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Alaa Jasim Mohammed

Saja Ali Muhsin

Raad Saeed Al-Marza

REVIEW

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Influence of Implant Dimensions on Survival Rate and Clinical Outcomes in the Posterior Region: A Systematic Study

Alaa Jasim Mohammed [a,*], Saja Ali Muhsin [a], Raad Saeed Al-Marza [b]

[a] Department of Dental Prosthetic Techniques, College of Health and Medical Techniques, Middle Technical University, Baghdad, Iraq
[b] Department of Restorative Dentistry, College of Dentistry, University of Sheffield, United Kingdom

Abstract

The objective of this systematic study was to offer a comprehensive examination of use of posterior dental implants. especially from the perspective of length and diameter. Electronic searches were done in Google Scholar, Utilizing the following keywords: "Dental Implant," "Wide Diameter Implant," "Narrow Diameter Implant," "Limited Space," PubMed and Embase were consulted. "Long Implant", "Short Implant", "Posterior Region" and their synonyms to discover relevant publications published between 2004 and 2024. About 190 studies were screened during the mentioned period based on their title and abstracts. Yet, only 18 studies were included in the review, which satisfied the study requirements inclusion and focused on the success of implant diameter, length, or both. A total of 10 studies (55.5%) discussed the application and performance of implant diameter, 5 studies (27.8%) on length, and 3 studies (16.7%) correlated on both diameter and length. According to the reviewed articles, for the posterior location, the narrow-diameter implant had a similar success rate and minor bone loss compared to the standard. The wide-diameter implant is used when there is a high load-bearing application and is preferred in instances of inadequate initial fixation or failure of the current implant. Furthermore, short implant length was used in cases of resorption and atrophy to avoid bone augmentation while the long implant had a very low risk of failure compared to the short implant.

Keywords: Dental implant, Wide diameter implant, Narrow diameter implant, Short diameter implant, Posterior region

1. Introduction

Single-tooth implants have already proven to be the most reliable form of tooth replacement. Multiple studies spanning at least five years show a greater survival rate compared to other tooth replacement techniques [1]. Implants have been demonstrated to significantly reduce bone loss, peri-implant ridge resorption, denture instability, discomfort, and pressure points, hence enhancing masticatory efficiency and capacity [2]. The durability of dental implants is mainly affected by surrounding bone quality and quantity, implant design, and surgical procedure [3–5].

The posterior jaw area, which is the primary effective area of mastication, is mostly made up of type IV bone and this is where the majority of tooth losses occur as it is made up of fine trabecular bone [6]. The outcome of implant rehabilitation in the posterior parts is influenced by various parameters, including the site and magnitude of the edentulous area, the condition of the remaining teeth, patient oral hygiene compliance, and patient-related factors [7].

Implant stability during implantation has been demonstrated to be improved by an increase in implant size, reduced bone stress and having an appropriate prosthetic profile than narrow [8–10]. Furthermore, wider diameter implants (WDIs) exceed

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* Corresponding author.
E-mail address: ecc0049@mtu.edu.iq (A. J. Mohammed).

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other diameter implants concerning biomechanical osseointegration, initial stability, and stress distribution capacity [11].

Osseointegration is characterized as a systematic functional and structural interface between normal bone and the implant surface [12]. In addition, when an implant remains stable, fresh bone is expected to form in the bone-implant connection area, contacting much of the implant surface with vital bone tissue [13]. NDIs were created to replace dental sections with small clinical crowns or limited interdental or interim plant area [14, 15]. These implants were unsuitable for posterior implantation due to prosthetic and biomechanical issues. The growing posterior teeth profile does not suit a thin implant neck [16]. Using short implants in the posterior region has good results in some studies while others report that it has a low success rate [17–19]. Incorrect crown-to-implant ratios can cause mechanical issues, increase treatment costs, and lengthen treatment. However, No bleeding, sinusitis, discomfort, or edema should prevent maxillary sinus augmentation for long-term implant placement [20–24].

In a research including 1,649 implants, narrow-diameter implants had the greatest failure rate at 5.1%, followed by regular-diameter implants at 3.8%, and wide-diameter implants (2.7%) [25].

This study focuses on finding the best posterior implant diameter and length to avoid mastication-related failure.

