Many theories have been published to 'explain' why and how physical disorders and pathologies develop. Underlying any individual problem is usually one true 'scenario' that triggered development of the disorder. This scenario is not always evident, and in most cases, its roots are quite complex. This makes the diagnostician’s job complex, and underscores the need to avoid hasty decisions which might lead to wrong conclusions.

In his book *Living, Loving and Learning*, Leo Buscaglia (1982) describes the prevailing diagnostic approach to special children. 'Our way of looking at children is interesting. The speech therapist
sees the child as a case of stuttering or of speech hindrance, the occupational therapist sees the child as a motor problem, the school psychologist sees the child as a learning or emotional problem, the physiotherapist sees the same child as an array of movement problems, and the neurologist uncovers behavioral responses. Then there are the parents who try to see their child as a whole entity but it does not take us long to convince them that there is no such thing, and then they lose their comprehensive view of their child’s latent abilities, and in their eyes, he or she becomes a ‘problem child.’

All of these ‘experts’ see only what they have been trained to consider as the crux of the problem, and the truth is that what they see actually exists in that child. But a child is much more than a symptom, so much so that the essence, the most important piece of the puzzle, may be completely hidden from view.

In this vein, it is worth remembering Maslov’s statement that if the only tool one has is a hammer, one will tend to treat all things like a nail. Therefore, when viewing children, therapists must see them as they are, as many things – some overt, others covert – and many ‘tools’ are necessary for working with them. This is the approach that should be applied to both diagnosis and treatment.
Many therapists who work with children have become more mellow over the years with regard to the influence they exert on the lives of the children they treat. They learn that success in their work with children depends first and foremost on the quality of their ties with the parents and the extent of the parents’ support for the treatment.

Parental motivation is a moving force for change that can and should be utilized for the good of the children who require treatment. The therapist’s challenge in addressing children’s problems is how to harness this motivation to yield cooperative work.

Parents are the most important source of information about their children’s development and environment, information that is essential to understand the child’s personality and problems.

The aim at this stage of diagnosis is to obtain general information from the parents about their children. This information forms a basis for deciding what to examine in the coming diagnostic stages. The most important points of reference have been selected from the many questions that parents should be asked at this stage (Appendix 1) (Solberg, 1998a):

- The background of the problem and the reason for seeking treatment
- The course of pregnancy and birth
- The child’s general development from birth
- Motor development – did the child go through all the developmental stages (turning over, crawling, sitting, standing, walking, running) within the normal time range
- Present motor functioning – any limitations or functional difficulties in daily life
- Cognitive functioning (comprehension)
- Affective functioning – fears, coping with difficulties, frustration threshold, self-esteem, expression of emotions
- Behavioral functioning
- Social status and communication with other children
- Other problems, illnesses, use of medications, allergies, etc.
Diagnosing posture

One of the most pervasive problems facing therapists working with children with postural disorders arises from the difficulty of using tests and measurements that allow reliable monitoring of the progress and results of treatment. Without these periodic tests, therapists are hard pressed to determine what effect, if any, their treatment has actually had on the children’s condition, and as a result, they base their work more on intuition and less on objective, reliable data. The posture evaluation presented in this chapter is based on a broad array of data which, if properly analyzed, will provide an adequately reliable diagnosis of a child’s condition.

In diagnosing posture, information can be gathered in a number of ways:

- Subjective evaluation by observing the standing individual from the side, front and back
- Anthropometric measurements that provide objective information about body proportions such as length of the lower extremities, scapula height, etc
- Functional muscle testing and ranges of joint motion
- X-rays.

The posture examination form presented in this chapter is intended for professionals, and its purpose is to help therapists to conduct their tests in a logical order and to record their findings concisely. The information obtained from these tests is usually sufficient, but in certain cases other tests may have to be added or alterations made to existing ones.
Posture examination form

Date:
Name:
Surname:
Gender: M / F
Date of birth:

General Examination:

a. Posterior view
1. Achilles tendon and feet: Right _________ Left _________
2. Knees (genu varum/genu valgum) ___________________________
3. Pelvic balance (posterior/superior Iliac spine) ________________
4. Scapulae (height, distance from spine, rotation) _______________
5. Shoulder line _____________________________________________
6. Neck ____________________________________________________
7. Symmetry of fat folds (pelvis, waist, neck) _____________________
8. Spinal column (scoliosis) _________________________________

b. Lateral view
1. Feet arches ______________________________________________
2. Knees (hyperextension) __________________________________
3. Pelvis (posterior/anterior tilt) ______________________________
4. Spinal curves (kyphosis/lordosis/flat back) ____________________
5. Shoulder position _________________________________________
6. Head position (cervical lordosis) _____________________________

