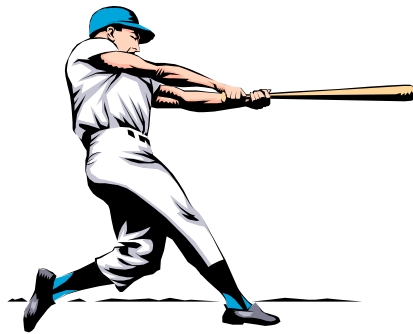


zenoLINK



welch-e technologies

INITIAL BIOMECHANICS EVALUATION

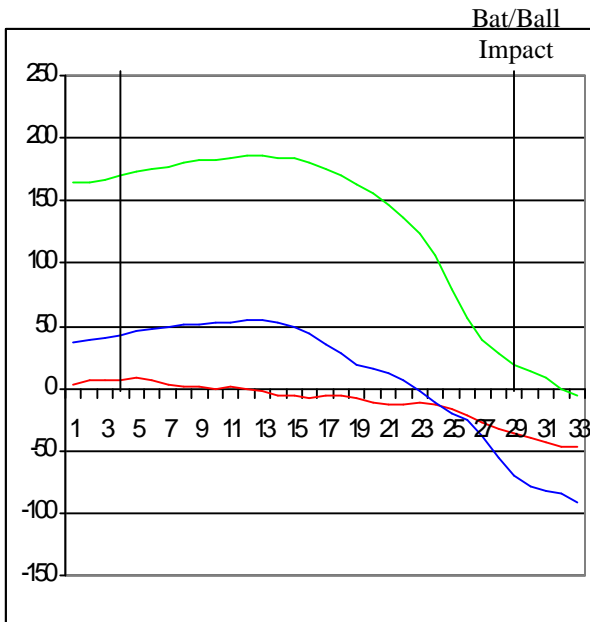
SWING CHARACTERISTIC:

Your swing is characterized by good basic kinetic linking coordination. However, a lack of lower body contribution to the power generation process forces the smaller muscles of the upper body to compensate (upper body, arm swing).

1.) When the body generates power and bat speed during the baseball swing, it uses a process called the kinetic link. The first step in the process is commonly called 'loading'. Loading refers to the preparation of muscles by stretching or elongating them prior to contraction or shorting during the generation of speed and power. **The most important part of loading is not the amount of stretch, but the timing of stretch to shorten.** We can objectively measure the amount of loading and the timing of loading by looking at the rotational displacement of each segment during the swing. **Your body exhibits GOOD muscular loading characteristics.** Muscles perform more effective work when they are lengthened prior to contraction. Muscular potential energy is very important in energy transfer from the legs to the upper body. In your swing muscles are loaded, however, much of the potential developed is dissipated prior to acceleration and power generation. This is in large part due to lower body stability and coordination break downs.

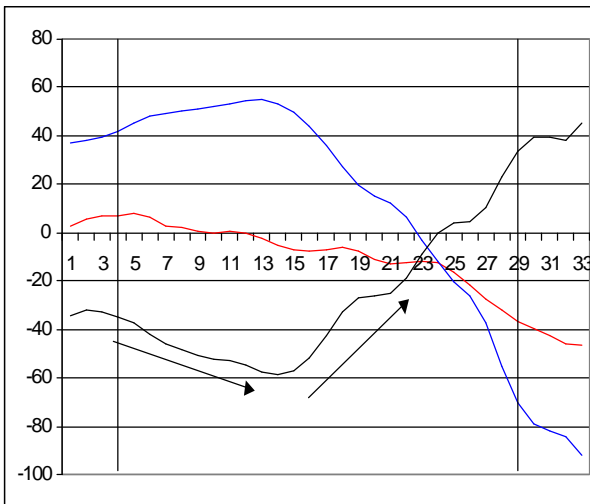
2.) During bat acceleration, the muscles of the legs must **both** stabilize and produce force to create hip speed. The muscles of the trunk that include upper and lower abdominal, external and internal obliques, and lower/mid back musculature produce energy transfer as they contract to accelerate the shoulder segment and decelerate the hip segment. **Your swing exhibits FAIR lower body stability and power generation characteristics.** Lower body stability creates a foundation for movement during the power generation process. In your swing, lateral movement creates an unstable platform for power generation.

3.) In an efficient transfer of energy, muscles are loaded and unloaded in a coordinate fashion such that rotational speed is built successively, producing significantly higher velocities at each segment. **Your swing exhibits GOOD kinetic linking characteristics.** Your main weakness occurs in creating power with the big muscles of the lower body and transferring this power to the upper body. Your swing relies heavily on upper body power.



