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Inside Pitch[®]

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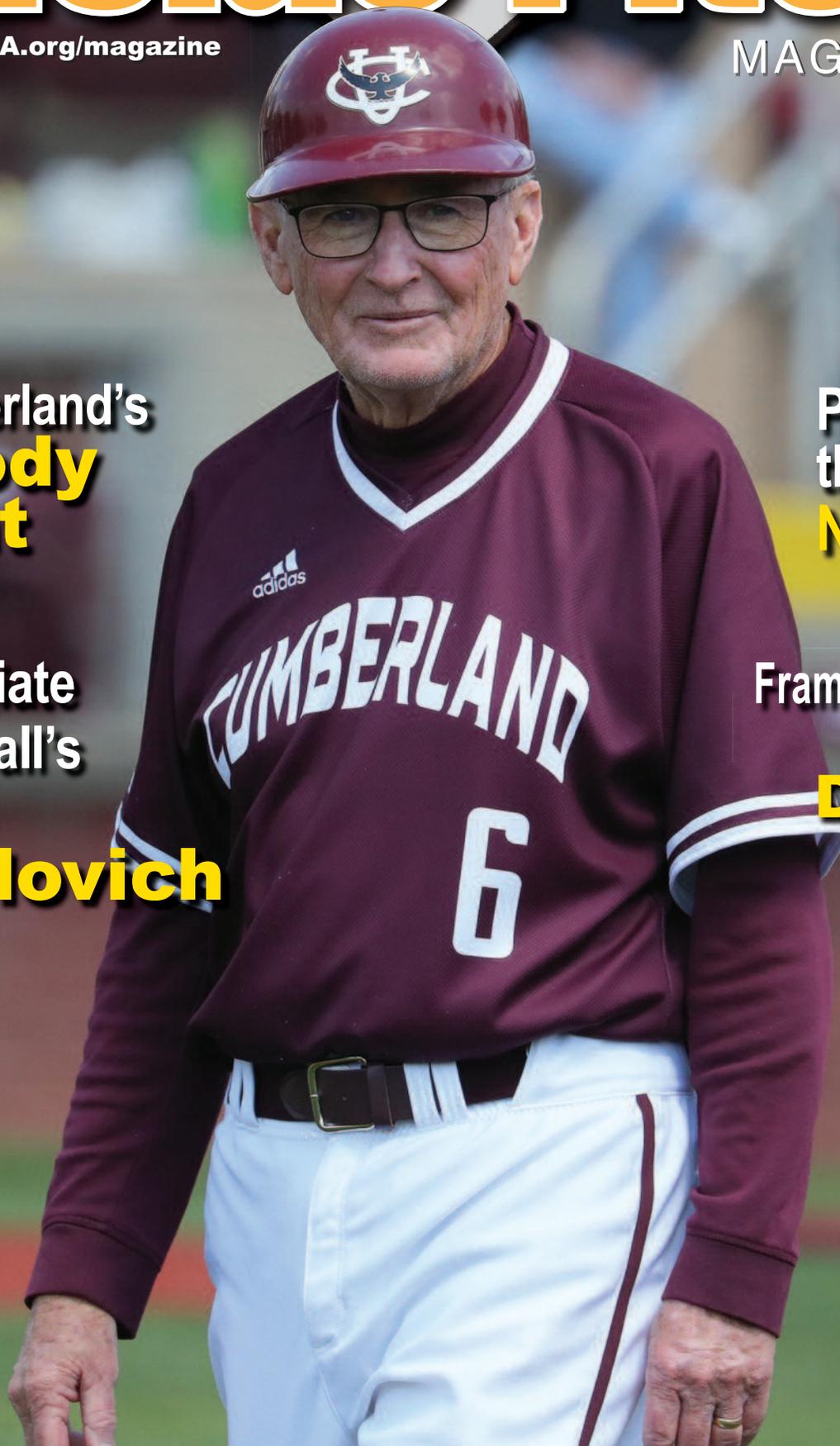
MAGAZINE

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the Age of
New Tech

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Official Magazine of the ABCA

Coaches' Corner

by Nunzio Signore and Bahram Shirazi
Rockland Peak Performance, Inc. (RPP Baseball)

Assessing Pitchers in the Age of New Tech

Whether you're a fan of technology or not, it's difficult to ignore. It's here in full force and it's changing baseball with it. Those that are too close-minded to take the time to expand their knowledge of the new performance metrics run the risk of being left behind, both in terms of overall knowledge about the game and improving an athlete's efficiency in performance.