C. Anterior view
1. Feet _____________________________________________________
2. Knees ___________________________________________________
3. Pelvis (anterior superior iliac spine) __________________________
4. Shoulders height __________________________________________
5. Neck/Head ______________________________________________
Functional tests (Figs 7.1–7.13)

1. Length of spinal column (C7–S1) ___________________________
   Standing: _______________ Forward bending: ______________

2. General flexibility test: _________________________________
   Legs straight
   Forward bending with knees bent _________________________

3. Hamstrings flexibility (SLR): Right _________ Left _________

4. Quadratus lumborum flexibility ______________________________

5. Thomas Test for iliopsoas flexibility: Right _____ Left ____

6. Abdominal muscle strength _________________________________

7. Ability to flatten lower back to floor (lying supine) __________

8. Range of shoulder motion: Right _________ Left _________

9. Length of lower extremities: Right __________ Left _________

10. Back muscle strength: Cervical erectors ________________________
    Erector spinae ___________________________________________
    Scapulae adductors _______________________________________

11. Shoulder girdle strength:
    Abduction: Right ____________ Left __________
    Adduction: Right ____________ Left __________
    Flexion: Right ______________ Left __________
    Extension: Right _____________ Left __________

12. Static balance: Right leg ____________ Left leg ____________

13. Dynamic balance: __________________________________________

14. Forward walking (general evaluation – broad/narrow support base,
   movement balance, movement flow, coordination) ______________

________________________________________________________________

X-rays, medical documents and previous diagnoses:
________________________________________________________________

General evaluation:
________________________________________________________________

Recommended treatment (indications/contraindications):
Figure 7.1 Observation from back and front to identify postural disorders on the coronal (frontal) plane.

Figure 7.2 Observation from the side to identify postural disorders on the sagittal plane.

Figure 7.3 Examination of spinal length standing and bent forward.

Figure 7.4 General flexibility test, with legs straight and with bent knees.

Figure 7.5 Test of straight leg raising (hamstring muscle flexibility).

Figure 7.6 Subjective test to evaluate quadratus lumborum flexibility.
Figure 7.7  Thomas Test to check iliopsoas muscle.

Figure 7.8  Test of abdominal muscle strength.

Figure 7.9  Examination of lower extremity length.

Figure 7.10  Test of cervical erector strength.

Figure 7.11  Test of erector spinae strength.

Figure 7.12  Test of scapulae adductor strength (shoulder extensors).

Figure 7.13  Ways to evaluate range of motion in the shoulder girdle.
Psychomotor diagnosis

One of the important skills diagnosticians must have is the ability to get to know the child and respond to his condition; they must understand the patterns, systems and processes that brought him to his present state. This stage of psychomotor ability diagnosis helps diagnosticians to become better acquainted with the children they are going to treat so that they can adapt the therapeutic contents and approach to the children’s personality and special needs (Solberg, 1998b, 1999). The basic assumption underlying this chapter is that postural disorders, whether arising from emotional or physical sources, also affect children’s movement patterns.

The characteristic limitations that children with postural disorders experience – such as muscle weakness, heightened muscle tone, limited ranges of motion or functional asymmetry resulting from incorrect positioning of one or more joints – necessarily affect functions such as balance, coordination, movement precision and strength regulation. Problems in these motor functions may cause other impediments to basic skills such as balanced walking and running and performance of various ball skills. In many cases, these difficulties are characterized by motor clumsiness.

Since movement and motor ability play such an important role in building children’s self-confidence and self esteem, those suffering from basic functional deficits may experience a loss of self confidence, develop emotional tension, and later become enmeshed in the ‘vicious cycle’ described in Figure 7.14.

![Figure 7.14 Interaction between postural disorders and emotional problems.](image-url)
In order to ensure effective and correct treatment of the problem, therapists should try to ‘break’ this cycle and build a new one. One of the ways to do this in working with children is through motor activity (Fig. 7.15).

The term ‘psychomotorics’ refers to the interaction of motor and emotional control processes that also include perceptive, cognitive, and emotional components. The term psychomotorics emphasizes the close interrelations between emotional processes and motor phenomena (Hutzler, 1990). The psychomotor approach views movement as a complex phenomenon that integrates feelings and thoughts as well as the body’s physiological systems. The aim of psychomotor diagnosis is to add another important facet to overall diagnosis of the children in order to establish a baseline on which to build the therapeutic process (Hutzler, 1990).

Psychomotoric disturbance includes deviant postural patterns, motor clumsiness, impaired muscle tone, movement disorders such as hypo/hyperkinesis, and others. One of the main aims of the examinations is to test children’s overall motor ability on the assumption that this multi-faceted ability will allow them to perform a broad array of motor tasks (Solberg, 1998b).

