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KIN 856 Assignment 2

Newton's Laws in Relation to Squats

I am analyzing how Newton's laws of motion relate to kicking a soccer ball. To kick a soccer ball, the kicking leg is bent at the hinge joint of the knee, causing a flexion of the muscles above and below the knee. To kick the ball, the knee and the hip joints extend through the sagittal axis as the hinge joint of the ankle is in a plantar flexion to connect with and send the ball. Depending on the amount of force used, the ball and socket joint of the hip may hyperextend as it follows through the kick.

Law	Description of Skill	How is This Law Associated?
Law of Inertia	<p>An object at rest/in motion will remain at rest/in unless acted upon by some force.</p> <p>If the ball is not moving already (from a pass or another kick), gravity will hold it stationary in place until it is kicked, picked up, etc.</p> <p>If the ball is already in motion, it will change direction according to force and direction applied in the kick.</p>	<p>When kicked, a soccer ball will not stop until it is kicked again, or blocked, headed, picked up, stopped by friction etc. The distance the ball travels directly relates to how much force is applied from the kick. This could relate to how fast and how far the hip hyperextends against gravity through the sagittal plane to deliver the kick.</p>
Law of Acceleration	<p>The acceleration of an object is directly proportional to the force applied, inversely proportional to the mass of the object, and will travel in the same direction of the force.</p> <p>A heavier ball will require more force to move fast and far than a lighter ball requires; or, a ball that has more air pumped into it will travel faster and farther than a ball that is flat.</p> <p>The mass of the person kicking the ball is directly proportional to the speed the ball will travel, and so is the speed at which the kicker is traveling.</p>	<p>The distance the ball travels is related to the weight of the person kicking the ball/the amount of force the kicker uses. Those with strongly developed gluteus maximus and biceps femoris will have more strength to deliver through the sagittal plane as the knee and hip joints extend and hyper extend to make contact with the ball.</p> <p>Additionally, a person approaching the ball very quickly will transfer the momentum of his or her speed to the ball, which will send the ball farther and faster than someone approaching the ball slowly.</p> <p>Thus, a person with more mass will send the ball further and faster than a</p>

		person who is lighter, and a person who is approaching the ball fast will send the ball further and faster than someone approaching the ball slowly.
Law of Reaction	<p>For every action, there is an equal and opposite reaction.</p> <p>The action is the transfer of force from the kicker to the ball.</p>	<p>However hard the ball is kicked, it will “kick” back just as hard. The noticeable reaction is how far/fast the ball travels. The less noticeable opposite reaction is the how hard the ball kicks back.</p> <p>This opposite reaction is less noticeable because, compared to the soccer ball, the leg of the kicker has more mass, which means more inertia (or resistance to move); that is, the hip joint does not hyper extend backward in the opposite direction of the ball.</p>

References:

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