RESEARCH PAPER

Poncho Technique in Implant Dentistry: Concept, Applications, and Clinical Perspectives- A Narrative Review

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Abstract

Background: Dental implant therapy relies on successful osseointegration as well as preservation of peri-implant hard and soft tissues. The Poncho technique is a membrane stabilization method used to improve regenerative outcomes in implant dentistry.

Aim: This narrative review evaluated the concept, clinical applications, and outcomes of the Poncho technique in implant dentistry, with emphasis on soft tissue healing and crestal bone preservation.

Materials and Methods: A literature search was conducted using an adapted PICO framework approach across PubMed, Scopus, Embase, Cochrane Library, and Google Scholar for studies published up to December 2024.

Results: Twelve relevant articles were identified. The Poncho technique has been applied in immediate implant placement, guided bone regeneration, and soft tissue augmentation. Most studies reported improved membrane stability, favourable healing, and possible preservation of peri-implant crestal bone.

Conclusion: The Poncho technique is a simple and promising adjunct in implant dentistry. Although early outcomes are favourable, further long-term clinical studies are required to establish its effectiveness.

Keywords: Poncho Technique, Dental Implant, Platelet-Rich Fibrin, Guided Bone Regeneration, Crestal Bone Loss

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Introduction

Dental implants have become a predictable treatment modality for the rehabilitation of partially and completely edentulous patients. Successful implant therapy depends not only on achieving osseointegration but also on maintaining healthy peri-implant hard and soft tissues. Adequate bone volume, stable peri-implant mucosa, and preservation of gingival architecture are essential for long-term implant survival and favorable esthetic outcomes. Therefore, regenerative procedures aimed at enhancing tissue healing and preserving alveolar bone architecture play a critical role in contemporary implant dentistry. Biologically driven regenerative approaches have gained increasing attention in recent years. Among these, autologous platelet concentrates such as platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) have been widely used to enhance wound healing and tissue regeneration. PRP represents the first generation of platelet concentrates and contains high concentrations of platelets and growth factors that stimulate cellular proliferation and angiogenesis. However, the preparation of PRP requires anticoagulants and biochemical additives which may limit its clinical application. Platelet-rich fibrin (PRF), introduced as a second generation platelet concentrate, overcomes several of these limitations. PRF forms a natural fibrin matrix rich in platelets, leukocytes, and cytokines that gradually release growth factors during healing. This fibrin scaffold supports cell migration, angiogenesis, and tissue regeneration. Due to these biological advantages, PRF has been widely used in procedures such as socket preservation, sinus augmentation, guided bone regeneration (GBR), and soft tissue augmentation around implants. Despite the advantages of platelet concentrates and barrier membranes, stabilization of these regenerative materials at the surgical site remains a critical factor influencing treatment outcomes. Conventional membrane stabilization techniques often require fixation screws, titanium tacks, or extensive suturing, which may increase surgical complexity and operative time. The Poncho technique has been introduced as a simple and effective method for stabilizing regenerative membranes around dental implants. In this technique, a membrane is perforated centrally and positioned over the implant so that the healing abutment passes through the perforation, resembling a poncho garment. This configuration stabilizes the membrane and protects the surgical site without the need for additional fixation devices.

History and Evolution of the Poncho Technique

The concept underlying the Poncho technique evolved from early membrane stabilization methods used in guided bone regeneration. GBR is based on the principle of using barrier membranes to exclude soft tissue cells and allow osteogenic cells to repopulate bone defects. Early studies investigating GBR reported the use of membranes positioned around implants to maintain a regenerative environment. With the increasing use of platelet concentrates in implant dentistry, clinicians began exploring ways to stabilize PRF membranes around implants. The idea of creating a central perforation in the membrane and positioning it around the healing abutment emerged as a practical solution. This configuration allowed the membrane to remain stable while

covering the surgical site, resembling a poncho garment. Over time, modifications of this technique were introduced. Variations such as the PRF Poncho technique, Sohn's Poncho technique, and Poncho lamina technique were developed to enhance peri-implant soft tissue healing and bone regeneration.

