A report: the definition and classification of cerebral palsy April 2006

Report Executive Committee:
Peter Rosenbaum (Definition Panel Chair) MD, *CanChild* Centre for Childhood Disability Research, Hamilton, Ontario, Canada.
Nigel Paneth (Classification Panel Chair) MD, Department of Epidemiology, Michigan State University, East Lansing, MI, USA.
Alan Leviton MD, Neuroepidemiology Unit, Children's Hospital, Boston, MA, USA.
Murray Goldstein* (Co-Chair) DO, MPH, United Cerebral Palsy Research & Educational Foundation, Washington DC, USA.
Martin Bax (Co-Chair) DM, FRCP, Division of Paediatrics, Obstetrics and Gynaecology, Imperial College, London, UK.

Panel Consultants:
Diane Damiano PhD PT, Washington University Department of Neurology, St. Louis, MO, USA.
Bernard Dan MD, PhD, Hôpital Universitaire des Enfants, Reine Fabiola, Université Libre de Bruxelles, Brussels, Belgium.
Bo Jacobsson MD, PhD, Perinatal Center, Sahlgrenska University Hospital East, Goteborg, Sweden.

**Correspondence to* Murray Goldstein, UCP Research and Educational Foundation; Suite 700, 1660 L Street NW, Washington, DC, USA 20036.

For a variety of reasons, the definition and the classification of cerebral palsy (CP) need to be reconsidered. Modern brain imaging techniques have shed new light on the nature of the underlying brain injury and studies on the neurobiology of and pathology associated with brain development have further explored etiologic mechanisms. It is now recognized that assessing the extent of activity restriction is part of CP evaluation and that people without activity restriction should not be included in the CP rubric. Also, previous definitions have not given sufficient prominence to the non-motor neurodevelopmental disabilities of performance and behaviour that commonly accompany CP, nor to the progression of musculoskeletal difficulties that often occurs with advancing age. In order to explore this information, pertinent material was reviewed on July 11–13, 2004 at an international workshop in Bethesda, MD (USA) organized by an Executive Committee and participated in by selected leaders in the preclinical and clinical sciences. At the workshop, it was agreed that the concept 'cerebral palsy' should be retained. Suggestions were made about the content of a revised definition and classification of CP that would meet the needs of clinicians, investigators, health officials, families and the public and would provide a common language for improved communication. Panels organized by the Executive Committee used this information and additional comments from the international community to generate a report on the Definition and Classification of Cerebral Palsy, April 2006. The Executive Committee presents this report with the intent of providing a common conceptualization of CP for use by a broad international audience.

Cerebral palsy (CP) is a well-recognized neurodevelopmental condition beginning in early childhood and persisting through the lifespan. Originally reported by Little in 1861 (and originally called 'cerebral paresis'), CP has been the subject of books and papers by some of the most eminent medical minds of the past one hundred years. At the end of the 19th century, Sigmund Freud and Sir William Osler both began to contribute important perspectives on the condition. From the mid-1940s, the founding fathers of the American Academy for Cerebral Palsy and Developmental Medicine (Carlson, Crothers, Deaver, Fay, Perlstein, and Phelps) in the United States, and Mac Keith, Polani, Bax and Ingram of the Little Club in the United Kingdom, were among the leaders who moved the concepts and descriptions of CP forward and caused this condition to become the focus of treatment services, advocacy, and research efforts.

It has always been a challenge to define 'cerebral palsy', as documented by the number of attempts that have been made over the years. For example, Mac Keith and Polani (1959) defined CP as 'a persisting but not unchanging disorder of movement and posture, appearing in the early years of life and due to a non-progressive disorder of the brain, the result of interference during its development.' In 1964, Bax reported and annotated a definition of CP suggested by an international working group that has become a classic and is still used. It stated that CP is 'a disorder of movement and posture due to a defect or lesion of the immature brain.' Though this brief sentence is usually all that is cited by authors, additional comments were added by Bax: 'For practical purposes it is usual to exclude from cerebral palsy those disorders of posture and movement which are (1) of short duration, (2) due to progressive disease, or (3) due solely to mental deficiency.' The group for which Bax was the reporter felt that this simple sentence could be readily translated into other languages and hoped that it might be universally accepted. At that time, it was felt that it was wiser not to define precisely what they meant by 'immature brain', as any such definition might limit services to those in need. Like its predecessors, this formulation of the CP concept placed an exclusive focus on motor aspects, and also stressed the specific consequences of early as opposed to late-acquired brain damage. Not formally included in the concept were sensory, cognitive, behavioral and other associated impairments very prevalent in people with 'disordered movement and posture due to a defect or lesion of the immature brain', and often significantly disabling.

