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## THE GROWING WORLD OF THE CHILD The Development of Movement, Action and the Self

**W**e have been observing and filming infants as they learn and grow since 1989. These video records of infant development have been very interesting to review and analyse and have been a rich source of inspiration and surprise. In this article we want to briefly describe what we have been doing. On hand from drawings, which were made from the films, we will share with the reader some of the observations we have made. In this first article we will relate some of our observations to themes and lessons from the Feldenkrais Method. We have spent considerable time reviewing the available literature on the subject of infant development. In the second part of this article we will review this literature in relation to our project, specifically exploring how the infant learns to roll over on the floor. The observations that we have made have proven to be very valuable for our work, and for us it has met the primary condition for learning, that is, it has been a real pleasure! We want to share some of this discovery and pleasure with the reader.

### THE "BABY PROJECT"

The project began as a personal interest of Roger in 1982 as he began to make notes of his son Daniel's development. In the neighborhood there were two more infants and they became subjects of his observations after their mothers discovered that they had a free baby-sitter who would come to watch their children while they went shopping. Several hundred pages of notes were the result. Ulla began her Feldenkrais training in 1988, and we began to review these notes together at that time. However, though the notes were carefully made they did not let us reproduce what the children had done. Therefore, we began a systematic project of making video films of four children during their entire development from shortly after birth until they were able to walk freely at about fifteen months of age. A fifth child is now being filmed.



The films were made in such a way that we would have a continuous record of each child's development. Starting at about three weeks after birth, we filmed the child engaged in spontaneous activity and play approximately once a week. In the early stages of development, before the infant began to move around on its own, we filmed from above, the side and the front. Later, as the child was moving freely around the room it was a real challenge to keep up with them with the camera! The filming sessions lasted from 15 to 30 minutes. We found that in that time the child would display almost all of its current patterns and activities. For each child we have about 15 to 20 hours of film. The filming was made on a portable video 8 camcorder, and later re-recorded onto a VHS tape for analysis and use in our courses and trainings. The recordings have 24 frames per second, which has been very useful to us as we look at the films frame by frame. The drawings in this article were taken from these individual frames of film.

#### **WHAT MOTIVATED US?**

Our primary motivation has been curiosity! It is really quite fascinating and enjoyable to watch these children grow. Beyond that we wanted to have a developmental framework for understanding the Feldenkrais Method. These two motivations are still with us, but have become more informed and differentiated. In both San Francisco and Amherst Moshe Feldenkrais discussed many of the processes of infant development, addressing many of the processes of movement development as in the three ways of crawling lesson in Amherst. At the same time that we began to make these films we began to make a search of the literature in this field. We were intimidated and disappointed—intimidated at first by the breadth of the material that has been collected in infant research, and disappointed to find that it was quite difficult to find information that addressed the issues of central importance to us.

Our goal was to find a framework, based on development, in which we could imbed the practical work of Awareness through Movement and Functional Integration. This framework would need to be a complete, flexible description of development that was concrete, detailed and explicit of both the content of WHAT the child does, and HOW he goes about the PROCESS of going from one recognizable pattern of behavior to the next, and how these patterns are interrelated. Furthermore, we wanted to relate it to the patterns of acting that we were encountering in the adults with whom we work. What we were looking for was not available in the literature without some bias or without being incomplete. We found that the only solution was to collect what we felt we needed for ourselves. What we are presenting here is our first approximation.

#### **WHAT HAVE WE OBSERVED?**

As a result of our efforts we have a continuous and in-depth record of the developmental activities, in the family and home environment, of each of the four children. Although we have certainly missed some of the details of each child's process, we are satisfied that this record is fairly complete. We are now involved in the time consuming process of reviewing the films. We have been able to develop an overview of the entire process of two children as well as to make detailed analysis of some functional development. We have found many common patterns among the children, which is no sur-

prise. What has been a surprise has been the variations among the children. Not only are the pathways that the children take to some common milestones of development diverse, some of the actions themselves were really quite astounding! These surprises have made us repeatedly go back to look at more details of the films, read more, and examine our assumptions.

