

SIDS and carbon dioxide retention around the infant due to rebreathing of exhaled air

Sleeping in the prone position has been implicated as a risk factor for sudden infant death syndrome (SIDS).^{1 2 3 4} SIDS is defined as the sudden death of an infant under 1 year old that is unexpected by history and unexplained after a thorough post mortem examination, including complete autopsy, investigation of the scene of death and review of the medical history. One hypothesis states that **rebreathing** of exhaled air may cause asphyxia in susceptible infants that sleep in the face down position.^{5 6 7} SIDS infants have been found to have structural and neurotransmitter alterations in the brainstem which are consistent with abnormalities in autonomic regulation.⁸ According to the rebreathing hypothesis some bedding materials may act to retard the dispersal of exhaled air, retaining the gases near a face down infant's mouth. With each subsequent breath the infant takes in an air mixture which is progressively less adequate to sustain life. Certain infants who remain face down on certain types of bedding for more than a short period of time might therefore be susceptible to rebreathing induced asphyxiation. Different bedding materials differ in rebreathing potential and may affect the risk for SIDS after adjustment for other known risk factors.⁹ The risk of SIDS in Australian infants sleeping prone on a soft, fluffy, enclosed natural fiber mattress was six times greater than those sleeping prone on other types of mattresses including foam¹.

Since the rates of prone sleeping have decreased in the general population the risk for SIDS among infants sleeping prone have increased. Infants at highest risk of SIDS are those who are usually placed in another sleeping position but were placed in the prone position for their last sleep ("unaccustomed prone") or were found in the prone position ("secondary prone").¹⁰ The unaccustomed prone position is more likely to occur in daycare or other settings outside the home and highlight the need for all infant caretakers to be educated about appropriate sleeping positioning.

Soft mattresses, older mattresses and soft, fluffy bedding such as comforters, pillows, sheepskins and polystyrene-bean pillows have been associated with a 2-3 fold increased risk of SIDS.^{11 12} Combination of risk factors result in an even higher risk; for example, prone sleeping in soft bedding has been associated with a 20-fold increased risk of SIDS.¹³

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⁹ Carleton JN, Donoghue AM, Porter WK. Mechanical model testing of rebreathing potential in infant bedding materials. *Arch Dis Child* 1998 Apr; 78:323-8.

¹⁰ Task Force on Sudden Infant Death Syndrome. The changing concept of sudden infant death syndrome: diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics* 2005; 116:1245-55.

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