JUSTIN BRUTON

FORCES AND TORQUE AT THE HANDLE

"If a lot of people gripped a knife and fork the way they do a golf club, they'd starve to death."

–SAM SNEAD

Hand

(Redirected from Hands)

"Hands" redirects here. For other uses, see Hand (disambiguation) and Hands (disambiguation).

A **hand** (Latin *manus*) is a prehensile, multi-fingered organ located at the end of the forearm or forelimb of primates such as humans, chimpanzees, monkeys, and lemurs. A few other vertebrates such as the koala (which has two opposable thumbs on each "hand" and fingerprints remarkably similar to human fingerprints) are often described as having "hands" instead of paws on their front limbs. The raccoon is usually described as having "hands" though opposable thumbs are lacking.[1]

Fingers contain some of the densest areas of nerve endings on the body, are the richest source of tactile feedback, and have the greatest positioning capability of the body; thus the sense of touch is intimately associated with hands. Like other paired organs (eyes, feet, legs) each hand is dominantly controlled by the opposing brain hemisphere, so that handedness—the preferred hand choice for single-handed activities such as writing with a pencil, reflects individual brain functioning.

Hand

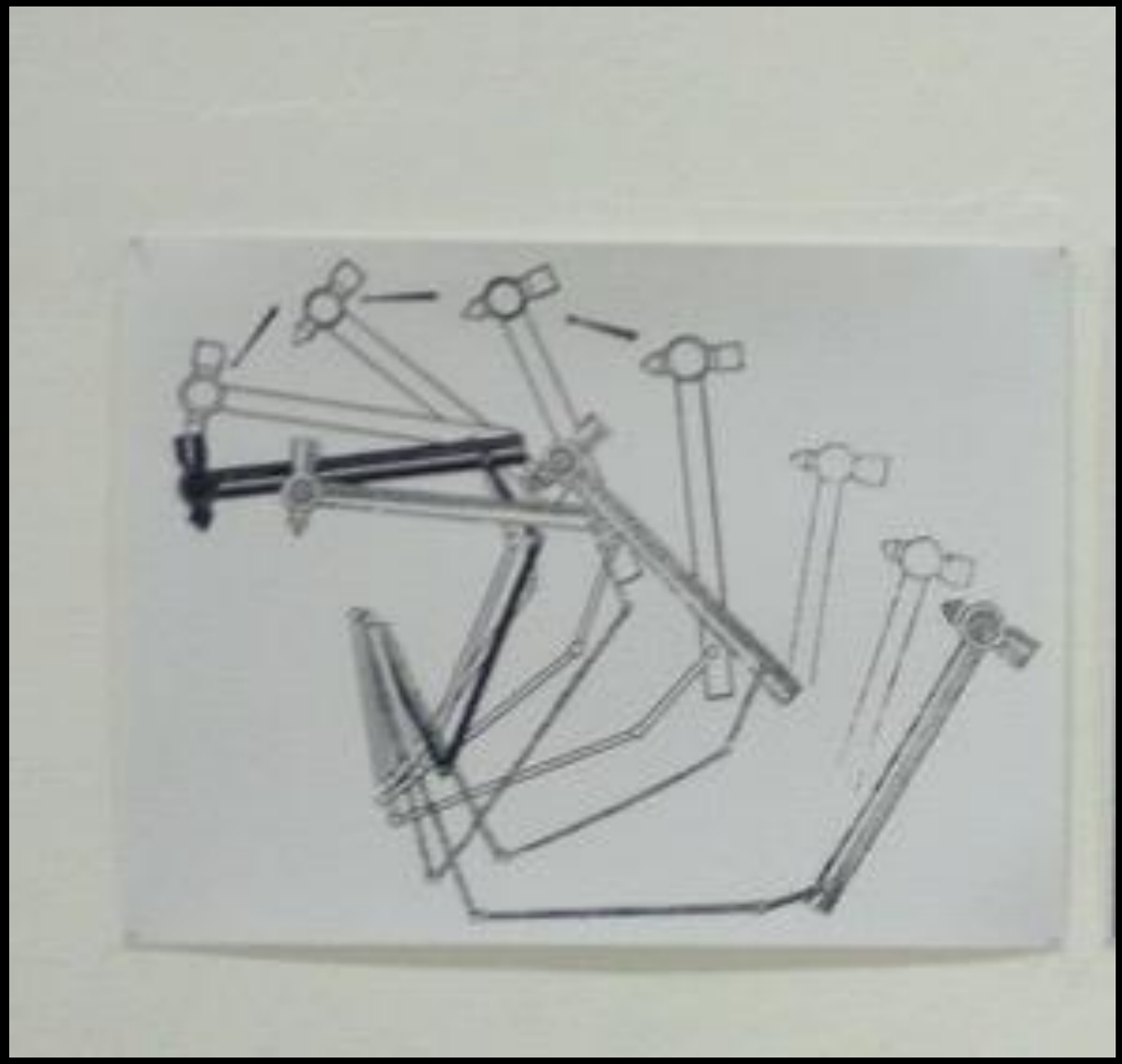
Palmar and dorsal aspects of human right hand

