Teaching Motor Skills to Children with Cerebral Palsy and Similar Movement Disorders

A Guide for Parents and Professionals

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If you have read the preceding chapters, you may be wondering how it is possible for children with cerebral palsy or similar movement disorders to master the gross motor skills they need. If their difficulties with muscle tone, abnormal movement patterns, lack of motor control, muscle weakness, abnormal sensory awareness, and slowed development are due to a brain injury or a developmental defect of the central nervous system, what can help them overcome these problems? There are two answers:

1. The brain can, to a certain extent, recover from, or compensate, for injury, and
2. Parents and therapists can teach children the most effective ways to learn and practice motor skills.

**Neural Plasticity**

At birth, an infant’s brain is not fully developed. During the first and second year of life, the brain is still growing, changing, and forming new connections. Therefore, it is possible that other cells may take over the work of the damaged cells. With stimulation and training, this is more likely to happen. This capacity of the brain to adapt to, and supplement for, a deficit is called neural plasticity.

As brain growth subsides, neural plasticity decreases. New research, however, indicates that some capacity for recovery remains throughout a person’s life. Even if an adult suffers an injury to her central nervous system, other nerve cells may take over all or part of the function of the damaged cells. Special training as soon as possible after the injury makes this more likely.
Physical Therapy Treatment and Motor Learning

Another possible way children with cerebral palsy may acquire a basic skill such as crawling or sitting up is by training. How this training is done has evolved over the years. There are several sources of information that guide therapists when they work with children or advise their parents, caretakers, or teachers. One is a rapidly expanding body of knowledge called motor learning. The other sources are concepts and techniques developed by professionals intimately familiar with the characteristics, problems, and potentials of children with cerebral palsy or similar movement disorders.

Motor Learning

Physical education teachers, athletic trainers, and coaches specialize in teaching children and adults a great variety of motor skills we call sports. Children learn to swim, skate, dance, ski, horseback ride, do gymnastics, play tennis, and so on. They are not born with the ability to perform these sports. It is exposure to and training of the skills that lead to their mastery.

How quickly and how well a person learns a new sport depends on many factors. Aptitude, motivation, and opportunities for practice are important. But how well a sport is taught also plays a significant role. Scientists have been investigating how people learn a new motor skill and how to teach them best. As they asked questions, tested, got answers, and arrived at conclusions, they gained new insights and understandings. A whole field of study developed—the science of motor learning.

The knowledge of motor learning pertains to how a healthy person learns a physical skill. Does this knowledge apply to people with a neurological deficit? Does it apply to children with cerebral palsy? Some studies have tried to answer this question (Thorpe & Valvano, 2002). So far, there is no clear answer. Yet, at this time the general consensus is that insights gained in the field of motor learning may also explain how children with cerebral palsy learn basic motor skills (Shumway-Cook & Woollacott, 2001). The following section presents some of the findings.

PRINCIPLES OF MOTOR LEARNING TO KEEP IN MIND

1. **Learning a new motor skill is an active process.**
   It involves finding an efficient, consistent solution to a motor problem. What does this mean? Let’s use an example—your child is able to sit but is unable to get down from sitting. The motor problem she has to solve is how to move from sitting to the floor with ease and control. For a small child, the best way to do this is to turn to the side and place both hands on the floor. With her arms in a good position to guide her movements and soften the impact, she may now lower her trunk and slides down on her belly without getting hurt. The therapist will show you how to help your child perform this movement sequence. As you follow the instructions at home, your child will get acquainted with the movement pattern and her arm muscles may get stronger as she bears weight on them. But true skill learning will only happen if your child also participates with problem solving. When your child wants to move (there
is a toy on the floor she likes to play with), gets only some help from you, and does as much as possible on her own, then she takes part in the problem solving process and skill learning happens.

2. **Motivation is an important part of skill learning.**

   Therefore, before you practice a skill with your child, look for ways to motivate her. For instance, when your child is happily sitting and playing, it is not a good time to practice moving down to the floor. She will not be motivated to do so. Instead, wait until she is done playing and ready to get to the interesting toy you placed on the floor. Only if she wants to be on the floor will she be motivated to learn and try to perform the movement sequence of lowering herself out of sitting. Learning does not take place without motivation.