The heterogeneity of disorders covered by the term CP, as well as advances in understanding of development in infants with early brain damage, led Mutch and colleagues to modify the definition of CP in 1992 as follows: 'an umbrella term covering a group of non-progressive, but often changing, motor impairment syndromes secondary to lesions or anomalies of the brain arising in the early stages of development.' This definition continued to emphasize the motor impairment and acknowledged its variability, previously underscored in the MacKeith and Polani definition; it also excluded progressive disease, a point introduced in Bax's annotation.

In response to the emerging need to evaluate the status of information about cerebral palsy and revisit the language presently used to describe it, an International Workshop on Definition and Classification of Cerebral Palsy was held in Bethesda, Maryland (USA), on July 11–13 2004, co-sponsored by United Cerebral Palsy Research and Educational Foundation in the USA and the Castang Foundation in the United Kingdom: support was provided by the National Institutes of Health/ National Institute of Neurological Disorders and Stroke and the Dana Foundation. The task of the participants (listing follows) was to revisit and update the definition and classification of cerebral palsy in light of emerging understanding of developmental neurobiology and changing concepts about impairments, functional status and personal 'participation'. Reassessment of the definition of CP was prompted by a host of factors: changes in delivery of care to children with disabilities; recognition that children with slowly progressive inborn errors of metabolism can present with motor difficulties at times indistinguishable from those of children with nonprogressive disease; increased availability of high-quality brain imaging to identify impairments in brain structure; acknowledgment that developmental motor impairment is almost invariably associated with a range of other disabilities; and increased understanding about associated antecedents and correlates of CP.

The Workshop participants agreed that CP as conceptualized previously had proved to be a useful nosologic construct, but that previous definitions had become unsatisfactory. They underlined that CP is not an etiologic diagnosis, but a clinical descriptive term. Reservations were expressed about the exclusive focus on motor deficit, given that persons with neurodevelopmental disabilities often present impairments of a wide range of functions that may or may not include severe motor manifestations, thereby calling for the need of an individualized, multidimensional approach to each affected person's functional status and needs. However, it was suggested that **the concept 'cerebral palsy' be retained** to serve diagnostic, management, epidemiologic, public heath, and research purposes. It was felt that an updated definition of CP, taking into account recent advances in the understanding of the physiology of and pathology associated with brain development, as well as changes in terminology, should be developed for international use. The updated definition needed to meet the requirements associated with these purposes, as well as to enhance communication among clinicians, scientists and the public. As in the prior concept, it was agreed that **the motor disorder needed to be emphasized; however, recognition should be provided that other developmental disorders of performance and behaviour can and often do accompany it**. This emphasis on the motor disorder is stipulated in that children with CP most often present for medical attention because of motor abnormalities, even if they have other developmental problems.

To underline the idea that a comprehensive approach to CP needs to be multidimensional and that management of patients with CP almost always requires a multidisciplinary setting, classes of disorders commonly accompanying CP have been identified and included in the revised definition. This addition reflects the concept that CP is one group of neurodevelopmental disorders which involve numerous developing functions. As in other neurodevelopmental disorders, various manifestations of the disordered brain may appear more significant in different persons or at different life periods, e.g. some aspects of the motor impairment, sensory loss, intellectual disability, attentional difficulty, epilepsy, musculoskeletal dysfunction and many others may be more prominent or more problematic at different stages of the life of a person with CP.

