# Child abuse: skin markers and differential diagnosis

## Violência contra a criança: indicadores dermatológicos e diagnósticos diferenciais

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**Abstract:** Reports of child abuse have increased significantly. The matter makes most physicians uncomfortable for two reasons: a) Little guidance or no training in recognizing the problem; b - Not understanding its true dimension. The most common form of child violence is physical abuse. The skin is the largest and frequently the most traumatized organ. Bruises and burns are the most visible signs. Physicians (pediatricians, general practitioners and dermatologists) are the first professionals to observe and recognize the signs of intentional injury. Dermatologists particularly, can help distinguish intentional injury from accidental, or from skin diseases that mimic maltreatment.
Keywords: Burns; Contusions; Ecchymosis; Domestic violence; Sexual violence

**Resumo:** As denúncias de abuso contra a criança têm sido frequentes e configuram grave problema de saúde pública. O tema é desconfortável para muitos médicos, seja pelo treinamento insuficiente, seja pelo desconhecimento das dimensões do problema. Uma das formas mais comuns de violência contra a criança é o abuso físico. Como órgão mais exposto e extenso, a pele é o alvo mais sujeito aos maus-tratos. Equimoses e queimaduras são os sinais mais visíveis. Médicos (pediatras, clínicos-gerais e dermatologistas) costumam ser os primeiros profissionais a observar e reconhecer sinais de lesões não acidentais ou intencionais. Os dermatologistas podem auxiliar na distinção entre lesões traumáticas intencionais, acidentais e doenças cutâneas que mimetizam maus-tratos.
Palavras-chave: Contusões; Equimose; Queimaduras; Violência doméstica; Violência sexual

## INTRODUCTION

The concept of "battered child syndrome" was introduced by Kempe in 1962 to define the situation in which multiple accidental traumas, not caused by external conditions unexplained by anatomic and pathological injury, are associated with physical violence perpetrated by caregivers. [1,7]

Abusive conduct, mistreatment, neglect and domestic violence are rarely considered among likely or differential diagnoses, unless they indicate sexual abuse or when sexually transmitted diseases are confirmed. The recognition of physical and psychological abuse, however, should be done by child care agencies, through a multidisciplinary approach, seeking to minimize or eliminate the suffering of the child, promoting and ensuring its well-being and even survival.

Violence against children tends to be an uncomfortable topic for many doctors, in part by the lack of training to recognize and deal with the problem. [8] The skin is the first organ to be affected in physical aggression and it is the most frequently involved, causing skin manifestations to be the most

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recognizable forms of abuse. [9-13] About 90% of victims of physical abuse show skin lesions on examination.[11] The dermatologist should know the signs of physical abuse and the differential diagnoses (skin and/or systemic diseases) that can mimic or simulate the main skin lesions resulting from physical violence.

There are few publications on the subject, especially in Latin America. This review aims to assist in differentiating the skin signs of child abuse (physical and/or sexual) and the main mimicking clinical conditions.

## EPIDEMIOLOGY

Reports of mistreatment of children have grown at an alarming rate in recent decades: about 60,000 cases in 1974, 1.1 million in 1980 and 2.9 million in 1992. [10] In the United States, more than three million cases of child abuse or neglect are reported annually, [14] and at least 2,000 children die due to abuse.[15] The rapid growth in the number of reported cases may be due to the recognition of the problem and complaints. Still, it is estimated that for every victim identified, there are two unreported or even unnoticed cases. [8]

Child abuse is defined by the Center for Prevention and Treatment of Child Abuse (USA), such as mental and physical injury, sexual abuse, neglect or mistreatment of individuals under 18 years of age, perpetrated by a caregiver, which indicates that the health of the child is threatened. [16] Recognition of the early signs of abuse is imperative, and often the doctor is the first and only professional to have contact with the situation. In addition, about 30 to 70% of abused children are subject to subsequent injuries, that is, less severe forms of abuse tend to evolve into progressively more severe abuse, unless there is early intervention. [17]

The diagnosis of child abuse is part of the International Classification of Diseases ($ICD_{10}$) [18] and must necessarily be distinguished from other diseases.[9] However, many skin signs may be the product of accidents, of events that are common in childhood, and of strictly medical conditions. [6]

Diagnostic investigation of child abuse resembles that of other medical conditions and details of the child's history can provide a strong indication of violence [9,17] Suspected abuse can have significant indirect evidence: 1) the explanations about the injuries found are vague or absent, 2) versions of the facts differ from one moment to another, 3) the perpetrator(s) of injury take at least two hours to seek medical help or use emergency services without reason or for petty reasons, 4) history of frequent visits to the emergency room, 6) repeated fractures, and 7) reported history that is inconsistent with the physical findings. [8,19]

There are four *major* types of abuse: physical, sexual, emotional and neglect. In almost all cases of physical abuse [8] skin signs appear, and the most common are ecchymosis, lacerations, abrasion, burns, bites, traumatic alopecia, and oral trauma. [8,20]

## ECCHYMOSIS AND DIFFERENTIAL DIAGNOSES

Ecchymosis is the most common sign of abuse, [9,10,21] despite being frequently found in any active child without any relation to abuse or neglect. Accidental ecchymosis on the knees and anterior face of the tibia [9] and any bony prominence, such as the forehead and the backbone, are common.[8] Children with less than three ecchymoses measuring less than 1.0 cm do not usually have a history of violence or abuse. [22] However, ecchymosis in places that are relatively protected, such as the arms and posterior and medial faces of the thighs, hands, ears, neck, genitals and gluteal region can signal abuse, especially ecchymoses that are extensive and of varying ages.[23]

Accidental injuries require motor skills. Therefore, ecchymosis in children under six months of age is rare because they do not have great mobility. One or more soft tissue ecchymoses on the preambulatory child can be correlated with abuse. Accidents tend to increase with mobility, especially in the legs and forehead. Accidental ecchymoses of the head are uncommon in preambulatory and school children, but they are not rare in children who have started to walk and who are still unsteady. Therefore, it should be known that any soft tissue injury in preambulatory children is highly correlated with abuse. [9]

Ecchymosis on the ears and genitalia is indicative of abuse, because these areas are rarely injured by accident. [20] Accidental abdominal ecchymoses are rare, due to the flexibility and muffling power of fat. When present, they indicate a strong impact and internal injuries should be investigated, as mortality rate reaches 50%.[24]

Ecchymoses with a pattern (specific form) constitute strong evidence of abuse. They tend to be located in the gluteal region, front legs and back. They may be linear, round, parallel, or in the pattern of a strap, and reflect, at least partially, the shape of the object used to inflict injuries (ropes, belts, buckles), helping to differentiate between accidental and provoked ecchymosis. [12] However, some diseases can cause ecchymoses or persistent erythema in protected areas without corresponding to abuse. Chart 1 shows the main skin diseases (localized or systemic) that may mistakenly lead to the wrong diagnosis of child abuse) [8].