2. Materials and methods

2.1. Study methodology

Digital investigation in Google Scholar, PubMed, and Embase to find the related articles published between 2004 and 2024 through The Keywords: dental implant, wide-diameter implant, narrow-diameter implant (small diameter) posterior region (posterior quadrant), short dental implant, long implant and their synonyms and this involve in vivo, in vitro, and meta-analysis. The reference to the resulting articles also leads to another one.

2.2. Inclusion criteria

The 2004–2024 research put dental implants in the posterior quadrant exclusively to measure their diameter or length.

2.3. Exclusion criteria

Dental implants were implanted in the anterior region and studies did not determine the diameter or length of the implant. In addition to studies written in languages other than English.

3. Results

190 studies were selected based on their title and abstracts. However, only 65 articles were selected based on this study's aim, and 18 studies were included in the review that were published between the years of 2004 and 2024.

This study tables are divided into three parts:

Table 1 illustrates the diameters of implants used in the posterior region(wide, regular, narrow, and extra narrow) Although there were some differences in the classification in this field, the most commonly report that extra narrow (<3 mm), narrow (3 mm to 3.7 mm), regular (3.7 mm to 5 mm), and wide (≥5 mm).

The appropriate implant diameter is contingent upon the patient's specific case, the available space, and the condition of the bone. WDI is for large teeth and when they fail in the standard implant, it also increases the primary stability and the osseointegration with bone. However, implants in poor bone quality might produce increased load-transferred strains into the surrounding bone [26]. However, NDI is for narrow residual ridges, small teeth, and narrow spaces when a standard implant cannot be used.

Table 2 illustrates implant length used in the posterior region (long, regular, short, and extra short). Also, there are a lot of classifications of these terms but the most popular that extra short (≤6mm), short (>6 to <10), regular (≥10 mm to <13 mm), and long (≥13 mm), [27].

In the atrophic ridge, severe resorption and short clinical crowns as well as when bone augmentation is not required short and extra short implants are suitable for these cases, as well as it has the advantage of short surgical time and are less invasive [28]. However, implant length considerably reduced peri-implant cortical bone stress and strain [29]. While Table 3 shows studies with implant length and diameter.

4. Discussion

Over the 18 studied types of research that were analysed between the years 2004 and 2024. A total of 10 studies (55.5%) discussed the use and performance of implants in terms of diameter, 5 studies (27.8%) on the influence of implant length, and only 3 studies (16.7%) correlated both implant diameter and length.

When it comes to dental implants, the success rate is directly proportional to the quality and quantity of the local bones, the design of the implant, and the surgical procedure. Both the diameter and length

Table 1. Studies discuss implant diameter.

Year	Cite	Title	Aim	Method	Conclusion
2005	[31]	A prospective investigation of screw-shaped oral implants with a small diameter over a five-year period	The objective of the investigation was to ascertain the clinical efficacy of 3.3 mm diameter NP implants over a five-year period.	The study recruited people with alveolar ridges too small for 3.75 mm regular platform (RP) implants. The clinical guideline recommends placing NP implants when the buccal-lingual alveolar ridge dimension is 5.0 mm or less, or when the interradicular space is less than 6 mm. Patients with serious medical issues that prevented implant therapy were excluded.	A five-year prospective clinical assessment of 3.3 mm NP implants demonstrated encouraging outcomes. The success rate of NP implants was 96% according to established standards. One implant out of 23 lost Osseo integration, but none were damaged.
2011	[30]	Small Diameter Implants: A Case Report on Specific Indications and Considerations for the Posterior Mandible	Exhibit the integration of small dimension implants (1.8–3.0 mm in diameter) for the replacement of absent mandibular posterior teeth.	The mesial-distal arch length between adjacent teeth was 12 mm, while the buccal-lingual breadth was 6 mm. Two standard-sized implants require 14 mm of mesial-distal length for sustained success. Insufficient bone in the mesial-distal arch for two standard-sized implants (3.75 mm). The diagnostic model revealed a 12 mm intra-tooth gap. The patient received a prescription for two 3.0-mm small diameter one-piece implants (Zimmer Dental Inc, Carlsbad, Calif) to substitute the mandibular first molar.	Small-diameter implants can replace traditional implants in several therapeutic circumstances. These implants may reduce operations, morbidity, treatment time, and screw loosening in the mandibular posterior.
2011	[14]	Retrospective clinical study on 3.3 mm diameter implants for the rehabilitation of edentulous posterior regions, with a follow-up period of up to 11 years.	The objective of this investigation was to document the clinical outcomes of implant-supported prosthetic rehabilitations in the posterior parts of both jaws, utilizing narrow-diameter implants.	The study involved 147 individuals (115 males, 32 females) aged 26-77 years (mean = 47.5 years), with 247 implants implanted and followed for 1-11 years, with a median follow-up duration of 5 years. The patients require fixed prosthetic implant-supported posterior jaw rehabilitations due to reduced interarticular bone or thin alveolar crest.	The utilization of narrow-diameter implants for the prosthetic rehabilitation of posterior jaw regions is feasible, with favorable long-term results, regardless of the surgical technique employed.
2013	[32]	Retrospective study of narrow implants for fixed dental prostheses over an extended period	to conduct a retrospective analysis of the long-term survival and success rates of narrow implants (NIs) that were placed with a variety of implant systems, as well as the correlation with biological and technical complications.	With a total of 338 patients, 45.6% of whom were male and 54.4% of whom were female, participated in this retrospective analysis. These patients had received 541 NIs (with a diameter of 3.5 millimeters or less) for fixed prostheses. Calculations were made to determine the change in the mean marginal bone level (MMBL). Life table analysis was conducted, incorporating cumulative survival rates and success rates, alongside an evaluation of biological and technical complications.	The results of this study indicate that NIs may be utilized safely for thin alveolar ridges or narrow mesiodistal gaps due to their elevated survival rate.

