

Female rugby players achieve peak fitness by varsity level, study suggests

September 27 2019, by Michael Brown



U of A Pandas rugby players already had well-developed fitness levels by the time they reached the varsity ranks—earlier than predicted by a standard model of long-term athlete development. Credit: Don Voaklander

The fitness ceiling for female varsity rugby players is being reached earlier than predicted, according to a University of Alberta study that challenges conventional wisdom suggesting elite athletes maintain an upward fitness trajectory throughout early adulthood and beyond.

Joao Falk Neto, a Ph.D. student in kinesiology, said the study was based on recommendations from the federally funded Long-Term Athlete Development (LTAD) model, which outlines where an athlete's development should be at every age.

Varsity-level female rugby players fall into the Training to Perform stage (18–21 years old). The LTAD model states athletes in this category should build speed, strength and endurance during the off-[season](#), maintain this fitness throughout the competitive season and then improve their fitness in the off-season, with this cycle continuing through their early 20s.

To test this, Falk Neto analyzed the fitness levels of 17 U of A Pandas rugby players taken before and after their first and second seasons one and two, and at the beginning of their third season.

Height, body mass and body mass index were measured at all five time points, along with a series of general fitness components—grip strength, flexibility, aerobic endurance (predicted VO₂ max test), trunk muscular endurance, upper-body muscular endurance, 40-metre sprint, vertical jump and 20-metre shuttle run to measure agility.

Falk Neto predicted a steady increase spanning the years, but what he saw was essentially a plateau across all five time points.

"It seemed the players start one season at a certain level, and then by the end of the season, they'll be at the same level or slightly below," he said. "Then by the start of the next season, they will basically be almost the same as they were in the previous season."

In fact, the only statistically significant increase over the study involved trunk muscular endurance, measured by sit-ups, which was at its highest level at the start of the third season. Performance in the first five metres

of the sprint test decreased by the end of the first season and hadn't recovered by the start of the second season. As well, results of the beep test, which predicted VO₂ max, were marginally higher at the start of the second season than at any other point.

Falk Neto said the results suggested that by the time these rugby players made the jump to the university ranks, they already possessed well-developed fitness levels, which were then merely maintained throughout their varsity career.

Some of these results might be attributable to the fact that varsity athletes are required to balance athletics and academics, he added.

"The LTAD for rugby says varsity players should closely mimic what professionals do, but I think that is an unrealistic level of commitment to expect from a student-athlete," he said. "At the end of the day, the coaches know that players are fit enough, so it is important that they use practice time to focus more on technique and tactics."

And if the coaches sacrificed fitness in the name of tactics, Falk Neto said it didn't show up in the team's play. Over the three years of the analysis, which started in 2007, the Pandas rugby team posted a winning record and made a trip to the national championships in 2008.

Falk Neto was then able to compare the varsity athletes' fitness data with a few fitness indicators taken from their national team counterparts. He found the only difference between the two levels was speed.

Michael Kennedy, a U of A exercise physiology researcher and Falk Neto's adviser, said this research runs counter to the prediction of the LTAD, which he explained is largely informed by expert opinion and is predicated on "some glamorous ideals around athlete maturation and development, with very little research evidence to back up LTAD

frameworks."

He added that the national team members' edge in speed speaks more to their genetic predisposition to maximize their [fitness](#) at each level.

"Up to 80 percent of all performance is already predetermined genetically," he said.

"If I were talking to parents, I would tell them to relax a bit on the sidelines and think more about the health benefits that come from being physically active, how sport is positively contributing to their child's social dynamics and—especially in the case of varsity athletes—how it improves their ability to be more resilient in life by balancing work, life and school."

Provided by University of Alberta

Citation: Female rugby players achieve peak fitness by varsity level, study suggests (2019, September 27) retrieved 11 May 2024 from <https://medicalxpress.com/news/2019-09-female-rugby-players-peak-varsity.html>

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