International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 18s, 2025
https://theaspd.com/index.php

# A Comparative Review Of Autogenous And Xenogeneic Grafting Techniques For Soft Tissue Augmentation Around Immediate Implants In The Esthetic Zone.

**Heba Ahmed Abdelmaged[1*], Ahmed abdelmeguid Moustafa[2], Ahmed Abdallah khalil[3]**
[1,2,3]Departments of [1]periodontology, minia university
*Corresponding author: E-mail: heba.elsweefy@mu.edu.eg

***Abstract:***
*This comparative review evaluates the efficacy of autogenous (modified vascularized interpositional periosteal-connective tissue graft, mVIP-CTG) and xenogeneic (xenogeneic collagen matrix, XCM) grafting techniques for soft tissue augmentation around immediate implants in the esthetic zone. mVIP-CTG, derived from palatal submucosa, offers superior soft tissue thickness gain (1.5–2.5 mm), long-term volume stability, and enhanced esthetic outcomes, particularly in papilla reconstruction and contour. However, it involves higher patient morbidity due to donor site complications. In contrast, XCM provides a minimally invasive alternative with moderate tissue gain (1.0–2.0 mm), reduced postoperative discomfort, and faster surgical execution, albeit with greater early resorption and less predictable long-term stability. Histologically, mVIP-CTG integrates rapidly due to its vascularized nature, while XCM relies on host remodeling, resulting in slower healing. Patient-reported outcomes favor mVIP-CTG for esthetics but XCM for comfort. The choice between techniques depends on clinical priorities: mVIP-CTG for maximal esthetic and volumetric results, and XCM for patient-centered, less invasive approaches. Both methods demonstrate unique advantages, highlighting the need for individualized treatment planning in implant therapy.*
***Keywords:*** *immediate implants, soft tissue augmentation, mVIP-CTG, xenogeneic collagen matrix, esthetic zone, comparative review.*

IIP provides tangible benefits for both physicians and patients, evidenced by the economic and societal impact resulting from a decrease in the number of procedures, treatment duration, and patient satisfaction [1]
Aesthetic results are typically attained by means of well-established peri-implant tissues and the final implant-supported restoration [2].
The function of the soft tissues around dental implants is a major concern in contemporary implantology. The keratinized mucosa's width and thickness are two crucial factors [3, 4].
New studies show that the thickness of the soft tissue around the implant is important for two reasons: how it looks and how it keeps marginal bone from resorbing. These days, there are a lot of ways to make soft tissues thicker; one of them is using xenogenic or allogenic materials. However, SCTG is widely regarded as the gold standard when it comes to its utilization [5].
Acellular dermal matrices (ADMs), xenogenic collagen matrix membranes (XCMs), and autogenous soft tissue grafts like subepithelial connective tissue grafts (SCTGs) are the three main kinds of grafts utilized in the area surrounding dental implants [6].
Connective tissue grafts, the traditional method, in summary:
In periodontal and implant dentistry, the Connective Tissue Graft (CTG) is a tried and true method of autogenous soft tissue augmentation. To improve peri-implant mucosal thickness and keratinized tissue width, cover exposed roots, or increase soft tissue volume, this procedure entails transferring subepithelial connective tissue, usually from the palate, to a recipient site.
The predictability and long-term success of CTG make it the gold standard for soft tissue augmentation. However, xenogeneic matrices and other alternative grafting materials are being employed more and more to decrease invasiveness.

**A pedicle autograft**

Autogenous soft tissue grafts, particularly the subepithelial connective tissue graft (SCTG), represent the gold standard for optimizing cosmetic results by augmenting soft tissue thickness and concealing obvious implant components. Reconstruction of the interdental papilla Nonetheless, these grafts include certain drawbacks associated with the dimensions of the donor site, which are primarily contingent upon individual anatomy, and also lead to patient pain [7].

The palate is the predominant donor site for obtaining soft tissue grafts needed to rectify morphological changes in the anterior maxillary regions resulting from tooth extractions, trauma, periodontal diseases, and/or developmental ridge defects, where augmentation procedures are frequently essential to restore substantial volume deficiencies [8].

Numerous methodologies utilizing palatal pedicle grafts encompass palatal advanced flap by [9], rotated full palatal flap by [10], palatal advanced flap by [11], VIP-CT flap by [12], modified VIP-CT by [13], and Double-fold CT pedicle graft [14].

