Recurrent pain in children and adolescents

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Abstract

Objective: To perform a bibliographic review of recurrent pain in children and adolescents, focusing on differential diagnosis and management of such patients.

Sources: Search of Medline and Lilacs databases, covering the last four and ten years, respectively. Classical studies and texts related to the matter were also included.

Summary of the findings: Studies carried out in different parts of the world demonstrate that the most frequent kinds of recurrent pain in children and adolescents are abdominal pain, headache, and limb pain. The occurrence of organic etiology is low, observed in 5% to 10% of the cases. Among the well defined organic etiology, no predominance is observed. The main advances regarding the pathophysiology of recurrent pain in its main localizations were analyzed. Guidelines for the diagnostic and therapeutic approach of the most common infantile diseases related to recurrent pain are presented.

Conclusions: Recurrent pain in children and adolescents is very common and determines significant demand on healthcare services. Defined etiology is only presented by 5% to 10% of patients. Anamnesis, physical examination and follow-up are extremely important instruments for dealing with such patients.


General considerations

Children can be affected by several pain disorders - with acute or chronic development -, which cause suffering and significantly increase the demand for health services. The expression of pain in children varies significantly according to factors such as age, sex, cognitive level - the child’s perception of pain -, previous painful experiences, learning, cultural values, family relationship and parental behavior, in addition to the impact of pain on the child’s daily routine (class attendance, participation in sports, social activities, and home activities).

In treating these children, attention must be drawn, initially, to the length of the complaint. The development of acute pain presents particular characteristics that are well described by the child and family members, due to the recency of the event; in cases of chronic pain, however, the history is not so clear, and information is usually incomplete and vague. Chronic pain can develop persistently and
Recurrent pain is rare in children, and may indicate the need to investigate an underlying disorder. On the other hand, complaints of recurrent pain - the object of the present study - are quite common in the clinical setting, being manifested by episodes that vary in terms of time, intensity and frequency, and are alternated with asymptomatic periods. The definition of recurrent pain involves the following criteria: three or more episodes, over a period of at least three months, of intensity great enough to interfere in the child’s daily activities. It is important to emphasize that, even if the symptom has developed over a shorter period, the complaint must be assessed and its evolution observed, so that the diagnosis can be established with increased reliability.¹

The second key point is to define whether the child presents systemic features associated with the complaint and to what extent the pain compromises his/her general health. This information can help to establish possible diagnoses and to determine the kind of investigation to be conducted in each case. A study performed by Oster and Nielsen,² in Denmark, with six-year-old to 19-year-old school children and adolescents constitutes one of the main references regarding this subject. In the study, a 20.6% prevalence was found for headache, 15.5% for limb pain, and 14.4% for recurrent abdominal pain. The presence of an organic cause for recurrent pain is low, being observed in 10% to 15% of the cases.¹ Since the etiology of these symptoms is complex, and the complaints are usually nonspecific, subjective and interpreted by children and family members, the investigation of recurrent pain becomes an arduous task for pediatricians, who are often unprepared to deal with such situation, as a consequence of an extremely organicist academic background. Frequently, a reductionistic and simplistic approach to the problem is observed; in such cases, symptoms are not adequately assessed, or, in the other extreme, excessive laboratory tests and medical appointments are required, due to the concern with an undiagnosed “severe organic disorder.” This behavior is reinforced by family pressure, who seeks diagnosis and treatment for a specific disease. The concern with an underlying organic disorder focuses the model of investigation only on the symptom, and, consequently, the child is not perceived as a whole. If the disorder turns out not to exist, the child’s complaint loses its importance, even tough it is real and impacts the life of both the patient and his/her family. The conceptual model for the origin of recurrent abdominal pain, proposed by Levine and Rappaport,³ in which multiple predisposing factors converge to generate this symptom (Figure 1), can also be considered in the approach to recurrent pain observed in other body sites - such as headache and limb pain. This model states that the identification of an organic cause must not rule out the analysis of emotional, social, familial, and cognitive aspects involved in the etiology and clinical expression of pain.

**Figure 1 - Conceptual model for the etiology of pain (Levine/Rappaport, 1984)**

### Diagnostic approach

The assessment of children with recurrent pain is a great challenge to the medical staff, because, usually, these children and their family members have already been to several other health services and carry with them a great deal of anguish and uncertainty. Therefore, the assessment requires open interviews that can clarify the complaint, including an evaluation of the emotional aspects involved (such as difficulties in family and social relationships), as well as the child’s potential ability to deal with pain, and the factors that influence its manifestation. In order to systematize the investigation and offer the child full care, it is necessary to create a bond between the patient and the health service, establishing a commitment among members of the health staff and between the child and his/her caregivers.

