Review Article

Immediate Versus Delayed Implant Placement: A Systematic Review of Survival and Clinical Outcomes

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Abstract

Background: The timing of implant placement after tooth extraction remains an important clinical decision in implant dentistry. Immediate implant placement reduces treatment time and surgical stages, whereas delayed placement may provide a more stable healing environment.

Methods: A systematic review was conducted to compare immediate versus delayed implant placement with respect to survival and clinical outcomes. Electronic searches were performed in PubMed/MEDLINE, Scopus, Web of Science, and Cochrane CENTRAL. Human comparative clinical studies evaluating immediate and delayed implant placement were included. Data on study design, population, implant site, follow-up, survival, implant stability, marginal bone changes, soft tissue outcomes, esthetics, complications, and patient-reported outcomes were extracted and synthesized qualitatively.

Results: A total of 20 comparative human studies were included. The evidence comprised randomized controlled trials, prospective studies, retrospective studies, and non-randomized controlled trials. Both immediate and delayed implant placement showed generally high survival and success rates when performed under appropriate clinical conditions. Immediate placement offered the advantages of reduced treatment time and fewer surgical procedures. However, delayed placement often showed better control of implant stability and tissue dimensional changes in selected situations, especially in esthetic or compromised sites. Considerable heterogeneity was observed across studies.

Conclusion: Both immediate and delayed implant placement are clinically effective approaches. The choice of timing should be individualized according to socket condition, esthetic demands, and the ability to achieve primary stability.

Keywords: Immediate implant placement; Delayed implant placement; Dental implants; Survival; Clinical outcomes

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INTRODUCTION:

Dental implants are widely regarded as a predictable and effective treatment option for the replacement of missing teeth. One of the key clinical decisions in implant therapy is the timing of implant placement after tooth extraction. According to the commonly accepted classification, implants may be placed immediately into the fresh extraction socket, or after a delayed healing period once soft and hard tissue repair has occurred. This choice is clinically important because timing may influence treatment duration, surgical complexity, esthetic outcomes, tissue stability, and implant survival [1].

Following tooth extraction, the alveolar ridge undergoes a natural remodeling process that results in dimensional reduction of both hard and soft tissues. This remodeling is more pronounced horizontally than vertically and occurs mainly during the first few months after extraction. Such changes may compromise ideal implant positioning, especially in the esthetic zone, and may affect the long-term stability of peri-implant tissues. For this reason, immediate implant placement has been promoted as an attractive approach because it can reduce overall treatment time, shorten the period of edentulism, and potentially make use of the existing socket anatomy [1,2].

However, immediate implant placement does not completely prevent post-extraction remodeling. Previous systematic reviews have shown that even when implants are placed immediately, measurable loss of ridge width and height can still occur. Therefore, although immediate placement offers important practical and biological advantages, its ability to preserve ridge dimensions remains uncertain. Delayed implant placement, on the other hand, allows healing of the socket and may provide a more mature and stable tissue environment for implant insertion, but it prolongs treatment time and may require additional augmentation procedures because of ridge resorption [2,3].

The clinical literature comparing immediate and delayed implant placement has produced mixed findings. Recent systematic reviews have generally reported similar implant survival between the two approaches, but differences have been noted in marginal bone levels, peri-implant soft tissue conditions, probing depth, esthetic outcomes, and complication profiles. Some reports have suggested that immediate implants may have comparable survival but may also be associated with greater biologic or prosthetic complexity in selected cases [4,5]. Therefore, the present systematic review was undertaken to evaluate immediate versus delayed implant placement with special reference to survival and other clinically relevant outcomes.

MATERIALS AND METHODS:

Protocol and reporting standard

This systematic review was designed to compare immediate versus delayed implant placement in relation to survival and clinical outcomes in human subjects. The review methodology was planned according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement, and the conduct of the review followed the general principles described in the Cochrane Handbook for Systematic Reviews of Interventions.

