

# Child Protection Evidence

## Systematic review on

# Dental Neglect

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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. Updated content will be indicated on individual review pages.

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## Summary

Varying definitions of dental neglect exist and broadly encompass “the persistent failure to meet a child’s basic oral health needs, which is likely to result in the serious impairment of the child’s oral or general health and development”<sup>1</sup>. This systematic review evaluates the scientific literature on abusive and non-abusive dental neglect in children published up until **November 2014** and reflects the findings of eligible studies. The review aims to answer one clinical question:

- What are the parent/carer characteristics of a child with dental neglect, and what oral features are present in these children?

### Key findings:

- Two new studies in 2014 have addressed dental neglect among pre-school children, including antenatal neglect and its impact on dentition. There has been increasing interest in the oral features of children experiencing other forms of maltreatment, and the impact of dental neglect on children<sup>2</sup>
- Failure to attend appointments when the child is experiencing pain or discomfort, or failure to adhere to a recommended treatment plan should prompt a full investigation of the explanation for this
- Dentists are strongly encouraged to collaborate with their local safeguarding / child protection team in order to ensure that prompt and appropriate referrals are made when concerns regarding dental neglect arise

## Background

This systematic review evaluates the scientific literature on abusive and non-abusive dental neglect in children published up until 2014 and reflects the findings of eligible studies. The review aims to answer one clinical question:

- What are the parent/carer characteristics of a child with dental neglect, and what oral features are present in these children?

## Methodology

A literature search was performed using a number of databases for all original articles and conference abstracts published since November 1947. 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 parent/carer characteristics of a child with dental neglect, and what oral features are present in these children?

- Of 93 articles reviewed from the international literature, 11 addressed this question<sup>3-13</sup>
- Age: Where age was recorded, is ranged from 15 months to 15 years

## 1.1. Parent/carer characteristics of children with dental neglect

### Failure/delay in seeking dental treatment

- Each of these studies recorded a delay in seeking appropriate dental treatment<sup>3,4,6,8-13</sup>
- The reasons varied, including domestic violence<sup>3</sup>
- The children's symptoms varied, but are well documented in one study<sup>6</sup>
- A comparison of children undergoing dental extraction under general anaesthetic had an over representation of dental neglect with significantly more children having missed or cancelled appointments and visits with acute pain. It is notable that very few children were referred to social services<sup>8</sup>

### Failure to follow the dental advice given

- Failure to adhere to the recommended treatment plan was the primary characteristic which highlighted the neglect this child was suffering<sup>9</sup>
- In other instances, this formed one of a number of features of neglect<sup>3-6,10,12,13</sup>

### Failure to provide basic oral care

- While developing a dental neglect scale for children, one control study highlighted inadequate tooth brushing and cariogenic snack behaviour<sup>12</sup>
- Other studies documented inadequate oral hygiene<sup>3,5,7,11</sup>

## 1.2. Oral features of dental neglect

### Oral features

- All studies documented caries, many of which were “nursing bottle caries” or extensive early caries<sup>3-13</sup>
- Dental pain was a recorded feature in three studies<sup>8,10,13</sup>
- One larger study of children aged three to eight years noted that 60.5% required extractions for dental caries, which included conditions that were painful or carried a risk of infection<sup>10</sup>
- One study noted that abused children had a significantly higher number of caries compared to controls<sup>11</sup>
- One study of 65 buprenorphine-exposed infants were recalled for examination at 3-4 years of age and compared to control infants. Those antenatally exposed to buprenorphine had a higher decayed, missing, filled teeth (dmft) index and were less likely to be caries free than controls. They were also more likely to have visible plaque. There were no differences in dental trauma or developmental enamel defects<sup>7</sup>

## 1.3. Implications for practice

- Failure to attend appointments when the child is experiencing pain or discomfort, or failure to adhere to a recommended treatment plan should prompt a full investigation of the explanation for this
- Given the varying prevalence of caries amongst young children in Western populations, it is impossible to define a precise threshold for dental neglect based on this feature. However, a child who is experiencing pain, discomfort, social embarrassment or medical complications as a consequence of caries should be attending for appropriate treatment
- Dentists are strongly encouraged to collaborate with their local safeguarding / child protection team in order to ensure that prompt and appropriate referrals are made when concerns regarding dental neglect arise