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What follows is: The Definition and Classification of Cerebral Palsy, April 2006, an annotated explanation of the terms used, and the thinking behind the choice of those words. This material was authored by the members of the Executive Committee functioning in panels enriched with expertise from consultants and by comments and suggestions from many reviewers responding to drafts provided to the international community. The Definition and Classification of Cerebral Palsy, April 2006 document is offered for international consensus and adoption, with the intent of providing a broad spectrum of audiences with a common conceptualization about cerebral palsy.

I. Definition of cerebral palsy

Cerebral palsy (CP) describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication, and behaviour, by epilepsy, and by secondary musculoskeletal problems.

ANNOTATION

Cerebral palsy (CP)[1] describes a group[2] of permanent[3] disorders[4] of the development[5] of movement and posture[6] causing[7] activity limitation,[8] that are attributed to[9] non-progressive[10] disturbances[11] that occurred in the developing fetal or infant[12] brain.[13] The motor disorders of cerebral palsy are often accompanied by[14] disturbances of sensation,[15] perception[16], cognition,[17] communication, and behaviour, by epilepsy[20], and by secondary musculoskeletal problems.[21]

COMMENTARY ON THE TERMS AND CONCEPTS

It is hoped this annotation of the definition will clarify the CP concept and allow unified use of the term both within and across the concerned fields. As it relies essentially on clinical aspects and does not require sophisticated technology, it should be possible to apply this definition very widely.

1. 'Cerebral palsy (CP)' – It is generally agreed that the CP concept, essentially a clinical formulation based on phenomenology, remains useful in the current state of nosology, insofar

as the term describes a prevalent, clinically important and identifiable group of persons with neurodevelopmental disabilities. Although the word 'palsy' has become largely obsolete in medical nosography and has no univocal connotation, the term 'cerebral palsy' is established in the literature and is used universally by clinicians, therapists, epidemiologists, researchers, policy makers, health care funding organization and lay persons. The term 'CP' has, however, been variably used, with poor comparability across different places and times, indicating the need for an internationally acceptable definition. The term cerebral palsy (CP) has been retained to relate future research in CP to existing published work.

The following explanations are offered to clarify several aspects of the definition of CP:

2. 'a group' – There is general agreement that CP is a heterogeneous condition in terms of aetiology as well as in types and severity of impairments. Several groupings are possible and warranted to serve different purposes. These groupings may show overlap. Therefore, the singular form 'CP' is used (as opposed to 'cerebral palsies').

3. 'permanent' – This definition excludes transient disorders, but recognizes that children and adults have changing patterns of clinical manifestations.

4. 'disorders' – This refers to conditions in which there is disruption of the usual orderly processes of child development.

5. 'development' – The notion of alteration in children's early development is essential to the CP concept. It distinguishes CP from phenotypically similar disorders in children due to later-acquired lesions, at a time when basic motor development is relatively well established. The 'developmental' aspect of CP is also important with regard to management strategies that may include interventions that address the developmental consequences of the functional limitations associated with CP, as well as interventions that are directed at the underlying neurobiological processes. The developmental nature of CP almost always implies impacts on the developmental trajectories of the people who have CP. The motor impairments of children eventually diagnosed with CP begin to manifest very early in child development, usually before 18 months of age, with delayed or aberrant motor progress; other neurodevelopmental and functional difficulties that often accompany the motor signs can appear throughout childhood or later. The clinical picture of CP evolves with time, development, learning, activities, therapies, ageing, and other factors.

6. 'movement and posture' – Abnormal gross and fine motor functioning and organization (reflecting abnormal motor control) are the core features of CP. These motor problems can lead to difficulties with walking, feeding and swallowing, coordinated eye movements, articulation of speech, and secondary problems with behaviour, musculoskeletal function, and participation in society. **However, people with neurodevelopmental disabilities that do not primarily affect movement and posture are not considered to have CP.**

7. 'causing' – Activity limitations are presumed to be a consequence of the motor disorder. Thus, disorders of movement and posture that are not associated with activity limitations are not considered part of the CP group.

8. 'activity limitation' – The World Health Organization's (WHO) International Classification of Functioning, Disability and Health speaks of 'activity' as "...the execution of a task or action by an individual", and identifies 'activity limitation' as "...difficulties an individual may have in executing activities". This term amplifies the previous WHO concept of 'disability' to recognize changing international concepts and terminology.

