Mandibular Kennedy Class I implant-tooth-borne removable partial denture: a systematic review
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CRD summary
This review evaluated the use of assisted and supported implants for removable partial dentures in patients with partially edentulous arches. The authors concluded that these interventions might provide a simple, economical, and less invasive treatment modality. Due to potential methodological limitations arising from the reliance on uncontrolled studies of uncertain quality, the reliability of this conclusion is unclear.

Authors' objectives
To evaluate the use of implant-tooth-borne removable partial dentures in prosthetic rehabilitation of Kennedy Class I partially edentulous arches.

Searching
MEDLINE (from 1969), EMBASE (from 1980), Cochrane Oral Health Group’s Trials Register, Cochrane Central Register of Controlled Trials (CENTRAL), UK National Research Register, Australian New Zealand Clinical Trials Registry (ANZCTR), and Conference Proceedings Citation Index were searched in August 2009. Search terms were reported. A number of relevant journals were handsearched from 1998 to 2009. Reference lists of retrieved articles were also searched to find relevant studies. Searches were restricted to studies written in English.

Two reviewers undertook the selection of studies, with disagreements resolved through discussion.

Study selection
Eligible studies were any design that included the rehabilitation of partially edentulous patients with a bilateral distal-extension in which implants were not splinted to the remaining teeth. Eligible comparisons were: implant-supported or implant-assisted removable partial dentures versus conventional removable partial dentures; or other forms of prosthetic treatment. Only mandibular situations were eligible. Outcomes were clinical performance and patient satisfaction.

All included studies placed implants in the most distal position in the molar region to enable the modification of Kennedy Class I in the mandible to a more favourable Kennedy Class III arch configuration. Where reported, a variety of implants were used with various attachments to support the removable partial dentures. Outcomes evaluated included patient satisfaction, bone loss, masticatory efficiency, prosthetic maintenance, and soft and hard tissue response. The majority of studies reported on complications associated with maintenance of the intervention.

Two reviewers undertook study selection, with disagreements resolved through discussion.

Assessment of study quality
There was no formal assessment of study quality.

Data extraction
Data were extracted on patient satisfaction, marginal bone loss, complications relating to maintenance of the implant, masticatory efficiency, prosthetic maintenance, tissue response, survival rate of the implant, and follow-up.

Two reviewers undertook the data extraction, with disagreements resolved through consensus.

Methods of synthesis
Studies were combined in a narrative synthesis.
Results of the review
Nine studies were included in the review (94 participants; 183 implants). Two studies were randomised; one was part of a multicentre randomised clinical trial (RCT) and the other was a crossover pilot study of five patients. Three studies were uncontrolled retrospective case series. Four studies were case reports of one or two patients. Follow up ranged from three weeks to 120 months.

The authors reported that implant-supported/implant-assisted removable partial dentures resulted in: enhanced stability and retention (three studies); improved aesthetic results (two studies); facilitation of oral hygiene maintenance (one study); reduced bone resorption (three studies); easy conversion to conventional removable partial dentures in case of implant failure (one study); modification of unfavourable arch configurations (two studies); improved patient satisfaction (three studies); less requirement for prosthetic maintenance than a conventional removable partial dentures (one study); reduced extension of the removable partial dentures base (one study); and reduced likelihood of combination syndrome (one study).

The percentage implant survival ranged from 94 to 100%.

Most studies reported minimal complications, but one RCT reported loosening of healing caps in 84% of patients, matrix activation or deactivation, adjustment of wrought wire clasp, and fracture of the denture base in 58% of patients in the experimental group.

Cost information
Two of the included studies reported reduced cost of implant-supported/implant-assisted removable partial dentures when compared with implant-supported fixed prostheses.

Authors' conclusions
Implant-assisted or supported-removable partial dentures might provide a simple, economical, and less invasive treatment modality for patients with partially edentulous arches.

CRD commentary
The research question was clearly expressed, and the inclusion criteria were broad. Searching included several relevant data sources and attempts were made to minimise publication bias. The restriction to studies in the English language meant that language bias could not be ruled out. Sufficient attempts were made to minimise error and bias in the processes of study selection and data extraction.

The lack of any formal validity assessment meant that the reliability of the included studies and their synthesis was unclear. The dominance of uncontrolled studies suggested that study quality may have been less than optimum. Included studies contained small numbers of participants. Most of the studies were uncontrolled case reports or series, so it was not possible to determine how the conclusions were reached in terms of comparisons with other modalities. The variation in the intervention (how implants were assisted or supported) meant that it was unclear how aspects of the intervention contributed to the findings.

Given the above concerns, the reliability of the authors' conclusion is uncertain.

Implications of the review for practice and research
Practice: The authors stated that implant-supported and implant-assisted removable partial dentures may be a possible treatment option for patients with partially edentulous arches. However, they acknowledged that for many patients, this option may not be economically feasible.

Research: The authors stated long-term RCTs are needed to validate the use of supported and assisted implants to the removable partial dentures in patients with bilateral distal-extension partial edentulism.

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