(Continued)

Table 1. Continued

Year	Cite	Title	Aim	Method	Conclusion
2014	[35]	Narrow-diameter implants: predictable treatment? Literature review	To assess the reliability of narrow-diameter implants as a therapeutic alternative in standard clinical practice	Medline-PubMed was searched from 2002 to 2012. English-language studies with a 12-month follow-up were included. Manual searches were also done in high-impact journals. Results: The literature review revealed 21 screening-compliant studies.	Treatment utilizing narrow-diameter implants yields clinical outcomes regarding implant longevity, peri-implant bone loss, and related problems comparable to those achieved with wider-diameter implants.
2020	[36]	Assessment of clinical and radiographic outcomes for narrow-diameter versus regular-diameter implants in the anterior and posterior jaw over a follow-up period of 2 to 6 years.	The current retrospective clinical investigation compared clinical and radiographic characteristics, complications, and satisfaction in patients who had fixed prostheses anchored by narrow-diameter implants (NDIs) in the anterior and posterior jaw.	Patients aged ≥30 with NDI- and RDI-supported fixed prosthesis in each jaw for at least 2 years were included in the study. Database records provided all NDI and RDI information. Each NDI and RDI was checked for depth of placement, number of implants, loading, duration of service, design, length, and diameter.	NDIs in the anterior and posterior jaws demonstrated comparable efficacy in maintaining peri-implant soft and hard tissue health, while providing satisfactory patient satisfaction and tolerable complication rates.
2022	[37]	Reconstruction of an extensive edentulous posterior region utilizing two narrow-diameter implants: Biologically-based alternative therapy	This article illustrates the utilization of two small-diameter implants to substitute an absent wide edentulous site and examines factors that may influence bone alterations.	Five patients (six edentulous locations) were identified, and twelve implants (two narrow or regular diameters) were utilized. All individual edentulous sites measured between 12 and 14 mm in mesiodistal size. Evaluated using cone beam computed tomography and periapical radiography.	The utilization of two narrow or regular-diameter implants for the replacement of a single edentulous site measuring approximately 12–14 mm in width in the posterior region appears to be a viable treatment option. This approach is particularly appropriate for individuals with ridge atrophy and/or those experiencing systemic diseases.

(Continued)