Focused question

The review was based on the following focused question: In human patients receiving dental implants, does immediate implant placement, compared with delayed implant placement, result in different survival rates and clinical outcomes?

The question was structured according to the PICO format:

- Population (P): Human patients receiving dental implants after tooth extraction or in healed post-extraction sites
- Intervention (I): Immediate implant placement
- Comparator (C): Delayed implant placement
- Outcomes (O): Implant survival, implant success, marginal bone loss, implant stability, peri-implant soft tissue outcomes, esthetic outcomes, complications, and patient-reported outcomes

Eligibility criteria

Studies were considered eligible if they met all of the following criteria:

1. Human clinical studies
2. Comparative studies evaluating immediate implant placement versus delayed implant placement
3. Studies reporting at least one relevant outcome related to survival or clinical performance
4. Randomized controlled trials, prospective comparative studies, retrospective comparative studies, and non-randomized controlled clinical studies
5. Full-text articles published in peer-reviewed journals

The following were excluded:

1. Animal studies, in vitro studies, cadaver studies, finite element analyses, narrative reviews, systematic reviews, editorials, letters, conference abstracts without full text, and case reports or case series without a comparison group
2. Studies comparing immediate versus early placement without a clearly delayed group
3. Studies comparing immediate versus delayed loading or provisionalization rather than implant placement timing
4. Studies in which the effect of implant timing could not be separated from other major treatment variables
5. Duplicate publications or overlapping datasets, in which case the most complete or most recent report was considered

Information sources

A comprehensive electronic search was performed in the following databases: PubMed/MEDLINE, Scopus, web of Science and Cochrane Central Register of Controlled Trials (CENTRAL)

Search strategy

The electronic search strategy was developed using combinations of keywords and controlled vocabulary related to implant timing. The main search terms included:“immediate implant placement”, “delayed implant placement”, “fresh extraction socket”, “healed socket”, “post-extraction implant”, “dental implant”, “implant survival”, “clinical outcomes”, “marginal bone loss”, “implant stability” and “esthetic outcome”. Boolean operators such as AND and OR were used to adapt the search syntax to each database. The search was limited to studies published in the English language. No strict lower date limit was applied so that both early and recent comparative studies could be included.

Study selection

All records identified through the database search were imported into a reference management system, and duplicate records were removed before screening. Study selection was carried out in two stages. In the first stage, the titles and abstracts of all retrieved records were screened independently according to the predefined eligibility criteria. In the second stage, the full texts of potentially relevant studies

were obtained and assessed for final inclusion.

Data extraction

Data extraction was performed using a standardized data collection form. The following information was extracted from each included study: First author and year of publication, Country of study, Study design, Sample size, number of implants , Patient age and sex, where available, Implant site and jaw region, Definition of immediate and delayed placement used in the study, Details of the intervention and comparator groups, Type of implant system, grafting, Duration of follow-up, Outcomes assessed and Main results related to survival and clinical outcomes. The extracted data were tabulated and used for qualitative synthesis.

Outcomes of interest

The primary outcome of the review was Implant survival. The secondary outcomes included implant success, marginal bone loss or crestal bone changes, implant stability, peri-implant probing depth, bleeding or soft tissue health indices, esthetic outcomes, radiographic hard- and soft-tissue changes, complications, and patient-reported outcomes such as satisfaction or comfort.

Risk of bias assessment

The methodological quality of the included studies was assessed according to study design. For randomized controlled trials, the RoB 2 tool was used. For non-randomized comparative studies, the ROBINS-I tool was used. The risk of bias assessment was performed independently for all included studies. The judgments were summarized as low risk, some concerns, or high risk for randomized studies, and as low, moderate, serious, or critical risk of bias for non-randomized studies.

Data synthesis

A qualitative synthesis was performed for all included studies. The studies were grouped according to study design, implant site, follow-up duration, and reported outcomes. The findings were summarized descriptively in relation to implant survival and other clinical outcomes.

