

The Pink Prosthetic Illusion: How to Predictably Restore Pink Aesthetics with Pink Ceramics, from Complex to Simple Gingival Reconstructions

Julian Jaramillo Botero^{1*}

^{1*}Dentist, Oral Rehabilitation, Clinic and Dental Laboratory owner at Dr Julian Jaramillo. Cali/Colombia.

Received date: June 30, 2026, **Accepted date:** July 07, 2026, **Published date:** July 20, 2026.

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***Corresponding Author:** Dr. Julian Jaramillo Botero, Dentist, Oral Rehabilitation, Clinic and Dental Laboratory owner at Dr Julian Jaramillo. Cali/Colombia.

Abstract

In contemporary restorative dentistry, achieving visual harmony requires a balanced intersection between white tooth restorations and natural pink aesthetics. While severe localized soft tissue defects or advanced alveolar ridge resorption traditionally demanded complex bone and connective tissue grafting, the predictability of these invasive procedures remains highly variable. Alternatively, managing these deficiencies from a purely prosthodontic approach through the application of gingival-colored porcelain and advanced pink ceramics has emerged as a powerful, non-surgical paradigm shift. By executing a structured workflow using artificial gingiva, clinicians can effortlessly establish an ideal

emergence profile, closing black triangles, and masking massive ridge discrepancies. This article outlines a streamlined, surgery-free approach utilizing custom gingival shade matching to restore complex anterior zones predictably, maximizing both technical success and patient acceptance. [1].

Prosthetic reconstruction of missing gingival tissue was historically the only available solution, as no predictable means existed to regenerate bone or soft tissue. Early pink restorations were limited to large, monochromatic acrylic bases that were bulky and uncomfortable, prone to early discoloration and surface degradation. Their inherent porosity favored plaque accumulation and bacterial colonization, frequently resulting in malodor and

poor long-term performance. [2]

Dental porcelain itself dates to 1774, when the French apothecary Alexis Duchâteau and the dentist Nicolas Dubois de Chemant developed the first mineral paste suitable for dental application [3]. It was not until 1962, with the introduction of the porcelain-fused-to-metal (PFM) system by Weinstein and colleagues, that technicians gained a material capable of fusing pink porcelain directly to the existing white porcelain substructure of the restoration. [3]

With the advent of digital dentistry, the CAD/CAM era, the introduction of zirconia as a novel framework material for fixed and hybrid prostheses, and, more recently, the availability of 3D-printed materials, new challenges have emerged in replicating the esthetic and functional properties required to maintain peri-restorative tissue health.

From a small retraction, to a flattened papilla, black spaces, or even the whole alveolar ridge, can now be prosthetically restored even mimicking attached gingiva and vascular structures.

Achieving a pristine, predictable osseous and periodontal outcome that fully mimics natural tissue architecture requires not only the appropriate surgical technique, indication, and clinical experience, but also a series of surgical procedures that extend healing time, delay the patient's final restorative outcome, and increase both discomfort and treatment cost.

When the pink esthetic outcome cannot be guaranteed with full predictability, a 90% to 100% predictable prosthetic alternative should be considered concurrently (4). Treatment planning should be guided by the functional and esthetic integration of the facial and intraoral presentation: when retraction of the lip is required to visualize the defect, the clinician should

clearly explain the actual indication for surgical treatment whenever the defect does not compromise function. This is particularly relevant when the defect is visible, yet the patient is unwilling to undergo surgery, or surgery is not a feasible option.

The following cases illustrate that gingival tissue can be predictably restored by prosthetic means, supporting its consideration as a valid alternative that should be thoroughly discussed with the patient to determine the most predictable course of treatment.

CASE PRESENTATIONS

Easy cases, are normally considered the ones that cannot be seen unless someone retracts the patient's lip, this is when the patients' expectations usually lower. But in order to meet the patients demand he needs to know in advance how much will you obtain and which are the small limitations.



Prosthetic Gingival Reconstruction or Surgery, how to decide the right path.

Prior to planning the restoration of a gingival defect, the clinician should systematically evaluate the following parameters:

1. Extraoral evaluation of the patient's facial proportions, planes and smile line.
2. Evaluation of the smile arc during conversational and full smile.
3. Location and severity of the gingival defect.
4. Radiographic evaluation of periodontal support.

