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Development of a new Motor Development Evaluation Scale for CP diagnosed children (SED-PCI): Phase I—Development of New Items

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Abstract. The aim of our study was to establish initial content validity of a new scale for measuring and quantification of motor development in children with cerebral palsy, SED-PCI (*Scala de evaluare a dezvoltării în paralizia cerebrala infantilă*), and to describe the process, including focus groups, used to develop the item content for this scale. The scale desire to be especially an observational instrument used to evaluate child's motor behaviour and performance.
We established the item bank for SED-PCI, we are describing the process, including focus groups, used to develop the item content for this scale. This study has supplied answers from 15 physiotherapists with expertise in the cerebral palsy rehabilitation field about items relating to motor development. The findings highlight the diverse range of items needed to adequately describe development for this type of pathology at different years of age.
This instrument adapt easily to evaluation program needs that are culturally sensitive in a particular region and ethnic group, and are intended to be useful in community-based programs which usually have limited resources and depend on the efforts of parents and personnel who have little formal training.
Key words: *cerebral palsy, development, fine and gross milestones.*

Introduction

As chronic disorder of movement or posture with cerebral origin, arising in early life and not the result of a progressive disorder (1), Cerebral Palsy (CP) stands worldwide like a common cause of physical disability in early childhood. It has been defined as a group of motor impairment syndromes secondary to a defect or lesion of the immature brain (2), showing a variety of functional limitations of various severity (3).
Cerebral palsy is a static neurologic condition resulting from brain injury that occurs before cerebral development is complete (4). Because brain development continues during the first two years of life, cerebral palsy can result from brain injury occurring during the prenatal, perinatal, or postnatal periods (4, 5). The peripheral manifestations depend on the magnitude, extent, and location of the insult that causes the irreversible damage to the brain, brainstem, or spinal cord. (6) The severity ranges from subtle motor impairment to involvement of the whole body([6]. Even though the lesion itself does not change, the clinical manifestations of the lesion change as the child grows and develops (7).
The motor skills of most children with cerebral palsy improve as they grow, but the rate of improvement is slower in children with cerebral palsy than in unaffected children (7).
Diagnosing cerebral palsy at an early age is important to the future well-being especial of children and their families. One major step in the diagnose is the screening for cerebral palsy applied to the population of the children with development delay. Assessing clinical change in motor function in children with cerebral palsy is a complex measurement task. Whereas a variety of methods have been developed to quantify specific aspects of motor behavior (e.g. gait analysis, electrophysiological tests, energy-consumption techniques), systematic measurement of overall motor function is a more difficult problem (8).
Evaluative measures are designed to evaluate the change over time or in response to an intervention. Responsiveness, or the ability to measure meaningful change over time (9), is a type of validity that is necessary for evaluative measures.

Most evaluative measures are criterion-referenced, meaning that a child is assessed on individual progress on a specific skill (i.e., walking) or domain (i.e., gross motor function), rather than comparing with norms for children without delays. For example, an evaluative measure may measure the child's progress toward walking, rather than comparing the child's ability to walk with typically developing peers.

Usually, a standardized measure of motor development is administered by a physical or occupational therapist. While administering a standardized measure, the therapist simultaneously observes how the child performs tasks in order to evaluate quality of movement and motor planning. On the basis of these observations, the therapist identifies sensory, motor, and musculoskeletal system concerns that require further examination (e.g., sensory processing, strength, balance, skeletal alignment, and range of motion). Future Therapeutical Recommendations are made based on the results of the comprehensive examination.

The literature repeatedly supports the need for measurement instruments that can objectively assess function and quality of movement (e.g., the performance of gross motor activities) in children with cerebral palsy. From 1965 to 1990, various gross motor function instruments were developed that included elements of motor performance. Many of these instruments have not been adequately tested for validity, reliability, and responsiveness in detecting clinically important changes in gross motor performance. It is necessary that an instrument being used to evaluate the effects of treatment over time have a high likelihood of detecting a clinically important treatment effect, even if that effect is small (9). Moreover, in order to most effectively track children's development, systematic screening and monitoring procedures must be developed and implemented. However, there are only a limited number of technically adequate, low-cost evaluation and screening tools. An ongoing barrier to widespread developmental evaluation and screening has been the availability of a cost-effective, valid, and reliable instrument reflective of current diverse demographics.