Here at RPP Baseball, we look at each athlete through a holistic, body-focused prism. To us, the body is the center of everything, however technology is now an important piece of the puzzle. Here's how we assess pitchers in the age of new tech:

1. Movement Screen

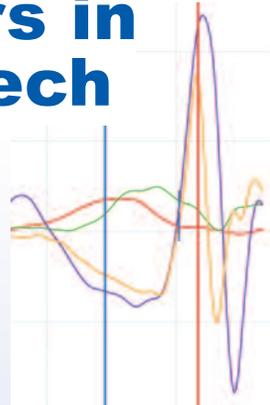
The first step in the process is a basic movement screen. Many of the issues pitchers face on the mound can be traced back to what we see in a movement screen. It can even predict what we're more than likely to observe on video or motion capture



later in the assessment process. Without a movement screen, you're basically flying blind. A coach can scream and yell all he wants but to quote Frans Bosch, "the body cares very little about what the coach has to say." In other words, if the body can't physically perform the task, there isn't a whole lot a coach can do.

While the movement screen happens to be the least tech-oriented aspect of the process, it's where we always refer back to when trying to tie together all the different pieces of data. It's an integral part of how we evaluate a pitcher's movement strategies, and it can tell us a lot about an athlete. A thorough assessment will review the following categories:

- **Laxity Test**
- **Standing Static Tests**
- **Shoulder**
 - Static Test
 - Dynamic Movement
 - Strength and Stability
 - Flexibility and Tightness
- **Lower Half**
 - Flexibility and Tightness
 - Strength and Stability
- **Other Tests**
 - Lunge Test
 - Kneeling Test



There is tremendous value in this information, not only for evaluating potential flaws in the delivery but also weaknesses that need to be addressed in any strength training program.

Name	Age	Wgt.	LBM%	Today's Date
[Athlete Name]	18	161	15%	[Date]
Email	Height	Throw/Bat (L/R)	Birth Date	
[Email Address]	6	2	L/R	[Date]
Pain, Injury, PT and Surgery History				Laxity / Tight
None				Tight
Force Velo Profile		Velo Deficit	4.37	Phase 1 RSI Index
Mobility Notes				
Tight Psoas	Insufficient Glute Activation			
Tight Pec Minor	Insufficient Ankle Strength/Mobility			
Tight Pec Major	Insufficient Ankle Mobility			
Tight Lats/Pec Minor	Chest Breather			
Scapular Abduction				
Limited Forearm / Wrist Mobility				
Insufficient T-spine Mobility				
Insufficient T-spine Extension				
Insufficient Serratus Strength				
Insufficient Hip Mobility/Stability				

2. Strength and Power Testing

Strength and power can give us great insight into the type of training our athletes are initially producing and help create a blueprint for their strength training programs. It wasn't long ago when strength testing was primarily measuring the 1 rep max (RM) of an athlete with a variety of different lifts in the weight room. Today, technology is changing this dramatically, literally as we speak. Several new technologies have found their way into the weight room:

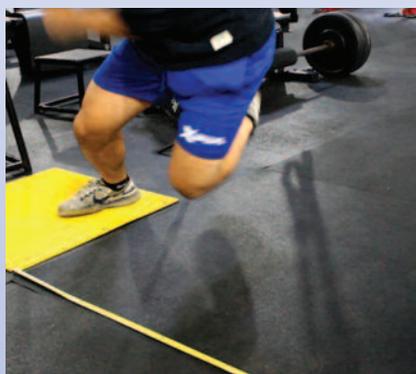
- **Velocity Based Training (VBT):** VBT is a method of evaluating the intensity of a given movement through the monitoring of bar and/or body speeds. Until recently, measuring velocity during resistance training was only available to elite athletes, measured with expensive equipment such as a Tendo unit. But now, with the introduction of linear transducers, anyone can calculate percentages of 1RM with high precision at a fraction of the cost. We can now zero in on an athlete's true strength and power as well as get predictions of an athlete's daily readiness to enable them to train at the optimal intensity for that given day.

“If it looks athletic...
 • ...and velo and command are there,
 • ...and there is no pain involved,
 • ...then leave it alone!”



