Dental implants in patients with ectodermal dysplasia and tooth agenesis: a critical review of the literature

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CRD summary
The authors concluded that implant survival rates in ectodermal dysplasia and tooth agenesis ranged between 88.5% and 100%. Implants in adolescent ectodermal dysplasia patients had no effect on craniofacial growth. Implants placed in patients younger than 18 years had higher failure rates. Multiple limitations in the review processes and included studies mean the conclusions may not be reliable.

Authors' objectives
To assess the effectiveness and optimal timing of dental implants in patients with ectodermal dysplasia syndrome and tooth agenesis.

Searching
MEDLINE (1950 to present), EMBASE (1966 to present), EBM Reviews (The Cochrane Library, ACP Journal Club, DARE) were searched for English-only publications. Search terms were reported. Reference lists of identified articles were handsearched.

Study selection
All studies that evaluated dental implants in patients with ectodermal dysplasia and tooth agenesis were eligible for inclusion. Case reports were excluded. Details on eligible outcomes were not reported.

Included studies considered patients with ectodermal dysplasia and oligodontia or special needs. Mean age (incompletely reported) ranged from 11.2 to 55.6 years. Outcomes assessed included survival rates of implants, prosthesis complications, treatment costs and quality of life.

Study selection was done by one reviewer.

Assessment of study quality
The authors did not state that they assessed validity. The levels of evidence of selected studies were graded according to study designs: randomised controlled trials (level I); controlled clinical trials (level II); descriptive designs (level III); and expert opinions (level IV). Grading was done by one reviewer.

Data extraction
Data on levels of evidence, number of implants and outcome measures were extracted and summarised in a table.

The authors stated neither how the data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
Data were grouped into three categories and results presented narratively: implants in patients with ectodermal dysplasia and tooth agenesis; age, growth and implants; and interdisciplinary management.

Results of the review
Twelve studies (n=471 patients) were included in the review: one cross-sectional study (n=52 patients); three prospective case-series (n=197 patients); six retrospective case-series (n=104 patients); and two mixed designs (n=118 patients). The overall level of evidence was reported to be weak.

Implants in patients with ectodermal dysplasia and tooth agenesis:
Survival rates ranged from 88.5% to 97.6% in patients with ectodermal dysplasia (n=71 patients, three studies) and from 90% to 100% in patients with tooth agenesis (n=178 patients, five studies).

Prosthesis complications were reported in 17.4% of implants up to 11.8 years following prosthesis insertion (n=15 patients, one study). The most frequent complications were screw loosening and sore spots.

Implant and prosthodontic treatment were associated with positive effects on satisfaction, treatment experience and mandibular function impairment (n=13 patients, one study).

**Age, growth and implants:**

There were no significant differences in implant survival in ectodermal dysplasia patients aged up to 11, 11 to 18 and more than 18 years (n=51 patients, one study).

The risk of implant failure was significantly higher in ectodermal dysplasia patients younger than 18 years compared with those older than 18 years (hazard ratio 2.5; n=51 patients, one study).

**Interdisciplinary management:**

Implant survival was 11.8 years following prosthetic insertion in patients with tooth agenesis. Prosthetic complications were reported in 17.4% of implants (n=15 patients, one study).

One study (n=223) reported no significant change in craniofacial growth in treated compared to untreated ectodermal dysplasia patients.

**Cost information**

Treatment costs on patients and families with ectodermal dysplasia and tooth agenesis were found to vary widely (mean US$27,894 ± US$3,791) in ectodermal dysplasia patients (n=24 patients, one study).

**Authors' conclusions**

Implant survival rates of patients with ectodermal dysplasia and tooth agenesis ranged between 88.5% and 100%. Implants placed in adolescent ectodermal dysplasia patients had no effect on craniofacial growth. Implants placed in patients younger than 18 years with ectodermal dysplasia had a higher risk of failure.

**CRD commentary**

The review question and inclusion and exclusion criteria were clearly stated. The adequacy of the search strategy was unclear (search dates incompletely reported). Limitation of the search strategy to English-only publications might have introduced language bias. No searches for unpublished papers were performed, so publication bias could not be ruled out. No measures were taken to minimise the risk of reviewer error and bias in the review processes. Quality of included studies was unclear as there was no validity assessment. The decision to summarise results in a narrative synthesis was supported by significant differences in the small number of included studies. The authors' acknowledged the limitations of small sample sizes of included observational studies. In view of the limitations in reporting of review methods and reliance upon limited evidence from generally small studies, the authors conclusions may not be reliable.

**Implications of the review for practice and research**

**Practice:** The authors stated that use of implant-borne prosthesis in anterior mandible could be recommended for younger patients shown to significantly improve craniofacial growth, social development, self-image and food choice.

**Research:** The authors stated that large prospective long-term controlled studies that evaluated Oral Health-Related Quality of Life (OHRQoL) and implant and prosthodontic outcomes in younger patients with ectodermal dysplasia and tooth agenesis were needed to elicit the benefits of early treatment.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.