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Perio-prosthodontic pontic site management, part I: Pontic designs and their current applications

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Abstract

Objective

Emulating natural dentition with dental implant restorations is challenging, increasing its complexity when a pontic area must be restored. Many different methods have been described to solve this problem. The pontic designs which have been proposed have specific indications and may require additional treatments, including soft tissue augmentation procedures, to increase the possibility of an esthetically pleasing and biologically tolerable outcome. Proper conditioning of the soft tissues during the interim restoration stage and adequate communication with the laboratory are also critical factors to a successful outcome. This article describes the different approaches to restoring pontic sites with different degrees of complexity, their clinical indications, and limitations viewed from a perio-prosthodontic approach.

Clinical Considerations

Different clinical scenarios for pontic sites require different approaches. Missing hard and soft tissues can be replaced by surgical or prosthetic means. Understanding the clinical indications and implications of the different pontic designs allows the clinician to make good decisions when planning and treating patients that require replacement of pontic spaces leading to more successful outcomes.

Conclusions

Different pontic designs have specific indications as well as biologic and esthetic prognoses. Selection of a good design, proper modifications during the provisionalization stage, and adequate communication with the dental laboratory will lead to higher chances of esthetic and biological success.

Clinical Significance

1 INTRODUCTION

Restoring a missing tooth in the esthetic sector represents a clinical challenge to the clinician.[1] These challenges include esthetic and functional hurdles that can affect the result of the case. The esthetic concerns include soft tissue collapse, possible scars due to previous surgeries, papilla loss and "black triangles". The functional problems include phonetic alterations resulting from open embrasures or gaps between the pontics and the soft tissues allowing for air or saliva exchange and food impaction in these areas.

Pontic site management in situations where fixed dental prostheses (FDP) are indicated is crucial for an esthetically pleasing outcome; this is especially important in patients with a high smile. The FDP should have a natural-looking appearance, optimal biomechanic characteristics and promote adequate cleansability to prevent gingival inflammation.[2]

Different pontic designs have been described in the literature to promote a natural appearance of the prosthesis, which is essential in the anterior maxilla, where the bone gets quickly remodeled after tooth extraction due to the thin cortical buccal plate present.[3-7]

The use of hygienic pontics, convex pontics, esthetic pontics, and other designs are commonly used pontic designs, each with specific indications of use (Table 1).[3, 8-10] Regardless of the pontic design, all pontics should ideally be flat or convex, with minimum pressure contact or pressure-free and well-polished to preserve healthy tissues and prevent mucosa inflammation due to plaque accumulation (Figure 1).[9, 11] The clinician needs to understand when a pontic design is ideal for specific clinical scenarios and the technicalities involved in using each of these, as this will enhance the esthetic and biological outcome of the future restoration.

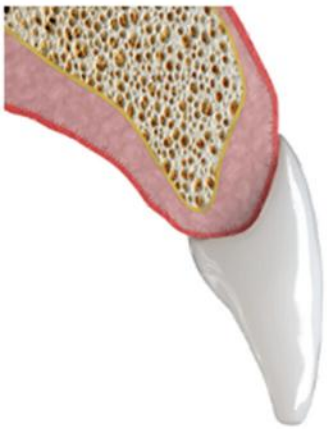
TABLE 1. Clinical considerations for most commonly used pontic designs.

Pontic design	Indication	Shape
Sanitary/hygienic	Posterior or lower teeth with hygienic demands	Convex
Conical	Posterior teeth without esthetic requirements	Convex
Saddle ridge lap	Posterior and Anterior teeth	Concave
Modified ridge lap	Posterior and Anterior teeth	Concave
Ovate	Anterior and posterior teeth	Convex
	High smile line	
Modified Ovate	Anterior and posterior teeth	Convex
	High smile line	

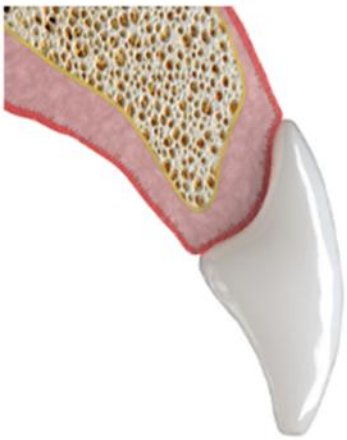
E-pontic	Anterior and posterior teeth High smile line	Flat
Flat pontic	Anterior and posterior teeth High smile line	Flat
Step pontic	Anterior and posterior teeth High smile line	Convex

Hygienic Pontic

Conical Pontic



Saddle Ridge lap



Modified ridge lap

Modified Ovate Pontic

Ovate Pontic

Step Pontic

Flat Pontic

The purpose of this article is to provide a review of the clinical and technical options available for fabricating pontics, illustrate the practical procedures, and describe the indications for treatment with each of the prosthetic designs available.

2 PONTIC DESIGNS

2.1 Hygienic pontic

This pontic design does not contact the underlying soft tissues, facilitating cleaning.[3] However, its main disadvantage is food trapping due to the space between the pontic and the tissues. This space also affects speech, comfort and creates an adverse esthetic result, so its use should be limited to the posterior area or the anterior mandible. Nowadays, it is mainly used in the mandible when treating the patient with full-arch implant-supported prostheses to ease the patient's hygiene in those situations with a shallow vestibule and a moderate–severe vertical bone defect. This design is contraindicated in full-arch implant-supported prostheses of the maxilla, as it may lead to phonetic problems due to the lack of seal (Figure 2).

FIGURE 2 Open in figure viewer | PowerPoint

Hygienic pontic designs can be used in the lower jaw to facilitate hygiene in those patients with very atrophic ridges.

2.2 Conical pontic

prevent bone remodeling (Figure 3).[13, 14] This pontic design should only be used in cases where a thick biotype is present. The main advantage of this design is the ease of access to oral hygiene and the maintenance of the socket volume. However, it may promote food trapping and poor esthetics, and its long-term prognosis may be compromised.

FIGURE 3 Open in figure viewer | PowerPoint

An ovate pontic delivered immediately into an extraction socket may reduce the gingival contour remodeling.

2.3 Saddle ridge lap pontic

This pontic design has a concave intaglio surface, which fulfills esthetic, phonetic, and functional requirements when minimal crest resorption happens.[8] However, when a significant vertical or horizontal ridge collapse is present, the extensive ridge-lapped material limits the ability to clean the concave area in the pontic design, which promotes inflammation and ulceration of the site (Figure 4a,b).[15] Restored teeth appear to long with this kind of design, however it may result useful during the interim phase to shape the pontic sites by adding composite to its intaglio surface (Figure 5). This design provides reasonably good esthetics but should not be used as a definitive design as it promotes food trapping, and it is difficult to clean.