The review of the literature regarding the motor developmental and function scales, as is revealed in table I, indicates that there is a need to develop a simpler and affordable scale that specifically measures and can quantify motor development in children CP diagnosed.

Table 1. Selected Measures of Motor Developmental and Function

Name	Description	Age range	Types of total scores	Critiques of selected measures
Ages & Stages Questionnaires (ASQ) (10)	Purposes: screens for risk of delays in gross and fine motor, communication, problem-solving, and personal-social skills; Type of test: Parent report Test structure: questionnaires written at a fourth to sixth grade reading level, with illustrations included Time required: 10–15 min	4 to 60 months	2 SD below the mean cutoff score is used for questionnaires at 4, 8, 12, 16, 24, 30 & 36 months 75 develop. Quotient is the cut-off for questionnaires at 6, 10, 14, 18, 22, 27 & 33 months.	
Bayley Scales of Infant Development, 2nd Ed. (BSID-II) (11)	Purposes: to identify developmental delay, to monitor developmental progress Type of test: Norm-referenced Test structure: Motor scale (fine and gross motor); mental scale (language and perceptual); behavior rating scale Time required: 25–60 min	1 month to 3.5 years	Age equivalent, developmental index (mental and motor), percentile rank (behavioral)	The inability to differentiate gross and fine motor development. The number of items (111 total) does not provide for a comprehensive measure of motor development. Items are scored as credit or no credit without accounting for emerging ability. For preschool-aged children, the age range is somewhat limited such that another measure would need to be administered after age 3 ½ years.
Gross Motor Function Measure (GMFM) (12)	Purposes: to measure change over time in gross motor function in children with cerebral palsy; to use for intervention planning Type of test: Criterion-referenced Test structure: Five dimensions: -Lying/rolling -Sitting -Crawling/kneeling -Standing -Walking/running/jumping Time required: 45–60 min	Not specified	GMFM-88: percentage score; GMFM-66: interval-level total score	Because the items are administered in a controlled environment, scores on the GMFM reflects capability (what a child can do) instead of performance (what a child does do) in everyday settings (13). Quality of movement is assessed with a companion measure the Gross Motor Performance measure (14).

Pediatric Evaluation of Disability Inventory (PEDI) (15)	Purposes: to measure functional capabilities and performance; to monitor progress in rehabilitation; to use as an outcome Measure Type of test: Norm-referenced, criterion-referenced Test structure: Three scales (functional skills, caregiver assistance, modifications) in 3 content domains: self-care, mobility, and social function Time required: 20–60 min	6 months to 7.5 years	Normative standard score, scaled score (criterion-referenced), fit score (compared with expected Rasch fit)	With more than 200 items, it is time consuming to administer all three domains for the Functional Skills and Caregiver Assistance scales, and thus, its use is limited in many practice settings (16).
Toddler Infant Motor Evaluation™ (T.I.M.E.) (17)	Purposes: to identify children with motor problems; to identify patterns of movement Type of test: Norm-referenced Test structure: Primary subtests: -Social-emotional -Mobility -Motor organization -Stability -Functional performance Clinical subtests: -Quality rating -Component analysis -Atypical positions Time required: 10–55 min	4 months to 3.5 years	Standard score, percentile, rank, growth score (motor organization subtest)	The entire test is lengthy, but can provide detailed information about the child's movement patterns. The scoring system is complex and may initially be cumbersome and lengthy for some examiners, especially for novice practitioners (18). Therapists may need to videotape test administration so that the detailed scoring system can be completed later (19).
Peabody Developmental Motor Scales, 2nd Ed. (PDMS-2) (20)	Purposes: to estimate motor competence relative to peers; to compare gross and fine motor skills Type of test: Norm-referenced Test structure: Fine motor and gross motor scales; 6 subtests (GM scale): -Reflexes -Stationary -Locomotion -Object manipulation -Grasping -Visual-motor integration Time required: 45–60 min	Birth to 6 years	Age equivalent, percentile rank, standard score (subtests), composite quotient (fine and gross motor)	While Folio and Fewell (20) indicate that the PDMS-2 can be used for both discriminative and evaluative purposes, there is no evidence of responsiveness to change for children with disabilities. As an evaluative measure, therefore, the PDMS-2 may be appropriate for children with motor delays, but not for children with specific neuromotor impairments (21).