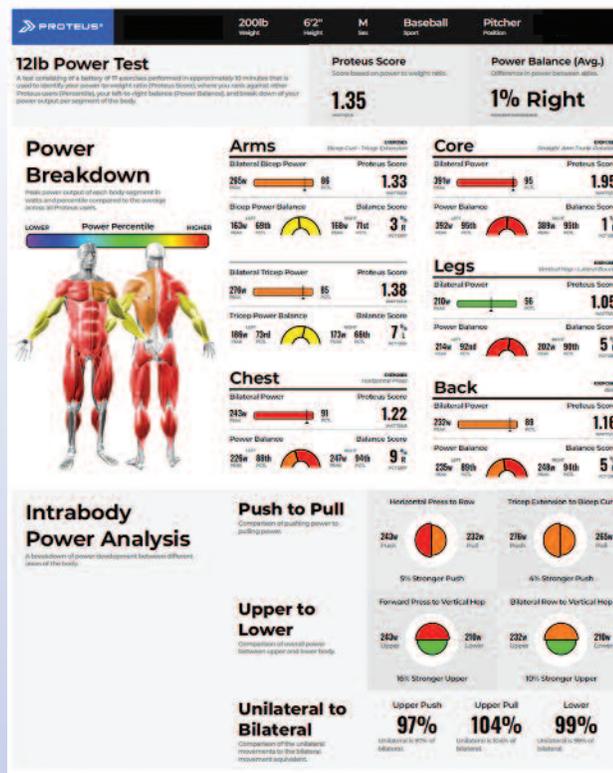
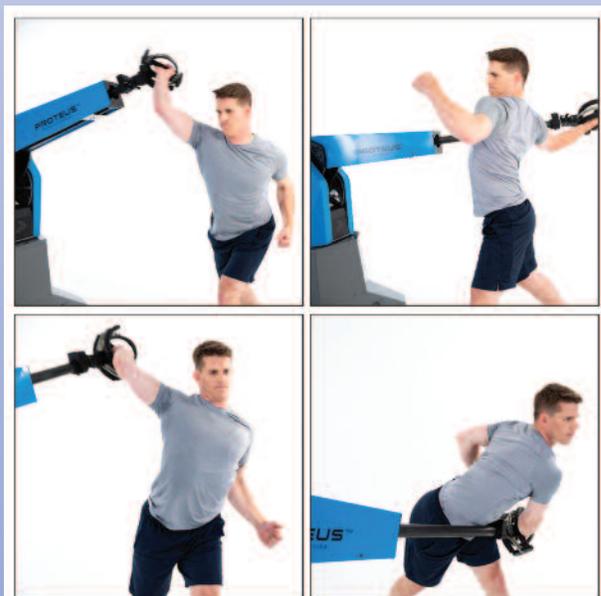
• **The Force-Velocity Curve:** Developing strength, speed and explosiveness in athletes is purely physics. Applying these traits to basic anatomical attributes can get a bit complicated but at the end of the day it's all about force, velocity, and power.

When it comes to training athletes in an explosive sport such as baseball, understanding how the athlete creates power through either force or velocity has a great deal to do with how they should train in the weight room. So, finding which trait, force or velocity, the athlete has a larger deficiency is the concept behind creating force-velocity profiles.



By using a force plate or jump-mat that can measure power production, we can better understand which side of power (force or velocity) the athlete relies on more and adjust training to give them more of what they need.

• **Proteus Motion :** This new technology is hot off the presses, as we recently ordered a unit. Proteus is the size of a small cannon and it is the first-ever technology to allow an accurate measurement of physical power production in 3D. Although we've been measuring power production in the lower half for some time with the aforementioned force plates, we're excited to be able to assess power production in 3D, especially in the upper body and in the frontal plane.



Although every piece of tech in this article is amazing, Proteus might just be the most revolutionary when it comes to assessing and training. To be able to evaluate power production in a rotational movement and train it within the freedoms of your own movements is huge. It also allows us to train on the strength continuum that otherwise has been delegated to

mostly med ball work only. By providing resistance continuously in a manner different than you'd experience with med balls, cable machines and free weights, we can better train eccentric strength and deceleration as well. For pitchers, this will be huge!

3. Pitching Mechanics Evaluation

Since no two pitchers are alike, it is our belief that assessing pitching mechanics is part art and part science. We

Continues

Assessing Pitchers

Continued



basically perform this part of the assessment in two ways:

Video Analysis: assessing a pitcher's mechanics should start and end with video. All the data in the world can never replace watching a delivery with your own eyes. You can call us old school if you want, but a pitching delivery is a human endeavor, and in our opinion, video is still king.