Figure 7.15 Improvement of motor functioning as a means of improving postural patterns.
General guidelines for psychomotor diagnosis

As noted, diagnosis and evaluation are initial milestones of any therapeutic program. The approach proposed in this chapter emphasizes a holistic view of the many components and characteristics comprising patients’ personality and abilities, in both the physical and the emotional domains. This model was developed to help therapists to improve their ability to observe, diagnose, process data and build the most appropriate treatment program.

It should be kept in mind that diagnosis is an ongoing dynamic process that offers the opportunity to define a person’s current condition as a whole. Therefore, each meeting throughout the treatment process creates a change that confirms or alters the therapist’s conclusions. Thus, each meeting renews the diagnostic process.

This chapter will present a number of options for examining each domain in order to allow diagnosticians as much ‘room to maneuver’ as possible in their professional decisions about the type of examination and the level required. This material can also serve as an idea bank to be referenced during the treatment stage as well. The examinations are based on subjective evaluations of each patient according to that patient’s functional level, and according to universal measures. While this applied approach is appropriate for therapists working in a clinic, it is not suitable for research that requires more precise objective tests under laboratory conditions.

Because adapting examination techniques to children is a true ‘art’ that diagnosticians should develop, it is important to maintain a great deal of flexibility of thought when diagnosing and to try not to work mechanically according to set schemas.

The evaluation scale presented for summarizing the data is based, as noted, on subjective evaluation using a 5-point scale for evaluating ability in each domain (Table 7.1).

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>QUALITY OF PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very weak</td>
</tr>
<tr>
<td>2</td>
<td>Weak</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>Very good</td>
</tr>
</tbody>
</table>

Table 7.1 Posture evaluation scale
Summarizing data in this manner allows therapists to continually monitor children’s progress in each domain, and based on their condition, to adapt the ‘line of action’.

The suggested tests have been divided into specific domains that inform therapists about children’s functioning on various levels. After defining the subject of each test, the text will provide examples for gathering information in that domain. It is important to keep in mind that the test options have infinite variations, and basing themselves on this material, diagnosticians can utilize their experience to develop additional approaches.

**The tests for each domain are presented as follows:**

1. Introduction to the test
2. How to perform it
3. Emphases for observation. This section mentions the points to observe closely as the child performs the task. In some cases, reference is made to other domains not directly connected to what is being tested but that give an indication of how the child functions in other spheres as well. As already mentioned, the aim of the diagnosis is to collect as much information about the child as possible, and the guiding principle is to obtain maximum information about all possible domains from each movement task.

It should be kept in mind that performance of certain motor tasks reflects a number of underlying abilities. Experienced diagnosticians observing a child bouncing a basketball, for example, can glean much information about that child’s visuomotor coordinative ability, force regulation, timing, movement isolation and movement precision. As to posture, diagnosticians will be especially interested in the array of motor abilities affecting movement and posture patterns such as balance, kinesthesia, force regulation, differentiated movement and coordination.

Main areas of examination in psychomotor diagnosis

**Coordination** Many daily activity movements require coordination between different body parts, such as arms and legs in walking, or eyes and extremities in ball skills. The right and left cerebral hemispheres function together integratively and cooperatively. The quality of cerebral functioning depends on the functional ability of each side independently, especially on the integration between them by means of pathways that connect the two sides.

Coordination makes movement efficient, flowing and energetically economical. Coordination is reflected in a person’s ability to combine a number of movements into a flowing pattern that integrates a number of systems, such as the musculoskeletal and nervous systems with the senses of sight, hearing and kinesthesia.
Impaired coordination between body systems, whether internal or external, indicates a flaw in holistic functioning. The effect of such poor functioning on children with coordinative difficulties is tremendous; frustration, because their bodies do not do what they want them to do and they feel that their body control has been undermined. In most cases, such difficulty also has affective ramifications, which are often evidenced in lowered self-esteem and self-confidence. Children tend to lose their footing because of lack of movement balance, they drop a ball thrown to them in a game, and they find play and activities—which other children consider joyful and natural—to be a source of difficulty.

Normal coordination, which facilitates optimal balance between stability and movement, depends on normal functioning of the nervous system as it receives and analyzes information and then directs implementation of normal movement patterns.

Many postural disorders may develop as a result of coordination problems. Under normal circumstances, the messages carried by the peripheral nerves pick up information from the sensory systems and transmit orders to the skeletal muscles. This fine and precise control is made possible by the continuous feedback of information received from the movement. This information undergoes processing, which creates a pattern of new motor responses (Schmidt, 1988).