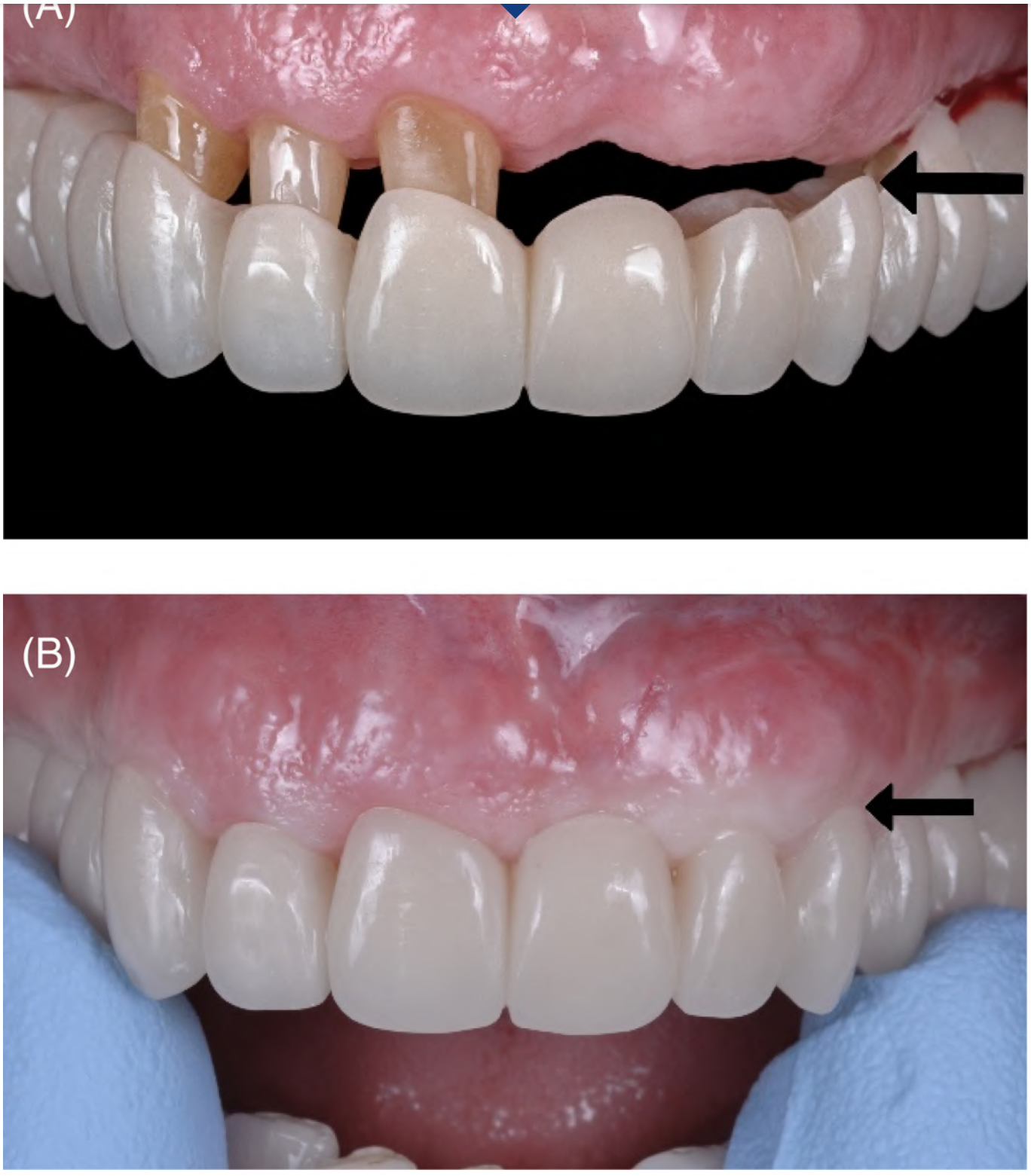


FIGURE 4

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(A) Ridge lap and modified ridge lap pontic designs can be used during interim restorations. (B) The ridge lap should be modified with resin or composite to change their design for cleansability and proper tissue conditioning.

FIGURE 5 Open in figure viewer | PowerPoint

Adding composite or acrylic resin to the interim restoration helps shape the soft tissues. Adding composite onto the facial area of an ovate pontic transforms it into into a modified ovate pontic.

2.4 Modified ridge lap pontic

In the modified ridge lap pontic, the concavity is reduced, shortening the pontic's palatal side, which makes it a favorable option for cases with mild crest defects.[16] Its drawback is the unesthetic result in situations where vertical resorption has occurred. This situation increases teeth length, compensating for vertical bone remodeling. In addition, papilla volume is reduced, leading to open gingival embrasures that cause saliva, air exchange, and food impaction.[1] Even though the concave surface is reduced, it remains challenging to clean with dental floss. Ridge lap pontic designs can be used in provisional restorations of patients with a high smile before modifying their shape, adding polymethyl methacrylate (PMMA) or composite to simulate missing soft tissues. They are also helpful tin evaluating the area to reconstruct with soft tissue augmentation procedures as they help visualize the expected result to be achieved after surgery. This design makes it easy to achieve reasonably good esthetic outcomes. However, even though they are easier to clean than conventional ridge laps, they still promote food trapping.

2.5 Ovate pontic

The ovate pontic, first described by Dewey in 1933 and revisited by Abrams in 1980, has a convex design to avoid the cleanability problems associated with the ridge lap and modified ridge pontic designs[17, 18]

Hygiene procedures are simple due to their convex shape, but the patient must be compliant due to the large contact area, which could cause inflammation if it is not well maintained.[16] The convex design

drawback is that it requires enough soft tissues to be sculpted with the interim restoration (Figure 6). Its use is possible in some patients with a thick phenotype and low bone remodeling after tooth extraction, but this possibility is low, and this kind of pontic design usually requires mucogingival procedures to reconstruct the soft tissues and achieve its esthetic goals (Figure 7).

FIGURE 6

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Ovate pontics can be shaped in the laboratory to manufacture the provisional restoration or the final prosthesis.

