

# Child Protection Evidence

## Systematic review on

# Ear, Nose and Throat

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While the format of each review has been revised to fit the style of the College and amalgamated into a comprehensive document, the content remains unchanged until reviewed and new evidence is identified and added to the evidence-base.

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## Summary

This systematic review evaluates the scientific literature on abusive and non-abusive ear, nose and throat injuries published up until **January 2015** and reflects the findings of eligible studies. The review aims to answer the following clinical questions:

- What are the identified characteristics of epistaxis indicative of asphyxiation in children less than 2 years of age?
- What are the ear, nose and throat manifestations of physical abuse or fabricated or induced illness?

Children who present with epistaxis in the absence of direct trauma to the nose raises the possibility of asphyxiation<sup>1</sup> This finding has proved controversial, although a landmark study involving covert video surveillance identified that epistaxis was feasible following asphyxiation, however the precise association between the two has not been defined<sup>2</sup>. Due to the significance of the findings, we aim to determine the probability of suffocation for a young child presenting with epistaxis.

While injuries to the ear, nose and throat as a consequence of physical abuse or resulting from fabricated or induced illness are not a frequently described manifestation, they are nonetheless important to identify. As the head and neck are the most frequently targeted organ in physical abuse, it would seem likely that ear, nose and throat injuries will result from this<sup>3</sup>.

### Key findings:

- Epistaxis is a rare presentation in children aged less than 2 years, however when present it is significantly associated with asphyxiation, either intentional or unintentional
- Any child less than 2 years of age presenting with epistaxis in the absence of known trauma or haematological disorders warrants a full evaluation for asphyxiation as a possible cause
- Some children presenting with asphyxia may have no overt symptoms; those that were symptomatic included altered skin colour, respiratory distress, altered heart rate, and a possible history of Apparent Life Threatening Events

## Background

This systematic review evaluates the scientific literature on abusive and non-abusive ear, nose and throat injuries published up until **January 2015** and reflects the findings of eligible studies. The review aims to answer the following clinical questions:

- What are the identified characteristics of epistaxis indicative of asphyxiation in children less than 2 years of age?
- What are the ear, nose and throat manifestations of physical abuse or fabricated or induced illness?

## Methodology

A literature search was performed using a number of databases for all original articles and conference abstracts published since 1950. Supplementary search techniques were used to identify further relevant references. See [Appendix 1](#) for full methodology including search strategy and inclusion criteria.

Potentially relevant studies underwent full text screening and critical appraisal. To ensure consistency, ranking was used to indicate the level of confidence that abuse had taken place and also for study types.

## Findings of clinical question 1

### What are the identified characteristics of epistaxis indicative of asphyxiation in children less than 2 years of age?

#### 1.1. Comparative studies of children with epistaxis

- Of the six included studies, four (five articles) were comparable<sup>4-8</sup>
- The probability of asphyxiation, either intentional or unintentional, in a child with epistaxis is 19.6% (95% CI, 12.7-28.8%)
- The included studies had both fatal and non-fatal cases. For the non-fatal cases clinical features associated with asphyxiation for those with epistaxis included pallor, cyanosis, respiratory difficulty, altered heart rate and reduced consciousness<sup>6,7</sup>
- A retrospective study of infants admitted with epistaxis identified one child with asphyxia as an aetiology where the mechanism was inflicted smothering and the infant had co-existent hypoxicischaemia on brain MRI<sup>8</sup>
- For the fatal cases the asphyxiated children were noted to have intra-pulmonary haemorrhages or intrathoracic, or pleural petechiae<sup>4,5</sup>

## 1.2. Non-comparative studies of children with epistaxis

- Two studies included case series of asphyxiated infants<sup>9,10</sup>
- One series included live children who were observed on covert video surveillance to have inflicted asphyxiation of whom eight had co-existent epistaxis<sup>10</sup>
- Clinical features of these children included pallor, cyanosis, respiratory distress, altered heart rate, and seizure
- A series of fatal asphyxiation and sudden infant death included four infants with epistaxis. All the children had previously presented with Apparent Life Threatening Events (ALTEs)<sup>9</sup>
- Post mortem features in asphyxiated children included intra-pulmonary haemorrhages and intrathoracic petechiae (the later were also seen in non-asphyxiated children)

## 1.3. Implications for practice

- Epistaxis is a rare presentation in children aged less than 2 years, however when present it is significantly associated with asphyxiation, either intentional or unintentional
- Any child less than 2 years of age presenting with epistaxis in the absence of known trauma or haematological disorders warrants a full evaluation for asphyxiation as a possible cause
- Some children presenting with asphyxia may have no overt symptoms; those that were symptomatic included altered skin colour, respiratory distress, altered heart rate, and a possible history of Apparent Life Threatening Events

## 1.4. Research implications

- Given the enormous clinical and forensic significance of epistaxis in young infants, future prospective studies with clearly defined aetiologies for epistaxis, including asphyxiation, would make an important contribution

## 1.5. Limitations of review findings

- Although comparative studies were identified, the number of infants within these studies was small, thus limiting the validity of the meta-analysis performed
- There is a lack of large scale comparative studies with explicit confirmation of asphyxiation as a mechanism of injury

## Other useful resources

The review identified a number of interesting findings that were outside of the inclusion criteria. These are as follows:

### Clinical question 1

- A large study of children presenting with Apparent Life Threatening Events (ALTEs), unexplained deaths or Sudden Infant Death Syndrome (SIDS). This study included infants with possible suffocation but did not meet the inclusion criteria for this review <sup>11</sup>
- A study of children with fatal abuse of whom 11 experienced asphyxia<sup>2</sup>
- American Academy of Pediatrics' recommendation for features which may indicate intentional asphyxiation<sup>12</sup>

## Related publications

No additional material published arising from the ear, nose and throat review.

