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Role of Physics is Critical in Gymnastic

 Gymnastic is, undoubtedly, one of the most interesting sports to watch in the Olympics. This support will require an athlete to push the very limits of balance, technique, and strength. Besides, gymnastic, to very extent, hinges upon the laws of physics and a gymnast would require to push the limits of physics as well. The concepts of physics involved in gymnastics are; twisting torque, constant angular momentum, zero angular momentum twist, moment of inertia, and law of gravitation (Sands). Moreover, the physics of gymnastics wholly spins around the mass of gymnast in motion. The essay will discuss the applicability of physics in the sport of gymnastics.

 Not only the twisting is involved in gymnastic but also the flipping, and the direction of the rotation plays a pivotal role in flipping and twisting coupled with the speed of the rotation. In rotational motion, linear velocity changes into angular velocity and conventionally the angular velocity follows the axis of rotation. Right-hand rule delineates the direction of the vector of angular velocity i.e. when someone curls fingers in the direction of motion the direction of erected thumb will be pointed towards the angular velocity vector (Yeadon). In order to understand twisting in gymnastic there is a little bit more physics. First, the torque is involved which is not only a rotational force but also a vector quantity. The angular momentum that a gymnast gain during twisting and flipping depends on the net value of torque generated during the motion (Hodgins and Raibert). If the second condition of equilibrium satisfies during the motion i.e. net torque = 0 then the motion of the gymnast can be expressed with angular momentum principle.

 There is another special case i.e. if a gymnast starts with no rotation at all. In such a case, if there is a change in moment of inertia tensor, will not influence the gymnast’s position. However, this is only a trick that a gymnast uses to get herself to rotate. The key for such a move is to rotate part of the body in one direction and part of the body in opposite direction. Both torques will cancel out each other, and hence no angular momentum.

Works Cited

Hodgins, Jessica, and Marc H. Raibert. “Biped Gymnastics.” *Dynamically Stable Legged Locomotion*, 1988, p. 79.

Sands, William A. “Why Gymnastics.” *Technique*, vol. 19, no. 3, 1999, pp. 1–11.

Yeadon, Fred. “The Physics of Twisting Somersaults.” *Physics World*, vol. 13, no. 9, 2000, p. 33.