



## Review Article

# Restless legs syndrome (Willis–Ekbom disease) and growing pains: are they the same thing? A side-by-side comparison of the diagnostic criteria for both and recommendations for future research <sup>☆</sup>



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## ABSTRACT

There has been no previous side-by-side comparison of the diagnostic criteria for restless legs syndrome (RLS) (Willis–Ekbom disease) and growing pains. In our review, we explore this comparison emphasizing overlaps and disconnects, summarize recent literature exploring the relationship between the 2 entities, and make suggestions for future research.

There is considerable overlap in the diagnostic criteria for childhood RLS and growing pains. The literature also indicates that RLS and growing pains more commonly occur together than one would expect based on chance alone, and the family histories of RLS and growing pains often are overlapping. Leg rubbing to obtain relief from leg discomfort is common to both disorders, though walking to obtain relief seems unique to RLS. Childhood RLS also has been reported to be painful in up to 45% of cases.

The development of standard diagnostic criteria is necessary to move forward in the field of growing pains research. A quantitative and validated rating scale for growing pains severity already exists. Because of the clinical and genetic similarity between RLS and growing pains, studies that parallel those previously performed in RLS patients are recommended for growing pains patients. For example, a genome wide association study in growing pains patients of all possible genes with particular attention to those identified as related to RLS and a therapeutic trial of medications known to be effective in RLS would be welcome. Abnormalities in vitamin D metabolism also may be common to both disorders.

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## 1. Introduction

To our knowledge, a side-by-side comparison of the diagnostic features of restless legs syndrome (RLS) (Willis–Ekbom disease) and growing pains has not been previously performed. The primary goal of our review was to perform such a comparison, emphasize overlaps and disconnects, summarize recent literature suggesting an overlap between the 2 disorders, and make recommendations for future research. We have reviewed the relationship between RLS and growing pains in the past [1]. In the intervening 10 years much new information has been obtained, which will be summarized in our review. Except in select circumstances relevant to

our goal, older literature will not be included and we will refer to our previous review [1].

## 2. Literature search

A literature search on PubMed was performed for articles that defined the clinical characteristics of growing pains alone, RLS alone, and those that explored the relationship between the 2 entities. A variety of terms were arbitrarily selected and employed for the search, but the terms *growing pains in children*, *growing pains in children*, AND *diagnostic criteria* as well as *growing pains AND restless legs syndrome* uncovered more articles relevant to achieving the a priori goals of determining the present status of diagnostic criteria for growing pains and evaluating the current literature exploring the relationship between growing pains and RLS. A search was done using the term *growing pains in children* for all articles from January 2001 to March 2013, and the titles of 360 references were reviewed. Sixteen of these articles were considered to be of possible relevance to the stated a priori goals, and therefore the articles were further reviewed. An additional search also was done for literature subsequent to 2001 combining the terms

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growing pains in children AND diagnostic criteria. We found 27 articles, and 11 of which were reviewed for further relevance in accord with our primary goals. In addition, a search was done for literature subsequent to 2001 combining the terms *growing pains* AND *restless legs syndrome*. We found 19 articles, and 14 of which were considered to be possibly relevant to our goals. Further articles were obtained in attempt to achieve the aforementioned goals from a complete review of the reference list of all of the articles obtained for relevance. Articles published before 2001 were not included in the review except when their historical importance was apparent, per the opinion of the first author (AW).

### 3. Diagnostic criteria

#### 3.1. Criteria for RLS

Recently, the diagnostic criteria for childhood RLS have been merged with those of the adult criteria, so that the 2 entities are identical [2–4]. For a diagnosis of definite RLS the subject must be able to describe the symptoms of RLS in their own words. The criteria for childhood RLS include (1) an urge to move one or both legs usually but not always associated with leg discomfort that may or not be painful; (2) the symptoms are worse later in the day or night; (3) the symptoms are worse at rest (i.e., sitting, lying); and (4) there is at least partial and temporary relief by activity such as walking or moving around in bed; and (5) in addition, it has recently been appreciated that some subjects can superficially meet all of the previous criteria for RLS but have another disorder instead of RLS, such as leg cramps or positional discomfort. These disorders should be excluded by further patient questioning [2–4] (Table 1).