Normal postural patterns are possible thanks to control over this process, so that in each movement, some muscles are recruited for activity, while others remain in a relaxed state (movement differentiation). Difficulties here may cause many excess movements, heightened muscle tone and rigid movement patterns. In this case, treatment that focuses only on releasing muscle tone without trying to improve the coordinative problems will not yield good results because it does not deal with the root of the problem.

The aim of diagnosis and its consequent treatment is to identify the source of the difficulty and to alter the situation accordingly. Diagnosticians must be sensitive to children’s coordinative functioning so that they can feel when a given task becomes a focus of frustration and stress, and when it imbues children with a feeling of confidence. This explains the importance of diagnosticians’ skill in building a graduated ‘remedial process’ that does not frustrate the children but rather makes them feel confident by giving many opportunities for success.

A number of components (given below) must act integratively to produce the conditions for coordinated movement.

**Regulation of force** This is reflected in the ability to perform a movement precisely and to adjust the amplitude of force required for its performance. Normal regulation of force allows children to invest the correct amount of energy in terms of the number of motor units that contract in the muscle.
**Differentiated movement** This affects the ability to activate each body limb separately and effectively while releasing excessive muscle tone in other body limbs. The result is no additional points of tension that do not contribute to movement.

**Balance** Balance affects the ability to change the base of support freely thus allowing a flowing, smooth transition from one position to the next while maintaining a state of balance.

**Kinesthesia** This allows children to feel the placement of their body limbs in the environment while controlling a variety of movements with no visual feedback (see Ch. 2).

In light of the above, treating postural problems should link these components together and relate to each of them in the exercises (Fig. 7.16).

The following tests enable information to be obtained on the patient’s ability in every one of the aspects shown above.

![Figure 7.16 Important motor components for maintaining normal posture.](image-url)
Tests to evaluate coordination and movement timing

1. Step leaps
   *Instructions*: Standing in a walking position, right leg forward, left arm (opposite) lifted to front and right arm backwards. Leaping and switching arm and leg positions simultaneously and sequentially. Emphases for observation:
   a. Arm–leg coordination in opposing movements
   b. Movement flow – are the leaps sequential or choppy?

2. Leg-spread leaps
   *Instructions*: From standing erect with arms beside body – leaping to a spread leg stance while bringing arms up to shoulder height at the same time; then back to starting position without stopping. Emphases for observation:
   a. Arm–leg coordination
   b. Movement flow.

3. Kicking and catching a balloon
   *Instructions*: Standing – throwing balloon into the air with two hands. As it falls, kicking it and catching it again with both hands. Emphases for observation:
   a. Eye–foot coordination
   b. Correct timing in kicking ball up
   c. Ability to balance body on one foot while kicking
   d. Force regulation in kicking ball up.
4. Move ball around body while walking  
**Instructions:** Walking forward in a straight line while moving ball around body (ball size should be adapted to the child’s age).  
Emphases for observation:  
- a. Arm–leg movement coordination  
- b. Ability to cross midline  
- c. Movement flow (does transferring ball make the child stop).

5. Dribbling a basketball  
**Instructions:** Standing in place, bouncing a basketball sequentially (dribbling).  
Emphases for observation:  
- a. Movement flow  
- b. Eye–hand coordination  
- c. Correct timing in pushing the ball down  
- d. Regulation of force.

6. Raising opposing arms–legs lying face down  
**Instructions:** Lying face down both arms forward. Raising one leg and opposite arm at the diagnostician’s command.  
Emphases for observation:  
- a. Coordination of arm–leg movements  
- b. Test of muscle tone in the limbs remaining on the ground (heightened tone may indicate difficulty in regulating force and isolating movement).

7. Crawling in a straight line  
**Instructions:** Crawling straight forward under an elastic band hanging 30–40 cm from the ground.  
Emphases for observation:  
- a. Coordination of arm–leg movements  
- b. Movement flow.
Balance

The ability to maintain equilibrium and stabilize the body in various starting positions is a precondition for normal balance in both static and dynamic states. As people are usually in movement, they must respond to each movement task with an appropriate dynamic process. To maintain stability while stationary, the body’s center of gravity should remain above its base of support. Every movement changes the position of the center of gravity, and postural muscles work to stabilize and organize the body in self spatial orientation and in general spatial orientation.

Difficulties in balance may occur as a result of functional disorders in one or more of the systems in charge (Fig. 7.18). Impairment to the optimal function of each of these systems affects the balance ability in various ways according to the following possibilities:

- Balance difficulties arising from impaired nervous system functioning (problem in obtaining information from the environment, processing the information received or planning correct movement patterns through neural paths to body limbs)
- Balance difficulties resulting from imbalance between antagonistic muscle groups throughout the body
- Balance difficulties because of poor joint positioning (mainly in the lower extremities) and postural disorders.