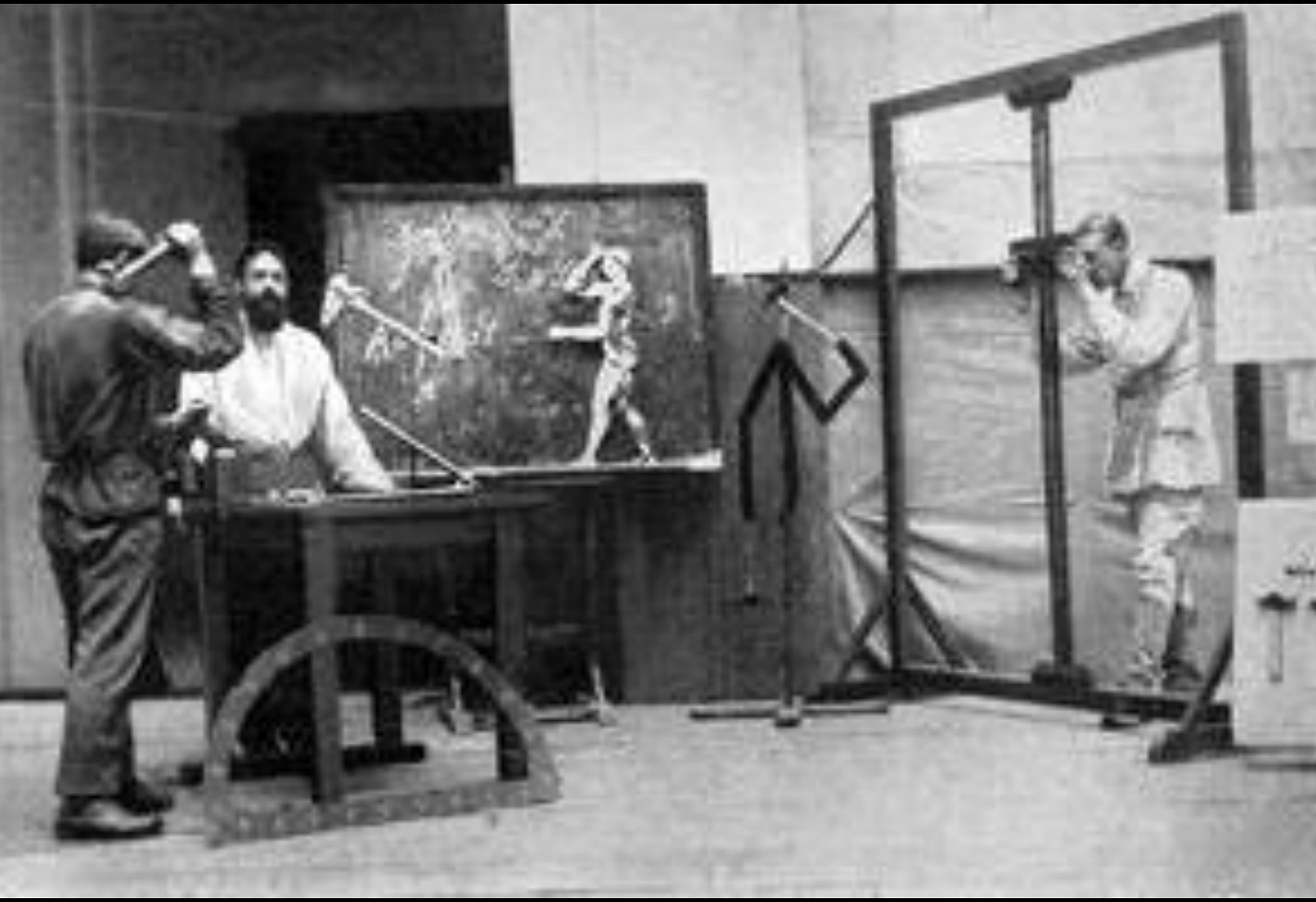
NIKOLAI BERNSTEIN

Soviet Neurophysiologist

- Largely self taught
- In 1935, received a Doctor of Science degree without submitting a thesis.
- In 1948, he was awarded the Stalin Prize in science.
- Most of his work was hidden to Western scientists until the 1960's

HIS FIRST SCIENTIFIC WORK WAS IN 1922, WHEN HE, ALONG WITH OTHER RESEARCHERS, WERE INVITED TO STUDY MOVEMENT DURING MANUAL LABOUR IN MOSCOW'S CENTRAL INSTITUTE OF LABOUR. THE PURPOSE OF THE STUDY WAS TO OPTIMIZE PRODUCTIVITY, AND BERNSTEIN'S ANALYSIS FOCUSED ON CUTTING METAL WITH A CHISEL





FINDINGS

- More variation in proximal joints, than distal.

- Proximal joints couple to create consistencies for distal in better performers.

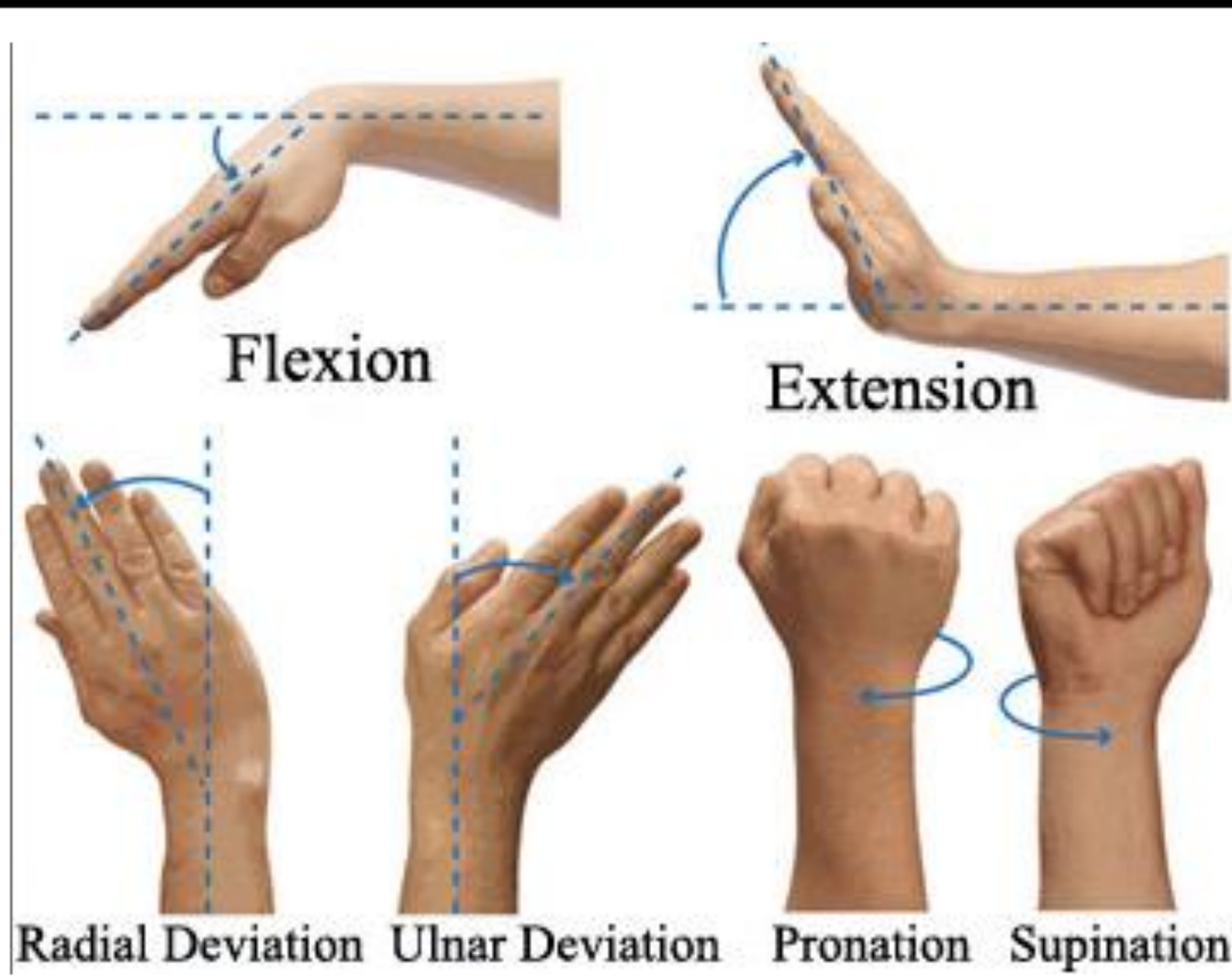
- The body will organize itself in accordance with the overall goal of the activity.

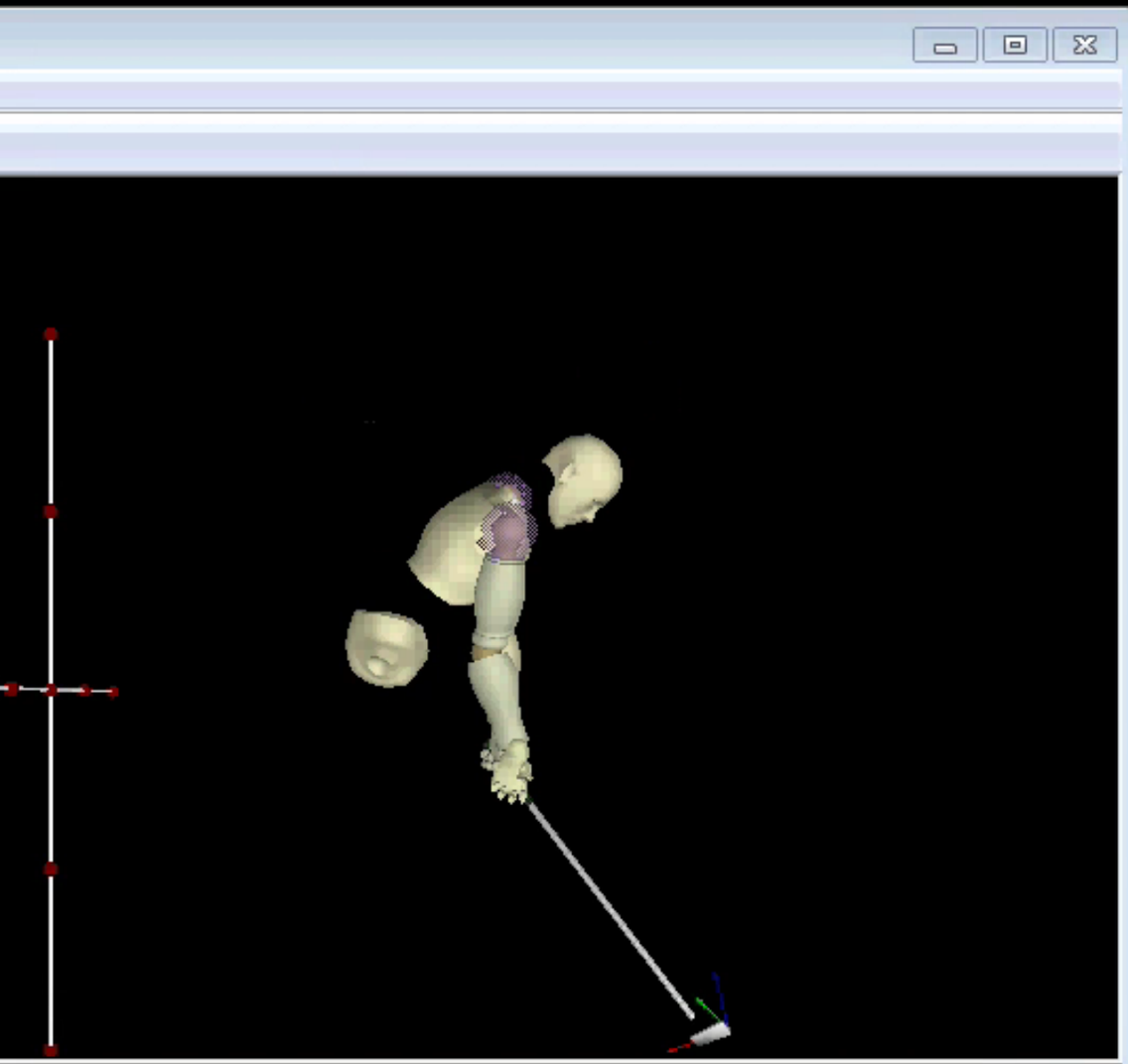
- There are multiple ways to perform a movement in order to achieve the same goal.