## 1.4. Research implications

- There are to date no large scale studies comparing children with dental neglect to appropriate controls in order to define precise characteristics that distinguish these cases
- Future studies should include routine oral assessment, including oral quality of life evaluation of children experiencing maltreatment of any type undergoing medical assessment
- Researchers are strongly advised to undertake such work as a matter of priority

## 1.5. Limitations of review findings

- The review findings are limited by the small number of studies included, and in particular by varying definitions of dental neglect
- A number of authors elected to examine children who have been identified as suffering from physical abuse or neglect but did not specify dental neglect
- Studies of dental neglect are prone to circularity as children are rarely independently assessed by child protection services; rather the definition of dental neglect relies on the dental features being examined

## 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

#### National Standards Relating to Dental Neglect

- UK Standards<sup>1,14,15</sup>
- US Standards<sup>16-20</sup>

#### **Oral Features of Children admitted into the Child Welfare system for causes of maltreatment other than dental neglect (i.e. physical, sexual, emotional abuse, or general neglect)**

- Features described included extensive childhood caries, poor oral hygiene and gingival inflammation<sup>21-26</sup>
- The introduction of a standardised pre form for oral examination of all children undergoing a child protection medical improved the recognition of intra-oral features and onward referral of children for dental treatment<sup>26</sup>
- One case control study noted that the study group had almost eight times as many dental caries as five year olds in the general population<sup>25</sup>
- A study of children entering out-of-home care interviewed carers and professionals with regards to oral and dental care. A number of barriers and facilitators to the provision of appropriate dental care to children in foster care were identified<sup>27</sup>

## A study of repeat treatment under general anaesthetic in children demonstrated the following:

- A case control study of children undergoing repeat GA for dental treatment versus those who only required a single GA highlighted a number of key differences<sup>28</sup>:
  - Those requiring repeat GA had more behavioural issues undergoing dental treatment
  - They were more likely to be responsible for brushing their own teeth (mean age 2.6 years, range 1.8 – 5.8) than controls (mean age 2.7 years, range 1.4 – 5.7)
  - Parents were more likely to give their child a drink other than water in their bottle at bedtime

## Adverse consequences of dental caries in children and risk factors for dental neglect

- Adverse consequences
  - A randomised controlled trial of Bush Creole children demonstrated a significant association between short stature and levels of dental caries. However, the longitudinal study did not show any ‘catch up’ in growth for those children who were randomised to receive dental treatment versus controls<sup>29</sup>
  - A study of 12 year old school children in Brazil highlighted that those with dental caries or dental trauma are associated with reduced school performance and those who had worse self-perceived oral health missed more days of school<sup>2</sup>
  - School absence related to dental pain or infection was related to poor school performance ( $p = 0.001$ )<sup>30</sup>
- Risk factors
  - Other risk factors include drinking fruit juice before being able to walk; however drinking milk or fruit juices after the child can walk is protective. Fluoridation was also found to be protective<sup>31</sup>

## Low Income

- A number of studies have reported an association between low income and dental disease<sup>31-34</sup>
- Children in low income families have a higher prevalence of cavitated lesions than those in high income families<sup>32</sup>
- Low socio-economic group, consumption of sweet foods and the use of a pacifier in a survey of Italian children had a strong association with dental caries<sup>33</sup>



## Dental Health Behaviours / Attitudes

- Higher caries prevalence in caregivers was associated with higher caries prevalence in children<sup>32</sup>
- Parents did not value the primary teeth<sup>33</sup>
- Survey of attitudes to dental health, care and consequences among British children aged 13 – 14 years<sup>35</sup>
- Attitudes of Public Health Nurses in UK to considering dental neglect in children less than five years old<sup>36</sup>
- A study in an area of free dental health care noted that the parents did not feel it was necessary to take their children to the dentist, even in the presence of oral abnormalities<sup>37</sup>
- A survey of parental attitudes to their child's oral health identified associations between dental caries and general health concerns in addition to a lack of concern about the child's dental health<sup>37</sup>

