The Myth of Growing Pains

Single-case studies elucidate the cause of growing pains with a connection to restless leg syndrome.

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Abstract

Eleven children, ages 5-15 with histories of growing pains, were fitted with orthotics to control abnormal subtalar joint pronation, which forces this joint into subluxation. All eleven children responded within two days with complete resolution of painful symptoms. Six adults, ages 30-65 with histories of restless leg syndrome (RLS), were also treated with orthotics with an 83% success rate. All six adults had growing pains as children and, therefore, may represent a subset of all patients with RLS.

Introduction

In spite of being intensively investigated, few medical conditions have been as misunderstood than growing pains in children. While the pain is real, the causative factor(s) are not well understood. Few topics in medicine have garnered as much attention, without realizing the benefits of continuous research as this misunderstood malady. Indeed, a Google Scholar search on “growing pains in children” results in 217,000 hits.

The idea of growing pains was first described in 1823 by M. Du-champ. The theory that the pains are generated as a result of the long bones, particularly in the lower extremities, growing faster than the soft tissues can keep pace with, is not new, but was debated for well over one hundred years.

It wasn’t until over 100 years after the Duchamp article was written that the subject was again vigorously explored by a number of researchers from both the United King-

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New Concepts and Studies

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From his early days in the United States, Hawksley in 1931 attributed growing pains to rheumatic fever, a connection he continued over the next eight years. Sheldon (1936) dismissed this correlation. Psychological maladjustment was implicated as a contributing factor to growing pains, by the forensic psychologist Neustatter, in 1937, as was hair and eye color, and race.

A connection between orthopedic anomalies and growing pains was referred to as early as 1939 by Hawksley, when he wrote: “A classification of the cases into various types for the purpose of observing whether coexisting abnormalities were in any way connected with the limb pain had the following result: a frequent cause of the pain is a postural or orthopaedic defect such as flat-foot, knock-knee, scoliosis, or bad stance; treatment of the cause in these cases nearly always gives relief. The success of the treatment has been most satisfying, and the majority have rapidly ceased to complain of pain.”

The actual treatment for these orthopedic and postural defects, especially by Drs. Kellgren and Wesson, was not discussed in Hawksley’s article, nor can any reference be found in the archives. However, Hawksley did offer an anatomical theory suggesting that pes planovalgus and femoral anteversion contributed to growing pains.

In 1950, an article submitted by Drs. Naish and Apley at the University of Bristol further dismissed the idea that growing pains were attributed to infectious agents but also assumed that limb pains were non-articular. Since that time, many authors have concluded that growing pains in children are non-articular.

In 2003, M. Angela Evans discussed in her published article that growing pains were a result of pes planus deformity based on the evaluation of eight pediatric patients. Her findings, however, were dismissed in her follow-up expanded study in 2008 when she wrote, “Growing pains is not associated with flat feet.”

Growing Pains and Restless Leg Syndrome—What’s the Connection?

Beginning in the mid-1940s, a disorder was described by K. A. Ekboth MD as “restless leg syndrome”, or RLS or even Ekboth Syndrome, named after the author who first coined the term. Ekboth and his associate R. Brenning initially believed there was a connection between growing pains in children and restless leg syndrome in adults. But Ekboth dismissed this connection based upon an interview with one patient’s family. More recently, many other investigators have also written about the potential link between Ekboth Syndrome, or RLS, and growing pains in children.

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Discussion

So What Is It?

Simply stated, the majority of growing pains that present into physicians’ offices are the result of chronic subluxation of the subtalar joint (STJ), creating transient synovitis with referred pain symptoms into the lower leg, typically with cessation...
of activity. If one takes the time to read through much of the studies that have already been conducted on this syndrome, the above definition explains many of the findings. The association of hypermobility, pes planus, increased activity and body weight, all can contribute to this phenomenon. But just because a patient presents with a pes planus, or flatfoot deformity, doesn’t mean that the subtalar joint is functioning at its end of range-of-motion at forefoot loading or static stance. Conversely, a foot that presents with a very high arch, or pes cavus, does not exclude the possibility that the subtalar joint is functioning at its everted end of range of motion during the gait cycle.

Let’s explore what referred pain represents. “Referred pain (also reflective pain) is pain perceived at a location other than the site of the painful stimulus.” While there is no widespread agreement on the causes or mechanism behind referred pain, it is a widely held and accepted term in medicine. Physicians understand that a child complaining of knee pain might actually be suffering from a problem more proximal, i.e., at the hip.

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nerve impingement, muscle tightness, and hip arthritis. It is also well understood that a child complaining of knee pain might actually be suffering from a problem more proximal, i.e., at the hip.