BERNSTEIN ALSO COINED THE TERM BIOMECHANICS, THE STUDY OF MOVEMENT THROUGH THE APPLICATION OF MECHANICAL PRINCIPLES.

IT'S IMPORTANT TO UNDERSTAND HOW BETTER PLAYERS ORGANIZE THEIR ARMS AND HANDS

3D Wrist Angles





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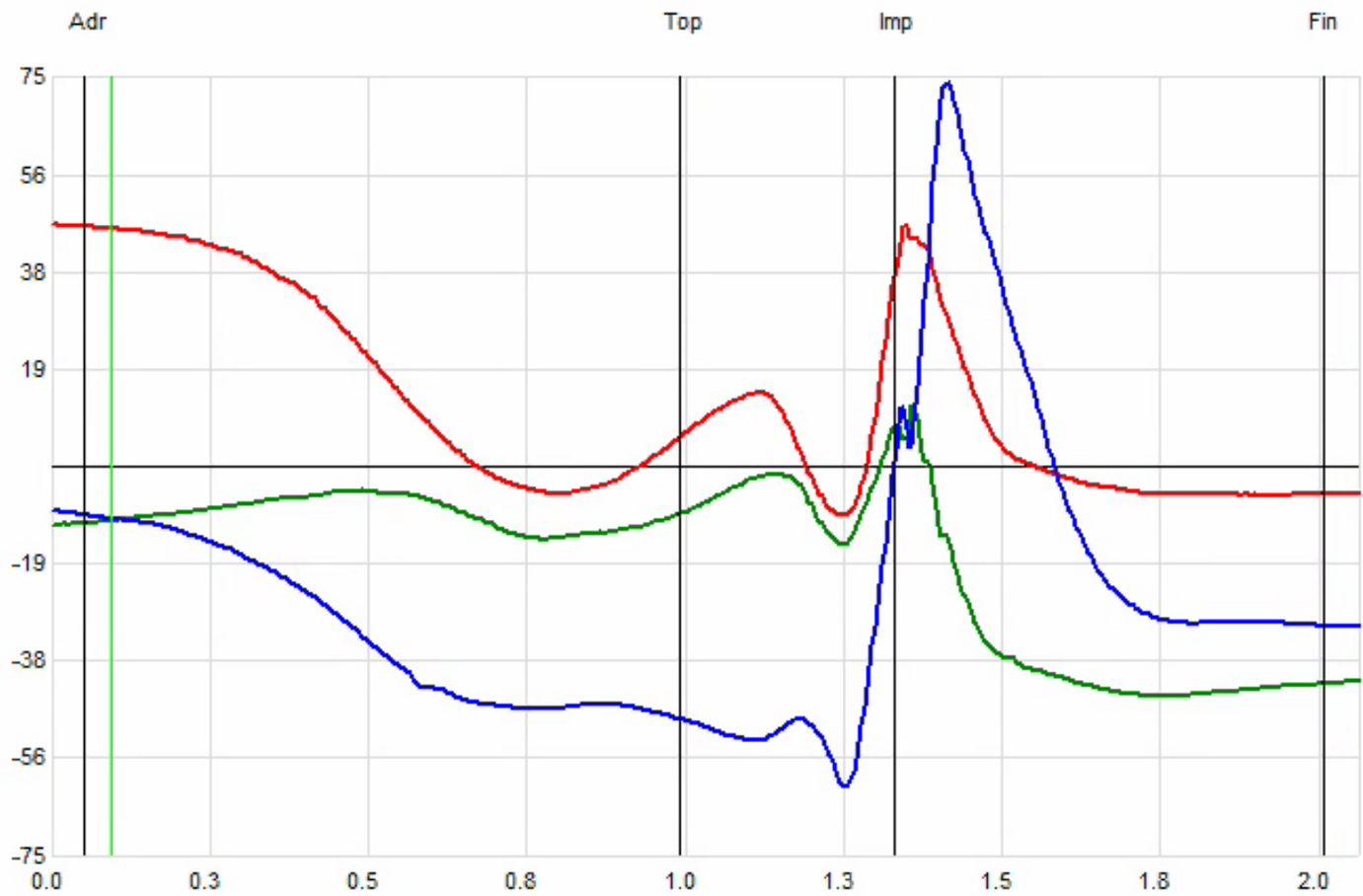
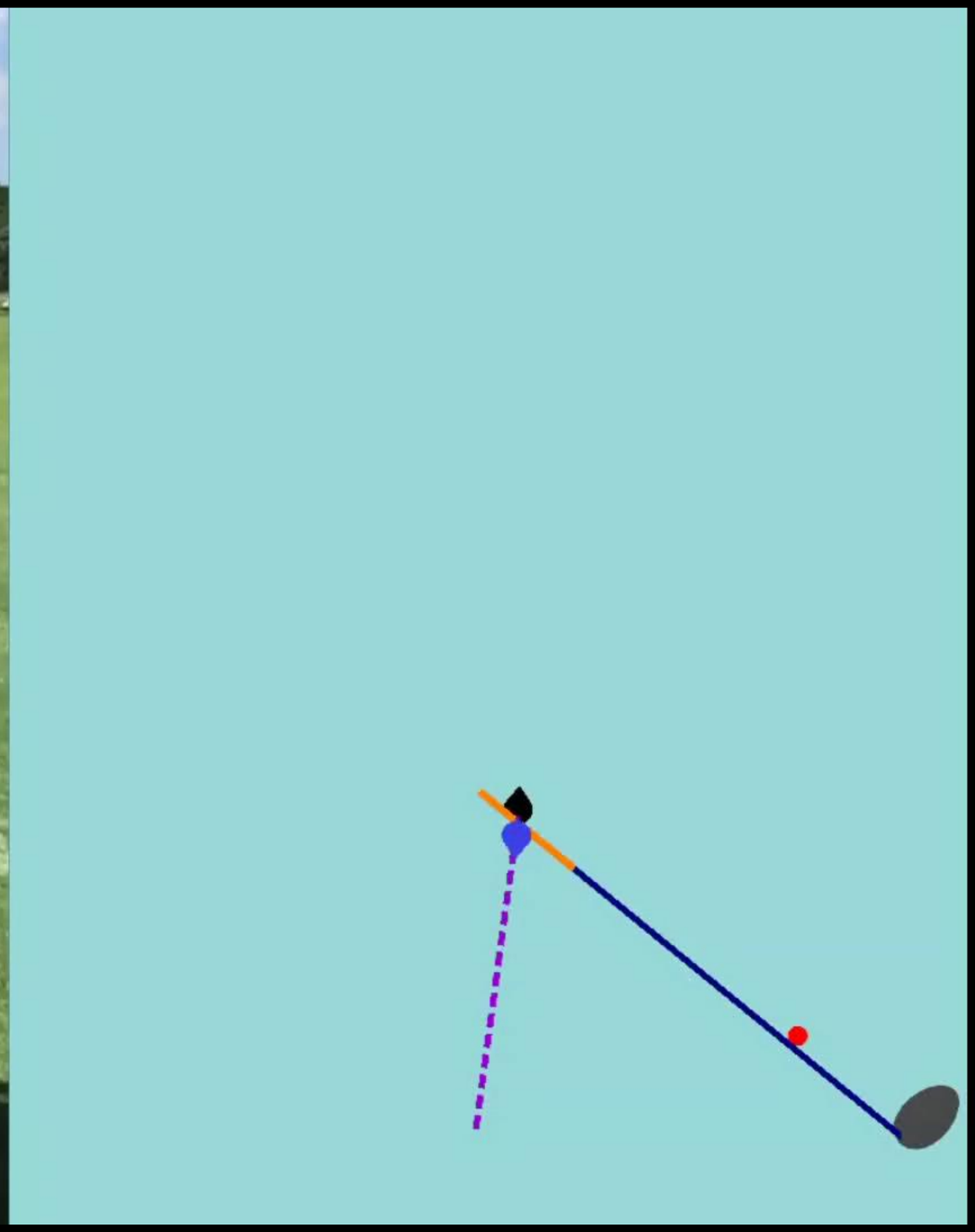
Lead Wrist Angles - 5irgood - Berger Daniel