A detailed anamnesis and physical examination are essential and, often, several appointments are required for a precise characterization of the child’s clinical status. During the follow-up period, personal reports by the child can be useful; therefore, children should be instructed to register painful episodes and describe associated events; parental behavior during crises; factors related to the improvement/worsening of the condition; and use of medication.¹ ⁴

In the anamnesis, patient and family should be given time to report what their explanation for the pain is, and whether they have any specific concerns; in addition, it is often valuable to interview the parents and the child separately. Symptoms indicating a general compromise of the child’s health status must be investigated, such as anorexia, weight loss, fatigue, fever, night sweats, and others. Children with recurrent pain usually present simultaneous pain in several different sites, or even pain
Recurrent abdominal pain - RAP

General considerations

The most widely accepted definition of RAP was established by Apley and Naish, in a 1958 study. RAP is characterized by three or more episodes of abdominal pain that occur over at least three months and are severe enough to interfere with daily activities. In this study, the authors found a prevalence of RAP of 9.5% for boys and 12.3% for girls. Subsequent studies, carried out in different countries, presented similar results, with rates varying from 10% to 15%; these investigations showed a higher incidence of RAP among school-aged children, predominantly adolescent girls, and an expressive demand for health services.

In approximately 95% of RAP cases, the etiology is not clearly established. The importance of emotional factors regarding the onset of the symptom has been recognized by different authors. The first classification proposed for RAP subdivided the condition, according to its etiology, into organic and nonorganic. Later, a third group was found: dysfunctional RAP (caused by a temporary change in physiological functions). These classifications reinforce a fragmented assessment of the patient, which is inappropriate for clinical practice. In the 1990s, the concept of Recurrent Abdominal Pain Syndrome (RAPS) was suggested, in order to name the group of children without an organic disorder, who would constitute the majority of RAP cases. Recently, a new system for the classification of RAP-associated gastrointestinal disorders was proposed, which is known as ROMA II; however, this classification does not contemplate all cases of RAP, as it is restricted to gastrointestinal tract disorders.

Several studies are being conducted in order to understand the pathophysiology of RAP. Some authors have been trying to establish a behavior and temper profile of these children and adolescents, as well as of their reaction to stressful situations. The association between onset of the symptom and previous exposure to critical events - hospitalization of family members or of the child himself/herself, school failure - has not been verified consistently. It is still a matter of discussion whether these stressful situations would occur more often in the lives of these children, or if they would be more valued by them, since the relationship between RAP and presence of similar symptomatology in family members is well described in the literature, as well as a pattern of learned responses. A new line of research has been trying to identify changes in the autonomous nervous system pattern of response in these children - associated or not with anxiety and depression - which could possibly explain the onset of the symptoms; however, results are not conclusive yet. Therefore, the model proposed by Levine and Rappaport, cited in the introduction of the present article, is considered, in clinical practice, to be the one that best contributes to the assessment of children with RAP. Such model establishes that, even when an organic cause is identified, the group of factors that affect the life of these children must still be a matter of concern.

Among the disorders - identified in 5% to 10% of the cases - the majority is found in the gastrointestinal or genitourinary tract, without predominance of any particular cause, and showing some variations according to the complexity of the analyzed service. In regard to reported diagnoses, functional constipation, gastroesophageal reflux, urinary tract infection, nephrolithiasis, peptic disease, intestinal parasitosis, anatomical abnormalities of the...
gastrointestinal and urinary tract are found, among others.\textsuperscript{11,17,18} It is important to emphasize that the list of disorders associated with RAP is extensive and includes gastrointestinal dysfunctions, musculoskeletal phenomena, traumas, congenital malformations, gynecological, inflammatory, immunological, metabolic and hematological disorders. In the last two decades, improved diagnostic approaches have allowed for a clearer understanding of RAP cases. Next, the most important and/or frequent disorders reported as cause of RAP are briefly reviewed.

**Peptic disease** is characterized by the presence of ulcerating and nonulcerating lesions, caused by the chlorhydripetic action of gastric secretion on the mucosa of the gastrointestinal tract. The site of the disease can be located from the lower third of the esophagus to the distal duodenum, and in Meckel’s diverticulum, in case it contains the ectopic gastric mucosa. According to the etiology, peptic disease can be classified as primary or secondary. It is considered primary when it presents itself as a primary disorder of the gastrointestinal tract, and secondary when it is associated with a stressful situation, chronic and/or severe disorder, or caused by the use of medication.\textsuperscript{11}