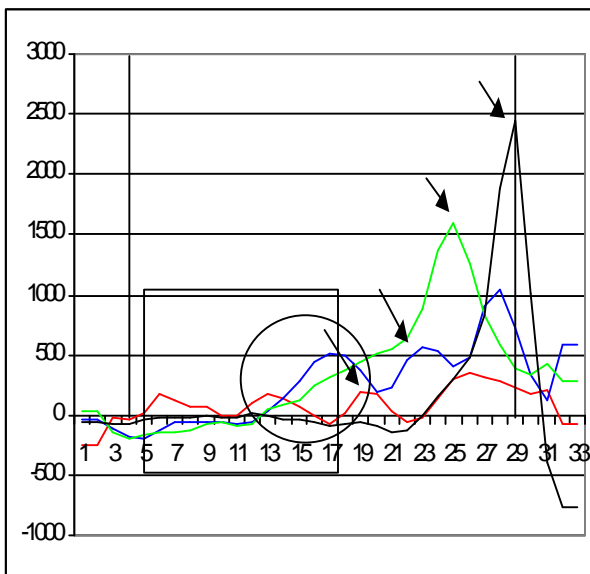
**BODY
SEGMENT
ROTATION
AROUND THE
ORIENTATION
OF THE TORSO**

Red: hips
Blue: shoulders
Green: arms



**MUSCULAR
LOADING OF
THE TRUNK
MUSCLES**

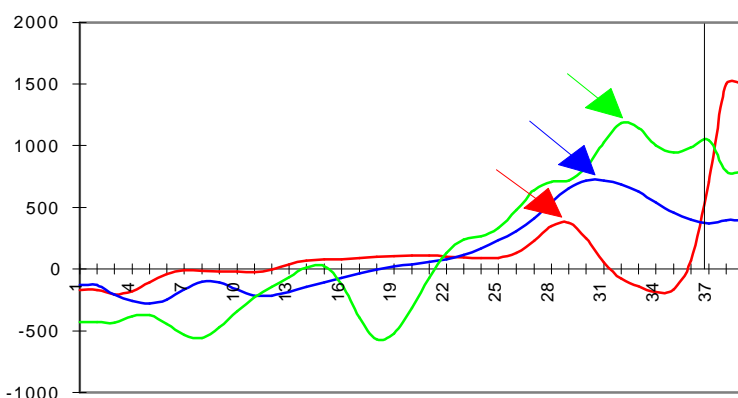
Red: hips
Blue: shoulders
Black: loading