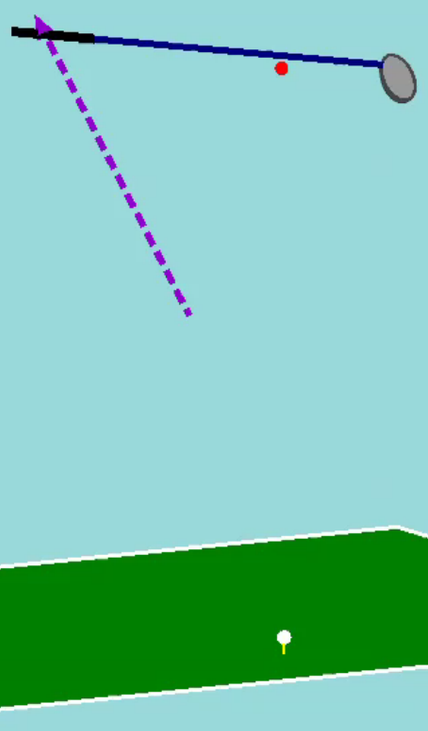


45.5 LdWrstDev -10.6 LdWrstFE -10.3 LdFArmRot 0.096s 24

JUST THE SAME AS IT WAS WITH THE BODY ANALYSIS...THE KINEMATICS TELL US THE "EFFECT", BUT NOT THE "CAUSE"

