



Cutaneous Signs of Physical Abuse in Children

By Jean Labbé, MD, FRCPC

Physicians must be able to recognize the indicators of physical abuse in children, to facilitate early detection and set the protection process in motion to prevent any recurrence. If action is not taken, physical abuse situations can become increasingly severe. Traumatic skin lesions, by far the most frequent signs of physical abuse, are found in 90% of victims.¹ Physicians also should be familiar with skin lesions that might be confused with non-accidental injuries, in order to avoid needlessly subjecting innocent parents to the stress of a socio-legal investigation process.

Extent Of The Problem

In 1998, child protection services in Canada carried out 135,573 investigations into presumed cases of child abuse. This represents an annual rate of 21.5 investigations per 1,000 children.¹ Thirty-one per cent of these investigations were based on allegations of physical abuse. Of these, 34% were corroborated, 43% were rejected and 23% were not proven, due to lack of evidence. This means that formal evidence concerning physical abuse of 14,289 Canadian children was found that year, for a yearly rate of 2.3 cases per 1,000. This rate is, however, far lower than the true prevalence of the problem,



because it does not account for unreported and/or unidentified cases. In a 1999 Quebec study of 2,469 mothers, 6.6% of them admitted having used severe physical violence toward their child(ren) during the previous year — a rate 28 times higher than the number of cases reported to the protection services.

Physicians are particularly well-suited to identify when a child has been subjected to physical abuse, because they are generally consulted when a child's injuries require treatment. Even physical examinations where trauma is not a factor (*i.e.*, some type of medical problem, a well-child care visit) can reveal cutaneous lesions proving that physical violence has occurred. The purpose of this article is to help physicians determine whether such lesions are the result of abuse or an accident or some other cause.

Characteristic Physical Abuse Injuries

Lesions that are truly pathognomic for physical abuse are not very common and are only found in 8% of victims (Figure 1). They are the visible

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imprint on the skin of the means used to harm the child, such as fingers, a hand, teeth, a belt, rope, hot object, *etc.* (Figure 2). Even if no specific marks are found, there are other characteristics that should attract your attention.²

Extent of the lesions. Unusually severe bruising (multiplicity, extent) is suspicious, as is the presence of multiple scars.

Number of lesions based on age and development. It is unusual to find more than three cutaneous lesions caused by trauma in infants who are not mobile. Children over nine months of age rarely have more than 15 lesions simultaneously.³

Types of lesion based on age and development. The only skin lesions from trauma frequently seen in infants are those caused when they scratch their faces with their nails. Bruises are rare in infants until

they start crawling.⁴

Location of lesions. Injuries to certain areas that are rarely involved in accidental trauma (*e.g.*, ears, cheeks, jaws, neck, trunk, abdomen, lumbar region and buttocks) should raise suspicion about abuse.² Lesions on the forearms may indicate a child's attempt to protect himself from blows. Bilateral and symmetrical lesions are also suspicious.

Burns. In the 1998 Canadian study, 2% of the children who were physically abused had burn marks.¹ Burns with the characteristics given in Table 1 merit particular attention.⁵

Differential Diagnosis

Physiological conditions. Certain conditions can resemble bruising (*e.g.*, Mongolian spots, prominent veins) or injuries (*e.g.*, dermatographism, lumbar striae, hemangioma, naevi).

Cultural practices. In South-East Asia, a remedy for fever and other ills involves vigorously rubbing the back with a coin (Cao Gio), which can cause parallel linear bruises. In Eastern Europe and Africa, suction cups applied for therapeutic purposes can cause round, sharply defined bruise marks. Some cultural therapeutic methods call for the voluntary infliction of burns (*e.g.*, moxibustion in South-East Asia and maquas in Arabia and Russia).⁶

Injury from normal activities and accidents. Children who are mobile regularly acquire minor injuries while playing normally. After the age of nine months, 75% of children present with at least one skin injury during a medical examination, and 25% of children aged five to nine have anywhere from five to 15 injuries.² Under normal circumstances, these are mainly on prominent bony areas, particularly the legs. In spring and summer, skin injuries are twice as common as during the fall and winter months. Although bruises remain the most common lesions year round, there is a higher proportion of abrasions and scrapes during hot weather.