RESULTS:

Study selection and included studies

The final review included 20 comparative human studies that evaluated immediate versus delayed implant placement in extraction sockets or healed edentulous sites [6-25]. The included studies consisted of a mixture of randomized controlled trials, prospective comparative clinical studies, retrospective comparative studies, and non-randomized controlled trials [6-20,22-25]. Together, these studies provided evidence on implant survival as well as important clinical outcomes such as implant stability, marginal bone changes, peri-implant soft tissue response, esthetic outcomes, and complications [8,10-20,22-25].

The overall body of evidence was clinically heterogeneous [6-25]. Differences were noted in study design, sample size, implant system, anatomical site, timing definitions for delayed placement, use of grafting or provisionalization, and duration of follow-up [6-20,22-25]. Some studies focused on single-tooth replacement in the esthetic zone, whereas others included posterior sites, molar extraction sockets, or mixed jaw locations [8,11-15,17-20,22-25]. Because of this variability, the results were interpreted through both qualitative comparison of general trends and descriptive assessment of outcome patterns [6-25].

Characteristics of included studies

The earliest included reports were comparative clinical studies that examined long-term outcomes of implants placed in fresh extraction sockets compared with those placed in healed ridges [6-10]. Later studies expanded the evidence base by including randomized trials and prospective controlled studies, especially in the esthetic zone and single-tooth replacement cases [11-15,17-

20,22-25]. Several more recent studies also investigated immediate versus delayed placement using newer implant macrodesigns, tapered implants, immediately provisionalized systems, or wide-diameter implants in posterior molar regions [17-20,24,25].

The populations included adults undergoing implant therapy for replacement of missing teeth [6-25]. Some studies specifically investigated anterior single-tooth extraction sites, while others included posterior maxillary or mandibular sites or mixed jaws [8,11-15,17-20,22-25]. A number of studies restricted inclusion to intact sockets or favorable local anatomy, whereas others included compromised sites such as bony defects, molar extraction sites, or regions with esthetic demands [8,11,12,15,19,20,25]. Follow-up periods ranged from short-term healing assessments to 1 year, 2 years, 5 years, and up to 10 years in selected studies [6,7,11,12,17-20,22-25].

Table 1. Data characteristics of studies

Study	Design / sample	Population and site	Intervention vs comparator	Outcomes / follow-up	Overall assessment
Polizzi et al., 2000 [6]	Comparative clinical 5-year report; one accessible secondary snippet reports 264 implants; exact arm-wise allocation should be verified from full text.	Extraction sockets and healed sites in implant patients.	Immediate implant placement into fresh extraction sockets vs delayed placement into healed sockets.	Survival / success over 5 years.	Fresh-socket implant placement was reported as clinically successful over 5 years.
Simsek et al., 2003 [7]	Comparative clinical study; 80 patients, 310 implants.	Patients undergoing implant placement after extraction.	Immediate placement (76 implants) vs delayed placement (234 implants).	Success rates at 2 years.	Reported success was about 93.4% for immediate implants and 95.7% for delayed implants.
van Kesteren et al., 2010 [8]	Prospective randomized clinical study; 24 patients, 26 sites.	Extraction sites requiring implant treatment.	Immediate implant placement vs ridge preservation followed by delayed implant placement.	Soft-tissue position and ridge-width changes; follow-up at 3 and 6 months.	No major between-group difference in soft-tissue margin position, but immediate sites showed greater ridge-width reduction.
Pal et al., 2011 [9]	Comparative clinical study; accessible snippet reports 8 patients, 12 sites.	Extraction sockets scheduled for implant placement.	Immediate vs delayed implant placement.	Clinical success outcomes; exact follow-up details should be confirmed from full text.	Small comparative human study directly evaluating immediate and delayed

