

TABLE 12.3 Component Developmental Sequences of Running

Leg Action	Arm Action
L1 <i>Minimal flight, flat-footed</i> —The foot toes out and the swing leg curves outward. Knee of the swing leg is bent more than 90 degrees.	A1 <i>High guard to middle guard arms</i> —Arms do not contribute to the running action. They are motionless or shift side to side in response to the running motion.
L2 <i>More flight time, may be flat-footed</i> —Longer stride and recovery knee flexed to at least 90 degrees. Thigh has lateral swing causing recovery foot to cross midline of the body in the rear.	A2 <i>Arms swing bilaterally</i> —Arms swing to counter hip and leg motions. Arms appear to flail across the midline.
L3 <i>Heel or ball foot contact, extension of leg on take-off</i> —Longer stride with heel-toe or ball of toe contact. Support leg fully extends at take-off. Higher heel recovery in swing phase and knee lift in forward swing.	A3 <i>Arms extend and flex in opposition</i> —Arms pump in opposition to legs. As they pump forward they flex, and as they swing back they extend. Arms swing across midline of body and out away from trunk.
	A4 <i>Arms pump in opposition to legs at 90 degree angle</i> —Humerus moves forward and back against leg action.

examples of kinematic and kinetic (describes the motions of bodies and the force production) data on running.

Product Measures of Running

In the 1970s and 1980s a significant amount of research, including some national data collected by the American Alliance for Health, Physical Education, and Recreation (AAHPERD), was conducted on the product measures of running such as run on the product measures of running such as run velocity and run times (AAHPERD, 1976; Branta, Haubenstricker & Seefeldt, 1984; Fountain et al., 1981; Milne, Seefeldt, & Reuschlein, 1976). From a constraints perspective age and gender were found to be important individual constraints. Overall, running speed (average velocities) varied greatly by age, sex, and distance run, with improvements for both boys and girls as a function of age until the teenage years. Branta, Haubenstricker, and Seefeldt (1984) found that running speed increased by about 30% from ages 5 to 10 years. In their longitudinal Motor Performance Study the mean times for a 30-yd dash for boys and girls, respectively, were 6.77 sec and 6.88 sec at age 5,

is important. Once running is more developed, young children should also have experiences in the many forms of running such as sprinting, jogging, and changing direction quickly as required in numerous sports and games. These opportunities will provide children with the “base camp” of locomotor skills from which they can move up the mountain of motor development (see Clark & Metcalfe, 2002) and apply the skill of running to engagement in lifetime sports and physical activity.

CONCEPT 12.1

Process measures of a fundamental motor skill describe the pattern of movement whereas product measures examine the outcome of the movement; although related, each tells something different about the movement of the child.

GALLOPING AND SLIDING

Galloping and sliding are very similar rhythmical skills. They both require a rhythmic step forward along with a leap step to the other foot. The gait pattern of the movement is asymmetrical and uneven. Galloping emerges first and is the first asymmetric locomotor skill learned by children. Galloping has a forward orientation in contrast to sliding, which has a sideways orientation. In order to gallop or slide children need dynamic balance and coordination, and a child’s strength-to-weight ratio can also influence the flight (leap) aspects of the movement. Galloping and sliding do not appear to be very functional skills, but if one looks to dance, galloping and sliding can be seen in many folk and cultural dances around the world. Elementary physical education teachers often use galloping or sliding as an “instant activity” in order to develop leg strength, coordination, and cardiovascular endurance as children enter the gym. Additionally, sliding can be seen in sports like basketball, fielding in baseball or softball, and in preparing to block at the net

in volleyball. There is almost no developmental research on sliding, so the focus of this section will be on galloping.

Proficient Gallopers

Galloping is a combination skill made up of a step and a leap-step with an uneven temporal component. That is, galloping requires an uneven pattern where the step takes longer than the leap-step (Clark & Whittall, 1989). Proficient gallopers can maintain a fluid, rhythmical pattern, keep their hips front facing, and move to music or a tempo. They also have sufficient strength in both legs to project their body weight forward and lead with either leg in front (see Table 12.4).

Initial gallopers struggle with many aspects of the skill and in the very early stages they look as if they are doing a lopsided run. The rhythm of an initial galloper is “choppy” and often the trail (rear) leg crosses in front of the lead leg in the air. Initial gallopers often have a “favorite” leg and cannot gallop with both legs leading. It is often a very “cognitive experience” for them with looks of great concentration on their faces as they try to maintain the pattern of the movement.

Development of Galloping

Table 12.1 and Figure 12.2 illustrate the three-stage developmental sequence of galloping (Sapp, 1980).

TABLE 12.4 Characteristics of a Proficient Galloper

- Proficient gallopers demonstrate the following:
- Smooth, fluid, rhythmical action
 - Lead leg that stays in front
 - Hips front facing
 - Trail leg that lands beside or slightly behind lead leg
 - Feet remain close to surface
 - Knees that are flexed slightly while in flight
 - Ability to lead with both right and left legs in front