Because of our limited resources we concentrated our efforts on capturing the primary developmental processes that were easily visible. The following list summarizes the information that we have for each child:

*We filmed some simple tests we made about the development of the visual coordination of the children including head and eye movements while following moving objects and the depth of the visual field.*

*We looked at the development of grasping from the most primitive grasp reflexes to the development of visually guided grasping in all areas of space around the child.*

*We have a large collection of the numerous and complex activities of the children lying on their backs, prone and on the side. This includes how they move between these positions.*

*We have a record of how the children move from prone to standing on their hands and knees.*

*We were particularly interested in how crawling and creeping develop and the variations of prone locomotion.*

*We have a record of how the children find their way to sitting from standing on all fours.*

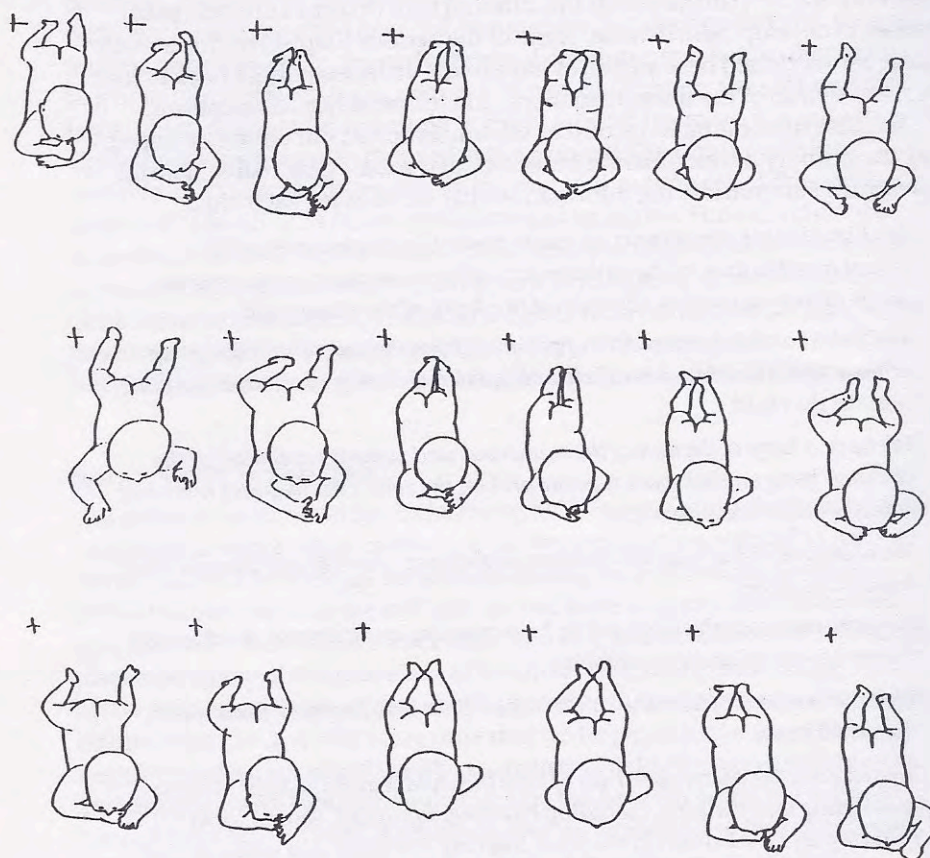
*We recorded the entire spectrum of how the child leaves the floor to come to standing and walking, including kneeling, squatting, getting up to standing and back down to the floor, walking sideways, and walking itself, from the first unstable steps to finely tuned walking.*

We made it a particular point to film the process by which the children move through these various stages of their development. For example: Laura spent an unusually long time moving about the room in what we call the "frog jump" method of sliding along on her belly (Fig.1). We have been able to go back and observe how this method of locomotion developed. This included pulling with her hands, and pushing with both feet after she had flexed and opened both legs and planted her toes on the floor. However, she struggled before the pattern came together. Our films document this in detail. We could see that both the movement of the arms and that of the legs were available, but not coordinated in timing to result in moving forwards. Only when she found the functional combination of manipulation and timing did the pattern become stable. Surprisingly, it remained her primary method of locomotion for several months. We were able to follow how this very symmetrical movement became unstable, showing first one-sided asymmetry, then for a few weeks she used almost every variety of moving forward on the floor that is thinkable. The following week she discovered creeping on all fours, and preferred it over any of the other patterns. This process of a stable pattern becoming unstable and then shifting to a new pattern that is itself stable is the description of development of new patterns that fits dynamic systems theory. Smith and Thelen (1993 and 1994) and Kelso (1995) describe some of their research concerning these processes of pattern development.