Kinetics at the Handle of the Club





Golfer Force: 3.2 lbs

Club Speed: 0.5 mph

Time to Impact: 0.258 s

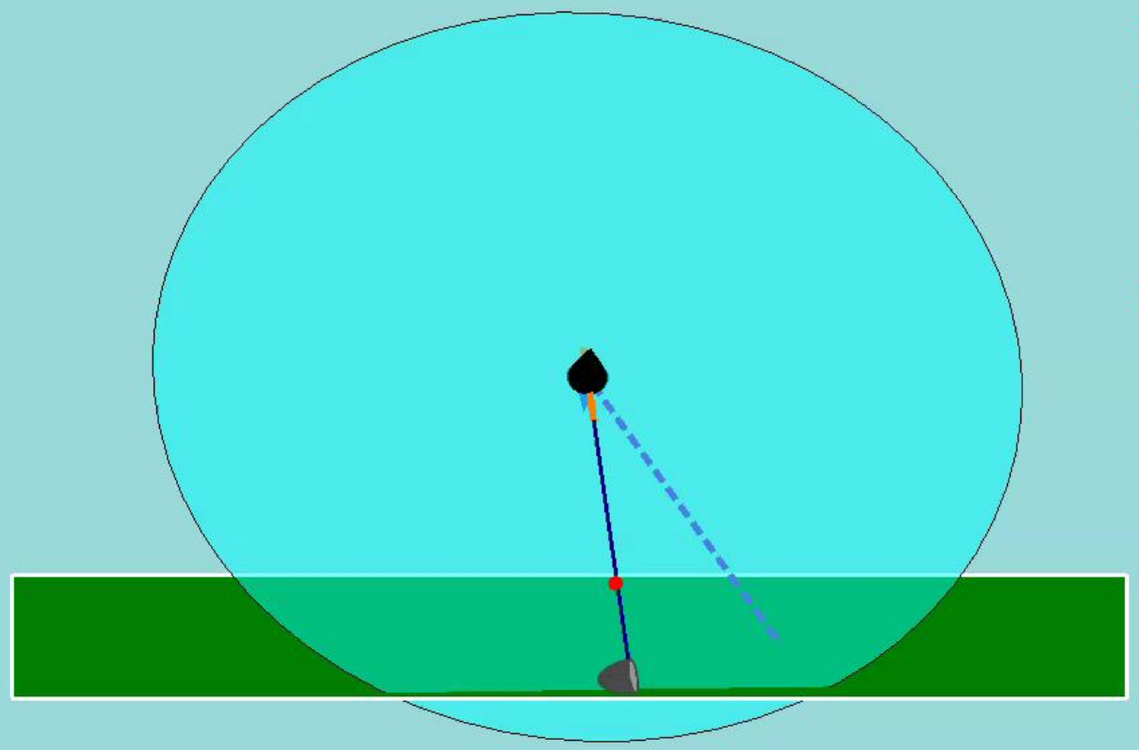
PGA Tour Major Winner

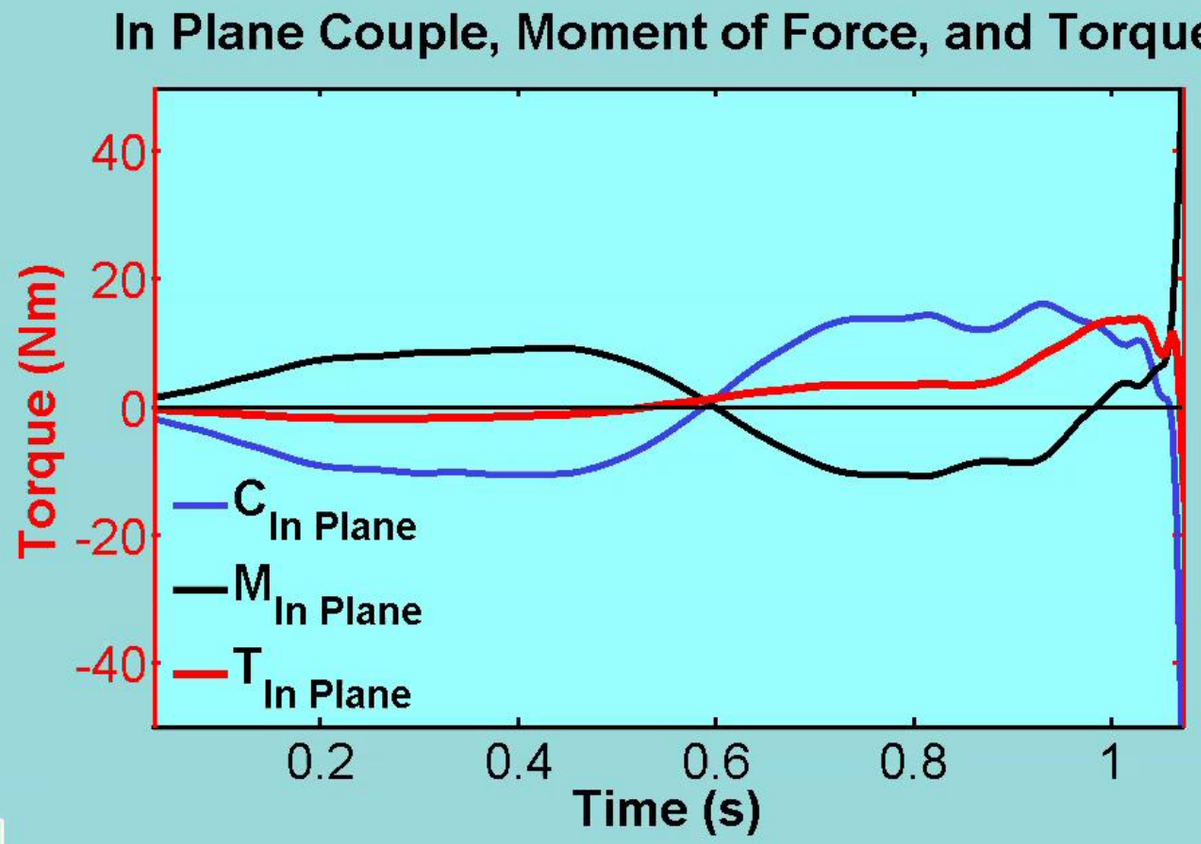
Dr. Sasho MacKenzie

Swing Plane Reference Frame: In, Out, & About

- **IN** the Plane Torques
  - Act to rotate the club IN the plane of the swing
- **OUT** of Plane Torques
  - Act to rotate the club OUT of the plane of the swing
- **ABOUT** the Shaft Torques
  - Act to rotate the club about its own shaft
- Vaughn (1979) was the first to do this


GOLF ACADEMY





$T_{In\ Plane}$: -0.3 Nm

$C_{In\ Plane}$: -1.8 Nm

$M_{In\ Plane}$: 1.5 Nm

F NET: 3.7 N

CHS: 0.5 mph

Time: 1.042 s

TI Driver 4 good In Plane 20151205T125630

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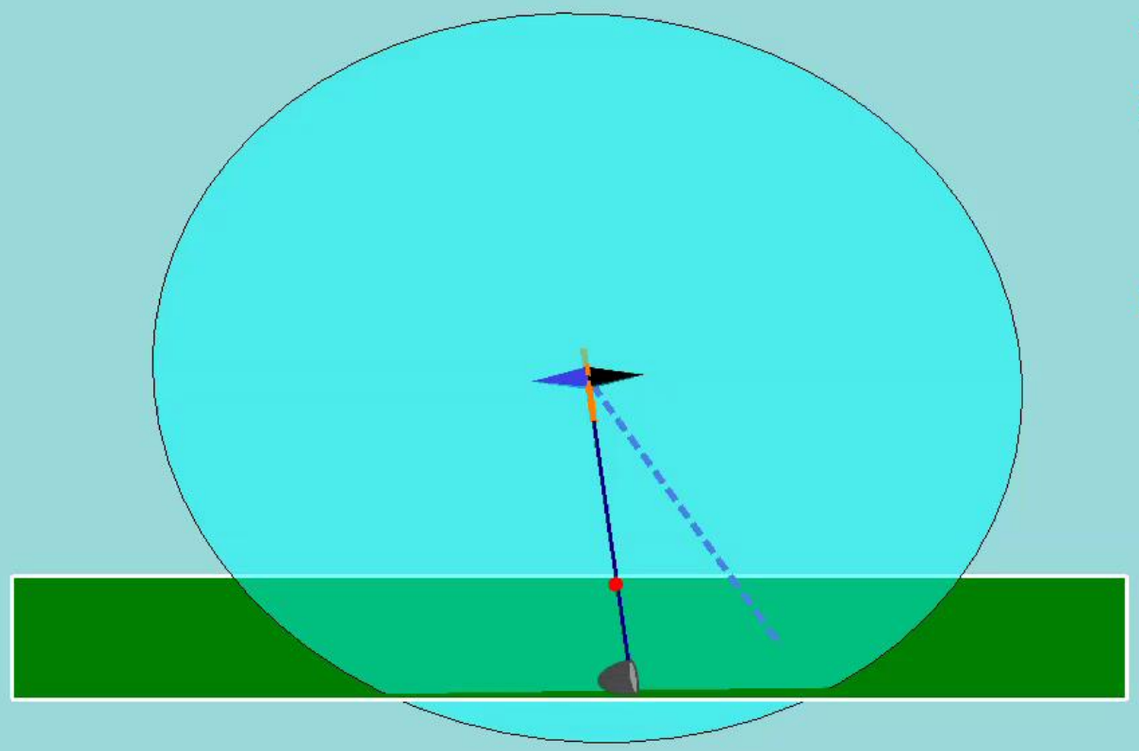

