

# NUMBERS GAME

## avcaVPI™: Standard Metrics and the Athleticism of Volleyball Players

By Kathy DeBoer and Kyle Norris

Four years ago the AVCA, along with Kyle Norris, MS ATC, Director of Training and Technology at SoloSports Technologies, started examining the physical characteristics of the 24 Under Armour/AVCA High School All-Americans. This remarkable group of athletes representing the top seniors in the country spends three days with us at our Annual Convention each December. We asked their permission to collect physical metric data, and what resulted was an analytical discussion that created more questions than answers related to the athleticism of volleyball athletes at every division of the sport. This discussion included recruiting, athlete development and a review of the current state of metrics in volleyball. The outcome was a deliberate search for the volleyball equivalent of the 40-yard dash and 90-mile/hour fastball as a critical metric in

predicting success for an individual or a team on the court.

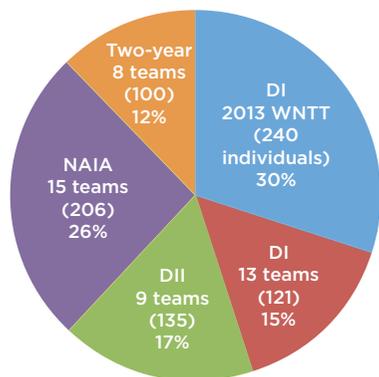
Over time, the focus of the project has been narrowed to eight metrics that, when packaged together, appear to correlate with success in our sport. Most of these will not surprise the learned coach; height, reach, and block touch are historically standard metrics. We tweaked some of the other traditional measurements: instead of approach *touch*, we found that height of attack gave us a more volleyball-specific indicator of hitter effectiveness by incorporating approach and swing biomechanics as factors; instead of approach *jump* we inserted the more universally-recognized measure of power: standing vertical jump. We also added three seldom-measured metrics: pro-agility, a standard football metric measuring collective coordinative abilities that correlate well to the desired athleticism of the volleyball

athlete; acceleration, a gauge of quickness and explosiveness; and arm swing velocity, again, a volleyball-specific indicator, which is measured in conjunction with height of attack to provide a comparable metric among hitters. Understanding that evaluators have different desires when looking at an athlete profile, these eight metrics are weighted equally and combined into one score to give us a volleyball performance index (VPI), i.e. a single number that is quite accurate in describing the athletic characteristics needed to be a successful volleyball player. The considerable predictive value of the VPI has resulted in a standardized athlete testing program that has enormous potential in athlete development, recruiting and position-specific evaluation of teams and players across the broad range of ages and skill levels of play that construct our sport of volleyball.