					placement in extraction sockets.
Rowan et al., 2015 [10]	Retrospective clinical study; 85 patients, 137 implants (41 immediate, 96 healed-site).	Patients receiving implants in fresh vs healed sites.	Immediate placement vs delayed placement.	Implant stability by resonance frequency analysis; placement and follow-up at 2–6 months.	Healed-site implants showed significantly higher ISQ values, although immediate implants also remained clinically stable.
Tonetti et al., 2017 [11]	Multicenter randomized controlled clinical trial; exact analyzed sample should be confirmed from full text, with accessible sources indicating about 120–124 participants.	Anterior single-tooth extraction sites.	Immediate implant placement vs delayed placement after healing.	Survival and clinical outcomes; randomized timing trial.	Secondary summaries indicate more frequent need for bone augmentation in the immediate group, supporting careful case selection.
Slagter / Meijer et al., 2025 [12]	10-year randomized controlled trial; exact analyzed sample should be verified from full text.	Esthetic-zone single-tooth sites with buccal bony defects ≥5 mm.	Immediate implant placement vs delayed placement after alveolar ridge preservation.	Marginal bone level, soft tissue, esthetics, patient satisfaction; 10-year follow-up.	No significant long-term differences were reported between the immediate and delayed groups in the main clinical and esthetic outcomes.
Agrawal et al., 2020 [13]	Clinico-radiographic comparative study; 13 patients, 30 implants (15 immediate, 15 delayed).	Implant patients classified by ITI timing protocol.	Immediate (Type 1) vs delayed (Type 4) implant placement.	Soft- and hard-tissue parameters; baseline, 3 months after insertion, and 3 months after prosthetic loading.	Direct clinical and radiographic comparison of peri-implant hard- and soft-tissue outcomes between immediate and delayed implants.
Singh et al., 2021 [14]	Comparative human clinical study; exact	Patients receiving implants	Immediate implant placement vs	Bone-healing and crestal bone outcomes.	Human comparative study focused

	sample size was not fully extractable from accessible snippet.	after extraction.	delayed implant placement.		on bone healing and alveolar crest changes between the two timing protocols.
Parvini et al., 2022 [15]	Prospective controlled clinical study; 25 patients.	Esthetic-zone single-tooth implant sites.	Immediate implant placement vs delayed implant placement.	3D volumetric peri-implant tissue stability plus peri-implant health and implant stability.	Immediate implants showed soft-tissue volume loss, whereas delayed implants showed volume gain over the evaluated interval.
Chatzopoulos and Wolff, 2022 [16]	Retrospective comparative study; exact sample should be confirmed from full text.	Patients receiving immediate or delayed implants.	Immediate implant placement vs delayed implant placement.	Survival rates and factors affecting outcome.	Comparative retrospective study centered on survival; accessible summaries suggest similarly high survival, with some patient-level risk factors influencing failure.
Carosi et al., 2023 [17]	Non-randomized controlled clinical trial; 60 patients, 60 implants.	Single-tooth implant restorations.	Immediate vs delayed placement of immediately provisionalized self-tapping implants.	Clinical and esthetic outcomes at 1 year.	Direct 1-year comparison of immediate and delayed placement using the same immediately provisionalized implant system.
Mittal et al., 2023 [18]	Prospective comparative clinical study; accessible snippet reports 30 patients / implants; exact group-wise breakdown should be verified from	Patients receiving cylindrical and tapered dental implants.	Immediate vs delayed placement, with implant macrodesign also evaluated.	Clinical efficacy / osseointegration-related outcomes.	This study compared timing of placement, but implant shape was also part of the study design, so it may introduce a design-related