3. **Active exploration helps skill learning.**

   The more a child is allowed to actively explore and find solutions to motor problems, the more skills she will learn and the better she will learn them. You may believe that helping your child to move perfectly and smoothly from sitting to the floor will enhance good learning. This is not true. Padding the floor with an extra rug and allowing your child to do as much as possible on her own will further motor learning. Her movements may be choppy, and lack grace and fluency as she struggles on her own. Yet, do not worry; she will be learning. Motor skill learning requires many repetitions before you may expect efficiency and smoothness. You have to remember how often you had to bat a baseball or do a golf stroke before you got good at it.

4. **A demonstration may help your child.**

   A sibling may model for your child how to do a movement such as getting down from sitting or you may show her using a doll. If you do, emphasize the outcome of the movement sequence—in our example, it would be sliding onto the belly and reaching the toy. Researchers found that this is the way children learn best. Also, modeling a new skill smoothly and perfectly is not as helpful to a beginning learner as watching someone struggle to perform the skill.

5. **Variability helps skill learning.**

   Initially, your consistent help will make it easier for your child to perform a new movement sequence. As soon as your child improves, however, vary your approach. Try not to always help her in the very same way. Do not always place the toy she wants to get to in the very same spot. The more variable the practice, the better your child will learn the new skill.

6. **Practice a skill until it is well learned.**

   Just because your child successfully moved from sitting to her tummy once does not mean she has mastered the skill. Encourage her to practice until the skill is well learned. Only after a skill is well learned will your child always be able to do it. If it is not well learned, she may lose it again. When your child moves from sitting to the floor with ease and does so on her own during play, this skill is well learned. It is now part of her skill repertoire.
7. **Transfer of learning may occur.**

Transfer of learning means that learning one skill may help your child to learn another skill. When and how much transfer of learning occurs is important to know. Researchers found that the better a skill is learned and the more variably it is practiced, the more likely transfer of learning will happen. Also, the more alike two skills are, the more likely it is for transfer of learning to occur. For instance, if a child learns to move from sitting to the floor well, she may learn to push into sitting from being on the floor fairly quickly thereafter. Moving into sitting and moving out of sitting are two skills that share movement components. Therefore, mastery of one skill will help a child learn the other.

8. **Some skills may have negative transfer effects.**

A two-year-old child may teach herself to move from sitting to the floor by slowly rolling backwards. Doing so will not have a positive transfer effect in regard to moving into sitting. That is, it will not help her learn a related skill. If she tries to sit up using the same motor pattern she used rolling down, she will not succeed. It is only between 68 and 72 months of age that a typically developing child is able to sit up this way (Peabody Developmental Motor Scale, 2000). A child with cerebral palsy will not be able to do it any earlier. On the other hand, going down and sitting up by placing both hands forward and sideways is mastered by typically developing children between 7 to 9 months of age. Consequently, children with cerebral palsy are more likely to become successful when they use this same pattern.

9. **Similar motor skills may need to be learned separately.**

Research indicates that we learn motor skills more specifically than once was assumed. For instance, you may think that sitting on a chair and sitting on the floor are one and the same skill. In both situations the person sits, so it may be assumed that when she learns to sit, she becomes able to sit either on the floor or in a chair. In fact, this may not be true. Sitting on a chair and sitting on a floor may be two separate skills. To master them, both may have to be trained.

Specificity of learning and transfer of learning are interrelated concepts. At this time we do not yet know how they apply to many practical situations. Future research should tell us.

10. **Feedback helps skill learning.**

Through feedback, the child receives information about how she performed a task. Feedback may come in many forms. When your child moves from sitting on the floor to stomach-lying, she perceives how it feels to turn her body slightly to the side, put weight on her arms, bend her arms, and touch the floor with her belly. She will notice if she is able to reach the toy she wants to play with. She will see her parents’ smiling faces and hear their applause as she succeeds. All of this is helpful feedback.