## Quality of Life (QoL)

- A study of Inuvik children in Canada highlighting the prevalence of pain associated with dental caries in this population disease<sup>31</sup>
- Maternal anxiety did not appear to correlate with oral health related QoL assessments for pre-school children<sup>34</sup>
- Excellent systematic review of Oral Health Related Quality of Life (ORQoL) tools for children, which highlights that there are validated tools, but also that account needs to be taken of the child's age, cognitive level and language development<sup>38</sup>
- Valuable systematic review exploring the complex relationship between clinical oral health status and ORQoL<sup>39</sup>
- Poor oral health, in combination with poor general health, has a negative impact on school performance<sup>40</sup>
- A comparison of an Oral Specific QOL (ECOHIS) measure with a generic Paediatric QOL measure (Peds-QLTM 4.0) in preschool children with Severe Early Childhood Caries (S-ECC), demonstrated that children with S-ECC exhibited a significant effect on wellbeing, for the child and family<sup>41</sup>
- A UK QOL survey conducted in addition to a dental examination survey demonstrated that up to a third of children aged 12 years are experiencing a negative impact on their overall wellbeing as a result of dental problems, with pain being the most frequently reported effect<sup>42</sup>
- In a sample of 12 year old Brazilian children, untreated caries and dental overjet were significantly associated with a lower QOL score<sup>43</sup>

- Children aged 30 – 60 months with more dental caries exhibited greater problems with externalising behaviour, sleep disturbances, anxious / depressed and attention deficit / hyperactivity scores than those who were caries free, although neither group had scores outside the normal range for age<sup>44</sup>
- 550 children with a mean age of 7.2 years completed the ‘Child oral health-related quality of life (COHQoL) score’. Those children with a higher dmft score had a poorer oral health related quality of life<sup>45</sup>

## **Dental Practitioners Response to Child Abuse and Neglect**

- A UK study surveying general dental practitioners identified that although 37% of respondents had suspected abuse and neglect, only 11% had made a child protection referral. 73% of dentists were interested in identifying dental neglect<sup>46</sup>

## **Related publications**

### **Publications arising from the dental neglect review**

Bhatia SK, Maguire SA, Chadwick BL, Hunter ML, Harris JC, Tempest V, Mann MK, Kemp AM. Characteristics of child dental neglect: A systematic review. *Journal of Dentistry*. 2014;42(3):229-239

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## Appendix 1 – Methodology

We performed an all-language literature search across 16 bibliographic databases to identify original articles published since 1947. The initial search strategy was developed across OVID Medline databases using keywords and Medical Subject Headings (MeSH headings) and was modified appropriately to search the remaining bibliographic databases. The search sensitivity was augmented by the use of a range of supplementary ‘snowballing’ techniques including consultation with subject experts and relevant organisations, and hand searching selected websites, non-indexed journals and the references of all full-text articles.

Identified citations, once scanned for duplicates and relevancy, were transferred to a purpose-built Microsoft Access database to coordinate the review and collate critical appraisal data. Abstracts and selected full-text papers were scanned by the lead researcher and eligible studies identified for review. Relevant foreign language articles were considered for translation, though none were undertaken. Where applicable, authors were contacted for primary data and additional information.

A panel of community and pediatric dentists, paediatricians, child protection practitioners, a lecturer in dental public health, social worker and pathologist conducted two independent reviews of each relevant article. Reviews were undertaken using a standardized critical appraisal form based on criteria defined by the National Health Service’s Centre for Reviews and Dissemination<sup>47-52</sup>. All reviewers underwent critical appraisal training purposefully designed for this review. A third review was undertaken to resolve disagreement.

Definition of dental neglect chosen for the purpose of this review:

“Neglect refers to the failure of a parent or guardian to meet a child’s basic oral health needs, such that the child enjoys adequate function and freedom from pain and infection, where reasonable resources are available to the family or caregiver”<sup>1,17,53-55</sup>.