The process for creating SED-PCI has involved the development of new items to create an item bank in the two functional domains of gross and fine motor function for a newly developed Scale. The method for item bank development was the focus groups method (22). Focus groups help to determine both general themes and specific ideas of participants about particular issues, products, and/or services and can, thus, be used to identify functional activities for new test items (22, 23).
The aim of our study was to establish initial content validity of a new scale for measuring and quantification of motor development in children with cerebral palsy, SED-PCI (*Scala de evaluare a dezvoltării în paralizia cerebrală infantilă*), and to describe the process, including focus groups, used to develop the item content for this scale.

Methods

The process of developing an item bank for SED-PCI included two phases. *Phase I* - Development of New Items, included generating of an expanded set of items using a review of existing measures, expert review and focus groups. *Phase II* - Item Revision, which include a series of interviews (figure 1).

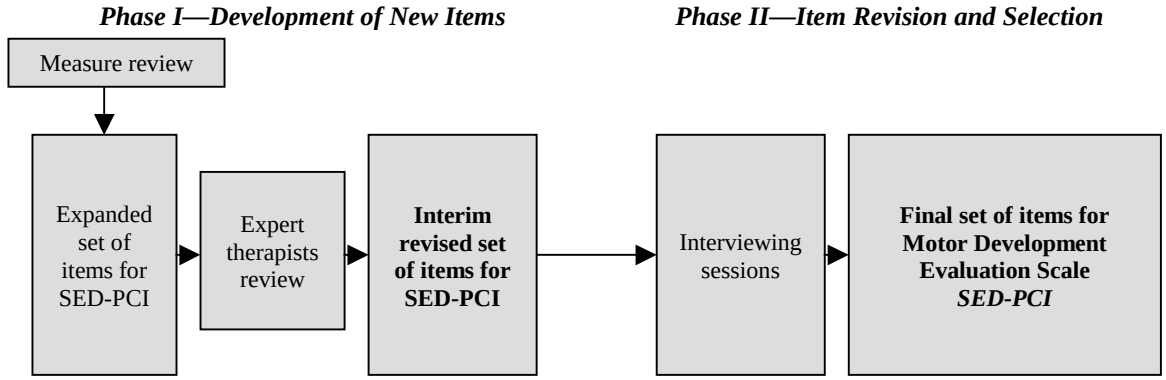

Figure 1. Development process for SED-PCI item content

Phase I—Development of New Items. A comprehensive review of 6 existing developmental pediatric measures in the content domains of mobility, gross and fine motor function was conducted by the project team, which included three specialist physicians and two additional physical therapists. Measures presented in table 1 were examined for content, age equivalents, item definition, response option type (e.g., frequency, level of difficulty, amount of assistance), types of total scores and the critiques of selected measures.

The project team developed an expanded set of items for the functional domains of gross motor and fine motor development and revised the response options from a two-point (unable/capable, 0/1) to a four-point scale (unable, early stage/more competent/capable to complete the specified skill, 0/1/2/3).

Subjects and procedure. Physiotherapists were recruited from *8* different settings within the children rehabilitation and physiotherapy field, including public and private rehabilitation clinics, private practice clinics, home and research settings. Physiotherapists were recruited through personal and professional contacts if they satisfied the following criteria: active in clinical practice and having expertise in child development, measurement of children's daily activities in home and community contexts, instrument design, validation, and score construction. In addition, these experts therapists were experienced users of children motor evaluation scales. The expanded set of items was sent via electronic mail to 15 physical and occupational therapists.

Table 2 provides a description of the participants at phase I. Via electronic questionnaire; we collected feedback regarding content coverage, content relevance, and individual item clarity.