Most parents like to give verbal feedback. They like to encourage and praise their children. Researchers asked the question of how often verbal feedback should be given. They found that steady verbal feedback is not as effective as intermittent feedback. Especially initially, verbal feedback may distract children from the task and may let them pay less attention to the feedback they receive from their senses. So, if you feel the urge to talk to and encourage your child, relax and do it only every once and a while. On the other hand, a loving smile or approving nod should always be helpful.
11. Don’t ask your child to show off a new skill too soon.

Researchers investigated the audience effect. They found that well-learned skills become better in front of an audience but a new skill may deteriorate. This explains why your child may not be able to demonstrate her newest trick to her grandparents or the therapist. After more practice, as the new skill becomes firmer, this should change.

12. The more practice, the better.

The more practice you can provide for your child, the more she learns. This makes sense, and motor learning research has confirmed it.

How much should you practice a skill with your child? Should you practice with her moving from sitting to the floor one time, then give her some free time, and later practice again? Or should you practice lots of time in a row with little rest in between? If you practice crawling with your child, should you take care that she practices only a short distance or should you encourage her to continue crawling as far as she possibly can? Researchers have looked into this. They found that it is all right to practice the same task again and again with little rest in between. They call it massed practice. Even if a person got tired after many repetitions and did not do the task as well as before, researchers found that learning occurred. In fact, at times massed practice brings better learning than practice distributed over a longer period of time.

After a child has initially been reluctant to practice a new skill, it frequently happens that suddenly she really likes to practice. Whenever this happens, let your child practice as much as she wants to—you know she is learning. If, after many repetitions, she gets tired and does not do as well as before—you know she is still learning. You may have to watch her more closely for safety reasons, however. And don’t forget to praise and hug her afterwards. (Not in between, as that would interfere with her learning.)

13. Ask the therapist how often to practice with your child each week.

The optimal amount of time to practice exercises depends on the type of exercise. Stretching exercises have to be done every day. Fortunately, stretching does not take much time. Depending on how many stretches your child needs, a stretching program may be done in less than 5 to 15 minutes. (See Chapter 5 for information on stretching.) Strengthening exercises are effective if done three to four times a week. Skill and balance training does not have to be done on a specific schedule. Yet time on task matters. More practice will bring about more learning. If in doubt about the frequency and length of practice sessions, be sure to ask your child’s physical therapist.

Physical Therapy for Children with Cerebral Palsy

Decades ago, before scientists started studying treatment outcomes, therapists learned from their experience—from their successes and failures—how to help children with cerebral palsy and similar movement disorders. Experienced therapists with a keen sense of observation and insight shared their experience and advanced the treatment. One of these therapists was Bertha Bobath. Fifty years ago, while working in a London hospital, Mrs. Bobath noted the difficulties her patients had as she treated them lying on their backs in their beds—as was customary in this hospital at the time. Compassionate, gifted, and energetic, Mrs. Bobath instead placed the children in different
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positions and supported and assisted them with her large, strong hands. While Mrs. Bobath worked with the children, they were able to hold their head or move their arms in ways they had not been able to before. Delighted, she shared her observations with her husband, Karel, a physician. Together they developed a new way of treating children with cerebral palsy called Neurodevelopmental Treatment (NDT).

The Bobaths devoted the rest of their lives to improving and refining their treatment method and taught it to therapists all over the world. Many therapeutic techniques that therapists use today were first advocated by Bertha Bobath. But some of the NDT principles had to be changed or were replaced as sciences advanced.

It is not the intent of this book to describe the NDT treatment or any other treatment approach. Instead the following tries to summarize treatment components understood as best practice in providing physical therapy treatment of children with cerebral palsy and similar movement disorders.

