J Pediatr (Rio J). 2016;92(3 Suppl 1):S64–S70

Jornal de Pediatria
www.jped.com.br

REVIEW ARTICLE

Fidgety movements – tiny in appearance, but huge in impact☆

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Received 11 December 2015; accepted 15 December 2015
Available online 17 March 2016

KEYWORDS
Cerebral palsy;
Fidgety movements;
General movements;
Infant;
Prediction;
Video analysis

Abstract
Objectives: To describe fidgety movements (FMs), *i.e.*, the spontaneous movement pattern that typically occurs at 3–5 months after term age, and discuss its clinical relevance.
Sources: A comprehensive literature search was performed using the following databases: MEDLINE/PubMed, CINAHL, The Cochrane Library, Science Direct, PsycINFO, and EMBASE. The search strategy included the MeSH terms and search strings ('fidgety movement*') OR [('general movement*') AND ('three month*') OR ('3 month*')], as well as studies published on the General Movements Trust website (www.general-movements-trust.info).
Summary of the data: Virtually all infants develop normally if FMs are present and normal, even if their brain ultrasound findings and/or clinical histories indicate a disposition to later neurological deficits. Conversely, almost all infants who never develop FMs have a high risk for neurological deficits such as cerebral palsy, and for genetic disorders with a late onset. If FMs are normal but concurrent postural patterns are not age-adequate or the overall movement character is monotonous, cognitive and/or language skills at school age will be suboptimal. Abnormal FMs are unspecific and have a low predictive power, but occur exceedingly in infants later diagnosed with autism.
Conclusions: Abnormal, absent, or sporadic FMs indicate an increased risk for later neurological dysfunction, whereas normal FMs are highly predictive of normal development, especially if they co-occur with other smooth and fluent movements. Early recognition of neurological signs facilitates early intervention. It is important to re-assure parents of infants with clinical risk factors that the neurological outcome will be adequate if FMs develop normally.

☆ Please cite this article as: Einspieler C, Peharz R, Marschik PB. Fidgety movements – tiny in appearance, but huge in impact. J Pediatr (Rio J). 2016;92(3 Suppl 1):S64–70.

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http://dx.doi.org/10.1016/j.jped.2015.12.003

PALAVRAS-CHAVE
Paralisia cerebral;
Movimentos irregulares;
Movimentos gerais;
Neonato;
Predição;
Análise em vídeo

Movimentos irregulares – pequenos na aparência, porém enormes no impacto

Resumo

Objetivos: Descrever os movimentos irregulares (FMs), ou seja, o padrão de movimentos espontâneos que normalmente ocorrem entre 3 e 5 meses após o nascimento e discutir sua relevância clínica.

Fontes: Uma pesquisa abrangente na literatura foi realizada nas seguintes bases de dados: MEDLINE/PubMed, CINAHL, The Cochrane Library, Science Direct, PsycINFO e EMBASE. A estratégia de busca incluiu os termos e cadeias de pesquisa do MeSH [(''fidgety movement*'') OU [(''general movement*'') E (''three month*'') OU (''3 month*'')], bem como estudos publicados no website da General Movements Trust (www.general-movements-trust.info).

Resumo dos dados: Praticamente todos os neonatos se desenvolveram normalmente se os FMs estiveram presentes e foram normais, mesmo se seus resultados do ultrassom do cérebro e/ou históricos clínicos indicassem tendência a déficits neurológicos posteriores. Por outro lado, quase todos os neonatos que nunca desenvolveram FMs apresentaram maior risco de déficits neurológicos, como paralisia cerebral, e doenças genéticas de início tardio. Caso os FMs fossem normais, porém simultâneos a padrões posturais não adequados para a idade, ou o caráter geral dos movimentos fosse monótono, as capacidades cognitivas e/ou de linguagem na idade escolar seriam abaixo do ideal. Os FMs anormais não são específicos e têm baixo poder preditivo, porém ocorrem em grande parte em neonatos posteriormente diagnosticados com autismo.

Conclusões: FMs anormais, ausentes ou esporádicos indicam um risco maior de disfunções neurológicas posteriores, ao passo que FMs normais são altamente preditivos de desenvolvimento normal, principalmente se forem simultâneos a outros movimentos suaves e fluentes. O reconhecimento precoce de sinais neurológicos facilita a intervenção antecipada. É importante garantir aos pais de neonatos com fatores de risco clínicos que o resultado neurológico será adequado se os FMs se desenvolverem normalmente.

Introduction

Even without constant triggering by specific sensory input the fetal, neonatal, and young nervous system generates a variety of motor patterns.[1] Present from 9 weeks postmenstrual age until 5 months after term, general movements (GMs) are part of this early spontaneous motor repertoire.[1–3] From birth until the end of the 2nd month post term age, GMs have a writhing character; thereafter they occur as so-called fidgety movements (FMs).[1–3]

Since its introduction 25 years ago,[4] the general movement assessment (GMA)[5] has been increasingly used to predict motor dysfunction, especially cerebral palsy (CP).[2,3,5–13] It is based on visual gestalt perception of normal *vs*. abnormal movements of the entire body. GMA is non-invasive, even non-intrusive, cost-efficient, and easy to learn within three to five days of training.[3,5] Bosanquet et al.[13] recently compared different structural and functional assessments used for early identification of CP risk and found that GMA had the best predictive power and accuracy. Summary estimates of the sensitivity and specificity of GMA were 98% and 91%, respectively.[13] Apart from normal *vs*. abnormal (cramped-synchronized)[6] writhing GMs, it is mainly FMs that contribute to excellent predictive values.[6,9,12,13]

Normal FMs

FMs are small movements of moderate speed with variable acceleration of the neck, trunk, and limbs in all directions (Fig. 1).[5] They may appear as early as six weeks after term, but usually occur from around 9 weeks until 16–20 weeks, occasionally even a few weeks longer. They fade out when antigravity and intentional movements start to dominate.[1,3,5,6]

FMs occur regardless of the position of the infant, but can be best observed if the infant is in supine or in a semi-upright position in a relaxing chair. It is important to note that FMs are state-dependent. They are only present if the infant is awake; they disappear when the infant starts being fussy or cries, is drowsy or sleeps.[3,5]

The temporal organization of FMs varies with age. At first (*i.e.*, at 6–8 weeks) they occur as isolated events; their frequency then increases, only to decrease again after 15–18 weeks.[5,6] The temporal organization of FMs can be defined as follows:

Continual FMs (score: ++)

Continual FMs are frequent, though interspersed with very short (1–2 s) pauses. As they are by definition GMs, they