The appearance of ecchymosis depends on the time of evolution of the bruising, location, depth and

skin aspect [25,26]. The process of resolution depends on other variables such as use of anti-coagulants, applied force, age, vascularization of the adjacent skin and comorbidities [27]. The use of Wood's light has been an auxiliary method in the visualization of light bruises or those invisible to the naked eye [28].

Attempted strangulation can cause swelling and distal petechiae on the labial commissure of mouth. Ecchymoses with a digitiform aspect can be observed in the arms. Original pressure points in pinching are white, demarcating the contours of the aggressor's fingers, pressuring the blood laterally [29]. Spanking may produce linear and parallel purpuric lesions with a small triangle at the base, representing the interdigital space [30].

The location, number, size and color of ecchymoses can be confused with lesions caused by abuse. [14,31-51]

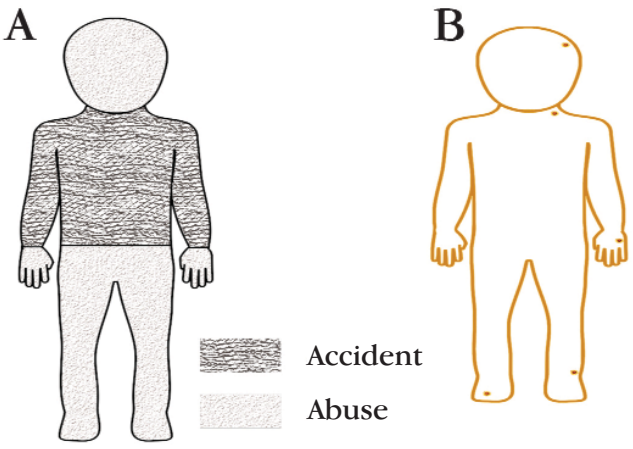


**Figure 1**: A. locations of burns (accidental x abusive ) **B.** schematic illustration of preferential sites of intentional cigarette burns
*Adapted source: Kos L, Shwayder T* [8]

## BURNS AND DIFFERENTIAL DIAGNOSES

Burns comprise about 5 to 22% of all physical abuse [52,53]. They represent between 8 and 25% of all pediatric burns and seem to be more common in children under 3 years old. [54,55]

Intentional contact burns are deeper, they may be multiple and with well-defined margins. They are usually produced by hot iron, radiators, hair dryers, hair curling irons, stoves or immersion in boiling water. Contact burns with well defined margins and uniform depth, usually located in protected areas, are suggestive of abuse. [55]

The location of the burn, although not a pathognomonic sign, may be useful to exclude the practice of abuse. Face, hands, legs, feet, perineum and gluteal region tend to be preferred sites of abuse. The perineum and gluteal region are rarely affected in accidental burns [53.54]. The anterior trunk and upper limbs are common sites of accidental burns (Fig. 1A). Abusive burns tend to involve the face, dorsum of hands, the lower trunk and lower limbs. Accidental burns of the hands most commonly affect the palms and the anterior surface of the fingers in contact with the hot object. [56]

Intentional cigarette burns are common. They are approximately 7 to 10mm in diameter, are well demarcated and have a central crater. As they injure the dermis, they usually regress forming a scar. They usually present as grouped lesions on the face, hands and feet [53]. When accidental, they tend to be oval, eccentric and more superficial, because the child reacts quickly to the pain. [54] (Figure 1B).

Burns caused by immersion in hot water can be accidental or intentional. Forced immersion in hot water preserves the folds and the resting point of the gluteal region, resulting in a symmetric delimitation that tends to show accurate limits and uniform depth. [17]. Forced immersions of the limbs present as "glove", or "sock" burns, and "zebra stripes" [53.55]" are the result of "creases" caused by the flexed position (Figure 2).

Erythematous-edematous and/or vesiculobullous lesions may mimic physical abuse caused by objects or hot liquids. Some studies show the difficulty in differentiating between intentional burns and skin diseases that mimic abuse. [14, 57-71] Chart 2 presents a brief discussion of such works.

## OTHER SIGNS OF VIOLENCE AGAINST CHILDREN

Bruising, abrasion and burn can be identified in the mouth (lips, cheek mucosa, palate). Oral traumas are reflected more by hematomas than by ecchymoses. [72] Erythema or petechiae on the palate, especially in the transition between the soft and hard palate, may point to the possibility of forced oral sex. [7] Lip or lingual frenulum fissures may indicate trauma by forced feeding or other type of violence, especially forced oral sexual practice. [58.73]. Despite the fact that evidence of lesions in the oral cavity indicate sexual abuse, such signs are not often observed [74]. Cutlery, cups, or hot foods can cause burns or lacerations in the oral cavity and even fractures or tooth loss. These children also tend to show signs of dental neglect [8].