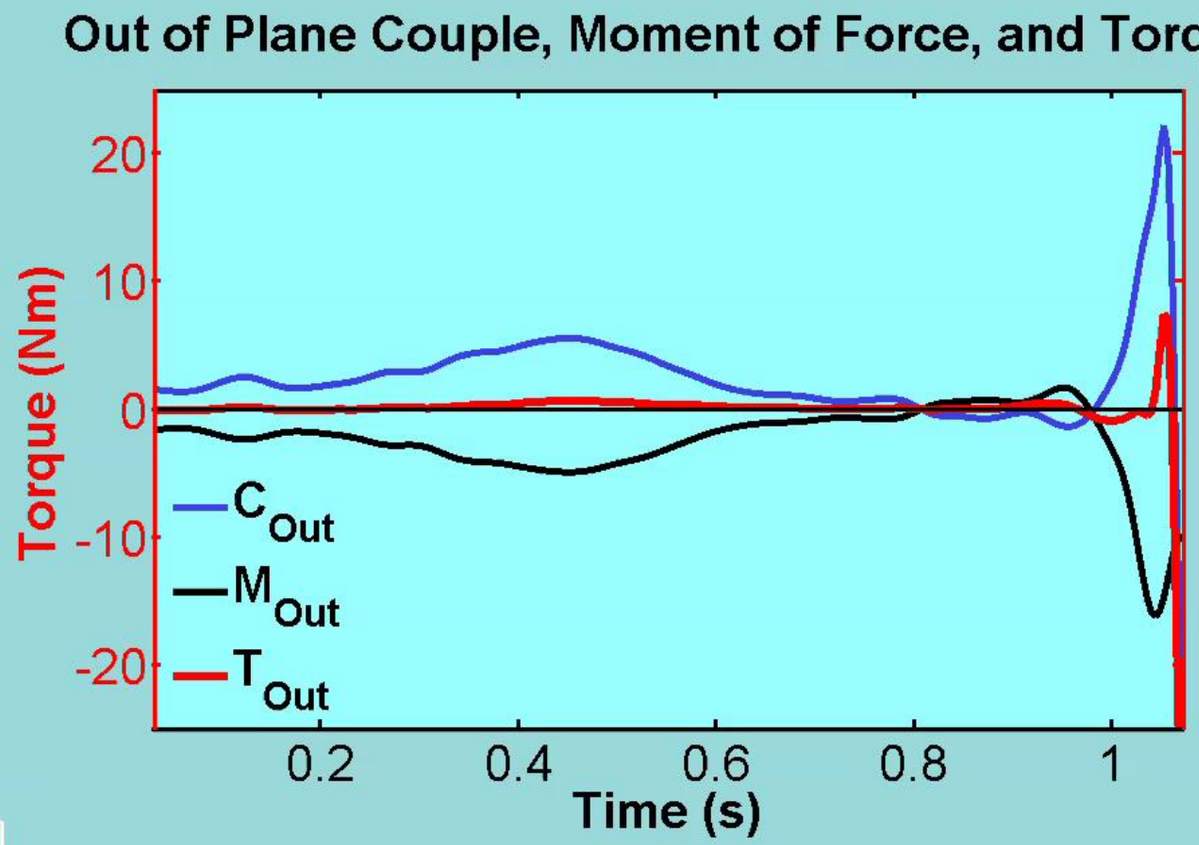

T_{Out}: -0.0 Nm

C_{Out}: 1.6 Nm

M_{Out}: -1.6 Nm

F NET: 3.7 N

CHS: 0.5 mph

Time: 1.042 s

TI Driver 4 good Out of Plane 20151205T132045

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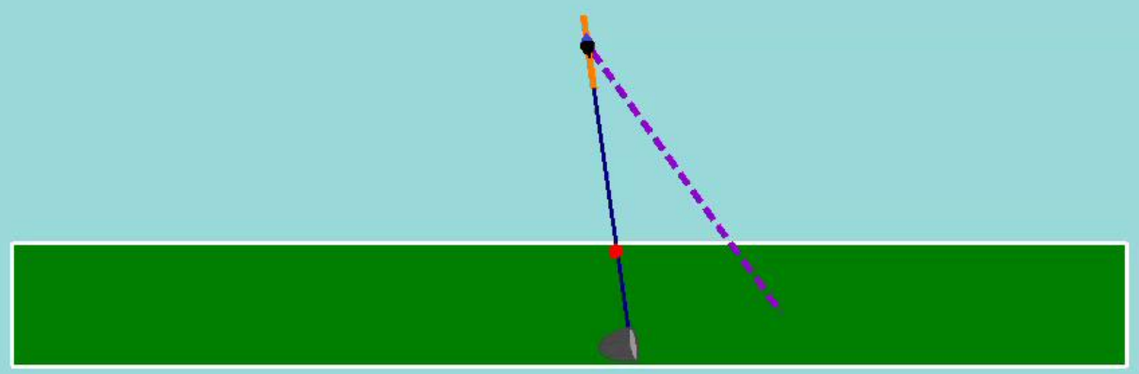
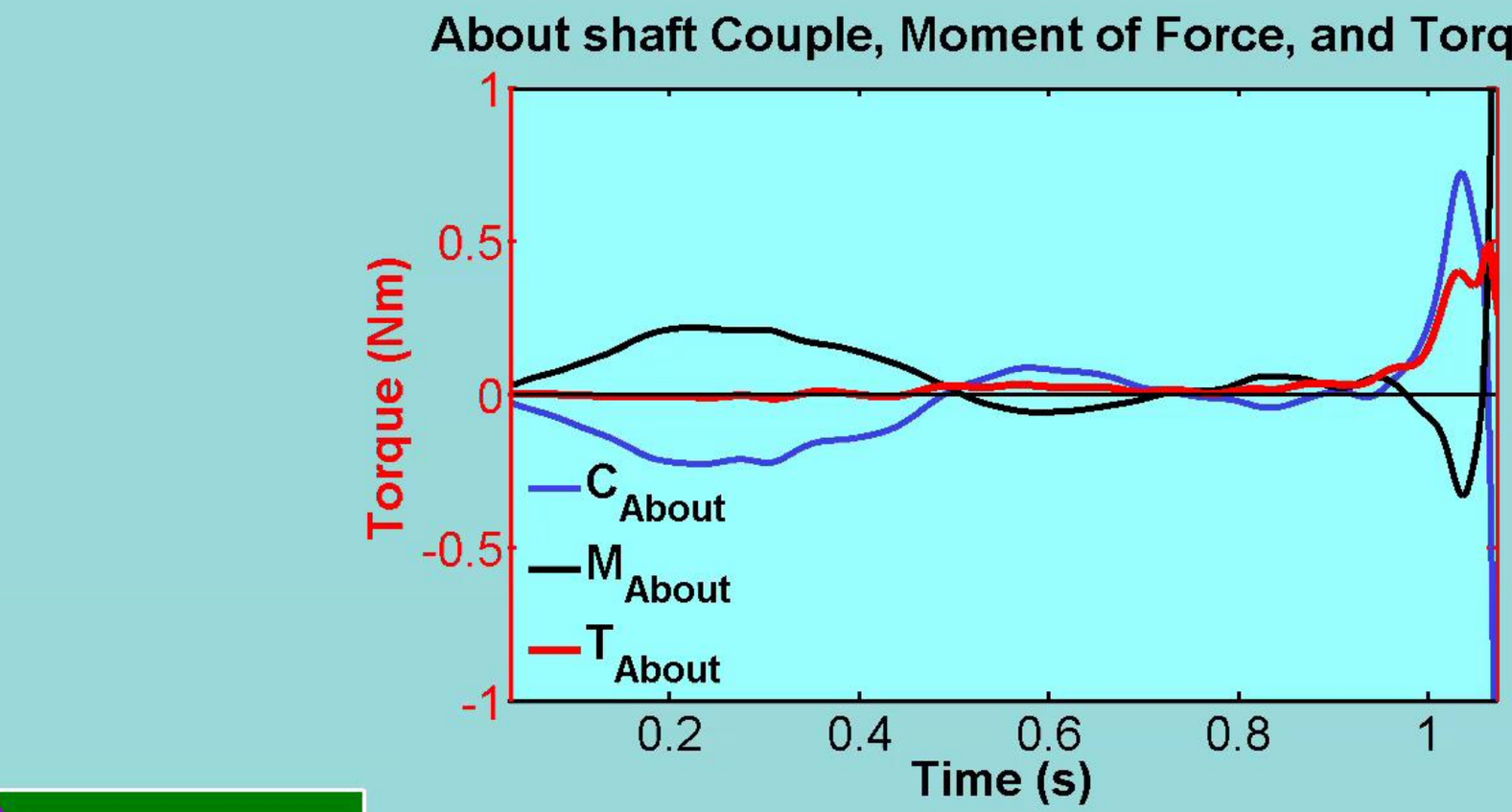




C_{About}: -0.0 Nm

M_{About}: 0.0 Nm

T_{About}: 0.0 Nm

F NET: 3.7 N

CHS: 0.5 mph

Time: 1.042 s

TI Driver 4 good About the Shaft 20151206T105723

Dr. Sasho MacKenzie

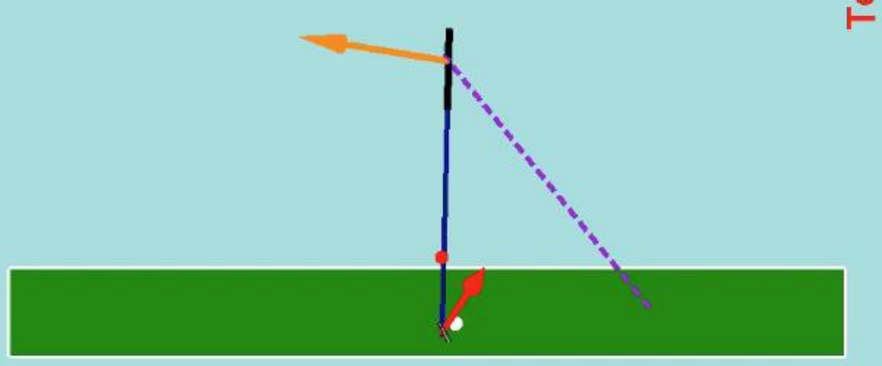
MORE THAN ANYTHING, THIS HIGHLIGHTS THE AMOUNT OF VARIABILITY THERE IS IN THE SWING

