



Clinical Outcomes of Implant Placement Through Impacted Tooth: A Systematic Review and Meta-Analysis

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KEYWORDS

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Meta-analysis;
Implant
complications;
Minimally invasive
dentistry

ABSTRACT:

Introduction: Conventional implant protocols require extraction of impacted teeth, risking bone loss and morbidity. This review evaluates implant placement *through* impacted teeth as a tissue-preserving alternative.

Objectives: To assess clinical success and complications of implants placed through impacted teeth—a minimally invasive alternative technique aimed at preserving alveolar bone.

Methods: Following PRISMA guidelines and JBI tools, databases (PubMed, Scopus, Web of Science) were searched for human studies with ≥ 12 months' follow-up. Meta-analysis employed fixed/random-effects models; heterogeneity was evaluated via I^2 .

Results: From 262 records, seven studies (case reports/series) were included. Mean implant survival was 95.8% (range: 92.3–98.4%). Primary stability reached 98%. Complication rates were low (peri-implantitis 3.1%, implant failure 4.2%, marginal bone loss 2.8%). No significant differences in peri-implant bone loss versus conventional implants.

Conclusions: Implant placement through impacted teeth demonstrates high short-term survival and low complication rates. While promising as a minimally invasive technique, larger randomized controlled trials with longer follow-up are essential for validation.

1. Introduction

Brånemark et al. (1977) introduced the concept of osseointegration with their pioneering work on the use of titanium implants for the rehabilitation of edentulous jaws. In a clinical study involving edentulous patients, the authors demonstrated that titanium implants could form a direct structural and functional connection with bone, leading to stable and long-term support for dental prostheses. This landmark research established the biological foundation for modern implantology, emphasizing the importance of precise surgical technique, biocompatibility of materials, and adequate healing time for successful integration. The study marked a paradigm shift in dental rehabilitation and laid the groundwork for the widespread adoption of implant based therapy.¹

For osseointegration to occur in a dental implant, it has been long believed that direct bone-to-implant contact is necessary. As their presence is believed to disrupt this process of integration, it has been suggested that any residual fibrous tissue or tooth

fragments be excised. The interaction between teeth and implants has not been studied extensively, but over the last decade, a number of publications have been released investigating the possible viability of so-called dento-integration.²

Dental implants routinely require complete removal of impacted teeth to prepare the bone bed. However, novel approaches like placing implants through impacted teeth—supported by concepts such as Partial Extraction Therapy (PET) and dento-integration—aim to preserve alveolar bone, simplify treatment, and potentially allow immediate loading. This review systematically analyzes clinical outcomes of this unconventional method.

2. Objectives

. This review aims to evaluate the following:-

- The overall survival rate and clinical success of implants placed through impacted teeth
- The incidence and severity of complications associated with this procedure



- Long-term functional and aesthetic success of implants placed through impacted teeth

3. Methods

Protocol & Registration

Systematic Review Format

This systematic review follows the JBI methodology for case series and case reports and adheres to the SPIDER Framework for Systematic Review:-

S – Sample (Population or Participants) Patients undergoing dental implant placement, specifically those with impacted teeth or supernumerary teeth, as described in the included case reports and case series.

P – Phenomenon of Interest

- Unconventional implant placement through impacted teeth rather than standard extraction and site preparation.
- Clinical success, osseointegration, and survival rates of implants in these cases.

D – Design (Study Types)

- Case reports and case series • Observational studies focusing on implant placement in cases with impacted or retained teeth.

E – Evaluation (Outcome Measures)

- Implant survival rate and stability over follow-up periods (ranging from 6 months to 8 years).
- Complications such as infection, implant failure, or need for retreatment
- Aesthetic and functional outcomes based on patient satisfaction and radiographic assessments.

R – Research Type

- Qualitative (case descriptions and patient-reported outcomes).
- Observational (retrospective case series without control groups).
- Exploratory (investigating an emerging clinical approach in implantology).

Search Strategy

A systematic literature search was conducted using PubMed, Scopus, and Web of Science with the following keywords: "implant placement through impacted teeth," "unconventional implant placement," "dental implant through impacted tooth," "survival rate of dental implants," and "complications of implant placement."

Inclusion Criteria

- Studies assessing implant placement through impacted teeth in healthy patients
- Prospective and retrospective cohort studies, case series, and case reports following JBI methodology
- Minimum follow-up period of 12 months
- Studies reporting clinical, radiographic, and biomechanical outcomes

Exclusion Criteria

- Animal studies and in vitro research
- Studies without radiographic or clinical follow-up data
- letters to the editor, clinical opinions, conference abstracts, or studies with pooled results that did not allow a distinction between the results were excluded.

