

# What Can You Learn from the Way Your Child Walks?

Professor Dr. Syed Arif Kamal

Project Director, the NGDS Pilot Project

University of Karachi, Karachi 75270, Pakistan

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URL: <http://ngds.uok.edu.pk> • e-mail: [sakamal@uok.edu.pk](mailto:sakamal@uok.edu.pk)

The articles "How to guard against curvatures of spinal column in children?" (The "News", March 8, 1997) and "Moiré fringe topography for the detection of scoliosis in children", (The "News", August 11, 1997) showed us the importance of good posture.



Sometimes, it becomes difficult to observe and to record natural posture because the child becomes conscious and assumes abnormal posture. However, if one observes and videotapes a child walking or running a number of steps one gets a pattern, which could be analyzed to find out if the child is suffering from any musculoskeletal or neurological disorder. In fact, a crooked gait is a first indication of CNS (Central Nervous System), spinal or lower-limb problems. The diagnostic value of gait can, therefore, never be overlooked.

In military and paramilitary occupations as well as during a job interview gait is the first thing noticed. It is a pity that majority of our children are not trained to walk properly ——— one could observe children walking to school any morning to see just how do they place their feet on the ground while walking. Of course, one of the factors contributing to this may be the heavy weight of the bags carried by these children on one side.

In order to get meaningful information from gait analysis let us first see the mechanism of walking. The bipedal locomotion could be studied from two perspectives: *Hows of motion* (kinesiology, equivalent to kinematics in the study of classical mechanics) and *whys of motion* (biomechanics, equivalent to dynamics as part of classical mechanics). The legs are activated out of phase with one another in each step. However, even standing on two legs is a state of unstable equilibrium like an inverted pendulum. The feet provide a narrow base of support for the body's center of gravity. Each step of gait may be considered as an unstable fall followed by a return to a stable posture. Normal gait of a human being is always in the sagittal plane ——— a plane that divides the body into the left and the right portions. The four phases of a single step may be described as:

## Phase One

Right leg forward, left toe and right heel touching the ground, center-of-gravity lying between the two feet.

**Phase Two**

Right leg forward, right toe and right heel (that is, right foot) and left toe on the ground.

**Phase Three**

Left foot in air (moving forward), body supported by right foot only, center-of-gravity lying on top of right foot.

**Phase Four**

Left leg forward, right toe and left heel touching the ground, center-of-gravity lying between the two feet.

The gait may be observed by asking a child to walk away 20 steps to touch, say, a wall and then come back (next time run to touch the wall and come back). Try to organize this as a game without letting the child feel that you are evaluating gait. The gait should be observed without shoes and stockings and, preferably, with the child wearing only gym shorts. The child could be asked to walk on solid ground and, then, on sandy beach.

For a child possessing normal gait, footprints on sand should be the mirror image from Phase One to Phase Four. To conclude:

- There is a dire need to establish scoliosis awareness and prevention programs for school-going children
- Students and their parents should be educated about faulty posture habits. Parents and teachers should keep a watchful eye on children for possible spinal curvatures.
- School bags should be worn symmetrically on back and not on one side. Unnecessary books should not be carried in the bags.
- Curricula should be integrated to reduce the number of books carried by a child. There should be only one or two books/workbooks per term having sections for different subjects.
- Annual scoliosis screening programs involving visual observation, forward bending, gait analysis and moiré imaging should be established in schools for children 5-10 years old.
- Posture and gait clinics should be held regularly in schools.
- There should be an adequate yearly follow-up of at-risk cases 11 years or older till their growth is complete. There is a need to establish growth standards for our region.
- Children should have adequate nutrition; their bodies should receive plenty of sunshine and fresh air to develop healthy spinal columns.

The study of posture and gait gives us an idea of functioning of a child's motor system. In order to have a balanced personality a child must have emotional stability. The child must be provided opportunities to develop cognitive and motor abilities.

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