9. 'attributed to' – Understanding of developmental neurobiology (including genetic, biochemical, and other influences on brain development) is increasing rapidly, such that it is becoming possible to identify structural and other evidence of brain maldevelopment in people with CP. As a consequence, structural-functional connections and correlations are becoming more clearly delineated than has previously been possible. It must, however, be acknowledged that at the present time a full understanding of causal pathways and mechanisms leading to cerebral palsy remains elusive.

10. 'non-progressive' – The term non-progressive is used to denote that the pathophysiological mechanisms leading to CP are presumed to arise from a single, *inciting event or* discrete *series of events* which are no longer active at the time of diagnosis. This inciting event(s) produce(s) a disruption of normal brain structure and function which may be associated with changing or additional manifestations over time when superimposed on developmental processes. **Motor dysfunction which results from recognized progressive brain disorders is not considered CP.**

11. 'disturbances' – This term refers to processes or events that in some way interrupt, damage or otherwise influence the expected patterns of brain formation, development and maturation, and result in permanent (but non-progressive) impairment of the brain. In a proportion of cases it is currently not possible to identify a specific 'disturbance' or a specific timing of the events that appear to impact on maturation.

12. 'fetal or infant' – The specification 'fetal or infant' reflects the idea that disturbances that occur very early in human biological development impact differently on the development of motor function than disturbances that occur later, even those that occur in early childhood. There is no explicit upper age limit specified, although the first two or three years of life are most important in the timing of disturbances resulting in CP. In practical terms, disturbance resulting in CP is presumed to occur before the affected function has developed (e.g. walking, manipulation, etc.).

13. 'brain' – The term 'brain' includes the cerebrum, the cerebellum and the brain stem. It excludes motor disorders solely of spinal, peripheral nerve, muscular or mechanical origin.

14. 'accompanied by' – In addition to the disorder of movement and posture, people with CP often show other neurodevelopmental disorders or impairments.

15. 'sensation' – Vision, hearing and other sensory modalities may be affected, both as a function of the 'primary' disturbance(s) to which CP is attributed, and as a secondary consequence of activity limitations that restrict learning and perceptual development experiences.

16. 'perception' – The capacity to incorporate and interpret sensory and/or cognitive information may be impaired both as a function of the 'primary' disturbance(s) to which CP is attributed, and as a secondary consequence of activity limitations that restrict learning and perceptual development experiences.

17. 'cognition' – Both global and specific cognitive processes may be affected, including attention, both as a function of the 'primary' disturbance(s) to which CP is attributed and as a secondary consequence of activity limitations that restrict learning and perceptual development experiences. **A child who has severely impaired cognition and no motor signs**

(except perhaps for some degree of hypotonicity) is not included within the concept of CP.

18. 'communication' – Expressive and/or receptive communication and/or social interaction skills may be affected, both as a function of the 'primary' disturbance(s) to which CP is attributed, and as a secondary consequence of activity limitations that restrict learning and perceptual development experiences.

19. 'behaviour' – This includes psychiatric or behavioural problems such as autistic spectrum disorders, ADHD, sleep disturbances, mood disorders and anxiety disorders.

20. 'epilepsy'– Virtually every seizure type and many epileptic syndromes may be seen in persons with CP.

21. 'secondary musculoskeletal problems' – People with CP may develop a variety of musculoskeletal problems, such as muscle/tendon contractures, bony torsion, hip displacement, spinal deformity. Many of these problems develop throughout life and are related to physical growth, muscle spasticity, ageing and other factors.

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II. Classification of cerebral palsy

Cerebral palsy (CP) describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication and behaviour, by epilepsy, and by secondary musculoskeletal problems.

The above definition of cerebral palsy covers a wide range of clinical presentations and degrees of activity limitation. It is therefore useful to further categorize individuals with CP into classes or groups. The purposes of classification include:

1. Description: providing a level of detail about an individual with CP that will clearly delineate the nature of the problem and its severity.

