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Clinical Predictability and Soft Tissue Outcomes of Immediate Implants in the Esthetic Zone: A Systematic Review

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Introduction

Since their introduction, dental implants have profoundly transformed the field of dentistry, establishing themselves as a reliable and widely accepted solution for edentulous patients [1]. Over the years, a wide variety of implant designs-differing in shape, size, and surface characteristics—has been developed with the goal of enhancing osseointegration and long-term stability [2,3].

In the current era, where aesthetic demands are increasingly prioritized, clinicians face significant challenges when dealing with tooth loss in the anterior region, commonly referred to as the esthetic zone. The simultaneous loss of hard and soft tissues in this area not only complicates clinical management but also has psychological implications for patients [4]. This underscores the need for innovative strategies that restore both function and esthetics.

Immediate implant placement has emerged as a promising approach within this context. It allows for the placement of an implant immediately after tooth extraction, offering reduced treatment time and expedited smile rehabilitation [5]. Despite its advantages, immediate implant placement in the esthetic zone presents particular challenges, notably with respect to the preservation of peri-implant tissues and the maintenance of implant stability during the healing phase [6, 7].

The predictability of immediate implant outcomes in the esthetic zone remains a topic of ongoing debate, especially in relation to alveolar bone remodeling and soft tissue adaptation. Therefore, a key question persists: In patients receiving immediate implant placement in the anterior esthetic zone, does this protocol, compared to early or delayed implant placement, result in improved implant survival, reduced marginal bone loss, and better peri-implant soft tissue stability? [8].

To address this question, we conducted a systematic review following the IMRAD structure (Introduction, Methods, Results, and Discussion), aiming to thoroughly assess the impact of immediate implants in the esthetic zone on bone and soft tissue healing.

Materials and Methods

This systematic review was conducted by a multidisciplinary team composed of two associate professors, and one full professor. The review process was based on continuous collaboration and critical analysis of relevant scientific literature. The clinical question was formulated according to the PICO strategy (Population, Intervention, Comparison, Outcome), which is widely used to frame clinical questions and facilitate efficient and structured literature searches [9].

The application of this method allowed us to clearly define the research focus and select appropriate studies for inclusion. The question driving this review was: In patients receiving immediate implant placement in the anterior esthetic zone, does this protocol, compared to early or delayed implant placement, result in improved implant survival, reduced marginal bone loss, and better peri-implant soft tissue stability? The review protocol followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological transparency and consistency. Eligible study designs included systematic reviews, meta-analyses, randomized controlled trials, case-control studies, and both retrospective and prospective cohort studies, depending on availability in electronic databases. The formulation of the clinical question using the PICO framework is presented in Figure 1.

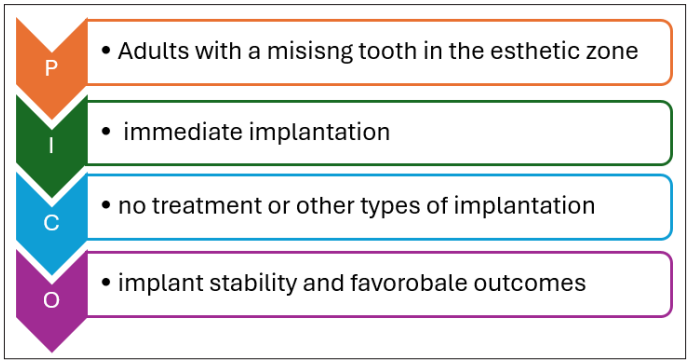

Figure 1: Clinical Question Structured using the PICO System

Search Strategy and Study Selection

A comprehensive electronic search was conducted across five major databases: ScienceDirect, PubMed, Wiley Online Library,

the Cochrane Library, and ClinicalTrials.gov. The search covered publications from 2012 to 2023 and was based on combinations of MeSH terms and Boolean operators, such as "immediate implants," "stability," "esthetic zone," and "bone resorption." These terms were adapted for each database to maximize retrieval efficiency. The search strategy was designed in accordance with the PRISMA guidelines to ensure transparency and methodological rigor.

