



- WELCOME TO THE PG TECH CAGE -

The PG TECH platform uses the most advanced technologies in MLB to provide data-based scouting and player development insights. Our mission is to help baseball players, parents, scouts, recruiters and coaches answer the fundamental questions: How does the player compare? How can the player reach their potential?

Afterwards, on your player profile page, you will be able to see your data.

This brochure is to help you understand this new experience at Perfect Game (PG) Showcases and to help turn your advanced data into actionable information.

The Capture Experience

When you walk into the batting cage, you'll find the same technology used by MLB teams: high-speed video cameras, a launch monitor, a radar unit, a bat sensor and a 3D motion capture system. Before you hit, our biomechanics specialists will attach the K-Motion 3D motion capture sensors to you. They'll also give you a bat with a Diamond Kinetics sensor built in. Next, you will hit five balls off a tee. When hitting off a tee, due to the ball being still, hitters have more time to load, create more internal rotation, and stretch between pelvis and torso. This may affect some metrics slightly, which will be important to remember later when looking at your data.

The PG TECH Cage is currently in beta release. We look forward to your feedback!

F.A.Q.'s and What to look for on your Perfect Game Player Profile Page

What data from the PG TECH Cage experience will be on my Perfect Game player profile page?

- K-Motion 3D data
- Edgertronics high speed video
- Pocket Radar ball data
- Diamond Kinetics bat data
- TrackMan launch monitor data

On my PG player profile page, I see my kinematic peak speed sequence; what does it tell me about my swing?

The kinematic peak speed sequence tells you the order in which during the swing your body segments hit their peak rotational velocities. In the chart, the pelvis is labeled 1, the torso 2, the arm 3, and the hand / bat 4.

What do I need to know to understand my kinematic peak speed sequence pattern?

- Every hitter has their own pattern. This is not one size fits all. There are players in college and pro baseball with lots of different peak speed sequence patterns.
- The key is to understand your pattern, which will help you understand how you move to hit a baseball and how you can swing your best.
- While each pattern has strengths and weaknesses, generally speaking, a peak swing sequence pattern that works from the ground up is more efficient. That's why coaches like to see the pelvis speed peak first and the hand / bat last.

What are the different kinematic peak speed sequence patterns and what do I need to know about them to understand mine?

- **1-2-3-4:** This is pelvis peaks before torso, torso before lead arm, and lead arm before the hand / bat. This is an efficient pattern that many top hitters have. The peak speed of each segment is in order from the ground up to the hand / bat. This sequence allows for efficient transfer of energy and adjustability to different pitches and pitch locations.
- **1-3-2-4:** This is pelvis peaks first, lead arm second, torso third and hand fourth. It is an efficient pattern that many top hitters have. While the arm and torso are switched around versus the ground up pattern, it is very common with elite hitters. This sequence allows greater adjustability to different pitches and pitch locations.
- **1-3-4-2:** This is pelvis followed by lead arm and then hand and then torso. The pelvis is firing first, then the arm and hand are dominating the swing. This pattern can lead to a loss of power and lessen the ability to adjust to different pitches and pitch locations.
- **2-1-3-4:** In this pattern the torso peaks first, then the pelvis, then the lead arm and then the hand / bat. The torso is leading in this swing. In most cases, without the lower half driving the swing, energy gets lost, making it difficult to create maximum power and adjust to different pitches and pitch locations.
- **2-3-1-4:** Here the torso peaks first, then the lead arm, then the pelvis and then the hand. The torso and arm are leading this swing. In this pattern there may be only minimal engagement between the lower half of the body and the arm and hand / bat, which can make it tough to produce power and adjust to different pitches and pitch locations.
- **1-4-3-2:** In this swing, the pelvis peaks first then the hand and then the arm and the torso. This is generally referred to as a hand dominated swing. With the hands leading the upper body, energy can get lost, and it may be difficult to produce power and adjust to different pitches and pitch locations.

Note, there are hitters who are effective with all different peak speed sequences. However, generally, a ground up peak speed sequence swing is more efficient.

The kinematic peak speeds - what are they?

Kinematic speeds are rotational velocities of body segments during a swing. Your kinematic peak speeds are the fastest speeds during a swing and they are shown on your profile page.

What are the kinematic peak speeds of elite players, in general?

Please, note, speeds will vary with the age and size of players. Small players, on average, will have higher speeds because they are moving less mass and have smaller bodies. As a result, the peak speeds tell a piece of the story, but not the full story.

That said, as a rule of thumb, these, on average, are peak speeds of fully mature elite players are:

- Pelvis: 600+ deg/s
- Torso: 850 + deg/s
- Arm: 1100+ deg/s
- Hand: 1800+ deg/s

What are the speed gains I see on the player profile page?

Speed gains are the amount of speed added to by the segment that reaches peak speed next in the kinematic sequence. Speed gain is an indicator that speed is building up the kinetic chain. This gives insight into efficient energy transfer, strength, control, and ultimately power.

What are good speed gains?

Good speed gains are produced when your body segments are working well together. Elite Ranges in a 1-2-3-4 pelvis to torso to arm to hand sequence are:

- Speed Gain Pelvis to Torso: > 250 deg/s
- Speed Gain Torso to Arm: > 250 deg/s
- Speed Gain Arm to Hand: > 500 deg/s

(Note that this does vary based on the size and age of the player. They are a big part of the story, but not the full story.)

What is stretch; I see on the page?

Stretch is a player's ability to create rotational separation between their pelvis and torso, called disassociation, during the swing. It is measured in degrees.

How much stretch do I want?

You want the right amount of stretch for you, not the maximum. The right amount enables you to create the most speed, which you do by closing the stretch you create in the swing at contact. Your right amount of stretch will be dependent on your mobility, your hitting style and a few other factors. The best hitters create a rubber band effect in their bodies – and as with a rubber band you can stretch it too much or too little.

What is the Edgertronic video and what can it show me about my swing?

We use ultra-high-speed Edgertronic cameras because, lower speed video can often be deceiving. The “Edger” video gives you a detailed view of your swing so you can see a more accurate, detailed view of your hitting in slow motion.

What other data will I get?

The technologies we have highlighted above give you the cause data of your swing – they tell or show you what you do in your swing.

We also record exit velocity and ball flight data. This is the effect of your swing. Increasing exit velocity is key to hitting the ball hard, getting more hits, and hitting it further. Having batted ball data and 3D and video, we can start to see the full picture of you as a hitter. From here, we can break down what you're doing well and areas to improve.

You will notice a sensor at the bottom of your bat as well. This sensor provides insight into the way your bat moves through space. The bat is the final piece to measure before you make contact with the baseball.

Enjoy the PG TECH cage experience. You will see a number of staff members at the cage with PG Tech t-shirts, ask them questions. They are here to help you understand the data and your swing.

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