Biological Basis

Platelet concentrates contain numerous growth factors that play a critical role in tissue healing and regeneration. Platelet-derived growth factor (PDGF) stimulates fibroblast proliferation and collagen synthesis, while transforming growth factor beta (TGF-β) promotes extracellular matrix formation and osteoblastic differentiation. Vascular endothelial growth factor (VEGF) enhances angiogenesis, which is essential for tissue regeneration. PRF provides a fibrin scaffold that acts as a natural matrix for cell migration and tissue regeneration. The slow release of growth factors from the fibrin matrix supports sustained healing and promotes formation of new blood vessels and connective tissue. When used in the Poncho configuration, the membrane also stabilizes the blood clot at the surgical site, which is essential for successful bone regeneration.

Literature Search Strategy

Although this study was designed as a narrative review, the research question was conceptually structured using an adapted PICO framework approach to improve the clarity of literature selection and synthesis. The PICO framework was not used for quantitative meta-analysis but served as a guiding structure for formulating the review question and identifying relevant studies.

Focused Review Question

The review sought to address the following primary question:

"What are the reported clinical applications, modifications, and outcomes of the Poncho technique in implant dentistry, particularly with respect to soft tissue healing, guided bone regeneration, and crestal bone changes?"

Adapted PICO Framework:

- **Population (P):** Patients undergoing implant-related surgical procedures in implant dentistry
- **Intervention (I):** Use of the Poncho technique or its modifications (Sohn's Poncho technique, Poncho flap technique, Poncho lamina technique)
- **Comparison (C):** Conventional membrane stabilization techniques or implant procedures without Poncho technique
- **Outcome (O):** Clinical outcomes including soft tissue healing, membrane stability, peri-implant mucosal enhancement, guided bone regeneration, and crestal bone changes

An extensive electronic search of the literature was performed using the following databases, PubMed, Scopus, Embase, Cochrane Library and Google Scholar. These databases were selected to ensure broad coverage of biomedical, dental, and clinical literature.

Time Frame of the Search

The search included all articles published up to December 2024. No strict starting date was imposed in order to capture the earliest available reports

describing the Poncho technique and its subsequent modifications.

Search Terms and Keywords

A combination of keywords, free-text terms, and Boolean operators was used to maximize the retrieval of relevant articles. The search terms were derived from the terminology used in previously published studies describing variations of the Poncho technique.

The following search string was primarily used:

("Poncho technique" OR "Poncho flap technique" OR "Sohn poncho technique" OR "Poncho lamina technique" OR "Poncho membrane technique"
OR "Modified poncho technique")
AND
("dental implant" OR "implant dentistry" OR "implant surgery"
OR "guided bone regeneration" OR "platelet rich fibrin"
OR "platelet rich plasma" OR "PRF membrane")

When necessary, the search terms were adapted according to the syntax and indexing system of each database, including the use of controlled vocabulary terms where applicable.

Search Limits

The following limits were applied:

- Language: English
- Article type: clinical studies, randomized controlled trials, case series, case reports, and technique papers
- Field of study: implant dentistry, oral surgery, and regenerative dentistry

No restrictions were placed on study design because the literature on the Poncho technique is relatively limited and largely composed of clinical reports and technical descriptions.

Additional Search Methods

To further ensure completeness of the literature search, additional strategies were employed:

1. Manual screening of reference lists of relevant articles to identify additional studies not retrieved in the initial database search.
2. Citation tracking of key articles to identify newer publications referencing earlier work on the Poncho technique.
3. Screening of related articles suggested by the databases.
4. Review of conference abstracts, technique papers, and preprints, which often describe novel surgical techniques before full clinical studies are published.

Study Selection

All identified records were initially screened by evaluating the title and abstract for relevance to the Poncho technique in implant dentistry. Articles considered potentially relevant were then subjected to full-text evaluation.

Inclusion Criteria

- The Poncho technique or its modifications, such as Sohn's Poncho technique, Poncho flap design, or Poncho lamina technique.
- The clinical application of the technique in implant-related procedures, including guided bone regeneration, soft tissue augmentation, or platelet concentrates stabilization.

Exclusion Criteria

- Were unrelated to implant dentistry or oral surgical procedures.
- Mentioned the Poncho technique in non-dental or unrelated medical contexts.