Selection Studies

A total of 7320 articles was initially retrieved: 3132 from ScienceDirect, 3056 from Wiley Online Library, 254 from PubMed, 112 from the Cochrane Library, and 44 from ClinicalTrials.gov. These discrepancies reflect differences in the databases indexing criteria, thematic focus, and search capabilities.

To ensure relevance and quality, specific eligibility criteria were applied. Studies were included if they were published in English or French between 2012 and 2023 and addressed the clinical question of this review. Eligible study designs included randomized controlled trials, comparative or experimental studies, systematic reviews, and meta-analyses. Only research involving human subjects requiring replacement of one or more teeth in the esthetic zone was considered, provided there were no underlying bone pathologies that could impair healing. Studies were excluded if they were published before 2012, written in languages other than English or French, not directly related to the review question, inaccessible in full text, or categorized as book chapters, narrative reviews, clinical guidelines, animal studies, or investigations involving patients with bone-related diseases that might affect regeneration.

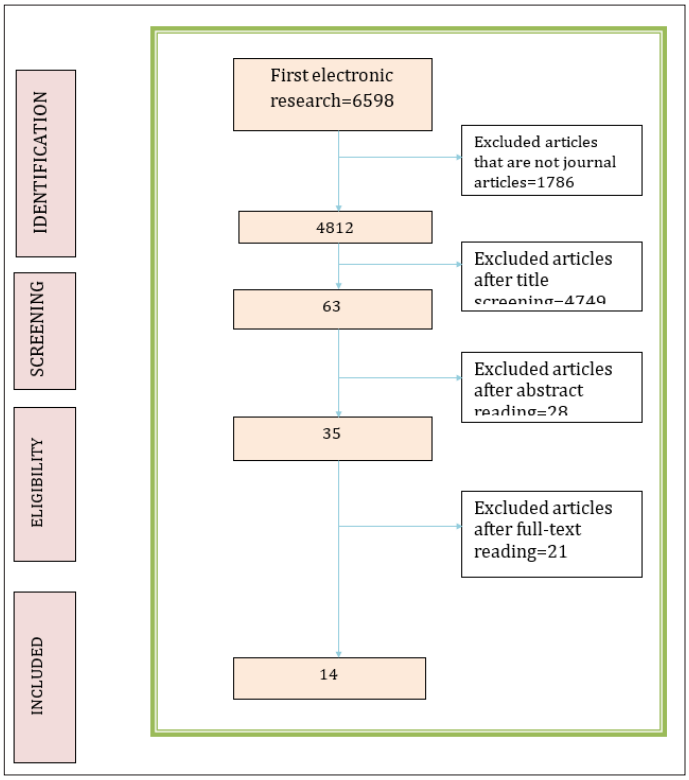

Figure 2: PRISMA's Flow Diagram for the Research Process

Critical Reading of Selected Articles

After initial screening of database results, including importing references, removing duplicates, and applying eligibility criteria, a full-text reading of selected articles was performed. Articles that passed the title and abstract screening stage were read in full by the review team and evaluated against the inclusion and exclusion criteria. A standardized screening tool was used to document decisions and identify studies suitable for inclusion in the systematic review.

Discrepancies in screening decisions were resolved through discussion and consensus among team members. According to Bettany-Saltikov it is essential to carefully document the entire screening process to ensure transparency and reproducibility. This includes recording the number of articles reviewed at each stage, the reasons for exclusion, and providing a summary of the final included studies with their key characteristics [10].

Data Extraction

The data were extracted from the included studies by three independent reviewers. A consensus meeting was conducted to validate the extracted information, and any disagreement was resolved through discussion. All data were compiled into a structured Excel spreadsheet (Excel®, Microsoft®, USA), organized according to the following categories: name of author(s) and year of publication; study type; sample size and patient age; number of implants; type of implantation procedure; graft material used (if any); whether a flapless approach was performed; whether connective tissue graft (CTG) was applied; type of provisional crown; esthetic outcomes; clinical outcomes; implant survival rate; and complications reported.Data Extraction

Results

Search:

The analysis included 14 studies investigating immediate implantation protocols, some comparing them with early or delayed placement. Among these, three were randomized controlled trials (RCTs), four retrospective cohort studies and seven were prospective cohort or case series [11-24]. The studies involved a total of 669 patients receiving 684 implants, with a mean age ranging from 34.6 to 62 years.