5. If the defect is concealed by the lip or not visible within the smile line, esthetics is not the primary concern; function is.

6. Surgical feasibility of correction.

7. Number of surgical procedures and healing time required.

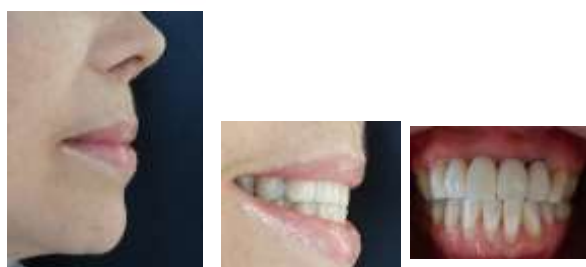
8. Predictability of the surgical outcome, expressed as a percentage.

9. If surgery is not performed, whether function will be affected, or whether the prosthetic objective can be achieved, and to what percentage.

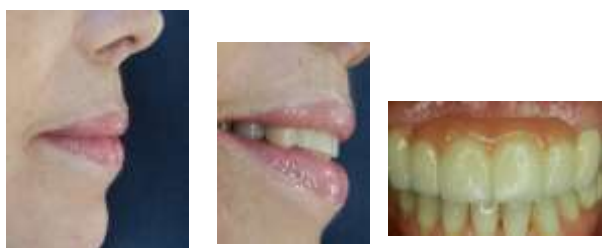
Smile evaluation Protocol:

- a. During the extraoral evaluation, the clinician should assess the patient's lips for wrinkles, depressions, or lip malalignment, which may provide early indication of an underlying defect. Failure to correctly reposition the missing teeth and gingival contours will not provide the lip with adequate support.

BEFORE

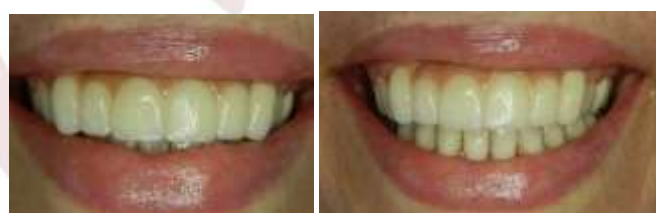


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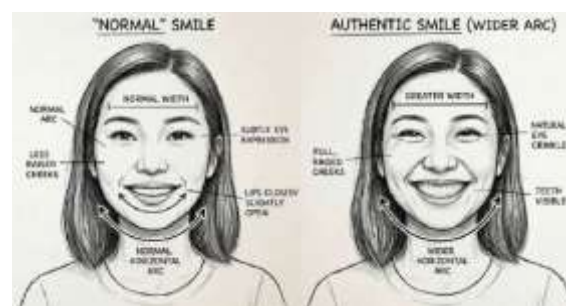


- b. The smile arc is best evaluated through video recording, as a static photograph may not capture a fully authentic smile; many patients do not contract their lip musculature completely on verbal request. Recording the patient and observing the eyes allows identification of the moment the orbicularis oculi contracts, narrowing and compressing the eyes into a genuine, or Duchenne, smile (5,6). This authentic smile arc reveals the additional gingival display that determines the true intersection between the restoration and the marginal soft tissue.

1. The evaluation of the smile arc is better studied in a video. We should look for a true authentic smile! As many times when we ask the patient to smile, his lip muscles do not contract in full, so take a video and look at his eyes when the orbicularis oculi contract the eyes crinkle narrow and compress into a "Chinese eye" this is when the Authentic Smile Arc appears and show that extra mm you just wanted to keep underneath, the intersection of the restoration with the gm tissue.



Left picture with a normal smile, right with a wider arc showing the triangle in upper right lateral pontic.





