

# The Development of Righting and Equilibrium Reactions

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**G**ravity is a natural force which attracts physical objects to other physical objects. We experience gravity as weight, as the earth's gravity pulls things downward.

Sir Isaac Newton first described gravity. Legend says that Newton was lying under an apple tree when a falling apple hit him on the head. Newton awoke, reached up to his head, considered the damage, got up, and walked away. The apple was still lying motionless on the ground, held there by gravity. How was it that he could counteract the force of gravity and the apple could not?

Everyone, Newton included, has a natural ability to move within the force of gravity. It allows us to use coordinated, voluntary, purposeful movements to live, work, and move around. Two reactions—the *righting reaction* and the *equilibrium reaction*—control the way we move and the way we react to being moved. The reactions determine the way we hold our heads and how we stand, sit, and otherwise position and reposition ourselves.

The reactions are not fully developed in infants. Infants depend on adults to move them from place to place and to supply everything they need. At birth, infants are dominated by gravity. But their strong desire to move soon motivates them to begin practicing the activities that will let them move freely.

## What are righting and equilibrium reactions?

**Righting reactions** are natural movements to keep the body aligned. These are the first to develop. There are two categories of body alignment: alignment of the head in an upright position, and alignment of body parts in respect to each other. These alignments begin at birth and are mature by about 8 months of age.

Righting reactions are involved in many movements. While in the tummylying position, your infant tries to raise the head to look around and

see the world. When being held upright, the infant gradually learns to hold the head up in a stable position without props or supports. When backlying, your infant will turn the head to look at something, and the rest of the body follows. The infant has just rolled for the first time.

Righting reactions are responsible only for alignment, not for maintaining balance. Babies can pull themselves up into a standing position and stay standing with support before they are able to balance without support. And they can sit, if someone puts them in position, before they can get into and out of the sitting position without help.

**Equilibrium reactions** are natural movements that help maintain balance when the body is moving. They develop in an orderly way, from the most stable position—lying down—to less stable positions, such as standing up. Physical laws determine how stable an object is; the bigger the base of support an object has, and the lower its center of gravity is, the more stable the object will be.

As children go from lying to standing, their stability gradually decreases, because their base of support gets smaller and their center of gravity moves upward. As stability decreases, they need more internal control of balance in order to move against gravity. Equilibrium reactions make this control possible. The reactions begin at about 6 months of age, with the baby in the tummylying position, and continue throughout life.

## When do these reactions develop?

### **Righting reactions**

Neck righting—begins at birth. When the head is turned, the body follows in the same direction.

- Optical righting—begins at 2 months. The child uses vision to align the head when the body is tilted.

- Labyrinthine righting—begins at 2 months in tummylying, 6 months in backlying and 8 months laterally. When the body is tilted the head orients itself to a normal position.
- Body righting—begins at 6 months. When the head is turned the shoulders follow, then the hips.

***Equilibrium reactions***

- Tummylying—begins at 6 months
- Backlying—begins at 6 months
- Hands and knees—begins at 8 months
- Sitting—begins at 10 to 12 months
- Standing—begins at 15 months