**Bites** raise suspicion for abuse and require a thorough examination of the victim. Classical marks are semi-circular, and the punctures caused by the canines may be prominent. Since the normal distance between the maxillary canines in adults is 2.5 to 4.0 cm, one can consider that bites with intercanine distance greater than 3.0 cm are probably inflicted by adults. Shorter distances suggest that the bite might have been caused by a child. [75]. The forensic dentist

**Chart 1:** Differential diagnoses of ecchymoses caused by child abuse

| Differential Diagnosis | Characteristics |
|---|---|
| **Mongolian Spot** | It may be confused with non-accidental traumatic ecchymosis, especially due to the location (lumbosacral region) and color (bluish). [31,32] |
| **Coagulopathies** | Idiopathic thrombocytopenic purpura, hemophilia, deficiency of coagulation factors (Von Willebrand disease) and leukemia can cause seemingly unexplained ecchymosis. [33,34] |
| **Vasculitis** | a) Henoch-Schönlein purpura (anaphylactoid purpura, allergic vasculitis) can cause ecchymosis in the early stages of the disease. 14 It should be considered in younger children with early history of upper respiratory infection (fever, headache, joint and / or abdominal pain);<br>b) Acute hemorrhagic edema of infants, characterized by acute clinical manifestations with peripheral inflammatory edema and ecchymotic purpura, especially in the face and extremities; [35]<br>c) Erythema nodosum - represented by painful lesions typically located on the extensor surfaces of the lower limbs. |
| **Erythema pernio** | Abrupt onset of erythematous, edematous, violaceous lesions in the extremities (ears, nose, fingers), associated with exposure to low temperatures. [36] |
| **Collagenopathies** | a) Ehlers-Danlos syndrome (hyperelastic skin) - it may present with ecchymosis and dystrophic scars in areas subject to trauma and be initially mistaken for child abuse. Clinical investigation and family history can guide the diagnosis; [37, 38]<br>b) Osteogenesis imperfecta - hereditary disease in which a mutation in the genes responsible for the production of collagen I occurs. It is defined by history of multiple fractures and might initially be confused with multiple intentional injuries; [39]<br>c) Dermatomyositis - edema (heliotrope) and Gottron papules may be confused with physical aggression. Periungual telangiectasias and muscle weakness may help in differentiation. |
| **Phytophotodermatitis** | Bizarre hyperpigmentation caused by phytophototodermatosis that may suggest child abuse. [40, 41] Vesicles and blisters from burns caused by plants are also a differential diagnosis of child abuse. [42] |
| **Hemangiomas** | Common benign tumors in childhood that can mimic ecchymosis and result in false reporting of child abuse. [43].Kaposiform hemangioendothelioma is an aggressive vascular tumor that can be mistaken for traumatic ecchymosis. |
| **Meningococcemia** | it presents with erythema, petechiae and ecchymosis 44. |
| **Incontinentia pigmenti** | It can be confused with abuse and requires confirmatory biopsy. It is distinguished by neurological and dental findings [45]. |
| **Neuroblastoma** | It is frequent in childhood and presents with periorbital ecchymosis. The diagnosis is confirmed by history, physical examination and complementary exams. [46] |
| **Erythema multiforme** | Autoinflammatory disease with sudden onset of erythematous-violaceous lesions, which can be confused with traumatic ecchymosis. [47] Progression of the disease with annular lesions of erythematous borders and discolored center can help in the differentiation. [48] The development of a central vesicle can simulate intentional cigarette burn. |
| **Digitiform parapsoriasis** | Variant of parapsoriasis in small plaques, it presents with digitiform lesions on the trunk. [49] |
| **Pyoderma gangrenosum** | It typically presents with ulcers, but may progress from erythematous nodules [50] - it is often triggered by trauma (pathergy) and there are reports of this condition after beating. [51] |
| **Erythema *marginatum*** | Rheumatic annular erythema, it occurs in 10% of the cases of rheumatic fever, especially when there is cardiac involvement. It appears as an eruption with arched forms that can be confused with lesions of beating with cables and cords. [48] It differs, however, due to its migratory character and other classic signs of rheumatic fever (arthralgia, fever). |

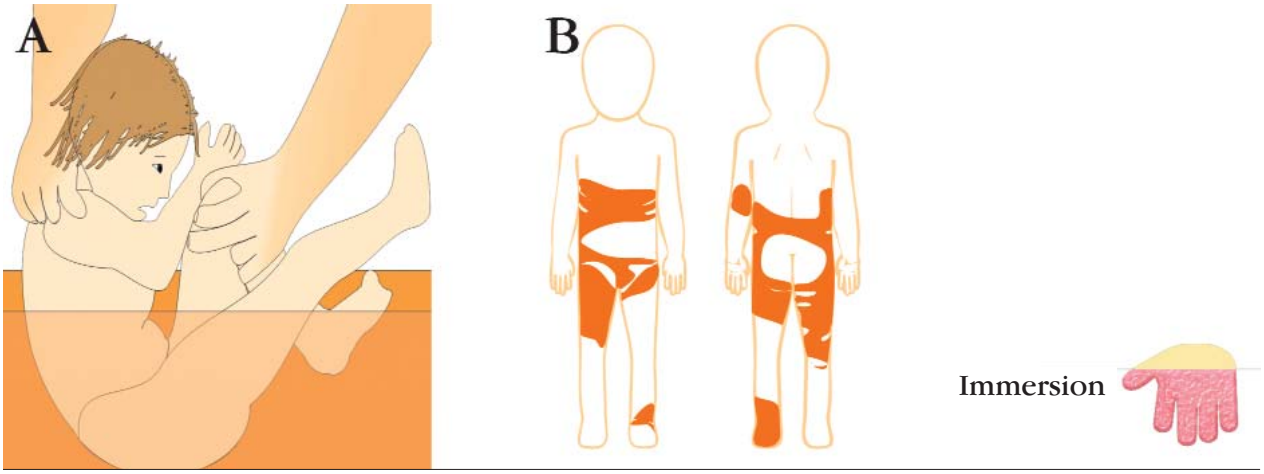


**Figure 2:** A. Scald; **B.** "Zebra striae" with preservation of the gluteal region (resting point) and C. "glove" burn
*Adapted source: Kos L, Shwayder T* [8]

can make molds of the dental arch and/or collect local *swab* (collection of DNA material to investigate the saliva of the aggressor). Animal bites are distinguished by being deeper and more lacerating than human's.[76]

**Alopecia** can be another indicator of abuse and mistreatment. It has a traumatic origin, by the intentional pulling of hair, as punishment, or the act of pulling the child by the hair. Violent pulling can produce petechiae, edema of the hair scalp and acute hematoma [8], with pain on palpation and irregular contours of localized hair loss. [77] *Tinea capitis,* traction alopecia, trichotillomania, loose anagen syndrome and alopecia areata are differential diagnoses [20].