Table 1. Continued

Year	Cite	Title	Aim	Method	Conclusion
2023	[38]	Effectiveness of ultra-wide implants in the posterior regions of the mandible and maxilla: a 5-year retrospective clinical investigation	This research aimed to assess the determinants affecting the prognosis and failure of ultra-wide implants.	In a study involving 81 patients, a total of 88 ultra-wide implants measuring 6 mm and 7 mm were inserted. One case was excluded due to the inability to conduct follow-up checks, as prosthetic treatment was not performed at this hospital. Another case was excluded because radiographs were not taken at the final observation. Additionally, 14 cases within 12 months of prosthetic loading were excluded from the study. A retrospective clinical investigation was conducted involving 78 implants in 71 individuals.	In maxilla and mandible implant failure or inadequate initial fixation, wide implants might be used. Age, sex, site, diameter, length, extra operation, ultra-wide implant rationale, main and secondary stability,
2023	[39]	Implant diameter-related biomechanical behavior during simulated bone loss—an in vitro investigation	The study sought to evaluate the stability of static fatigue in implants with varying degrees of bone loss and diameters.	90 self-curing laminating resin blocks contained conical implants. Conelog implants with "d" diameters of 3.3 mm (I33), 3.8 mm (I38), and 4.3 mm (I43). Three circular bone loss levels were simulated for each diameter. Implants in each test group (n = 10) were embedded 1.5 mm, 3.0 mm (ISO norm), and 4.5 mm below nominal bone levels to imitate bone loss. Different circular bone losses "h" were produced for each diameter: 1.5 mm (I-15), 3.0 mm (I-30), and 4.5 mm (I-45) resorption.	Thus, conical IAC biomechanical sustainability requires crestal bone maintenance. 1. IAC stability values increased with larger implant diameters and less bone loss around the implant shoulder. (implant-abutment complex) 2. Larger implant diameters reduce bone loss-related resistance at IAC.
2023	[40]	Implantoplasty and the fracture risk of narrow implants in cases of significant bone loss: A laboratory investigation	To evaluate the effect of Implantoplasty (IP) on the maximum failure strength of small diameter implants of various types, designs, and materials, under conditions of simulated advanced bone loss.	This study evaluated parallel-walled implants measuring 3.3 mm in diameter and 10 mm in length, featuring an internal connection, and utilizing BL and TL (Straumann Standard Plus) designs, as well as Ti and TiZr materials. Half of the implants were randomly selected for IP, while the other half were left intact as controls. Including dynamic loading before maximum load strength testing.	IP adversely affects the fracture strength of narrow implants afflicted with advanced peri-implantitis. Tissue level (TL) implants have had greater adverse effects than bone level (BL) implants, exhibiting a heightened risk of failure during typical mastication.

Implantoplasty (IP), tissue level (TL), bone level (BL), Titanium grade four (Ti), Titanium-Zirconium alloy (TiZr), implant abutment complex(IAC), cone beam(CTs), mean marginal bone level (MMBL) regular platform (RP), narrow platform (NP).

of the implant are recognized as important factors [5]. The implantation of implants has demonstrated efficacy in mitigating bone loss following tooth extraction, with surgeons employing various types and sizes of implants based on the morphology of the alveolar bone [4].

The width of the alveolar ridge can be enhanced through bone grafting; however, this procedure may

Table 2. Studies discuss implant length.

Year	Cite	Title	Aim	Method	Conclusion
2004	[33]	Short implants in the significantly resorbed maxilla: a two-year retrospective clinical investigation	To assess the survival rates of 6–8.5 mm implants in the severely resorbed maxilla after a surgical technique to improve initial implant stability.	Thirty-five men and fifty-five women, with a mean age of 58.6 years, were enrolled in the study. All of the patients got implant-supported prostheses at the same treatment center. Participants were required to get one or more implants ranging from 6 to 8.5 millimeters in size without any bone augmentation. Only implants that were used to replace second premolars (13) first molars (54) or second molars (29) were investigated	This study advocates for the utilization of short implants in the prosthetic rehabilitation of severely resorbed maxillas, serving as an alternative to more intricate surgical procedures.
2016	[34]	Short vs. conventional posterior dental implants: A comprehensive review and meta-analysis	This study aimed to evaluate the survival rate of short implants (8 mm or less) vs conventional implants (greater than 8 mm) in the posterior jaws.	For the purpose of conducting an electronic search for data lished up until September of 2015, the databases PubMed/Medline, Embase, and The Cochrane Library were utilized.	Short implants had comparable bone loss, prosthesis failures, and complication rates to conventional implants, making them a predictable posterior jaw treatment, especially in instances requiring additional surgery. Short implants (4–7 mm) are more likely to fail than regular implants.
2019	[41]	A systematic review and meta-analysis of randomized controlled trials comparing short dental implants to long implants with bone augmentation in atrophic posterior ridges.	To determine if short implants without augmentation can improve posterior atrophic ridge rehabilitation compared to standard-length implants with augmentation.	This review strictly followed PRISMA criteria. PubMed and CENTRAL were searched electronically. Only RCTs comparing short and conventional implants with augmentation were considered. Screening titles and abstracts, data extraction, and bias assessment were done. Meta-analyses were done on 13 RCTs with comparable outcomes.	Atrophic posterior ridge therapy with short dental implants appears to be beneficial. Short dental implants had statistically less marginal bone loss and postoperative problems than standard-length dental implants with augmentations. Implant failure is not statistically different. Short dental implants reduce bone-grafting and improve patient acceptability.Meta-analyses were done on 13 RCTs with comparable outcomes.
2020	[42]	A prospective clinical pilot study will be conducted to address the rehabilitation of the posterior maxilla. The study will involve the use of eleven 4-mm extra-short implants that are connected to lengthier implants.	The utilization of 4 mm long implants, referred to as extra-short implants, is facilitated by the principle of osseointegration enhancement.	We inserted 22 implants sequentially at healed sites in 11 patients (ages 42–69, mean age 57 $\pm$ 8.4 years): nine females and two men. All patients received 11 8-mm mesial implants splinted to 11 4-mm extra-short implants in the posterior maxilla.	An 8-mm long implant positioned mesially and splinted to a 4-mm long implant positioned distally yielded encouraging results, with no implant failures observed throughout the 24-month follow-up period.