### Inclusion criteria

| Inclusion   | Exclusion   |
|---|---|
| Children aged 0-18 completed years (17 yrs & 364 days)                        | Studies relating to adults 18 yrs or over, either exclusively or where relevant data cannot be extracted      |
| Primary studies (all evidence types)  | Studies of physical abuse, sexual abuse, emotional abuse, general neglect, where oral neglect was not present |
| Documenting features of oral neglect (oral, systemic, social, behavioural) in | Studies of management or complications of dental neglect  |



|   |   |
|---|---|
| children  |   |
| Characteristics of parent/carer of a child Studies addressing risk factors for dental neglect with dental neglect |   |
| Confirmation of dental neglect rank A- C2   | Formal consensus/expert opinion/personal practice/review article/systematic review  |
|   | Inadequate detail for oral features or parent/carer characteristics to be extracted |

| Ranking Criteria used to identify/confirm oral neglect |   |
|--|---|
| A <sup>3,9</sup>                                       | Oral neglect confirmed at Child Protection case conference, multi-disciplinary assessment including social services, Child in Need Framework Assessment or Court proceedings, or admitted by perpetrator, or described by the child |
| B1 <sup>4,9,11</sup>                                   | Confirmation of oral neglect by dental care professional or professional with dental training   |
| B2 <sup>3,5,9,10,13</sup>                              | Failure to attend follow-up appointments  |
| B3 <sup>3,6*</sup>                                     | Failure to follow treatment or preventive regime  |
| C1   | Oral neglect confirmed by <b>referenced</b> criteria / tool or by non-dental health professional  |
| C2 <sup>12</sup>                                       | Oral neglect defined by <b>unreferenced</b> criteria / tool   |
| D  | Oral neglect suspected or stated, <b>with no supporting detail given</b>  |

\*failed to SEEK treatment

## Quality standards for oral examination

|  |
|--|
| <p>1. Was / were the child / children examined by a dental care professional or other professional with dental training appropriate to the study?</p>  |
| <p>2. Were the intra / extra oral features identified using a referenced recognised index? For example,</p> <ul style="list-style-type: none"> <li>- ICDAS, BASCD, WHO criteria for decay / caries</li> <li>- PUFA for clinical features consequent upon decay, such as dental abscesses, facial swelling, spreading cellulitis</li> </ul> |
| <p>3. Were the intra / extra oral features identified using unreferenced but explicitly stated criteria, or were the features described in detail?</p>   |
| <p><b>If you have been UNABLE TO ANSWER YES TO EITHER QUESTION 2 OR 3, the study is excluded.</b></p>  |

If you **HAVE ANSWERED YES TO EITHER QUESTION 2 OR QUESTION 3**, please answer questions 4, 5 or 6.

4. Was the practitioner trained in the use of the index / criteria?

5. Was the amount / prevalence of caries quantified in the child (e.g. DMFT)?

6. Was the child / children examined by more than one practitioner?

If YES, how many?

## Search strategy

The below table presents the search terms used in the 2014 Medline database search for dental neglect, 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/                          | 76. gum disease*.mp.  |
| 2. exp Child Preschool/                | 77. (tooth or teeth).ti,ab.   |
| 3. exp Infant, Newborn/                | 78. (toothache or tooth pain).ti,ab.                                    |
| 4. exp Infant/                         | 79. oral health.ti,ab.  |
| 5. infancy.ti,ab.                      | 80. gum inflam*.tw.   |
| 6. child*.ti,ab.                       | 81. oral mucosal health.ti,ab.  |
| 7. infant*.ti,ab.                      | 82. caries.mp.  |
| 8. (baby or babies).ti,ab.             | 83. (dental adj2 fracture*).tw.   |
| 9. toddler*.ti,ab.                     | 84. (dental adj2 concussion).tw.  |
| 10. neonat*.ti,ab.                     | 85. (tooth adj2 fracture*).tw.  |
| 11. (pediatric* or paediatric*).ti,ab. | 86. ((dental or orthodontic or oral) adj2 (intrusion or extrusion)).tw. |
| 12. or/1-11                            | 87. tooth fill*.tw.   |
| 13. (abus* adj neglect*).ti,ab.        | 88. (discol* adj2 (teeth or tooth or dental)).tw.                       |
| 14. (abuse and negl*).ti,ab.           | 89. (infection adj2 (tooth or teeth or mouth)).tw.                      |
| 15. (maltreat* or mistreat*).ti,ab.    | 90. tartar.tw.  |
| 16. neglect*.tw.                       | 91. discolo* tooth.tw.  |
| 17. (malnourish* or malnutrition).tw.  | 92. ((clean* or brush*) adj2 (tooth or teeth)).tw.                      |
| 18. (fail* adj2 grow*).tw.             |   |