Distributing body weight evenly over the entire base of support on the foot is extremely important. To this end, there is a need to check for excessive tension or pressure on one part of the foot in comparison to other areas. Such a condition may cause imbalance in higher areas of the body as well as indirectly impairing balance ability.

The messages carried by the peripheral nerves receive information from the sensory organs and send commands to the skeletal muscles, but for fine and precise movement control, the muscles provide constant feedback of information and continual adjustment of motor responses even after they begin their operation. Thus, there exists interrelationship between the nervous system and the musculoskeletal system in various functions requiring balance. Diagnosticians should be aware of the effects of these systems and try to identify the source of the problem.

In psychomotor diagnosis, therapists have the opportunity to diagnose functional imbalance according to how children respond physically to
forces acting on them. Correct and balanced responses require the ability to use body forces effectively while maintaining balance.

As balance ability is reflected in both static and dynamic situations, diagnosticians should examine both static balance (in diverse starting positions) and dynamic balance. The tests presented here are examples of examination options, and can certainly be altered at the diagnostician’s discretion. Special attention has been paid to simple tests that are easy to implement and that provide information in as little time as possible with no need for special apparatus.

The tests examine static and dynamic balance, either separately or together. The children are barefoot as they perform the various tasks so that diagnosticians can obtain important additional information about foot function and ankle joint position, and identify various postural disorders in the feet (see Ch. 5).

However, diagnosticians must also remember that performing tasks barefoot raises the difficulty level because of the smaller base of support.

Tests to evaluate balance

1. Walking a straight line
   *Instructions:* Walking on a straight line marked on the floor, forwards, backwards and sideways.
   *Emphases for observation:*
   - a. Number of deviations from the line
   - b. Directions of deviations from the line
   - c. Foot position (toe-in/toe-out, foot arches, etc.).

2. Moving forward and stopping on the line
   *Instructions:* Advancing along a straight line or balance beam 10 cm wide at a height of 10–30 cm (depending on child’s age). Occasionally the child is told to stop for a few seconds.
   *Emphases for observation:*
   - a. Dynamic and static balance ability on the beam
   - b. Is the movement characterized by shaking, extra movements and excessive trunk swaying from side to side?
   - c. Self-confidence in movement.

*Figure 7.19* Tests to evaluate balance.
3. Standing on one leg (static balance)
   
   **Instructions:** Balancing the body while standing on one foot, arms extended at shoulder level.
   
   Emphases for observation:
   
   a. Static balance on one foot
   b. Check of ankle joint stability and the ‘response’ of the support foot. Amount of muscular energy invested in the support foot (is it characterized by much movement near the toes?)
   c. Checking balance in other body parts. Do the pelvic area and trunk manifest excessive movements and swaying to maintain balance? Is the body balanced and still or in constant movement?

In cases where children have difficulty performing this test, it is recommended to allow them to touch the diagnostician’s hand lightly. If this light touch helps the children to become stable, the source of the problem may be kinesthetic difficulties in organizing the body, and not necessarily in mechanisms connected to the postural characteristics mentioned.

4. Hopping on one foot
   
   **Instructions:** Moving forward by hops on one foot.
   
   Emphases for observation:
   
   a. Balance ability on one foot during forward movement
   b. Assessment of muscle strength in the hopping foot. Ability to leave the ground and to absorb shocks in the knee and ankle joints when landing.

5. Jumping down into a hoop
   
   **Instructions:** Jumping from a height of 50–100 cm (depending on child’s age) and landing in a hoop placed on a mattress.
   
   Emphases for observation:
   
   a. Checking body’s ability to absorb shocks when landing. Does the child succeed in remaining within the hoop area without losing balance?
   b. Checking knee strength in eccentric contraction of the knee extensor muscles
   c. Self-confidence in jumping.
6. Sudden stop

*Instructions:* From a fast run – stopping suddenly at a pre-agreed signal.

*Emphases for observation:*

a. Can the child stop immediately and maintain body balance, or does he fall in the effort?

b. Assessment of reaction time.

7. Hand–knee stand (six-point stance)

*Instructions:*

- Raising one limb (arm/leg) and stabilizing the body on the other points of support
- Raising opposing arm and leg
- Raising arm and leg on same side

*Emphases for observation:*

a. Ability to balance body on various support points for a few seconds

b. Assessing overall strength in the back and gluteal muscles

c. Checking ability to balance pelvis and lower back using abdominal muscles

d. Coordinative ability in differentiating movements.

