

Esthetic Fixed Partial Dentures: Rational and Technique for Ovate Pontics

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ABSTRACT

As patient's esthetic demands increase, dentists face the difficult challenge of replacing missing teeth with maximum esthetics without compromising overall function and health. When a fixed partial denture is the right choice, the ovate pontic is the best esthetic option. Dentists as far back as the 1930's describe the ovate pontic as an esthetic-type abutment, but its use was limited due to concerns that it caused chronic gingival inflammation. The ovate pontic is revived with the esthetic revolution in Dentistry with new research discrediting the belief that ovate pontics do not maintain gingival health. It is important to note that some of the most widely used pontic designs today, like the ridge lap and the saddle pontic, are far more difficult to keep clean and do not maintain gingival health, underscoring the importance of the dentist designing the pontic based on sound principles.

DISCUSSION

An artificial looking anterior fixed partial denture can have a devastating effect on a person's self confidence and ability to interact with others.¹ Patients today demand more natural-looking teeth replacements. The ovate pontic is the most esthetic of all pontic designs because it most closely resembles the emergence profile of natural teeth. It is also more desirable from the phonetic view because it does not allow the passage of air and saliva like other, more hygienic

designs. Furthermore, patients also prefer the lingual contours of the ovate pontic because of their close resemblance to natural contours (Fig. 1).

Although the ovate pontic design is not new,² it had been in almost complete disuse until the 1980s, when the cosmetic revolution pushed dentists to re-evaluate the ovate pontic.³ The ovate pontic became unpopular because dentists considered it a non-hygienic pontic design,

believing that it would lead to chronic gingival inflammation due to its lack of cleansability. Recent research done by Zitzmann and colleagues to assess the amount of chronic inflammation caused by an ovate pontic showed that "ovate pontics supported with adequate oral hygiene measures is not associated with overt clinical signs of inflammation".⁴ Tripodakis and colleague also found that the tissue pressure caused by ovate pontics does not introduce inflammation to adjacent tissues.⁵

The Ovate Pontic design and execution is considerably more involved than a regular pontic procedure and requires more time, preparation, and clinical skills.



FIGURE 1—Ovate pontic compared to natural teeth

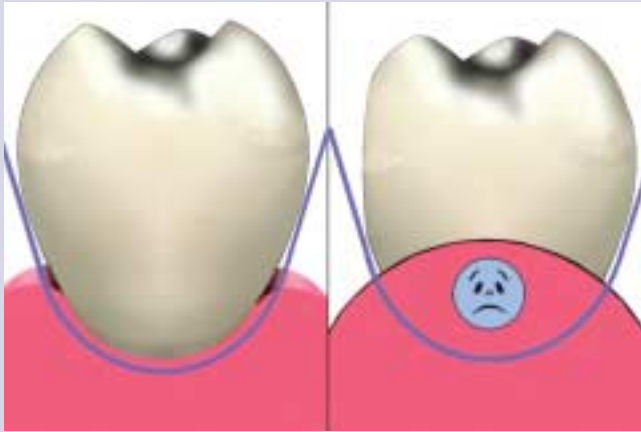


FIGURE 2—Ovate Pontic vs. Saddle Pontic—the thick blue line shows how floss will not be able to clean as well under the ridge lap or saddle pontic as compared to the ovate pontic.

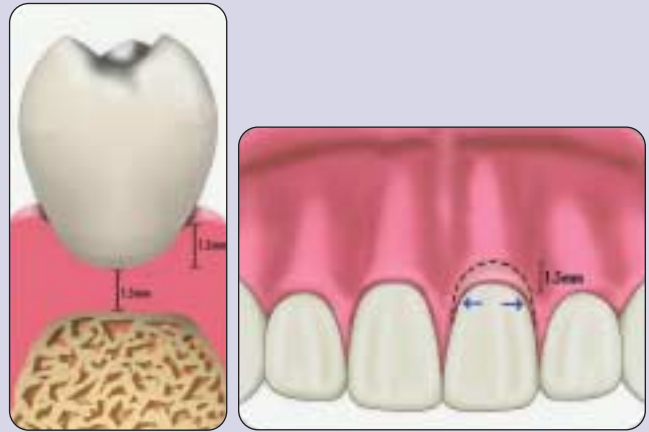


FIGURE 3—The ovate pontic's ideal distance from bone and pressure to gingival.