**BEARING WEIGHT WITH GOOD POSTURE**

Bearing weight—putting weight on your arms or legs—encourages the muscles to work. When you lean on your arms and the weight of your upper body bears down on them, your arm and shoulder muscles work to hold you up. When you stand and the weight of your body bears down, your leg, hip, and back muscles work to hold you up. Therapists use this response to strengthen the muscles of children with hypotonia. Even if a child is too weak to hold herself up, assisted weight bearing is beneficial for her. Her effort to stand or hold herself up with her arms has a strengthening effect.

In children with hypertonicity, weight bearing may bring about an extremely strong response. The children may stiffly straighten their arms or legs. All their muscles respond instead of just the ones needed to hold themselves up. This type of reaction to weight bearing is not helpful. When the arms are stiffly straightened, the child cannot bend her elbows. Yet, bending the arms is necessary—for instance, when the child sits on the floor, props on her arms, and wants to lower herself onto her tummy. Likewise, when the child stands with stiffly straightened legs, she cannot bend her knees or her ankles. Therefore, she cannot sit down or walk.

Therapists discovered that when children with cerebral palsy weight bear with a good posture, they show a more normal muscle response. When bearing weight on their arms, therapists helped the children to place their open hands down and support their shoulders in a good position so they were not pulled up or back. They placed the hand, elbow, and shoulder joints in alignment. Now the arm muscles response became more normal. With training, the children could learn to bend the elbows with control, shift their weight over one arm, and so on.

When the therapists help the children to stand with feet flat on the floor, toes pointing forward or slightly outward, hips and trunk straight or slightly tilted forward, they no longer stiffened their legs. Instead of all their muscles responding at once, they began to use mostly the muscles needed to hold themselves up. With consistent training they could now bend their knees a little and straighten them again, shift most of their weight onto one leg, and so on.

Weight bearing with good posture can be done in many different positions—on hands and knees, propped on elbows, and in side leaning, side sitting, squatting, kneeling, half-kneeling, half standing, and more. It is an important tool. It improves
strength and coordination. Depending on the position, it also stretches specific muscles. Therapists teach bearing weight with a good posture to parents and professionals working with the children. The illustrated weight bearing activities in this book should make the task easier.

**CONTROLLED WEIGHT SHIFT**

The ability of shifting weight means that you move your body weight from one part of your body to another. Trying to tap dance is an easy way to experience weight shift. You stand, move your body weight over one foot, and than tap with the other foot. As you take turns tapping with the right and then the left foot, you will notice how you shift your weight before each tap. Watch someone else tap dance and you can easily observe her shift her weight. Frequently you shift your weight without noticing it. You may be surprised to learn that all movements entail some weight shifts. The weight shifts are often very small and subtle. You only shift as much as needed. This way you remain stable and balanced as you move. The more fine-tuned your weight shifts are, the more fluent and coordinated your movements are.

Uncontrolled weight shifts produce jerky movements. A person who cannot control her weight shifts in standing will lose her balance and fall.

Children first learn to shift their weight when lying on the floor. The skill that most obviously involves weight shifts is rolling. Once children are able to roll over on their own they frequently enjoy the activity. They may teach themselves to roll and roll—thereby traveling on the floor wherever they want to go.

When the children sit up they slowly learn to control weight shifts and balance in sitting. In the beginning your child will sit very quietly on the floor. You want to reinforce this. As she quietly plays, she learns to control small weight shifts. Small and slow weight shifts are easiest to control. After they are mastered she may progress to control faster and larger ones. The direction of the weight shifts also makes a difference. Shifting your weight forward is easiest; shifting it to the side is harder; backwards weight shifts and those that involve turning the trunk are hardest to control whether sitting or standing.

Physical therapists train small weight shifts by working with the children on a mobile surface. For instance, when therapists work with the children sitting or lying on a large ball, the slightest movement will bring about some weight shift. The same is true when the children sit or stand on a rocking board. These activities train children to respond to weight shifts in a general way. In addition, children need to learn to initiate a weight shift and control it in specific situations.

In summary, learning to shift her weight with control enables your child to move independently. Many activities in this book prepare your child for weight shifts or help you to train specific weight shifts you want your child to master.