8. Standing on all fours

*Instructions:*

- Raising one limb (arm/leg) and stabilizing body on the remaining points of support
- Raising opposing arm and leg.

*Emphases for observation:*

a. Ability to balance body on various support points for a few seconds

b. Assessment of overall strength of shoulder girdle

c. Coordinative ability in separating movements.
Crossing the midline

The midline of the body is an imaginary longitudinal line through the center of the body from top to bottom (Fig. 7.20). This line cuts the body into two halves: right side and left side. Crossing the midline refers to the ability to move one part of the body across this line and function in front of the other side of the body.

The ability to cross the midline is based on overall movement control of all the movement components, among them extension, flexion, side flexion and rotation on the horizontal plane (Ratzon, 1993). In normal conditions, children can rotate their trunk easily to both sides, and the arms accompany the movement and work on the facing side. Coordinative problems characterized by the inability to cross the midline may impact negatively on children's general motor functioning. This faulty functioning will appear as motor clumsiness, rigid movement and postural patterns and difficulties in activities of daily living (ADL) such as writing and dressing oneself.

Tests to evaluate the ability to cross the midline

1. Cross walk on a straight line
   **Instructions**: Walking along a marked straight line, right leg crossing over to left side, and left leg crossing over to right side. Feet should be parallel and next to the marked line.
   Emphases for observation:
   a. Crossing midline with both legs
   b. Balance and width of base of support (distance of feet from the marked line).

2. Rolling from side to side
   **Instructions**: Lying supine on the back with arms at the sides of the body, rolling from side to side, leading with a different arm each time.
   Emphases for observation:
   a. Crossing midline with arms and legs
   b. Movement flow. Does the movement flow or is it choppy?

3. Crawling between cones
   **Instructions**: Crawling between cones set up along a straight line at a distance of 40–60 cm from each other.
   Emphases for observation:
   a. Crossing midline while crawling
   b. Overall movement coordination.
4. Walking in place, hand meeting opposite leg
   
   **Instructions:** Stepping in place, raising knees high and bringing each hand in contact with the opposite knee sequentially throughout the movement.
   
   Emphases for observation:
   
   a. Ability to cross midline with arm movements
   
   b. Overall coordination in diagonal movements.

---

**Basic ball skills**

Evaluating children’s basic ball skills is part of an integrative approach to functioning and makes it possible to obtain important information about overall motor functioning. Movement with a ball is not an isolated, localized phenomenon. Rather, it occurs in constant coordination with all the other parts of the body. For this reason, working with balls is also an effective and enjoyable means of treatment for improving coordination, force regulation, differentiation of movement, movement timing and accuracy.

Evaluating children's abilities in basic ball skills:

- Catching a ball
- Throwing a ball
- Bouncing a ball (dribbling)
- Shooting a ball to a basket or hoop or pail (depending on child’s age).

Emphases for observation:

a. Coordination (arm–leg, eye–hand, eye–foot)
b. Regulation of force, accuracy
c. Differentiation of movement
d. Movement flow and timing
e. Kinesthetic ability.
Gross motor skills

Basic skills are movements children learn to perform as they develop, and on which they will base their future control of their body and their movements. These skills, which include walking, running, jumping, climbing, crawling, rolling, etc., develop naturally in all healthy children, but can be improved by directed experiences and rich motor exposure.

Examination of gross motor skills refers to evaluating children’s abilities and functioning in large, general actions. It is recommended that the following skills in this domain be tested in order to obtain information about overall physical functioning.

Tests to evaluate gross motor abilities

1. Walking
   Emphases for observation:
   a. Movement flow and speed of movement
   b. Base of support (are feet close or far from one another?)
   c. Coordination (do arms and legs swing in opposition or parallel?)
   d. Functioning of feet and ankle joints.
   (Additional parameters for comprehensive diagnosis of the walking cycle are described in Ch. 5).

2. Running
   Emphases for observation:
   a. Coordination
   b. Movement flow (checking for rigidity in muscles of hands, arms, shoulder girdle and face)
   c. Movement speed.

3. Ladder climbing
   Emphases for observation:
   a. Movement planning
   b. Self confidence
   c. Hand grip ability.

4. Forward crawling
   Emphases for observation:
   a. Crossing midline
   b. Coordination
   c. Range of motion in hip joints.
5. Forward broad jumping (on two legs)

   Emphases for observation:
   a. General strength of lower extremities
   b. Balance and ability to stop and absorb shocks
   c. Movement coordination and timing.