**Fig. 1**

*Laura: Date: 24.1.93 Age: 8 months 19 days. This film was made from above and in front of Laura. The cross is one point of the blanket on which she was lying. The series shows three full cycles of her movement across the floor. Laura begins in Fig. 1.1 by opening her legs, flexing both hips, knees and ankles, moving the legs in the way that reminds us of a frog. In Fig. 1.2 she plants first the right toes, then the left foot as she begins to extend the legs in Fig. 1.3. The extension of the legs pushes her past the forearms and elbows which she also uses to pull herself forward in Figs. 1.4 and 1.5. In Fig. 1.6 she extends the back, lifting both arms and legs, reaching forward with the arms to put them on the floor in front of her in Fig. 1.9, at the same time the legs have been opened and flexed again. She repeats this cycle again two more times until she has moved forward, away from the cross on the blanket in Fig. 1.19.*



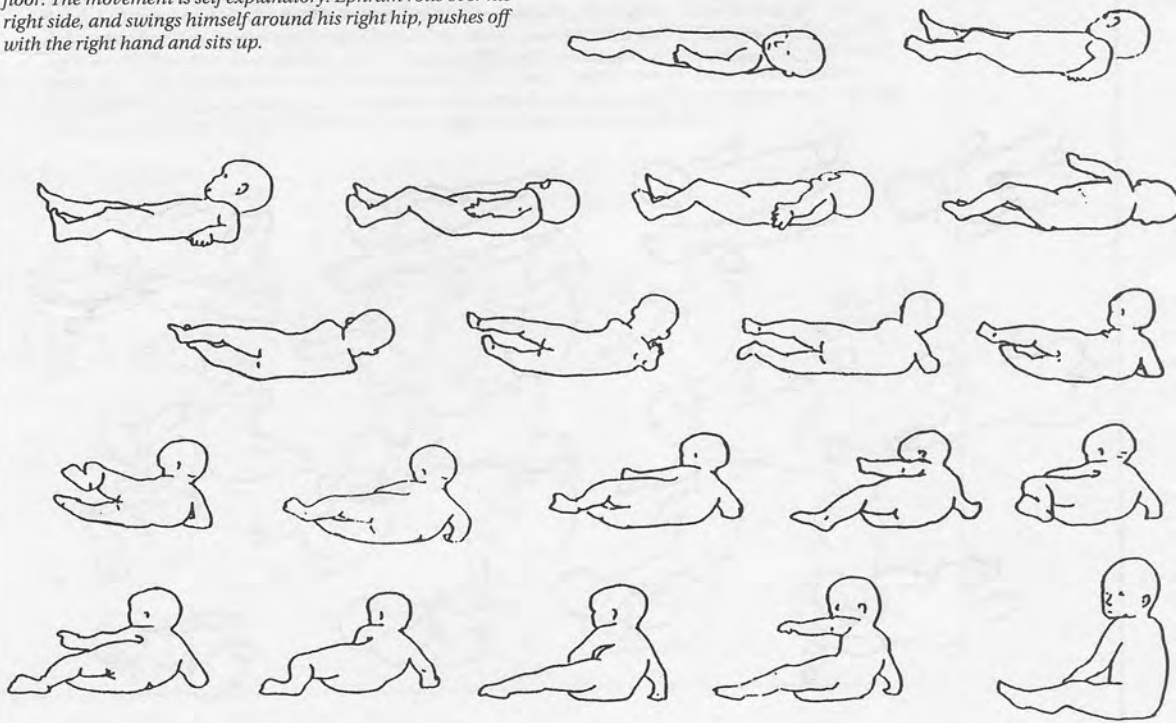
The films have provided us with a number of surprises. One which we mentioned above, was that Laura spent several months on her belly before she left the "frog jump" and began to creep on all fours. The other was a classic "Feldenkrais move" that Ephram used to sit up. The drawings below give the reader an impression of how they did these activities.

There is a hidden potential in these recordings. With proper resources they form the basis of an ongoing longitudinal study following these children over the entire span of their development to adulthood. This could include carefully planned filming of the children on an ongoing basis to evoke and record some of their basic movement patterns to test some of the hypotheses we have in our Feldenkrais community about what happens to our movement functioning throughout the life span.