FIGURE 4—Pre-operative view showing teeth #7, 8, 9 & 10 prior to removal.



FIGURE 5—Laboratory-made provisional restoration with ovate pontic.



FIGURE 6—Provisional fixed partial denture in patient's mouth.



FIGURE 7—Pre-operative view of edentulous area #8, 9 & 10.

Dentists must design the ovate pontic with the help of a qualified dental technician and base it on the circumstances of the case, patient expectations, and correct prosthodontics principles. However when the proper procedure is followed, ovate pontics becomes predictable.

Sadly, pontic design today is often delegated to the dental technician, the most widely used pontic designs by dental technicians are the ridge lap and saddle pontic. It is interesting to note that many technicians might be unaware that these pontics are the least hygienic pontics. It is virtually impossible to

keep the saddle or ridge lap clean, and they often leads to chronic inflammation. (Fig. 2)

INDICATIONS

Ovate pontics are utilized primarily on the maxillary anterior area, although they can be used successfully anywhere in the mouth as



FIGURE 8—Photo of provisional restoration model with ovate indentations.



FIGURE 9—After one month of healing.



FIGURE 10—Impression using Impregum® (3M ESPE).



FIGURE 11—Making a matrix of the provisional ovate pontic using silicon putty.

long as patients' oral hygiene can be accomplished successfully. The main advantages of the ovate pontic design are that it most closely resembles the emergence profile of natural teeth, allowing for ideal esthetics and phonetics. The ovate pontic also has improved function because it does not allow air or saliva to pass through and, when properly designed, its axial contours can deflect food, allowing for less food impaction.⁵

Ovate pontics can be developed on an immediate extraction site or on an edentulous ridge. Ovate pontics can be made more predictably on ideal edentulous ridges, but it is also possible to use them on hyper-

trophic ridges with the assistance of some type of ridge augmentation surgery, GBR, or GTR.^{6,11} Many techniques exist today to correct a deficient ridge, but they are outside the scope of this paper.

OVATE PONTIC DESIGN

The design of the ovate pontic is a cooperative work between dentists and technicians and largely depends on the patient's ridge, esthetic needs, phonetics, and function. The design process will vary depending on if it is an immediate extraction or a healed edentulous ridge, but the basic principles remain similar. The apical portion of the ovate pontic can be imagined as the preexisting root cut off 1 to 2mm

below the gingival crest with a highly-polished, convex, "egg" shaped finish. Other designs, like the "E" pontic with its 90 degree angle finish, have also been advocated.⁷ The apical extension is determined by the existing tissue architecture and distance to the bony crest. The distance to the bone crest should be no less than 1- 1.5mm as determined by sounding with a probe^{6,8} (Figs. 3 a & b). The pontic must create a positive pressure on the tissue to properly support its proximal gingiva and to help create the appearance of an interdental papilla.

TECHNIQUE FOR IMMEDIATE EXTRACTION

A simplified, direct technique will



FIGURE 12—Checking ovate fit on final fixed partial denture using the silicon matrix.



FIGURE 13—Silicon matrix impression cut in half.



FIGURE 14—Gingiva showing site developed for ovate pontic.



FIGURE 15—Final fixed partial denture showing slight gingiva blanching.

require a prefabricated, laboratory, provisional partial denture or a pre-made, silicone or vacuform matrix, made from a wax-up. After the abutment teeth are prepared following proper prosthodontic principles, an atraumatic extraction is performed. In some cases, a bone grafting technique can be performed either by a restorative dentist or a specialist to avoid ridge collapse. The fabrication of the temporary is a crucial step. Using the prefabricated laboratory provisional or matrix made from a diagnostic wax up, fill or reline the pattern with PMMA acrylic or similar material, allowing the dough like material to go into socket, replicating the shape of the pre-existing root. Allow the acrylic to set intraorally, insuring the teeth do not overheat by the exothermic reaction of the acrylic. Use acrylic burs to trim the provisional restoration. Make

sure the apical portion of the pontic is left 2mm below the crest of the gingival with an egg-shape convexity. A high polish is very important to allow for optimum healing. Sometimes it is necessary to add material to the pontic to insure necessary lateral pressure to the tissue. The ideal material for this is Triad® (Dentsply) because is easy to manipulate, bonds well to acrylic, and can be highly polished. Patients should be assessed every month to evaluate the healing process. In some cases it is necessary to remove the provisional to clean, alter for esthetics, reinforce proper patient hygiene, or repolish the pontic. After three months, the final restoration face can usually be initiated.

