

Early peanut consumption: Postpone or promote?

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In the 1990s, the prevalence of peanut allergy in children increased dramatically in Western nations. Estimates from the United Kingdom suggested a 2-fold increase, from 0.5% to 1.0%, among young children between 1989 and 1994 to 1996.¹ Similarly, estimates from the United States suggested an increase from 0.4% to 0.8% between 1997 and 2002.² Peanuts and tree nuts account for the vast majority of life-threatening or fatal reactions to foods,^{3,4} and the threat of such reactions can cause anxiety for children with peanut allergies and their families. In 1998, without much scientific evidence, the United Kingdom's Committee on Toxicity recommended that mothers of at-risk infants avoid eating peanuts during pregnancy and breast-feeding, and that peanut products be withheld from such infants in early life.⁵ And in 2000, the American Academy of Pediatrics suggested, based on expert medical opinion, that nursing mothers of at-risk infants eliminate peanuts from their diet and that introduction of peanut be delayed until 3 years of age.⁶ Although the American Academy of Pediatrics committee noted that conclusive studies were not available to support the recommendations, limiting peanut exposure early in life seemed a reasonable strategy to avoid sensitization. However, based on more recent data regarding diet and development of atopy, the recommendations in Europe and the United States on avoiding peanut have been modified to be less restrictive. Two studies from Gideon Lack's group^{7,8} in the United Kingdom pose data supporting an alternative hypothesis in which early oral intake of peanuts actually decreases the likelihood for developing peanut allergy, whereas environmental exposure without oral consumption increases the risk.

To explore the role of early consumption of peanuts, Du Toit et al⁷ compared the prevalence of peanut allergy among Jewish children in the United Kingdom and Israel. Israeli children commonly consume peanuts in infancy, in part because of the availability of spongy peanut snacks that dissolve easily in saliva. The prevalence of peanut allergy in Israel has been estimated to be relatively low,

0.04%.⁹ More than 10,000 Jewish schoolchildren, approximately half in Israel and half in the United Kingdom, were surveyed, and the prevalence of peanut allergy was more than 10-fold higher in the United Kingdom, with a rate of 1.85% versus 0.17% in Israel. Effects of genetics are presumed to not factor into the difference, because the children share a similar hereditary background. A second survey was used to assess peanut consumption and weaning in infancy in fewer than 200 mother-child pairs. Results from the survey suggest peanut is introduced earlier and is eaten more frequently in Israel than in the United Kingdom. The median monthly consumption of peanut protein in Israeli infants aged 8 to 14 months was 7.1 g, compared with 0 g in the United Kingdom.

Because the majority of peanut allergies present on first exposure to peanut,¹⁰ Fox et al⁸ looked at whether environmental sensitization through low-dose cutaneous exposure increases risk for allergy. They administered questionnaires regarding peanut consumption to parents of children with peanut allergy as well as to high-risk controls (with egg allergy) and controls without allergy. The children had been referred to a food allergy clinic predominantly because of eczema, and parents completed questionnaires before patients were aware of peanut allergy status. Peanut consumption of mothers (starting during pregnancy) and the entire household were recalled. Median weekly household peanut consumption in 133 peanut allergy cases was significantly elevated (18.8 g) compared with 150 controls without allergy (6.9 g) and 160 high-risk controls (1.9 g). There were no differences in infant peanut consumption between the groups. The authors report that differences in maternal peanut consumption during pregnancy and lactation were significant but became non-significant after adjusting for household peanut. They described a dose-response relationship between household peanut exposure and the development of peanut allergy.

