

Overhead Equipment Use: The Developmental Benefits and Use Patterns of Overhead Equipment on Playgrounds



A PlayCore sponsored study conducted by Joe L. Frost, EdD, LHD; Pei-San Brown, MA; John A. Sutterby, PhD; James A. Therrell, PhD; and Candra D. Thornton, PhD.

Background

The activity of swinging from one arm to another on overhead equipment is called brachiation. This is one of the few activities that most children encounter first on playgrounds since almost no natural materials in playgrounds provide for brachiation. Most early American outdoor playground apparatus was inspired by the nineteenth century German emphasis on physical fitness and their outdoor gymnastic apparatus, including overhead play apparatus such as hanging rings, chinning bars, and horizontal ladders. Later, overhead track rides and various types of overhead rotating apparatus such as giant strides were added to American playgrounds. Presently, American playground equipment manufacturers offer various modifications of early types of overhead apparatus.

The growing volume of research on benefits of brachiation demonstrates its value for overall health, fitness, and physical development. Specific skills developed include endurance, strength, flexibility, general coordination, eye - hand coordination, visual perception of distance, balanced locomotor patterns, confidence, and ability to use increasingly challenging equipment.

Research Questions

The questions guiding this study included:

- 1) What characteristics of children's brachiation activities are associated with beginning use of overhead equipment?
- 2) What characteristics of children's brachiation activities are associated with their development (stages) leading to mastery on overhead equipment?
- 3) What characteristics of children's brachiation activities are associated with their mastery of overhead equipment?

Methods

Reviews of published research and interviews with experts were conducted. University professors and doctoral students observed 77 preschool and kindergarten children and 41 third- and fifth-grade children on three playgrounds for a total of 1,637 episodes of overhead apparatus use. Videotapes and photographs were taken of observations for later study, and coding instruments were used for analyzing data. The preschool playground contained an overhead ladder; the kindergarten playground contained a slanted overhead ladder and a set of gymnastic rings; the school-age playground contained an overhead ladder, a chain balancing apparatus, rings suspended by eight inch chains, and a track

ride. Take-off decks were padded with resilient rubber material and equipment height was matched to sizes of children.

Findings

Beginning preschool children (3- to 6-year olds) needed assistance but quickly progressed with assistance from teachers and encouragement from peers. Initial efforts included standing on take-off point, holding onto bar, raising feet and not knowing how to proceed. The children grasped the bars with a cupped motion, switched hands as they traveled, moved forward with little leg movement and often fell from the equipment or received dismounting assistance from the teacher. With freely selected practice all children except those overweight or obese successfully traversed the length of the apparatus and many developed more sophisticated skills such as hand over hand, skipping rungs, traversing the support bars and sliding down the support posts. Those children who practiced, regardless of age, progressed faster than others. The height of the apparatus was five feet, loose-fill resilient surfacing and rubber take-off devices (inverted balloon tires) were in place and there were no injuries. Reviews of research literature and interviews with medical personnel uncovered no evidence that normal brachiating activity would result in radial head subluxation, commonly called “nursemaid’s elbow, sometimes caused by adults violently jerking children’s arms.

A much wider variety of brachiating patterns were observed for older children, especially those who had used overhead apparatus in previous grades. The variety of equipment available also contributed to the range of motions and resulting skills. The school-age children’s brachiating behaviors ranged from relatively simple hand-to-hand movement to leaping from the take-off platform to the third or fourth bars and swinging all the way to the opposite platform. Third graders could replicate all of the actions seen by the fifth graders but they did so less frequently. The ring trek posed additional challenges and resulted in very elaborate rhythmic movements. These movements were supported by the short lengths of chain that allowed a wide range of bodily movement, and by the positioning of three rows of rings in parallel fashion that allowed extensive side to side coordinated movement. Many children who frequently used the equipment during chase games and competitive swinging events developed extraordinary skills of movement, coordination, and grace. The linkage of overhead apparatus, allowing organized games of chase and tag to flow from device to device contributed to both function and frequency of use.

In general, children progressed through fundamental beginning stages to practice stages, refining stages, and finally to mastery stages, each marked by ever more complex patterns of movement, greater refinement in skills, and apparent improved strength, flexibility, coordination, and confidence.

Discussion

Preschool and kindergarten children use overhead apparatus for exploration and practice in developing emerging motor skills. The activity, coupled with encouragement and minimal assistance (scaffolding) lead them to develop ever more complex brachiation patterns. These factors alone appear to motivate and provide sufficient pleasure and encouragement for them to continue searching out and mastering new challenges. As

children move through beginning to mastery stages, the physical, social, and cognitive skills developed through using overhead apparatus are complemented by skills learned while using other equipment. Such skills are broadened by engaging in imaginative play, social play, and through integrating acquired abilities into emerging organized games.

School-age children continue to explore equipment and practice skills for pleasure and sense of accomplishment, but they also use equipment to support their growing interest in spontaneous games such as chase and tag. Isolated equipment or closed end equipment that appeals to children during the beginner, fundamental, or practice stages does not hold the same appeal or play support for children in the refining and mastery stages. Children prefer certain equipment linkages for their organized games. Insights from research on children's developmental stages in using overhead equipment, and knowledge about the types of play chosen as children grow through these stages, are essential factors in designing developmentally appropriate overhead apparatus for children.

Children as young as three and four can use traverse overhead equipment, but they fall frequently during early stages. Consequently, their equipment, surfacing, and supervision must receive very special attention. The formula, excessive height + hard surfaces + beginner level of child = potential for injury, is critical in protecting beginners from injury. The results of national playground safety surveys, interviews with experts, and observations during this study, indicate that all three factors are widely disregarded and falls from overhead equipment rank highest among all playground equipment as sites for fractures. The findings of this study are utilized by PlayCore designers in providing developmentally appropriate overhead apparatus for children's playgrounds.

More extensive discussions of this and related studies are available in:

Frost, J. L., Brown, P. S., Sutterby, J. A. and Thornton, C. D. (2004). *The Developmental Benefits of Playgrounds*. Olney, MD: Association for Childhood Education International.

Dr. Joe L. Frost is the Parker Centennial Professor Emeritus at the University of Texas at Austin and is often called the contemporary father of play advocacy. He is an accomplished educator, author and consultant. His current research interests are children's play and play environments, children's safety, and play and child development.