

The clinical effectiveness and cost-effectiveness of routine dental checks: a systematic review and economic evaluation

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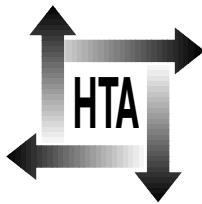
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Executive summary

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Executive summary

Background

Oral health can be defined as a general state of well-being as a result of healthy and functioning mucosae, gingivae and dentition. Despite an increasing incidence of oral cancer in adults and static levels of periodontal disease in children, a marked improvement has been observed in general oral health (experience of periodontal disease, caries and tooth loss in adults, and caries in children) over the last three decades.

Six-monthly dental checks have been customary in the General Dental Service in the UK since the inception of the NHS and NHS regulations recognise this practice. Dental practitioners can be remunerated for performing 6-monthly checks and registration with an NHS dentist lapses with a longer than 15-month gap between visits. However, the NHS does not explicitly recommend a specific dental check recall frequency.

Despite the general improvement in oral health, important inequalities in dental health remain, particularly across socio-economic groups and between geographical areas with and without a fluoridated water supply. This has raised questions over the current lack of an explicit dental check recall policy and, in particular, whether dental check recall intervals should be adjusted to reflect oral health needs more closely in order to optimise their clinical effectiveness and cost-effectiveness.

Questions addressed by this review

- How effective are routine dental checks of different recall frequencies in improving quality of life and reducing the morbidity associated with dental caries and periodontal disease in children?
- How effective are routine dental checks of different recall frequencies in improving quality of life, reducing the morbidity associated with dental caries, periodontal disease and oral cancer, and reducing the mortality associated with oral cancer in adults?
- What is the cost-effectiveness of routine dental checks of different recall frequencies in

improving quality of life and reducing the morbidity associated with dental caries and periodontal disease in children?

- What is the cost-effectiveness of routine dental checks of different recall frequencies in improving quality of life, reducing the morbidity associated with dental caries, periodontal disease and oral cancer, and reducing the mortality associated with oral cancer in adults?

Methods

A systematic review of the clinical effectiveness and cost-effectiveness of routine dental checks of different recall frequencies was undertaken.

After an informal scoping search to identify existing reviews, the search strategy for primary studies was designed to identify controlled trials and observational studies, with no language restrictions. Primary studies were identified from the following sources: electronic bibliographic databases, internet sites, contact with experts, citation checks, and a search of the Cochrane Oral Health Group specialised register of controlled trials.

The selection of studies for inclusion, and the subsequent quality assessment and data extraction were undertaken by at least two reviewers working independently, using explicit predefined criteria and proformas. A limited sensitivity analysis was performed in order to assess the impact of study quality on the clinical effectiveness findings.

A Markov decision analysis modelling exercise based on current available UK data was undertaken in order to address deficiencies in the existing literature and perform an incremental cost-effectiveness analysis of different dental check recall policies on decay experience in deciduous and permanent dentition. The cost-effectiveness of 3-, 6-, 12-, 18-, 24- and 36-month dental check recall policies was examined using transition probabilities for the progression of caries and incorporating two key risk factors: socio-economic background (manual versus non-manual) and water fluoridation. ►

Results

Effectiveness

Information from 25 articles reporting the results of 29 studies are included in this review. Twenty-four studies addressed the effectiveness of dental checks on caries; nine concerned periodontal disease, two oral cancer and one quality of life.

The studies included in the effectiveness review were poorly reported, which limited internal comparison (between studies) and also external comparison with the current UK situation. Heterogeneity across studies with regard to the intervention under study further limited external comparison with the current UK situation. Only four studies addressing caries in permanent or deciduous teeth included 6 months as a comparison frequency and thus addressed the review question from a UK perspective. A sensitivity analysis conducted on the outcome of dental caries indicated that the findings presented below were robust to the methodological quality of the studies.

Caries

There was little consistency in the direction of effect of different dental check frequencies between studies for outcome measures in deciduous, mixed or permanent dentition. Two separate studies demonstrated no significant difference between dental check frequency and decayed, missing and filled teeth in deciduous or mixed dentition. One study reported a significant reduction in the number of fillings with individualised dental check frequencies compared with a blanket recall policy of 12 months or longer in mixed dentition. There was a preponderance of studies reporting an increase in decay, a decrease in the number of teeth, and a decrease in fillings, with less frequent dental checks in permanent dentition.