In fixed prosthodontics when restoring the anterior upper segment in a moderate to severe Gingival Defect Visibility Classification (GDVC) and once achieving the authentic smile, we will usually encounter a mesial black transition defect on the mesial of the canines. Here is where function can't be compromised so ease of cleaning and keeping the papilla space open to introduce the floss is a priority. While localized tissue defects are sometimes corrected using tiny composite restorations, these resins stain rapidly in the short term and hinder oral hygiene. In contrast, dental ceramics resist discoloration and maintain a smoother surface that facilitates easier cleaning [4,7]



On the right the Authentic Smile uncovers this mesial canine transition. In a thin biotype in the lateral pontics sites. Pontic design in thin biotypes is usually flattened, as patient can't withstand mucosal pressure and for ease of hygiene, compromising the esthetic outcome. This case is a zirconia framework with incisal edges in zirconia and small layering of white and pink porcelain to enhance esthetics and prevent delamination on layered porcelain microcracks.

c) Gingival defects in the mandibular arch are

comparatively easier to mask, as they are typically concealed by elevation of the lower lip during smiling. Maxillary defects extending from the distal aspect of the canine across the six anterior teeth are the most visible from any viewing angle, whereas defects distal to the canine are visible only from the corresponding side, depending on the width and height of the smile arc. Because existing recession indices show only moderate inter-examiner reliability (8), this report proposes the GDVC, summarized in Table 1, together with its Type III subdivisions, to support a more reproducible, visibility-based assessment that can guide surgical and prosthetic decision-making. [9]

Classification	Anatomical Location	Dynamics & Impact	Criticality Level
GDVC Type I	Lower arch (all teeth)	Hidden entirely by the rising upper lip during a smile.	Low
GDVC Type II	Upper arch: distal of canine	Conditionally visible, depending on smile arc width and height.	Moderate
GDVC Type III	Upper arch: Anterior teeth	Highly exposed and fully visible from any viewing angle.	High
GDVC Type III Subdivisions			
Classification	Anatomical Focus	Tissue Impact	Criticality Level
GDVC Type III-1	Interdental papilla	Restricted to black triangles only.	Mild
GDVC Type III-2	Papilla and gum tissue	Involves the papilla and a partial portion of the gingiva.	Moderate
GDVC Type III-3	Full attached gingiva	Complete vertical and horizontal width collapse of the tissue.	Severe

Table 1: Gingival Defect Visibility Classification (GDVC).

d) Table 2 presents the GDVC Comprehensive Clinical and Prognostic Matrix, intended to standardize case evaluation using radiographic data ranging from simple periapical series to three-dimensional volumetric imaging. Each case should be jointly evaluated with the periodontist, estimating the 90% to 100% predictability of the surgical approach and re-classifying the anticipated

post-surgical GDVC type or subdivision. The matrix should also record the projected number of surgical procedures, the healing time required per site, and the associated additional treatment cost.

Initial GDVC Classification	Expected Final Classification	Esthetic Treatment Predictability	Number of Surgeries	Total Time to Heal	Relative Extra Cost	Surgical Contraindication Rationale	GDVC Visibility Impact
Class I (Mild Defect / Localized Papilla Loss)	Class I (Complete Reconstruction)	Moderate (Technically demanding color-blending)	0 (Surgery-Free)	Immediate (Upon definitive prosthetic delivery)	Medium (Custom gingival characterization fee)	Minimal defect volume; surgical intervention poses risk of further papilla loss.	Low (Defect easily hidden by lip line or minimal in size)
Class II (Moderate Defect / Facial Margin Recession)	Class I (Seamless Visual Alignment)	High (Highly predictable ceramic layering)	0 (Surgery-Free)	2–4 Weeks (Prosthetic provisional tissue conditioning)	Medium (Custom gingival characterization fee)	Unpredictable surgical root coverage; prosthetic pink ceramic offers guaranteed symmetry.	Moderate (Defect visible during dynamic smile; requires careful blending)
Class III (Severe Defect / Horizontal Ridge Deficiency)	Class I (Full Volumetric Restoration)	Very High (Transition line concealed by upper lip lip-line)	0 (Surgery-Free)	2–4 Weeks (Pressure-sculpting of alveolar mucosa)	Medium (Multi-chromatic pink ceramic processing)	Severe horizontal defect requires complex grafting; prosthetic pink provides immediate volume.	High (Defect fully exposed; pink ceramic transition must be concealed)
Class IV (Extreme Defect / Combined Vertical & Horizontal Loss)	Class I (Total Aesthetic Rehabilitation)	Very High (Substantial restorative space optimizes design)	0 (Surgery-Free)	4–6 Weeks (Ovate pontic receptor site maturation)	High (CAD/CAM zirconia framework + custom veneering)	Extreme vertical/horizontal loss makes surgical reconstruction biologically impossible.	Very High (Massive defect dominates smile; requires complete prosthetic rehabilitation)

Table 2: GDVC Comprehensive Clinical and Prognostic Matrix.