Although it can occur alone, nonulcerating peptic disease (gastroduodenitis) is usually combined with peptic ulcer. Both in children and adults, the association between antral gastritis, in the presence of \textit{H. Pylori}, and duodenal ulcer is well described; however, the presence of this agent in 20\% of healthy adults and its age-dependent manifestation do not allow for the establishment of a direct relationship with the disease, which could depend on other factors - genetic factors, smoking, or use of ulcerogenic drugs. The eradication of \textit{H. pylori} from the mucosa, in patients with duodenal ulcer, relieves the symptomatology and reduces the recurrence of ulcers; however, its role in cases of gastritis or gastroduodenitis without peptic ulcer is not yet clearly defined and, in these cases, eradication is not indicated.\textsuperscript{11} The hypothesis that there would be a relation between the colonization by \textit{H. pylori} and RAP was not confirmed, therefore not justifying its investigation in children and adolescents with RAP.\textsuperscript{19}

Peptic ulcer must be considered as one of the causes for RAP in childhood, although its estimated incidence in this age group is low. There are more registered cases of duodenal ulcer than of gastric ulcer, and symptoms vary according to age. Although reports of long-lasting pain are extremely common in children under the age of seven, vomiting and nausea are more frequent complaints, followed by hemorrhage. In children above seven, pain followed by hemorrhage prevails. Curiously enough, pain is atypical, and is not related to food intake or felt in any particular site. Adolescents usually present a clinical status similar to that found in adults.\textsuperscript{11,20} In regard to diagnosis, abdominal pain presents high sensitivity, in spite of low specificity - the opposite of the remaining symptoms. Family history of the disease is significant. Endoscopy is the exam of choice for the diagnosis.

Giardiasis and strongyloidiasis, usually asymptomatic, can cause RAP associated with other symptoms and, undoubtedly, must be investigated and treated. In Brazil, population-based studies on the prevalence of parasitic intestinal disease indicate a reduction of its frequency in urban areas, and a prevalence of giardiasis among children under the age of five.\textsuperscript{21} The usual approach of prescribing mebendazole for children with RAP must be, therefore, criticized. Functional constipation can occur along with RAP, and the observation of its relationship with bowel habits may contribute to the diagnosis and management of each case. Controlled studies did not find an association between RAP and lactase deficiency; therefore, exclusion diets, without diagnostic support, must be avoided.\textsuperscript{10,11,22} Also, recently, studies have failed to establish a relationship between RAP and celiac disease.\textsuperscript{23}

**Diagnostic approach**

Anamnesis and physical examination follow the standard procedure described for general recurrent pain. In cases of RAP, special attention must be given to the relation of pain with food and bowel habits. In regard to physical examination, it is important to look for the presence of any mass, visceromegaly, and regions tender to palpation. If anamnesis and physical examination do not indicate the presence of a specific disorder, as an initial investigation, it is advisable to perform a complete blood test, erythrocyte sedimentation rate, urine culture, and parasitological examination of the feces. Warning signs suggesting the presence of an organic disorder\textsuperscript{10,11,24} are presented in Table 1.

**Therapeutic approach and prognosis**

Often, treatment dispensed to children with RAP is quite simple. These children are prescribed vermifuges,\textsuperscript{11,20} and do not receive a more detailed assessment or an adequate follow-up. In identifying a cause for RAP, this cause must be adequately treated. To consider, however, a multifactorial origin implicates the need for a comprehensive approach and follow-up of all cases. The use of an antispasmodic in the moment of the pain can result in placebo effect and drug-based treatment of symptoms, instead of drawing the attention to the child as a whole. In regard to prognosis, approximately 30\% of the children and adolescents with RAPS present remission of symptoms in the first few months of follow-up; however, relapses and the appearance of pain in other sites (especially headache and limb pain) are often observed.\textsuperscript{11,12}

**Recurrent limb pain**

**General considerations**

Limb pain syndromes, with chronic or recurrent development, have been named soft tissue rheumatism, nonarticular rheumatism or psychogenic rheumatism. They are more common among school-aged children, from four
to 10 years old, with girls being slightly more affected. The concept used in diagnosis is the same used for pain in other body parts: three or more episodes, over a period of at least three months, of intensity great enough to interfere in the child’s daily activities. The occurrence of an organic cause is rare, and is observed in approximately 3% to 4% of the cases. Thus, in more than 90% of the patients, limb pain is a clinical entity without an established pathophysiology.

Usually, pain is diffuse and nonarticular, affecting the lower limbs (complaints of pain exclusively in the upper limbs are rare). A study carried out by Moysés et al., with 71 children with recurrent limb pain, showed predominance of diffuse pain, associated with other pains. In addition, the authors pointed out that approximately 25% of the children presented previous diagnosis of rheumatic fever, without proper criteria for the establishment of such diagnosis. Next, some disorders that must be taken into account when evaluating children with recurrent limb pain are described.