**Neglect** is more common than overt physical violence and may eventually manifest itself as skin lesions [78]. Neglect is defined by the lack of provision of the basic needs of the child. It is usually chronic, jeopardizing the nutrition, clothing, education and health of the child. On clinical examination, there is marked loss of subcutaneous tissue, dermatitis (such as persistent ammonia dermatitis), scarification and/or skin sores caused by chronic hypovitaminosis and poor hygiene, often with pediculosis [9], scabies, pyoderma and fungal intertrigo. [80] These children are often not immunized according to the vaccination schedule and show various signs of abuse. [20]

## SEXUAL ABUSE AND DIFFERENTIAL DIAGNOSES

About 1% of children suffer some form of sexual abuse every year, resulting in a prevalence of victims around 12-25% of girls and 8-10% of boys until the age of 18 years. [81] The diagnosis of sexual abuse and the protection of the child partly depend on the promptitude of the physician to consider abuse as a possibility. [82] Despite an increase in the number of cases, many doctors are not familiar with their recognition and don't know how to differentiate them from medical conditions that mimic sexual abuse [20].

Physical examination of the genitalia of boys and girls who have suffered sexual abuse reveals erythema, ecchymosis, excoriations and lacerations. Some findings such as erythema and hyperpigmentation are frequent in the perianal region, and they are not always associated with sexual abuse · Accurate clinical history can differentiate the two conditions.

There are many differential diagnoses of sexual abuse against children and among them are other types of genital injury, infections, dermatological diseases, congenital conditions affecting the perineal region and diseases affecting the urethra and/or anus. [83] When sexual abuse is suspected, it is essential to remember that various dermatological diseases cause erythema, ulcers, friability or bleeding in the perigenital region. [20] Similarly to other lesions caused by trauma in more exposed areas of the body (ecchymoses and burns), lesions in this region can generate diagnostic questions and even undue accusations of abuse, as shown by the works listed in Chart 3. [20, 84-101]

The confirmation of sexual abuse is difficult and there are few cases in which the clinical diagnosis is unquestionable without the aid of police and forensic investigation. Genital trauma or sexually transmitted diseases in the child (syphilis, HIV infection, gonococci and *Chlamydia)* provide strong evidence for the diagnosis of sexual abuse when vertical transmission, transmission through the birth canal and by blood transfusion are excluded. Positive

**Chart 2:** Differential diagnoses of burns caused by child abuse

| Differential Diagnosis | Characteristics |
|---|---|
| **Phytophotodermatitis** | See Chart 1. |
| **Bacterial diseases** | a) Bullous impetigo: it can be mistaken for cigarette burns, especially when there is secondary infection. [14, 57] It presents with irregular lesions and yellowish superficial crust, without producing scarring. [58] The periorificial location of impetigo helps in dif ferentiation.<br>b) Ecthyma: it can be confused with cigarette burns. Attention should be given to repetitive episodes of pyoderma that can be caused by bad hygiene, indicating child neglect. [59]<br>c) Staphylococcal scalded skin syndrome: it can mistaken for intentional scalding of children. [60-62] In the hospital, if the appearance of new bullous lesions is observed, natural causes can be confirmed. [61]<br>d) Erysipelas: erythematous-edematous and bullous lesions can be confused with thermal injury.<br>e) Distal bullous dactylitis: erythema, vesicles and blisters on the fingers are a common condition in children. [63] It can be mistaken for "glove" burn caused by intentional immersion in boiling water. |
| **Incontinentia pigmenti** | It can initially present with vesicles and / or blisters and can possibly be confused with intentional burns. [45] |
| **Bullous Diseases** | a) Epidermolysis bullosa: it may resemble intentional burn [64, 65] and, when diagnosed in mucous membranes, it can be mistaken for sexual abuse. [66]<br>b) Bullous pemphigoid: it is rare in children and may initially be mistaken for abuse; vulvar location can alert to the possibility of sexual abuse. [67.68]<br>c) IgA linear dermatosis: it is typical of childhood and can be confused with intention al burn and, depending on location, be interpreted as a sign of sexual abuse. [66].<br>d) Stevens-Johnson syndrome: adverse drug reactions involving skin and mucous membranes common in children and young adults that may be mistaken for extensive burns or scalding, especially if prodomic symptoms resemble viral infection or are not perceived. |
| **Circumscribed lymphangioma** | Diagnostic confusion of circumscribed lymphangioma may occur with sexually transmitted diseases in children, [69.70] but in other location, such as limbs, and due to the elimination of a liquid content from the lesions (vesicles), it may be mistaken for various forms of intentional burns. |
| **Fixed pigmented erythema** | Common adverse drug reactions that can cause erythematous-violaceous lesions likely to erroneously suggest ecchymosis or burns. |
| **Ingestion of laxatives** | It may induce the formation of blisters and ulceration in the perianal region, possibly resembling a scald burn, being different by not sparing the region of the folds. [71] |
| **Contact dermatitis / diaper dermatitis:** | It presents with erythema, erosions and even ulceration, especially on convex surfaces, whereas in scald the resting point represented by the portion that contacts the container forms a circular area spared by the burn (Figure 2B). |

forensic findings and the presence of semen or sperm in the genital region confirm sexual contact. [102]

In dermatological practice, genital warts tend to raise suspicion of child sexual abuse. The incidence of child infection by HPV types that cause genital warts follows the increase in the number of cases of this infection in adults. Sexual abuse should always be considered, even if infection by other means is frequent. Until the age of two perinatal transmission is possible, through unsanitary handling by the caregiver (eg, diaper changing) and even sexual abuse. After this age, even when perinatal origin and unsanitary handling are considered, the possibility of abuse as a cause of condyloma acuminata increases [20].