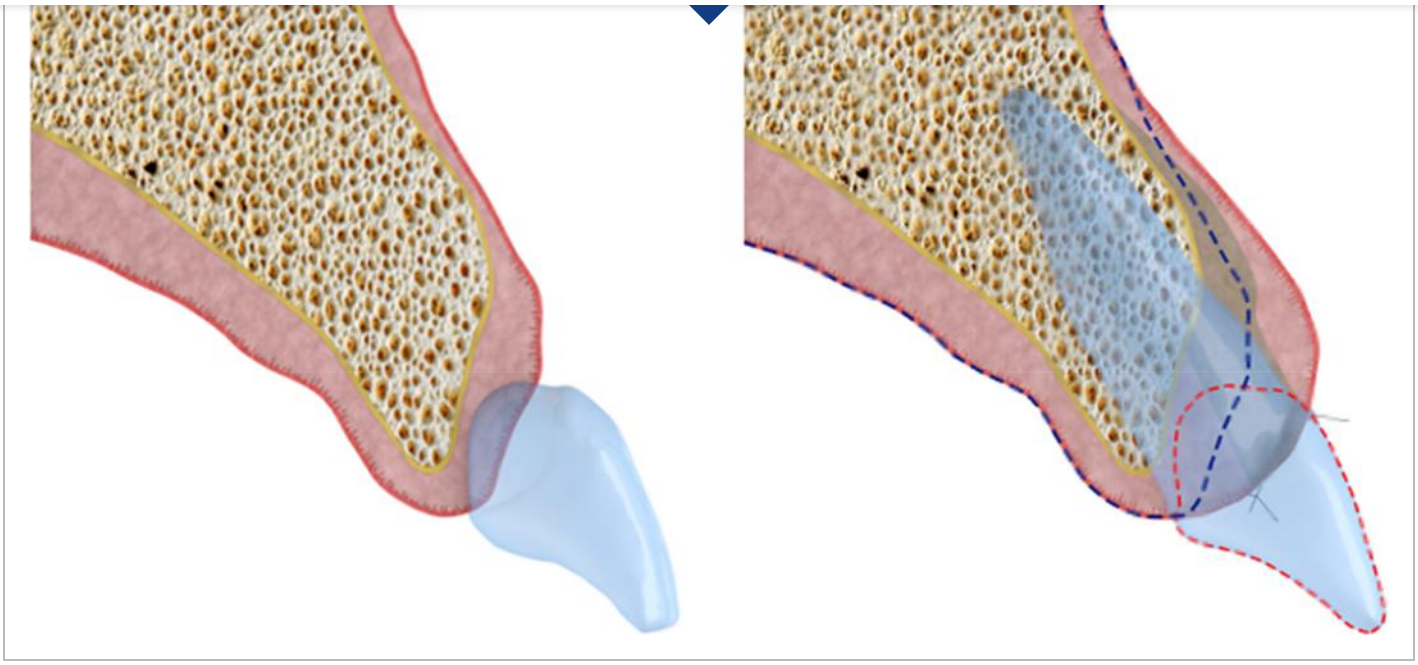


FIGURE 7 Open in figure viewer | PowerPoint

Treatment planning and pontic design for a perio-prosthodontic approach showing the outline of the soft tissue after tooth extraction (blue line) and the ovate pontic design (red line): without the soft tissue reconstruction is difficult to achieve a predictable esthetic and functional result.

2.6 Modified ovate pontic

This design moves the height of contour (1–1.5 mm) from the center of the base to a more labial position. The buccolingual thickness needed is less than when the ovate design is used, so it does not often require surgical reconstruction of the pontic site.[20] This design promotes good esthetics generally, easy hygiene and appropriate air sealing for proper phonetics. However, the esthetic result is not pleasant enough if done in patients with a high smile and vertical ridge defects, as it may create a shadow in the pontic-gingival margin. The best esthetic result is achieved if the soft tissues are augmented before the prosthetics are done.

2.7 E-pontic

The E-pontic design consists of a flat design with sharp borders that promotes the gingival facial tissue to migrate over the pontic, creating a gingival sulcus.[10]

FIGURE 8 Open in figure viewer | PowerPoint

The F-pontic consists of a flat design that promotes the gingival facial tissue to migrate over the pontic, creating a gingival sulcus coronally.

Contrary to other designs, developing the pontic shape with the provisional before making the final impression is unnecessary. However, at least 2 mm of soft tissue should be present over the bone crest on the ridge's facial aspect to create the pontic site bed.[21] This is important as the pontic depth is dictated by the amount of tissue over the bone and the amount of tissue compression needed to create an adequate volume of interproximal tissue in the gingival embrasure space.

The main advantage of the E-pontic is the potentially esthetic result that can be achieved by using it without previous tissue manipulation during the interim restoration phase. However, its main challenge is the ease and predictability to achieve the esthetic result without an interim restoration. Seating the final restoration into the soft tissues requires compression, which can be technique sensitive, which may lead to esthetic and functional complications.

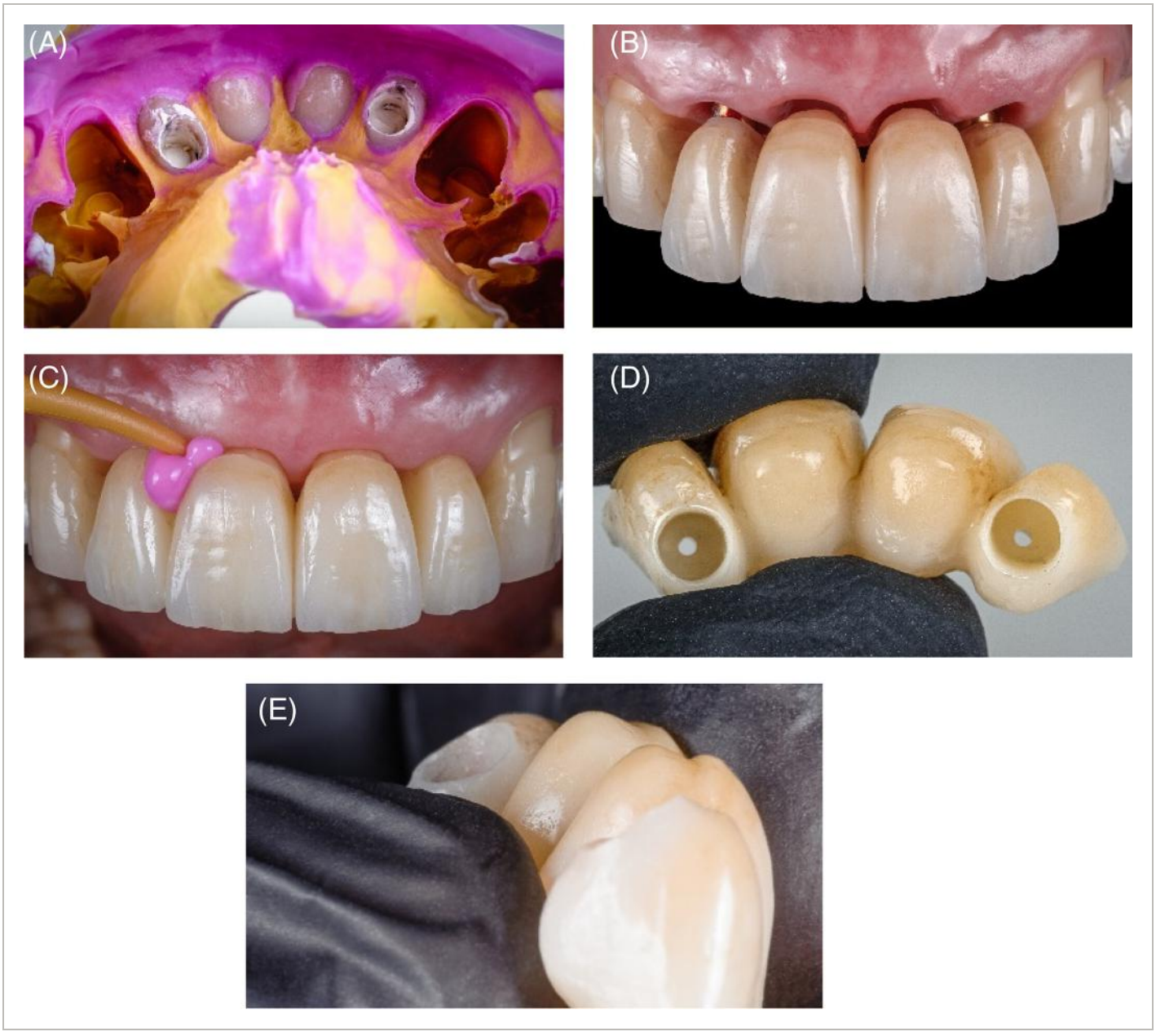
2.8 Flat pontic

The flat pontic is a modification of the ovate pontic; however, in this design, the pontic's convexity can be reduced with a periodontal reconstruction before the pontic placement is required. This soft tissue reconstructive surgery makes the esthetic and functional results more predictable.[22] An interim restoration with the appropriate design is kept in place to promote tissue healing. The interim restoration design may be modified, and its final design must be replicated in the final restoration through copy-milling. The round angles in the facial and lingual pontic-tissue contact areas facilitate hygiene and the prosthesis seating. The central portion of the pontic has a semi-flat design, preventing excessive pressure