**CLOSED KINETIC CHAIN EXERCISES**

One may think of the parts of a leg—the hip, thigh, lower leg, and foot—as a chain. The parts of this chain are linked and move together. The arm is a similar chain. The shoulder, upper arm, lower arm, hand, and fingers are linked and move as a unit. When the end of the chain furthest away from the body is fixed, it is called a closed kinetic (movement) chain.
When you squat down, your feet are not moving but fixed on the floor. When you lie on your stomach and push yourself up with your arms, your hands press against the floor and do not move. Doing squats, pull-ups, or pushups are examples of closed kinetic chain exercises.

In an open kinetic chain, the end furthest away from the body is free. When kicking a ball, your foot moves freely and so does your hand when you reach for something. Kicking, stepping forward, or reaching are examples of open kinetic chain activities.

When doing an open chain activity, your child has to control the direction of the movements around each joint. For instance when throwing a ball, she has to control the direction of the movements around her shoulder, elbow, and wrist joint, as well as open her fingers at the right time so the ball will fly forward. Pressing the ball between her hands—a closed chain activity—is a far simpler movement. The directions of all joint movements are predetermined and the outcome of the movement hardly varies. Doing a movement sequence—pressing the ball, letting go some, and then pressing again—the child's arm muscles are learning to work together in a predictable way.

Physical therapists often use closed kinetic chain exercises when training basic postures and movements. Abnormal reflexes and involuntary movements are less likely to interfere with a closed kinetic chain exercise. Therefore, training of a controlled, coordinated movement pattern becomes possible.

Closed kinetic chain exercises may train skills that require weight shifts and bearing weight with a good posture. These exercises are especially helpful. They train coordinated muscle work, reinforce a good posture, strengthen the muscles, and often stretch important muscles at the same time. The Sit-Stand-Sit and Squat-Stand-Squat exercises described and illustrated in Chapter 12 are examples of exercises that train good posture and coordinated leg movements as well as stretch and strengthen your child's leg muscles.

The exercise Rocking on Big Arms in Chapter 8 is an example of a closed chain arm exercise that combines bearing weight with good posture and shifting weight with control. This exercise shows you how to help your child to push up and then hold the position while you rock her from side to side providing small weight shifts. This strengthens the arm muscles and encourages coordination. At the same time the exercise stretches the muscles that bend the wrist and fingers.

JOINT STABILIZATION

Closed kinetic chain exercises help children in many ways. But in order for the children to play and to walk, physical therapists have to train open chain movements as well. How can this be done? If your child makes abnormal arm movements and cannot reach for a toy, how can she improve? If her legs cross over each time she tries to step, how can she learn to do it better?

Therapists have found that joint stabilization helps to control movement. Joint stabilization means that the therapist holds the joint close to the body and guides the child’s movements. For instance, the therapist holds and guides the shoulder joint while the child reaches; or the therapist holds and guides the movement around the hip joint while the child takes a step.

Why is this helpful? When closely observing the children's arm movements, the therapists noted that the abnormal pattern of the arm movement began at the shoulder.
The shoulders moved up and back as the children tried to reach. It gave the movement the wrong start. Therapists found that by helping the children to sit in a good position, relax their shoulders, and stabilizing the shoulder of the reaching arm, they can guide the child’s arm to move with a more normal pattern. With consistent training and many repetitions, children slowly learned to reach and touch a toy without assistance.

Joint stabilization during leg movements follows the same principle. The therapist helps the child to stand with a good posture holding onto parallel bars or her walker. The therapist supports the hips, stabilizing the standing leg while guiding the stepping leg. Stepping to the side is practiced similarly. The standing leg is stabilized and the other leg guided to step out to the side.

Skillful and correct joint stabilization is a very helpful tool for therapists. They will use it as needed and fade it out as soon as possible. Regardless of where and how joint stabilization is done, the goal is always for the child to become able to do a useful movement independently without any help.

There are drawbacks to the joint stabilization techniques used by physical therapists. It takes training, skill, and experience to do them. Therefore, they are difficult to teach to parents or other professionals working with the children. If parents master a specific technique helpful with their child they will notice that it is time consuming to implement. It may also be strenuous. For instance, stabilizing your child’s hips and guiding her steps is hard work.

