I saw *Riverdance* a few years ago in Joburg and marvelled at the dancers’ unbelievable energy and timing, but one sequence in particular astounded me. The dancers sat on the edge of the stage with their legs crossed in one direction; they clapped and uncrossed and crossed their legs, first to the left and then to the right, repeating the whole sequence without one mistake. I was completely bowled over by their split-second timing.

Crossing your legs may seem like a simple enough thing to do, but is in fact a task that toddlers can only get right if they are able to ‘cross the midline’, an imaginary line down the centre of the body that separates the left and right sides. For instance, a right-handed child reaching across her body to the left side to pick up a cup is able to cross the midline. Reading, writing, dancing and sport – all fine and gross motor skills – require you to cross the midline of your body. Not mastering this skill will hinder your child’s development.

**Birth to 1 Year**

‘Newborn babies, up to around 6 months, are unable to cross the midline in any way. Their progress and development is centred on strengthening their muscles and developing their senses,’ writes educational psychologist Melanie Hartgil.

A baby of up to 3 months will not cross the midline by using an arm or a leg – she doesn’t have any control over her body yet. When she has enough eye control at around 3 months or so, she will “follow an object in an arc about 15cm above the face past the midline,” say the authors of *What to Expect the First Year.*

Is your child able to spread peanut butter on a piece of bread? Can she cross her legs? Believe it or not, but these skills are learned when your child starts to crawl.
During the first 6 months of life a baby discovers that she has arms, legs, toes, fingers, a head and a tummy, and by the time she rolls over at around 5 months she will favour rolling onto her back – although only to one side. Rolling develops your baby’s awareness of the right and left sides of her body; it does not help the two sides to work together. This is one of the reasons why crawling is so important for every baby because it “integrates the two sides to work as a team,” says developmental expert and educator Dr Melodie de Jager, who is also a BabyGym and MIND MOVES® specialist.

De Jager emphasises that it is only through physical contact with the environment, which includes parents, siblings and other caregivers, that a baby is forced to develop the power to control the muscles in her body. Babies lift their heads to see what is going on around them, but only if you put them on their tummies. The more time babies spend on their tummies from birth, the more they will want to experience their surroundings – to see, hear, smell, taste or touch as much as they can. Eventually they hold themselves up to do this. When a baby learns to roll over at around 5 months, the world becomes an even bigger place.

Before your baby can roll over she must become aware that there are two sides to her body. All babies can only learn about themselves and ultimately about their environment through touch. This is one reason why occupational therapists advise moms to massage their babies at least once a day. The problem with most babies is that they usually favour rolling onto one side only, which can inhibit learning about the other side, which also has an arm and leg attached!

It is important, however, that your baby discovers rolling over to the other side, as we all need to be aware of and able to use both sides of our bodies. It is these established neural pathways – connections in the brain that have been made over and over again, that allow babies to move from milestone to milestone.

**SITTING PRETTY**

By around 6 months your child has strengthened her neck muscles that she can hold up her head and look at her world. She can sit without support, which leaves her hands free to reach for things in front or to the side of her. A little later, at around 8 months, your baby is able to pass an object from one hand to the other, which is the beginning of crossing the midline with one or both arms.

“Children begin to sit, however, they are able to reach over to pick up objects and may stretch to the opposite side of the
body if that is where the object is located, but the process of crawling is the real starting point of crossing the midline,” says Hartgill.

She goes on to say that at the age of 1 year your child will start holding things in one hand, while manipulating it in the other, which means bringing both hands together and integrating both hemispheres of the brain.

This ‘working together’ is called bilateral integration and means that the two sides of the brain communicate with each other, allowing the two sides of the body to move together. This cannot occur unless the two sides of the brain talk to each. “If the two hemispheres cannot integrate information in this way a child will have learning difficulties throughout her life,” says De Jager.

What is important for parents and caregivers to know is that it’s usually through learning to crawl that a baby first uses an opposing arm and leg in a coordinated way. Your child must become skilled at coordinating both sides of her body to work together before she can make one side of her body do one thing while the other side does another. For example, cutting out a paper shape requires one hand to hold the paper still while the other cuts. Even though your hands are doing different things they still have to work in harmony with each other.

**Crawl for Success**

By 9 or 10 months most babies are crawling, or getting around by some means. De Jager is adamant that crawling is the only thing that really prepares a baby for future growth and learning. “Every baby must crawl before 14 months in order to learn to cross the midline.”

Hartgill adds to the crawling manifesto: “Children must crawl in order to learn to focus their eyes at arm’s length, which is necessary for reading and writing and in order to strengthen the shoulder girdle for fine motor development (the use of the hands and fingers). Crawling also gets both sides of the body working together to integrate the brain hemispheres, which is the start of bilateral integration. Crawling of course pushes a baby to cross the midline.”

Crossing the midline is an obstacle that babies and children must overcome in order to be able to judge distance, speed and depth later in life, says De Jager. “Not being able to cross the midline also means that a child will struggle to learn to read and write.”

Crawling is without a doubt one of the most important milestones for all babies. “This is the crucial stage at which babies use their hands and eyes to cross the midline of their bodies,” says De Jager. “Do not hurry your child through this phase as every baby needs to crawl an average of 50 000 times before she is ready to move onto the next developmental stage.”