(Continued)

Table 2. Continued

Year	Cite	Title	Aim	Method	Conclusion
2023	[43]	Biomechanical assessment of bespoke short implants with wing retention utilized in the treatment of severely atrophic maxillary posterior regions: A three-dimensional finite element analysis	This study sought to assess the application of digitally generated and personalized short implants with wing retention in cases of severe bone atrophy in the maxillary posterior region.	Small titanium wings are inserted into the prosthesis' short implant. Digital design and processing allow titanium screw-fixed wings to be flexible and provide main fixation. Wing design affects stress distribution and implant stability. This study uses three-dimensional finite element analysis to assess the wings fixture's position, structure, and spread area. Wing designs are linear, triangular, and planar. Simulated vertical and oblique occlusal forces are used to study implant displacement and bone surface stress at 1 mm, 2 mm, and 3 mm bone heights.	1) For patients with severe atrophic maxillary posterior regions, the tailored Yang's implant may be less traumatic and intrusive. When the maxillary posterior RBH is less than 4 mm, the short implant with suitably constructed wings can meet clinical requirements for stress distribution. 2) Planar-form wings distribute stress and stabilize implants better than other designs. A tailored short implant with a planar wing fixture can be used with 1 mm residual bone height by changing the cusp slope to lessen lateral force.

The Cochrane Central Register of Controlled Trials (CENTRAL), Residual bone height (RBH), randomized controlled trials (RCTs), and Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA).

be time-consuming, costly, and pose risks to patients. Moreover, bone-grafting techniques do not resolve the problem of length assessed from mesial to distal. Consequently, implants with reduced diameters are utilized as an alternative option for larger diameters [30, 31]. Implants with a diameter of ≤3.5 mm are generally employed to substitute teeth with narrow clinical crowns or in restricted interdental or inter-implant areas. The success rate seen is equivalent to that of standard-diameter implants [15]. Additional studies indicate that the utilization of these implants in the posterior jaws is deemed unfavorable due to prosthetic and biomechanical considerations. The emerging profile of posterior teeth is generally incompatible with a small implant neck. Decreasing the implant diameter from 3.75 mm to 3.3 mm is anticipated to reduce fracture resistance by 25% [14, 31]. Several constraints must be considered while evaluating the implementation of NDIs in the posterior jaws. This encompasses the risk of breakage of the screw and implant fixture attributable to the slender wall of the NDI [32]. Additionally, this may complicate oral hygiene. Furthermore, bite force in the posterior region can attain elevated levels, resulting in significant stress on abutments and implants [16].

Conversely, broad implant systems should be regarded as the primary choice for rehabilitating posterior edentulous regions when bone availability permits their use. Furthermore, wider-diameter implants may alleviate bone stress [9]. Due to poor bone quality, WDI was often needed in the maxilla or mandible's posterior. It is put posteriorly and replaced with crowns, giving it a better prosthetic profile than narrower implants [10]. An augmentation in implant diameter has demonstrated enhancement in implant stability during implantation. Initially, implants over 6 mm in diameter were predominantly utilized for the re-implantation of unsuccessful standard-diameter implants or for rapid placement following tooth extraction to achieve sufficient initial stability [4]. A study involving 1,649 implants revealed that narrow-diameter implants exhibited the highest failure rate at 5.1%, whereas regular-diameter implants had a failure rate of 3.8% and wide-diameter implants had a rate of 2.7% [25]. Nevertheless, implants with a substantial diameter (e.g., 6.0 mm) positioned in suboptimal bone quality are deemed crucial for implant longevity, as insufficient bone stock surrounding the implant can result in increased load-transferred stresses from the implant body to the adjacent bone [26].