sensitive and more predictable than the E-pontic (Figure 8). This pontic design has high esthetic results, good sealing, hygiene, and efficient provisional seating, but it requires a previous surgical procedure to be used, which is its main disadvantage.

2.9 Step pontic

The step pontic is a modification of the flat pontic. In this design, the buccal aspect of the pontic is reduced to facilitate the gingiva's coronal migration creating a more natural-looking result. It requires enough horizontal quantity of soft tissues to achieve creeping of the soft tissues over the created space on the pontic. This design is used in cases where vertical tissue height is lacking even after a reconstruction procedure of the ridge. This design aims to avoid a second surgery pushing the palatal soft tissues facially but not compressing the gingiva's most facial aspect to allow them to adapt to the emergence profile of the restoration and avoid longer crowns. This pontic is designed the same way the esthetic emergence profile of an implant-supported restoration is shaped (Figure 9A–E).[22]



which was modified digitally from a flat design to promote gingival adaptation. (B) Bisque try-in of the implant supported fixed dental prosthesis with the newly designed step pontics. (c) A new pick-up impression done during the bisque try-in to communicate the final status of the soft tissues to the laboratory for final layers of feldspathic porcelain to be added. (D) Intaglio view of the step design. (E) Side view of the step design.

2.10 Treatment planning

Several parameters should be analyzed before deciding on the pontic design to be used:

2.10.1 Gingival considerations

The outline, quantity, color, and texture of the soft tissues must be assessed to achieve a natural emergence of the restoration. Multidisciplinary treatment is often needed to achieve an esthetic transition between the tissues and restorations.

2.10.2 Lip line considerations

The lip line position has a significant influence on the selection of the pontic design. If the contact area with the alveolar ridge is visible when the patient speaks or smiles, a thorough analysis of the lip line in repose, during the speech, and smiling must be done to select the prosthetic design. In such situations, additional techniques may be necessary to reconstruct the pontic site before the prosthodontic approach.

2.10.3 Patient related factors

It is crucial to evaluate patients appropriately as some will have high esthetic expectations. More complex cases will require surgical treatment to generate ideal emergence profiles, and the technique depends on the ridge defect's severity.[22, 23] Mild and moderate defects can be regenerated predictably with mucogingival techniques, enhancing the overall result of the case. More severe defects may require bone regeneration procedures as well.

Ovate, E-pontic, Flat, and Step pontic designs are indicated in patients with high expectations and gummy smiles whenever the soft tissue volume is adequate or has been augmented.

2.11 Prosthetic soft tissue conditioning and communication with the dental laboratory

Pontic site conditioning may be required in post-extraction sockets or in healed ridges, each of these situations must be addressed differently to achieve adequate results.

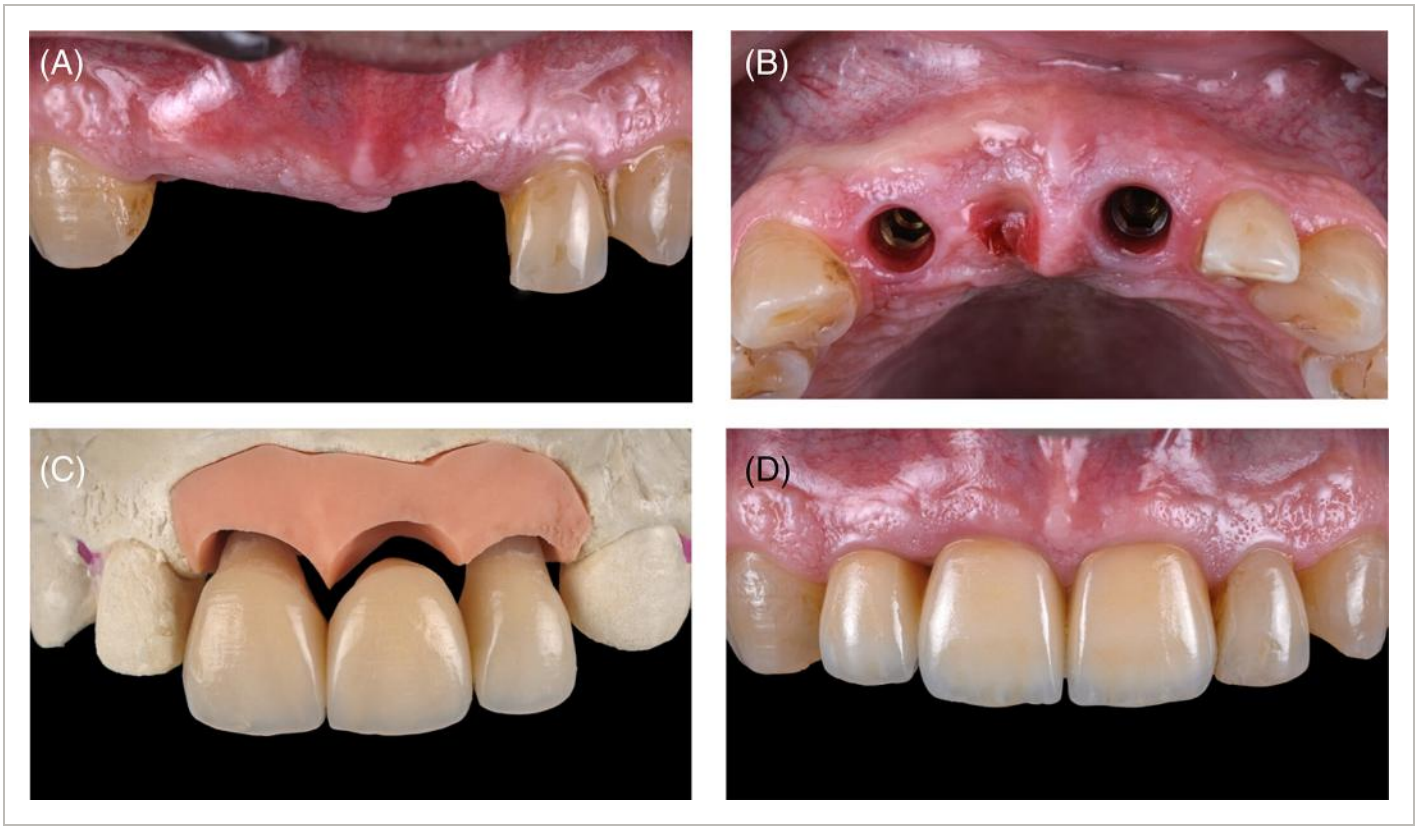
2.11.1 Post-extraction sockets

After a tooth is extracted, immediate pontic conditioning may be done. In this approach, a highly polished interim restoration with an ovate pontic design is introduced 2.5 mm into the socket and kept in place for 4–6 weeks while the site heals and there is tissue stability.[19, 24] It has been described that the pontic site

emergence profile.[26, 27] After 4–6 weeks, the interim restoration is removed and modified, leaving a 1 mm depression in the gingiva. This area should be adequately cleaned using super floss to avoid inflammation.[16, 26] A long-term interim restoration should be kept in place for 6–12 months before fabricating the final prosthesis with a pontic design set approximately 0.5 mm into the gingiva.[11] The main disadvantage of this approach is that the convex pontic design introduced into the socket may limit the healing process leading to a lack of tissue volume.

