

The Mechanics of a Basketball Jump Shot and the Necessary Muscle Recruitment

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This project makes no effort to suggest generalizability. Instead, it was designed to demonstrate competency using lab equipment, capacity to integrate knowledge with application, and understand the scientific method.

INTRODUCTION

- According to Lerner & Lerner, a jump shot is when a player attempts to score a basket by leaping straight into the air, cocking the elbow of the shooting hand, ball in hands above the head and releasing it in a high arc towards the basket
- The jump shot is a critical movement in basketball that allows a player to score points for the team
- This particular shot can be worth 2 or 3 points depending on if the player is shooting from behind the 3-point arc or inside it
- Different players have different release points and techniques to their shot which make them unique from one another
 - The main section of this movement is when the elbows are bent, the ball is around head height and the person jumps from their feet releasing the ball quickly and smoothly
- The jump shot requires muscle recruitment and activation specifically in the quadriceps, gluteus group, hamstrings, core, deltoids, triceps, biceps, and various muscles of the ulna and radius.
- This movement shot type requires many types of muscle groups to allow for control of the body for a straight and powerful jump and quick release of the ball from the arms and wrist to generate arc, spin and power.

KEY POSITIONS

1. Stage 1: Set Phase

- a. Knees, Shoulders, Elbows, Wrists at a 90° angle
- b. Pre-jump phase: According to Lerner & Lerner, flexed knees prepares athlete for quicker and more powerful explosion.
- c. Ball is held at the mid section
 - i. Every athlete holds the ball in a different place
 - ii. This allows the athlete to generate their smooth routine

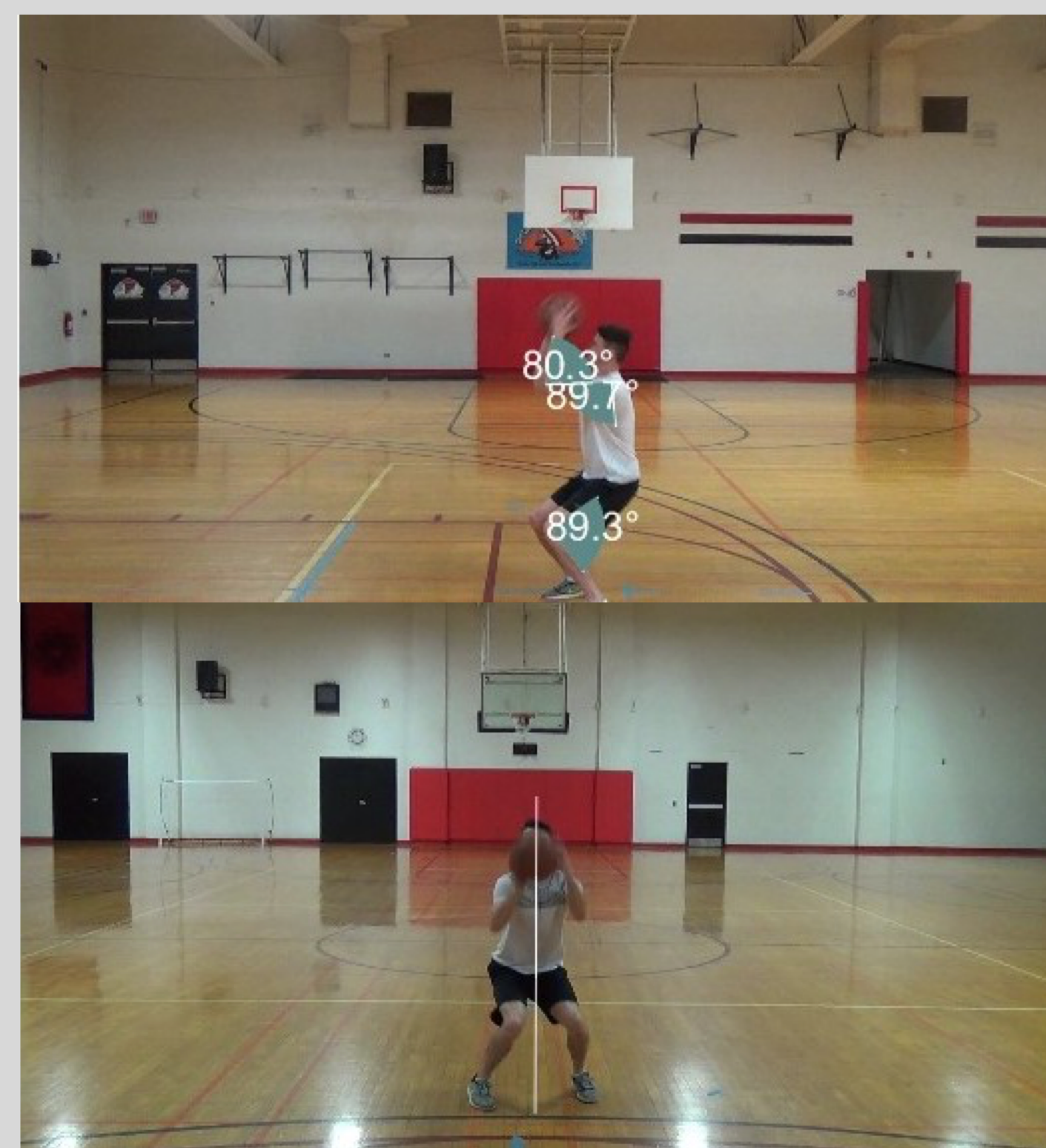
1. Stage 2: Explosive Phase (2 parts)

- a. Generates power inferior to superior
- b. Brings athlete closer to the basket
- c. Legs explosion: Quadricep and gluteus firing
 - i. Legs straighten during the jump up
- d. Cock back
 - i. Ball is brought from hip or midsection to eyelevel or possibly behind the head.