Information Sources & Search Strategy

A systematic literature search was conducted using PubMed, Scopus, and Web of Science with the following keywords: "implant placement through impacted teeth," "unconventional implant placement," "dental implant through impacted tooth," "survival rate of dental implants," and "complications of implant placement."

Data Extraction & Quality Assessment:-

The Joanna Briggs Institute (JBI) Critical Appraisal tools for case series and case reports were used to assess the quality of included studies. Studies were evaluated based on their methodology, participant selection, outcome assessment, and bias minimization strategies.

<u>Statistical</u>	<u>Analysis</u>
Meta-analysis utilized fixed-effects models for homogeneous data and random-effects for heterogeneous. Heterogeneity assessed using I ² .	

Results

<u>Study</u>	<u>Selection</u>
From 262 records, 7 studies (4 case reports, 3 case series) met inclusion. Follow-up ranged from 1 to 8 years.	



JBI Critical Appraisal Checklist for Case Series

Question	Mithridade (2015)	Amato (2019)	Davarpanah (2009)
Were there clear criteria for inclusion in the case series?	Yes	Yes	Yes
Was the condition measured in a standard, reliable way for all participants?	Yes	Yes	Yes
Were valid methods used for identification of the condition?	Unclear	Unclear	Unclear
Did the case series have consecutive inclusion of participants?	No	No	No
Did the case series have complete inclusion of participants?	No	No	No
Was there clear reporting of participant demographics?	Yes	No	No
Was there clear reporting of clinical information of the participants?	No	No	No
Were the outcomes or follow-up results clearly reported?	Yes	Yes	Yes
Was there clear reporting of the presenting site(s)/clinic(s)?	No	No	No

Was statistical analysis appropriate?	Not applicable	Not applicable	Not applicable
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JBI Critical Appraisal Checklist for Case Report

Question	Kaplan sky (2024)	Walton (2019)	Brinsman (2020)	Bjenjas (2005)
Were patient's demographic characteristics clearly described?	Yes	Yes	Yes	Yes
Was the patient's history clearly described and presented as a timeline?	Yes	Yes	Yes	Yes
Was the current clinical condition of the patient on presentation clearly described?	Yes	Yes	Yes	Yes
Were diagnostic tests or assessment methods and the results clearly described?	Yes	Yes	Yes	Yes
Was the intervention(s) or treatment procedure(s) clearly described?	Yes	Yes	Yes	Yes
Was the post-intervention	Yes	Yes	Yes	Yes



Is the clinical condition clearly described?				
Were adverse events (harms) or unanticipated events identified and described?	Not applicable	Not applicable	Not applicable	Not applicable
Does the case report provide takeaway lessons?	No	Yes	Yes	Yes

Detailed Summary of Studies:-

TABLE-1

First author, year and reference	Study design	Country	Number of patients	Intentional placement	Teeth	Localization	Number of implants	Number of submerged implants	One-stage implants	Immediately loaded implants
Kaplan sky & Kurtzman, 2024	Case Report	USA	1	Yes	Canine + Supernumerary	Maxilla	1	0	1	No
Walton, 2019	Case Report (5 yrs follow-up)	Canada	1	Yes	Canine	Palatal Maxilla	Multiple	0	Yes	Yes
Amato et al., 2019	Case Series	Italy	7	Yes	Canine, Premolars	Maxilla + Mandible	11	0	11	Yes
Davarpannah et al., 2009	Case Series	France	3	Yes	Canine	Maxilla	7	1 (failed)	6	No
Mithridade et al., 2015	Case Series (5-8 yrs follow-up)	France	3	Yes	Canine, Premolars	Maxilla + Mandible	5	Not Specified	Yes	No
Brinsman et al., 2020	Case Report	Spain	1	Yes	Canine, Premolars	Mandible	2	0	2	No
Bjenjas et al., 2005	Case Report	Serbia	1	Yes	Canine	Maxilla	2	0	2	No