2.11.2 Healed ridges

The technique may become more labor-intensive in healed ridges, and delayed pontic conditioning is required. When an excessive volume of soft tissue is present in the unconditioned pontic site, the interim restoration will often not sit because of the resistance from the healed gingival tissues to the pontic design (Figure 10A). If this happens, gingivoplasty or prosthodontic site-conditioning must be done to adapt the pontic to the gingiva (Figure 10B).[5, 28] When a prosthodontic site conditioning is done the interim restoration in these cases is prepared in the laboratory on a working cast imitating the emergence profile of the adjacent teeth by sculpting the plaster 2 mm where the ovate pontic design is needed (Figure 10C). The clinician's challenge is to design the proper space intraorally in the soft tissues to serve as a recipient bed for the interim restoration designed. Prosthodontic clinical site conditioning with interim restorations should apply light pressure on the gingiva. The interim restoration should push the soft tissues buccally as the patient bites down on a cotton roll. It is important to note that the amount of pressure exerted must allow the soft tissues to recover the blood supply from the ischemia created by the pressure within 5 min (Figure 10D).[24] This procedure can be repeated every 2 weeks until the proper soft tissue contours are created.



the interim restoration manufactured without excessive ischemia. (C) Proper contour of the interim restoration are fabricated in the laboratory idealizing the desired result. (D) Seated restoration in the patients mouth with adequate contours of the soft tissues.

Gingivoplasty or tissue sculpting is a minimally invasive procedure for tissue conditioning.[5, 28] Laser, bur abrasion, and electrosurgery can be used to speed up conditioning of the pontic site (Figure 11A) by eroding the epithelium 1 mm and applying pressure to the soft tissues immediately with the interim restoration. The interim restorations can be readjusted and polished after 2 weeks if necessary. No other tissue sculpting is usually necessary after doing this procedure. After gingivoplasty, the mucosa heals by second intention over weeks. Interim restorations should be kept for 3 months, but there is little evidence for this (Figure 11B).[27] Instead of gingivoplasty or tissue sculpting, a central incision with a scalpel may be enough for shallow pontic defects (Figure 12A). The pontic is inserted into the incision, pushing the gingiva buccally and laterally, increasing its volume and enhancing the emergence profile's appearance (Figure 12B,C). This incision can also be made vertically, with lateral gingival displacement increasing the papilla tissue volume. An H or T-shape design of pontic incision helps seat the interim restoration at the same time as small quantities of soft tissue are displaced and adapted to the provisional. On rare occasions, excessive bone is present due to tooth extrusion, and an osteotomy needs to be done to properly seat the interim laboratory restoration, leaving a minimum of 2 mm of space between the pontic design outline to the bone crest (Figure 12D).

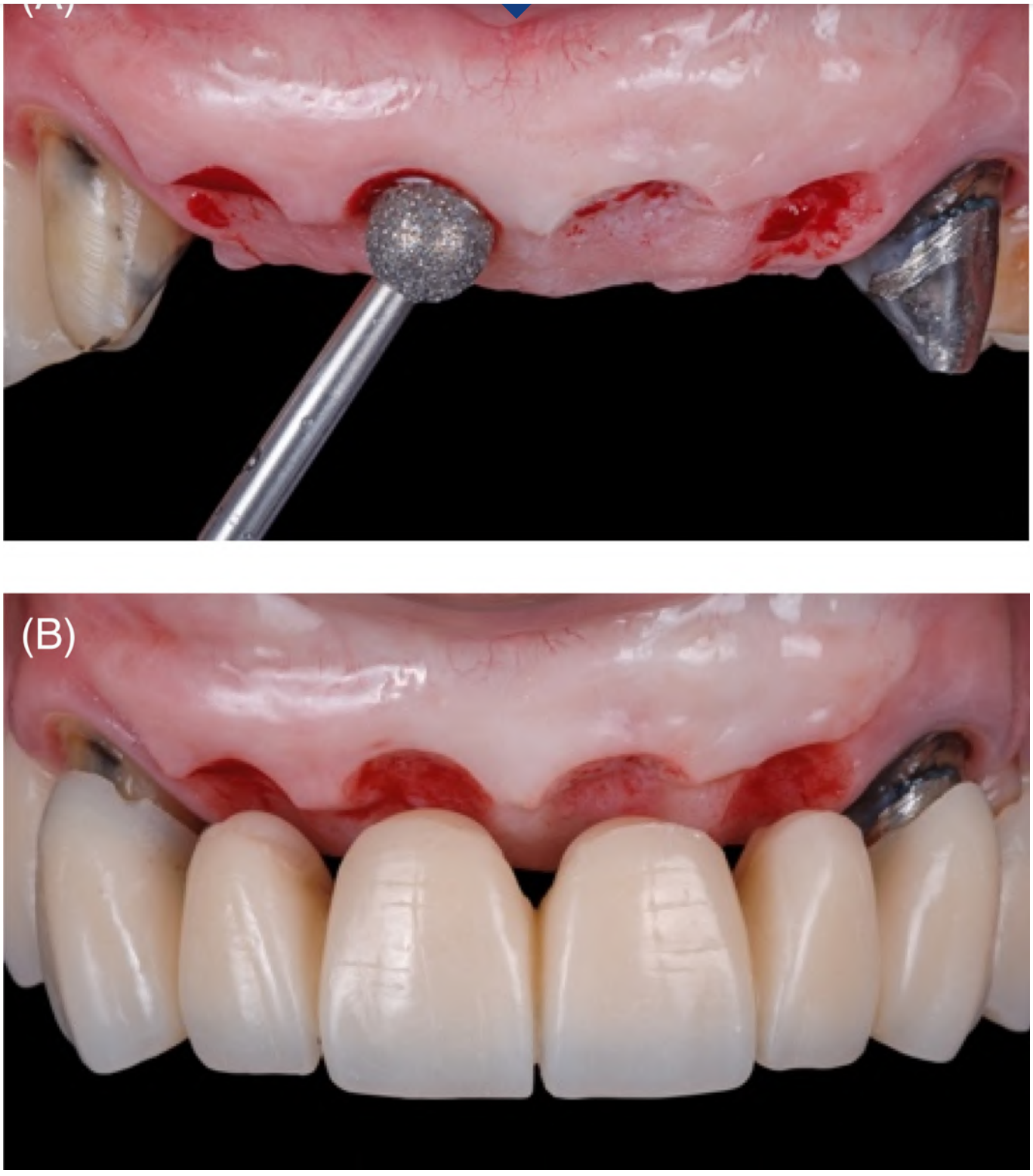


FIGURE 11

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(A) Laser, bur abrasion, or electrosurgery may be used to condition the pontic site. (|B) Ideally contoured restorations will allow proper tissue healing after laser, bur abrasion, or electrosurgery has been used to prepare the pontic site.