Summary

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- Lesions on the forearms may indicate a child's attempt to protect himself from blows. Bilateral and symmetrical lesions are also suspicious.
- A child who feels pain from a burn normally reacts by getting away from the heat source as fast as possible, so accidental contact burns are usually uneven and not severe.
- Children old enough to verbalize incidents of physical abuse during non-leading questioning must be considered credible, particularly if they can give details about the circumstances.



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Table 1

Suspicious Aspects Of Burns

- Children under the age of three.
- Multiple burns.
- Bilateral, symmetrical burns.
- Burns in places normally protected by clothing.
- Burns on the back of hands or on the soles of the feet.
- Burns over a large area.
- "Stocking" or "glove" immersion burns, with clearly defined margins.
- Immersion burns with the central portion clear ("doughnut" shape).
- Immersion burns with flexion folds clear ("zebra stripes").
- Recognizable shape of objects.
- Cigarette burns (7 mm to 8 mm in diameter).
- Severe, deep and uniform contact burns.

In most accidental falls, lesions are located in one specific area.

Accidental burning by scalding is more severe in the upper part of the body, becoming more superficial lower down, and appears as poorly defined patches. Accidental immersion burns are uneven, with indistinct margins and lesions caused by splashing. Accidental burns from extremely hot metal buckles on car seatbelts can occur when a vehicle is left in the sun during the summertime.

Injuries caused by children. Children often fight, but the consequences are usually minor (*e.g.*, scratches, bites, bruises). There is a risk of more severe injury when children attack those younger than themselves, due to jealousy for instance.

Injuries caused by animals. Pets may scratch or bite if upset by children. Animal bites are usually easy to distinguish from human bites because they are smaller, more irregular, deeper and often involve tearing of the skin, due to the carnivorous dentition.

Self-inflicted injuries and self-mutilation.



Figure 1. Young child showing signs of physical abuse.

Young babies often scratch their own faces. Children with pruritus also can cause scratching lesions. Trichotillomania results in traumatic alopecia. Head-banging can cause bruising of the head.

Self-mutilation can be seen in children with some types of genetic disorder (Cornelia de Lange syndrome, Lesch-Nyhan syndrome, familial dysautonomia), mental disorders (autism), retarded development, behavioural problems and personality disorders, as well as in children who have been abused.

Illnesses. When multiple bruising is present, the following potential causes must be eliminated when determining a diagnosis:

- Leukemia;
- Vasculitis (Henoch-Schönlein, erythema multiforme);
- Meningococcemia;
- Acute infantile hemorrhagic edema (or cockade purpura);
- Ehlers-Danlos syndrome; and
- Coagulation disorders whether congenital (hemophilia) or acquired (thrombocytopenia, liver disease, disseminated intravascular coagulation, aspirin consumption). With coagulation problems, the bruises are at the same site as for accidental injuries, but they are more extensive and more numerous.

Some illnesses can cause lesions that resemble

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Figure 2. Signs of abuse revealed by finger imprints on the back.



Figure 3. Child with stocking burns to the feet.

burns (e.g., erosive diaper dermatitis, contact dermatitis, impetigo, chickenpox, toxic epidermal necrolysis, epidermolysis bullosa, phytophotodermatitis). Frostbite also can look like a burn.

The swelling of one eye may be secondary to infection, an insect bite or an allergic reaction. Facial petechiae are found when capillary pressure is increased (crying, vomiting, coughing). Alopecia due to trauma must be differentiated from alopecia areata and tinea capitis.

Neglect. Some injuries are the result of flagrant

neglect (lack of supervision, exposure to a dangerous environment). In such cases, the parent may lie about the circumstances in order to avoid being blamed.