**Chart 3:** Differential diagnoses of child sexual abuse

| Differential Diagnosis | Characteristics |
|---|---|
| **Lichen sclerosus** | It is the dermatological disease most confused with sexual abuse, mainly because bleeding occurs to minimal trauma. It differs by showing telangiectasia, atrophy and hypopigmentation. [84-88] |
| **Nonspecific vulvovaginitis** | Nonspecific vaginitis or vulvar inflammation are common in girls, without association with the sexual transmission of pathogens or violence. [89] |
| **Seborrheic Dermatitis** | It is common in children under two months of life, affects the flexural surfaces and spares the mucous membranes, which allows differentiation of sexual abuse. [20,90] |
| **Contact Dermatitis** | History of exposure to irritant or vesicant agent allows differentiation between diaper dermatitis, photodermatitis and other contact dermatitis, excluding the possibility of sexual abuse. [91, 92] |
| **Atopic dermatitis** | It is a pathological condition that requires early diagnosis to facilitate therapeutic intervention and education of caregivers [93].Lesser-known manifestations may occasionally and mistakenly suggest abuse, (eg, genital itching and lacerations caused by scratching). |
| **scabies** | It often affects the genital region and can cause intense itching and painful ulcerations, especially when there is secondary bacterial infection. [20] |
| **Perianal Streptococcal Dermatitis** | It is a well-defined clinical entity, often misdiagnosed by the similarity with diaper rash; it must be preceded by impetigo and / or nasopharyngeal secretion, as it is transmitted by auto-inoculation. [90] |
| **Congenital abnormalities** | Midline anomalies, hemangiomas of the vulva, hymen, perianal region or urethra may mimic abuse. Hemangiomas are relevant, especially because they can somtimes bleed. [90,94] |
| **Bullous Diseases** | Blistering diseases that can present with lesions restricted to the genital area are rare; such diseases should, however, be considered as a differential diagnosis of sexual abuse. [67-68, 95] |
| **Behcet's Disease** | Rare in childhood, it can present with genital ulceration in prepubertal children with no history of contact or sexual abuse. [96] |
| **Urethral Prolapse** | Vaginal bleeding associated with urethral prolapse may be confused with trans-vaginal bleeding in pre-menarche and with sexual abuse. [97] |
| **Circumscribed plasma cell vulvitis** | It is rare in girls and may resemble other inflammatory genital skin diseases and also be confused with sexual abuse. [98] |
| **Crohn's disease and neoplasms** | They may cause edema, bleeding and anal fissures and are confirmed by biopsy. Diagnosis is achieved through history and conventional tests for both diseases. [99] |
| **Inflammatory linear verrucous epidermal nevus (ILVEN)** | It occasionally appears in the genital or inguinal region and this can be confused with sexual abuse, [100] especially because it resembles condyloma acuminata. |
| **Kawasaki disease** | In the acute phase, there is a predilection for the perineum and groin. Other manifestations of the disease may assist in diagnosis. [101] |
| **Lichen Planus** | Intensely pruritic inflammatory disease that presents in the form of typical flat violaceous papules and, occasionally, as blisters, erosions and lacerations in the oral and genital mucosa. It may be confused with sexual abuse. in |
| **Inverse psoriasis** | Rare in childhood, it may present differently from the vulgar form (plaques), with erythema and fissures in the folds of the groin and buttocks. Eventually, this atypical form can be mistaken for sexual abuse due to its clinical manifestations: erythematous, macerated, painful and bleeding areas. Conclusive diagnosis can be achieved by biopsy of affected skin. [93] |
| **Lichen simplex chronicus** | Intensely pruritic inflammatory disease that can cause erosive lesions and bleeding, which can be confused with sexual abuse. History and histopathological features can help in the diagnosis. |

## PSYCHOLOGICAL CONSEQUENCES OF CHILD ABUSE

Child abuse is a public health issue of great social and family impact [103]. The events can be intra-or extra-familial and psychological damage to the victims and families is indelible. Health professionals, social workers, educators and lawyers are intimately involved in these events and multidisciplinary action is imperative.

Abuse against the child or adolescent may have different consequences, depending on whether it occurs in an intra-or extra-familial context, which explains the different degrees of difficulty in detection and diagnosis, requiring different strategies of intervention with victims, abusers and family, and always taking into account the interests of the child. The different sequelae depend on characteristics of the victims, abusers and the abuse itself (type, duration, frequency). [104]

Some aspects of intra-familial abuse may constitute aggravating factors: younger age of the victim, greater proximity to the offender, greater degree of emotional violence. Loss of security in the home/family is a profound threat to the development of children and adolescents. In addition, family abuse is diagnosed later, due to lower visibility. Offending caregivers tend to minimize the physical signs of abuse. Thus, evidence based on physical examination tends to be scarce. In these situations, after report of the suspicious case, an expert's opinion on forensic psychology is paramount to evaluate the victim's testimony and confirm its veracity, as well as to conduct psychological tests that could confirm the events in a non-verbal way. [104]

In order to characterize the sequelae of maltreatment, a psychobiological model has been proposed that emphasizes a cascade of events: environmental stressors such as child abuse would provoke key changes in biological systems, particularly the neurological system, causing problems in the auto-regulation of behavior. The devastating psychological effects would result, in the long run, in excessive anxiety, depression, cognitive and language distortions, somatization, dissociation, aggression, impulsivity, distrust, attachment disorder, substance abuse, emotional instability, self-destructive behavior, suicide, personality disorders, eating disorders, obesity, risky sexual practices and criminal behavior. [105]

## CONCLUSION

Pediatricians and general practitioners, in general, must be prepared to respond to incidents of child abuse because they are very frequent worldwide, regardless of socioeconomic status. Physicians and health professionals should identify the signs of abuse and take legal action when there is strong suspicion or confirmation. The diagnosis should be optimized, criteria must be established and progressively more specific, seeking to reduce the causes of error.

