

both the kick and the fracture may occur, and both bruises will be at the same site. With an indirect force, such as the twisting that may be applied to a leg during a fall, the bone breaks at a distance from where the force was applied. In such cases there are two sites of potential bruising. The indirect force itself may be relatively minor and therefore no bruising is seen at the site where it was applied. Similarly, with an indirect force soft tissue injury at the site of the fracture may be minimal and bruising here may also be absent. This is particularly so if the fracture occurs, as for example in the femur, deep within the soft tissue envelope of the thigh, when the haemorrhage must rise through several fascial planes before it is visible through the intact skin.¹

It is common knowledge among orthopaedic surgeons that there may be no external signs of bruising in association with a fracture, and this is one of the many reasons why so much emphasis is placed on marking the limb before surgery. Unfortunately, though it is common knowledge, it is also unwritten knowledge and perhaps not so well understood by our non-orthopaedic colleagues. Many doctors are now involved in the care of children with fractures, particularly in cases where child abuse is suspected. Some have assumed that the lack of bruising means that a pathological process such as osteogenesis imperfecta is present and that the bone has fractured easily without the use of undue force and therefore is not a non-accidental injury. The work on which these ideas are based has tended to appear in the letters section

rather than the peer reviewed sections of medical journals.²⁻⁴ In suspected child abuse, however, the fact that breaks and bruises do not always occur together can have more serious consequences.

Much has been written about the size, shape, and site of bruises caused by non-accidental injury to the soft tissues of a child,⁵ but little has appeared in either the adult or paediatric literature about the presence or absence of bruising in association with fractures. The paper by Mathew et al in this week's issue starts to evaluate the meaning of bruising in association with fractures in children by suggesting that a high proportion of "normal" fractures in children show no bruising (p 1117).⁶ I hope that this will stimulate further work on the subject and allow us to be more precise over which injuries should cause concern.

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- 1 Campbell RM. Problem injuries in unique conditions of the musculoskeletal system. In: Rockwood CA, Wilkins KE, Beaty JB, eds. *Fractures in children*. 4th ed. Philadelphia: Lipincott-Raven, 1996.
- 2 Taitz LS. Child abuse and osteogenesis imperfecta. *BMJ* 1986;296:292.
- 3 Taitz LS. Child abuse and metabolic bone disease: are they often confused? *BMJ* 1991;302:1244.
- 4 Paterson CR, McAllion SJ. Osteogenesis imperfecta in the differential diagnosis of child abuse. *BMJ* 1989;299:1451-4.
- 5 Sproles ET. Inflicted trauma in children. In: Arensman RM, ed. *Paediatric trauma: initial care of the injured child*. New York: Raven, 1995.
- 6 Mathew MO, Ramamohan N, Bennet GC. Importance of bruising associated with paediatric fractures: a prospective observational study. *BMJ* 1998;317:1117-8.

House dust mite allergen avoidance in asthma

Benefits unproved but not yet excluded

Since faecal pellets of house dust mites were identified as the principal source of allergen in house dust over 30 years ago,¹ the role of mite eradication or allergen avoidance in the management of asthmatic patients has remained controversial.²

Enthusiasts point to studies in which allergic asthmatic patients stayed for several months in hospitals or high altitude Alpine sanatoriums. In these effectively mite free environments their condition improved both symptomatically and in terms of non-specific bronchial responsiveness.^{3 4} These were, however, uncontrolled studies in which patient blindness was impossible, so not all the benefits can be attributed unequivocally to allergen avoidance. Nevertheless, that is the most plausible explanation, implying that radical reduction in mite allergen exposure may be beneficial to at least some asthmatics.

Sceptics emphasise the practical challenge of achieving sustained and substantial reductions in mite allergen exposure in the home, particularly in regions, including Britain, where mite infestation is widespread. In theory, personal exposure may be reduced by eradicating mites from the environment or by preventing their faecal pellets becoming airborne.^{2 5} In practice, each method has important limitations. Killing live mites does not remove the offending allergens, which

may persist for months or even years in reservoirs of house dust. Reinfestation is likely to occur unless acaricides are applied regularly or the humidity of the home is kept low throughout the year. On the other hand, physical barriers to allergen dispersion can be applied to bedding—though not so readily to other mite habitats such as carpets, curtains, furnishings, and soft toys.

Many methods of domestic mite eradication or allergen avoidance have been tested in small intervention studies, and these have been the subject of two recent overviews. The first, a narrative review, suggested that there was some evidence of benefit from interventions which reduced allergen exposure.⁵ The second, a quantitative meta-analysis published in this week's issue,⁶ concludes that "current chemical and physical methods aimed at reducing exposure to house dust mite allergens seem to be ineffective." The most recent British guidelines on asthma management state that "in those with established asthma avoidance of house dust mite allergen by means of bed covers has proven efficacy in the short term. Other methods such as acaricides remain unproved."⁷ Whom should we believe?