**POWER
CREATION
AND
KINETIC
LINKING**

Red: hips
Blue: shoulders
Green: arms
Black: bat lag

BODY LINKING AND POWER GENERATION

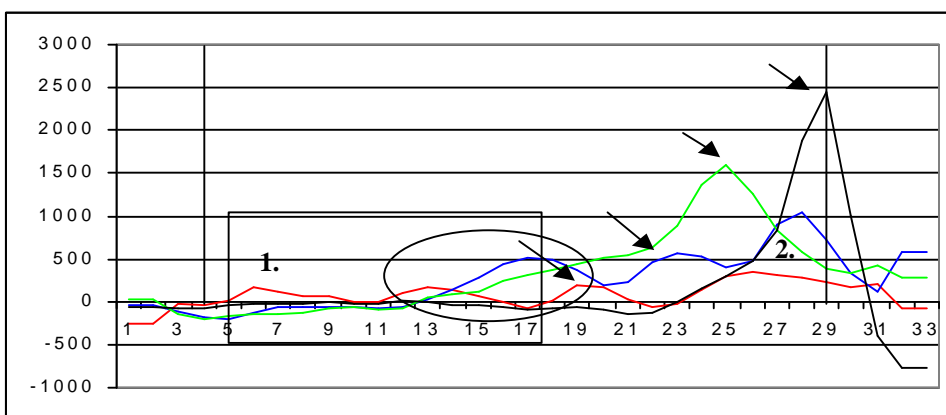


SAMPLE OF EFFICIENT BODY SEGMENT COORDINATION DURING POWER GENERATION

Red: hips
Blue: shoulders
Green: arms

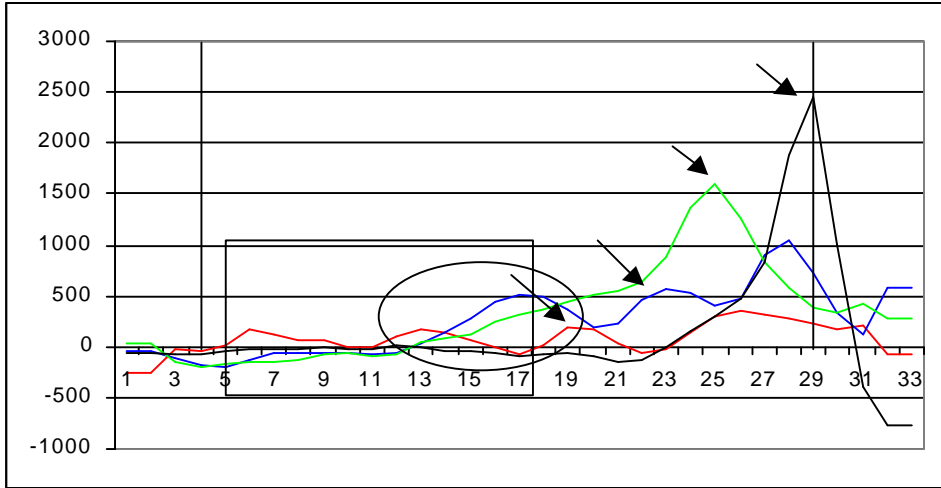
When the body generates power and bat speed during the baseball swing, it uses a process called the kinetic link. The first step in the process is commonly called 'loading'. Loading refers to the preparation of muscles by stretching or elongating them prior to contraction or shorting during the generation of speed and power. **The most important part of loading is not the amount of stretch, but the timing of stretch to shorten.** We can objectively measure the amount of loading and the timing of loading by looking at the rotational displacement of each segment during the swing. **Your swing exhibits lower body stability and coordination break downs.** As a result, the large muscles of the legs do not contribute effectively to power generation, which in turn forces the upper body to compensate.

1.) Look below at area labeled number one. Compare this to the example above. This is the area during which your lower body movement pattern inhibits lower body contribution to swing power. 2.) The result is upper body compensation and re-accelerations as shown in the next highlighted area.



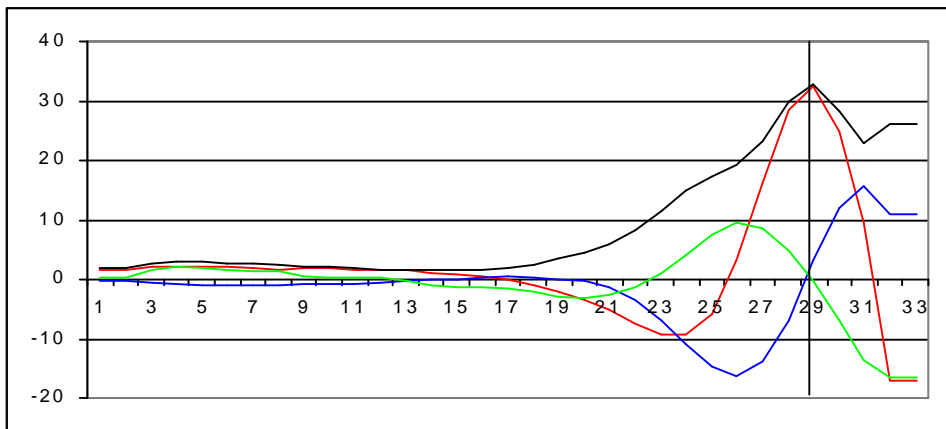
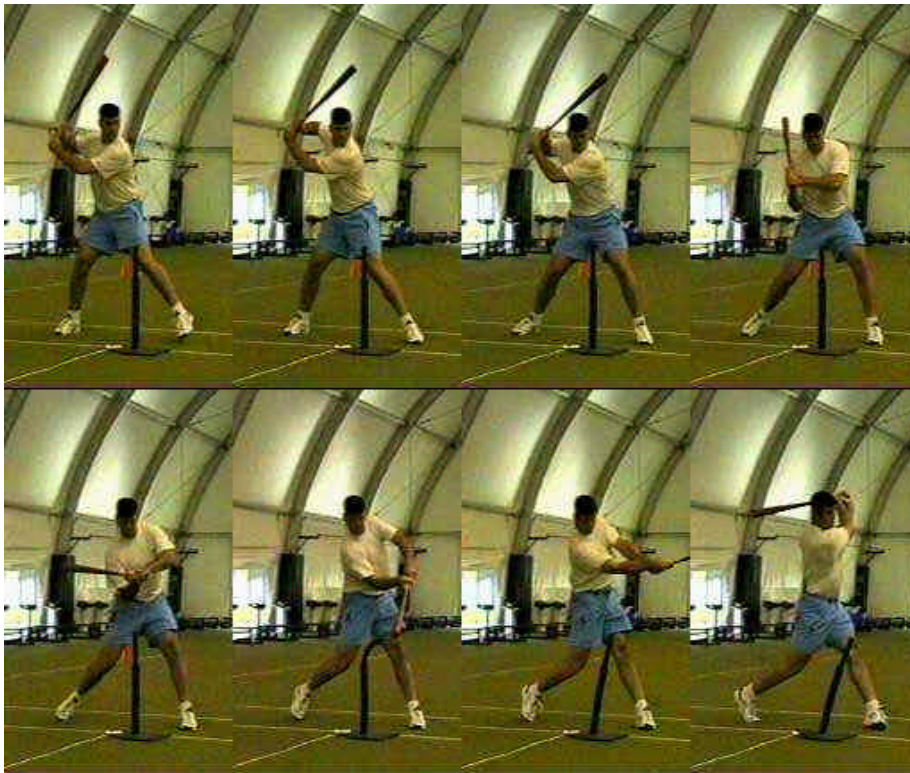
BODY SEGMENT COORDINATION DURING POWER GENERATION (DURING YOUR SWING)