In the introduction to her book, Babygym, De Jager writes: “It is in struggling to get up that they develop all the skills and abilities necessary to survive outside the womb.” She is describing what impels babies to push themselves to learn new physical skills.

She adds that “babies who use other methods of getting around do not get practice at crossing the midline. Shuffling on their behinds or using one leg to push against the ground does not encourage them to cross the midline. It is so important that a baby uses opposing limbs and this only happens if they crawl.”

“Crawling starts with head control, followed by trunk rotation and hip flexion,” says De Jager. Sitting, also an important precursor to crawling, strengthens the hands and gives the baby a chance to learn how to balance her body. However, without ‘tummy time’ (literally time spent on her tummy on the floor) a baby doesn’t get the opportunity to struggle to see that wonderful experiences are out of reach.

“As soon as a baby can lie on her tummy and prop herself up, she is getting ready to crawl,” De Jager says. Tummy time also strengthens a baby’s neck muscles, which are necessary for good head control. Only once the baby has sufficient strength in the muscles of her neck can she lift her head and keep it up and start using her legs, arms and torso to get around (rotating her torso and flexing her hips). “Baby starts making movements similar to a frog swimming.”

The asymmetrical tonic neck (ATNR) or ‘fencing’ reflex, which usually disappears by the time your baby is 1 year old, is also related to crossing the midline. With this reflex, the baby’s face is turned to one side, the arm and leg on the side to which the face is turned is extended, and the arm and leg on the opposite side bend. This reflex has to disappear otherwise your baby will find it impossible to crawl, and your child will only learn to work to one side of her
If you want your baby to crawl you need to put her on her tummy on the ground right from the word go.

Crossing the midline is a fine motor skill required for learning throughout a person’s life. Activities that involve using both hands and feet stimulate midline crossing. Clapping or even bringing the hands to the mouth.

By 15 months your child will probably be reaching for anything with which she can roll and arm and back muscles are strong enough to do so on their own. Walking rings don’t promote the use of these muscles, which means that achieving head control and crawling may be delayed (and your child may not crawl at all). In her book, De Jager states that crawling strengthens the joints in the arm and back and helps to develop motor function in the little finger and ear, foot and hand dominance should be fixed with no difficulties crossing the midline. Finally, by the age of 6, not only is dominance established, but also the dominance between the hand, foot and eye (and ear) should correlate – in other words, they should be using their left, or their right, eye, foot and hand pre-dominantly,” Hartgill explains.

“Without crossing the midline a child will find playing sport and dancing very difficult. “It is possible to correct problems with crossing the midline at any age, but it is preferable to correct them as early as possible,” Hartgill goes on to say that at around 2½ years of age, your child may begin to ride a tricycle and also be drawing horizontal lines. When scribbling, holding a crayon in her fist. All of these activities help to build strength in the shoulder girdle that encourages crossing the midline and bilateral integration. It’s only at around 2½ that your child will most likely begin to use one hand more than the other, although you shouldn’t view this as the beginning of choosing a dominant hand - many children use one hand for specific activities and the other hand for other activities. At this time your child may use her left hand repeatedly but begin to write with her right hand.

By the age of 3 your child will most likely be able to stand on one leg for a few seconds and will begin to show a leg preference. Hand dominance becomes more obvious by 4 years of age when your child will mostly cut and draw with the same hand. At this stage she will often cross the midline spontaneously and efficiently. “By 5 years old, most children can ride a bike well and their hand, eye and foot dominance should be fixed with no difficulties crossing the midline. Finally, by the age of 6, not only is dominance established, but also the dominance between the hand, foot and eye (and ear) should correlate – in other words, they should be using their left, or their right, eye, foot and hand pre-dominantly,” Hartgill explains.

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Activities to promote bilateral integration and crossing the midline:

- Painting a fence by using a large brush.
- Spreading peanut butter on her bread.
- Playing clapping games.
- Playing musical instruments.
- Carrying heavy objects with two hands.
- Doing mixing bowl activities.
- Tearing paper.
- Doing jumping jacks.
- Tearing paper.

It is critical to hearing (the brain won’t blend sounds), to reading and writing and to coordination (gross and fine). Without crossing the midline a child will find playing sport and dancing very difficult. “Not crossing the midline, says Hartgill, “leaves a child feeling disorganised and less confident.”

Activities that involve using both hands and feet and therefore stimulate midline crossing. Hartgill goes on to say that at around 2 years of age, your child may begin to ride a tricycle and also be drawing horizontal and vertical lines when scribbling, holding a crayon in her fist. All of these activities help to build strength in the shoulder girdle that encourages crossing the midline and bilateral integration. It’s only at around 2½ that your child will most likely begin to use one hand more than the other, although you shouldn’t view this as the beginning of choosing a dominant hand - many children use one hand for specific activities and the other hand for other activities. At this time your child may use her left hand repeatedly but begin to write with her right hand.

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Resources and recommended reading

Websites: www.developmentaldelay.net (Center of Developmental Pediatric Therapies’ website); www.childrensdisabilities.info

Books: Babygym by Melanie de Jager, Human & Rousseau, Cape Town, 2004

The Out of Sync Child: Recognising and Coping with Sensory Integration Dysfunction by Carol Stock Kranowitz, Berkeley Publishing Group, New York, 1998

The Out of Sync Child Has Fun, Revised Edition: Activities for Kids with Sensory Processing Disorder by Carol Stock Kranowitz, Penguin, New York, 2006