Instrument. An open-ended questionnaire was designed to investigate what items are more important to include on a new evaluation measure of motor development for CP diagnosed children. Four of the project team members examined drafts of the questionnaire to ensure completeness, clarity, and applicability. Few minor revisions were made. According to correct procedures for designing questionnaires (24, 25) the final draft was pre-tested by the fifth team member, expert physiotherapist, and final minor revisions made. Therapists were provided with the expanded list of items and asked to respond to the following questions: (a) Select the 10 most appropriate motor skills for the respective age category, (b) Are there other important motor skills in each domain that should be addressed?, (c) Are the items written clearly for therapists and/or clinicians to understand and respond to?, and (d) Which response option would you choose: two-point or four-point scale?.

Phase II—Item Revision and Selection. Following additions and revisions to the expanded item bank based on the Phase I feedback, a convenience sample of 10 therapists will be recruited. To be eligible for inclusion, participants would have to be the physical therapists, without expertise in child development. Once the participant will be identified as having met the eligibility criteria and provided informed consent, the interviewing sessions will be scheduled.

Results

The subjects were the 15 physiotherapists from 8 different centers from Craiova within the child physiotherapy field. Physiotherapists were recruited through personal contacts if they satisfied the presented criteria: physiotherapists with expertise in cerebral palsy rehabilitation; with a minimum of five years' experience and currently practicing in the field.

Table II. Characteristics of panel of physiotherapists participating in SED-PCI selecting items

No.	Background	Years of experience	Education	Age	Sex	Employment setting	Location
1	Pediatrics, neurology	6	MSc (PT)	30	F	Public rehabilitation clinic	Craiova
2	Occupational therapists	10	BSc (Psih)	35	F	Public rehabilitation clinic	Craiova
3	Occupational therapists	11	BSc (Psih)	36	F	Public rehabilitation clinic	Craiova
4	Occupational therapists	16	BSc (Psih)	44	F	Public rehabilitation clinic	Craiova
5	Pediatrics, rehabilitation	12	MSc (PT)	40	M	University, hospital	Craiova
6	Pediatrics	6	MSc (PT)	29	F	Private rehabilitation clinic	Craiova
7	Pediatrics	7	MSc (PT)	31	M	Private rehabilitation clinic	Craiova
8	Pediatrics, neurology	10	MSc (PT)	34	F	Public rehabilitation clinic	Craiova
9	Pediatrics, rehabilitation	7	MSc (PT)	32	F	Public rehabilitation clinic	Craiova
10	Occupational therapists	15	MSc(Psih)	45	F	Public rehabilitation clinic	Craiova
11	Pediatrics, neurology	11	MSc (PT)	38	F	University, hospital	Craiova
12	Pediatrics, neurology	15	MSc (PT)	41	M	University, hospital	Craiova
13	Pediatrics	10	MSc (PT)	36	M	Private rehabilitation clinic	Craiova
14	Pediatrics	8	MSc (PT)	34	F	Private rehabilitation clinic	Craiova
15	Pediatrics	9	MSc (PT)	44	F	Private rehabilitation clinic	Craiova

Characteristics of physiotherapists agree to participate to SED-PCI selecting items are presented in the table above. The fifteen highly experienced physiotherapists (11 females, 4 males) have a mean age of 36.6 years (SD =5.23, range = 29-45) and a mean of 10.2 years' experience in CP physiotherapy (SD = 3.23; range = 6-16). The items were coded and statistical analyzed to provide a comprehensive list of tasks. A wide range of responses was received like feedback for each item that we propose. Consequently, the items with fewer responses were omitted like we present in *tables* III and IV, showing the items included, and excluded, in SED-PCI by the 15 physiotherapists for each question in the open-ended questionnaire.

The statistic analyze of the frequency of responses help us to establish all the ten item remained for each development age category that we propose, so all the items that present the major score will make part of our final SED-PCI scale.

Regarding the response options, 10 physiotherapists decided for a two-point scoring (unable/capable, 0/1), and 5 physiotherapist for the four-point scale (unable, early stage/more competent/capable to complete the specified skill, 0/1/2/3).