Red: hips
Blue: shoulders
Green: arms
Black: bat



**POWER
CREATION
AND
KINETIC
LINKING**

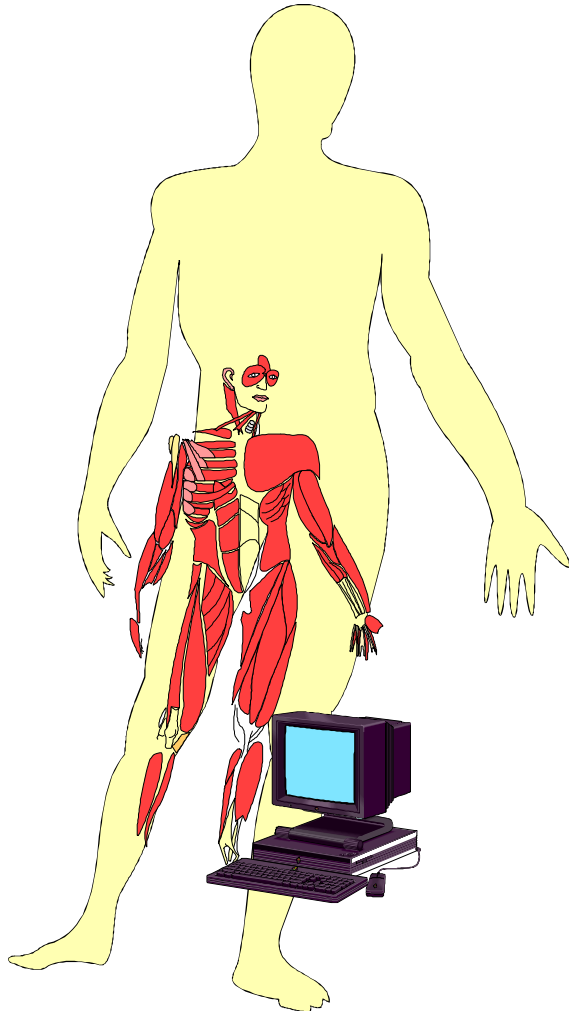
Red: hips
Blue: shoulders
Green: arms
Black: bat lag



**BAT LINEAR
SPEED**

Red: x component
Blue: y component
Green: z component
Black: linear speed
(in meters per sec)

APPROACH TO FUNCTIONAL TRAINING AND SKILLS ACQUISITION



✂ The key to becoming efficient, reducing stress and creating more power lies in developing a solid foundation of movement.

This solid foundation of movement includes lower body contribution to the power generation process.

Functional Strength and Flexibility:

- 1.) Lower body (power, stabilization)
- 2.) Trunk (rotary power, stabilization)

Functional movement training and skills acquisition:

- 1.) Movement skills that emphasize lower body coordination and acceleration pattern.
- 2.) Movement skills that emphasize rotary power generation and energy transfer from lower to upper body around a stable trunk and lower body.
- 3.) Movement skills that emphasize arm acceleration using upper body strength and transfer from shoulder segment around a stable lower body and trunk.



Technique:

- 1.) Lower body coordination
- 2.) Lower body power and quickness
- 3.) Compact movement