Table 1 - Recurrent pain in childhood and adolescence - warning signs

<table>
<thead>
<tr>
<th>Abdominal pain</th>
<th>Limb pain</th>
<th>Headache</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss</td>
<td>Location and fixed pain</td>
<td>Neurologic alterations</td>
</tr>
<tr>
<td>Peripheral pain</td>
<td>Pain that spreads to the thighs, knee or lumbosacral region</td>
<td>Ocular alterations such as papillary edema, anisocoria, nystagmus, strabismus, diplopia and decrease of visual accuracy</td>
</tr>
<tr>
<td>Pain spreading to back, shoulder blade or lower limbs</td>
<td>Pain with paresthesias, cramps or weakness</td>
<td>Persistent vomiting with increased frequency or recent onset</td>
</tr>
<tr>
<td>Pain often wakes up the child</td>
<td>Presence of painful sites detected by palpation</td>
<td>Alteration of the headache pattern, with increased intensity and frequency</td>
</tr>
<tr>
<td>Child refuses to eat because of the pain</td>
<td>Pain detected by muscle palpation</td>
<td>Morning recurrent headache or headache that repeatedly wakes up the child</td>
</tr>
<tr>
<td>Signs and/or symptoms such as recurrent fever, arthritis, melena, etc.</td>
<td>Alteration in muscle strength</td>
<td>Children with slowed growth speed</td>
</tr>
<tr>
<td>Family history of organic disease such as sickle-cell anemia, peptic disease, urinary and gallbladder stones.</td>
<td>Waking difficulties or alterations such as claudication or refusal to walk</td>
<td>Insipid diabetes</td>
</tr>
<tr>
<td>Alterations in laboratory tests</td>
<td>Systemic symptoms associated with fever, pallor, skin rash, weight loss, presence of lymphadenopathy and visceromegaly</td>
<td>5 year old or younger children</td>
</tr>
<tr>
<td></td>
<td>Pain persistence</td>
<td>Patients with neurofibromatosis</td>
</tr>
</tbody>
</table>

Recurrent limb pain without systemic manifestations

Diffuse pains are the most common complaint: growing pains, fibromyalgia, joint hypermobility, and postural and structural disorders.

The name growing pains, despite not actually being related to growth, has been consecrated in the literature. It affects children aged between six and 13 years, who complain of intense musculoskeletal pain, nonarticular, located in lower limbs - back of the thighs, popliteal area and calf, or periarticular - lasting from 10 to 15 minutes, and usually occurring towards the end of the afternoon or waking the child up in the middle of the night. Since pain is diffuse, the child is not able to point, precisely, where the painful site is located. Correlation with physical exercises is not always reported. Usually, the history of pain is long, without reference to traumas, other associated complaints or general compromise. The pain is eased by means of heat, massage, and pain-killers. General physical examination and evaluation of the locomotor system are normal, as well as radiological examination and lab tests.

Fibromyalgia (FM) is more frequent in adolescents, especially females. A study by Yunus and Masi demonstrated that the average age at onset is 12.3 years, and the condition persists for approximately 30 months. Liphaus et al., in a study carried out in Brazil, also observed a predominance of females among adolescents affected by FM (71%), with an average age at onset of 10.4 years. The most frequently referred painful sites were the shoulder blade, elbow and knee. FM is characterized by diffuse, intermittent musculoskeletal pain, usually associated with mood swings (depression, anxiety), sleep disorders and fatigue. Complaints of other recurrent pains, irritable bowel syndrome, subjective edema, paresthesia, and sleep disorders are also common. Aggravating factors and associated symptoms are directly related to lifestyle and stressful environments.
situations, fatigue, anxiety and depression. Patients with FM present recurrent widespread pain in the four quadrants of their bodies, with tenderness at 11 of the 18 specific points of muscle insertion, according to the criteria established by the American College of Rheumatology. Lab tests are normal, and some authors draw attention to the risk of overdiagnosis in cases of FM. The possibility of disease overlap must also be considered, since FM can be secondary to other entities, such as juvenile rheumatoid arthritis, systemic lupus erythematosus, dermatomyositis, or it can also co-exist with joint hypermobility and postural-mechanical defects.29

The Joint Hypermobility Syndrome (JHS) affects children older than five and is characterized by the presence of generalized joint hypermobility, associated with musculoskeletal pain, and characteristics similar to growing pains. These children have excellent performance in physical activities that require greater range of flexion and extension movements, but present a history of frequent falls. Pain is usually widespread, but it can also manifest only in periarticular areas or as arthralgia. Frequently, JHS is limited to one or two joints, and recur in the same site. The most often affected joints are hips, knees, elbows and ankles. Arthritis occurs in 10% to 20% of the cases. Physical examination is characterized by excessive laxity of joint ligaments and increased elasticity. Diagnosis is confirmed by the presence of at least five of the criteria presented in Table 2. Differential diagnosis must be made with Ehlers-Danlos and Marfan syndromes, which present, in addition to joint hypermobility, other characteristic findings that allow the proper diagnosis.28