Table III. Selected and eliminated items of SED-PCI for the period 3 month – 18 month of age

	AGE 3 MONTHS	***AGE 6 MONTHS***	***AGE 9 MONTHS***	***AGE 12 MONTHS***	***AGE 15 MONTHS***	***AGE 18 MONTHS***
SELECTED ITEMS	**1.** Lying on back, lie with head in midline most of the time. **2.** Waves booth arms symmetrically, hands loosely open. **3.** Kicks vigorously, legs alternating or occasionally together. **4.** When pulled to sit, little or no head lag. Head held erect and steady for several seconds before *bobbing* forwards. **5.** In ventral suspension, head held well above line of body, hips and shoulders extended. **6.** Lying on abdomen, lifts head and upper chest well up in midline, using forearms to support and often actively scratching at surface with hands, buttocks flat. **7.** Held sitting, back is straight except in lumbar region. **8.** Brings hands together in midline over chest or chin. **9.** When lying supine, watches movement of own hands before face and engages in finger play, opening and closing hands and pressing palms of hands together. **10.** Held standing with feet on hard surface, sags at knees.	**1.** Lying on back raises head up and moves arms up to be lifted. **2.** When hands grasped, braces shoulders and pulls self to sitting. **3.** Sits with support, head and back straight and turns head from side to side to look around. (Independent sitting without support is achieved from 5 to 9 months.). **4.** Can roll over from front to back (prone to supine) and usually from back to front (supine to prone). **5.** Placed on abdomen, lifts head and chest well up, supporting self on extended arms and flattened palms. **6.** Anterior protection. **7.** May attempt to grasp cup if used while feeding. **8.** Manipulates objects attentively, passing them frequently from hand to hand. **9.** Able to bear almost all body weight when supported in a standing position **10.** Reaches out to grasp with both hands.	**1.** Pulls self to sitting position. **2.** Sits unsupported on the floor and can adjust body posture when leaning forward to pick up and manipulate a toy without losing balance. **3.** Can turn body to look sideways while stretching out to pick up toy from floor. **4.** Progresses on floor by rolling, wriggling on abdomen or crawling. **5.** Pulls to standing, holding on to support for a few moments but cannot lower self and falls backwards with a bump. **6.** Held standing, steps purposefully on alternate feet. **7.** Immediately stretches out to grasp a small toy when offered, with one hand leading. **8.** Manipulates toy with a lively interest, passing from hand to hand and turning over. **9.** When being carried by an adult, supports self in upright position and turns head to look around. **10.** Grasps string between finger and thumb in scissor fashion in order to pull toy towards self.	**1.** Sits unsupported on floor for indefinite time. **2.** Can rise to sitting position from lying down with ease. Pulls to standing and sits down again, holding onto furniture. **3.** Crawls on hands and knees, shuffles on buttocks or 'bear walks' rapidly about the floor. **4.** May stand alone for a few moments. **5.** Walks forwards and sideways with one or both hands held. **6.** Drinks well from cup with little assistance. **7.** Uses both hands freely but may show preference for one. **8.** Holds two toy bricks, one in each hand with tripod grasp, and bangs together to make noise. **9.** Helps with dressing by holding out arm for sleeve and foot for shoe. **10.** Will put objects in and out of cup or box when shown.	**1.** Stands without pulling up. **2.