It is an accepted fact of clinical diagnoses that more proximal origins of pain need to be part of the differential diagnoses in any patient. But this type of pain does not always travel distally, i.e., from a source closer to the central nervous system distally. Referred pain also can be from areas of the body other than the extremities, such as gall bladder pain being referred to the shoulder blades or right shoulder. Pain from a myo-skeletal complaint can cause the subtalar joint to evert to the end of its range of motion and, as the definition of subluxation suggests, beyond.

Rearfoot varus (otherwise known as calcaneovarum in allopathic and osteopathic nomenclature), is defined as a positional deformity where the rear foot is excessively inverted to the leg and supporting surface during the swing phase of gait and, therefore, at heel strike. There are several factors that can influence and/or create a rear foot varus deformity, including a structural deformity of the calcaneus and subtalar joint, or a tibial varum condition. So what happens when the calcaneus is significantly inverted at heel strike, that is referred pain from an origin more distal than the area of perceived pain is not new or unique.

It is the belief of the authors of this program that growing pains are a result of referred pain from the subtalar joint (STJ), more proximally into the lower leg.

So what foot deformities exist that will sublux the subtalar joint? There are two main causes associated with this particular syndrome. First, a forefoot varus deformity, compensated or not, and second, a rear foot deformity. The result of this situation is referred pain from the ankle joint more proximally into the leg or even the knee. Therefore, the concept of referred pain from an origin more distal than the area of perceived pain is not new or unique.

If the motion of the oblique and longitudinal axes of the midtarsal joint are not sufficient to compensate for the varus deformity, the STJ then needs to pronate sufficiently in order for the first ray to contact the ground.
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the forefoot varus, then it is termed an uncompensated forefoot varus deformity, and the patient’s STJ will be functioning at its end of range-of-motion, and potentially beyond. In other words, the STJ will be subluxing at the midstance phase of gait.

The authors feel that it is important to forward a notion that is not unique in podiatry, and that is the role of the forefoot in determining the forces on the rear foot. Measuring the forefoot to the rear foot in supine and prone positions is important. However, we feel the forefoot to the ground and/or the long axis of the leg is also important in successfully treating these patients. With the patient in a sitting position, the STJ held in neutral position, and the forefoot dorsiflexed with the lateral column loaded to resistance, an imaginary plane can be visualized by the practitioner which would represent the ground and, thus, the ground reactive force that influences the forefoot in order that the great alis, sural, and deep peroneal nerves send sensory branches to the synovium that lines the subtalar joint.

So what does this all mean? How can or should this information affect the way we not only view this medical dilemma, but treat it? The presentation of a patient into the office with these types of complaints should alert the practitioner to focus on determining the cause of this joint dysfunction at the end of its range of motion. It is no longer acceptable for the practitioner to simply tell the patient and family that the child will grow out of this pain when immediate and satisfactory relief of this syndrome is so readily available and so simply achieved.

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Any foot condition that forces the toe comes into contact with the supporting surface. It is our belief that this may explain why static measurements don’t always coincide with the more extreme position the foot maintains during gait analysis.

Now that we’ve briefly reviewed abnormal foot position and function, let’s review again what our working definition is for “growing pains” or paroxysmal nocturnal pain. Growing pains are referred pain from the subtalar joint into the lower leg, typically at night, once the day’s activities have subsided. The cause of the referred pain is chronic or acute subluxation of this joint created by maximal eversion, resulting in transient synovitis. So, how is perceived pain referred to the lower leg? By what nerve routes does this occur? The subtalar joint receives sensory innervation from three nerves that pass from the leg, into the foot. The posterior tibial, sural, and deep peroneal nerves send sensory branches to the synovium that lines the subtalar joint.

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The authors feel that it is not only the objective of this article to identify and address the root cause of growing pains in children but to also expand the inquiry to include the anecdotal evidence that some restless leg syndrome may very well be the adult version of this same phenomenon. Are the authors implying that all RLS is referred pain from the foot? Certainly not, but the connection between the two maladies cannot be totally dismissed. There is, at least, clinical overlap between the two medical conditions that has been previously discussed as described by Ekbom, Brenning, and Walters, as well as others.

Any foot condition that forces the subtalar joint to its end of range-of-motion in pronation (and therefore at risk of subluxation) can create paroxysmal nocturnal pain in children and, perhaps, restless leg syndrome in adults. Previous investigators, with only a few exceptions, have been focused on one malady but not the other. The authors of this presentation believe the two are closely linked. The clues to identify and treat this problem that are found in the literature, first from Dr. Hawksley’s article written in 1939, and more recently from Dr. Angela Evans in her article published in 2003, have seemingly been ignored or their findings minimized. Whether the foot “appears” to be flat, or conversely high-arched, does not indicate where the STJ is positioned during static stance or through the weight-bearing portion of the gait cycle.