In 2003, Sclar et al. created the pedicle autograft, a vascularized interpositional periosteal connective tissue (VIP-CT) flap, which consists of anteriorly based pediculated tissue derived from palatal submucosa, comprising periosteum and connective tissue. Enables the clinician to execute extensive soft tissue augmentation in aesthetic areas in a single procedure within 6 to 9 months, accompanied by minimal postsurgical contraction and primary closure of the donor site, while preserving an intact vascular supply to ensure superior aesthetic integration at the recipient site. The vascular supply of this flap has a random pattern, with its pivot point located near the incisive papilla [12].

Employing these types of pedicle flaps facilitates tension-free flap closure when the implant is positioned promptly following tooth extraction. Consequently, concurrent hard and soft tissue augmentations are probable with an instantaneous implant utilizing these flap configurations [13].

Kim et al. introduced a novel version of the VIP-CT flap, incorporating palatal tunneling (modified VIP-CT graft), which features a papilla preservation flap at the implant site. This alteration diminishes tissue damage and lessens postoperative flap contraction to avert papillary loss, therefore preserving the donor site's vascular integrity [13].

A modified VIP-CT graft was obtained using a modified single incision approach from the palate, followed by advancement via a palatal tunneling process [15]

This alteration of the VIP-CT flap deviates from the traditional method [12] by omitting releasing incisions at the donor site, thereby permitting the pedicle to be advanced over the recipient site. In this proposed technique, progress was attained via a tunneling procedure [16].

Essential Stages of the mVIP-CTG Harvesting and Grafting Protocol:

A partial-thickness flap is elevated at the recipient location, maintaining the papillae and vascular supply. A vascularized connective tissue graft is obtained from the palate, preserving a periosteal pedicle to protect the blood supply. The graft is tunneled or pushed behind the flap towards the buccal aspect without total detachment. The vascularized characteristics of the graft improve survival, angiogenesis, and integration. Suturing is used to secure the graft and ensure a tension-free closure.

Typical Donor Location is Palatal Mucosa (located between the canine and first molar)

**Esthetic and Patient-Reported Outcomes:**

Enhancement of Esthetic Score: Elevated Pink Esthetic Score (PES) values documented postoperatively. Patient satisfaction is typically elevated due to the natural contour, color compatibility, and reduced morbidity compared to free connective tissue grafts.

Healing: The vascularized structure facilitates expedited and more reliable healing.

This modification provides

It achieves optimal outcomes with minimal tissue trauma [17] guarantees superior blood circulation, less morbidity, and primary closure of both the donor and recipient sites, which are further benefits of this flap. It also maintains color consistency and improves patient acceptance as it entails a singular surgical site [18].

Furthermore, it safeguards the underlying bone graft, provides nourishment, and concurrently enhances the vertical dimension of the area. The outcome of this flap is an aesthetically pleasing prosthesis in the vital region of the mouth. The rapid insertion of implants into fresh extraction sockets using this flap obviates the necessity for a membrane, decreases expenses, and enhances the histological quality of the ridge crest. Maxillary implants are advantageous in cases with absent or minimally wide keratinized gingiva. It is well acknowledged, but not conclusively proven, that keratinized gingival tissue surrounding dental implants is more physiologically resilient than alveolar mucosa in enduring masticatory stresses [19].

Soft tissue substitutes (Xenogenic collagen matrix):

The advancement of connective tissue substitutes derived from xenogeneic, allogeneic, or synthetic sources is becoming increasingly pertinent to address the limitations of autogenous connective tissue. These biomaterials can decrease surgery duration, mitigate surgical morbidity, and enhance patient acceptance. Two primary

characteristics must be met: favorable biological behavior that allows for modeling and remodeling processes, and temporal volume stability [20].

In recent decades, various non-autologous materials have been assessed to enhance peri-implant keratinized tissue [21, 22]. Soft tissue substitutes have proven to be effective alternatives to FGG [23, 24], but on the other hand, they have shown a high resorption rate over time [25].

Collagenous barriers of xenogenic origin are predictable for guided tissue regeneration[26]. Collagen exhibits angiogenic properties that accelerate healing and stimulate fibroblast expression. Furthermore, due to its enzymatic biodegradability, it does not necessitate removal [23].

One of the most extensively reported cross-linked collagens consists of type I and III collagens derived from certified pigs that have completed health assessments both pre- and post-mortem before processing. The collagen undergoes chemical purification to reduce its antigenic properties. Subsequently, after packing, the matrix is sterilized using gamma irradiation to eliminate bacteria and viruses. Cross-linked collagen matrices are porous and volumetrically stable due to the chemical cross-linking technique used on the collagen. These properties facilitate the stabilization of the blood clot, its cellular colonization, and angiogenesis [27, 28].