2. Prediction: providing information that can inform healthcare professionals of the current and future service needs of individuals with CP.

3. Comparison: providing sufficient information to permit reasonable comparison of series of cases of CP assembled in different places.

4. Evaluation of change: providing information that will allow comparison of the same individual with CP at different points in time.

Traditional classification schemes have focused principally on the distributional pattern of affected limbs (e.g., hemiplegia, diplegia) with an added modifier describing the predominant type of tone or movement abnormality (e.g., spastic, dyskinetic). However, it has become apparent that additional characteristics must be taken account of for a classification scheme to contribute substantively to the understanding and management of this disorder.

INFORMATION REQUIRED FOR CLASSIFICATION

The information available to provide an adequate classification of the features of CP in any individual will vary over the age span and across geographic regions and settings. The role of aging in changing the clinical phenomenology of CP has been little studied, and the possibility of classification changes over time cannot be completely dismissed. Defining the presence or degree of accompanying impairments, such as cognitive deficits, is age-dependent, and in young children the type of motor disorder may be hard to characterize. Some young children diagnosed as having CP may in fact have as yet undiagnosed neurological disorders that are very slowly progressive. While progressive disorders are not included in the CP rubric by definition, a period of observation that includes serial examinations of the child may at times be needed before their exclusion can be assured.

Factors other than age will affect classification. Historical data, especially about the course of pregnancy, will vary in reliability and validity. Where neuroimaging facilities, diagnostic specialists and biochemical laboratories are not available, it may not be possible to completely exclude progressive disorders and underlying pathology, as described by neuroimaging and other laboratory findings, **However, all classification documentation should include the age of the child, the nature of the information available from clinical history (e.g. whether from clinical notes, maternal recall or period of observation of the child), and the extent to which metabolic and neuroimaging investigation has been performed.**

USES AND LIMITATIONS OF A CLASSIFICATION SYSTEM

Classification often requires making difficult decisions about where to draw the boundaries within ordinal or quantitative measures. Some degree of arbitrariness is inevitable. Assignment of individuals with the diagnosis of CP to distinct clinical groups is not straightforward, and will differ depending on the characteristic(s) chosen as the basis for classification. No one

single approach has emerged as definitive. Depending on the purpose of the classification, certain characteristics or combinations of characteristics may be more useful than others. For example, in assessing the effectiveness of a new treatment for a specific type of tone abnormality, the nature of the motor disorder and the level of functional motor ability are likely to be paramount, while determining service delivery needs will require consideration of accompanying impairments.

No classification system is useful unless it is reliable. Thus it is not enough to specify the characteristics to be used in classification; they must be operationally defined so that, in general, competent examiners will classify the same individual in the same way given identical information. Providing such definitions is, however, beyond the scope of this document. For example, the term 'spastic diplegia' is problematic because its existing definitions are variable and imprecise, and because evidence is lacking that the term can be used reliably. Some use the term to describe children with spastic CP whose only motor deficit is in the legs, while others include children who have arm involvement of lesser severity than leg involvement. However, determining the relative severity of arm and leg involvement can be challenging since they perform very different functions. **Discontinuation of the term 'spastic diplegia' is recommended;** however, if the term is used, the user should define exactly what is meant, and what characteristics the term describes.

Table I: Components of CP classification

1. Motor abnormalities
A. NATURE AND TYPOLOGY OF THE MOTOR DISORDER: The observed tonal abnormalities assessed on examination (e.g. hypertonia, hypotonia) as well as the diagnosed movement disorders present, such as spasticity, ataxia, dystonia, athetosis.
B. FUNCTIONAL MOTOR ABILITIES: The extent to which the individual is limited in his or her motor function, including oromotor and speech function.

2. Accompanying impairments
The presence or absence of later-developing musculoskeletal problems and/or accompanying non-motor neurodevelopmental or sensory problems, such as seizures, hearing or vision impairments, or attentional, behavioral, communicative and/or cognitive deficits, and the extent to which impairments interact in individuals with cerebral palsy.