To further elucidate the source of this pain, the examiner can press
on the skin overlying the sinus tarsi and the medial and lateral posterior facet of the subtalar joint of the patient. By pressing on the sinus tarsi, a dell in the foot structure found just anterior to the lateral malleoli, intra-capsular pressure of the STJ is increased. If the patient responds symptomatically, one can be fairly confident that this is the source of the referred pain at night. The same response should be elicited with direct palpation to the joint capsule overlying the posterior facet of the STJ, located posterior to the medial and lateral malleoli. Our observations have been that when this examination is performed on patients who are experiencing almost nightly pain, they will be very symptomatic and will demonstrate guarding responses.

**So What Are the Numbers?**

For this pilot program, the practitioners did not advertise in local media for treatment of growing pain or RLS patients. While a few pediatricians were contacted about this pilot study, most of the patients were sent by “word-of-mouth” from fellow patients and family members. Eleven children with growing pains, aged 5-15, were treated with orthotics, all successfully. The results were almost immediate and dramatic. By the second day of orthotic control, all symptoms were relieved. In two of the cases, the orthotic either broke, needing to be replaced, or the patient simply outgrew the existing devices. In both of those cases, the symptoms returned until new orthotics replaced the broken or outgrown devices. We believe this is a key finding. With few exceptions, each patient’s parent indicated that the symptoms began at around age six, which is consistent with prior studies and the medical record.

Six patients with the symptoms of RLS, ages 30-65, were treated with orthotics resulting in an 83% total success rate. One patient had such a high degree of calcaneal inclination angle, adequate and accepting footgear was near to impossible to find. In her case, only partial resolution of her symptoms was achieved and medication to treat neuropathic-type pain was administered. All of the RLS patients distinctly remember having growing pains as children and all related a history of family members experiencing similar problems, even several generations earlier. Four of these patients had been given medication for the painful symptoms by various medical practitioners and after treatment with orthotics, are no longer taking any medication. Foot types are an inherited trait. It is not the growing pains that are inherited, but the foot type that leads to growing pains that is.

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that are inherited, but the foot type that leads to growing pains that is.

**Where Is the Proof?**

The authors realize that this overlap between the two maladies, but those in allopathic medicine have described growing pains in children as the adolescent form of RLS. We have not read any articles that describe RLS as the adult version of growing pains. Therefore, the authors of this program are submitting the hypothesis that these two syndromes are a continuum of the same problem. Note that the entire small sample of RLS patients treated in this pilot study remembers having growing pains as children; therefore they may represent a subset as described by Arthur S. Walters.

Centers for further research could be established to test this hypothesis that these two syndromes are a continuum of the same problem. Note that the entire small sample of RLS patients treated in this pilot study remembers having growing pains as children; therefore they may represent a subset as described by Arthur S. Walters.

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program is based upon a small set of patients. However, the personal testimony of the patients indicates consistency, not only within this group, but with the vast historical record. Another piece of evidence that is being forwarded in demonstrating the source of this pain is the clinical examination of pressing on the sinus tarsi and/or the posterior facet of the STJ from medially and laterally. There is consistent and reproducible pain elicited by the patient in each of these syndromes prior to treatment that completely resolves after utilization of orthotic control.

**Conclusion**

**So Where Do We Go from Here?**

While the authors feel fairly comfortable with the information given here with respect to not only what causes but successfully treats growing pains, much more research needs to be undertaken to solve the mystery of RLS. Prior researchers have discussed the overlap between the two maladies, but those in allopathic medicine have described growing pains in children as the adolescent form of RLS. We have not read any articles that describe RLS as the adult version of growing pains. Therefore, the authors of this program are submitting the hypothesis that these two syndromes are a continuum of the same problem. Note that the entire small sample of RLS patients treated in this pilot study remembers having growing pains as children; therefore they may represent a subset as described by Arthur S. Walters.

Centers for further research could be established to test this hypothesis, and with careful history taking, a better correlation could perhaps be obtained. The authors are not suggesting that all RLS is referred pain from the foot, but the anecdotal evidence presented here is simply too compelling to dismiss. Considering that like growing pains, RLS seems to occur in family lineages,  

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the connection between the two medical dilemmas appears to have a stronger basis in fact. Early diagnosis and intervention are very important in treating either of these two enigmas. The authors hope that this article will be useful in expediting the type of research that can bring relief to the millions of patients who currently suffer from them. PM

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