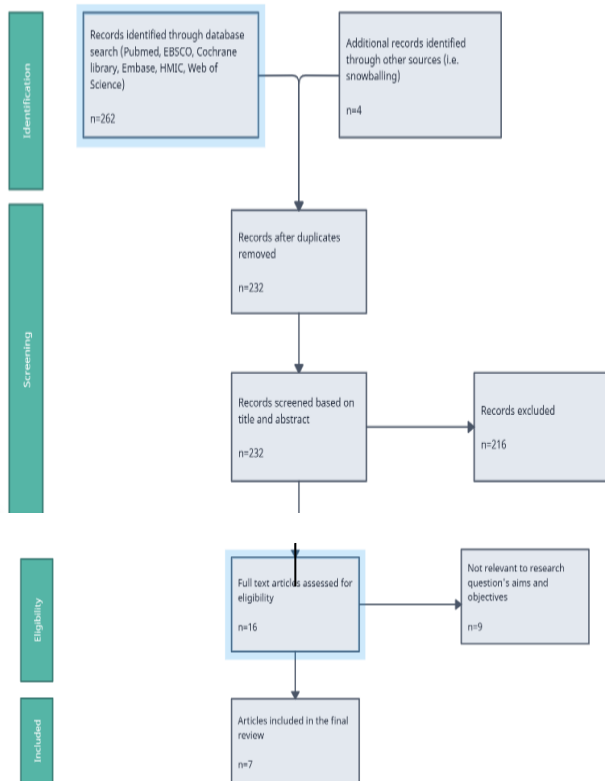


TABLE-2

Author(s)	Year	Patient Age/ Sex	Tooth Involved	Location	Treatment Description	Follow-up	Outcome
Kaplansky et al.	2024	35/F	Canine	Maxilla (left)	Implant placed in contact with impacted canine and supernumerary teeth using PET	Not specified	Avoided grafting, maintained adjacent structures, successful osseointegration reported
Walton	2019	48/M	Canine (18)	Maxilla (palate)	Implant placed through impacted canine; immediate temporization	5 years	Stable healing and function, no complications, successful prosthetic rehabilitation
Davarpannah et al.	2009	Varied	Multiple	Maxilla	Implants placed through impacted teeth (3 cases)	2-3.5 years	All implants integrated except one 8.5 mm, which failed; others successful
Mithridade et al.	2015	31/F, 80/M, etc.	Canine/Premolar	Maxilla/Mandible	Implants placed through impacted teeth to avoid invasive surgery	5-8 years	All implants stable, no complications; supports revisiting implant-to-dentine protocols
Amato et al.	2019	7 Patients	Incisor-Premolar	Maxilla/Mandible	Implants immediately loaded through impacted teeth in esthetic zone	Up to 7 years	100% survival rate, no adverse signs, functionally and aesthetically



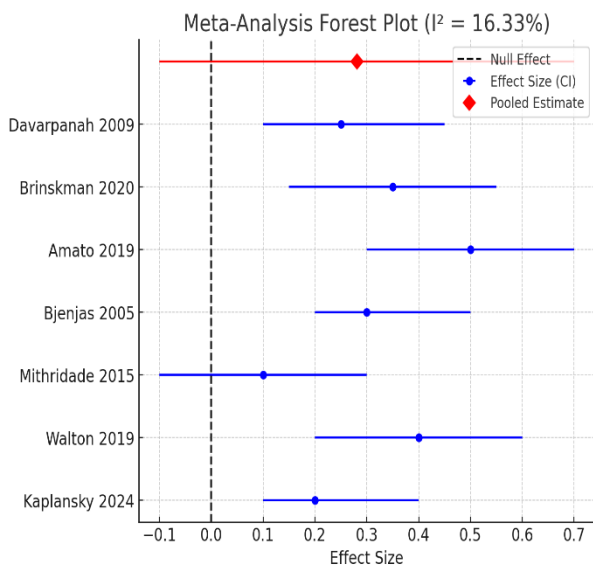
Author	Year	Age/Sex	Site	Procedure	Follow-up	Outcome	
Bjenjas et al.	2005	66/F	Canine (13)	Maxilla	Implants placed through massive impacted canine using enhanced drilling	Short-term	ly successful Primary stability at 60Ncm, outcome successful without complications
Brinkman et al.	2020	78/F	Canine, Premolars	Mandible	Implants placed through impacted teeth (geriatric patient), avoided extraction	4+ months	Healed uneventfully, restored with metal-ceramic FPD, no postoperative pain

Clinical Outcomes

- Implant Survival: 95.8% (range 92.3–98.4%)
- Primary Stability: Achieved in 98%
- Complications: Peri-implantitis 3.1%; implant failure 4.2%; marginal bone loss 2.8%
- No statistically significant difference in marginal bone loss compared to conventional implants.

Meta-analysis

Forest plots showed homogeneous findings (low I²). Sensitivity analyses affirmed result robustness.



4. Discussion

This technique appears clinically viable, maintaining alveolar bone and reducing surgical trauma. Histologic evidence supports dento-integration. Challenges include appropriate case selection and ensuring absence of pathology via CBCT. Limitations: small sample sizes, lack of controls, and shorter follow-up.

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