All studies focused on immediate implantation, although several also evaluated early, delayed, or late protocols [12-14].

Surgical Technique: A flapless technique was used in ten studies confirming a clinical preference for minimally invasive procedures, except in cases requiring guided bone regeneration (GBR) [11,13-15,18-24].

Grafting Materials and Soft Tissue Management

A variety of grafting materials were used:

- *Bio-Oss*® (DBBM) was the most frequently used graft, either alone or combined with autogenous bone [11,13,14,17,18,20,23].
- *Alloplastic* or synthetic grafts were used in two studies [22,24].
- Three studies reported no graft material used [12,15,16].

Collagen membranes were placed only in GBR procedures [13,14,18].

Prosthetic Protocol

Most studies placed immediate provisional crowns (typically without occlusal contact), followed by final restorations at 3 to 6 months. Final crowns were usually screw-retained or cemented on zirconia abutments.

Implant Survival and Complications

Implant survival rates exceeded 94% in all studies, with 100% survival in 10 studies [11,15-17,20-24]. Reported complications were:

- Biological: abscesses, fistulas, peri-implantitis (rare).
- Technical: screw loosening, provisional loss, fracture, or crown retention issues [11,16,7].

Overall, complications were minimal and manageable.

Clinical Outcomes

Marginal bone loss was generally under 1.5 mm. A 10-year study 18showed significant facial bone loss in one-fourth of patients, particularly when initial horizontal defects were present.

Clinical parameters such as probing depth (PD), plaque index, and bleeding on probing (BoP) remained stable in most studies [11,16,17,20].

Esthetic Outcomes (PES, Papillae, Zenith)

Pink Esthetic Score (PES) and White Esthetic Score (WES) were generally satisfactory, with mean PES ranging from 10 to 12.8. Several studies confirmed:

- Minimal mid-facial recession (<1 mm in most cases) [11,15-17,20-22].
- Improved papillary contour and zenith with immediate provisionals [12-14].
- A statistically significant association between initial buccal plate thickness and soft tissue stability [21,23].
- Better esthetic results in females [14].

Table 1: Summary of the Descriptive Characteristics of Included Studies

1	Cosyn et al 2016[11]	Prospective cohort	22 12M 10F	50	22	Immediate	Bio-oss	Yes	Yes	immediate
2	Hof et al 2015[12]	Retrospective cohort	153 73M 80F	37±17	153	Immediate Early delayed	Bio-oss, Autologous bone blocks	No	No	_
3	Elangovan et al 2017[13]	RCT	124 40M 84F	50±14(IIP) 55±13(DIP)	124	Immediate Delayed	bovine xenograft	No	No	_
4	Arora et al 2018[14]	Retrospective cohort	110 48M 62F	46 ± 17	110 total 33 type1 14 type2 19 type3 44 type4	Immediate Early Delayed Late	Bio-oss	Yes n= 15	No	_
5	Lee et al 2020[15]	RCT	36 13M 23F	49.22 ± 17.09	36	Immediate	No	Yes N=18	No	Immediate
6	Cabello et al 2013[16]	Prospective cohort	14 7M 7F	52	14	Immediate	No	_	No	Immediate
7	Tian et al 2019[17]	Prospective Cohort	27 14M 13F	34.6	27	Immediate	Bio-oss	No	No	Immediate
8	Kuchler et al 2015[18]	Retrospective Cohort	17 9M 8F	62	17	Immediate	GBR	Yes	Yes	_
9	Martin et al 2014[19]	Case series	9 9F	47.1	12	Immediate	Yes	Yes	No	Immediate
10	Slagter et al 2015[20]	RCT	40 13M 27F	39.4 ± 16.9(group A) 42.3±14.2 (group B)	40	Immediate	autogenous bone Bio-oss	Yes	Yes	Immediate n=20 Delayed n=20
11	Yang et al[21]	Prospective cohort	40 22M 18F	38.31 ± 11.23 years	50	Immediate	Xenogenic and artificial grafts	Yes	no	Immediate
12	Barroso-Panella et al[22]	Prospective cohort	15 4M 11F	#	16	Immediate	Alloplastic material	yes	no	Immediate