**Fine motor skills**

Children’s fine motor skills are assessed by examining their fine movement functioning, which entails control of small muscle groups. Control of the fine skills requires a high level of movement differentiation, force regulation and movement precision, and is directly connected to the ability to control the trunk and shoulder girdle. Therefore, in cases of fine motor skill difficulties, it is recommended to test the trunk and shoulder girdle because stability in their functioning facilitates control of hand movements (the proximo-distal principle of motor development, see Ch. 12). At times, the source of the difficulty will be identifiable through the hand–trunk–shoulder girdle connection, and treatment can be directed accordingly.

Fine hand movement control is reflected in the ability to produce wrist and finger movements independent of the whole hand. This ability to isolate movement is essential for performing an array of fine skills, such as writing and cutting.

The following are some of the skills that enable therapists to assess children’s fine motor functioning. Some of the skills focus on fine motor functions in one hand (drawing, writing), and others test movement coordination between the two hands (beading, tying shoelaces). Some or all of them can be tested, at the diagnostician’s discretion.

- Buttoning
- Lacing and unlacing
- Opening and closing zippers
- Stringing beads
- Copying a coin on paper
- Drawing or writing (depending on the child’s age).

Emphases for observation in performing the various skills:

- Eye–hand coordination and eye focus
- Ability to differentiate movement, force regulation and accuracy
- Overall strength in hand functioning
- Child’s range of attention and concentration.
Other areas of reference in psychomotor diagnosis

Agility and movement speed

Children’s overall functioning in daily activities is affected, among other things, by their ability to execute tasks requiring agility and movement speed; therefore, these aspects of movement should be tested as part of the process of motor skill assessment. Children’s movement agility is measured, among other things, by their ability to change physical position while changing direction during a rapid movement, both in self spatial orientation (for example, the rapid transition from lying to standing), and in general spatial orientation (for instance, the ability to change direction rapidly, effectively, and purposefully while running).

Difficulty in these movement aspects may be reflected in situations in which children’s motor responses are not appropriate to the demands of the situation they are in. Their movements will be characterized by heaviness, they tend to avoid physical activities requiring rapid and agile movement (such as ball games), and at times this situation may cause lack of self-confidence and low self-esteem.

Spatial orientation

Spatial orientation is a first step towards developing motor ability. Spatial perception is a process of recognizing different movement terms, location, amplitude, and directionality. It is based on a familiarity with one’s body, how the body moves about in its own immediate surroundings and how it moves about in relation to others in the surroundings (Ratzon, 1993), e.g., above–below, up–down, left side-middle–right side, large–small, etc.

Spatial orientation can be divided into two main components:

1. *Self spatial orientation*: This refers to the child’s understanding of the movement options available for his body limbs on the various movement planes, while internalizing functional relationships between those body limbs. For example, he will understand that he can bring his chin to his knee, but that he can’t ‘kiss’ his back.

   Self spatial orientation is learned through children’s experiences and activities with their bodies, and when necessary, it can be improved through exercises such as identifying and bringing different limbs together, learning the movement options for a given joint in relation to others, etc.

2. *General spatial orientation*: This refers to the individual’s place in his environment: moving away–moving towards, going up–going down, entering–exiting, etc. The surroundings are perceived basically through the experience and activity in them, when infants begin to crawl, to ‘go into,’ ‘climb onto,’ ‘reach,’ etc. (Ratzon, 1993).
Disorders in these aspects of self and general spatial orientation may be characterized by clumsy movements. There is a tendency to drop things and to bang into people and objects. Such children tend to fall, and often experience difficulties in daily functions such as dressing themselves, washing up, etc.

**Kinesthesia – the feeling of movement**

Normal movement patterns in daily actions are based on individuals’ ability to feel their body limbs and to control various movement components without the need for visual feedback.

Kinesthesia as a perceptual system allows one to maintain normal posture in static situations and in movement when one is aware of the location of the body limbs and is able to regulate the muscle force applied during activation of these limbs.

The main traits of kinesthetic ability were explained earlier, where details were given of the receptors that facilitate the feeling of movement (Golgi, Rafi ni, and Pacini receptors, see Ch. 2). These receptors help to maintain posture and absorb information about movement location, range of motion and rhythm. This important functional aspect is reflected in almost every motor action, whether in sports or in daily functioning.

Kinesthetic ability develops over the years and is based on previous motor experiences. Disabilities in this domain lead to the development of postural disorders, low movement quality and motor clumsiness.

**Body image**

Body image is related to the many aspects of how people see their body and how they internalize functional ties between various body limbs.

Body image is shaped gradually over the years, and it is the product of a large array of factors such as control of body movements and knowing the names and positions of the body limbs. Rich motor exposure and varied movement experience contribute to this process of shaping body image and raising individuals’ awareness of their body.

**Self esteem**

The psychomotor diagnosis and the physical and verbal interactions with the child during diagnosis enable diagnosticians to obtain a picture of a given child’s self esteem as well. Self esteem is nourished by body image but many other factors are also involved in shaping it.