3. Anatomical and neuro-imaging findings
A. ANATOMIC DISTRIBUTION: The parts of the body (limbs, trunk, bulbar region, etc.) affected by motor impairments or limitations.
B. NEURO-IMAGING FINDINGS: The neuroanatomic findings on CT or MRI imaging, such as ventricular enlargement, white matter loss or brain anomaly.

4. Causation and timing
Whether there is a clearly identified cause, as is usually the case with post-natal CP (e.g. meningitis, head injury) or when brain malformations are present, and the presumed time frame during which the injury occurred, if known.

DEVELOPMENT OF A STANDARDIZED CLASSIFICATION SCHEME

The state of the science underlying the proposed classification has evolved in recent years and continues to progress at a rapid pace, particularly in the area of quantitative assessment of the neuro-imaging and clinical features of cerebral palsy. These advances will continue to improve our ability to classify children and adults with cerebral palsy more accurately. **For classification of CP, use of the four major dimensions of classification listed in Table I is recommended.** Each is elaborated upon in the text that follows.

1. Motor abnormalities

1.A. NATURE AND TYPOLOGY OF THE MOTOR DISORDER

The type of abnormal muscle tone or involuntary movement disorder observed or elicited is usually assumed to be related to the underlying pathophysiology of the disorder, and may also reflect etiologic circumstances, as in kernicterus. Individuals with cerebral palsy have traditionally been grouped by the *predominant* type of motor disorder with a 'mixed' category available in those cases when no one type dominates. This strategy has been adopted by the classification system described in the Reference and Training Manual of the Surveillance of Cerebral Palsy in Europe (SCPE),[i] which divides CP into three groupings based on the predominant neuromotor abnormality – spastic, dyskinetic or ataxic, with dyskinesia further differentiated into dystonia and choreoathetosis.

However, an argument can be made that many children have mixed presentations, and that identifying the presence of *each* of the tone and or movement abnormalities may be of greater clinical and etiologic utility, as recommended by the 2001 NINDS workshop on childhood hypertonia.[ii] **It is recommended that cases continue to be classified by the dominant type of tone or movement abnormality,** categorized as spasticity, dystonia, choreoathetosis, or ataxia, but that any additional tone or movement abnormalities present should be listed as secondary types. The term 'mixed' should not be used without elaboration of the component motor disorders. For a recent review of the terminology of motor disorders, see Sanger et al.[iii,iv]

1.B. FUNCTIONAL MOTOR ABILITIES

The WHO International Classification of Functioning, Disability and Health (ICF),[v] along with several other recent publications, have sensitized health professionals to the importance of evaluating the functional consequences of different health states. **The functional consequences of involvement of the upper and lower extremities should therefore be separately classified using objective functional scales.** For the key function of ambulation, the Gross Motor Function Classification System (GMFCS) has been widely employed internationally to group individuals with CP into one of five levels based on functional mobility or activity limitation.[vi] A parallel classification scale, the Bimanual Fine Motor Function Scale, or BFMF, has been developed for assessing upper extremity function in cerebral palsy, but has not been as extensively studied as the GMFCS.[vii] A newer instrument for assessing hand and arm function – the Manual Ability Classification System or MACS – has been shown to have good inter-rater reliability between parents and professionals, and will shortly be published.[viii] Concurring with SCPE, it is recommended that a functional classification system be applied to hand and arm function in children with CP. Bulbar and oromotor difficulties are common in cerebral palsy and can produce important activity limitation, but there is as yet no activity limitation scale for such functions. A high research priority is the development of a scale for speech and pharyngeal activity limitation in cerebral palsy. In the meantime, the presence and severity of bulbar and oromotor involvement should be recorded.

While activity limitation is important, the extent to which motor disorders affect the ability to participate in desired

societal roles is also an essential consideration. However, at present, evaluation of participation restriction (formerly termed "handicap") in CP is not well developed, and reliable categorization of children based on this aspect of daily life is therefore not yet possible.