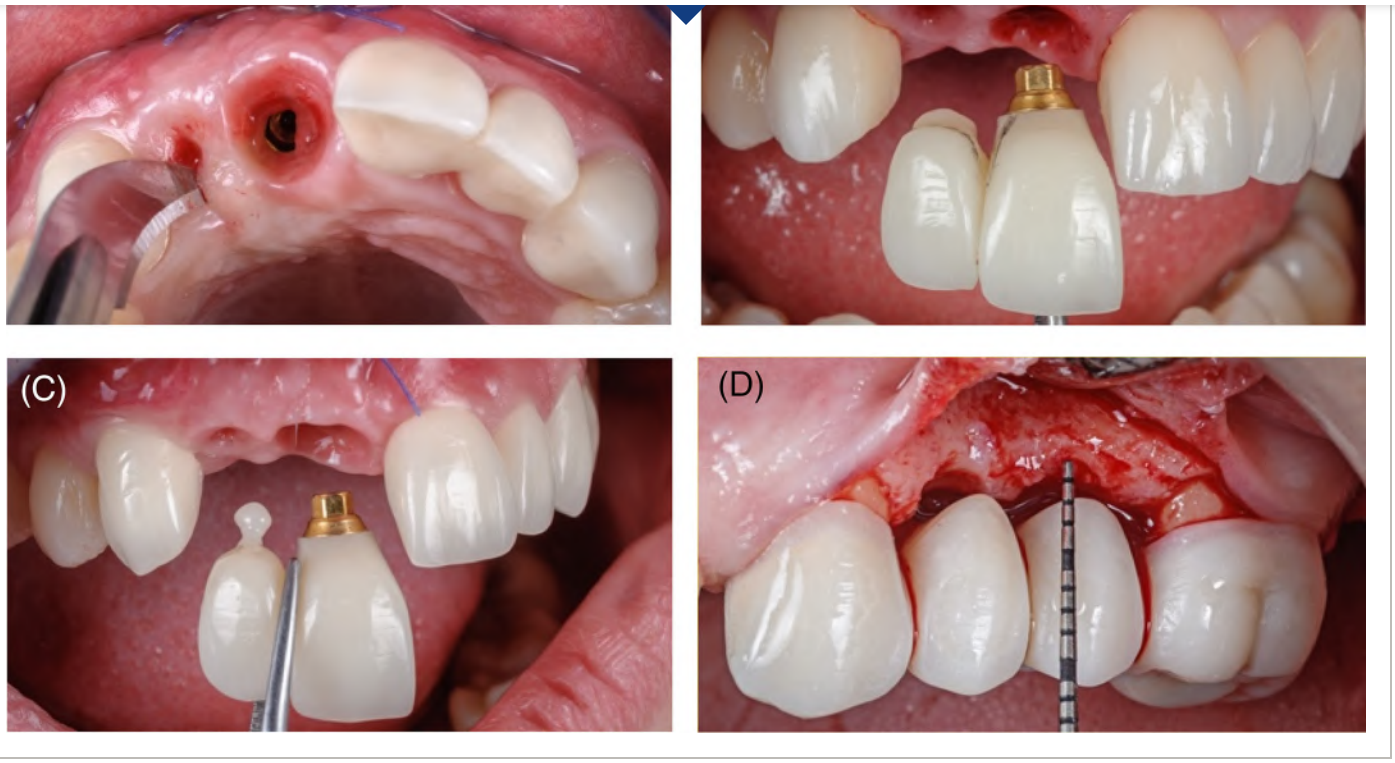


FIGURE 12 Open in figure viewer | PowerPoint

(A) An incision can also be made instead of a gingivoplasty or tissue sculpting. A central incision with a scalpel may be enough for shallow pontic defects to increase the tissue volume around the pontic. (B) Gradual manipulation of the pontic site is done to progressively enhance the soft tissue outline on a healed ridge. (C) Adding composite resin helps displace the soft tissues buccally during soft tissue contouring. (D) If there is excessive bone underlying the pontics it may need to be remodeled to comply with the biologic spaces. A distance of 2 mm from the pontic design outline to the crest of the bone must be present to avoid clinical and biologic complications.

After the soft tissues have been shaped and stabilized, it is important to allow the dental laboratory to replicate this in the final restoration by providing accurate impressions that copy the pontic sites, papillae and overall esthetic contours of the tissues.

An interim restoration can be placed during implant uncovery. If this is done, an impression must be made at implant placement. The interim restoration will be fabricated during the osseointegration period. This helps adapting the soft tissues to the designed emergence profile.[29]

2.12 Impression technique

Before replacing the interim restoration with the final prosthesis, stable soft tissues are necessary. The interim restorations should be kept for at least 2 months in healed ridges and 6–12 months in recently extracted sites. Developing the site when fitting the final prosthesis is not ideal, as the laboratory technician has to guess the thickness and compression of the mucosa. In these cases, the clinician has to prepare the recipient site before fitting the FDP by adapting the pontic. To guide the process, the clinician can use pressure-indicating paste on the pontic site, which, when seated, will mark where the mucosal

profile of the restoration. Since tissues can easily collapse in a few minutes, two impressions must be made. First, a standard impression technique is used to make impressions of the prepared teeth or the implants. A soft tissue cast and an ovate pontic index can be fabricated to transfer accurate information of the sculpted tissue to the laboratory technician (Figure 13A–C). A second impression is made using a resin framework with the proper pontic shapes. These techniques, however, require additional clinical appointments and laboratory procedures.[27, 30-34]

(B)

FIGURE 13 Open in figure viewer | PowerPoint

(A) Once the pontic sites have been developed an impression of the intaglio surface can be done to relay the information to the laboratory for the production of the final esthetics. (|B). The custom impression of the pontic sites will be used to fabricate the final contours of the definitve prosthesis. (C) Final implant supported fixed dental prosthesis delivered with replicated pontic sites from the interim stage.

Another option is to inject a medium-body vinyl polysiloxane into the interim restoration after the final impression to create a silicone cast to transfer the exact shape of the pontic to the laboratory (Figure 14A–C).[35] The laboratory will use the silicone matrix to replicate the provisional custom-made pontics.