- Were duplicate publications of the same dataset.

Data Extraction and Synthesis

Relevant information from the selected articles was extracted, including:

- Authors and year of publication
- Study design
- Clinical application of the Poncho technique
- Type of regenerative material used
- Reported clinical outcomes
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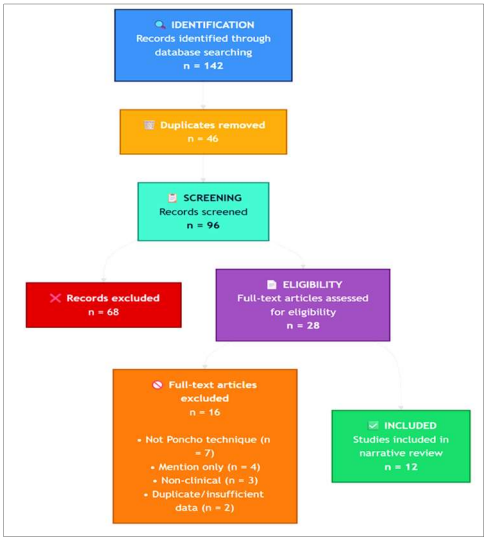
The collected data were subsequently organized and summarized descriptively to present the evolution, variations, and clinical applications of the Poncho technique in implant dentistry

Results

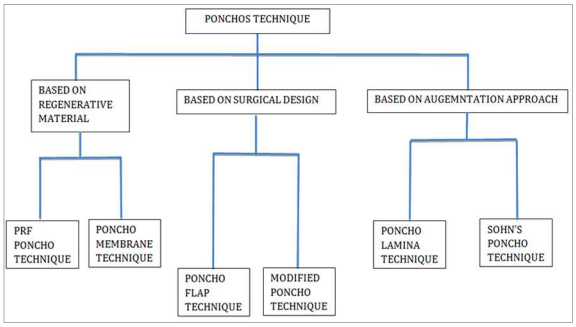
No	Author (Year)	Study Type	Poncho Technique/Application	Material Used	Main Outcomes	Crestal Bone Outcome
1	Fiorellini et al. (1998)	Animal study	Early poncho-style membrane stabilization over implants	ePTFE membrane	Improved membrane stability and regenerative healing	Bone regeneration observed; crestal bone not directly measured
2	Saghe b et al. (2017)	Clinical study	Modified poncho incision for titanium mesh management	Titanium mesh + graft	Reduced mesh exposure and improved soft tissue healing	Better maintenance of ridge contour
3	Various authors (2019)	Case report	PRF Poncho technique in immediate implants	L-PRF membrane	Improved socket sealing and healing	Suggested preservation of peri-implant bone
4	De Santis et al. (2021)	Clinical study	Poncho flap technique for customized mesh coverage	Titanium mesh + graft	Reduced exposure complications	Improved maintenance of regenerated bone
5	De Santis et al. (2022)	Retrospective study	Poncho flap approach in GBR	Titanium mesh + graft	Favorable healing and regeneration	Stable peri-implant hard tissue levels
6	Various authors (2023)	Case report	PRF Poncho sealing of fresh extraction socket	PRF membrane	Improved tissue adaptation and healing	Crestal bone preservation suggested clinically
7	Various authors (2023)	Comparative clinical study	PRF membrane stabilized using Poncho configuration	PRF membrane	Increased mucosal thickness and healing	Reduced crestal bone loss compared with controls
8	De Santis et al.	Case report	Poncho Lamina Technique	Cortical lamina + graft	Simultaneous hard and	Favourable ridge

	(2023)				soft tissue augmentation	and bone stability
9	De Santis et al. (2023)	Technique article	Accelerated Poncho Lamina protocol	Cortical lamina + grafts	Reduced surgical stages and improved tissue management	Maintenance of regenerated bone contour
10	Noelken et al. (2023)	Literature review	Poncho technique in peri-implant regeneration	Barrier membranes/ grafts	Reduced wound dehiscence risk	Potential crestal bone preservation benefit
11	Patnaik et al. (2024)	Randomized controlled trial	Sohn's Poncho Technique	Leukocyte-PRF membrane	Increased mucosal thickness and keratinized tissue width	Better radiographic crestal bone stability
12	Wang & De Santis (2024)	Case series	Modified Poncho flap technique in GBR	Titanium mesh + graft	Enhanced healing and reduced mesh exposure	Improved regenerated crestal bone architecture