Nonetheless, the utilization of short implants presents a viable alternative in resorbed jawbones; the 94.6% survival rate recorded for 96 little implants, measuring 6 to 8.5 mm in length, in the atrophied maxilla is comparable to the results documented for bigger implants [33]. Short implant placement is regarded as a minimally invasive option, characterized

Table 3. Studies on implant diameter and length.

Year	Cite	Title	Aim	Method	Conclusion
2017	[27]	A proposed classification strategy for dental implants based on length and diameter.	To suggest a classification scheme for dental implants based on length and diameter, aiming to standardize terminology in dental literature and facilitate communication among interested parties.	We searched Google-Scholar, PubMed/Medline, ISIWeb of Knowledge, and EMBASE for "Dental Implant Diameter" and "Dental Implant Length." From January 2004 to February 2016, databases were analyzed. The Cochrane Consumers and Communication Review Group-based data extraction sheet was pilot-tested on ten randomly selected studies and refined (interexaminer Kappa = 0.92).	The suggested classification system seeks to create a common standard for categorizing dental implants based on their diameter and length, despite indexed publications containing diverse terms utilized by clinicians and researchers for implant categorization based on dimensions.
2020	[29]	The influence of diameter, length, and elastic modulus of a dental implant on stress and strain in peri-implant bone: A 3D finite element analysis.	The stress and strain values in the peri-implant bone were examined in this study using finite element analysis to determine the impact of three distinct parameters of a dental implant.	Implant material elastic modulus, thread length, and neck diameter. Twelve implant designs were made with elastic modulus implants from 40,000 to 110000 MPa, diameters from 3.8 to 4.5 mm, and lengths from 10 to 13 mm.	The implant diameter, implant length, and their interaction demonstrated a statistically significant impact on the maximal VMES values and VMS in the peri-implant trabecular bone.
2024	[44]	A retrospective investigation of the significance of implant length and diameter in relation to implant failure	This study aimed to evaluate the impact of several risk factors associated with implant failure.	The study included Kyoto University Hospital dental implant patients. The selection criteria were dental implants put from January 2005 to 2022. Data on patients and implants was collected. We used a marginal Cox proportional hazards model to examine implant failure and potential variables.	The cumulative survival rate over extended durations was comparable to that documented in other studies. While implant failure is complex, implant length is merely one factor contributing to implant loss.

Von Mises strains (VMS), Von Mises stress (VMES), and Mega Pascal (MPa).

by enhanced simplicity, reduced surgical length, and decreased morbidity rates and expenses [28]. Mechanical issues may rise with crown-to-implant ratio fluctuation, although peri-implant marginal bone loss does not [34]. There is no consensus on the survival rate of short posterior maxilla and mandible implants. Some writers have found low success rates for brief implants, while others have found high success rates [17–19].

An alternative is the enhancement of bone height using techniques such as maxillary sinus augmentation, with or without bone grafting, facilitating the placement of longer implants [28]. The disparity in crown-to-implant ratio may increase the likelihood of mechanical complications; however, it does not heighten the risk of peri-implant marginal bone loss [20]. The expenses and duration of treatment exceed those associated with conventional implant placement without bone grafting [21]. Furthermore, issues like as bleeding and sinusitis, along with pain and swelling, should not be deemed prohibitive regarding the decision to do maxillary sinus augmentation for extended implant placement, particularly if the dental surgeon possesses a proficient learning curve [22–24].

To sum up, it seems that the demand for implant diameter research for the studied period between 2004 and 2024 was highly needed to identify the success of some restoration. However, either implant length or implant diameter/length studies may be limited in some clinical cases. Therefore, further studies from such a perspective are needed to be suggested.

5. Conclusion

Narrow-dimension implants (NDIs) are secure for use in the posterior region due to their long-term success rates. Wide dimension implants are used in case of large spaces or failure of the existing implant as well as poor initial fixation of the implant. Patients with high resorption or atrophy ridge use

a short-length implant to avoid bone augmentation. However, in case of bone grafting or maxillary sinus augmentation long implant is utilised for the patient.

Ethical approvals

Not applicable.

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Conflicts of interest

The authors declare no conflict of interest.

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