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One-Piece Implants: Placement Timing, Surgical Technique, Loading Protocol, and Marginal Bone Loss

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Keywords
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Abstract

Purpose: Osseointegration being an accepted and well-documented concept, attention is now directed towards simplification of the mechanical design of implants and towards achieving biomechanical success. The aim of this literature review is to provide an overview of the one-piece implant, with its advantages and disadvantages over a conventional two-piece implant.
Methods: The PubMed database was searched in the English language using the keywords one-piece implant, single-piece implant, single-stage implant surgery, and two-piece implant. Articles were selected on the basis of whether they had sufficient information related to placement timing, surgical procedure used, loading protocol, follow-up periods, marginal bone loss, and implant success rates of one-piece implants. For inclusion, a study group must have had a minimum of 30 one-piece implants followed for at least 1 year.
Discussion: Nineteen articles were subjected to the selection criteria. Out of 19 clinical trials only 11 met the selection criteria. Five parameters were taken into consideration for studying one-piece implants: placement timing, surgical technique, loading protocol, marginal bone loss, and implant survival rate. The data from the identified studies were tabulated according to these parameters and discussed.
Conclusion: Delayed placement of one-piece implants is more commonly practiced than extraction and immediate placement. Most surgeons prefer surgeries using flaps as compared to flapless surgeries, and in most cases, one-piece implants were loaded immediately. Limited literature reveals both positive and negative results regarding the effect of a one-piece implant system on surrounding hard and soft tissues.

Over the last two decades, implant treatment has become one of the first options for the prosthetic rehabilitation of edentulous and partially edentulous jaws. The original Branemark concept consists of a two-piece dental implant designed to be used in a two-stage treatment procedure. The implant is inserted into the bone after raising a soft tissue flap, which is subsequently repositioned to cover the implant during healing. Following a healing period, a new flap is raised, and a transmucosal abutment is attached to the implant to allow the prosthesis to be connected.[1]

Submerged healing periods of several months are not required to achieve osseointegration, and implants may be placed in a single stage and immediately loaded with an interim prosthesis, if occlusal loads are controlled, and the implants are placed with primary stabilization.[2] The immediate function protocol has several advantages over the delayed treatment protocol, including fewer surgical interventions, shorter treatment time, and reduced trauma for the patient. Further, immediate implant placement after extraction may preserve alveolar bone height and width and provide optimal soft tissue esthetics.[3]

One-piece implants were introduced to incorporate the transmucosal abutment as an integral part of the implant and thus eliminate the structural weakness built in two-piece implants. The seamless transition of implant to abutment is the design advantage offered by one-piece implants, which mimic the natural tooth in its construction and offer many advantages like strong unibody design, no split parts, single-stage surgery with either flap or flapless approach, and simple restorative techniques. A one-piece implant is intended for immediate function as well as for immediate placement in fresh extraction sockets. The surgical protocol for placement of this implant includes both flap and flapless surgical procedures; however, reports on

one-piece implants are rare.[4] The aim of this literature review is to provide an overview of the one-piece implant, with its advantages and disadvantages over a conventional two-piece implant and to evaluate its possibility for replacing two-piece implants.

Search strategy

The PubMed (using medical subject headings) database was searched in English using the following combinations of keywords: one-piece implant, single-piece implant, single-stage implant surgery, and two-piece implant. The initial PubMed search returned 198 results. After review of these results and their references, 19 articles were subjected to the selection criteria. Articles were selected on the basis of whether they had sufficient information related to placement protocol, surgical procedure used, loading protocol, follow-up periods, marginal bone loss, and implant success rate of one-piece implants. For inclusion, a study group must have had a clinical trial of at least 30 one-piece implants followed for at least 1 year. Out of 19 clinical trials, only 11 met the selection criteria.

Results

Five parameters were taken into consideration for studying one-piece implants: surgical procedure, loading protocol, marginal bone loss, and implant survival rate. The data from the identified studies were tabulated according to the following criteria: number of patients, number of implants, placement protocol, surgical procedure used, loading protocol, follow-up periods, marginal bone loss, and implant success rate.

Placement timing, surgical procedure, and loading protocol

In implant surgery, surgical trauma and patient morbidity should be kept to a minimum. The surgical protocol for placement of a one-piece implant includes both flap and flapless procedures. Visualization of the surgical field with flap elevation may reduce the risk of bone fenestration and dehiscences; however, flap elevation is associated with some degree of patient morbidity and discomfort. Furthermore, flap surgery for implant placement may negatively influence implant esthetic outcome, especially in the anterior maxilla.[5] Flapless procedures have been used for some time with tooth extractions and site preservation and have shown reduced morbidity.

