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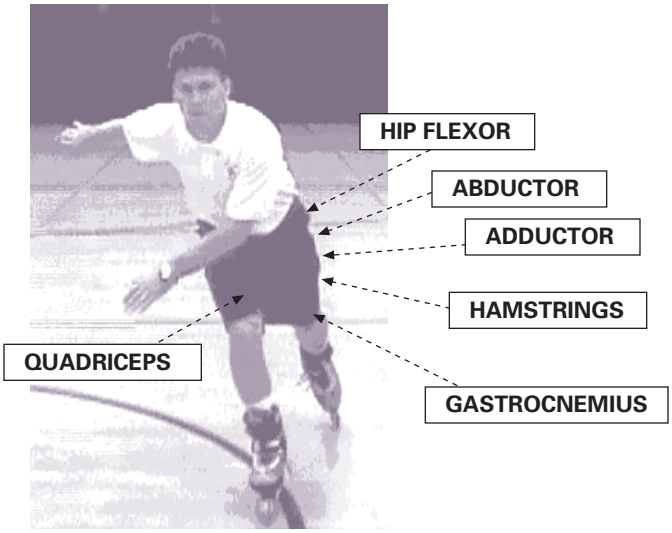
# PHYSIOLOGY OF SKATING

Inline skating requires a balance of agility, power, speed, endurance & coordination. It is very similar to ice skating. Research of ice skating and inline skating shows that there are no significant differences in performance when referring to oxygen uptake, ventilation, or heart rate. The stroke frequency, work per stroke, and power have also been shown to be the same. One of the major differences between ice and inline skating is the amount of friction between the skates and the surface. The wheels create much more friction on land than blades do on ice; for this reason it is believed that 45% of the power created by the inline skater is lost to friction (Publow, 1996).




When it comes to biomechanical characteristics inline skating is a unique activity. Unlike traditional weight bearing sports, inline skating does not have the up and down motion of the center of gravity. Rather, it has a horizontal displacement of the center of gravity that results in locomotion. Inline skating primarily uses the musculature of the lower body for locomotion. Running and cycling uses some of the same muscles, but in a different manner. These activities primarily use those muscles to flex and extend the hip, knee, and ankle joints. Inline skating uses these muscles in this fashion to some extent, but also uses the abductors and adductors of the hip. These muscle groups move the leg away from and towards the midline of the body.

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Both of these muscle groups aid in lateral movement. Very few aerobic exercises offer the lateral musculature training that inline skating does (Publow, 1996). This training and development of the hip muscles does not occur during traditional cardiovascular activities. The thigh and gluteal muscles are also developed due to the lower limb positioning during the glide phase. The bent over stance used during speedskating also strengthens the low back. This bent over stance is similar to a cyclists, but there are no handle bars to support the weight of the trunk. There is also no seat to support the weight of the body, which makes the lower limbs and lower body musculature support the entire body weight. Another important benefit of inline skating is the repetitive glide of the movement. During running there is a great deal of stress that is placed on the lower joints to absorb the pounding of the foot into the pavement. With inline skating the joint stress is reduced. This makes it physically demanding but the athlete recovers from the workout quicker and without constant abuse on the joints. Research has shown that inline skating offers similar cardiovascular benefits when compared to running or cycling. Because of these advantages many people use inline skating as a method of crosstraining (Burke, 1998).

Inline skating be used to train either the aerobic or anaerobic energy system. The energy system used depends upon the type of skating the athlete is performing. Short, quick bursts are supplied mainly by the anaerobic energy system. Long, sustained efforts use the aerobic energy system. Depending on the sport, the athlete can fine tune the workout to primarily use one system or the other. A distance runner or triathlete would want to focus on the aerobic energy system. A football player would want to focus on the anaerobic. Some athletes use inline skating training as a recovery type workout which keeps the stress off of the joints while still improving fitness. Inline skating can be used in a variety of ways to improve sports performance, cardiovascular endurance, and add variety to training. Additional information can be found in the book Precision Heartrate Training For Maximum Fitness and Performance by Edmond Burke (1998).