(B)

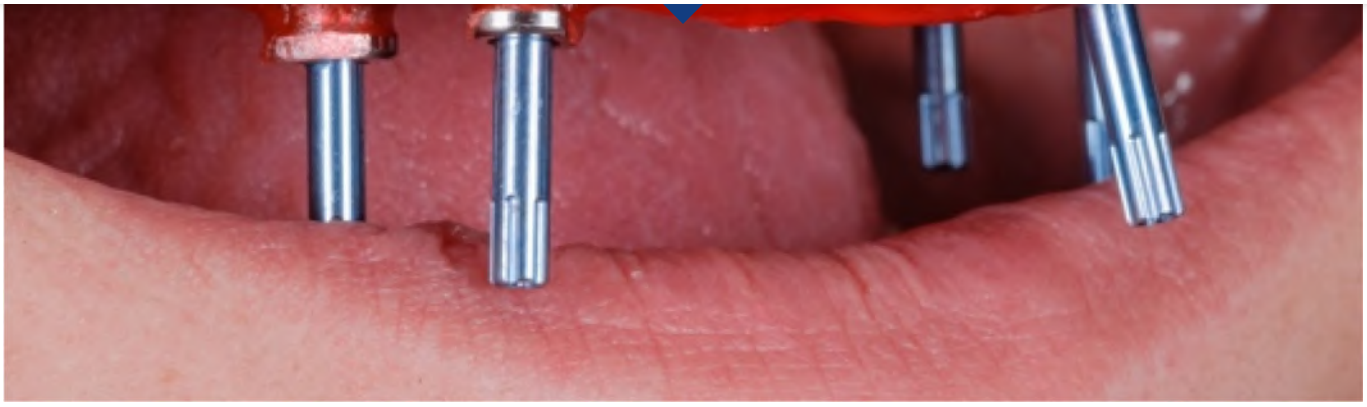


FIGURE 14 Open in figure viewer | PowerPoint

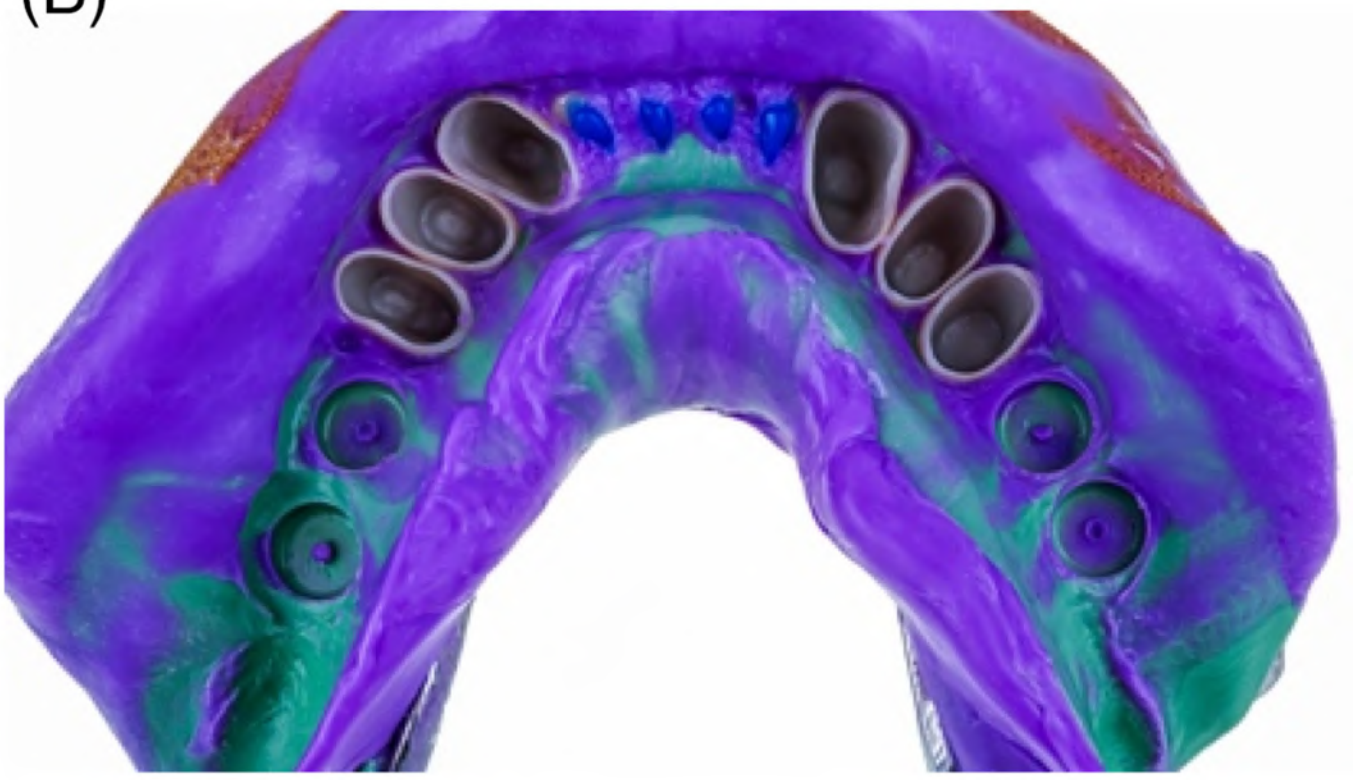
(A) If no cast is available analogs can be connected to the prosthesis and a medium body poli-vynil impression of the intaglio surface can be made. (B) The custom impression will be used to fabricate a custom-impression jig. (C) The custom impression jig will be picked up intra-orally with an open-tray impression technique to be sent to the laboratory for prosthesis fabrication.

A quicker approach consists of making a silicone impression and scraping the stone cast in the pontic area, taking the CEJ of the adjacent teeth as a reference. However, reshaping or adding porcelain to the definitive pontic may be necessary at the evaluation phase since the model scraping has been done arbitrarily.[36] The prosthetic framework must be relined with a self-curing or light-cured acrylic resin, and a medium-viscosity polyether or vinyl polysiloxane (VPS) is needed to make a pick-up impression of the structure which transfers the pontic design to the working cast.

Pick-up impressions of the interim restoration or the bisque try-in are essential to properly communicate the amount of ceramic necessary to shape the prosthesis's emergence profile with the dental laboratory.

Another clinical option to communicate the precise soft tissue impactation to the laboratory consist on adding composite resin to the framework or bisque try-in. This way the technician knows the exact quantity of ceramics needed to optimally shape the emergence profile of the pontic site (Figure 15A–C).

(B)



(C)

FIGURE 15 Open in figure viewer | PowerPoint

(A) Self-curing or light-cured acrylic resin used to modify the pontic sites during bisque try-in and later be picked up through an impression for final contours to be fabricated. (B) Pick-up impression of the bisque try-in with acrylic resin add-ons on the pontics to copy the soft tissue outline. (C) Final prosthetic design of the fixed dental prosthetis with the modified pontic sites copied from resin add-on during bisque try-in.