TECHNIQUE FOR EDENTULOUS RIDGE

If the edentulous ridge is atrophic, ridge augmentation surgeries

must be performed first. An ideal ovate pontic design starts with proper treatment planning and good communication with the laboratory technician. With excellent working models and precise information from the dentist, which must include the depth of the osseous crest and the thickness of the gingival on the ridge, the technician will prepare the ovate pontic site on the plaster model using acrylic burs. The laboratory technician will then fabricate an indirect provisional on the ovate pontic with the ideal proportions and emergence profile (Fig. 8).

On a subsequent appointment, the provisional restoration will be tried in the patient's mouth for proper fit, though the pressure of the pontic will not allow for a full seating. When the fixed partial

denture is pressed down, blanching of the ridge will occur. At this point, the pontic site is prepared with an electro surgery unit^{10,12} or with a large, egg-shaped course diamond without water. The site is prepared carefully to avoid excessive tissue removal. The pontic should create positive pressure, particularly lateral pressure, to create the illusion of an inter-dental papilla. Some blanching should still occur. Adjustments to the acrylic pontic are sometimes needed and can be best done using Triad® (Dentsply), as previously mentioned. The fixed partial denture can be removed 6 to 8 weeks after pontic site preparation surgery to evaluate healing (Fig. 9). If the ovate site has healed well and the esthetics are adequate, the final impression can be performed. If not, the provisional restoration may be readjusted and polished to allow a few more weeks for healing.

IMPRESSION TECHNIQUE

Once tissues are healthy and the emergence profile has been perfected, the next step is to take impressions. Due to the fact that tissues can easily collapse in a few minutes, two impressions must be taken. First, a standard impression technique is used to make impressions of the prepared teeth and a second impression of the provisional fixed partial denture is taken with our final pontic shape.

For the first impression, a standard crown and bridge technique is performed using a hydrophilic impression material Impregum® (3M ESPE), which takes excellent impressions of soft tissue (Fig. 11). The second is an impression of the provisional using silicone putty. After filling a receptacle with PVS putty, the provisional restoration is inserted the in to the putty halfway, coronally, replicating the internal aspect of the abutments and the custom designed ovate pontic(s). This will

become the silicon matrix the technician will use to make the porcelain ovate pontic to exactly match the provisional restoration (Fig. 12). After the impressions are taken, the provisional is repolished and cemented. The laboratory will use the silicone matrix to replicate the provisional's custom-made pontic(s). It is desirable for the technician to carve the silicone matrix ovate site(s) ever so slightly to give a small positive pressure into the ovate sites. A two-step technique has been advocated in which the master model is made first and the soft tissue impressions are taken on the second visit.⁹ While an excellent and meticulous choice, it does add another appointment and increases the cost of the procedure. It is the author's experience that the silicone matrix gives the technician enough information to achieve excellent results (Fig. 13).

CEMENTATION

If done correctly, the pontic will create positive pressure with a slight blanching of the tissues. The pressure should be minimal and should not interfere with the bridge fully seating. Slight adjustments might be necessary. Final cementation is done using a standard crown and fixed partial denture cementation technique. Care must be taken to insure thorough cement removal and that no cement particles are left under the pontic area. Detail maintenance instructions should be given to patients. As with any of the other pontic types, patients need to know that without excellent oral hygiene the health of the tissue under the pontic, their results will be compromised.

CONCLUSION

Ovate pontics are an excellent option for the esthetically minded patient and dentist. Unlike what was previously believed, it is possible to maintain oral health with ovate pontics as long as they are

properly designed and well maintained. In the esthetic zone, ovate pontics have many advantages over conventional or hygienic pontic designs. They allow for maximum esthetics, are functional, and maintain tissue health. Their draw back is that they are laborious and pontics and their need for multiple appointments before they commit to the procedure. Dentists must also adjust their fees according to the additional time investment that is required with this procedure. **OH**

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Oral Health welcomes this original article.

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