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House dust mite allergen in pillows

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For many years asthmatic patients have been told to avoid using feather filled pillows on their beds, although there is no evidence to support this practice. Strachan and Carey's case-control study is the first to have directly challenged this assumption.¹ This study showed that, after exclusion of asthmatic subjects whose bedding had been changed because of their disease, pillows with synthetic fillings were a risk factor for severe asthma. In the light of this finding, we have compared pillows with synthetic and feather fillings for their content of *Der p* I, the major allergen of the house dust mite *Dermatophagoides pteronyssinus*.

Methods and results

In December 1995 we took dust samples from nine pairs of pillows and analysed them for *Der p* I. Each pair consisted of one feather filled pillow and one filled with polyester fibre; these had been used together on the same adult bed for more than six months to ensure that the environmental exposures of the pillows in each pair were similar. The pillow fillings were encased in closely woven cotton fabric. Two of the subjects in our study slept with the polyester filled pillow on top, four with the feather filled pillow on top, and three had no preference. We took dust samples with a portable Hitachi CV-2500 vacuum cleaner with a sock attachment, vacuuming each pillow for three minutes on each side, a total of six minutes per pillow. We sieved the dust collected to remove fluff and large particles and weighed the resulting fine dust. We then analysed this dust for *Der p* I content using monoclonal antibody enzyme linked immunosorbent assay (ELISA).² The between batch coefficient of variation of the assay is <15% in our laboratory.

Levels of *Der p* I are usually given as $\mu\text{g Der p I}$ per gram of fine dust. It is arguable that for pillows, which have direct contact with the head for several hours at a time, total *Der p* I is the important measure. We therefore measured total *Der p* I as well as $\mu\text{g Der p I/g}$ fine dust for each pillow. We analysed the results with two-tailed paired Student's *t* tests after log transforming the data.

There was no significant difference in the total weights of fine dust obtained from polyester filled pillows (mean weight 0.065 g (95% confidence interval 0.021 g to 0.108 g)) and feather filled pillows (0.060 g

Table 1—Geometric means of total and relative weight of house dust mite allergen *Der p* I in fine dust taken from pillows with synthetic and feather fillings

	Pillow filling		Mean ratio (95% confidence interval) of weights (synthetic: feather)
	Synthetic	Feather	
Weight of <i>Der p</i> I:			
Total (μg)	1.01	0.13	8.05 (1.69 to 38.2)
Relative ($\mu\text{g/g}$ fine dust)	22.28	6.24	3.57 (1.13 to 11.27)

(0.026 g to 0.145 g)). Table 1 shows the geometric means of the total weight of *Der p* I and $\mu\text{g Der p I/g}$ fine dust obtained. Paired analysis showed that the polyester filled pillows contained significantly more total weight of *Der p* I (mean ratio 8.05 (95% confidence interval 1.69 to 38.2), $P = 0.015$) and significantly higher $\mu\text{g Der p I/g}$ fine dust (mean ratio 3.57 (1.13 to 11.27), $P = 0.034$) than the feather filled pillows.

Discussion

In New Zealand 81% of patients with severe asthma have a positive skin prick test to house dust mite allergen,³ and exposure to mite allergen is a factor in triggering attacks of asthma in asthmatic subjects.⁴ Strachan and Carey suggested that pillows with synthetic fillings may release volatile organic compounds which may influence the airway response to inhaled allergens.¹ While this may be true, they were perhaps assuming that the allergen load in feather fillings is as great or greater than that in synthetic fillings. Our results, and the fact that the differences are large enough to be detected with such a small sample, imply that this assumption is not valid. Further studies are needed to confirm our findings, and then to determine whether pillows with synthetic fillings preferentially retain allergen or support greater infestation with mites.

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