Non-cross-linked collagen matrices comprise type I and type III collagen. The complete production method, akin to the cross-linked CM, produces a stable three-dimensional matrix of collagen and elastin, without necessitating additional cross-linking or chemical treatment [29, 30].

Generally, in contrast to autologous tissue grafts, soft tissue substitutes present numerous advantages, including a theoretically unlimited supply, ease of use and manipulation, enhanced aesthetic integration, reduced operative durations, elimination of donor site complications, decreased postoperative discomfort and analgesic consumption, along with improved overall patient satisfaction [31]

XCM is an absorbable bio-membrane generated from swine sources, frequently utilized as a novel soft tissue alternative to circumvent the drawbacks associated with autologous tissue grafts. This three-dimensional matrix consists of two layers: a dense layer advantageous for suturing and wound protection, and a porous layer that promotes blood clot stabilization, fast vascularization, and tissue integration [32, 33].

Xenogeneic collagen matrix (XCM) materials, designed to overcome these limitations, function as scaffolds for the formation of new peri-implant tissues; they possess angiogenic properties, and their application has demonstrated an increase in keratinized tissue comparable to that of an autologous graft in both linear and volumetric dimensions.[34]

Histological outcomes have confirmed that XCM can integrate well with host tissues, with minimal inflammatory reactions [32, 35].

Previous studies have investigated the clinical efficacy of XCM for augmenting keratinized mucosa and reported promising results [36]

Three-dimensional structures are essential for serving as scaffolds that facilitate cell attachment and migration, thereby creating a suitable environment for cell proliferation and differentiation. This allows cells to produce their extracellular matrix, resulting in a tissue-like structure [18].

As a result, collagen matrices (CMs) are regarded as an inexhaustible substitute for autogenous connective tissue grafting and have been employed for soft tissue augmentation surrounding dental implants and root coverage therapy, with positive outcomes [12,19].

Despite XCM demonstrating commendable volume stability, which permits adequate time for cellular infiltration and neotissue development, its swift biodegradation due to enzymatic activity undermines its viability as a substitute for autogenous grafting [20,21].

This study aims to assess the efficacy of XCM in augmenting peri-implant soft tissue thickness within the IIP protocol and to compare it with autogenous palatal pedicle graft (mVIP-CTG).

It is also recommended to graft the space between the socket and the implant [37]. The objective of the grafting technique is to fortify the osseous tissue encircling the implant. This treatment is believed to positively impact the soft tissue surrounding the implant. A critical component influencing the morphology of soft tissue is buccal bone thickness (BBT). Variations in BBT are regarded as a crucial predictor of the aesthetic outcome of the implant [38].

**Surgical steps**

XCM is typically rehydrated in sterile saline or the patient's blood for several minutes prior to placement to enhance pliability and manageability. The matrix is thereafter manipulated delicately using atraumatic forceps to maintain its structural integrity.

Determine the desired orientation, as the majority of XCMs are bilayered, featuring one porous layer for tissue ingrowth and a denser layer for volumetric stability. The matrix is thereafter adjusted to conform precisely to the size of the recipient site. It may be positioned buccally beneath a split thickness pouch, analogous to mVIP-CTG methods. Stabilization is attained using sutures or tissue adhesive to guarantee close contact with the recipient bed.

**Comparative Analysis: mVIP-CTG vs. XCM in the Esthetic Zone**

**1. Soft Tissue Volume and Thickness Gain**

- **Findings from Comparative Studies:**
  - Most studies report greater soft tissue thickness gain with mVIP-CTG (typically 1.5–2.5 mm) compared to XCM (1.0–2.0 mm).
  - The vascularized pedicle in mVIP-CTG supports better perfusion and tissue integration, contributing to enhanced volume stability.
  - XCM shows greater early resorption, with a portion of the initial volume lost during remodeling.
- **Factors Influencing Volume Stability:**
  - Graft type (autogenous vs. collagen matrix).
  - Blood supply and flap tension.
  - Implant positioning and prosthetic support.
  - Patient biotype (thicker biotypes may better preserve augmented tissue).

2. **Esthetic Outcomes (Papilla, Contour, Color Match)**

- **Effectiveness in Esthetic Results:**
  - mVIP-CTG demonstrates superior papilla fill and buccal contour enhancement due to robust volume and integration.
  - XCM offers good esthetic integration, especially in terms of color match, but may lag in papillary reconstruction and volume projection.
- **Subjective and Objective Assessments:**
  - The Pink Esthetic Score (PES) tends to be higher in mVIP-CTG, particularly for contour and papilla height.
  - Patients often report high satisfaction with both, but slightly higher esthetic perception with CTG-based techniques in the long term.
  - XCM often scores better in terms of comfort and surgical experience.