#### **HOW CAN WE RELATE THESE OBSERVATIONS TO THE FELDENKRAIS METHOD?**

The foremost goal would be to relate movement development to the development of function and what Moshe called self-image. This is a tall order and our descriptive record of the development of function and movement needs to be seen as several orders of magnitude away from any kind of reliable statements that would relate this description of movement to the wide and complex domain of developmental psychology. Nevertheless, our

**Fig. 2**  
 Ephram: Date: 8.8.93 Age: 8 months 9 days. We were astonished to see this film. It was taken from the side, the camera on the floor. The movement is self explanatory. Ephram rolls over his right side, and swings himself around his right hip, pushes off with the right hand and sits up.



observations have proven to be of great practical value in our work with the Feldenkrais Method.

The most obvious connection to our work can be seen in the almost perfect parallels between some of the activities of the child as she moves around on the floor, or is learning to creep or walk, and many of the Awareness through Movement lessons that we all know. Two of the series of drawings (Frank Fig. 3 and Laura Fig. 4) reflect this. Lessons that involve movements that are identical or very similar to these activities can be found in the lessons that Moshe, Gaby and Mia gave in the evening classes and training in San Francisco in the 1970s. There are countless other examples of this in our archives. They have proven to be a great source of ideas for ATM as well as FI.

This part of the movement is almost identical to a lesson that Gaby taught in her evening classes in San Francisco in 1975. In this lesson we are asked to stand the right leg and roll the pelvis, lifting the right hip while sliding the head to the right in both hands. There follow several steps of turning the head to look upward to the left while reaching up on the floor with the left hand, and sliding the right hand toward the right foot, then reaching toward the left hand with the right hand.

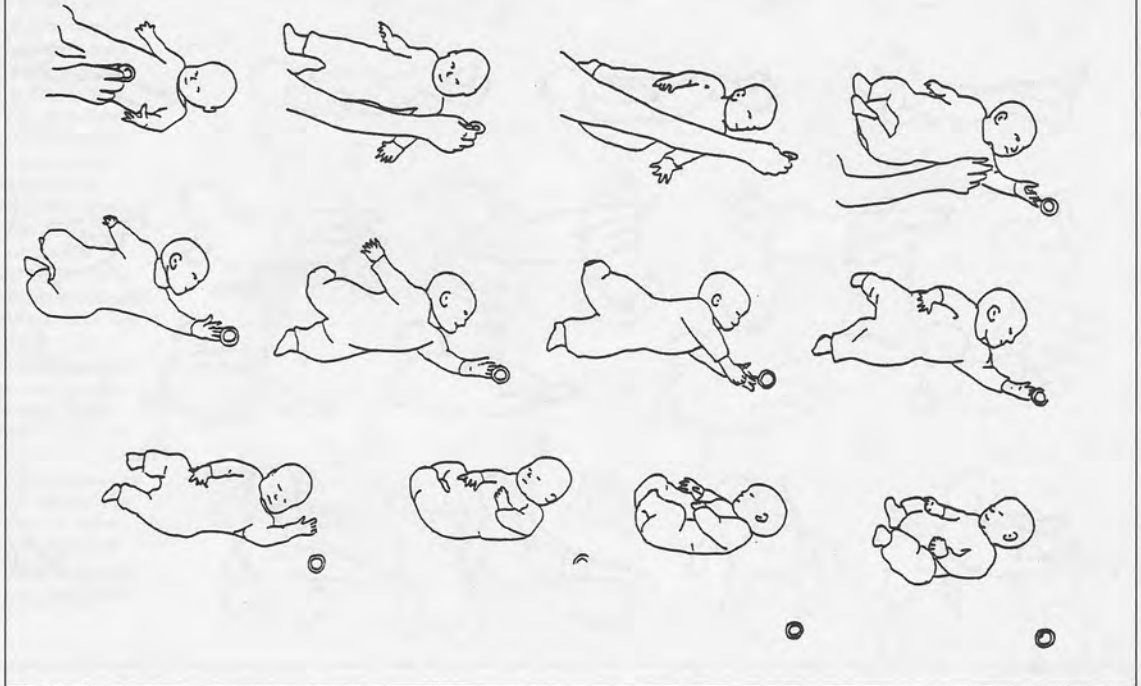
In fig. 3.8 -3.12 Frank rolls back to the right, flexing his back while maintaining the lateral flexion (with the left side longer than the right side) that he used to turn left.