2. Accompanying impairments

In many individuals with cerebral palsy, other impairments interfere with the ability to function in daily life, and may at times produce even greater activity limitation than the motor impairments that are the hallmark of cerebral palsy. These impairments may have resulted from the same or similar pathophysiologic processes that led to the motor disorder, but they nonetheless require separate enumeration. Examples include seizure disorders, hearing and visual problems, cognitive and attentional deficits, emotional and behavioral issues, and later-developing musculoskeletal problems. These impairments should be classified as present or absent, and if present, the extent to which they interfere with the individual's ability to function or participate in desired activities and roles should be described. In concurrence with the SCPE recommendation, **the presence or absence of epilepsy (defined as two or more afebrile, non-neonatal seizures) be recorded, and IQ, hearing and vision be assessed.** While SCPE provides terminology for describing different degrees of cognitive, hearing and visual impairment, **the IQ score, corrected vision in each eye, and decibel loss (if any) in each ear be recorded** whenever this information is available. Standardized instruments are available to measure IQ, vision and hearing, and categories describing specific levels of dysfunction (e.g., visual impairment, profound hearing loss, mild mental retardation*) have come to be generally accepted.

3. Anatomical and neuro-imaging findings

3A. ANATOMIC DISTRIBUTION

The pattern and extent of the motor disorder in CP with respect to different anatomical areas should be specified. Previous classification schemes included only the extremities and required a subjective comparison of severity in the arms and the legs. The inherent validity of making this comparison has been questioned since the arms and legs are so structurally and functionally diverse. Notably missing from current anatomical classification schemes is description of truncal and bulbar involvement. **All body regions – trunk, each limb, and oropharyx – need to be described individually in terms of any impairments of movement or posture.** A scale for describing truncal posture in cerebral palsy has recently been developed.[ix] Separate objective classification schemes have also been developed for the upper and lower extremities.

It is acknowledged that the terms "diplegia" and "quadriplegia" have been extensively used for determining the anatomic distribution of the motor disorder and have become firmly entrenched in research and clinical practice, The severity of involvement in the arms (ranging from 'none' to 'less that that of the legs') has been used as the main characteristic for making this distinction which is problematic as stated above. Gorter et al. have documented the imprecision of these terms in clinical practice.[x] **It is recommended that the terms diplegia and quadriplegia not be used until more precise terminology evolves and gains similar acceptance. Those who continue to use these terms should define exactly what is meant by them and the characteristics the terms describe.**

A promising alternative approach that has been recommended, and which is being utilized currently by the SCPE, is the differentiation of unilateral versus bilateral motor involvement. Categorization based on this distinction has shown good reliability (SCPE manual[1]). Even this distinction can still be blurred since many children with primarily unilateral CP may also have some degree of motor involvement on the opposite side and some children with primarily bilateral involvement may have appreciable asymmetry across sides. This distinction should be considered as part of a multiaxial classification scheme, thus it should be coupled with a description of the motor disorder and functional motor classification in both upper and lower extremities.

3.B. NEURO-IMAGING FINDINGS

Until recently, correlations between neuroimaging findings and clinical presentation in cerebral palsy were weak. However, advances both in imaging technology and in quantitative motor assessments are changing this picture. The goal of categorizing all patients based on specific neuroimaging findings will require more development before implementation. **The recommendation of the American Academy of Neurology to obtain neuroimaging findings on all children with cerebral palsy should be followed whenever feasible.**[xi] At present, information is insufficient to recommend any specific classification scheme for neuroimaging findings.

4. Cause and timing

It is increasingly apparent that cerebral palsy may result from the interaction of multiple risk factors, and in many cases, no identifiable cause may be found. Therefore, while every reasonable effort should be undertaken to investigate causes or causal pathways, **clear-cut categorization by cause is unrealistic at the present time.** It is possible that by looking further downstream from putative cause to common mechanisms of injury, and by grouping cases on that basis, a more salient method of classification may be developed. For the present, **timing of insult should only be noted when reasonably firm evidence indicates that the causative agent, or a major component of the cause, was operative in a specific time-window,** as for example, with post-natal meningitis in a previously well infant. While recording adverse events in the prenatal, perinatal and postnatal life of a child with CP is necessary, clinicians should avoid making the assumption that the presence of such events is sufficient to permit an etiologic classification that implies a causal role for these events in the genesis of CP in the affected individual.

*UK usage: learning disabilities.

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