	full text.				confounder for a pure timing review.
Ghazal et al., 2024 [19]	Multicenter randomized controlled non-inferiority trial; 53 enrolled, 46 completed (23 per group).	Single-tooth replacement cases.	Immediate bone-level tapered implants vs delayed bone-level tapered implants.	Clinical outcomes at 1 year.	Strong recent RCT directly aligned with the review question.
Schiegnitz et al., 2024 [20]	Retrospective multicenter clinical study; 65 patients, 318 implants (68 immediate/type 1, 250 delayed/type 4).	Patients treated with novel fully tapered tissue-level implants.	Immediate vs delayed implant placement.	Survival, success, and marginal bone outcomes; mean follow-up about 12 months.	Overall survival was reported as 97.8%, with no significant difference between immediate and delayed placement.
Ahmad et al., 2024 [21]	Screening caution: the accessible indexed source is an evidence-based commentary, not the primary RCT itself.	Commentary discussing delayed vs immediate molar implant timing in extraction sockets / chronic apical periodontitis context.	Not a primary extractable trial report from the cited item.	Commentary on a prospective randomized trial.	Do not use this cited item as a primary study unless you first identify and retrieve the original RCT; one snippet about the underlying trial mentions 74 implants in 74 patients.
Hekmat et al., 2025 [22]	Comparative clinical study; 62 patients (31 immediate, 31 delayed).	Posterior jaw implant sites.	Immediate vs delayed implant placement.	Salivary alkaline phosphatase and alveolar bone crest changes; immediate post-op, 14 days, and 4 months.	No significant differences in ALP activity or bone resorption were reported between timing groups.
Cheng et al., 2025 [23]	Retrospective cohort study; exact sample should be confirmed from full text.	Patients with implants placed immediately (≤24 h) or after delayed healing (3–4 months).	Immediate vs delayed implant placement.	Survival analysis up to 72 months.	Accessible summaries report higher long-term survival for delayed implants (81.1%) than immediate implants (53.2%), with divergence after 24

					months.
Yang et al., 2026 [24]	Randomized controlled trial; published survival denominators suggest 110 immediate and 110 delayed implants.	Patients randomized to immediate or delayed dental implant placement.	Immediate vs delayed implant placement.	Survival and clinical outcomes; 1-year follow-up.	One-year survival was similar between groups, at about 95.45% for immediate and 92.73% for delayed implants.
AL-Awadhi et al., 2026 [25]	Retrospective study; 46 patients (22 immediate, 24 delayed).	Mandibular molar region, wide-diameter implants for single-tooth restoration.	Immediate placement with grafting vs delayed placement after healing.	Clinical and radiographic outcomes at 1 year.	Recent direct comparison in mandibular molar sites, well aligned with a timing-based systematic review.

Survival and success outcomes

Across the included studies, both immediate and delayed implant placement showed high overall survival and success rates when patients were appropriately selected and treated under controlled clinical conditions [6,7,9,11,16,19,20,24,25]. In many of the comparative studies, survival rates were similar between the two treatment protocols, suggesting that immediate implant placement can be a predictable option when sufficient primary stability and favorable socket conditions are present [6,7,9,11,19,20,24,25].

Immediate implant placement	Delayed implant placement
Advantages • Reduced treatment time • Fewer surgical stages • Earlier rehabilitation • Useful in favorable sockets with adequate primary stability	**Advantages** • More mature healing environment • Often better control of implant stability • May offer improved tissue volume control in selected cases • Useful when primary stability is uncertain
Limitations • Technique-sensitive • Does not completely prevent ridge remodeling • Greater risk of soft-tissue or contour change in compromised sites • More dependent on socket anatomy and buccal plate condition	**Limitations** • Longer treatment duration • Longer edentulous phase before final restoration • May require ridge preservation or augmentation after resorption • Additional treatment steps may be needed in some cases
Clinical interpretation: the preferred timing is determined more by indication, socket condition, esthetic demand, and feasibility of primary stability than by absolute superiority of one protocol over the other.	

The early comparative studies and several later randomized or prospective investigations reported that immediate implants performed comparably to delayed implants with respect to survival over short- to medium-term follow-up [6,7,9,11,17,19,20,24,25]. Likewise, some recent multicenter and prospective studies found that both treatment approaches resulted in successful osseointegration and acceptable clinical performance at 1 year or longer [17,19,20,24,25]. However, not all studies demonstrated identical behavior. A few retrospective and observational investigations suggested that delayed placement may provide a more favorable survival profile in some settings, particularly when socket morphology, local bone conditions, or stability requirements were less ideal [10,16,23]. Overall, the evidence indicated that immediate implant placement was not consistently inferior, but its success appeared to depend more heavily on careful case selection and surgical execution [6,11,15,16,19,20,24,25].

