysis to the athletic department, Dr. Dengel follows a philosophy that enables coaches and trainers to understand the data, as well as remain in control when it comes to communicating with their players.



“We produce a team report for the strength coach or dietician to then take and present to the head coach and other team personnel,” noted Dr. Dengel. “One of things we're very careful about is that we don't make the presentation to the athletes. Allowing the coaches to present the data to their players helps them better understand the information and ensure their athletes are getting the insight and information they need.”

“It is a very fast system that produces accurate and useful data.”

Advancing Athletic Performance

By partnering with the academic department to generate useful body composition analysis via DXA, athletic trainers and coaches are able to accurately and continuously monitor the physical development of their players, as well as better understand and prevent against injuries. As a result, teams can make any necessary changes to workout regimens and nutrition programs in real-

time to ensure players are always on the right trajectory.

“For example, the strength coach for our hockey teams is constantly working with different types of training programs to maximize lean muscle mass in his athletes. These insights allow him to see if and how a certain training style has impacted his players,” explained Dr. Dengel. “Team dieticians also use the measurements to see if dietary changes are producing the desired results, such as decreasing body fat. If not, they can reassess the program and figure out what's going wrong, whether it may be an athlete not following the diet correctly or the program itself being ineffective.”

Having performed countless DXA scans over the years with collegiate and professional athletes across a variety of sports, Dr. Dengel's team has compiled a rich database of information that teams and trainers can strategically use to help inform their programs.

“We're able to provide insights regarding how our players compare with other athletes at their position and can reference historical data about the optimal body composition for a particular position or sport, such as the typical wide receiver in football. Furthermore, if a certain player has been particularly successful on the field, trainers can look at their body composition and then develop programs to help other players attain those same measurements.”

Making Academics Smarter

As a professor and researcher, the partnership with the athletics department has also benefitted Dr. Dengel from an academic perspective, providing him and his colleagues with a unique and comprehensive collection of information.

“From a research standpoint, it has been very helpful. We use a lot of the data generated for consortiums where we add our results to a database with other colleges, allowing us to produce comprehensive research and develop normative value data.”

The insights and data generated by working with the university's sports teams allow the academic department to push scientific innovation and investigation forward, as Dr. Dengel explained that, “the partnership provides us with different ways to look at various research questions, sometimes from a curiosity standpoint but other times to help us learn more about these relationships in the body.”

Essential Equipment

Education, planning and partnership have allowed the academic and athletic departments at the University of Minnesota to grow and strengthen their relationship, to the benefit of both parties. However, at the core of their success is the technology itself, Hologic's Horizon® DXA System, which produces efficient and precise results.

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“It is a very fast system that produces accurate and useful data,” noted Dr. Dengel. “If you're working with a football team, which has over 100 athletes, the time savings enabled by the Hologic system really do add up.”

Dr. Dengel has long understood the efficacy of and benefits provided by dual x-ray absorptiometry when it comes to academic research and generating detailed body composition insights. As he has continued to work with the university's athletic teams and personnel, they too have come to understand the unique value of the technology as well as the partnership.

“DXA scans to measure body composition have become essential for the athletic department. Teams are able to monitor the development of their players and the effectiveness of their programs in ways that their previous measurement techniques were never able to.”

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