Classification of Poncho Techniques

The Poncho technique can be broadly classified as:



- PRF Poncho Technique – stabilization of PRF membranes around implants.
- Sohn's Poncho Technique – use of leukocyte-rich PRF to enhance mucosal thickness.
- Poncho Membrane Technique – use of barrier membranes in guided bone regeneration.
- Poncho Flap Technique – modification of surgical flap design for membrane coverage.
- Modified Poncho Technique – combination with graft materials or titanium mesh.
- Poncho Lamina Technique – use of cortical lamina barriers for

simultaneous hard and soft tissue augmentation.

Discussion

The Poncho technique represents a relatively recent but increasingly recognized surgical concept in implant dentistry for the stabilization of regenerative biomaterials around implants. The technique derives its name from the characteristic placement of a membrane over a healing abutment through a central perforation, resembling a poncho garment. This design allows mechanical stabilization of platelet concentrates or barrier membranes without the need for additional fixation devices such as tacks, screws, or complex suturing. From a clinical standpoint, this simplified stabilization may reduce surgical trauma and improve handling of regenerative materials during implant procedures. The biological rationale for the Poncho technique is closely associated with the regenerative potential of platelet concentrates, particularly Platelet-rich fibrin (PRF). PRF provides a three-dimensional fibrin matrix enriched with platelets, leukocytes, and cytokines, allowing sustained release of growth factors such as platelet-derived growth factor, transforming growth factor-β, and vascular endothelial growth factor. These mediators are known to support angiogenesis, fibroblast proliferation, collagen synthesis, and osteoblastic activity. When PRF is stabilized in a Poncho configuration, the membrane remains closely adapted to the implant collar and surrounding tissues, which may help maintain the blood clot and support early wound healing. This mechanism may explain the favourable soft tissue responses reported in several clinical studies. The available literature indicates that the Poncho technique has evolved from simple membrane stabilization in guided bone regeneration to more complex applications in hard and soft tissue augmentation. Early evidence can be traced to experimental guided bone regeneration models described by Joseph P. Fiorellini and colleagues, where barrier membranes were stabilized over implants to create a secluded regenerative space. Although these studies did not explicitly standardize the term “Poncho technique,” they demonstrated the conceptual foundation of using a centrally perforated membrane around implant abutments. Later, with the introduction of PRF and other autologous concentrates, the concept was adapted into a clinically convenient technique for immediate implant placement and socket sealing. A notable expansion of the technique has occurred in conjunction with customized titanium mesh and cortical lamina protocols. Daniele De Santis and collaborators reported several modifications including the Poncho flap technique and Poncho lamina technique, in which the soft tissue flap is designed to cover customized titanium mesh or cortical lamina barriers more predictably. These modifications aimed primarily to reduce the incidence of membrane exposure, a major complication in guided bone regeneration. Across these studies, the Poncho approach consistently demonstrated improved soft tissue adaptation and lower wound dehiscence rates. The current evidence suggests that the main clinical indications for the Poncho technique include immediate implant placement, socket sealing, peri-implant soft tissue augmentation, guided bone regeneration, and titanium mesh-assisted ridge augmentation. In