#### 3.2. Criteria for growing pains

In contrast to RLS, there is no unified definition for growing pains. Two groups of authors have attempted to actually enumerate diagnostic criteria for growing pains [5–8] (Table 2). Both groups stated that their diagnostic criteria were adopted from that of Peterson [9,10]. However, the 2 groups come up with somewhat different diagnostic criteria (Table 2). Part of the reason for this difference is that Peterson did not actually provide diagnostic criteria with enumeration of inclusion and exclusion criteria, but instead he offered a general description of the disorder. Peterson actually said:

**Table 1**  
Diagnostic criteria for adult and childhood restless legs syndrome—modified from Allen et al. [2,4].

#### Essential diagnostic criteria for RLS (adults)

1. An urge to move the legs, usually accompanied or caused by uncomfortable and unpleasant sensations in the legs
2. The urge to move or unpleasant sensations begin or worsen during periods of rest or inactivity such as lying down or sitting
3. The urge to move or unpleasant sensations are partially or totally relieved by movement, such as walking or stretching, at least as long as the activity continues
4. The urge to move or unpleasant sensations are worse in the evening or night than during the day, or only occur during the evening or night
5. Conditions such as positional discomfort and leg cramps that meet all 4 criteria for RLS but are not RLS should be excluded by asking additional relevant questions preferably during a personal patient interview

#### Definite childhood RLS

1. The child meets all 4 essential adult criteria,  
And
2. The child relates a description in his or her own words that is consistent with leg discomfort.

Abbreviation: RLS, restless legs syndrome.

“Through the years, *growing pain* has gradually been defined. It consists of intermittent, often annoying pain or ache, usually localized in the muscles of the legs and thighs. The pain or aching may be associated with a feeling of restlessness. The most common sites of pain are in the front of the thighs, in the calves and behind the knees. The groin is sometimes affected. The pains are deep and localized in areas outside the region of the joints. Pain in the joints requires detailed investigation to rule out rheumatoid or intra-articular conditions. The pain typically is bilateral, which is an important differentiation from serious causes of pain in the limbs, which are usually unilateral. The pains usually occur late in the day and in the evening, although they may have their onset at night and awaken the child from sleep. When the child awakens in the morning, the pain has disappeared. The pains typically occur in children and young adolescents, but they may commence in early infancy and disappear once the child reaches maturity. In older children, the pain may resemble what adults more accurately describe as cramps in the legs, creeping sensations, or restless legs. However, Ekblom makes sharp distinctions between growing pains and restless legs. Growing pains may be accentuated by increased running during the day. Pain from fatigue may occur with or without excessive physical activity in children. Its character resembles the condition designated growing pains, but in contrast to growing pains, the pain of fatigue disappears after rest. Growing pains are not associated with limping or limited mobility. The case history does not indicate local trauma or infection. The pain is not associated with local tenderness, erythema, or swelling. There is a lack of objective findings. Results of physical examination, laboratory studies, and roentgenograms are normal [9,10].”

#### 3.3. Working group combined criteria for growing pains

Because there are no contradictions between the diagnostic criteria provided by Evans and Scutter [5–7] and those provided by Champion et al., they have both been combined in Table 2 [8]. However, Champion et al. [8] lists any 3 of his first 4 criteria as being essential for the diagnosis of growing pains. In addition, they mention mention age of onset and duration of symptoms as part of their diagnostic criteria but Evans and do not [5–7]. On the other hand, Evans and Scutter mention the bodily distribution of the symptoms as part of their diagnostic criteria but Champion et al. do not [8] (Table 2). A review of the other growing pains literature showed that other authors used incomplete forms of the much more detailed criteria for growing pains established by Evans and Scutter [5–7] and Champion et al. [8]. It should be emphasized that our review was only an initial attempt at establishing a unified set of criteria for the diagnosis of growing pains and was strictly done for comparative purposes to RLS. The true establishment of universally agreed on criteria will depend on a consensus of growing pains researchers.

#### 3.4. Overlap of the criteria for RLS and growing pains

All 10 of the criteria listed in Table 2 are typical of RLS with 2 exceptions. The first exception is that growing pains are thought to be strictly bilateral, whereas RLS can be seen bilaterally or unilaterally [11–20]. In addition growing pains are identified as being strictly painful, whereas a variety of different types of leg discomfort are seen in RLS including pain, which is not an uncommon presentation in RLS. Rajaram et al. [12] reported a series of 10 children with true RLS who were originally misdiagnosed as having growing pains. The reason for this misdiagnosis was that the RLS was described as painful. In another series of 33 RLS children [21], 55% of patients reported their symptoms as nonpainful, but up to 45% of the children described their symptoms as painful. On the other hand, a nonpainful form of growing pains also has occasionally

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