Nkenke et al[6] evaluated the differences in patient morbidity between flapless (n = 10) and conventional implant surgery (n = 10). Immediately after surgery and 1 and 7 days postoperatively, the patients were asked to evaluate pain and discomfort using a visual analog scale (VAS). On the same day, an optical 3D image was assessed. The flapless surgery reduced the amount of pain and postoperative swelling significantly ($p < 0.05$). Fortin et al[7] compared postoperative discomfort and use of analgesics after flapless or conventional implant surgery. The patients (n = 60) used VAS to describe postoperative pain, starting on the day of surgery and daily thereafter for a total of 6 days. The patients in the flapless group experienced significantly less pain ($p < 0.01$) than the patients in the conventional group and used less analgesics for a shorter period of time.

In most situations, the placement of oral implants is purely an elective procedure. It is generally agreed that surgery should not impair the patient's quality of life and should reduce surgical trauma and patient morbidity to a minimum. One-piece implants are indicated for immediate placement in fresh extraction sockets as well as for delayed placement.[8] In case of delayed placement either flap surgery or flapless surgery can be used during placement. Further loading can be immediate as well as delayed.

In the studies[3,4,9-17] considered (Table 1) 903 implants were placed in 504 patients. A total of 103 implants were placed immediately after extraction in fresh extraction sockets, and 769 were placed after complete healing (delayed placement). One study[13] (patients: 17, implants: 31) did not mention whether implants were placed immediately or after complete healing of extraction sockets. A flapless procedure was used for 287 implants, and 476 implants were placed with flap elevation. Three studies[3,4,13] did not specify the surgical procedure. No interim prosthesis was given over 203 implants. A total of 698 implants were provided with interim prostheses, and almost all the interim prostheses were kept out of occlusion.

Marginal bone loss/mean bone levels

Success of dental implants is commonly defined by implant survival; however, ongoing marginal bone loss could jeopardize the survival of implants in the long term. Success criteria for marginal bone loss, among other parameters, were suggested by Alberktsson et al in 1986.[18] Their criteria allowed 1 mm of marginal bone loss during the first year after abutment connection followed by 0.2 mm/year. Today, these criteria are still frequently referred to as the gold standard for implant success. In one-piece implants no microgap between implant and the abutment could harbor bacteria, and there is no need to change healing caps or cover screws for abutments at the implant level after implant integration. Each manipulation at implant level can result in an inflammatory response with adverse hard- and soft-tissue responses. Broggini et al[19] concluded that the absence of implant/abutment interface (microgap) at the bone crest in one-piece implants was associated with reduced peri-implant inflammatory cell accumulation and minimal bone loss. Further, Wood et al demonstrated a correlation between the surgical procedure used (flap elevation) and gingival recession, as well as bone resorption around teeth.[20]

Hahn[3] (Table 2) observed that after 1 year of loading, 6% of the total number of one-piece implants had marginal bone loss >2 mm apical to the reference point, as compared to 16% reported for two-piece implants. Similar findings were also observed by Finne et al.[9] The one-piece implant design enables undisturbed healing of the peri-implant soft tissue and avoids disruption of the soft tissue seal when placing the definitive prosthetic restoration. In contrast, Ostman et al[12] reported that out of 104 one-piece implants, 49% had a marginal bone loss of >2 mm, and 20% had >3 mm as compared to only 7.7% with >2 mm and 0.6% with >3 mm of bone loss in two-piece implants. They concluded that one-piece implants showed more bone resorption than two-piece implants.[14,15]