13	De Angelis et al[23]	Retrospective cohort	48 22M 26F	SCTG: 51.2±13.2 years XCM: 52.4±16.6 years NG : 47:7±9:1 years	48	Immediate	Bone xenograft BioOss	yes	*Yes *No for gr3	Immediate
14	Barroso-Panella et al[24]	Prospective cohort	14 4M 10F	57.5 years	15	immediate	Synthetic bone graft VivOss	yes	no	Immediate

CTG=connective tissue graft; GBR=guided bone regeneration; RCT= randomized controlled trials;

Risk of Bias and Quality Assessment

The NOS (Newcastle Ottawa scale) is designed to assess the risk of bias in three categories: selection of the population, comparability of groups, and the determination of outcomes. Within each domain, the NOS [25,26]. assesses specific criteria that are rated as low, moderate, or high risk of bias. The NOS provides a total score of nine points, with higher scores indicating better quality of study. The NOS can be applied to evaluate the quality of case-control studies, cohort studies, and cross-sectional studies. For cohort studies, we used NOS score

A detailed risk of bias assessment is illustratedin the following table for the cohort studies (table 2)

Table 2: Evaluating the Risk of Bias of Non-Randomized Studies

1	**	*	**	5	moderate
2	***	*	****	8	Low
3	-	-	-	-	-
4	***	*	***	7	moderate
5	-	-	-	-	-
6	***	*	**	6	moderate
7	***	*	**	6	moderate
8	***	**	***	8	low
9	***	**	**	7	moderate
10	-	-	-	-	-
11	**	**	***	7	moderate
12	***	**	***	8	low
13	***	**	**	7	low
14	***	*	**	6	moderate

NOS score:
- <5: low methodological quality
- 5-7: moderate methodological quality
- >7: high methodological quality

For the randomized clinical trials, JADAD scale is found to be more adequate.
Its score varies between 0(very poor) and 5(rigorous).
This scale focuses on the following characteristics in a clinical trial : randomization, blinding and withdrawal [36].

JADAD Score Calculation
Item
Was the study described as randomised (this includes words such as randomly, random and randomisation)?
Was the method used to generate the sequence of randomisation described and appropriate (table of random numbers, computer-generated, etc.)?
Was the study described as double blind?
Was the method of double blinding described and appropriate (identical placebo, active placebo, dummy, etc.)?
Was there a description of withdrawals and dropouts?
Deduct one point if the method used to generate the sequence of randomisation was described and it was inappropriate (patients were allocated alternately, or according to date of birth, hospital number, etc.).
Deduct one point if the study was described as double blind but the method of blinding was inappropriate (e.g., comparison of tablet vs. injection with no double dummy).
Total Score

Figure 3: JADAD Score Questionnaire

Each question (figure 3) has a yes or no. A "yes" gets 1 point and a "no" gets 0. The score is the sum of all the answers.

The following table (table 4) is the score of the 3 randomized controlled trials included in our study:

Study ID	Scoring	Verdict
3	2 points	Poor quality
5	3 points	Good quality
10	3 points	Good quality

Discussion

Clinical Outcomes

Clinical and Biological Outcomes of Immediate Implant Placement in the Esthetic Zone:

The survival rate of immediate implants in the esthetic zone was consistently close to 100% across all included studies, with few implant failures reported during follow-up periods exceeding one year, confirming previous findings by Lang et al [27].

Prosthetic Rehabilitation and Surgical Techniques

Immediate provisionalization with delayed loading was the preferred approach, minimizing marginal bone loss. According to Slagter et al. [20], delayed provisionalization was associated with >0.05 mm bone loss. Screw-retained provisionals were favored over cemented types to reduce resorption. Flapless techniques were generally preferred due to their minimally invasive nature, although both techniques yielded similar outcomes over a 12-month follow-up as shown by Stoupel et al [28].