Coincidentally, in 2008 both the European Society for Paediatric Gastroenterology, Hepatology and Nutrition¹¹ and the American Academy of Pediatrics¹² reported that conflicting evidence from several clinical trials does not support a strong relationship between the timing of introducing complementary foods and the development of allergy. For example, in a recent, longitudinal cohort study, 642 children were followed until 5.5 years of age.¹³ Rice cereal was introduced at a median age of 3 months, milk at 6 months, and egg at 8 months. The later introduction of solids had no protective effect on the prevalence of asthma, atopy, or atopic dermatitis, although there was an increased risk of atopic dermatitis with late (6–8 months) rather than early introduction of eggs. In a group of 4753 children in the German Infant Nutrition Intervention Program, no association was found between the development of eczema with either the time at which solid foods were introduced or their diversity, regardless of family history of allergies.¹⁴ The European Society for Paediatric Gastroenterology, Hepatology and Nutrition concluded that there is no convincing evidence to avoid or delay introduction of solid foods and that complementary foods should be introduced after

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17 weeks but no later than 26 weeks.¹¹ The American Academy of Pediatrics report similarly concluded that there is not enough evidence to recommend restricting maternal diet during either pregnancy or lactation, or in infants after 4 to 6 months of age.¹² The recommendations apply to all allergenic foods, including peanut.

Data from the 2 new studies^{7,8} are consistent with the current recommendations that allow early consumption of peanut protein, but they do not provide sufficient evidence to suggest that early consumption of peanuts has a protective effect or that environmental exposure to peanut—as distinguished from maternal consumption—puts children at risk. There are several factors that could contribute to differences in peanut allergy between Israel and the United Kingdom, and it is inherently difficult to tease apart the relative roles of maternal versus household peanut consumption.

The difference in peanut allergy prevalence between Israel and the United Kingdom may reflect a delayed increase in Israel, especially given that the prevalence of 0.17% for Israel that Du Toit et al⁷ report is a 4-fold increase from the prevalence of 0.04% that Dalal et al⁹ reported in 2002. In addition, differences in peanut preparation could contribute to the differing rates of peanut allergy. In Israel, peanuts in most locally produced snacks are boiled in water for 30 minutes at 80°C.¹⁵ Most peanuts in the United States are dry-roasted at a much higher temperature, 170°C. Progressive roasting increases the capacity of peanut-specific IgE binding to peanut protein¹⁶ and may increase allergenicity.

The implication of the new results is that avoiding consumption of peanut abrogates development of oral tolerance and increases risk of hypersensitivity through cutaneous exposure. Yet the initial recommendations for avoidance followed increases in peanut allergy, and there is little evidence to suggest that the recommendations were followed. In a survey of 957 mothers in the United Kingdom, 61% recalled hearing the advice about peanuts in 1998, and only 3.8% stopped consuming peanuts while pregnant.¹⁷ We know from other allergenic foods that early and frequent ingestion of a protein does not always prevent the development of sensitivity. Cow's milk is introduced early in life, yet all over the world the prevalence of atopy is about 2.5% for young children.

In evaluating the effects of environmental exposure to peanut, it is challenging to separate contributions of maternal diet versus household exposure. Fox et al⁸ used a statistical model to exclude maternal peanut consumption during pregnancy and breast-feeding, but maternal peanut consumption was included in the calculation of household exposure. The measurements of peanut consumption were based on parent recall, which may not be accurate.

However, the new studies^{7,8} do provide an intriguing hypothesis for future interventional studies. Several authors of the article are also involved with the Learning Early About Peanut Allergy study, a randomized controlled trial to test whether giving high doses of peanut protein to high-risk infants is more effective at preventing peanut allergy than avoidance therapy. Learning Early About Peanut Allergy is currently enrolling more than 400 children age 4 to 10 months who have eczema and are allergic to egg (and thus have a 20% chance of developing peanut allergy). Each child will be assigned to being fed a peanut snack 3 times

per week or having peanut products withheld entirely.¹⁸ The rates of peanut allergy by age 5 years will be compared.

Although an intriguing proposition, the principle of early feeding to prevent development of food allergy remains unproven. At this time, there is not enough evidence to put this theory into clinical practice. Prospective studies with specific measurement of maternal diet and infant cutaneous exposure are needed to tease apart the possible effects of maternal versus household diet in development of atopy in children. For clinicians in the United States, the 2008 American Academy of Pediatrics recommendations¹² remain the most comprehensive summary of what we know of the contribution of maternal and infant diet to the development of food allergy.

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