The anogenital region should be routinely and accurately examined, considering the emotional sensitivity of the child and its family. Inspection should aim at detecting diseases and possible injuries. Confirmation of abuse depends on medical knowledge, and the physician must insist on judging the chances of misdiagnosis. While assessing the consequences of trauma and other forms of abuse bylistening to and believing in the report of the child and any informer and being willing to testify and notify when needed, the physician must know the differential diagnoses or diseases that can mimic abuse.

Suspicion of physical and/or sexual abuse has a multidisciplinary nature; it requires the involvement of a pediatrician or general practitioner, a dermatologist, a forensic pathologist, a gynecologist (when applicable) and a social worker. The diagnostic confirmation and exclusion of dermatological diseases must precede report to judicial authorities, [99] bearing in mind that *error or omission may cost the lives of children and undue child abuse charges could cost the reputation of an innocent adult.* [20]. ❑

## REFERENCES


1. Kempe CH, Silverman FN, Steele BF, Droegemueller W, Silver HK. The battered child syndrome. JAMA. 1962;18:17-24.
2. Kairys SW, Alexander RC, Block RW, Everett VD, Hymel KP, Johnson CF, et al. American Academy of Pediatrics. Committee on Child Abuse and Neglect and Committee on Community Health Services. Investigation and review of unexpected infant and child deaths. Pediatrics. 1999;104:1158-60.
3. Oral and dental aspects of child abuse and neglect. American Academy of Pediatrics. Committee on Child Abuse and Neglect. American Academy of Pediatric Dentistry. Ad Hoc Work Group on Child Abuse and Neglect. Pediatrics. 1999;104 (Pt 1):348-50.
4. Distinguishing sudden infant death syndrome from child abuse fatalities. Committee on Child Abuse and Neglect. American Academy of Pediatrics. Pediatrics. 1994;94:124-6.
5. American Academy of Pediatrics Committee on Child Abuse and Neglect: Shaken baby syndrome: inflicted cerebral trauma. Pediatrics. 1993,92:872-5
6. Committee on Child Abuse and Neglect. American Academy of Pediatrics. When inflicted skin injuries constitute child abusePediatrics. 2002;110:644-5.
7. American Academy of Pediatrics Committee on Child Abuse and Neglect; American Academy of Pediatric Dentistry; American Academy of Pediatric Dentistry Council on Clinical Affairs. Guideline on oral and dental aspects of child abuse and neglect. Pediatr Dent. 2008-2009;30:86-9.
8. Kos L, Shwayder T. Cutaneous manifestations of child abuse. Pediatr Dermatol. 2006;23:311-20.
9. Chadwick DL. The diagnosis of inflicted injury in infants and young children. Del Med Jrl. 1997;69:345-54.
10. Sirotnak A P, Krugman R D. Physical abuse of children: an update. Del Med Jrl. 1997;69:335-43.
11. Stepherson T. Bruising in children. Curr Pediatr. 1995;5:225-9.
12. Carpenter RF. The prevalence and distribution of bruising in babies. Arch Dis Child. 1999;80:363-6.
13. Coulter K. Bruising and skin trauma. Pediatr Rev. 2000;21:34-5.
14. Mudd SS, Findlay JS. The cutaneous manifestations and common mimickers of physical child abuse. J Pediatr Health Care. 2004;18:123-9.
15. Saade DN, Simon HK, Greenwald M. Abused children: missed opportunities for recognition in the ED. Acad Emerg Med. 2002;9:524.
16. Lyden C. Caring of the victim of child abuse in the pedriatric intensive care unit. Dimens Crit Care Nurs. 2009;28:61-6.
17. Purde GF, Hunt JL, Prescott PR. Child abuse by burning: an index of suspicion. J Trauma. 1988;28:221-4.
18. International Classification of Diseases. 9th ver, clinical modification, 2nd ed. Washington, DC: Government Printinf Office; 1980. US Dept of Health and Human Services Publication PHS 80-1260.
19. Hettler J, Greenes DS. Can the initial history predicts wheter a child with a head injury has been abused? Pediatrcs. 2003;111:602-7.
20. Swerdlin A, Berkowitz C, Craft N. Cutaneous signs of child abuse. J Am Acad Dermatol. 2007;57:371-92.
21. Ellerstein NS. The cutaneous manifestations of child abuse and neglect. Am J Dis Child. 1979;133:906-9.
22. Fleisher GR, Ludwing S, Hereting FM, Ruddy RM, Silverman BK. Textbook of pediatric emergency medicine. Philadelphia: Lippincott, Williams & Wilkins; 2006. p.1761-1801.
23. Chen W, Balaban R, Stanger V, Haruvi R, Zur S, Augarten A. Suspected child abuse and neglect: assessment in a hospital setting. Isr Med Assoc J. 2002;4:617-23.
24. Wood J, Rubin DM, Nance ML, Chirstian CW. Distinguishing inflicted versus accidental abdominal injuries in young children. J Trauma. 2005;59:1203-8.
25. Johnson C F. Inflicted injury versus accidental injury. Pediatr Clin Norh Am. 1990;37:791-814.
26. Sugar NF, Taylor JA, Feldman KW. Bruise in infants and toddlers: those who don't cruise rarely bruise. Puget Sound Pediatric Research Network. Arch Pediatr Adolesc Med. 1999;153:399-403.
27. Stephenson T. Ageing of bruising in children. J R Soc Med. 1997;90:312-4.
28. Vogeley E, PierceMC, Bertocci G. Experience with Wood lamp illumination and digital photography in the documentation of bruises on human skin. Arch Pediatr Adolesc Med. 2002;156:265-8.