Using a digital protocol is more efficient when reproducing the pontic site by scanning the relined temporary restoration and copy-milling this information in the final prosthesis design (Figure 16A–D).[37]

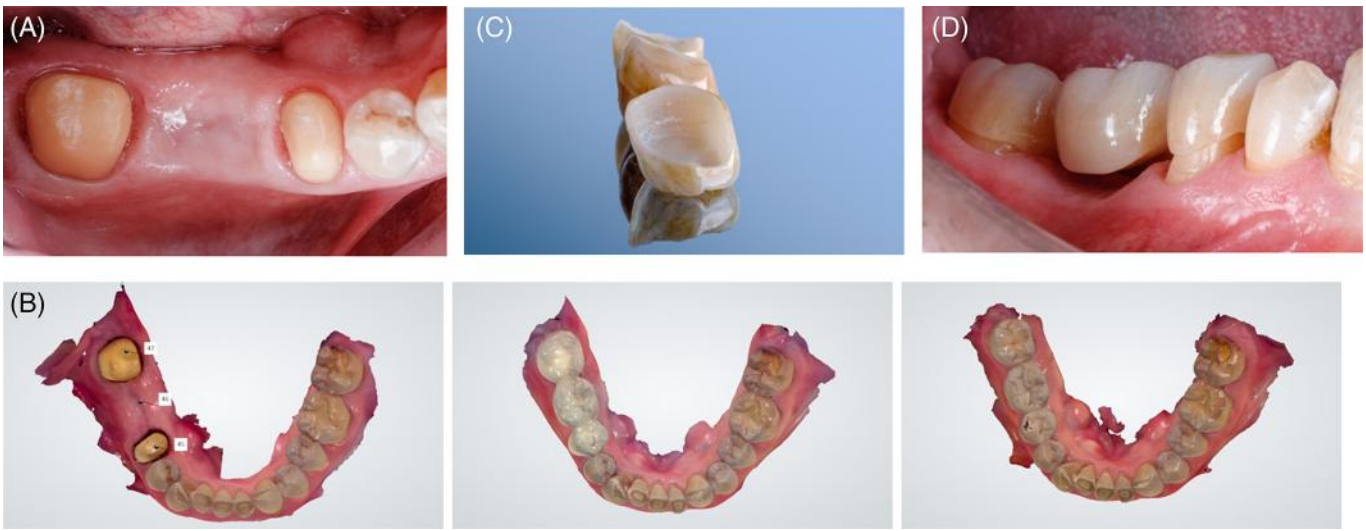


FIGURE 16 Open in figure viewer | PowerPoint

(A) Three unit fixed dental prosthesis with periodontically enhanced ridge. (B) A triple intraoral scan for the communication with the laboratory is used after the soft tissues conditioning which copies the soft tissue anatomy, the interim restoration and copy mills it into a definitive restoration. (C) Three unit fixed dental prosthesis with Flat pontic design. (D) Seating of flat pontic design.

2.13 Cementation

Thorough cement removal is essential to prevent residual cement under the pontic sites. On tooth-supported FDPs where cementation is needed, the pontic will create minimal positive pressure with a slight blanching of the tissues without interfering with the seating of the FDP during the cementation

3 DISCUSSION

FDPs are a predominant treatment for the partially edentulous patient; after a tooth is extracted, the ridge contours change, and bone remodeling happens mainly during the first 3 months and continues during the first year. These hard and soft tissue alterations become a challenge to the restorative dentist as they may affect the esthetic outcomes of the restorations.[38, 39] It has been reported that after extraction, there is a horizontal dimensional change of 32% at 3 months. These changes in the horizontal dimension reach 29%–63% at 6–7 months.[39] If adjacent teeth are extracted, soft tissue changes are more evident. It has been shown that most anterior ridges (91%) suffer vertical and horizontal collapse after tooth extraction.[40] For this reason and to increase soft tissue stability and the final restoration's predictability, when several adjacent teeth have been extracted, long-term interim restorations should be kept for 6–12 months.

All different pontic designs have specific indications, limitations, and challenges. The use of modified ridge lap pontics has been proposed.[4, 9, 11] However, this design's function and the esthetic result are limited when the alveolar bone crest has remodeled vertically.[16] It has been suggested that sealing the extraction socket immediately with an ovate pontic stabilizes the blood clot promoting bone regeneration.[41] The immediate pontic technique with an interim restoration with ovate pontics can also be used.[18, 25, 42] However, it has been suggested that with this procedure, the tissue contour has an average loss of 0.9 mm in width and 1.6 mm in height.[13] Other studies suggest that with this technique, the soft tissue contour can have a more significant loss ranging from 2.6 to 4.5 in width and 0.4 to 3.9 in height.[43] It has also been suggested that using a provisional restoration with ovate pontics after tooth extraction may preserve the alveolar ridge by supporting the soft tissue, predominantly the papilla.[14] However, this technique may not be time efficient as multiple modifications must be done for the long-term interim restoration after the tooth removal.

Additional treatment for the sites can also be done. It has been shown that socket preservation techniques can reduce 40%–60% atrophy which normally occurs two to 3 years post-extraction.[44] The use of mucogingival techniques have been described to reconstruct the pontic sites, improving the esthetic and functional result of the final restoration.[1] It must be noted that after soft tissue augmentation procedures a shrinkage of the grafted area of 25%–45% is expected within 4–6 weeks depending on the type of grafting done.[23, 45, 46] The ovate, E pontic, and flat pontic designs usually require a socket preservation technique, soft tissue reconstruction, or both. When augmentation procedures are contraindicated due to medical problems, pink ceramics should be used, resulting in an unesthetic long pontic design and more plaque accumulation.[1] To prevent esthetic complications, it is also essential to have the proper contour and bulk in the interim restorations. It has been suggested that an over-contour of the pontic of 0.25–1 mm would apply safe pressure to the site without inducing inflammation.[11] Adding and removing resin to the pontic may control the pressure on the site. Tissue sculpting with laser, bur abrasion, and electrosurgery can be done for this.[5, 28]

Clinically healthy conditions in pontic sites are possible if plaque control is done.[47] For this reason, a proper pontic design that promotes cleansability is also essential when designing pontics in patients.

lasting, esthetic results. To achieve this, a series of technical considerations must be met, such as proper patient selection, adequate knowledge of the clinical techniques, dental materials, and biomechanical considerations needed to achieve long-term clinical stability.

4 CONCLUSION

1. In patients with a high smile line and a vertical defect, surgical procedures ridge preservation or ridge reconstruction techniques should be made in order to use more favorable pontic designs with a flat or convex surface.
2. The presence or development of an adequate amount of soft tissue allows using a convex or flat pontic with adequate esthetic and functional results. Tissue sculpting and gingivoplasty are quickly done in these situations, getting predictable results
3. Using a long-term provisional prosthesis for at least 6 months is paramount for a good and stable result. However, periodontal reconstruction techniques make the results more predictable than pure prosthodontic approaches.
4. Inadequate oral hygiene measures or excessive hyper-pressure will inevitably lead to inflammation in the pontic sites. Good compliance and hygiene are essential longevity of results.
5. Pink ceramics may be used in cases with alveolar ridge deficiency when augmentative are not indicated. Further studies are needed to understand the long-term prognosis of alveolar ridge preservation, the long-term stability of ridge augmentation procedures, and their relationship with the prosthetic design used.

DISCLOSURE

The authors do not have any financial interest in the companies whose materials are included in this article.

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DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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