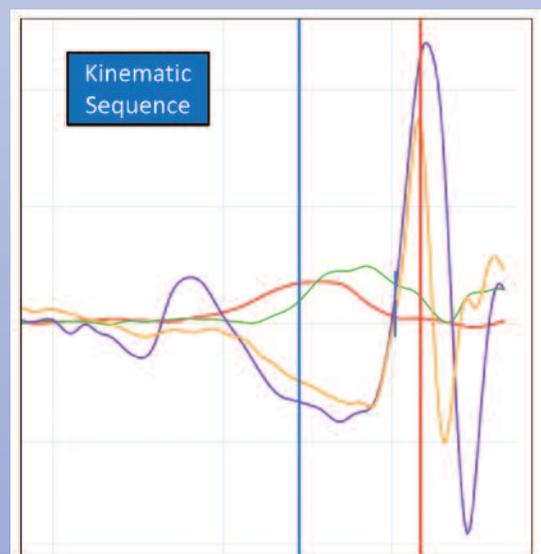
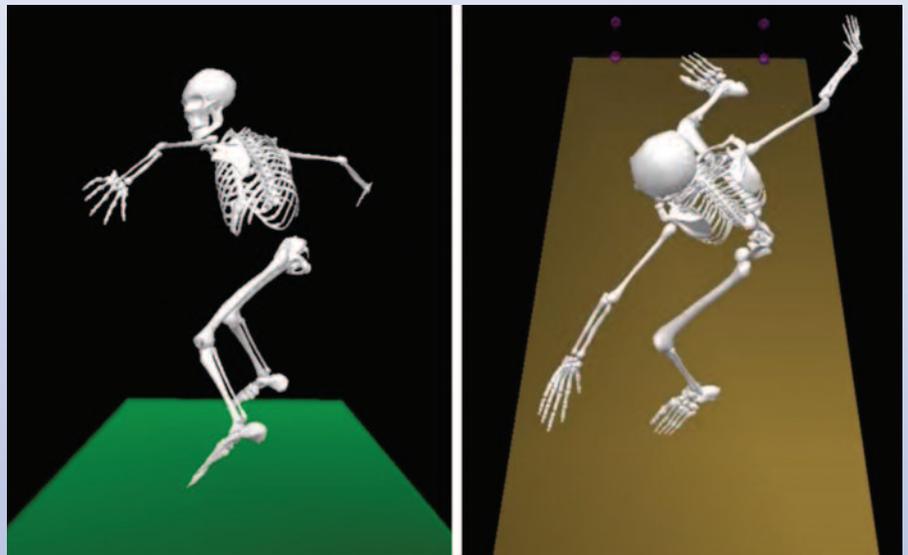
Being able to visually see a pitcher in “real-time” speaks volumes about the athlete's strengths, weaknesses, and overall athleticism. There are times when video will trump everything else the data is telling us. Why? Here's one way to look at this. Pitching is an art, so...

- If it looks athletic...
- ...and velo and command are there,
- ...and there is no pain involved,
- ...then *leave it alone!*

Motion Capture: “Mocap” is considered to be the gold standard of measuring athletic movement. It basically refers to recording human movement digitally and using that information to create an avatar at extremely high levels of accuracy. During motion capture, movements are recorded synchronously with multiple cameras at the same time and hundreds of times per second. This information is then mapped to a 3D model such that the avatar performs the same actions as the athlete in the digital world.

The data and information provided by our Qualisys motion capture system can be extremely valuable from several different perspectives. It paints a thorough picture of how body parts are moving at extremely high speeds, it provides data that allows us to have a much better understanding of the torque and consequent stress placed on different parts of the body during the delivery, and we can utilize the system to help provide a detailed picture of where in the delivery the athlete may be losing velocity.