Another problem with the technique is that the children may become used to it and rely on it. Instead of becoming independent, they may become dependent on this help from their therapist or parent. Therefore, how to fade out manual joint stabilization has to be as well planned as when to use it.

**JOINT STABILIZATION BY POSITIONING**

A position may stabilize a joint. In side-lying on the right side, the right shoulder is firmly wedged beneath the body. The left shoulder is stabilized by the effect of gravity. The child’s hands rest close to each other. Therapists use side-lying to encourage fine motor skills in a small child who cannot yet control her shoulder muscles and therefore is unable to play lying on her back or tummy. As the therapist places a rattle into one hand, the child may move it, shake it, hold it with both hands, or pass it from one hand to the other. Thereby the child learns to use her hands and gains hand and finger coordination.

**GENERAL STABILIZATION TECHNIQUES**

These techniques are used to help children with cerebral palsy to “dissociate” or to isolate movements. Dissociating is the term therapists use when describing the ability to move one body part without moving others. If your child moves her head, chest, and arms without moving her hips and legs, she dissociates her upper body from her lower body. If she moves one arm without moving the rest of her body, she is able to dissociate the arm movement.

Your child may be helped to move just one body part by the use of a stabilization technique. The exercise *Kicking with One Leg* in Chapter 12 is an example of how stabilizing helps the child to control the movements of one leg at a time.
Isolating a movement means that the child controls a specific movement such as bending the index finger when she taps a computer key. The therapist may initially stabilize the child’s wrist, hand, and other fingers as she learns this discreet movement. Moving one leg to the side without bending the hip or turning the leg is another example of an isolated movement.

Most general stabilization techniques are not difficult. Therapists may teach them to the child’s parent or teacher. Specific positions, braces, splints, straps, sandbags, weighted vest, and most recently, even suits, may also be used to provide stabilization to help the child better control her movements.

As with joint stabilization, general stabilization techniques are to be used during initial learning. As soon as possible they are phased out. The goal is for the child to become independent of the help by another person.

There are limits to the benefits of stabilization techniques. They are very helpful when your child needs to learn a new movement but not if she needs to gain control of a position. Let’s look at the following situation: You want to teach your child to kick a ball with her right foot. So you support her while she stands on her left foot, ask her to concentrate on her right foot and kick. You make kicking easy and fun and your child succeeds. She learns to swing her leg forward and kick the ball. Now you ask her to kick without you supporting her and she may not be able to do it. The reason is that without your support she cannot stand long enough on her left leg to kick with her right one. Your child learned the movement (kicking) but not the postural control (briefly standing on one leg) to use the movement functionally.

For your child to progress further you had to use exercises or activities, which train postural control and balance. For instance the exercises in Chapter 14 under the heading Extra Standing Time for the Weaker Leg would be beneficial. Another possibility would be that you teach your child a self-stabilization technique, which enables her to kick without your help.

**SELF-STABILIZATION**

Self-stabilization means that children learn to stabilize a joint or their posture by their own action. There are many ways children can stabilize themselves. In the situation mentioned before your child may be encouraged to lean against a wall with her left side when she kicks with her right foot. Or she could hold onto something stable like a doormat or a banister, brace herself with one hand against a wall, or just touch the wall with one finger to stabilize herself. With no need to support her—she does it herself— you are free to become her partner in the kicking game. With practice your child may slowly become able to support herself less and eventually succeed to kick the ball without holding on.

Usually physical therapists teach self-stabilizing techniques as part of functional skill training. The therapist may ask your child to brace herself with one hand on the bench or on her upper leg as she leans forward to pull up her sock with the other hand. When using the toilet, she may be taught to hold onto a wall bar with one hand while pulling her pants up or down.