Part of the confusion is resolved by distinguishing clearly between two measures of effectiveness: reduc-

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tion in allergen exposure (efficacy) and impact on symptomatic illness (clinical effectiveness). It is not surprising that interventions which lack efficacy are clinically ineffective. However, this does not exclude a potential benefit to patients from measures which actually achieve substantial reductions in personal allergen exposure. Such measures include impermeable (plastic) or semipermeable (microporous) mattress and bedding covers, which dramatically reduce allergen levels on the bedding surface⁸⁻¹⁰ and thus protect at least against nocturnal allergen exposure. Recently marketed microporous fabrics are much more acceptable to patients than vapour impermeable plastic covers, but they have yet to be fully evaluated for clinical effectiveness. Should they be recommended to patients, based on the evidence currently available?

The meta-analysis by Gøtzsche et al identified only five trials, involving 123 adults and 86 children, in which there was proved reduction in mite allergen exposure in the intervention group.⁶ Only four of these trials reported changes in morning peak expiratory flow rate, the principal outcome selected for meta-analysis. The results would be consistent either with no clinical benefit or an increase in average peak flow of up to about 45 l/min—a small but potentially useful improvement. This meta-analytic approach may be conservative in that other outcome measures, such as improvements in symptoms or bronchial responsiveness, are not analysed for this small subgroup of trials. Woodcock and colleagues considered six studies to have used an efficacious intervention.⁵ They point to some evidence of clinical benefit in all of these trials, although the outcome measures differed in each. This narrative evaluation may overestimate effectiveness because the findings reported from a wide range of trial outcomes will tend to be those which were statistically significant, particularly in favour of the intervention. Thus, neither review offers conclusive evidence to guide patient choices.

Most methods of mite eradication or allergen avoidance tested in published trials cannot be recommended to patients simply because they do not materially reduce mite allergen exposure. There are

too few data from trials where allergen exposure was substantially reduced to draw any firm conclusion about the potential clinical benefits of newer, more efficacious methods. This position of uncertainty can be resolved only by large trials, preferably double blind and placebo controlled, in which interventions known to reduce allergen exposure are tested in large representative samples of mite sensitised asthmatic patients. At least one such trial has started recently, using encasement of mattress and bedding by semipermeable covers. When its findings are reported we may be able to provide more definite advice to patients and their doctors.

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- 1 Voorhorst R, Spieksma FTM, Varekamp H, Leupen MJ, Lyklema AW. The house dust mite (*Dermatophagoides pteronyssinus*) and the allergens it produces: identity with the house dust allergen. *J Allergy* 1967;39:325-39.
- 2 Colloff MJ, Ayres J, Carswell F, Howarth PH, Merrett TG, Mitchell EB, et al. The control of allergens of dust mites and domestic pets: a position paper. *Clin Exp Allergy* 1992;22 (suppl 2):1-28.
- 3 Platts Mills TAE, Tovey ER, Mitchell EB, Moszoro H, Nock P, Wilkins SR. Reduction of bronchial hyperreactivity during prolonged allergen avoidance. *Lancet* 1982;ii:675-8.
- 4 Peroni DG, Boner AL, Vallone G, Antolini I, Warner JO. Effective allergen avoidance at high altitude reduces allergen-induced bronchial hyperresponsiveness. *Am J Respir Crit Care Med* 1994;149:1442-6.
- 5 Custovic A, Simpson A, Chapman MD, Woodcock A. Allergen avoidance in the treatment of asthma and atopic disorders. *Thorax* 1998;53:63-72.
- 6 Gøtzsche P, Hammarquist C, Burr M. House dust mite control measures in the management of asthma: meta-analysis. *Br Med J* 1998;317:1105-10.
- 7 British Thoracic Society, National Asthma Campaign, Royal College of Physicians of London. The British guidelines on asthma management: 1995 review and position statement. *Thorax* 1997;52 (suppl 1):S2-8.
- 8 Owen S, Morgenstern M, Hepworth J, Woodcock A. Control of house dust mite in bedding. *Lancet* 1990;335:396-7.
- 9 Ehnert B, Lau-Schadendorf S, Weber A, Buetner P, Schou C, Wahn U. Reducing domestic exposure to dust mite allergen reduces bronchial hyperreactivity in sensitive children with asthma. *J Allergy Clin Immunol* 1992;90:135-8.
- 10 van der Heide S, Kauffman HF, Dubois AEJ, de Monchy JGR. Allergen reduction measures in houses of allergic asthmatic patients: effects of air cleaners and allergen-impermeable mattress covers. *Eur Respir J* 1997;10:1217-23.

Is medical school selection discriminatory?

New data should be used as a catalyst for change

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Disadvantage—To deprive of the resources and privileges enjoyed by the majority of people
Discriminate—To treat differently because of prejudice
Adapted from *Chambers 20th Century Dictionary*

Being white, female, an academic high achiever, and singleminded can have its drawbacks, but when it comes to selection for United Kingdom medical schools, no one's better placed. At least that's the message from the analysis by McManus of the anonymised data on selection released this

week (p 1111).¹ The key findings show, surprisingly, that women are more likely to gain entry to medical schools, but candidates from ethnic minorities remain disadvantaged. Concerns about the selection procedure have long inspired calls for a code of practice.²

Differences exist between ethnic minority groups. Caribbeans are less disadvantaged than Africans. Indians are less disadvantaged than Bangladeshis or Pakistanis. While wide confidence intervals hint that some of these differences may not be real, it is undeniable—and suspicions are confirmed—that overall ethnic minorities are disadvantaged. Sceptics will

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