Table 1 Placement timing, surgical procedure, and loading protocol

Study/year	No. of patients	No. of implants	Placement of implant	Surgical procedure	Loading protocol
Finne et al, 2007[9]	56	82	71: delayed placement; 11: immediate placement	36: flap procedure; 46: flapless procedure	Immediate provisional restoration, 69 without contact, 13 with light centric contact
Siepenkothen, 2007[10]	58	92	82: delayed placement	42: flap procedure; 50: flapless procedure	33 without and 57 with provisional restoration without working nonworking contacts, definitive prosthesis after 3 months
Engquist et al, 2005[11]	22	88	Delayed placement	Flap procedure	Delayed loading (12 weeks)
Sohn et al, 2011[4]	36	62	Delayed placement	Both flap and flapless procedure	Immediate provisional restoration without occlusal or lateral contacts, definitive prosthesis after 3 months in mandible and 5 months in maxilla
Hahn, 2007[3]	30	47	29: delayed placement; 18: immediate placement	Both flap and flapless procedure	Immediate provisional restoration, 37 without contact, 10 with light centric contact
Ostman et al, 2007[12]	48	115	101: delayed placement; 14: immediate placement	92: flap procedure; 23: flapless procedure	Immediate provisional restoration, single crowns out of contact, others in light centric contact, definite prosthesis after 3 months
Reddy et al, 2008[13]	17	31	Not mentioned	Both flap and flapless procedure	Immediate provisional restoration with no centric or eccentric contact, definitive prosthesis after 4–6 months
Sennerby et al, 2008[14]	43	117	99: delayed placement; 18: immediate placement	41: flap procedure; 76: flapless procedure	95: immediate loading 22: delayed loading
Zembic et al, 2011[15]	47	57	47: delayed placement; 10: immediate placement	55: flap procedure; 2: flapless procedure	All 57 implants with immediate loading
Finne et al, 2007[16]	87	152	130: delayed placement; 22: immediate placement	92: flap procedure; 60: flapless procedure	All 152 implants with immediate loading with 52% of implants kept out of occlusion and 48% kept in light centric contact
Froum et al, 2011[17]	60	60	All delayed placement	30: flap procedure; 30: flapless procedure	Delayed loading (8–12 weeks)

Implant success rate

Implant success was evaluated using the four-field table defined by Albrektsson and Zarb (1993) with the following categories:[17]

Success

An implant meeting the success criteria. Criteria for success included absence of implant mobility and absence of pain and neuropathy. Originally, 1 mm of bone loss was acceptable during the first year and 0.2 mm annually thereafter.

Survival

An implant still in the mandible or maxilla that does not meet with or has not been tested for success criteria.

Unaccounted for

An implant in a patient who dropped out of the study for any reason.

Failure

An implant removed for any reason.

Of the 903 implants from 11 reviewed studies (Table 3), 25 implants failed. Three studies[4,10,17] recorded a 100% success rate (n = 163). Engquist et al[11] reported a higher success rate of 97.5% for two-piece implants as compared to 93.2% for one-piece implants. Ostman et al[12] also reported that one-piece implants had a success rate of 94.8% (n = 115, failed = 6) as compared to 98.7% (n = 380, failed = 5) in two-piece implants. A minimum success rate[11] of 93.2% and a maximum success rate[4,10,17] of 100% was reported for one-piece implants.

Discussion

The goal of modern implant therapy entails more than just the successful osseointegration of the implant. Presently many options are available for one-piece implant placement and loading (i.e., placement and loading may be immediate or delayed, surgical procedure may be flapless or with flap).

Table 2 Marginal bone loss/mean bone levels (in mm)

Study/year	No. of patients	No. of implants	At fixture insertion (mean ± S_e)	At 1 year (mean ± S_e)	At 2 years (mean ± S_e)
Finne et al, 2007[9]	56	82	0.00	−0.78 ± 1.60 (n = 33) (marginal bone loss)	−0.26 ± 1.50 (n = 26) (marginal bone loss)
Siepenkothen, 2007[10]	58	92	+0.40 ± 1.40 (n = 72) (marginal bone level)	−0.68 ± 1.25 (n = 63) (marginal bone level)	−0.58 ± 1.28 (n = 64) (marginal bone level)
Engquist et al, 2005[11]	22	88	+0.1 ± 0.92 (n = 92) (marginal bone level)	−0.91 ± 1.27 (n = 61) (marginal bone level)	
Sohn et al, 2011[4]	36	62	−3.339 ± 0.10 (n = 64) (marginal bone level)	−4.79 ± 0.14 (n = 80) (marginal bone level)	
Hahn, 2007[3]	30	47	0.00	−0.53 ± 0.37 (marginal bone loss) (n = 62)	
Ostman et al, 2007[12]	48	115	0.00	−2.1 ± 1.3 (n = 104) (marginal bone loss)	
Reddy et al, 2008[13]	17	31	+2.33 ± 0.73 (n = 31) (marginal bone level)	+1.63 ± 0.81 (marginal bone level)	
Sennerby et al, 2008[14]	43	117	0.00	−2.4 ± 1.5 (n = 109) (marginal bone loss)	
Zembic et al, 2011[15]	47	57	0.00	−1.6 ± 1.2 (marginal bone loss)	
Finne et al, 2007[16]	87	152	+0.33 ± 1.20 (n = 141) (marginal bone level)	−0.98 ± 1.38 (n = 123) (marginal bone level)	+0.17 ± 1. 20 (n = 26) (marginal bone level)
Froum et al, 2011[17]	60	60	M 1.73 ± 0.94 with D 1.30 ± 1.06 flap (30) M 0.94 ± 1.06 without D 0.77 ± 0.98 flap (30) (marginal bone level)	M 0.87±0.99 with D 0.60 ± 1.06 flap(30) M 0.27 ± 1.00 without D 0.24 ± 1.03 flap (30)(marginal bone level)	

M: mesial; D: distal.