When she learns to color or write, the therapist may teach her to hold onto a rod or grab bar with one hand. The bar will be firmly suctioned to her table or desk in such a way that by holding on, her shoulder is pulled slightly forward. This will help her to
keep her shoulders in a good position, stabilize her upper body, and make it easier to control the movements of her working hand.

There are many situations in which children may learn to stabilize themselves. It is a useful technique, which is easily adapted to the home or school environment. Therapists may combine joint stabilization they provide with teaching of self-stabilization. This way, as the child’s movements improve, the therapist may withdraw her support readily and encourage the child to rely on stabilizing herself.

TEACHING FUNCTIONAL SKILLS

How much time should physical therapists spend preparing children for functional skills as opposed to training functional skills directly? For example, should the therapist work on improving a child’s sitting balance using a variety of types of therapy equipment? As the child’s sitting balance improves, she becomes able to shift her weight with control. This should help her to play or do work while sitting or to move in and out of sitting.

Or should the therapist work with the child as soon as possible on functional skills? In this case, the therapist would spend less time on sitting balance exercises. Instead she would work on functional activities such as doing a specific dressing task while the child sits, or ask the child to move in and out of sitting. The reasoning would be that as the child masters these skills, she would improve her balance and ability to shift her weight with control at the same time.

Which approach will bring better and faster results? There is an ongoing debate and study of this question (Ketelaar, 2001, Ahl Ekstrom, 2005). So far, however, there are no definite answers.

For parents of children with cerebral palsy and similar movement disorders, functional progress is important. You are glad when your child does well with an activity during her therapy session. Yet, when your child becomes able to move in or out of her car seat, you are really happy about it. Your child learned something useful that will make your life easier.

Physical therapy is not just about teaching your child to walk. It is the therapist’s goal for your child to become independent with all daily motor tasks. Feel free to ask your therapist to help you with all movement problems your child encounters.

The “Road to Independence” for Children with Cerebral Palsy

“With so much to learn, how will my child ever become independent?” you wonder. Yes, there is much to learn for a child with cerebral palsy or similar movement disorders. But instead of worrying about tomorrow it is best to look at today. Take one day at a time, appreciate small progress, and enjoy major achievements as they are mastered.

The “Road to Independence” lists major achievements you want to look for. Each one will help your child to do more on her own and is a building block for the skills still to be mastered. The initial skills are listed sequentially in the order children usually master them. The first of these may be skipped by children who are able to play with their hands when they lie on their backs or in their infant seats.
Two of the initial skills are listed in bold letters. They are especially important building blocks. Many later skills depend on them. *Holds head and looks around propped on forearms in stomach-lying* is important because it shows that a child has basic head control, has gained some shoulder strength and coordination, and likes to be on her tummy. Your child may master this skill with ease. If not, you want to provide as much help as needed. Your special attention and training will make a difference. Chapter 6 and 8 address this in more detail.

“*Bunny*” – from stomach-lying: *child pulls both legs up and props on both arms* is another early skill printed with bold letters. Moving into the “bunny” position is the easiest way children with cerebral palsy and similar movement disorders can lift their body off the surface. The sooner your child learns this, the better. As she becomes independent with this skill and does it many times during the day, the strength and coordination of her trunk, shoulder, and arm muscles will improve. At the same time, she will be challenged to shift her weight and keep her balance in ways not possible if she just played lying on the floor.

The intermediate skills are clustered. The order they are mastered may vary from child to child. *Sits and stands holding onto a bar* is listed in the beginning to assure that it is trained early. Chapter 12 explains the reasoning for this. The sitting and kneeling skills are listed side by side. It is good to work on them concurrently. Children with hypotonia may show steady progress with floor sitting. Children with hypertonia often have difficulty there. (See Chapter 10 for details.) They may show better progress with kneeling. Training sitting and variations of kneeling concurrently will assure that the children progress to the best of their ability. Training kneeling after a child is able to sit could delay her progress.

Training of pulling to stand, cruising along furniture, and assisted stair walking are listed with walking with an assistive device. Again, these skills are best trained concurrently. They improve your child’s leg muscle strength and coordination. (See Chapter 12 for details.)