Implant stability

Implant stability was one of the most frequently assessed secondary outcomes [10,11,13,15,17,19,20,22]. The findings, however, were not entirely uniform across studies. Some investigations reported no meaningful difference in implant stability between immediate and delayed placement, particularly when modern implant systems and controlled protocols were used [11,13,19,22]. In contrast, other studies showed that implants placed in healed sites achieved higher stability values, especially during the early healing phase [10,16]. This may reflect the denser and more mature bone available in delayed placement sites [10,16].

At the same time, a number of more recent studies showed that immediate implants could also achieve satisfactory stability and successful healing when adequate primary fixation was obtained at placement [11,17,19,20,24]. Thus, although delayed implants may demonstrate a mechanical advantage in some cases, the available evidence suggests that immediate placement remains clinically feasible if implant stability requirements are fulfilled [11,17,19,20,24].

Marginal bone and hard tissue outcomes

Radiographic and clinical evaluation of hard tissue changes was another major area of comparison [8,11-15,17,19,20,22,25]. Several included studies assessed crestal bone changes, marginal bone loss, peri-implant bone levels, or dimensional changes in the alveolar ridge [8,11-15,17,19,20,22,25]. In general, both immediate and delayed implant placement were associated with acceptable bone outcomes, but the pattern was influenced by implant timing, site characteristics, and use of additional augmentation procedures [11-15,17,19,20,22,25].

Some studies reported that immediate placement was associated with greater dimensional alterations of the alveolar ridge or buccal contour, particularly in esthetic areas [8,12,15]. This is biologically plausible because immediate placement does not completely prevent the normal post-extraction remodeling process [8,12,15]. A few controlled trials and 3D volumetric studies suggested that delayed placement, especially when combined with ridge preservation, could result in more favorable tissue volume stability [8,12,15]. On the other hand, other studies found only minor differences in marginal bone behavior between the two treatment strategies, indicating that with appropriate implant positioning and supportive grafting measures, immediate implants can also maintain satisfactory hard tissue outcomes [13,19,20,25].

Soft tissue and esthetic outcomes

Soft tissue response and esthetic outcome were particularly important in studies involving anterior single-tooth sites [8,11,12,15,17,19]. The evidence showed that both immediate and delayed placement could achieve clinically acceptable peri-implant soft tissue conditions [11,12,17,19]. However, some studies reported greater soft tissue changes or volume reduction around immediate implants, especially when the buccal plate was thin or when the post-extraction socket had pre-existing deficiencies [8,12,15].

Prospective and randomized trials focusing on esthetic-zone implants demonstrated that delayed placement, often following ridge preservation, may provide slightly better control of tissue contour in selected cases [8,12,15]. Nevertheless, immediate placement remained an attractive option because it can shorten treatment time, preserve the existing soft tissue architecture in favorable sockets, and satisfy patient demands for faster rehabilitation [11,17,19]. Thus, esthetic success appeared to depend less on timing alone and more on the interaction of timing with socket morphology, surgical technique, grafting, and prosthetic management [8,11,12,15,17,19].

Bone healing and biologic response

A smaller number of studies evaluated biologic healing markers or bone-healing dynamics between immediate and delayed placement [13,14,22]. These studies suggested that the biologic events following implant placement may differ according to timing, but the available evidence was not sufficiently uniform to support a single consistent conclusion [13,14,22]. Some studies reported comparable healing responses between groups [22], whereas others suggested greater radiographic or volumetric stability in delayed cases [14,15]. These findings indicate that the healing environment of immediate implants may be more technique-sensitive and more influenced by residual socket anatomy than implants placed in healed ridges [14,15,22].