Table 3 Implant success rate

Study/year	No. of implants	Withdrawn implants	Observation period (months)?	Implant failure	Success rate (%)
Finne et al, 2007[9]	82	11	36	1	98.8
Siepenkothen, 2007[10]	92	None	24	None	100
Engquist et al, 2005[11]	88	4	36	6	93.2
Sohn et al, 2011[4]	62	None	33	None	100
Hahn, 2007[3]	47	1	36	1	97.9
Ostman et al, 2007[12]	115	None	24	6	94.8
Reddy et al, 2008[13]	31	None	12	1	96.7
Sennerby et al, 2008[14]	117	None	10.2 (range 1 to 18)	6	94.9
Zembic et al, 2011[15]	57	None	12	1	98
Finne et al, 2007[16]	152	None	24	3	97.9
Froum et al, 2011[17]	60	8	12	0	100

The same treatment options are applicable for two-piece implants.

Following extraction of the natural teeth, the edentulous ridge begins to resorb. This results in a general narrowing and shortening of the residual ridge and reduces the bone foundation available for implant therapy. Some authors believe in immediate placement of implants as a valid technique for preserving bone at the extraction site.[21] However, in all the reviewed studies, most implants were placed after complete healing of bone. Very few implants were placed immediately after extraction. In cases of immediate functional loading, it is important that initial implant stability is achieved. This criterion is even more crucial for one-piece implants, as the design of the implant does not allow the clinician to submerge the implant below the gingiva during the initial healing period.[10] In most of the reviewed studies, implants were immediately provided with an interim prosthesis but almost all were kept out of occlusion.

As far as the surgical protocol is considered, less patient discomfort (less pain, swelling, analgesic dose) was observed in flapless procedures than in surgeries with flap. Moreover, it took fewer appointments and less surgical time. Also, blood supply to the underlying bone was maintained; however, despite these advantages, the flapless technique also has several

potential shortcomings. It becomes difficult for the surgeon to visualize the anatomical landmarks and vital structures during implant placement. The potential for thermal trauma to the bone is greater due to limited external irrigation during preparation of the osteotomy site. Another disadvantage of the flapless procedure is the possibility of contamination of the implant surface or the deposition of epithelial or connective cells in the hole in the bone, which can interfere with osseointegration.[7] Manipulation of the circumferential soft tissues is not possible to ensure the ideal dimensions of keratinized mucosa around the implant. Flap elevation facilitates assessment of the quality and morphology of the bone at the implant placement site. It also provides accessibility for any alveoloplasty if required. As Brodala[8] noted, "The importance of keratinized mucosa around implants is debated, as some studies[22] have shown that the absence of keratinized gingiva is not critical to the health of the gingiva and the implant outcome, while others suggest that the failure rate is higher when there is a lack of keratinized gingiva or only a small amount is present."[23] From the reviewed studies, it is clear that surgery with flap reflection is more common in practice than the flapless procedure. The available short-term data also demonstrate that flapless surgery, although initially recommended for inexperienced surgeons, actually requires more experience and presurgical planning than originally assumed. This technique is often more challenging than the conventional surgical approach.

One-piece implants have no microgap between the implant and the abutment, so the loss of alveolar bone around the implant is minimized.[24] In two-piece implants, microleakage and micromovement of the prosthetic abutment can occur, which may lead to local inflammation of soft tissue around the implant.[25] Broggini et al[19] reported that there is significant difference in the accumulation of total number of inflammatory cells between two- and one-piece implants. Inflammatory cell infiltration is significantly greater for two-piece implants than for one-piece implants. Accumulation of microorganisms shows not only on the microgap on the external implant surface, but also on the internal surface or screw hole.[25] In conventional two-piece implants, after the abutment is connected, 1.3 mm to 1.4 mm of horizontal crestal bone loss and 1.5 mm to 2 mm of vertical interproximal bone loss are fairly typical during the first year of loading.[26] Also, if there is insufficient space between the implant and the adjacent natural tooth, interproximal bone loss, caused by horizontal bone loss, can influence the esthetic outcome.[27]