|   |  |
|---|--|
| 19. (falder* adj2 growth).tw.   | 93. lift the lip.mp.                         |
| 20. exp Failure to Thrive/  | 94. nursing caries.tw.                       |
| 21. non organic failure to thrive.tw.   | 95. (plaque adj2 level).tw.                  |
| 22. body weight.tw.   | 96. dental abscess.tw.                       |
| 23. quality of life.tw.   | 97. dental infection.tw.                     |
| 24. underweight child*.tw.  | 98. excessive calculus.tw.                   |
| 25. Growth failure.tw.  | 99. Gingivitis.tw.                           |
| 26. (child adj2 need*).tw.  | 100. bleeding gums.tw.                       |
| 27. child* in need*.tw.   | 101. gingival bleeding.tw.                   |
| 28. vulnerable child*.tw.   | 102. oral health.tw.                         |
| 29. Unmet treatment needs.tw.   | 103. poor tartar control.tw.                 |
| 30. or/13-29  | 104. dental pain.tw.                         |
| 31. neglected dentition.ti,ab.  | 105. dental rehabilit*.tw.                   |
| 32. ((oral or dental injur* or tooth or teeth) adj2 (failure or disreg*or overlook*or failed or neglect*)),ti,ab. | 106. Dentin* decay.tw.                       |
| 33. (oral hygiene adj3 neglect*).ti,ab.   | 107. dental trauma.tw.                       |
| 34. ((“oral care” or “dental care”) adj3 (fail* or disreg*or overlook* or negl*)),ti,ab.                          | 108. (linguae or buccarum).tw.               |
| 35. oral neglect.ti,ab.   | 109. (Buccal mucosa or labial mucosa).tw.    |
| 36. (neglect* adj oral).ti,ab.  | 110. morsicatio labiorum.tw.                 |
| 37. (failure to thrive adj3 caries).tw.   | 111. (“tongue biting” or “cheek biting”).tw. |
| 38. (dental hygiene adj3 neglect*).ti,ab.   | 112. or/41-111                               |
| 39. dental neglect.tw.  | 113. 40 or 112                               |
| 40. or/31-39  | 114. Patient Compliance/                     |
| 41. exp Tooth Avulsion/   | 115. dental appointment.mp.                  |
| 42. exp Tooth Injuries/   | 116. dental attendance.tw.                   |
| 43. exp Tooth Extraction/   | 117. failed appointment*.tw.                 |
| 44. exp Tooth Discoloration/  | 118. (dental adj3 failed appointment*).tw.   |
| 45. exp Toothbrushing/  | 119. (dental adj3 missed appointment*).tw.   |
| 46. exp Mouth Mucosa/   | 120. (non compliance adj3 dent*).tw.         |
|   | 121. (attendance pattern* adj3 dent*).tw.    |
|   | 122. dental attendance pattern*.mp.          |

|   |  |
|---|--|
| 47. exp Orthodontic Extrusion/                                      | 123. (attendance pattern* adj3 oral health).tw.              |
| 48. exp Tooth Extraction/   | 124. missed appointment*.tw.                                 |
| 49. **Oral Hygiene"/  | 125. attendance pattern*.tw.                                 |
| 50. Tooth Movement/   | 126. No-show.mp.   |
| 51. exp Gingivitis/   | 127. failure to turn up.tw.                                  |
| 52. exp Orthodontic Extrusion/                                      | 128. (fail* adj2 appointment*).tw.                           |
| 53. Gingival Diseases/  | 129. failure to follow advice.tw.                            |
| 54. exp Dental Plaque/  | 130. (fail* adj prevent*).tw.                                |
| 55. Tooth Movement/   | 131. (fail* adj treat*).tw.                                  |
| 56. **Tooth Diseases"/  | 132. "did not attend".tw.                                    |
| 57. exp Toothache/  | 133. "recall visit".tw.                                      |
| 58. Dental Caries/  | 134. (non-attendance or non attendance).tw.                  |
| 59. Periodontal Diseases/   | 135. or/115-134  |
| 60. exp Periodontitis/  | 136. Family/   |
| 61. exp Oral Health/  | 137. Mother-Child Relations/                                 |
| 62. exp Pacifiers/  | 138. Parent-Child Relations/                                 |
| 63. ((erosion or wear) adj2 (teeth or tooth or dental)).tw.         | 139. **Parenting"/   |
| 64. (luxation* or subluxation*).tw.                                 | 140. exp Parents/  |
| 65. ((intrusion* or disease* or injur*) adj2 (tooth or dental)).tw. | 141. exp Mothers/  |
| 66. rampant caries.ti,ab.   | 142. exp Fathers/  |
| 67. early childhood caries.ti,ab.                                   | 143. (parent* or mother or father or carer* or guardian).tw. |
| 68. baby bottle caries.ti,ab.                                       | 144. (mum or dad or families or caregiver*).tw.              |
| 69. baby bottle tooth decay.ti,ab.                                  | 145. or/136-144  |
| 70. ((tooth or dental) adj3 (decay or plaque)).tw.                  | 146. 12 and 30 and 112                                       |
| 71. (dental adj2 (infection or decay)).ti,ab.                       | 147. 12 and 112 and 135                                      |
| 72. dental extraction.ti,ab.  | 148. 12 and 40   |
| 73. plaque control.ti,ab.   | 149. 12 and 30 and 113 and 145                               |
| 74. nursing bottle.ti,ab.   | 150. 146 or 147 or 148 or 149                                |
| 75. baby bottle.ti,ab.  | 151. limit 150 to yr="2013 –Current                          |
|   | 152. limit 151 to humans (154)                               |