WE NEED TO MOVE AWAY FROM ANATOMICAL INSTRUCTION AND TOWARDS ADAPTIVE INSTRUCTION

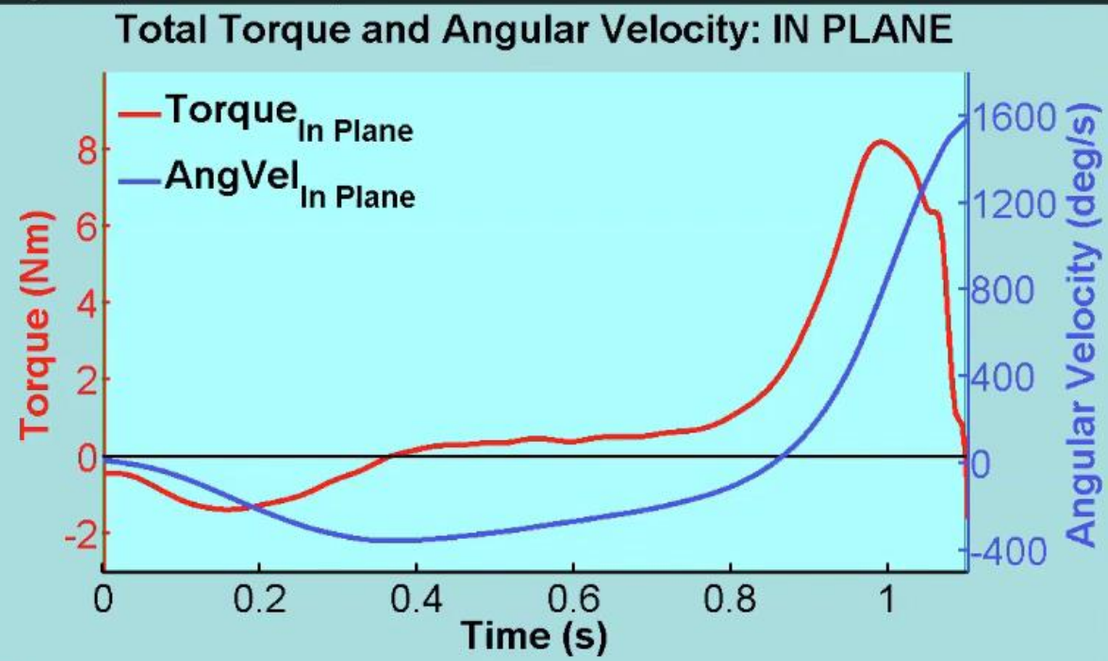
ESTABLISHING THE CORRECT INTENT AND VISUALIZATION ARE KEYS TO IMPROVING THE RELATIONSHIP BETWEEN THE HANDS AND THE HANDLE.