Marginal Bone and Ridge Remodeling

Marginal and buccal bone loss (both in height and width) was common. Cosyn et al. reported bone preservation or minor gain in 7 out of 17 cases. [11]. Martin et al.observed a significant increase of 0.92 mm in mesial bone height and a non-significant 0.43 mm gain distally after two years. [19]. However, heterogeneous methods of bone measurement (e.g., radiographs, probing) may compromise comparability. Comparative data favored delayed implant placement for superior bone remodeling.

Bone grafting, when performed, aimed to fill peri-implant gaps or correct defects using various materials (autologous, allogenic, xenograft, or synthetic). Yet, most studies did not elaborate on the effects of guided bone regeneration. Notably, Lee et al. found that even non-grafted immediate sites showed stable ridge dimensions with <1 mm changes over 12 months. However, grafted sites typically experienced less dimensional reduction [15].

Soft Tissue Behavior and Recession

Soft tissue changes around immediate implants were widely reported, yet unpredictable and highly variable across studies due to differing evaluation methods (3D scanners, CBCT, probing, calipers). Recession was the most frequent outcome, observed at mid-buccal and proximal aspects. Although mean recession did not exceed 1 mm, the distal papilla appeared most affected. Cabello et al.found recession of 0.80 mm distally vs 0.38 mm mesially [16]. Yang et al confirmed these trends [20].

The initial thickness of the buccal plate was a significant determinant; sites with 0–0.5 mm thickness showed greater recession. Kan et al associated immediate provisionals with 0.5–1 mm recession [5]. Flapless approaches showed better biological contour Blanco et al and Lee et al. reported greater recession with flap elevation. Lee's study also suggested that advanced age and thin gingival phenotype correlate with proximal recession, while thick phenotype might be linked to mid-buccal recession [15,29]. These findings, however, remain inconclusive due to lack of standardization and the influence of patient-specific and implant-related variables.

Hard and Soft Tissue Interplay

The mucosal margin is strongly influenced by underlying hard tissue, particularly the resorption of the coronal segment of the buccal plate, which results in apical migration of the soft tissue. This relationship emphasizes the importance of considering bone dynamics in implant planning to ensure favorable esthetic outcomes.

Cosyn et al.highlighted a higher risk of midfacial recession and buccal convexity defects with immediate implants, largely dependent on the initial bone phenotype [11]. On a molecular level, Gerstenfeld et al. stated that bone formation and soft tissue behavior are regulated by shared cellular mechanisms, underscoring the complexity of tissue remodeling in implant therapy [29].

Esthetic Outcomes of Immediate Implantation in the Esthetic Zone

The patients must be involved in the esthetic evaluation of this procedure. Several scales have been made available for use like the visual analog scale. Visual Analog Scales (VAS) is a straightforward method for quantifying subjective experience. They have been proven to be valid and reliable in a variety of clinical and research settings [30]. Throughout the research, several of selected studies used VAS to evaluate the results of esthetic implants. Hof et al found that immediate implantation had a higher score in comparison to other types (95%) [12]. Kuchler et al has a linear score of 9 in esthetic appearance and satisfaction [18]. De Angelis et al had score varying between 8.5 and 9.1 on gingival shape, volume and color as well as prosthetic rehabilitation [23].