29. Feldman K. Patterned abusive bruises of the buttocks and pinnae. Pediatrics. 1992;90:633-6.
30. Pride H. Skin Signs of Physical Abuse in: Fitzpatrick's Dermatology in General Medicine 7th ed. New Yourk: Mc Graw Hill; 2008. p.927-31.
31. Dungy CI. Mongolian spots, day care centers, and child abuse. Pediatrics. 1982;69:672.
32. Asnes RS. Buttock bruises--Mongolian spot. Pediatrics. 1984;74:321.
33. Harley JR. Dosorders of coagulation misdiagnosed as nonaccidental bruising. Pediatr Emerg Care. 1997;13:347-9.
34. Olivieri M, Kurnik K, Bidlingmaier C. Coagulation testing in the evaluation of suspect child abuse. Hamostaseologie. 2009;29:190-2.
35. Silveira JCGS, Quattrino AL, Bragança R, Rochael MC. Edema hemorrágico agudo da infância. An Bras Dermatol. 2006;81(Supl 3):S285-7.
36. Sampaio,SAP, Evandro AR. Dermatologia. 3 ed. São Paulo: Artes Médicas; 2007. p.841-2.
37. Roberts DL, Pope FM, Nicholls AC, Narcisi P. Ehlers-Danlos syndrome type IV mimicking non-acidental injury in a child. Br J Dermatol. 1984;111:341-5.
38. Owen SM, Durst RD. Ehlers-Danlos syndrome simulating child abuse. Arch Dermatol. 1984;120:97-101.
39. Tsujii M, Hirata H, Hasegawa M, Uchida A. An infant with unexplained multiple rib fractures occurring during treatment in a neonatal intensive care unit. Turk J Pediatr. 2008;50:377-9.
40. Barradell R, Addo A, MacDonagh AJ, Cork MJ, Wales JK. Phytophotodermatitis mimicking child abuse. Eur J Pediatr. 1993;152:291-2.
41. Coffman K, Boyce WT, Hansen RC. Phytophotodermatitis simulating child abuse. Am J Dis Child. 1985;139:239-40.
42. Carlsen K, Weismann K. Phytophotodermatitis in 19 children admitted to hospital and their differential diagnoses: Child abuse and herpes simplex virus infection. J Am Acad Dermatol. 2007;57:S88-91.
43. Greig AV, Harris DL. A study of perceptions of facial hemangiomas in professional involved in child abuse surveillance. Pediatr Dermatol. 2003;20:1-4.
44. Fredrickson JM, Bauer W, Arellano D, Davidson M. Emergency nurses' preceived knowledge and comfort levels regarding pediatr patients. J Emerg Nurs. 1994;20:13-7.
45. Ciarallo L, Paller AS. Two cases of incontinentia pigmenti simulating child abuse. Pediatr. 1997;100:E6.
46. Dober I, Stranziger E, Kellenberger CJ, Huisman TA. Periorbital ecchymosis - trauma ou tumor? Práxis (Bern 1994). 2007;96:811-4.
47. Adler R, Kane-Nussen B. Erythema multiforme: confusion with child battering syndrome. Pediatrics. 1983;72:718-20.
48. Stewart GM, Rosenberg NM. Conditions mistaken for child abuse: Part I. Peadiatr Emerg Care. 1996;12:116-21.
49. Hu CH, Winkelmann RK. Digitate dermatosis. A new look at symmetrical, small plaque parapsoriasis. Arch Dermatol. 1973;107:65-9.
50. Powell FC, Hackett BC. Pyoderma Gangrenosum. In: Wolff K, Goldsmith LA, Kalz SI, Gilchrest BA, Paller AS, Leffell DJ, editors. Fitzpatrick's Dermatology in General Medicine. 7th ed. New Yourk: Mc Graw Hill; 2008. p.296-301.
51. Keskin M, Tosun Z, Ucar C, Savaci N. Pyoderma gangrenosum in a battered child. Ann Plast Surg. 2006;57:228-30.
52. Hight DW, Bakalar HR, Lloyod JR. Inflicted burns in children. Recognition and treatment. JAMA. 1979;242:517-20.
53. Stratman E, Melski J. Scald abuse. Arch Dermatol. 2002;138:318-20.
54. Showers J, Garrison KM. Burn abuse: a four-year study. J Trauma. 1988;28:1581-3.
55. Hobbs CJ. When are burns not accidental? Arch Dis Child. 1986;61:357-61.
56. Lane WG, Dubowitz H. Primary care pediatricians' experience, comfort and competence in the evaluation and management of child maltreatment: do we need child abuse experts? Chil Abuse Negl. 2009;33:76-83.
57. Wheeler DM, Hobbs CJ. Mistakes in diagnosing non-accidental injury: 10 years' experience. Br Med J (Clin Res Ed). 1988;296:1233-36.
58. Jain AM. Emergency department evaluation of child abuse. Emerg Med Clin North Am. 1999;17:575-93.
59. Ohshima T, Nakaya T, Saito K, Maeda H, Nagano T. Child neglect followed by marked thymic involutin and fatal systemic pseudomonas infection. Int J Legal Med. 1991;104:167-71.
60. Taïeb A, Lasek-Duriez A. Atypical staphylococcal scalded skin syndrome: it could be battered child syndrome. Rev Med Suisse. 2008;4:1107-8, 1110-1.
61. Porzionato A, Aprile A. Staphylococcal scalded skin syndrome mimicking child abuse by burning. Forensic Sci Int. 2007;168:e1-4.
62. Murphy S. Non acidental injury vs staphylococcal scalded skin syndrome. A case study. Emerg Nurse. 2001;9:26-30.
63. Scheinfeld N. A review and report of blistering distal dactilitis due to Staphylocossus aureus in two HIV-positive men. Dermatol Online J. 2007;13:8.
64. Winship IM, Winship WS. Epidermolysis bullosa misdiagnosed as child abuse. A report of 3 cases. S Afr Med J. 1988;73:369-70.
65. Colver GB, Harris DW, Tidman MJ. Skin diseases that may mimic child abuse. Br J Dermatol. 1990;123:129.
66. Marren P, Wojnarowska F, Venning V, Wilson C, Nayar M. Vulvar involvment in autoimmune bullous diseases. J Reprod Med. 1993;38:101-7.
67. Hoque SR, Patel M, Farrell AM. Childhood cicatricial pemphigoid confined to the vulva. Clin Exp Dermatol. 2006;31:63-4.