The advanced skills start with *Stands without Support*, which is printed in bold letters. Gaining independent standing balance is the key to all advanced skills. After your child learns to stand without holding on, training of walking without arm support becomes a possibility.

The “Road to Independence” is meant to be a general guideline of how children with cerebral palsy or similar movement disorders master gross motor skills. It does not tell or predict the order in which your child may learn the skills. Your child’s gross motor development will depend on her specific potentials and problems.
“Road to Independence” Skills Guideline

Initial Skills:
- Brings hands together and plays in side-lying. (photo 4.1)
- Holds head in the middle, brings hands together, and plays in an infant seat. (photo 4.2)
- Holds head and looks around propped on forearms in stomach-lying. (photo 4.3)
- Lifts feet off the floor in back-lying and rolls over. (photo 4.4)
- Plays and moves about on stomach. (photo 4.5)
- Sits with both arms propped. (photo 4.6)
- “Bunny” from stomach-lying: child pulls both legs up and props on both arms. (photo 4.7)
INTERMEDIATE SKILLS I:

- Sits and stands holding onto a bar.  
  (photo 4.8a & 4.8b)
- Pulls from bunny position to kneeling at a box and plays.  (photo 4.9)
- Sits with some arm support and plays.  
  (photo 4.10)
- Plays in bunny position.  (photo 4.11)
- Plays in heel sitting and moves in/out of position.  (photo 4.12)
- Sits without arm support and moves in/out of sitting.  (photo 4.13)
INTERMEDIATE SKILLS II:
- Crawls on hands and knees. (photo 4.14)
- Sits well on a bench or chair. (photo 4.15)
- Pulls to stand at furniture, plays, and cruises. (photo 4.16)
- Walks with a walker. (photo 4.17)
- Walks with forearm crutches. (photo 4.18)
- Walks stairs with assistance.

ADVANCED SKILLS:
- Stands without Support. (photo 4.19)
- Walks without support. (photo 4.20)
- Walks up and down stairs, walks up and down curbs, and may run.
Frequently Asked Questions

Q. “How long will it take our son Hayden to learn each skill?”
A. This varies greatly from child to child. Hayden may learn a few skills rather quickly, while others may require weeks or even months of daily practice.

Q. “Should we work with Hayden on one skill at a time?”
A. In general, it is good to work on several skills at a time. As mentioned you may want to work on sitting and kneeling at the same time and practice standing with arm support also on the same day. Some times, however, it helps to concentrate on one skill and practice it over and over (see massed practice). This all varies depending on circumstances. Your child’s physical therapist will give you guidance for specific situations. She will explain which skills need to be practiced more than other skills.

Q. “Does Celeste have to crawl in order to walk?”
A. Children with developmental delays or cerebral palsy may learn to walk with a walker without first being able to crawl. Yet, crawling will help Celeste in many ways. It teaches her coordinated reciprocal arm and leg movements and strengthens her hip, shoulder, and arm muscles. Few children walk independently without ever crawling. An exception is the child with hemiplegia whose arm is seriously affected by cerebral palsy. She will be unable to crawl, but still progress to independent walking.

Q. “Does Celeste have to walk with a walker before she walks on her own?”
A. No. Not all children with cerebral palsy walk with a walker first, but many do.

Q. “Our son Mohsen has hemiplegia. Only one side of his body is affected by cerebral palsy. How will he develop gross motor skills?”
A. On his own, Mohsen will rely mostly on his stronger arm and leg. By doing so, he may learn most skills almost as quickly as children without cerebral palsy until it is time to walk. Now the abnormal muscle tone, the lack of coordination, and the weakness of the affected leg may delay the onset of walking. Nevertheless, he will progress to independent walking.

It is best for Mohsen to receive physical therapy early. It will assure that he uses his affected arm and leg as much as possible and does not “neglect” them. Even though it is not essential that children with hemiplegia crawl, they benefit a great deal from crawling. The more Mohsen crawls, the stronger and more coordinated his affected arm and leg become. For the rest of his life, he will benefit from crawling.