Structural/postural disorders are common in the presence of structural orthopedic changes, such as flat fleet, genu varum, genu valgum, and femoral anteversion in children with complaint of recurrent limb pain. Many of these changes can be part of the child’s normal development - when angular changes in the longitudinal axis of the lower limbs occur -, tending to align spontaneously. However, even when outside the expected range, there is no evidence supporting the hypothesis that such changes can be the cause of musculoskeletal pains.26

Table 2 - Criteria* for the diagnosis of joint hypermobility syndrome (JHS)

<table>
<thead>
<tr>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opposition of the thumbs up to the flexor fascia of the forearms (2)</td>
</tr>
<tr>
<td>Hyperextension of the fingers parallel to the extensor fascia of the forearms (2)</td>
</tr>
<tr>
<td>Hyperextension of the elbows, higher than 10° (2)</td>
</tr>
<tr>
<td>Hyperextension of the knees, higher than 10° (2)</td>
</tr>
<tr>
<td>Leaning hands on the ground during body flexion, keeping the knees extended (1)</td>
</tr>
</tbody>
</table>

* Each side corresponds to one criterion.

In localized pains, investigation must be drawn to the group of osteochondritis, overuse syndromes and bone tumors.27,28,30,34,35

Osteochondritis is defined as any change in bone cartilage, usually affecting only one area, predominantly in lower limbs. Boys, with ages varying from three to 14, are most frequently affected. The etiopathogenesis is unknown, but traumas caused by overuse are suspected to be a contributing factor, and, in some cases, avascular necrosis, not related to trauma. Radiological examination is required for the detection of such changes.

Painful overuse syndromes have become a matter of concern as the participation of children in sport activities, often competitive, is increasingly starting at an earlier age, with inappropriate physical preparation. The overload of some specific anatomic structures, by repetitive effort, can lead to microtraumas, causing inflammation and, consequently, edema, functional incapacity, or also stress fractures. Recent involvement in physical activity or intensification of training in the weeks prior to the onset of symptoms is present in the patient’s history. At early onset, pain is aggravated with effort and is eased at rest. Throughout the development of the condition, pain subsists even when at rest, and it becomes constant, with exacerbation during physical activities. Radiological exams do not show any significant changes, but are useful in order to discharge other diagnoses, such as tumors.28,36,37

Excessive use of computers by children and adolescents, at home (electronic games) or at work, during several hours throughout the day, has been pointed as a cause of musculoskeletal localized or diffuse pain. In addition, this situation holds the child back from other physical activities, and promotes obesity, thoracic pain, headache and fatigue. Children can also present tenosynovitis or repetitive strain injuries (RSI) or Work-Related Musculoskeletal Disorders (WMSD). Prevention is achieved by correct posture in front of the computer, use of adequate ergonomics and stretching and relaxation exercises for the arms, wrists, hands and back, about 10 minutes every hour. Children and adolescents should use the computer or videogame for no more than two hours a day, and, in case of pain or musculoskeletal lesion, the use of such equipment must be suspended. The use of pain-killers or nonsteroidal anti-inflammatory drugs may be required, and, in some cases, so may physiatric treatment.28,35,38

Bone tumors cause recurrent limb pain, usually localized, unilateral and permanent on the site of the lesion. Among benign tumors, the most frequent are osteoid osteoma, osteochondromas, and chondromas. Osteoid osteoma is a benign tumor that affects the proximal femur area, vertebræ, and proximal tibia, causing deep and penetrating pain, which is intensified at night. Patients complain of tenderness to palpation, muscle atrophy, weakness and claudication on the side of the affected limb; pain is relieved by the use of salicylic acid and other nonsteroidal anti-inflammatory drugs. Osteochondromas present as a painless mass, affecting
the distal section of long bones and sites of tendon attachment. These tumors can develop with functional changes, related to their location and size, causing pain due to the compression of nervous and vascular structures. About half of the primary bone tumors in children are malignant, accounting for 1% of the malignant neoplasms in children. The most common are osteosarcoma (osteogenic sarcoma) and Ewing’s sarcoma. Radiological changes are suggestive of tumors, and a definite diagnosis is made with bone biopsy.34

**Recurrent limb pain with systemic manifestations**

This group is formed by connective tissue disorders, avitaminosis, endocrine disorders, and hemoglobinopathies.

**Connective tissue disorders** develop with symmetrical limb pain, associated with systemic manifestations, usually with joint or muscular involvement. Inflammatory disorders are characterized by morning stiffness, and movements with joint or muscular involvement. Inflammatory disorders are associated with systemic manifestations, usually with joint or muscular involvement. Inflammatory disorders are characterized by morning stiffness, and movements tend to improve with walking.