To further assess the appearance of soft tissue, different authors utilized the Pink Esthetic Score (PES) as a clinical tool. The form, color, and texture of the soft tissue, as well as the existence of any obvious recession, inflammation, or other cosmetic issues, all contribute to the score. The purpose is to offer practitioners a consistent and systematic method for evaluating and communicating the esthetic outcomes of implant-supported restorations in the esthetic zone. The PES is based on seven variables: the mesial papilla, the distal papilla, the soft-tissue level, the soft-tissue contour, the alveolar process deficiency, the soft-tissue color, and the soft-tissue texture. Each variable was given a 2-1-0 score, with 2 being the best and 0 being the worst. The completeness, incompleteness, and absence of the mesial and distal papillae were assessed. All other factors were evaluated by comparing them to reference teeth highest score is 14 [31]. The PES in selected papers when used oscillated between 10 and 12.15 [32]. In comparison with delayed implantation, PES was higher in immediate implantation [32]. According to Hof et al. (2015), crown length has an effect on PES, with longer crowns resulting in lower scores [12]. Arora et al registered better scores with female patients [14]. De Angelis et al (2021) made a comparison study that associated different types of soft tissue augmentation techniques, better esthetic results and PES were observed when using autogenous connective tissue or xenogenic collagen matrix with immediate implant placement. However, the effect of soft tissue graft is still debatable and inconclusive [23].

The Implications of Immediate Implants in the Esthetic Zone

In times of evidence-based dentistry, it is proven that immediate implants can be a successful procedure when guidelines are respected [33]. It has the advantages of reducing treatment time and eventually patients' satisfaction. With a high survival rate, immediate implants can as well minimize post-extraction alveolar bone resorption. Preserving hard tissue is crucial to achieving optimal esthetic results, as it provides natural-looking contours and proportions for implant-supported restorations. However, evaluating individual patient factors (such as bone quality and socket morphology, soft tissue biotype, implant position, grafting and provisionalization) is necessary to decide on the most suitable approach for each clinical situation.

- Socket type: According to guidelines, socket type 1 is the best candidate for immediate implants as it is characterized by intact facial bone and the absence of facial soft tissue loss [32].
- Soft tissue biotype: A thin biotype (<1.5mm) is a proof of thin buccal plate and sets the procedure for esthetic complications. A thick biotype allows the performing of immediate provisionalization if primary stability is established whereas a thin type needs 3-4 months to install provisionals to allow the regrowth of soft tissue [23].
- Implant position: With a persistent advocacy for flapless procedure, it is recommended that the implant is to be placed >2mm from the buccal plate and 1 mm subcrestally [35].
- Grafting: The best time for bone graft is after extraction and the socket represents a good container for graft material with an adequate bone supply. Dual zone grafting is performed, not only in bone but also up to soft tissues [23].
- Provisionalization: depends mainly on the gingival biotype.

Considerations for Future Research

Due to the varied nature of the academic publications under evaluation, the current systemic assessment refrains from drawing decisive conclusions. It is critical to proceed with caution after obtaining the results. The use of standardized measurements is strongly recommended to increase credibility and substantiate the research as evidence-based. Furthermore, a more extensive investigation is required, particularly with regard to issues including implant-related data and patient-related characteristics. It is essential to exercise prudence in the inclination towards the exclusion of populations exhibiting comorbidities and systemic diseases pertinent to oral health, such as diabetes, as this exclusionary practice may compromise the validity of findings. A discerning approach is recommended to avoid the imposition of constraints for the purpose of obtaining supposedly "clean" results. In order to fortify the grasp of immediate implantation's role in the oral rehabilitation process, there is a pressing need for additional in-depth investigations. This involves the pursuit of further long-term perspective studies characterized by larger sample sizes, thereby facilitating a more comprehensive understanding of the subject matter at hand.

Conclusion

In conclusion, the study of immediate implants in the esthetic zone has provided valuable insights into the feasibility and success of this approach in dental implantology. The evidence presented suggests that immediate implant placement can be a predictable treatment option if proper planning takes place. It can offer numerous advantages in terms of reduced treatment time, preserved soft and hard tissue architecture, patient satisfaction, and enhanced esthetic. However, it is essential to acknowledge the importance of case selection as it dictates the outcomes. Patients with acceptable oral hygiene, adequate bone support, healthy gingival architecture, and the absence of active infections in the implant site are presented in the literature as good candidates for favorable results. In addition, surgical skill is crucial to achieve optimal outcomes. However, bone resorption is seemingly continuous and inevitable with minor esthetic complications that hinder the gingival zenith in the long run. In summary, further academic investigations long-term prospective studies and clinical trials are needed to further validate the efficacy and longevity of immediate implants in the esthetic zone.