Surgical Contraindication Rationale

This explicitly states why surgery is skipped for each class:

- For Class I: "High risk of surgical scarring/recession; restorative color-blending preferred."
- For Class II: "Surgical root coverage unpredictable; prosthetic tissue conditioning is highly predictable."
- For Class III & IV: "Surgical volumetric regeneration is highly unpredictable; large defect optimizes restorative space for pink aesthetics."

GDVC Visibility Impact

This acts as a filter before treating the patient:

- If GDVC Type I/II: "Defect hidden by lip line; aesthetic surgery unnecessary."
- If GDVC Type III: "Defect exposed; requires highly predictable prosthetic camouflage rather than surgical risk."

Surgery is contraindicated either because the defect is naturally hidden (GDVC I/II) OR because the defect is so large that prosthetic replacement is vastly superior and more predictable than surgical regeneration (Class III/IV).

Once completed, this matrix allows the clinician to determine whether a purely prosthetic approach is indicated, or whether a combined surgical and prosthetic approach offers a more predictable outcome.

Restorative Vs Surgical Trade-Offs

Criteria	Prosthetic Pink Solutions (Porcelain)	Surgical Reconstruction (Soft Tissue/Bone Grafts)
Predictability	High; final contours are fully controlled in the dental laboratory.	Variable; dependent on blood supply, biotype, and graft shrinkage.
Treatment Time	Short; resolved within the normal prosthetic delivery window.	Lengthy; often requires multiple surgeries and months of healing.
Patient Compliance	Highly accepted; completely non-invasive.	Lower; requires tolerance for donor-site morbidity and surgical recovery.
Maintenance	Requires meticulous hygiene; borders must be designed to avoid plaque traps.	Once healed, behaves like natural tissue and allows standard hygiene access.

This classification does not necessarily correspond to the relative ease of achieving the prosthetic outcome. Paradoxically, larger defects are often easier to manage prosthetically: fixed partial denture Type III (FP-3) restorations are comparatively straightforward to harmonize, as they incorporate the full pink-white esthetic transition line without requiring an exact match to the remaining natural tissue. The most challenging cases are, instead, those involving papillary resorption, where black triangles or discrepancies near the pink-white transition zone are most critical and most readily perceived by the observer. The clinical objective should therefore be an imperceptible pink-white transition [4].

Hybrid prostheses are generally the most straightforward to manage esthetically; zirconia frameworks further facilitate favorable esthetic outcomes, as less material thickness is required to mask the inherently white substructure (7,10,11). Ultimately, however, it is the

technician's skill with the available materials, together with the patient's specific biocompatibility requirements, that determines the appropriate restorative material. Consequently, the more coronally positioned the pink-white transition line lies relative to the gingival sulcus, the more likely it is to fall within the esthetically critical zone of the smile arc.



In this case, a zirconia framework was combined with individual lithium-disilicate (e.max) pressed crowns and layered gingival-shade ceramic, with stained pink porcelain simulating vascular structures and both attached and free gingiva. [11]



Metal-ceramic restorations achieved a favorable esthetic outcome in this case; a wider smile arc was selected, displaying additional papilla and gingival tissue to preserve dento-facial proportions. Connection of the anterior segment across these three implant-supported prosthetic units is technically demanding, given the

difficulty of managing a tight interproximal connection and the gingival gap dictated by the path of insertion of the screw-retained restoration. Whenever feasible, connecting all papillae within a single prosthetic structure is preferable to fabricating separate units. [12]

GDVC Type II & III-1

In narrow, long-span anterior pontic sites, a wider or thicker mucosa, corresponding to a thicker gingival biotype, facilitates the application of pressure and the concealment of the pink-white transition line.



OVATE PONTICS & MODIFIED RIDGE LAP PONTIC

Historically, the restoration of pink esthetics progressed through dentures, fixed partial dentures, single-tooth restorations, and finally pontic designs; the success of any pontic design, however, depends largely on the management of the edentulous ridge. The Modified Ridge Lap Pontic (MRLP) rests on the mucosal surface and is generally indicated for sites with vertical and horizontal ridge reduction, whereas the Ovate Pontic (OP) is intrasulcular and indicated for wider, higher ridges with adequate soft tissue volume. [13]

Placement of an OP requires a thicker biotype or

additional mucosal volume to allow the pontic to be seated into the soft tissue. A simple clinical test can determine feasibility: gentle pressure applied to the ovate pontic site should produce tissue blanching that resolves within five minutes; persistence beyond this interval indicates excessive pressure and a risk of subsequent tissue recession.