** May walk alone, usually with uneven steps: feet wide apart, arms slightly flexed and held above head or at shoulder level for balance. **3.** Walks with broad base, high stepping gait and steps of unequal length, starting voluntarily but frequently stopped by falling or bumping into furniture. **4.** Lets self down from standing to sitting by collapsing backward with a bump, or by falling forwards on hands and then back to sitting. **5.** Watches small toy pulled across floor and stops to pick up. **6.** Manipulates cubes and may build a tower of two cubes after demonstration. **7.** Can take objects out of container and replace fairly precisely, e.g., pegs in holes. **8.** Grasps crayon with whole hand, using palmar grasp. **9.** Pushes large, wheeled toy with handle on level ground. **10.** Carries objects, toys, watches where things fall., looks for hidden toy.	**1.** Walks well with feet only slightly apart, starts and stops safely. **2.** No longer needs to hold upper arms in extension to balance. **3.** Runs rather stiffly though seldom falls. **4.** Runs carefully, head held erect in midline, eyes fixed on ground 1–2 meters ahead but finds difficulty in negotiating obstacles. **5.** Pushes and pulls large toys or boxes along the floor and can carry large doll or teddy bear while walking. **6.** Backs into small chair or slides in sideways to seat self. **7.** Enjoys climbing and will climb forwards into adult's chair, then turn round and sit. **8.** Walks upstairs with helping hand and sometimes downstairs. **9.** Picks up small objects immediately on sight with delicate pincer grasp. **10.** Enjoys simple picture books and turns several pages at a time.
ELIMINATED ITEMS	1. Holds rattle for a few moments when placed in hand, may move towards face – sometimes bashing chin 2. Moves head deliberately to gaze attentively around. 3. Reaches out to grasp with both hands 4. Limbs with movements smoother and more continuous. 5. Follows dangling toy at 15–25 centimeters from face through half circle horizontally from side to side and usually also vertically from chest to brow.	1. Takes everything to mouth. 2. Initially spits out food using back-and-forth tongue movements. 3. Gradually learns to suck food from spoon. 4. Reaches with one hand. 5. Able to sit in a high chair with a straight back. 6. Can hold head steady while sitting	1. Can reach and grasp a moving object by moving towards the anticipated position of the moving object. 2. Pokes at small object with index finger and begins to point at more distant object with same finger. 3. Looks in correct direction for falling or fallen toys. 4. Shakes a rattle, explores it with a finger and bangs on floor. 5. Tries to grasp spoon when being fed.	1. Points with index finger at objects of interest. 2. Drops and throws toys forwards deliberately and watches them fall to ground. 3. Manipulates toys and will shake to make noise. 4. May crawl upstairs. 5. May walk two or three steps 6. Sits, or sometimes stands, without support while dressed by career. 7. Goes from belly to back to sitting 8. May walk alone.	1. Holds and drinks from a cup. 2. Helps more constructively with dressing. 3. Attempts to hold spoon, brings it to mouth and licks it but is unlikely to prevent it turning over.	1. Creeps backwards downstairs or occasionally bumps down a few steps on buttocks facing forwards. 2. Holds pencil in mid- or upper shaft in whole hand in a pronated grip, or with crude approximation of thumb and fingers. 3. Builds tower of three cubes after demonstration and sometimes spontaneously. 4. Assists with dressing and undressing, taking off shoes, socks and hat, but seldom able to replace.