One initial assumption that we made as we began to observe children and see these similarities between our films and many ATM lessons was



**Fig. 3**

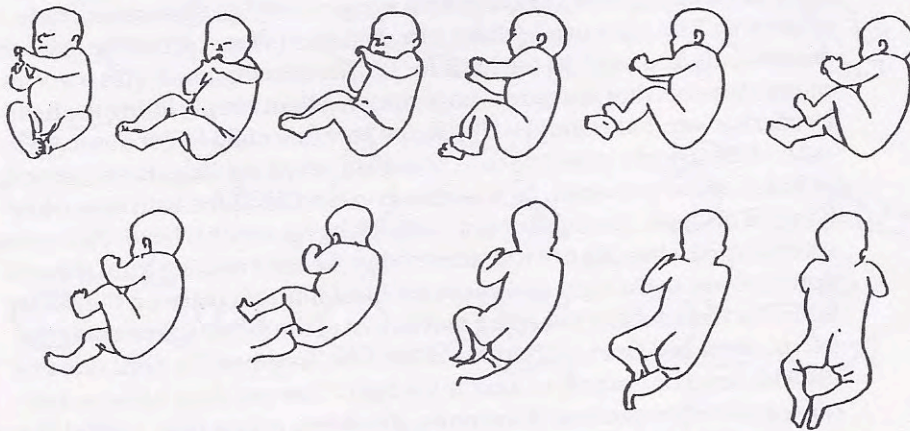
Frank: Date: Not recorded Age: approximately 4 months 20 days. This movement was filmed from directly above the child. His mother shows him his pacifier and places it above him on the floor. In Fig. 3.3 he looks at the pacifier and at the same moment opens his left hand as he begins to turn to reach. In Fig. 3.5-3.7 he pushes with his right foot on the floor, lengthens the left side, extends his back and slides his head backwards as he turns to reach first with the left hand and then reaches across himself with the right hand.



that we would find all of the Feldenkrais lessons in the activities of the children. This assumption was not true. Many ATM lessons are very specific in their construction relating to a functional relationship in movement. An example is lesson number 6 in the Alexander Yanai collection, volume 1, part 1, pages 31-37, "Turning the head around its circumference and in the center," which explores various movements of the head and neck. Children do not do this sort of thing, at least we have not observed them doing so. On the other hand, a careful analysis of the ATM lessons makes it possible to understand which learning and functional processes are involved in the lessons, and then to look for how the children solve these tasks within the field of natural possibilities that they have.

The films have helped us to understand two central themes for our work in the Feldenkrais Method. The first is an understanding of the development of function. All of the activities of the children are related to their environment of people and objects. They are never just moving. The movements involve contact with their world and the child's movement development always goes hand in hand with growing competence in interacting with their world. As a specific example it is particularly interesting to see how the coordination of visually guided grasping seems to "drive" the child's functional development. We have observed how one child's discovery of the connection between looking at what he grasps and grasping what he sees results in a new sense of everything "see-able" being "grasp-able". Suddenly, objects that were not particularly interesting because they were

**Fig. 4**  
*Laura: Date: 3.9.92. Age: 3 months 29 days. In this movement, filmed from directly above the child, Laura rolls over her right side onto her belly. What astonished us as we first reviewed this movement is the extent to which the child maintains the flexion of the spine while turning. She flexes herself from head to pelvis even until she is almost on her stomach, as can be seen in Fig. 4.8.—she is still looking downward toward the floor, her head barely lifted. In Fig. 4.9 she begins to lift her head and look to the right on the floor and she extends her back to complete the turning and lie on her belly, looking around in Fig. 4.11. This movement is one of the variations of the "baby rolling" lessons that Moshe taught in both San Francisco and Amherst. Furthermore, it is a very specific example of how children roll, and the reader can compare it to Fig. 5 which is Laura's way of rolling several months later.*



not "grasp-able" seem to evoke real interest. It is as though the visual world has new possibilities for the child. The result is a new curiosity to reach out even further in space. The first real efforts of locomotion emerge, albeit not yet very successful. Thus, out of movement competence in grasping and looking, the child discovers a growing world! The space itself in which the child can act and interact seems to grow as movement skills emerge in new patterns and variations.