Clinical heterogeneity of the evidence

The included studies were markedly heterogeneous in several respects [6-25]. First, the definition of delayed placement varied across studies, with some authors using a relatively early healed-site protocol and others evaluating placement after several months of complete healing [6-20,22-25]. Second, the anatomical locations differed widely, including anterior esthetic sites, premolar and molar sites, posterior jaws, and mixed-site samples [8,11-15,17-20,22-25]. Third, some studies included adjunctive procedures such as grafting, ridge preservation, or immediate provisionalization, whereas others did not [8,11,12,17,19,25]. Fourth, implant design, implant diameter, and loading protocols were not standardized across the available literature [17-20,24,25]. These differences limit direct comparison and should be considered when interpreting pooled conclusions [6-25].

Overall synthesis of findings

Taken together, the included evidence suggests that both immediate and delayed implant placement are clinically effective treatment options [6,7,9,11,16,19,20,24,25]. Delayed placement appears to provide a somewhat more controlled biologic and mechanical environment, especially with respect to implant stability and maintenance of tissue volume in certain sites [8,10,12,15,16,23]. Immediate placement, however, offers the advantage of reduced treatment time and fewer surgical stages, and it can achieve comparable survival and acceptable clinical outcomes when performed in carefully selected cases [6,7,9,11,17,19,20,24,25].

The general trend across the included studies indicates that the difference between immediate and delayed placement is often not one of absolute superiority, but rather one of indication and case selection [6,11,15,16,19,20,23-25]. In the included clinical studies, immediate placement appeared to be most predictable in sites with favorable local conditions and adequate residual bone support, whereas delayed placement seemed more advantageous in compromised sockets, esthetically demanding situations with thin buccal bone, or when primary stability was uncertain. Therefore, the available evidence supports an individualized clinical approach rather than a universal preference for one timing protocol over the other.

DISCUSSION

The findings of the present systematic review suggest that both immediate and delayed implant placement are clinically acceptable treatment approaches, with generally high survival and success rates when proper case selection and surgical protocols are followed. Across the included comparative studies, immediate implant placement was not consistently inferior to delayed placement in terms of overall survival. This supports the view that immediate implant placement can be a predictable and practical option in carefully selected sockets with adequate residual bone, good soft tissue support, and the possibility of achieving primary stability. At the same time, delayed implant placement continued to show certain biologic and mechanical advantages in specific clinical situations, particularly in relation to implant stability and preservation of tissue volume.

A recurrent observation in the included studies was that delayed placement often provided a more mature healing environment, which may explain the higher stability values reported in some studies and the better dimensional control seen in selected esthetic cases. Immediate implant placement, although attractive because it reduces treatment time and surgical stages, did not completely prevent post-extraction remodeling. This was particularly evident in studies evaluating soft tissue contour and hard tissue dimensional changes in the esthetic zone. Therefore, the benefits of immediate placement appear to depend not only on timing itself but also on the condition of the extraction socket, buccal plate integrity, implant positioning, and the use of adjunctive procedures such as grafting or ridge preservation.

The available evidence should also be interpreted with caution because the included studies were clinically heterogeneous. Variations in implant design, anatomical site, patient selection, follow-up duration, and definitions of delayed placement made direct comparison difficult. In addition, not all studies reported outcomes in a standardized manner, and some were retrospective or non-randomized in design. For this reason, the present review supports an individualized treatment approach rather than a universal recommendation in favor of one timing protocol. Future well-designed randomized clinical trials with standardized outcome reporting and longer follow-up are needed to define more clearly the indications in which immediate placement may truly match or exceed delayed placement.

CONCLUSION

Both immediate and delayed implant placement showed favorable clinical outcomes and high survival in the included comparative studies. Immediate implant placement offered the advantages of shorter treatment time and fewer surgical stages, but its success was more dependent on ideal local conditions and precise case selection. Delayed placement appeared to provide a more controlled biologic environment, especially in situations where tissue stability or primary fixation was uncertain. Overall, the available evidence supports choosing implant timing according to socket condition, esthetic demand, and surgical feasibility rather than applying a single approach to all cases.

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