1. Stage 3: Release

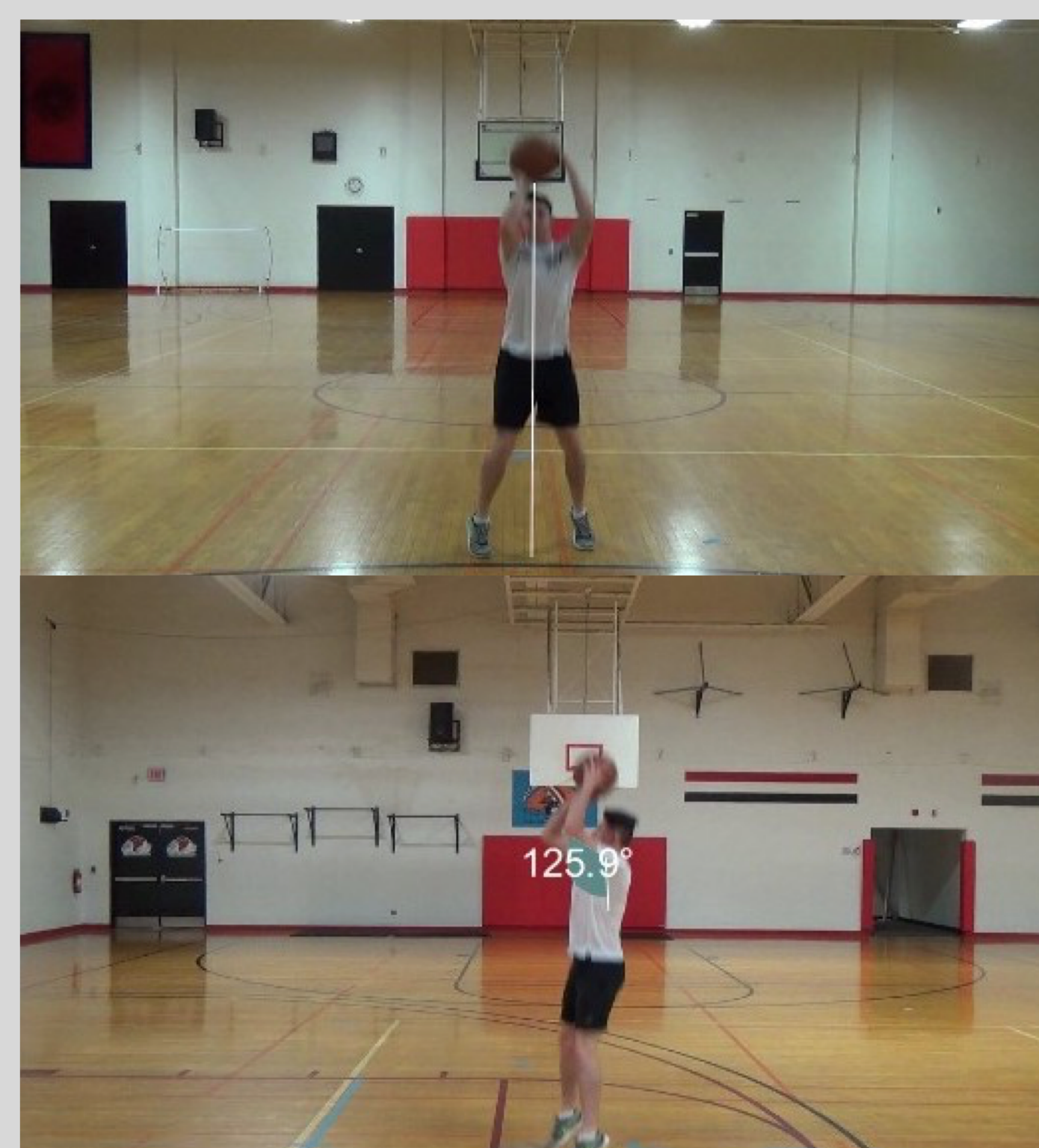
- a. Legs and back are nearly parallel
- b. Wrist flicks 180° at release of ball
- c. According to Podmenik et. all, ball velocity must be increased with distance, therefore joint angular velocity must increase.