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The Data Availability: This study is available upon request from the corresponding author.

References

1. Brånemark PI (1983) Osseointegration and its experimental background. J Prosthet Dent 50: 399-410.
2. Albrektsson T, Zarb G, Worthington P, Eriksson AR (1986) The long-term efficacy of currently used dental implants: a review and proposed criteria of success. Int J Oral Maxillofac Implants 1: 11-25.
3. Wennerberg A, Albrektsson T (2009) Effects of titanium surface topography on bone integration: a systematic review. Clin Oral Implants Res 20: 172-184.
4. Chen ST, Buser D (2014) Esthetic outcomes following immediate and early implant placement in the anterior maxilla—a systematic review. Int J Oral Maxillofac Implants 29: 186-215.
5. Kan JY, Rungcharassaeng K, Lozada JL (2003) Immediate placement and provisionalization of maxillary anterior single implants: 1-year prospective study. Int J Oral Maxillofac Implants 18: 31-39.
6. Grunder U (2000) Stability • of the mucosal topography around single-tooth implants and adjacent teeth: 1-year results. Int J Periodontics Restorative Dent 20: 11-17.
7. Chen ST, Darby IB, Reynolds EC (2007) A prospective clinical study of non-submerged immediate implants: clinical outcomes and esthetic results. Clin Oral Implants Res 18: 552-562.
8. Cosyn J (2019) The predictability of immediate implant placement and provisionalization in the aesthetic zone: a systematic review. J Clin Periodontol 46: 224-241.
9. Schardt C, Adams MB, Owens T, Keitz S, Fontelo P (2007) Utilization of the PICO framework to improve searching PubMed for clinical questions. BMC Med Inform Decis Mak 7: 16.
10. Bettany-Saltikov J (2010) Learning how to undertake a systematic review: Part 2. Nurse Stand 24: 47-56.
11. Cosyn J, Eghbali A, Hermans A, Vervaeke S, De Bruyn H, et al. (2016) A 5-year prospective study on single immediate implants in the aesthetic zone. J Clin Periodontol 43: 702-709.
12. Hof M, Pommer B, Ambros H, Jesch P, Vogl S, et al. (2015) Does timing of implant placement affect implant therapy outcome in the aesthetic zone? A clinical, radiological, aesthetic, and patient-based evaluation. Clin Implant Dent Relat Res 17: 1188-1199.
13. Elangovan S, Avila-Ortiz G (2017) Case selection is critical for successful outcomes following immediate implant placement in the esthetic zone. J Evid Based Dent Pract 17: 135-138.
14. Arora H, Ivanovski S (2018) Evaluation of the influence of

implant placement timing on the esthetic outcomes of single tooth implant treatment in the anterior maxilla: A retrospective study. J Esthet Restor Dent 30: 338-345.