The second theme is to understand how these new patterns of action emerge from the child's ongoing experimentation with himself and the world. By this we mean that the child seems to continually repeat, with small variations, actions that are familiar and not particularly novel. Out of this ongoing activity new patterns emerge that are in every sense new, transforming the child's entire structure of behavior. A description of how these new patterns of action emerge in development has been a major theme of research and of the sensorimotor development in infancy. Many descriptions of infant development have not addressed this question of how new patterns develop in a satisfactory way. In fact, many of the more popular books simply describe the developmental "milestones" without demonstrating how new patterns emerge. They simply say what the new activities are and at which age they can be observed. For our purposes this was not satisfactory. We have found that we can carefully observe what the child is doing, using the films to trace back from a new development to the activities that preceded it. We are able to see new functions and new patterns emerge from movement elements that at first glance seem unrelated to the outcome that becomes a stable pattern many weeks after the various



elements first appear in the child's actions. These new patterns of interaction with the world then become the foundation for new growth. This has great relevance for our work. This process of development is what the Feldenkrais Method is all about, and we have had the pleasure of being able to follow this process as we analysed the films.

Let us look at some examples of how new patterns of function develop and relate them to the three elements of action that Moshe Feldenkrais outlined: orientation, manipulation and timing.

**Orientation** The development of lifting the head to the vertical position while lying on the belly plays a central role in all further development. How does this come about? The child does not generally do this immediately after birth. The child needs about 3 to 4 months before being able to do this consistently and use it as the basis for further development. This involves many elements that are much more complex than simply lifting the head in a reflexive way. For example: Ulrich, the very first child Roger observed in 1984, at the age of 1 month 16 days could not yet lift his head to the vertical, or hold it there. However, he was able to extend his spine with ease while lying on his back, turning around and looking up over his head. This action was initiated when his eye was attracted to the light coming from the window that was to the right and above his head from his place on the diaper table. He then made a sweeping movement of the entire spine, using the pelvis, chest and head to shorten the left side, lengthen the right side and slide his head backwards to look at the light. This was done without any differentiated movement of the arms, shoulders, legs or hips, related to the spine. He held the arms and hands flexed, near his head and the legs flexed and open. As he slid the head he would turn and extend the entire spine, following the movement of the head and eyes towards the light. This easy extension of the spine without lifting or balancing the weight of the head clearly contributed to the skill he attained a few months later in lifting his head to look around him while lying on his belly.

**Manipulation** The process of rolling over from the belly to the back, or the reverse, involves a very differentiated organization of the skeleton. This action requires that the child brings its skeleton into a very specific alignment in the internal relationships of the parts of the body among themselves. We have observed two basic strategies of doing this movement. One involves flexion of the spine in a relatively undifferentiated movement as the child rolls from the back to the side and onto the belly. This is illustrated by Laura in Fig. 4. The other strategy involves a very differentiated movement of extension and rotation of the spine utilizing all of the potential mobility of the skeleton from the head to the hips. This can be seen in Fig. 5.

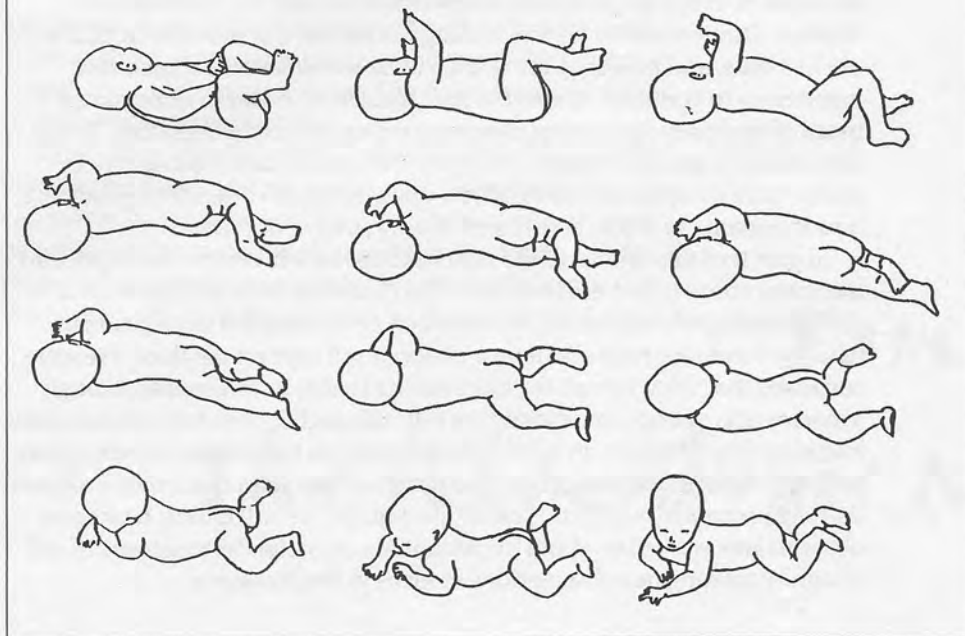
The way in which the movements of flexion and extension, lateral flexion and rotation in the spine are interrelated for these two strategies is very different. The general developmental process is from the flexion (undifferentiated) to the extension (differentiated) pattern. However, we have observed one child in four who used the extension pattern first and later developed the flexion pattern. The entire process of the development of rolling involves many elements and variations, and we will look at this process in more detail in part II of this article.