68. Levine V, Sanchez M, Nestor M. Localized vulvar pemphigoid in a child misdiagnosed as sexual abuse. Arch Dermatol. 1992;128:804-6.
69. Darmstadt GL. Perianal lymphangioma circumscriptum mistaken for genital warts. Pediatrics. 1996;98:461-3.
70. Gupta S, Radotra BD, Javaheri SM, Kumar B. Lymphangioma circumscriptum of the penis mimicking veneral lesions. J Eur Acad Dermatol Venerol. 2003;17:598-600.
71. Leventhal JM, Griffith D, Duncan KO, Starling S, Christian CW, Kutz T. Laxative-induced dermatitis of the buttocks incorrectly suspected to Be abusive burns. Pediatrics. 2001;107:178-9.
72. Fenton SJ, Bouqout JE, Unkel JH. Orofacial considerations for pediatric, adult, and elderly victims of abuse. Emerg Med Clin North Am. 2000;18:601-17.
73. Jessee SA. Orofacial manifestations of child abuse and neglect. Am Fam Physician. 1995;52:1829-34.
74. Kellog N; American Academy of Pediatrics Committee on Child Abuse and Neglect. Oral and dental aspects of child abuse and neglect. Pediatrics. 2005;116:1565-8.
75. Wagner GN. Bitemark identification in child abuse cases. Pediatr Dent. 1986;8:96-100.
76. Whittaker DK. Principles of forensic dentistry: 2 non-acidental injury, bite marcks and archeology. Dent Update. 1990;17:386-90.
77. Ntuen E, Stein SL. Hairpin-induced alopecia: case reports and a review of the literature. Cutis. 2010;85:242-5.
78. AMA diagnostic and treatment guidelines concerning child abuse and neglect. Council on Scientific Affairs. JAMA. 1985;254:796-800.
79. Raimer BG, Raimer SS, Hebeler JR. Cutaneous signs of child abuse. J Am Acada Dermatol. 1981;5:203-14.
80. Blum L, Bourrat E. [Cutaneous pathology of misery]. Rev Prat. 1996;46:1839-43.
81. Finkelhor D. Current information on the scope and nature of child abuse. Future Child. 1994;4:31-53.
82. Krugman RD. Recognition of sexual abuse in children. Pediatr Rev. 1986;8:25-30.
83. Hymel KP, Jenny C. Child Sexual abuse. Del Med J. 1997;69:415-29.
84. Loening-Baucke V, Lichen sclerosus et atrophicus in children. Am J Dis Child. 1991;145:1058-61.
85. Isaac R, Lyn M, Triggs N, Lichen sclerosus in the diagnosis of suspected child abuse cases. Pediatr Emerg Care. 2007;23:482-5.
86. Al-Khenaizan S, Almuneef M, Kentab O. Lichen sclerosus mistaken for child sexual abuse. Int J Dermatol. 2005;44:317-20.
87. Powell J, Wojnarowska F. Childhood vulvar lichen sclerosus and sexual abuse are not mutually exclusive diagnoses. BMJ. 2000;320:311.
88. Wood PL, Bevan T. Lesson of the week child sexual abuse enquiries and unrecognised vulvar lichen sclerosus et atrophicus. BMJ. 1999;319:899-900.
89. Aruda MM. Vulvovaginitis in the prepubertal child. Nurse Pract Forum. 1992;3:149-51.
90. Souillet AL, Truchot F, Jullien D, Dumas V, Faure M, Floret D, Claudy A. Perianal streptococcal dermatitis. Arch Pediatr. 2000;7:1194-6.
91. Hanks JW, Venters WJ. Nickel allergy from a bed-wetting alarm confused with herpes genitalis and child abuse. Pediatrics. 1992;90:458-60.
92. Gruson LM, Chang MW. Berloque dermatitis mimicking child abuse. Arch Pediatr Adolesc Med. 2002;156:1091-3.
93. Williams TS, Callen JP, Owen LG. Vulvar disorders in the prepuberal female. Pediatr Ann. 1986;15:588-9,592-601,604-5.
94. Aljasser M, Al-Khenaizan S. Cutaneous mimickers of child abuse: a primer for ped iatricians. Eur J Pediatr. 2008;167:1221-30.
95. Coleman H, Shrubb VA. Chronic bullous disease of childhood--another cause for potencial misdiagnosis of sexual abuse? Br J Gen Pract. 1997;47:507-8.
96. Deitch HR, Huppert J, Adams Hillard PJ. Unusual vulvar ulcerations in young ado lescent females. J Pediatr Adolesc Gynecol. 2004;17:13-6.
97. Shavit I, Solt I. Urethral prolapse misdiagnosed as vaginal bleeding in a premenarchal girl. Eur J Pediatr. 2008;167:597-8.
98. Albers SE, Taylor G, Huyer D, Oliver G, Krafchik BR. Vulvitis circumscripta plasma cellularis mimicking child abuse. J Am Acad Dermatol. 2000;42:1078-80.
99. Porzionato A, Alaggio R, Aprile A. Perianal and vulvar Crohn's disease presenting as suspected abuse. Forensic Sci Int. 2005;155:24-7.
100. Le K, Wong LC, Fischer G. Vulvar and perianal inflammatory linear verrucous epi dermal naevus. Australas J Dermatol. 2009;50:115-7.
101. Castro PA, Urbano LMF, Costa IMC. Doença de Kawasaki. An Bras Dermatol. 2009;84:317-31.
102. Guidelines for the evaluation of sexual abuse of children: subject review. American Academy of Pediatrics Committee on Child Abuse and Neglect. Pediatrics. 1999;103:186-91.
103. Chen YW, Yeh L, Feng JY. Concept analysis of child abuse. Hu Li Za Zhi. 2009;56:71-6.
104. Taveira F, Frazão S, Dias R, Matos E, Magalhães T. O Abuso sexual intra e extra-familiar. Acta Med Port. 2009;22:759-66.
105. Kearney CA, Wechsler A, Kaur H, Lemos-Miller A. Posttraumatic stress disorder in maltreated youth: a review of contemporary reserch and thought. Clin Child Fam Psychol Rev. 2010;13:46-76.

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