Hermann et al[24] reported that the width of a one-piece implant is similar to the biologic width of natural teeth, and the gingival margin may be placed more coronally than when two-piece implants are used. The implant can be provided with an interim prosthesis at placement, allowing mucosal epithelium and connective tissue adhesion to take place coronal to the alveolar crest. Moreover, with a one-piece implant design, manipulation of the peri-implant soft tissue after initial healing can be avoided. The preparable abutment portion of the implant makes it possible to create an individualized profile that follows the contour of the gingival margin without violating the soft tissue seal.[3] The flapless surgical technique may also contribute to a beneficial marginal bone level outcome. Avoiding separation of the periosteum from the underlying tissue may result in a better-maintained blood supply to the marginal bone, thus reducing the likelihood of bone resorption.

The bone reaction with the one-piece implant was different in many ways from two-piece implants. One-piece implants, despite being clinically stable, often presented with crater-like defects, which are rarely seen around conventional two-piece implants.[12] No explanation is documented in the literature about this difference in bone reaction. Some implants also showed atypical juxtaradicular defects. The crater-like defect is generally looked upon as a radiographic sign of peri-implantitis, a condition usually seen after many years of loading. Various clinical follow-up studies have reported a similar degree of initial bone loss for both one-piece implants and submerged two-piece implants.

Abutment screw loosening is the most common prosthetic complication of two-piece implants and has been reported to occur in 7% to 40% of cases (depending upon patient factors and the implant system used).[28] This complication does not arise in one-piece implants due to the absence of screw. In terms of material strength, one-piece implants are stronger than two-piece implants. The abutment screw is eliminated, resulting in unibody design, allowing for sufficient strength of the one-piece implant despite its small diameter.

Edentulous areas corresponding to a missing upper lateral incisor and lower anterior teeth provide very limited mesiodistal space. Traditional implant sizes of 3.5 mm and greater at the crest module are often too large to replace missing teeth in these areas. To prevent interproximal bone resorption and loss of gingival papilla volume in the esthetic zone, a space of at least 1.5 mm between the implant and adjacent natural tooth is necessary.[29] On the other hand, two-piece implants of less than 3.0 mm diameter have a risk of fatigue fracture.

Due to the absence of a connecting screw, it is possible to design a one-piece implant of smaller diameter so one-piece implants can be easily used in narrow edentulous spaces. In addition, when adjacent mandibular incisors are missing, splinting two smaller diameter implants together is a better option than cantilevers from one implant. Two small diameter implants have a greater surface area than one traditional implant, and the moment of force is reduced when the cantilever is eliminated.[30]

The conventional two-piece implants usually are put to function only after 3 to 6 months of healing. As it is possible to attach a transgingival extension to the implant after the first surgical phase, similarly, a regular prosthetic abutment can be connected, and the implant can be either progressively loaded or immediately restored if there is good primary stability.[31] Moreover there is no need to join a separate abutment to the implant through a connecting screw.

After second stage surgery, conventional two-piece implants require a healing abutment around which soft tissue heals and also require separate prosthetic components such as impression copings, which further differ on the basis of impression techniques (closed- or open-tray impression techniques) and implant analogs for lab models. One-piece implants with a built-in abutment can be prepared with tungsten carbide burs using the same principles recommended for tooth preparation. Similar impression procedures can be used as recommended to record the prepared tooth (using gingival retraction and impression making with a suitable impression material such as

addition silicone). The laboratory phase is similar to that of the conventional crown technique with which many dental commercial laboratories are familiar.

Despite the above advantages, one-piece implants also have some limitations. After the placement of a one-piece implant, it is not possible to change the abutment angulation, so precise placement of the implant is very important, whereas the abutment angulations can be modified by using angulated abutments in two-piece implants. The second disadvantage is the necessity of immediate restoration, especially in esthetic zone areas, which may lead to an increased risk of overload during initial bone healing. Further, oral habits or activities such as gum chewing, tongue thrust, or playing a musical instrument such as woodwinds may also overload the developing interface between bone and implant. In the maxillary anterior region, the available bone determines the angulation of the one-piece implant, commonly resulting in a more-labial position of the implant. To avoid this, various angulated one-piece implant systems are now available; however, the necessity of rotation of these implants during placement poses a problem when limited mesiodistal space is available in partially edentulous areas.