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Table IV. Selected and eliminated items of SED-PCI for the period 24 months – 5 years of age

	AGE 24 MONTHS	***AGE 30 MONTHS***	***AGE 3 YEARS***	***AGE 4 YEARS***	***AGE 5 YEARS***
SELECTED ITEMS	**1.** Walks alone using heel-toe walking pattern. **2.** Stands on tiptoe. **3.** Walks backward a distance of 6 feet. **4.** Runs safely on whole foot, rarely falling, stopping and starting with ease and avoiding obstacles. **5.** Squats with complete steadiness to rest or to play with an object on the ground and rises to feet without using hands. **6.** Pushes and pulls large, wheeled toys easily forwards and usually able to walk backwards pulling handle. **7.** Jumps off floor with both feet, jumps over small object such as a chalkboard eraser. 8**.** Kicks a ball and throws it overhand and forwards, without falling over. **9.** Sits on small tricycle but cannot use pedals. Propels vehicle forwards with feet on floor. **10.** Goes up and down stairs alone, with both feet on each step walks up stairs, alternating feet, with one hand held.	**1.** Runs well with better coordination and climbs easy nursery apparatus. **2.** Walks upstairs confidently and downstairs holding rail, two feet to a step. **3.** Pushes and pulls large toys skillfully but may have difficulty in steering them around obstacles. **4.** Can jump with two feet together from a low step. **5.** Throws ball from hand somewhat stiffly at body level and kicks large ball but gently and lopsidedly. **6.** Builds tower of seven-plus cubes using preferred hand. **7.** Inserts square, circular and triangular shapes in a jigsaw by recognizing the shape. **8.** Holds pencil in preferred hand, with improved tripod grasp. **9.** Imitates horizontal line and circle, and usually 'T' and 'V'. **10.** Eats skillfully with spoon and may use a fork.	**1.** Bends over without falling. **2.** Walks alone up stairs using alternating feet one foot to each step, comes down stairs two feet to a step and can carry large toy. **3.** Walks forwards, backwards, sideways, etc., hauling large toys with complete confidence. **4.** Can stand and walk on tiptoe. **5.** Can stand momentarily on one (preferred) foot when shown. 6. Can pull pants down and up but needs help with buttons and other fastenings. 7**.** Can throw a ball overhand and catch large ball on or between extended arms and kicks ball forcibly. **8**. Builds tower of nine or ten cubes. **9.** Can close fist and wiggle thumb in imitation, right and left. **10.** Holds pencil near the point in preferred hand, between the first two fingers and thumb, and uses it with good control.	**1.** Walks or runs alone up and down stairs, one foot to a step in adult fashion. **2.** Navigates self-locomotion skillfully, turning sharp corners, running, pushing and pulling. **3.** Can stand, walk and run on tiptoe. **4.** Holds and uses pencil in a dynamic tripod grasp with good control, like adults. **5.** Stands on one (preferred) foot for 3–5 seconds and hops on preferred foot. **6.** Arranges and picks up objects from floor by bending from waist with knees extended. **7.** Sits with knees crossed. **8.** Washes and dries hands, brushes teeth. **9.** Builds tower of ten or more cubes and several bridges of three from one model on request or spontaneously. **10.** Imitates spreading of hand and bringing thumb into opposition with each finger in turn, right and left.	**1.** Walks easily on narrow line. **2.** Runs lightly on toes. **3.** Active and skillful in climbing, sliding, swinging, digging and doing various 'stunts'. **4.** Can stand on one foot for 8–10 seconds, right or left, and usually also stands on preferred foot, with arms folded. **5.** Can hop 2 or 3 meters forwards on each foot separately. **6.** Grips strongly with either hand. **7.** Holds the cubes with the ulnar fingers tucked in and the hand diagonal to get a better view. **8.** Builds elaborate models when shown, such as three steps with six cubes from model; sometimes four steps from ten cubes. **9.** Good control in writing and drawing with pencils and paint brushes, writes a few letters spontaneously. **10.** Can cut a strip of paper neatly and uses knife and fork competently.
ELIMINATED ITEMS	1. Walks upstairs and downstairs holding on to rail or wall, two feet to a step. 2. Holds a pencil well down shaft towards point, using thumb and first two fingers. 3. Puts on hat and shoes. 4. Good manipulative skills; picks up tiny objects accurately and quickly and places down neatly with increasing skill. 5. Can match square, circular and triangular shapes in a simple jigsaw. 6. Feeds self competently with a spoon but is easily distracted.	1. Can kick ball without losing balance. 2. Can browse through book one page at a time. 3. Able to turn a door knob. 4. Can pick up objects while standing without losing balance. 5. Pulls down pants when using the toilet but seldom is able to replace them.	1. Usually jumps from bottom step with two feet together. 2. Eats with a fork and spoon. 3. Can sit with feet crossed at ankles. 4. Cuts with toy scissors. 5. Rides tricycle using pedals and can steer it round wide corners. 6. Washes hands but needs adult supervision with drying. 7. Can turn around obstacles and corners while running and also while pushing and pulling large toys.	1. Can undress and dress except for laces, ties and back buttons. 2. Expert rider of tricycle, executing sharp U-turns easily. 3. Beginning to name drawings before production. 4. Throws ball overhand. Kicks ball forward 5. Climbs ladders and trees. 6. Shows increasing skill in ball games, throwing, catching, bouncing, kicking, etc., including use of bat. 7. Hops and stands on one foot. 8. Builds three steps with six cubes after demonstration.	1. Can bend and touch toes without flexing knees. 2. Moves rhythmically to music. 3. Undresses and dresses alone. 4. Throws and catches a ball well, though catching with one hand does not develop until 9–10 years. 5. Plays all varieties of ball games with considerable ability, including those requiring appropriate placement or scoring, according to accepted rules. 6. Copies square and, at 5½ years, a triangle. Also copies letters 'V' , 'T' , 'H', 'O', 'X', 'L', 'A', 'C', 'U' and 'Y'.