In this respect, diagnosticians should test whether a child’s self esteem is realistic in terms of real skills: does the child exaggerate in estimating personal ability or tend to underestimate true worth, not believing that he or she can succeed in performing any task even though the capability exists?
The behavioral–emotional aspect  The holistic approach in diagnosis makes it possible to obtain important information even about aspects not directly related to a child's physical functioning. Diagnosis and activity create conditions for getting to know the child and for testing his responses to success and to failure. The various stimuli to which the child is exposed during the diagnosis allow him to express his successes, difficulties and frustrations, which usually consist of a broad array of feelings and emotions (Holon Center for Therapeutic Sport, 2000).

Recommended reference points

- Communication – does the child develop ties easily? Is he reachable or otherwise, does he feel comfortable or afraid, does he have trouble being separated from his parents, etc.?
- Self confidence – does the child need constant confirmation and reinforcement for his actions? Does he express fear while performing tasks that require little courage? Does he speak confidently and express himself freely? Does he make eye contact with the diagnostician, etc.?
- Frustration threshold – how does the child respond to difficulty? Does he tend to give up or does he make more effort and insist on succeeding?
- Expressing feeling – does the child cry or laugh a lot? Does he exhibit nervousness or general joyfulness? Does he experience extreme mood swings? Does he demand contact with the diagnostician, or reject him?
- Cooperation and motivation – is the child apathetic and unmotivated, or does he cooperate and reveal motivation and enthusiasm even in less interesting tasks?
- Cognition – does the child understand movement terms, movement directions, shapes, colors, etc.? Does he have difficulty understanding complex tasks and performing them? Does he have a rich language?
- Concentration and attention – is the child restless in his movements? Is he easily distracted? Does he show a tendency to 'jump' from place to place? Does he have a short concentration span? Does he wait patiently for the end of the explanation before performing the task?

In terms of the subject of this chapter, these behavioral–emotional aspects are presented as a means for getting to know the child, but at the same time, it should be remembered that the diagnostic emphasis depends on the type of problem and the information received from the parents (see the first stage of the diagnosis). The behavioral–emotional aspects presented here for testing can be further developed, expanded and emphasized as needed.
Summarizing psychomotor diagnosis data

This section presents a table for summarizing data (Table 2). The purpose of Table 2 is to focus on overall assessment in each domain of the diagnosis, without recording a specific evaluation for each test. The assumption is that a correct professional diagnostic view will create ‘crosschecks of information’ obtained from observations of the various tasks in a given area, thus enabling the diagnostician to give an overall evaluation in that domain.

This approach will help map the desired directions the treatment should take and ways to implement them. This simplification should help diagnosticians or therapists to avoid having to deal with overly detailed data.

As noted, the assessment is subjective and on a scale of 1 (the weakest level of functioning) to 5 (the highest level of functioning). Overall evaluation in each domain is based on a battery of tests for the same skill with reference to the various emphases during observation.

To summarize, presentation of the ways of diagnosing postural disorders indicates the recommended approach during the treatment stage as well, in which the child should not be seen as a mass of joints, muscles, and bones. The most important component is the child’s personality that connects and is ‘connected’ to those joints. Therefore, it is not enough to perform a posture examination; it is necessary to expose the child to a variety of tasks that will reveal not only the physical sides but also other elements in his or her personality. These elements, pertaining to the child’s social, emotional, and cognitive status, may also indicate the source of a given problem and help to select the correct emphases in treatment.

And above all, the general information obtained helps therapists to become acquainted with the child, to come close to him, to create an atmosphere of trust, and of course, to use the material that is revealed about his personality to build an exercise program that will bond to his inner world. This approach, which places the child’s personality and not problematic joints in the spotlight, should be emphasized in adapted physical activity and in other disciplines related to paramedical treatment.
### Table 7.2 Assessment of psychomotor functioning: summary table of diagnostic data

<table>
<thead>
<tr>
<th>TEST AREA</th>
<th>1</th>
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<th>5</th>
<th>QUALITATIVE ASSESSMENT OF MOVEMENT PATTERNS</th>
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<td>A. BASIC SKILLS</td>
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<td>Jumping on two feet</td>
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<td>B. BALL SKILLS</td>
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<td>Catching</td>
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<td>C. FINE MOTOR SKILLS</td>
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<td>D. GENERAL MOTOR ABILITIES</td>
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### E. BEHAVIORAL–EMOTIONAL–COGNITIVE CHARACTERISTICS

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### F. GENERAL EVALUATION


### G. MAIN EMPHASES FOR TREATMENT

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