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11. Truman T.L., Ayoub C.C. Considering suffocatory abuse and Munchausen by proxy in the evaluation of children experiencing apparent life-threatening events and sudden infant death syndrome. *Child Maltreat* 2002; 7(2): 138-148. <http://www.ncbi.nlm.nih.gov/pubmed/12020070>
12. Hymel K.P. Distinguishing sudden infant death syndrome from child abuse fatalities. *Pediatrics* 2006; 118(1): 421-427. <http://www.ncbi.nlm.nih.gov/pubmed/16818592>

# Appendix 1 – Methodology

## Inclusion criteria

Criteria used to answer “What are the identified characteristics of epistaxis indicative of asphyxiation in children less than 2 years of age?” and “What are the ear, nose and throat manifestations of physical abuse or fabricated or induced illness?”

Inclusion	Exclusion
Studies of all observational evidence types other than case report (minimum 3 cases)	Personal practice
English and non-English articles	Review articles
Patients aged <2 years	Case report
Epistaxis defined as any bleeding from the nose/ nasal haemorrhage	Case series (<3)
Studies where the population only includes children with epistaxis in the absence of asphyxiation	Studies where the population includes adults and children and the data for children cannot be extracted
Studies with a mixed population of children with epistaxis as a result of asphyxiation and not as a result of asphyxiation	Likelihood of asphyxiation rank 4-5, or mixed rank
Asphyxiation of any aetiology (confirmation rank 1-3) defined as deprivation of oxygen from upper airway obstruction, inflicted or unintentional	Likelihood of no asphyxiation rank C1-C2
No asphyxiation (confirmation rank A-B2)	Methodologically critically flawed papers
	Study exclusively addresses epistaxis in association to: <ul style="list-style-type: none"> <li>Trauma (blunt or penetrating)</li> <li>Prior nasal surgery</li> <li>Post mortem examination alone</li> <li>Medical causes of epistaxis (coagulation disorder, congenital disorders, pre-existing ENT disease)</li> </ul>
	Oral bleeding only

## Search strategy

The below table presents the search terms used in the 2015 Medline database search for ear, nose and throat, truncation and wildcard characters were adapted to the different databases where necessary. Changes to the search strategy were adopted only after consultation with the clinical expert sub-committee.

1. exp Child/	52. otitis media.mp.
2. exp Child, Preschool/	53. pharyngitis.mp.
3. exp Adolescent/	54. oropharynx.mp.
4. exp Infant/	55. laryngopharynx.mp.
5. Infant/ or exp Infant, Newborn/	56. Otorhinolaryng*.mp.
6. (child: or toddler: or baby or infant* or adolescent*:.mp.	57. Otolaryngo*.mp.
7. 1 or 2 or 3 or 4 or 5 or 6	58. paranasal sinus*.mp.
8. exp Child Abuse/	59. submandibular gland*.mp.
9. exp Battered Child Syndrome/	60. parotid gland*.mp.
10. exp Shaken Baby Syndrome/	61. palatine tonsil*.mp.
11. exp Airway Obstruction/ or exp Asphyxia/	62. (bleed* adj3 ear*).mp.
12. (child abuse or battered child or battered baby or shaken baby or asphyxia or airway obstruction).mp.	63. (caustic adj3 ear*).mp.
13. suffocat*.mp.	64. hypopharynx*.mp.
14. asphxia*.mp.	65. hypopharynx* perforat*.mp.
15. nonaccidental injur*.mp.	66. perichondritis.mp.
16. non-accidental injur*.mp.	67. Animals/
17. nonaccidental trauma.mp.	68. animal stud*.mp.
18. non-accidental trauma.mp.	69. exp "Review"/
19. soft tissue injur*.mp.	70. exp Child Abuse, Sexual/
20. Infanticide.mp.	71. sexual abuse.mp.
21. abusive trauma.mp.	72. allerg*.ti.
22. (child maltreatment or child protection).mp.	73. surg*.ti.
23. (child adj3 maltreatment).mp.	74. congenital.ti.
	75. 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74
	76. cohort*.tw.

24. (child adj3 physical abuse).mp.	77. controlled clinical trial.pt.
25. child murder.mp.	78. exp Epidemiologic Methods/
26. covert homicide.mp.	79. exp Case-Control Studies/
27. child homicide.mp.	80. (case\$ and control\$).tw.
28. exp Munchausen Syndrome by Proxy/	81. exp case report/
29. Factitious disorder by proxy.mp.	82. (case\$ and series).tw.
30. Fabricat* ill*.mp.	83. exp case studies/
31. Induc* ill*.mp.	84. exp Cohort Studies/
32. Munchausen Syndrome by proxy.mp.	85. 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 32 or 33
33. unnatural death.mp.	86. 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66
34. exp Epistaxis/	87. 76 or 77 or 78 or 79 or 80 or 82 or 84
35. exp Ear/	88. 7 and 85 and 86 and 87
36. exp Nose/	89. 88 not 75
37. exp Pharynx/	
38. (epistaxis or ear or nose or throat or pharynx).mp.	
39. nosebleed.mp.	
40. nose bleed.mp.	
41. (bleed* adj3 nose).mp.	
42. nasal hemorrhage.mp.	
43. nasal haemorrhage.mp.	
44. nasal bleed*.mp.	
45. intra-alveolar haemorrhag*.mp.	
46. intra-alveolar hemorrhag*.mp.	
47. oronasal bleed*.mp.	
48. oronasal haemorrhag*.mp.	
49. oronasal hemorrhag*.mp.	
50. otalgia.mp.	
51. (otitis adj3 extern*).mp.	