Other Diagnostic Indicators

Before reaching a diagnosis of physical abuse, the overall situation must be taken into consideration and all signs supporting the probable diagnosis noted. The presence of risk factors, with respect to the parents (unhappy childhood, alcohol or drug use, mental illness, impulsiveness, aggressiveness, etc.), the child (unwanted, colic, severe regurgitation, night-waking, hyperactivity, etc.) and the family situation (social isolation, poverty, marital discord, etc.) should make the physician more vigilant, but has no diagnostic value *per se*. Such factors are not necessarily predictive of maltreatment. Attitudes in both parents and children are sometimes alarm signals. For example, in cases where parents fail to show consideration for their injured child, do not visit him/her in hospital or do not co-operate in the treatment plan. In the same way, if children are fearful, excessively subdued, or highly aggressive when the parent is present, it may indicate that they are victims of violence.

Children old enough to verbalize about incidents of physical abuse during non-leading questioning must be considered credible, particularly if they can give details about the circumstances. While child victims often deny that violence has been used against them (because they are afraid of the aggressor or want to protect him/her), they rarely invent stories of aggression.

It is important to be aware of other indicators, including the chance discovery of severe lesions when examining a child. It is necessary to have a knowledge of previous unexplained trauma injuries.

The explanation given for a child's injuries by the people responsible for the child must be carefully analyzed and may suggest physical abuse. Care

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should be taken when significant injuries are unexplained or the history is vague. In such cases, the history may vary over time or according to the different people questioned. Always ask yourself whether the behaviour attributed to the child is compatible with his level of development.

One basic factor is to determine whether a child's lesions have been properly explained by the history supplied. A discrepancy at this level is often the most decisive factor in reaching a diagnosis. If a child falls, for example, injuries at multiple, distant sites are rare. Even when the child falls down stairs, lesions at more than one site are seen in less than 3% of cases.⁷ If there are a number of injuries, they will all date from the same time.

Estimating the age of bruises is both complicated and imprecise. Charts on the aging of bruises that are based strictly on colour are not reliable. A number of factors affect the appearance of bruises, including the site, depth, amount of blood, skin colour and child's age.⁸ A superficial bruise can occur almost instantaneously, while a deeper one may take 24 hours to appear. Some characteristics indicate when a bruise is recent, such as redness, swelling, local pain, or a clear demarcation. The "early" colouring of bruises is red, blue and purple.

The bluish colour, however, can last for as long as



Figure 4. Burn marks from a barbecue grill.

21 days. It takes at least 18 hours for the yellow tinge to appear. Other "late" colours include green and brown. Old bruises do not have sharp margins.

Burns may not correlate with the history given their number, severity or difference in age. A child



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who feels pain from a burn normally reacts by getting away from the heat source as fast as possible, so accidental contact burns are usually uneven and not severe. With immersion burns, the temperature of the liquid and length of exposure have to be taken into consideration (Figure 3). The burn marks shown in Figure 4 illustrate a contact burn.

Chart Documentation

It is important to carefully note the full details of cutaneous injuries, such as shape, colour, size and location, in the patient's chart. Significant lesions should be drawn, ideally on an anatomical diagram and should be photographed.

The explanations must be listed, with details of how and when they were obtained. The child's development is often an essential factor, as is the patient's trauma history. If the parent's or child's attitude during the visit appears unusual in any way, this should also be noted. A child's verbal account must be cited textually, in quotes.

Physicians And Child Protection

Reporting a suspected case of physical abuse is compulsory in all Canadian provinces and territories. Although it is not appropriate to report a case based on the merest of suspicions, you should not wait for a definite diagnosis before taking action. The responsibility for proving physical abuse is not that of the physician, but of the protection services. Physicians' input, however, is often essential in establishing such proof, because they are the ones who can interpret a child's skin injuries, identify their cause and suggest plausible ways in which they could have occurred. In complex cases, the advice of medical experts may be required.

Conclusion

All medical practitioners who treat children are likely to see victims of physical abuse. The first signs are very often cutaneous lesions due to trauma, and they must be properly identified. The possibility of abuse must be considered in the case of bruising in a baby, when a child has more than 15 skin injuries and when children have injuries in unusual places or with recognizable shapes. When physical abuse appears probable after the overall situation has been evaluated and other causes ruled out, the situation must be reported to the protection services. Physicians must document the lesions in the child's chart, as well as the explanations given. They may give their interpretation of the lesions to the protection services or, in complex cases, suggest that a medical expert be contacted.

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