Over the past decade, implants of smaller diameters have been introduced into the field of dentistry. Nomenclature of smaller diameter implants is confusing. These can be classified into reduced diameter (RDIs, 3.25 mm to 3.5 mm), small diameter (SDIs, 2.5 mm to 3.2 mm), and mini dental implants (MDIs, 1.8 mm to 2.4 mm).[32] These implants are frequently used in cases of limited alveolar anatomy. The choice of implant diameter depends on the type of edentulism, the volume of the residual bone, the amount of space available for the prosthetic reconstruction, the emergence profile, and the type of occlusion. SDIs are indicated for the replacement of teeth with small cervical diameters and in cases of reduced interradicular bone. Survival analyses of SDIs have been exceptional, with rates between 88.5% and 96%, depending on methodology and survival criteria.[33] In two retrospective analyses of 2.9 mm implants, Vigolo et al demonstrated survival rates of 92%[34] and 94.2%.[35] Based on this in vivo and in vitro success, MDIs seem a logical successor. MDIs were initially designed for temporary prosthetic stabilization during the healing phase of standard implants.[36] Reproducible success in this indication[37] has led to expanded uses in orthodontic anchorage,[38] for the temporary fixation of transplanted teeth,[39] in periodontal therapy[40] and more recently, for long-term fixed and removable prosthetics.[41,42] Implants supporting fixed prostheses may be more successful than those supporting removable prostheses.[43] Regardless, the survival difference between implants in the fixed and removable prosthetic subgroups merits further discussion as follows: It must first be noted that a greater implant-to-tooth ratio was used in fixed prosthetic stabilization (e.g., 10 to 12 implants for a "roundhouse" fixed upper bridge vs. 6 implants for a full upper denture).[43] For single tooth replacement, one MDI is used for anterior and bicuspid teeth, and two MDIs are used for molars. Replacing a single missing molar with two narrow dental implants serves as a viable treatment option. Mazor et al[44] reported a 100% success rate over a period of 1 year for 66 SDIs (3 mm wide) in the molar region. The bridgework in these cases acts as a splint, anchoring adjacent implants and reducing micromovement. In addition, single tooth replacement was more common in the esthetic zone, where occlusal forces are minimal. Conversely, for implants supporting removable prostheses, the repeated forces of prosthetic insertion and removal may disrupt the process of osseointegration.

An MDI has about a quarter of the volumetric displacement of a standard-diameter implant of the same length. MDIs produce less osseous displacement than standard implants and may present less of a barrier for osseous healing and angiogenesis for osseointegration. There is also less percutaneous exposure compared with standard-sized implants because the MDI has about 50% less circumference.[45] This may be important if oral hygiene is compromised by presenting less of a surface area that may accumulate plaque. Assuming a cylinder, the surface area of an MDI is about half that of a standard-diameter implant. MDIs exert greater force per millimeter^2 on the supporting bone than standard-diameter implants. These forces may overload or fracture the supporting bone, causing the implant to fail.[45] Implants with a 2-mm diameter have a fracture strength 16 times lower than that of 4-mm implants. Therefore, SDIs should be used in areas bearing weak occlusal forces such as lower incisor areas. A 1-mm decrease in width of an implant may decrease the surface area of an implant by more than 40%.[30] Less-dense osseous sites, such as type IV, may be contraindicated for MDIs. The greatest disadvantage of the MDI is its poor efficacy in immediate extraction sites; the large socket diameter precludes adequate implant/bone interface. Also, a greater number of implants are recommended for MDI restorations. Furthermore, one-piece implants allow only a knife-edge margin for the definitive restoration; a chamfer or shoulder is not allowed due to the narrow head of the implant.[4]

Conclusion

From the above studies, it is clear that delayed placement of one-piece implants is more commonly practiced than is extraction and immediate placement. Most surgeons prefer surgeries using flaps to flapless surgeries, and in most cases, one-piece implants were loaded immediately. Limited literature reveals both positive as well as negative results regarding the effect of a one-piece implant on surrounding hard and soft tissue. Further studies are required before a solid conclusion can be stated regarding the implication of a one-piece implant in practice and its effect on surrounding soft and hard tissue; however, certain disadvantages such as limited options for finish line, inability to change the prosthesis angulation after placement, and the requirement of immediate provisionalization pose limitations in its application. Both systems have their advantages and disadvantages. Choice of one procedure over the other should be based on each clinical situation, and the decision is subject to discretion of the clinician.

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