Periodontal disease

A single study demonstrated a decrease in attachment level with a decrease in dental check frequency, which was of uncertain statistical significance. There was no consistency in the direction of effect of different dental check frequencies in permanent dentition between studies for: bleeding, probing depth/pockets, presence of plaque/calculus, bone score, gingivitis and periodontal health.

Oral cancer

One study suggests that dental check recall intervals of less than 12 months do not impact on tumour size at diagnosis. One study reports that decreasing dental check frequencies (more than

12 months) may significantly increase the stage and size of tumours at diagnosis.

Quality of life

One study demonstrated a significant association between increasing dental check frequency and the perception that oral health affects quality of life.

Cost-effectiveness

There was much uncertainty in the analyses reported in the literature (concerning data sources used, extrapolation of results, and variable modelling approaches) with no employment of sensitivity analysis techniques to address the problems. There were no published cost-effectiveness studies based on UK data and current UK practice (i.e. comparisons of dental checks performed at 6-monthly intervals compared with other frequencies). Economic studies that have considered the frequency of routine dental checks have focused on children rather than adults.

Only one formal cost-effectiveness study was identified, which reported an incremental cost of US\$73 per carious surface averted when comparing 12-monthly dental assessment to no assessment.

The results of five resource impact studies appeared to be consistent; less frequent dental checks (range 7–24 months) were associated with reduced assessment and treatment, with little evidence of an adverse impact on dental health.

Decision analysis

Moving from a policy option of 6-monthly to 3-monthly dental checks was associated with a relatively small reduction in the experience of decay over 6 years in deciduous and 68 years in permanent dentition (an average of between 0.04 deciduous and 0.41 permanent teeth (non-manual, fluoridated water) and 0.12 deciduous and 0.22 permanent teeth (manual, non-fluoridated water)), and a sharp increase in costs (around £64 per patient over 6 years in deciduous dentition and about £202 per patient over 68 years in permanent dentition). Moving from the policy option of 6-monthly dental checks for both deciduous and permanent dentition to longer frequency policies (i.e. 12, 18, 24 and 36 months) demonstrated a consistent trend of an increase in dental decay experience relative to a saving in cost. This finding holds for both deciduous and permanent dentition and across all risk

groups studied. The magnitude of the increase in decay experience is greatest in non-manual and non-fluoridated groups for both deciduous and permanent dentition.

For deciduous teeth, modelling indicates that, by moving from 6-monthly to 12-monthly dental checks, an average of between 0.2 (manual, non-fluoridated water) and 0.07 (non-manual, fluoridated water) teeth would be affected by decay experience, with a reduction in cost of around £30 per patient over 6 years. In permanent dentition, modelling indicates that, by moving from a 6-month to a 12-month recall policy, an average of between 0.14 (manual, non-fluoridated water) and 0.21 (non-manual, fluoridated water) teeth would be affected by decay experience, with a reduction in cost of between £75 and £95 respectively per patient over 68 years. The results of the economic modelling exercise appear robust to sensitivity analyses.

Conclusions

There is little existing evidence to support or refute the practice of encouraging 6-monthly dental checks in adults and children. Decision analysis modelling using current UK data to investigate further the cost-effectiveness of different dental check recall frequencies on the experience of dental decay in deciduous and

permanent dentition suggests that moving to longer (more than 6-monthly) dental check frequencies, rather than shortening the currently practised recall interval, would be more cost-effective. However, the model demonstrates that cost-effectiveness varies across risk groups and therefore consideration should be given to whether a population recall policy or a recall policy based on individual risk would be more appropriate.

Given the limitations of existing UK epidemiological data, it was not possible to undertake a modelling exercise to investigate the cost-effectiveness of different frequencies of dental checks on the experience of periodontal disease or on the morbidity and mortality associated with oral cancer.

There is a need for further primary research addressing the role of the dental check and its effectiveness in different oral diseases.

Publication

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The research reported in this monograph was commissioned by the HTA Programme on behalf of the Chief Dental Officer. Technology assessment reports are completed in a limited time to inform policy development by the Chief Dental Officer. The review brings together evidence on key aspects of the use of the technology concerned.

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