**Timing** We gave a short description above of Laura's process by which she not only coordinated the parts of herself to move forward on her belly, but she explored a variety of timing coordinations of the actions before the



**Fig. 5**

*Laura: Date: 16.1.93 Age: 8 months 11 days. This film was made from the side. Laura initiates the movement in Fig. 5.2 by looking up to the left, and from the very beginning extends the spine. In Fig. 5.3 she pushes with the right foot on the floor, turns and reaches across herself to the left. In Fig. 5.6 she crosses the right leg over the left, and in Fig. 5.7 the pelvis lies almost completely on the front while the head is still on the floor behind the left shoulder. In this position the spine is extended and rotated in a very differentiated way. In Figs 5.8 -5.12 she lifts the head, lifting it over the shoulders until she lies completely on her belly.*



functional pattern related to timing came together to extend her reach to grasp a toy over a distance longer than her own length. Our films show that Laura had three critical elements of this pattern available, but that only one coordination of these elements had the timing that allowed her to move forward. We direct the reader back to Fig. 1. The first element is visible in how she lifts herself over her elbows and arms. (Fig. 1.10-1.12) Previously she would shift between pulling forwards and pushing herself backwards on her elbows, remaining in the same place on the floor. The second element was to discover that she could plant her feet and toes after flexing the legs and feet (Fig 1.2-1.5); before this the feet and knees would simply slide on the floor as she extended the legs. The third element involved sensing a coordination between pushing with the legs and pulling with the arms in relation to the hands and feet which were fixed on the floor. This coordination was unified in a thrust of the pelvis, spine and head past the point of contact of the hands and feet on the floor—the proximal moving past the distal. The discovery of this coordination of timing resulted in a considerable movement forward. This was soon consolidated into a very effective way of extending her reach to distant parts of the room. It was time for her parents to take everything breakable out of the two lower shelves of the cabinets and bookshelves. Her world had now grown considerably larger!

In this way we are able to look at the evolution of functional patterns of action as they emerge in the spontaneous play of the child. We can examine some of the elements of this growth in real detail, and we can relate this to



the continuing development of the same individual. This brings us to an important point for most of us as Feldenkrais teachers. Although it is interesting to know about this developmental process, most of us do not work with children who are having difficulty. We are confronted each day with adults who don't seem to have any obvious developmental deficits. In an article entitled "Changing Theories of Postural Development" Reed (1989) brings up the question of how the emergence of posture in the first years of life provides a stable basis for our actions throughout our lives. If we can understand how this happens it would be decisively useful to us in applying our skills of evoking functional competence through the Feldenkrais Method. Our interest in understanding the patterns of movement that we see in adults, and how they are related to developmental patterns has inspired us to continue to observe the children. In order to understand more of these developmental processes we turned to the literature in the field of infant development to relate the movement development to the much more complex question of how our self image comes into being and how it remains so stable across such a long span of our lives.

In part II of this article, in the next Journal, we will review the important literature about infant development. This is a wide field that dates back to the beginning of the century. We will then give a detailed description of what we have observed about how children roll over on the floor. We were surprised that what we call the baby rolling lesson in Awareness through Movement is not how most children roll, although it does bear close resemblance to how children do it. We will describe, on hand from drawings that we made from the films, some of the details of the ways that infants roll over and the process by which this develops. Finally, we will look at how these observations can tell us about important issues of the development of self image by relating our observations to ideas in the literature.

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