The MRLP is indicated for larger gingival resorption defects with limited residual soft tissue, where little to no pressure can be applied without causing patient discomfort. [14]

In this clinical case, early extraction of the lateral incisor and canine resulted in horizontal collapse of the facial bone and mucosa at the MRLP sites, producing a less natural contour with a tendency for food accumulation beneath the pontic. In contrast, at the first premolar site, where extraction was recent, the pontic was placed immediately into the extraction socket, allowing the soft tissue to heal directly around it and providing improved tissue support.



Symmetry plays a critical role in the final esthetic outcome, even when the gingival horizontal planes do not perfectly coincide, particularly at the lateral incisors. Gingival margin asymmetries as small as 1mm are perceptible to both clinicians and lay people, and overall smile attractiveness is strongly influenced by how harmoniously the pink and white esthetic horizontal planes are integrated. In the case illustrated, although the

pink and white esthetic planes were matched on the left side, the final outcome on the right side was judged more esthetically favorable, as the residual gingival defect was rendered less perceptible. [15]



GDVC Type III-1



Asymmetric gingival heights at the lateral incisors, restored with lithium-disilicate (Emax) pressed, stained crowns. [15]



Pink ceramic is not always the only solution: in some cases, a double contour incorporating a lightly stained, exposed dentin margin at the cervical third can equally satisfy the gingival defect while still meeting the patient's full esthetic expectations and blending into a natural-tooth-like restoration.



In daily function, however, with saliva present and the patient speaking or smiling spontaneously, approximately 55% to 60% of patients who habitually conceal their gingiva during a posed smile will elevate the upper lip during an emotional, spontaneous, or authentic smile [6].

In a daily base with saliva present, the patient speaking and just eventually showing their big smile these outcomes look even nicer and can easily evade a trained eye.

About 55% to 60% of patients who normally cover their gums, will elevate their lip during emotional spontaneous, Authentic Smile [6].

We already know after terrible failures that iliac crest bone reconstructions have a dramatic bone resorption, so in the old implant cases where individual patients were restored with single implants we tend to see a dramatic loss of surrounding necessary gum tissue with little to no surgical procedure to regain a suitable amount of gum tissue around their implants. So here is where pink prosthetic turns into a predictable aesthetic solution.



Using 2 of the old Zirconia abutments in the left lateral and canine and 3 new anodized it abutments, e-max pressable ceramics for screw retained individual crowns where placed only the left canine was cemented due to the chimney access.

Slight asymmetric crown where designed and matching the remaining teeth. And even though in an authentic smile you can see the black triangles the patient is 100% satisfied. Patients report extremely high satisfaction with implant-supported prostheses that restore the surrounding mucosa prosthetically. It proves that you do not need surgery to achieve a high esthetic satisfaction rate; prosthetic pink gingiva and creating the pink illusion does the job. [12,16].

CONCLUSIONS

Pink esthetic restoration is a valid, predictable alternative to surgical correction of gingival and osseous defects, provided that case selection is rigorous and patient expectations are addressed before treatment begins.

The Gingival Defect Visibility Classification (GDVC) and its accompanying Comprehensive Clinical and Prognostic Matrix, proposed here for the first time, offer a structured, reproducible framework for comparing the visibility of a given defect against the predictability, cost, and biologic burden of its surgical correction.

Across the cases presented, prosthetic management consistently restored a harmonious pink-white esthetic transition without requiring additional surgical intervention, supporting its consideration as a first-line option whenever the defect does not compromise function and the patient is unwilling or unable to undergo surgery. Further multicenter validation of the GDVC is warranted to confirm its inter-examiner reliability and clinical utility.

OP work better in thick periodontal biotype and pontics tend to be rounded, and MRLP on thin biotypes, and pontics tend to be flattened.

CONFLICT OF INTEREST & CREDITS

There is no conflict of interest. The author has a private practice in Cali, Colombia, has an in-office dental laboratory where he and his lab technicians design, develop, and personalize each case. All the cases are real and the patients have been fully fulfilled functional and aesthetic expectation.

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