immediate implant procedures, the Poncho technique allows the PRF membrane to be positioned over the extraction socket and around the healing abutment, acting as a biological seal. This may minimize soft tissue collapse and support early tissue maturation. In guided bone regeneration, the same principle can stabilize collagen membranes or lamina barriers over grafted defects, potentially simplifying surgical procedures and reducing the need for fixation screws. A significant aspect of interest in implant therapy is the preservation of crestal bone. Although only a limited number of studies directly evaluated this outcome, several reports suggest that the Poncho technique may contribute to reduced crestal bone loss by improving peri-implant soft tissue thickness and minimizing early wound disruption. The randomized clinical study by Bibhuti Bhusan Patnaik et al. demonstrated that the use of leukocyte-rich PRF under Sohn's Poncho technique significantly increased peri-implant mucosal thickness, with a corresponding trend toward improved radiographic crestal bone stability. Similarly, comparative studies using PRF in a Poncho configuration observed less crestal bone remodelling compared with control groups, although the magnitude of this effect remains insufficiently quantified. Despite these promising findings, the literature on the Poncho technique remains limited in both quantity and methodological quality. Most available publications are case reports, case series, technical notes, or retrospective observational studies. Such designs are inherently subject to selection bias and lack the statistical power required to establish definitive clinical recommendations. Furthermore, the term "Poncho technique" itself has not been uniformly defined across studies. In some publications it refers specifically to PRF stabilization, whereas in others it describes a flap design or a customized barrier technique. This variability complicates direct comparison of outcomes and hinders synthesis of evidence. Another limitation is the absence of long-term follow-up data. Most studies report outcomes over relatively short observation periods, typically ranging from immediate postoperative healing to one year after implant placement. Long-term assessment of implant survival, peri-implant bone levels, and soft tissue stability is largely lacking. Additionally, objective measurements of crestal bone changes are inconsistently reported, with many authors relying on descriptive clinical observations rather than standardized radiographic measurements. The role of the Poncho technique in the context of modern regenerative dentistry should therefore be interpreted cautiously. While the technique appears biologically plausible and surgically practical, it currently serves more as a technique-sensitive adjunct rather than a universally established protocol. The simplicity of membrane stabilization, reduced operative time, and elimination of additional fixation devices are clear advantages. However, clinicians must consider defect morphology, implant position, soft tissue biotype, and the type of regenerative material used before adopting the technique in routine practice. Future research should aim to standardize the terminology and classification of the Poncho technique. Well-designed randomized controlled trials comparing Poncho-based stabilization with conventional

membrane fixation methods are necessary to clarify its true clinical value. Particular emphasis should be placed on quantitative assessment of peri-implant crestal bone changes, soft tissue dimensions, and long-term implant success rates. In addition, advances in biomaterials such as customized resorbable membranes and digital surgical planning may further expand the applicability of the Poncho concept in implant rehabilitation. Overall, the Poncho technique represents an innovative and minimally invasive strategy for membrane stabilization in implant dentistry. The available evidence suggests favourable outcomes in soft tissue healing and possible benefits in preserving peri-implant bone architecture. Nevertheless, due to the limited evidence base, its use should currently be regarded as a promising adjunctive technique that requires further clinical validation through robust prospective research.

Surgical Protocol

The Poncho technique generally follows a simple surgical protocol:

1. Implant placement at the prepared osteotomy site.
2. Preparation of regenerative membrane (PRF or collagen membrane).
3. Creation of a small central perforation in the membrane.
4. Placement of the membrane around the implant so the healing abutment passes through the perforation.
5. Adaptation of the membrane over the surgical site.
6. Repositioning of soft tissues and suturing for stable healing.

Clinical Applications

The Poncho technique has been applied in various clinical situations including:

- Immediate implant placement
- Socket sealing procedures
- Soft tissue augmentation around implants
- Guided bone regeneration
- Titanium mesh-assisted bone augmentation

These applications help improve membrane stability, enhance wound healing, and maintain peri-implant tissue architecture.

Advantages

The Poncho technique offers several advantages including:

- Simplified membrane stabilization
- Reduced surgical complexity.
- Improved soft tissue healing.
- Elimination of fixation devices.
- Reduced operative time and cost.

Limitations

Despite its advantages, the Poncho technique has certain limitations including:

- Limited high-quality clinical evidence
- Variability in technique modifications
- Restricted use in large bone defects requiring rigid fixation.

Future Perspectives

Future studies should focus on randomized clinical trials comparing the Poncho technique with conventional membrane stabilization methods. Advances in biomaterials and regenerative medicine may further expand the applications of this technique.

Conclusion

The Poncho technique represents a simple and innovative method for stabilizing regenerative membranes

around dental implants. By improving membrane stability and promoting tissue healing, the technique may enhance peri-implant tissue regeneration. Further clinical research is necessary to validate its long-term effectiveness.

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