Discussions

The purpose of this study was to describe the process of developing an item bank for SED-PCI, a new scale for assessing the gross and fine motor abilities. To establish the new items we make an integrated synthesis of the available literature, starting out with a clear idea of the question regarding the gross and fine motor acquisition from birth to 5 years for the normal child. The development surveillance and examination expertise from our subjects was use in the comparative knowledge to identify developmental concerns item for the scale. This study has supplied answers from 15 physiotherapists with expertise in the cerebral palsy rehabilitation field about items relating to motor development. The findings highlight the diverse range of items needed to adequately describe development for this type of pathology at different years of age.

Our principal idea of this work was to create a scale, and using the analysis of the information gathered in these areas (gross and fine motor development), making it relatively easy for the practitioner to use it in identification a child's motor competence or to identify motor impairment even at an early age. The development of the brain and nervous system follows a predictable pattern that is determined intrinsically. Gessel in the early 1900 (26) was the first to establish developmental norms that are signals of the function of neurologic maturation and growth, development ,,milestones'' that are the basis of the practice for the therapist involved in the child health representing "red flags" (warning behaviors) symbolic of developmental deficits and can be the basis of the assessment and surveillance of child development.

The purposed scale can be a routine exam of developmental diagnosis and clinical monitoring, that identifies quickly problems and risks in children and can focus and orientate on more detailed assessment and develop an understanding of the goals for developmental monitoring.

Cerebral palsy is a clinical diagnosis made by an awareness of risk factors, regular developmental screening of all high risk babies and neurological examination. As in all medical conditions, a systematic approach focusing on maternal, obstetric and perinatal histories, review of developmental milestones, and a thorough neurological examination and observation of the child in various positions such as supine, prone, sitting, standing, walking and running is mandatory (27).

It is not possible to diagnose CP in infants less than 6 months except in very severe cases. The patterns of various forms of CP emerge gradually with the earliest clues being a delay in developmental milestones and abnormal muscle tone. In CP, the history is nonprogressive. Milestones once acquired do not show regression in CP (29). Early detection of developmental problems is greatly facilitated when quality instruments are deployed (29). Screening measures should be used in the context of developmental surveillance; the longitudinal process of incorporating professional observations into decision-making about children's developmental needs (30).

It is recommended that the assessment of children who have a motor disorder focus on the use of functional tests and measures to help ensure that the emphasis of the treatment programs will be meaningful to both the child and the family. These tests are useful in determining treatment goals and treatment planning. Traditional assessment models focus on the presence or absence of pathology (30). In order to track gross motor function longitudinally in children with cerebral palsy, valid and reliable assessments are required that are responsive to change (31). Ideally, such assessments should be appropriate, reliable, and easy to apply and should require minimal training.

Conclusions

For the health care professionals it is important to understand typical motor development in young children in order to make appropriate observations about the child's development, easy recognition of potential motor problems for the purpose to facilitate appropriate intervention strategies and in developmental surveillance and strategies. This instrument adapt easily to evaluation program needs that are culturally sensitive in a particular region and ethnic group, and are intended to be useful in community-based programs which usually have limited resources and depend on the efforts of parents and personnel who have little formal training.

The scale SED-PCI identify those children who are at risk of developmental problems or those who are showing some evidence already of a developmental problem but is not intended to completely describe the child's developmental characteristics. The goal of such a broad classification is to identify children who appear relatively normal; such information at a

community level could provide important data concerning the frequency and distribution of developmental risk and problems which would be impractical to obtain on a massive scale using more detailed instruments. External validity of the study for development of new items are generalizable to similar conditions. The findings of the current study represent the first step in the validation process for a motor evaluation scale for CP diagnosed children.

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