JB nb2 Torque AngVel wGraph 20160325T110505.mp4

00:00 -00:53



JB nb2 Torque AngVel 20160325T110505



$T_{In\ Plane}$: -0.4 Nm

$C_{In\ Plane}$: -3.1 Nm

$M_{In\ Plane}$: 2.7 Nm

AngVel: 17 deg/s

CHS: 0.2 mph

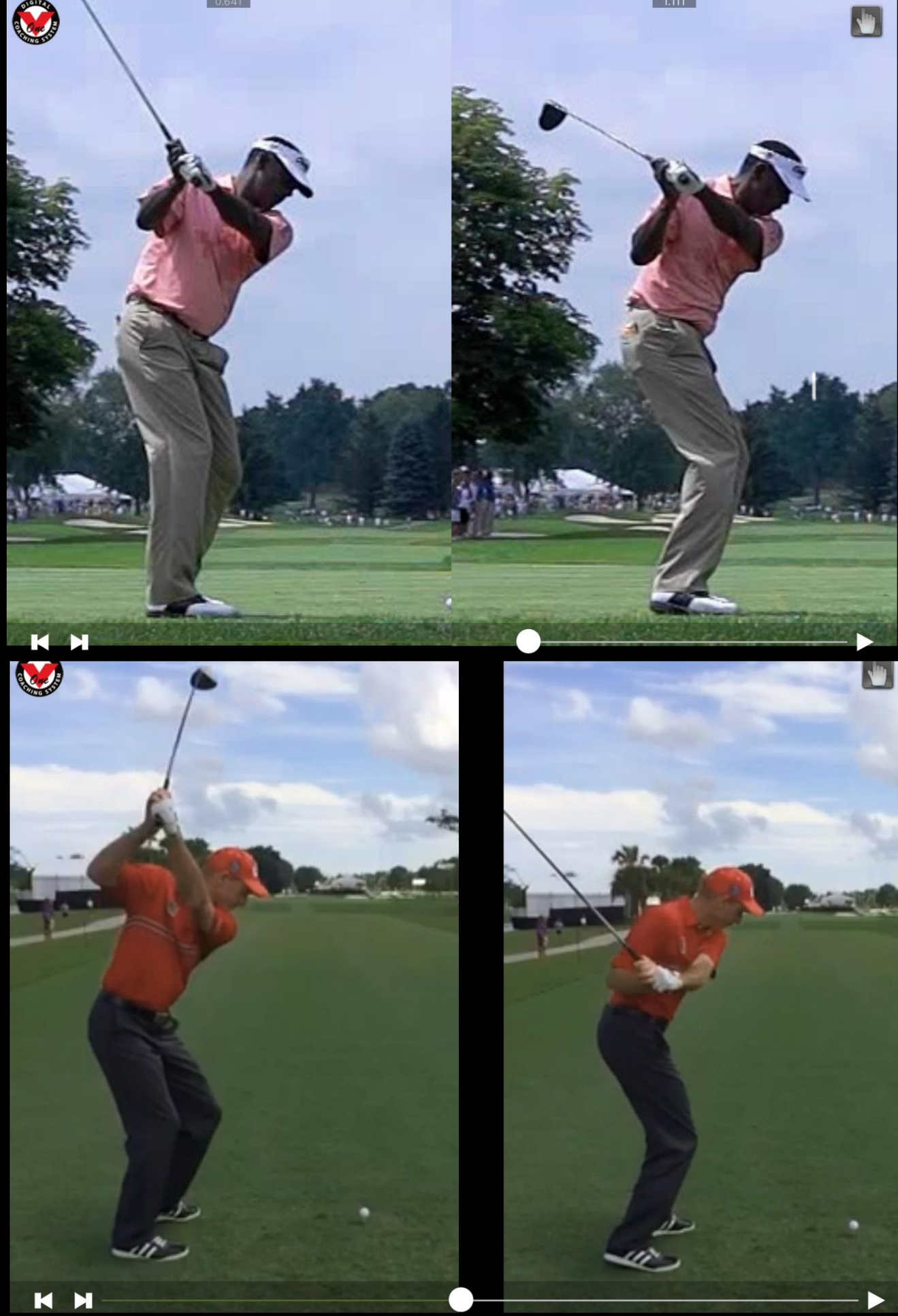
Time: 1.100 s

Dr. Sasho MacKenzie

POSITIVE AND NEGATIVE PASSIVE TORQUES

POISTIVE PASSIVE TORQUE

CREATES AN IMPULSE THAT HELPS SQUARE THE CLUBFACE



NEGATIVE PASSIVE TORQUE

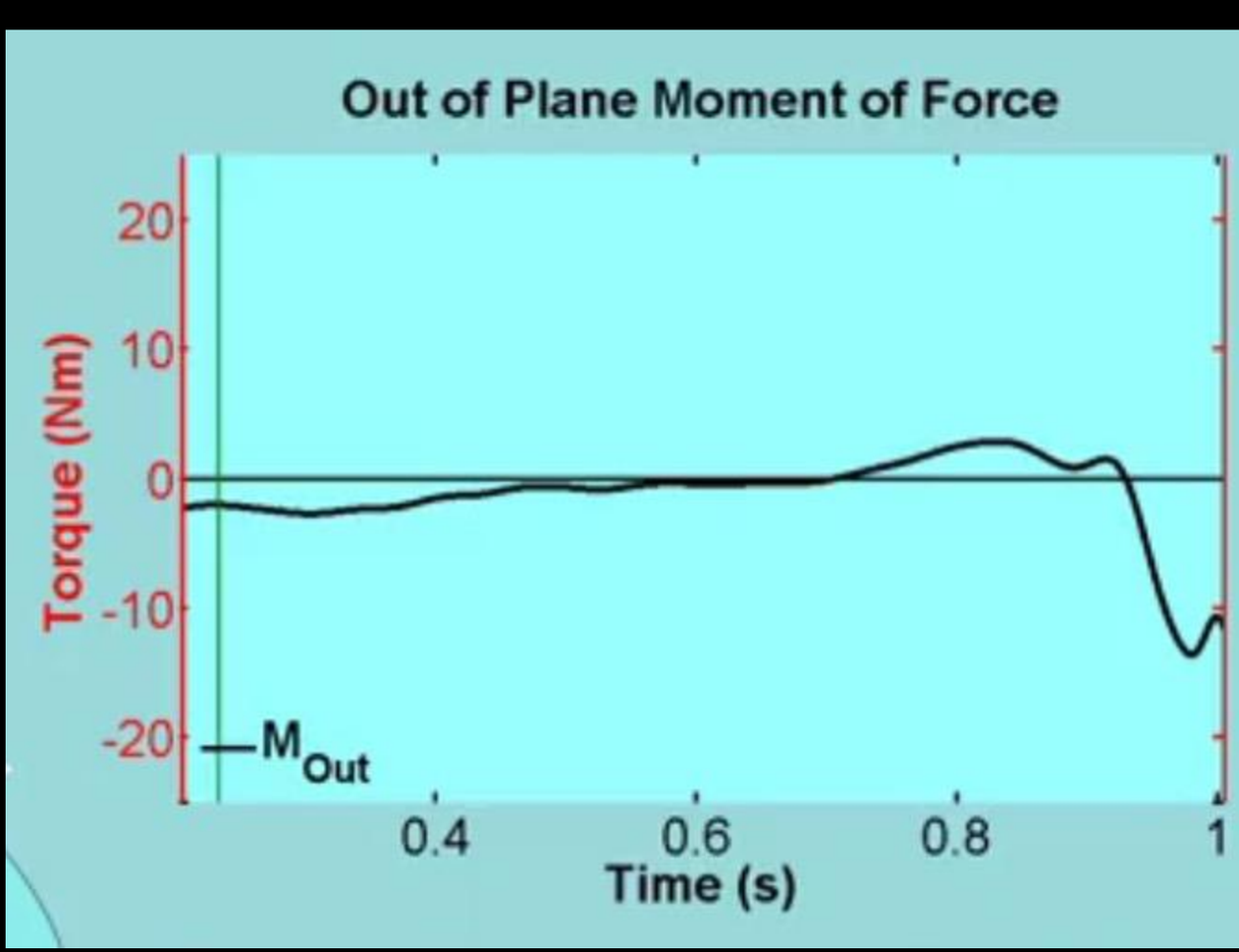
CREATES AN IMPULSE THAT HELPS OPEN THE CLUBFACE

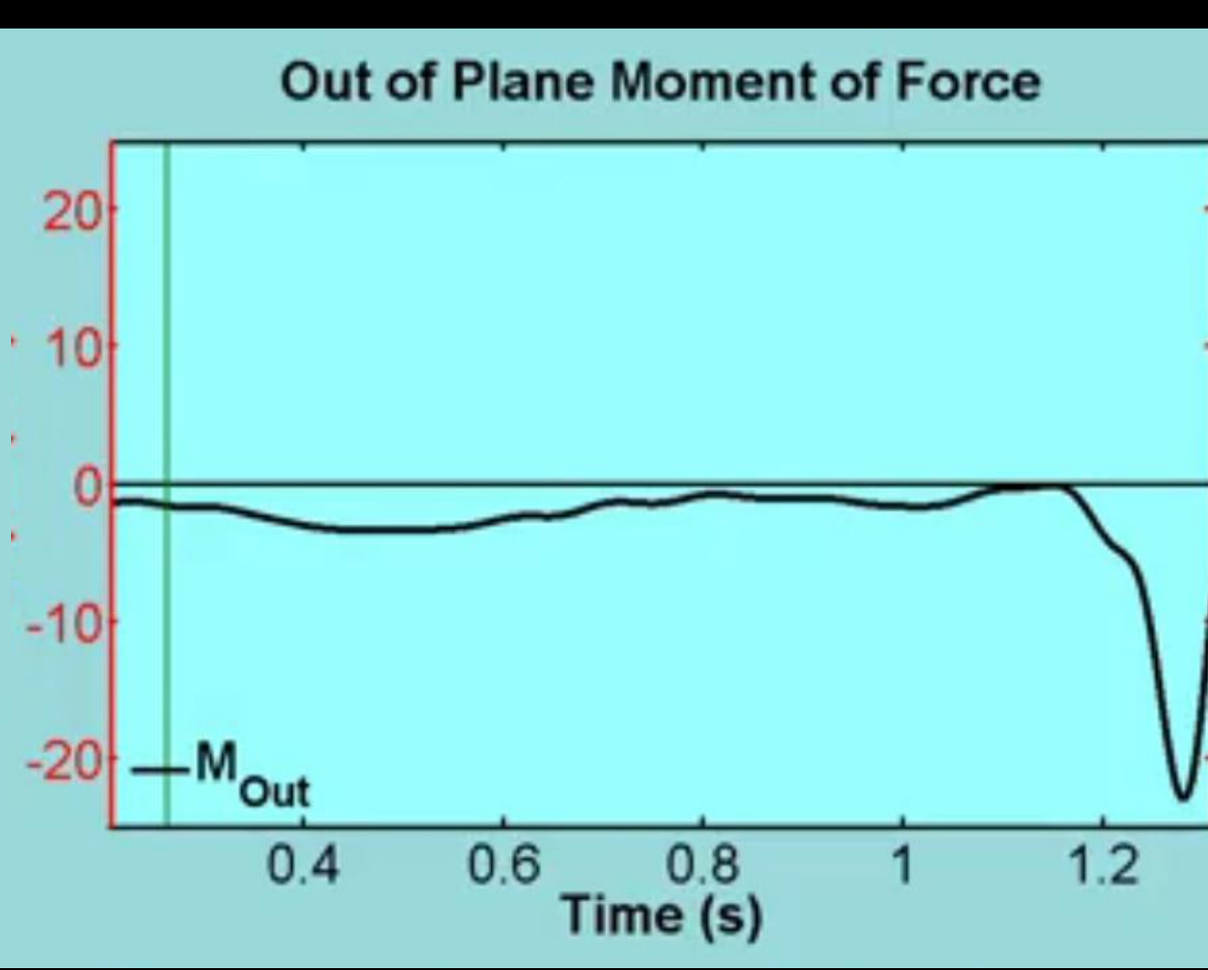
POSITIVE

Helps square

NEGATIVE

Helps open





"THERE'S ABSOLUTELY NO REASON IN MY MIND SCIENTIFICALLY WHY YOU WANT TO MOVE THINGS THE SAME WAY IN THE BACKSWING AND DOWNSWING."

"SERGIO PROBABLY REQUIRES WAY LESS TIMING & TORQUE FROM HIS WRIST MUSCLES, BECAUSE HE'S USING THIS EFFECT (PASSIVE TORQUE) TO A GREATER EXTENT."

"IF YOU HAVE SOMEONE THAT'S PERFECTLY ON PLANE THEY ARE GOING TO NEED A LOT OF MUSCULAR EFFORT TO SQUARE THE CLUB."

- DR. SASHO MACKENZIE

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