AL CASE

Chart 1 **avcaVPI™:**  
College Data by Division



802 student-athletes tested by same crew

Chart 2 **avcaVPI™:**  
College Data by Position

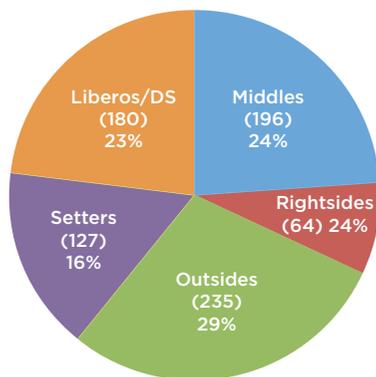


Chart 3 **College Middle Blockers**

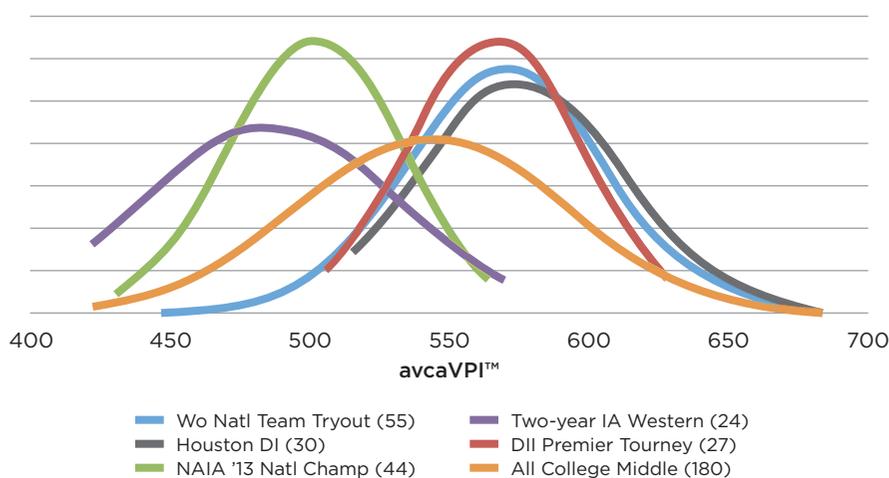
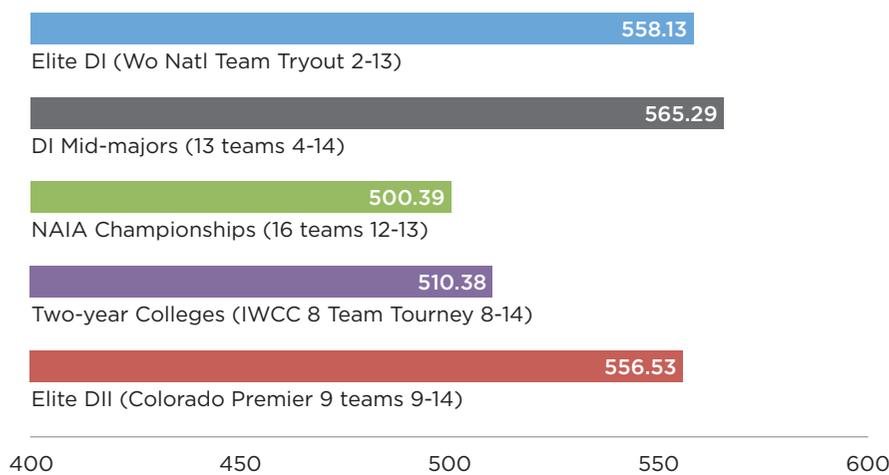


Chart 4 **avcaVPI™ Averages: Hitters**



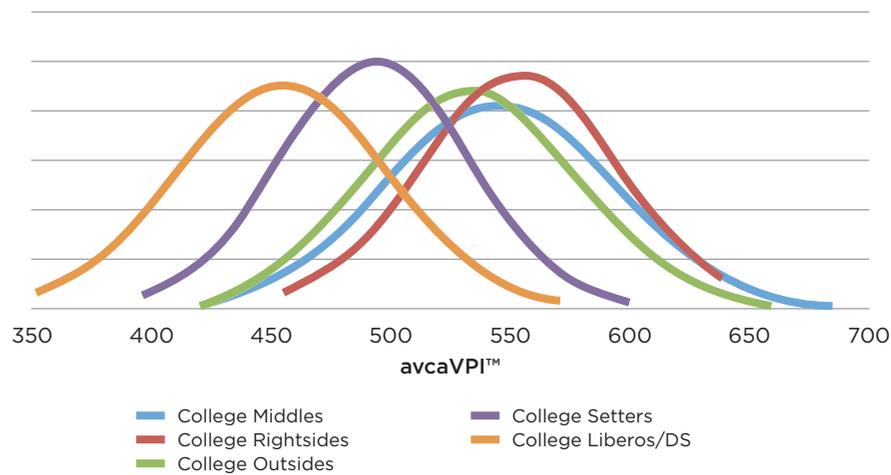
To extend our research and check the validity of the All-Americans' data, we began testing players who had already proven they were worthy of a collegiate roster position through the recruiting process and sorted the results by significant factors like position, division, starter/non-starter and award winner. From February of 2013 until September of 2014 we tested 802 players in DI (361), DII (135), the NAIA (206) and Two-year Colleges (100). The legitimacy of the performance index held up; while we found examples of elite athletes (over a 550 VPI score\*) in every group that was tested, we found a significantly higher frequency of elite scores clustered among award winners (All American, All Tourney Teams), players selected for National Team participation, i.e. invited to Anaheim, A2, Junior National Team, from the Women's National Team Tryout, and ranked teams in all divisions. [See Charts 1 and 2.](#)

\*When all prospect and collegiate players are combined, only 12% of athletes tested achieved a score of 550 or higher.