**Avitaminosis and endocrine diseases** include scurvy (lack of vitamin C), hyperparathyroidism, and Cushing’s disease, which can also be associated with limb pain.

**Hemoglobinopathy**, such as sickle cell anemia, can cause pain in long bones, during hemolytic crises, as a clinical manifestation; however, arthritis and arthralgia are the most commonly observed pains. Other hemoglobinopathies, such as thalassemia major and S-C hemoglobinopathy, also cause recurrent limb pain. The presence of anemia and other signs and symptoms guides the diagnosis, which is confirmed by blood test and hemoglobin electrophoresis.

**Diagnostic approach**

Diagnostic approach of recurrent limb pain must follow the steps suggested for other kinds of recurrent pain. Some aspects of the anamnesis and physical examination, however, deserve special attention. In regard to the patient’s history, when systemic manifestations are found (such as fever, anemia, weight loss, skin rashes, bleeding, edema, loss of muscle strength, fatigue, arthritis, lymph node enlargement, hepatosplenomegaly, walking difficulty, and others), the investigation must be more focused on the possible etiology. An examination of the locomotor system is essential in children with complaint of limb pain. Postural and gait assessments, evaluation of joint symptomatology (inspection, palpation, active and passive movements of all joints, including hips), muscle strength, and palpation of peripheral pulses must be carried out. In addition, the lower limbs must be measured (distance from the anterior-posterior spine to the medial malleolus), disregarding differences less than 0.5 cm.

In most cases of children with recurrent limb pain, a laboratory investigation consisting of a complete blood test and an acute phase protein measurement (normally, erythrocyte sedimentation rate) are good enough. However, in the presence of warning signs, diagnostic investigation must be reinforced (Table 1).

**Therapeutic assessment and prognosis**

When the cause of pain is identified, it should be adequately treated. In the remaining situations, it is important to explain clearly to the parents that, although a disease does not exist, the pain is real, and the symptom may indicate a way through which the child deals with his or her experiences, situations of anxiety or conflict. Prognosis is benign; pain is self-limited, and relaxation exercises can produce positive results.28,39

With regard to hypermobility joint syndrome, due to the increased chance of microtraumas, ligament and tendon ruptures, and early arthrosis, activities such as ballet, capoeira, and olympic gymnastics must be avoided. Treatment must include physical therapy and/or water sports in order to strengthen the compromised periarticular muscles. Nonsteroidal anti-inflammatory drugs are to be indicated only in cases of intense pain. As to fibromyalgia, there is no consensus regarding treatment; however, there are several reports of improvement following combined actions such as increase of physical activity, reduction of stressful situations, relaxation, and use of antidepressants. Painkillers and anti-inflammatory drugs are rarely indicated.

**Recurrent headaches**

**General considerations**

Headache is a common complaint in pediatrics and, when occasional, it does not interfere in children’s daily habits. However, cases of recurrent pain affect routine activities, and are one of the most important causes of class absence and demand for health services. Bo Bille’s study, which included 9,000 Swedish children and adolescents, showed that 35% of seven-year-old children, and 54% of 15-year-old adolescents reported episodes of headache sporadically. The same author verified that the complaint of recurrent headache was reported by 2.5% of the children aged seven and by 15.7% of the adolescents aged 15.40 The study by Oster and Nielsen, carried out in Denmark with school-aged children and adolescents, revealed a prevalence of 20.6%, and predominance among girls.5 Other studies have found similar results.41,42

In 1988, the International Headache Society (IHS) proposed a classification for headaches, structured according to diagnostic complexity (Table 3). Types number one to four refer to primary headaches, that is, headaches that are not consequences of specific organic diseases, from intracranial or systemic origin; these are the most common types of headache in the pediatric age group and, among
Table 3 - Classification of headaches, cranial neuralgia and facial pain by the International Headache Society (IHS) - (1988)

1. **Migraine**
   - Migraine without aura (common migraine)
   - Migraine with aura (classical migraine)
   - Ophthalmoplegic migraine
   - Retinal migraine
   - Childhood periodical syndromes that may be precursors to or associated with migraine
   - Complications of migraine
   - Migrainous disorder not fulfilling the criteria above

2. **Tension headache**
   - Episodic tension headache
   - Chronic tension headache
   - Tension headache not fulfilling the criteria above

3. **Cluster headache and chronic paroxysmal hemicrania**
   - Cluster headache
   - Chronic paroxysmal hemicrania
   - Disorder similar to cluster headache not fulfilling the criteria above

4. **Other headaches not associated with structural lesion**
   - Idiopathic stabbing headache
   - External compression headache
   - Cold stimulus headache
   - Benign cough headache
   - Benign exertional headache
   - Headache associated with sexual activity

5. **Headache associated with head trauma**

6. **Headache associated with vascular disorders**

7. **Headache associated with nonvascular intracranial disorder**

8. **Headache associated with substances or their withdrawal**

9. **Headache associated with noncephalic infection**

10. **Headache associated with metabolic disorder**

11. **Headache or facial pain associated with disorder of cranium, neck, eyes, ears, nose sinuses, teeth, mouth, or other facial or cranial structures**

12. **Cranial neuralgias, nerve trunk pain, and deafferentation pain**

13. **Headache not classifiable**

them, there is predominance of migraines and tension headaches.\(^{43,44}\) The additional challenge imposed by children’s difficulty in expressing their symptoms often forces the differential diagnosis to be made during the patient’s follow-up.