Sixteen databases were searched together with hand searching of particular journals and websites. A complete list of the resources searched can be found below.

| Databases  | Time period searched |
|--|----------------------|
| ASSIA (Applied Social Sciences Index and Abstracts)  | 1987 – 2014          |
| CINAHL ( <i>Cumulative Index to Nursing and Allied Health Literature</i> )                                     | 1960 – 2014          |
| Cochrane Central Register of Controlled Trials   | 1960 – 2004          |
| EMBASE   | 1980 – 2014          |
| ERIC (Education Resources Information Center)  | 1966 – 2014          |
| HMIC (Health Management Information Consortium)  | 1983 – 2014          |
| MEDLINE  | 1947 – 2014          |
| MEDLINE In-Process and Other Non-Indexed Citations   | 3 Nov 2014           |
| OpenGrey   | 1980 – 2014          |
| SCOPUS   | 1960 – 2014          |
| Social Services Abstracts  | 1979 – 2014          |
| Sociological abstracts   | 1952 – 2014          |
| Web of Knowledge – Conference Proceedings Citation Index- Science (CPCI-S) -1990-present                       | 1992 – 2014          |
| Web of Knowledge – Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH) -1990-present | 1990 – 2014          |
| Web of Knowledge – Science Citation Index  | 1960 – 2014          |
| Web of Knowledge – Social Science Citation Index   | 1960 – 2014          |
| Journals 'hand searched'   | Time period searched |
| Child Abuse and Neglect  | 1979 – 2014          |
| Child Abuse Review   | 1992 – 2014          |
| New York State Dental Journal  | 2005 – 2014          |
| Proceedings of the British Paedodontic Society. Continued as: International Journal of paediatric dentistry.   | 1991 – 2014          |
| Websites searched  | Date accessed        |

|   |                           |
|---|---------------------------|
| American Academy of Pediatric Dentistry | From inception 05/11/2014 |
| European Academy of Pediatric Dentistry | From inception 05/11/2014 |
| British Society of Paediatric Dentistry | From inception 05/11/2014 |
| British Society of Periodontology       | From inception 05/11/2014 |
| Google scholar                          | From inception 05/11/2014 |

## Pre-review screening and critical appraisal

Papers found in the database and hand searches underwent three rounds of screening before they were included in this update. The first round was a title screen where papers that obviously did not meet the inclusion criteria were excluded. The second was an abstract screen where papers that did not meet the inclusion criteria based on the information provided in the abstract were excluded. In this round the pre-review screening form was completed for each paper. These first two stages were carried out by clinical experts. Finally a full text screen with a critical appraisal was carried out by members of the clinical expert sub-committee. Critical appraisal forms were completed for each of the papers reviewed at this stage. Examples of the pre-review screening and critical appraisal forms used in previous reviews are available on request ([clinical.standards@rcpch.ac.uk](mailto:clinical.standards@rcpch.ac.uk)).