



Review article

Primitive reflexes and postural reactions in the neurodevelopmental examination

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Abstract

The primitive reflexes and the postural reactions comprise one of the earliest, simplest, and most frequently used tools among child neurologists to assess the central nervous system integrity of infants and young children. Infants with cerebral palsy have been known to manifest persistence or delay in the disappearance of primitive reflexes and pathologic or absent postural reactions. The clinical significance of asymmetric tonic neck reflex, Moro, palmar grasp, plantar grasp, Galant, Babinski, Rossolimo, crossed extensor, suprapubic extensor, and heel reflex, alone or in combination, as well as their contribution to the early diagnosis and differential diagnosis of cerebral palsy, have been demonstrated in a number of studies. Moreover, infants with 5 or more abnormal postural reactions have developed either cerebral palsy or developmental retardation as reported in a number of studies. Although a comprehensive neurologic examination in the context of a motor assessment instrument is preferable to an informal list of items,

the combined examination of primitive reflexes and postural reactions should be considered by the child neurologist, as a simple but predictive screening test for the early identification of infants at risk for cerebral palsy. It is quick and easy to perform, both in nonhospital environments and in underdeveloped countries, where time and specific recourses are limited. The combined examination is also useful in developed countries because many developmental disorders such as cerebral palsy appear in nonrisk groups whereas others are not detected by metabolic screening programs.

Introduction

The primitive reflexes and the postural reactions constitute one of the earliest, simplest, and most frequently used tools among child neurologists, as well as developmental and general pediatricians all over the world to assess the central nervous system integrity of infants and young children [1]. On the other hand, there are a considerable number of developmental scales [2], [3], [4], [5], [6], [7], [8], developmental screening tests [9], [10], [11], [12], [13], [14], [15], and motor assessment instruments [16], [17], [18], [19], [20] which more or less cope with the evaluation of motor development in either term or preterm infants and young children and include a variable number of primitive reflexes or postural reactions as items [21] (Table 1). The reliability, sensitivity, and validity of some of these motor assessment instruments vary greatly, and each one's predictive power increases with the age of the infant or young child [22]. Moreover, in a critical review by Majnemer and Mazer, none of the instruments tested was effective in the early diagnosis of infants younger than 12 months of age [23]. Although a comprehensive neurologic examination is preferable than an informal list of items, either in the busy neuropediatric daily practice or even at the hospital, it is crucial to obtain as much information as possible within a small time frame.

The purpose of the current article is to review and critically discuss the major primitive reflexes and postural reactions as an integral part of the neurologic examination of the infant. This review will also summarize the diagnostic relevance of specific primitive reflexes or postural reactions, alone or in combination, regarding an early diagnosis of cerebral palsy and developmental retardation. Furthermore, the diagnostic utility of the presence of primitive reflex patterns in adults with various neurologic disorders will be outlined. Finally, the assessment of general movements, a promising new diagnostic tool

for the neurologic examination of high-risk infants based on the observation of spontaneous motility, will be briefly discussed.

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Section snippets

Primitive reflexes

Primitive reflexes are brainstem-mediated, complex, automatic movement patterns that commence as early as the twenty-fifth week of gestation, are fully present at birth in term infants, and with central nervous system maturation become more and more difficult to elicit after the first half of the first year of life, when voluntary motor activity and thus cortical inhibition emerges and takes over [24], [25], [26]. They are considered part of the motor repertoire of the specific age. Primitive...

Postural reactions

A number of postural reactions (i.e., motor patterns) have been identified and repeatedly described as diagnostically relevant. Both Capute et al. [45] in the English literature and Vojta [32] in the German literature emphasized the distinction between primitive reflexes and postural reactions. Blasco [26], [46] and the Kennedy group (Capute et al. from the John F. Kennedy Institute in Baltimore) [45] suggested that postural mechanisms are not true reflexes, but rather are based on multiple...

Early diagnosis of cerebral palsy

As stated earlier, the evaluation of posture, muscle tone, primitive reflexes, and postural reactions is an integral part of the neurologic examination of the infant in the first year of

life. Posture or muscle tone disturbances during the first 12 months of life in high-risk infants are not always prognostic of the later diagnosis; some of these infants are normally developed, whereas others have various types of cerebral palsy or developmental retardation without motor disturbance [47], [48], ...

Primitive reflexes in adults

In adults, the clinical implication of a positive primitive reflex is a controversial issue. Its presence is believed to signify frontal lobe damage or upper motor neuron disease. It is generally considered as a marker of cortical disinhibition. The elicitation of these reflexes has been incorporated in the neurologic examination of patients with dementia or human immunodeficiency virus–infected patients [61], [62]; they have been also reported as useful in the clinical assessment and diagnosis ...

Assessment of general movements

A new approach to neurologic assessment, based on observation of the spontaneous motility of fetuses, preterm and term infants, has been recently proposed by Prechtl et al. [14], [15], [67]. The central idea of this approach is that the observation of general movements, which are gross movements involving the entire body, is more reliable than the assessment of the incidence of specific isolated movements and can predict outcome in infants at risk. Although this method is quick and easy to...

Conclusions

Although there are a considerable number of instruments dealing with the early diagnosis of motor abnormalities, the combined examination of primitive reflexes and postural reactions still has a place in the neurologic examination of the neonate or infant. It is quick and easy to perform, both in nonhospital environments and underdeveloped countries, where time and specific recourses are limited, as well as in developed countries, since many developmental disorders such as cerebral palsy appear ...

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