**Migraine** is characterized by moderate/strong pain intensity, often interfering in daily activities. It is usually accompanied by gastrointestinal symptoms (nausea and vomiting), photophobia, phonophobia, and, occasionally, by transient neurological manifestations (hemianopsia, paresthesia, palsy, ataxia), characterizing the aura. The prevalence of migraine in school-aged children and adolescents is estimated between 5% and 10%, and its frequency increases with age. Until the age of seven, boys are predominantly affected; from seven to 11 years of age, boys and girls are equally affected; past the age of 11, migraine is predominantly found in girls.\(^{45-47}\) The IHS, in 1988, defined the diagnosis of migraine for adults as the occurrence of at least five crises, lasting between four (two hours for children under 15) and 48 hours, with the presence of criteria listed in Table 4. Additionally, according to the IHS, migraine can be classified as migraine without aura, migraine with aura, and other forms of migraine. Several authors\(^{44,46,48}\) have questioned the criteria for the diagnosis of child and adolescent migraine, noticing that, in this age group, the clinical status shows some peculiarities. The minimum duration of two hours is considered unusual; migraines are usually bilateral, located in the frontal region; rarely can the child characterize the pain as pulsatile, or define the intensity of the symptom; photophobia and...
phonophobia, when present, are not always associated. The classifications proposed by Vahlkist and by Prensky and Sommer show increased sensitivity for the pediatric age group, although it is a consensus that no adequate classification of childhood migraine exists yet. The Pediatric Headache Committee of the American Association for the Study of Headache presented a proposal to review the IHS criteria. This proposal included duration from one to 48 hours; bifrontal, biparietal or unilateral localization; and presence of photophobia or phonophobia, not necessarily associated.

The most common kind of migraine in pediatric patients is migraine without aura. It is usually associated with neurovegetative symptoms, particularly nausea, vomiting and abdominal pain. Migraines with aura occur, mostly, among adolescents, being usually visual, preceding or accompanying a painful clinical status, and lasting from five minutes to one hour. The remaining types of migraine are not common among this age group.

The frequency of migraine in close family members is significant, being considered an important information during the anamnesis. In face of this evidence, several kinds of genetic inheritance have been postulated; however, the only confirmed fact refers to the identification of the gene responsible for familial hemiplegic migraine. Factors related to family and school environment are related to migraine crises, and some disturbances are often described in the intercritical period - kinetosis, sleep walking, sleep talking, night terrors. The correlation between personality type and temper of children affected by migraines and anxiety or depression is not well established.

The diagnosis of tension headache, according to the IHS criteria, is done in the presence of a constant pain that can limit - but does not tend to prevent - children in their daily activities. Pain is usually felt on compression or pressure, being usually bilateral, and lasting from 30 minutes to seven days, without nausea, vomiting, photophobia or phonophobia. Tension headaches impose a difficult diagnostic and epidemiologic approach due to the inaccuracy of their definition; in clinical practice, this diagnosis is made by exclusion in cases of children showing recurrent headache that does not fulfill the criteria established for migraine without aura. Follow-up studies of children and adolescents with migraine without aura or tension headache have shown a switch between the two diagnoses. Some authors point out that these two kinds of headache could represent different degrees of the same condition.

Factors involved in the onset of crises are common to migraine - family tensions, critical events, school problems, chronic pain in family members, among others.

Secondary headaches - intracranial hypertension, arterial hypertension, and sinusitis

Only 5% of recurrent headaches in children are secondary to an organic disorder. One of the greatest concerns of pediatricians is that these headaches are part of an intracranial expansive process. Brain cancer is the most common solid tumor found in children; however, they do not constitute a common cause of headache in pediatric patients, due to the small incidence of neoplasms in this age group. Clinical presentation of intracranial tumor depends on its location, growth rate, presence of infiltration, and invasion of vascular structures or obstruction of cerebrospinal fluid pathways. The anatomical location, clinical signs and symptoms provide the basis for the classification of childhood cancer. Infratentorial brain tumors usually present with

| Table 4 - Criteria of the IHS for the diagnosis of migraine without aura in children |

- At least two of the following criteria:
  - unilateral location;
  - pulsating pain;
  - moderate or severe intensity sufficient to inhibit or prohibit daily activities;
  - aggravation by climbing stairs or similar routine physical activity.