15. Lee CT, Sanz-Miralles E, Zhu L, Glick J, Heath A, et al. (2020) Predicting bone and soft tissue alterations of immediate implant sites in the esthetic zone using clinical parameters. Clin Implant Dent Relat Res 22: 325-332.
16. Cabello G, Rioboo M, Fábrega JG (2013) Immediate placement and restoration of implants in the aesthetic zone with a trimodal approach: soft tissue alterations and its relation to gingival biotype. Clin Oral Implants Res 24: 1094-1100.
17. Tian J, Wei D, Zhao Y, Di P, Jiang X, et al. (2019) Labial soft tissue contour dynamics following immediate implants and immediate provisionalization of single maxillary incisors: A 1-year prospective study. Clin Implant Dent Relat Res 21: 492-502.
18. Kuchler U, Chappuis V, Gruber R, Lang NP, Salvi GE (2016) Immediate implant placement with simultaneous guided bone regeneration in the esthetic zone: 10-year clinical and radiographic outcomes. Clin Oral Implants Res 27: 253-257.
19. Martin C, Thomé G, Melo ACM, Fontão FNGK (2015) Peri-implant bone response following immediate implants placed in the esthetic zone and with immediate provisionalization—a case series study. Oral Maxillofac Surg 19: 157-163.
20. Slagter KW, Meijer HJ, Bakker NA, Vissink A, Raghoebar GM (2015) Feasibility of immediate placement of single-tooth implants in the aesthetic zone: a 1-year randomized controlled trial. J Clin Periodontol 42: 773-782.
21. Yang X, Zhou T, Zhou N, Man Y (2019) The thickness of labial bone affects the esthetics of immediate implant placement and provisionalization in the esthetic zone: A prospective cohort study. Clin Implant Dent Relat Res 21: 482-491.
22. Barroso-Panella A, Ortiz-Puigpelat O, Altuna-Fistolera P, Lucas-Taulé E, Hernández-Alfaro F, et al. (2020) Evaluation of peri-implant tissue stability and patient satisfaction after immediate implant placement in the esthetic area: A 3-year follow-up of an ongoing prospective study. Int J Periodontics Restorative Dent 40: 731-739.
23. De Angelis P, Manicone PF, Gasparini G, De Angelis S, Liguori MG, et al. (2021) Influence of immediate implant placement and provisionalization with or without soft tissue augmentation on hard and soft tissues in the esthetic zone: a one-year retrospective study. Biomed Res Int 2021: 8822804.
24. Barroso-Panella A, Gargallo-Albiol J, Hérnandez-Alfaro F (2018) Evaluation of bone stability and esthetic results after immediate implant placement using a novel synthetic bone substitute in the anterior zone: Results after 12 months. Int J Periodontics Restorative Dent 38: 235-243.
25. NOS manual pdf version. https://www.ohri.ca/programs/clinical_epidemiology/nos_manual.pdf.
26. Newcastle - Ottawa Quality Assessment Scale Case Control Studies. https://www.ohri.ca/programs/clinical_epidemiology/nosgen.pdf
27. Lang NP, Pun L, Lau KY, Li KY, Wong MC (2012) A systematic review on survival and success rates of implants placed immediately into fresh extraction sockets after at least 1 year. Clin Oral Implants Res 5: 39-66.
28. Stoupel J, Lee CT, Glick J, Sanz-Miralles E, Chiuzan C, et al. (2016) Immediate implant placement and provisionalization in the aesthetic zone using a flapless or a flap-involving approach: a randomized controlled trial. J Clin Periodontol 43: 1171-1179.
29. Blanco J, Nuñez V, Aracil L, Muñoz F, Ramos I (2008) Ridge alterations following immediate implant placement in the dog: flap versus flapless surgery. Journal of Clinical Periodontology 35: 640-648.
30. Yao J, Tang H, Gao XL, McGrath C, Mattheos N (2014) Patients' expectations from dental implants: a systematic review of the literature. Health and quality of life outcomes 12: 1-14.
31. Fürhauser R, Florescu D, Benesch T, Haas R, Mailath G, et al. (2005) Evaluation of soft tissue around single-tooth implant crowns: the pink esthetic score. Clin Oral Implants Res 16: 639-644.
32. Groenendijk E, Staas TA, Bronkhorst E, Raghoebar GM, Meijer GJ (2020) Immediate implant placement and provisionalization. Clin Implant Dent Relat Res 22: 812-819.
33. Bhola Monish, Jacobs Leyvee Cabanilla, Kolhatkar Shilpa (2015) Immediate implants for aesthetic success: New guidelines. Journal of the International Clinical Dental Research Organization 7: S138-S147.
34. Elian N, Cho SC, Froum S, Smith RB, Tarnow DP (2007) A simplified socket classification and repair technique Pract Proced Aesthet Dent 19: 99-104.
35. Lin GH, Chan HL, Wang HL (2014) Effects of currently available surgical and restorative interventions on reducing midfacial mucosal recession of immediately placed single-tooth implants: A systematic review J Periodontol 85: 92-102.
36. Jadad AR, Moore RA, Carroll D, et al. (1996) Assessing the quality of reports of randomized clinical trials: is blinding necessary? Control Clin Trials 17: 1-12.