A motion capture system can also provide a full kinematic sequence which graphically lays out how velocity is gener-



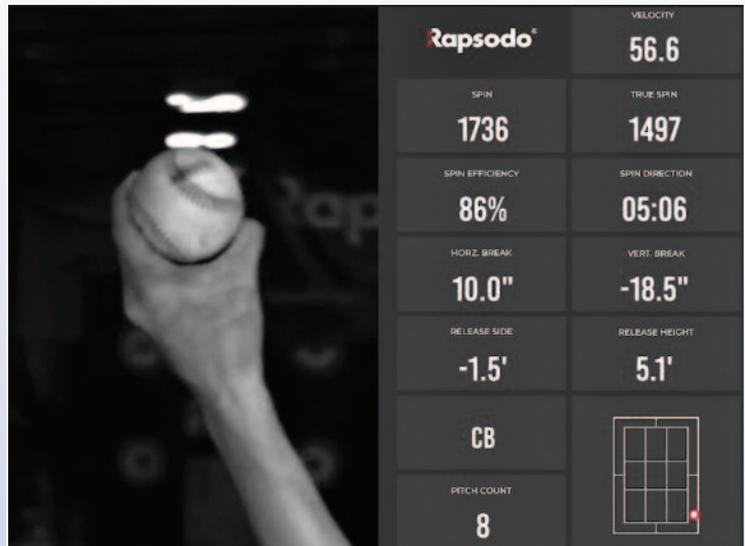
ated from the ground up, from your pelvis to your torso and then shoulders and finally the hand. There are many things that can go wrong as the kinetic chain works itself up the body. Mocap provides the angular velocities up the chain and allows us to numerically and graphically observe how velocity is transferred.

4. Pitch Movement Evaluation

Although Trackman has been around for a while, it wasn't until Rapsodo came out with their lower price point pitching camera system that evaluating ball movement data started to become mainstream. Here are five areas we evaluate in every pitcher's ball movement:

1. Spin axis by pitch type
2. Spin efficiency percentages by pitch type
3. Differentiation and relative pitch movement
4. Holes in the overall movement pattern
5. Consistency of arm slot (release height and side)

The measurements will help dictate how you work with each pitcher in a pitch design program. Issues may be varied but



can include 4-seam and 2-seam with similar movement patterns or offspeed pitches that could use more depth, drop, or sink, for example.

PITCH DESIGN CHART - MLB AVERAGES							
PITCH TYPE (RHP)	3D SPIN	SPIN RATE (RPM)	SPIN DIRECTION	GYRO (DEGREES)	SPIN EFFICIENCY	VERTICAL BREAK	HORIZONTAL BREAK
FB		2250 - 2350	12:30 - 1:30	<10°	>95%	20"	12"
2S FB		2150 - 2200	1:00 - 2:00	10° - 20°	90%	13"	18"
SINKER		2100 - 2150	1:00 - 2:00	20° - 30°	85%	10"	18"
CUTTER		2350 - 2450	11:00 - 12:00	40° - 50°	45%	8"	-2" : +2"
GYRO SLIDER		2400 - 2500	11:00 - 12:00	>85°	<10%	-1"	-1"
TOPSPIN SLIDER		2400 - 2500	11:00 - 12:00	65° - 75°	35%	-5"	-2"
SIDESPIN SLIDER		2400 - 2500	10:00 - 11:00	65° - 74°	35%	-2"	-8"
CURVEBALL 12-6		2500 - 2600	6:00 - 7:00	20° - 30°	78%	16"	-10"
SLURVE		2500 - 2600	7:00 - 8:00	30° - 40°	60%	13"	-12"
CURVEBALL SWEEPING		2500 - 2600	8:00 - 9:00	30° - 40°	68%	10"	-16"
CIRCLE CHANGEUP		1700 - 1800	12:00 - 3:00	40° - 50°	65%	10"	15"
THREE FINGER CHANGEUP		1700 - 1800	12:30 - 1:30	<15°	90%	15"	10"
FRISBEE CHANGEUP		1700 - 1800	2:30 - 3:30	10° - 20°	85%	0"	20"
SPLITTER		1400 - 1500	12:00 - 12:30	<10°	90%	10"	-2"

Source: Rapsodo

Evaluating the actual release point on video goes hand-in-hand with the ball tracking information provided by Trackman, Rapsodo and other systems. Cameras such as Edgertonic and Rapsodo Insight can be coupled with movement data to provide pitchers with a more visual assessment of how the ball's spin axis is created at the point of release. They can help you make instant adjustments to create different types of spin and movement on the ball. If interested in learning more on this topic, please refer to our article on pitch design published in the July/August 2019 of *Inside Pitch Magazine*.

Summary

Coaches don't need to worry about a Robo-Coach. That of course will never happen. Pitching is and always will be an art. However, with the type of information that is available today, pitchers and coaches can reach conclusions and make decisions more quickly. But most importantly, pitchers can develop faster with more precision and focus. **IP**