- At least one of the symptoms during migraine crisis:
  - nausea or vomiting;
  - photophobia and phonophobia.

- At least one of the following criteria:
  - history and physical and neurologic examinations do not suggest headache due to a secondary disorder;
  - history and physical examinations suggest headache due to a secondary disorder, but appropriate investigations rule out a secondary disorder;
  - a secondary disorder exists, but the migraine crises did not start at the same time the secondary disorder started.

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hydrocephalus, clinical signs and symptoms of intracranial pressure (headache and/or vomiting), cerebellar signs (ataxia), brainstem signs (cranial nerve paralysis) or meningeal signs. In third ventricle tumors, hydrocephalus, neuroendocrine and optical disorders are commonly found. Convulsion, hemiparesis and motor incoordination are signs/symptoms of hemispheric brain tumors. 58 Studies that have analyzed the presence of signs and symptoms in the diagnosis of brain tumors in children demonstrated that headache presents high sensitivity, but low specificity; on the other hand, neurological disorders, in addition to high specificity, manifest early on. Consequently, the presence of brain tumor in the absence of such disorders is unlikely. 43,58 Headache secondary to intracranial tumors usually present chronic and progressive development, diurnal periodicity, and exacerbations related to changes in head position, cough or Valsalva maneuver. 43

The main cause of arterial hypertension in children has renal etiology, and can be secondary to pheochromocytoma and coarctation of the aorta. Although it is a rare cause of recurrent headache, it is worth emphasizing the importance of the measurement of arterial blood pressure in all children and adolescents. Sinusitis, often referred to as a cause of headache in clinical practice, is accompanied by signs and symptoms of the respiratory tract. Headaches related to refractive disorders are caused by the intense activity performed by the ciliary muscle after long periods of visual effort. They are usually located in the frontal region, being bilateral and showing improvement after a short period of visual rest. 43

**Diagnostic approach**

Anamnesis and physical examination, as in other recurrent pains, are essential. It is important to emphasize, however, the importance of measurement of arterial blood pressure and the neurological exam. The systematic request for ancillary exams is not recommended if anamnesis and physical examination do not indicate changes or presence of a specific disorder. 58 It is very important that a follow-up plan be presented to the child and his/her parents, clarifying the need for several appointments until a definite diagnosis can be established. Some authors suggest that pediatricians should ask the child to draw pictures, as a way of expressing his/her symptomatology, in addition to orally reporting the pain crises, frequency, preceding facts and situations. 43,59 The presence of warning signs 43,52 (Table 1) indicates the need for a more direct investigation.

**Therapeutic approach and prognosis**

Once the etiology has been established, the treatment and/or adequate procedures must be initiated. Next, the approaches to be employed when facing the most common cases of headache in children are reviewed.

In most cases, the treatment of migraine does not require the use of medication. Treatment must always be personal and decided in accordance with the family and the patient. 43,60 In regard to drug treatment, there are two main drug classes: symptomatic and prophylactic for pain crises. Children usually respond well to sleeping; in crises of pain, the search for a calm, dark place to take a few minutes of rest is recommended. 43,60 In cases in which no improvement is observed, a common pain-killer will usually be sufficient to treat painful crises. Nonsteroidal anti-inflammatory drugs or associations of paracetamol and salicylic acid with caffeine have been used with positive results. When the patient has an aura, medication must be started at the onset of symptoms. When nausea and vomiting occur associated with the crisis, the use of antiemetic drugs is indicated. Among medications used specifically for the treatment of moderate to severe headache not responsive to common pain-killers, ergotamine and triptans can be used, respecting the limits for their administration in children. 43 Prophylactic treatment is indicated by most authors when more than two monthly crises are observed or, in case of a smaller number of events, when these present one of the following characteristics: extremely intense or debilitating crises, associated with focal neurological manifestations, or when painful episodes have an excessively long duration. Drugs normally used in prophylactic treatment are propranolol, flunarizine, sodium divalproex, pizotifen, and cyproheptadine. 60 The treatment of tension headache is based on non-drug prophylactic measures. An understanding of precipitating factors and use of relaxation measures can be useful.

**Conclusions**

Finally, the importance of follow-up for children and adolescents with recurrent pain by a pediatrician must be highlighted. These patients must be monitored in outpatient clinics, in primary care units or private offices, as these are the services that gather the best qualifications needed to establish a bond between doctor and patient, allowing for an integral health care. A joint effort must be made in order to improve the child’s quality of life. The medical approach must not only grasp the characteristics of the pain and its manifestations, but also perceive children in their subjectivity and several social dimensions.

**References**

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