Taking a closer look at position-specific data using middle blockers, the average avcaVPI™ score for this position was 545 with a range of 684 on the high end and 423 on the low end. Unsurprisingly, groups that contained more "walk-on" players and typically had larger rosters had lower averages than those with more full-scholarship players, as seen in the shifting of the bell curve to the right in those groups. This phenomenon is seen in both the bell curve of middle blockers and the bar graph of all hitters. [See Charts 3 and 4.](#)

As a rule, metrics should be used to verify what is commonly held as a belief and several commonly held beliefs are borne out in the data. One of these metric validations is that the attacker positions (middles, rightsides and outsides) show a higher level of volleyball-specific athleticism than the skill positions of setter and libero. It should be noted that the setter position showed less correlation between award winners and VPI score than any other position, which is evidence of the higher level of intangibles believed to be required by that position to be successful at the collegiate level. On the contrary, middles show the highest correlation between VPI score and awards,

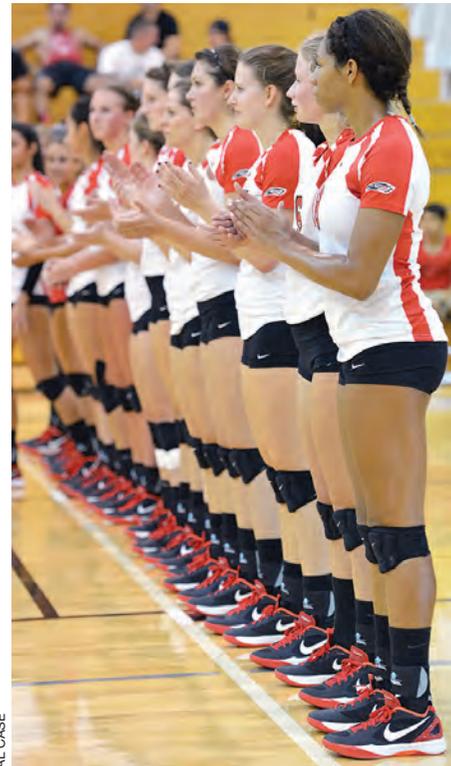
Chart 5 College avcaVPI™ Scores by Position



leading to the conclusion that physical measurables play a primary role in effectiveness of the position. See Chart 5.

Simultaneously, we also started testing prospect-age players at the 2012 Phenom College

Prep program in Louisville and subsequently in a series of College Prep Combines in 2013 and 2014, all events targeted at unsigned players seeking a place on a college roster. Two hundred eighty-six of these players have now graduated from high school and a search of



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All avcaVPI™ > 490  
= 75% on College Rosters

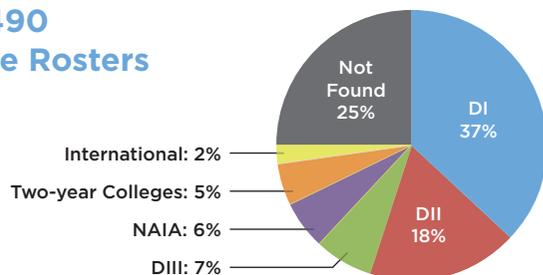


Chart 6

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college rosters was completed to verify if there is a correlation between their performance index (avcaVPI™) and ultimately achieving a college roster position. Research found that prospects that had a volleyball performance index of 490 or above appeared on a college roster 75% of the time. [See Chart 6.](#)

In early 2014 our work was trademarked as avcaVPI™. In conjunction with the trademark, a searchable database was developed, [www.avcavpi.com](http://www.avcavpi.com), where we can share the information we are collecting with interested coaches and parents. The correlation between the benchmarking data and the scores achieved by prospects will make this a valuable resource for both groups. The data exists to assist coaches in building a team profile that can compete at the highest level and assisting prospects in understanding how improvements in specific aspects of their athleticism can benefit and influence their ability to compete at the collegiate level. Within the database, scores can be sorted by individual metric or using the avcaVPI™ composite, whichever is the preference of the user.

There is still much to learn from the data, including digging deeper into individual positions and seeking the most important metrics for each and looking at successful teams and isolating predictive data for winning on the court. It will also be interesting to track prospects as they become contributing members of collegiate programs and determining if avcaVPI™ scores at the junior level are predictive of ultimate success at the collegiate level. It is an exciting and seemingly limitless area for growth in the sport of volleyball, and all parties involved are in a position to benefit from the work that has been done and the needles that are still in the haystack. ☺



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