



2016  
CASE STUDY



# Biomechanical Pitching Evaluations

Vision Research High-Speed Phantom® Cameras Aid in Biomechanical Pitching Evaluations at the American Sports Medicine Institute 

The human body is an intricate machine with an array of moving parts. When in sync, these parts work seamlessly together allowing the body to perform most physical tasks with balance, grace and agility, which is critical to avoid possible injury when performing at a fast pace.

Career-ending and other serious injuries are particularly high among baseball pitchers. With the start of each windup through delivery and release of the baseball, a pitcher's body is put through a rigorous routine, and it's no surprise that pitchers of all levels suffer from injury. Pitchers from the Major Leagues to Little League come to the American Sports Medicine Institute (ASMI) – a recognized leader in understanding and preventing sports-related injuries. ASMI is dedicated to facilitating pitchers' recovery from injury, as well as working with healthy pitchers to tweak their mechanics to avoid injury. To do so, ASMI offers a comprehensive biomechanical evaluation of a pitcher's unique delivery, which incorporates footage captured by a Vision Research digital high-speed camera.



*When it's too fast to see and too important not to.®*

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## How It’s Done

ASMI’s biomechanical evaluations provide a qualitative and quantitative look at each pitcher’s windup and delivery. First, a motion capture system provides a thorough, quantitative analysis of the body. This motion capture system is used to calculate the kinematics, such as body angles, joint velocities, and timing mechanisms, as well as kinetics, including joint forces and torques. Data from an individual’s evaluation are compared to cumulative data from a set of elite pitchers previously tested by ASMI. Then a Phantom digital high-speed camera from Vision Research is used for a unique qualitative analysis. Each pitch is captured with the Phantom camera from the front, side and back of the pitcher at a speed of 450 frames-per-second. This high-speed footage can be viewed and shared with the pitcher immediately, providing them with an unprecedented look at what their body is subjected to, and where adjustments should be made to maximize performance and prevent injury. Individual still images are also extracted from the camera and utilized to highlight key findings of the evaluation.

“ASMI employs a motion capture system to quantify three-dimensional pitching mechanics,” explains Dr. Glenn Fleisig, ASMI’s Research Director. “This motion capture system allows us to measure the pitcher’s exact angles and arm forces; however, measuring flaws is only the first part of the solution. These measurements are useless if the player or coach cannot comprehend the findings. This is why high-speed video is such an important tool for ASMI, adding significant value to the services we provide for our customers. The high-speed recording from our Vision Research Phantom camera is the perfect bridge for illustrating the scientific results to the athlete.”

The highly-advanced technologies which bolster ASMI’s comprehensive biomechanical pitching evaluation services have helped position the organization as a leader and pioneer in the industry. For two decades, ASMI has been studying the biomechanics of baseball pitching, working to understand injury mechanisms and providing critical information to the medical community for improving injury treatment. To date, ASMI has served more than 2,000 pitchers from all levels, from youths to Cy Young Award winners.

To see examples of slow-motion shots from ASMI,  
**visit: <http://www.phantomhighspeed.com/go/asmi/>**



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