VIDEO CLIP ANALYSIS



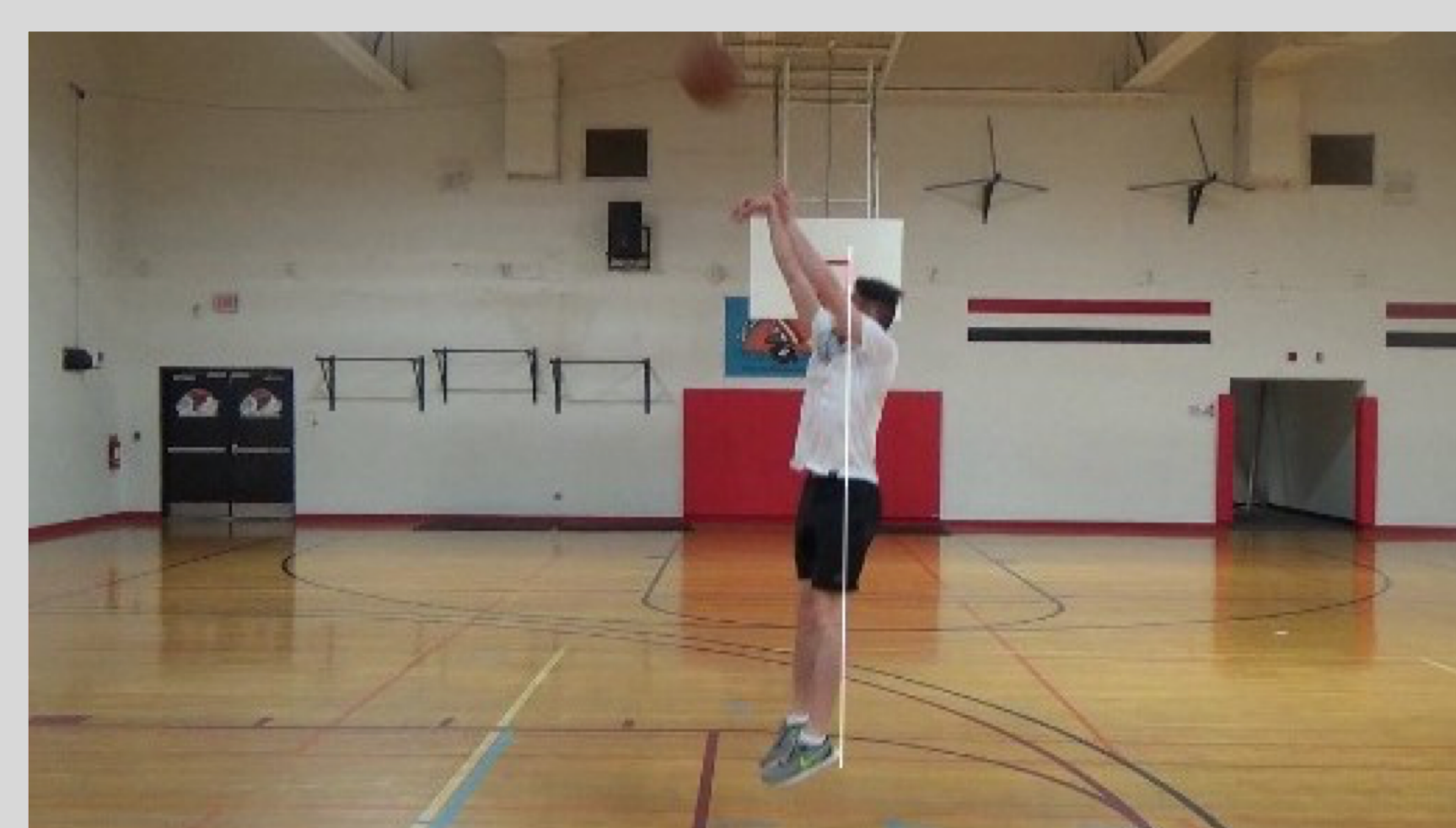
Stage 1

- Lateral and angular view (top). Anterior angle (bottom)
- Athlete shows nearly 90° angles at patellofemoral, brachioradialis joints, and between arm and torso.
- Athlete is prepared to explode from the “athletic position”
- Hips have slight medial rotation based off athletes strong foot



Stage 2

- Anterior view of jump and cock back (top). Lateral angular view (bottom).
- Legs and back are nearly parallel.
- Shoulders raised above 90 degrees, each athlete holds the ball at a different spot around or above their head.
- Wrist stays at 90 degrees through explosive phase



Stage 3

- Lateral view of follow through
- This athlete has a slight kick out of his legs, but legs and back are nearly straight
- Wrist is flicked out

CONCLUSION

- The jump shot is one of the most critical movements in basketball as it allows a player to score from various ranges on the court (Lerner & Lerner, 2007)
- The closer the person is to the basket the higher the percentage they have of making the shot
- The jump shot is a particular movement that requires tons of repetition and muscle memory in order to contribute to consistent success of shooting the basketball.
- Although a player's technique can vary, it is essential that he/she has bent elbows and wrists, the ball is around head height, and the release is quick through a powerful jump and high joint angular velocity (Podmenik, 2017)
- Controlling one's breathing rate can also play a major factor in bodily control to enhance shooting percentage (Okazaki et al., 2015)

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