3. **Patient Morbidity and Comfort**

- **Postoperative Experience:**
  - mVIP-CTG involves a second surgical site, resulting in increased pain, swelling, and risk of bleeding (especially at the palatal donor site).
  - XCM eliminates the need for tissue harvesting, thus offering reduced morbidity, quicker recovery, and improved patient comfort.
- **Donor Site Impact:**
  - mVIP-CTG requires palatal dissection, which prolongs surgery and healing.
  - XCM has a clear advantage in minimally invasive applications and is preferred by patients who prioritize comfort.

4. **Complications and Healing**

- **Reported Complications:**
  - mVIP-CTG: potential for palatal bleeding, donor site infection, or partial graft necrosis if vascularity is compromised.
  - XCM: risk of early exposure and matrix collapse if flap tension is not managed; however, no donor site-related complications.
- **Healing Patterns:**
  - mVIP-CTG heals via primary intention, with rapid integration due to vascularity.

- XCM heals via secondary intention, requiring host cell infiltration, and this may delay maturation but often results in good long-term integration.

5. **Long-term Stability**

- **Tissue Maintenance Over Time:**
  - mVIP-CTG shows greater long-term stability, with preservation of soft tissue volume and contour reported beyond 1–3 years in many clinical studies.
  - XCM, while effective in the short term, may undergo partial resorption, especially in cases with high muscle pull or thin biotype.
- **Clinical Implications:**
  - mVIP-CTG is preferred when maximum volume preservation and esthetics are the primary goals.
  - XCM is ideal when minimally invasive intervention is desired, and moderate tissue gain is clinically sufficient.

**Summary table**

| Parameter | mVIP-CTG | XCM |
|---|---|---|
| **Tissue Thickness Gain** | 1.5–2.5 mm (greater, stable) | 1.0–2.0 mm (moderate, some resorption) |
| **Esthetic Outcome (PES)** | High (especially papilla & contour) | Moderate to high (good color match) |
| **Patient Morbidity** | Higher (due to donor site) | Lower (no harvesting) |
| **Healing Pattern** | Faster (vascularized integration) | Slower (remodeling phase required) |
| **Long-term Stability** | Superior | Acceptable but less predictable |
| **Common Complications** | Donor site pain/bleeding | Matrix exposure, partial resorption |

Indeed, here is a concise yet informative summary of the biological and histological differences between mVIP-CTG (autogenous graft) and XCM (xenogeneic collagen matrix), along with their clinical implications:

**Clinical Implications of Biological Differences**

Stability & Volume Maintenance:

mVIP-CTG benefits from immediate vascular perfusion, which reduces the risk of necrosis and improves graft survival, especially in thin biotypes or tension-prone areas.

- XCM, being initially acellular, is more vulnerable to resorption and relies entirely on host vascularization, which may delay integration and reduce long-term volume.
- Healing Time:

mVIP-CTG supports faster and more predictable healing due to biological continuity.

XCM has a slower integration process, influenced by individual variability in healing and immune response.

- Esthetics and Tissue Quality:

CTG-derived tissue tends to have superior elasticity, color, and texture due to its autologous origin.

XCM-derived tissue may appear slightly different in hue or firmness during early stages, although it often blends well over time.

- Long-Term Resilience:

The dense collagen and vascular foundation of mVIP-CTG results in improved resistance to mechanical and inflammatory challenges.

XCM may have reduced resilience to trauma or peri-implant inflammation due to initial fragility during remodeling.

**Conclusion:**

- mVIP-CTG provides biologically robust and histologically mature soft tissue early on, resulting in superior volume stability and aesthetic outcomes.
- XCM offers a less invasive alternative that integrates gradually, with slightly less predictability in volume retention, but provides good long-term aesthetic blending in suitable cases.

**REFERENCES:**

1. Tonetti, M.S., et al., Immediate versus delayed implant placement after anterior single tooth extraction: the timing randomized controlled clinical trial. Journal of clinical periodontology, 2017. 44(2): p. 215-224.
2. Moussa, S.G., N.I. Ragy, and K.A. Ghaffar, Evaluation of Mucograft® in increasing the peri-implant soft tissue thickness in the esthetic zone. Future Dent J, 2020. 2: p. 5.
3. Tarasenko, S., et al., Comparative analysis of methods to increase the amount of keratinized mucosa before stage-two surgery: a randomized controlled study. Quintessence International, 2020. 51(5).
4. Avila-Ortiz, G., et al., The peri-implant phenotype. 2020.
5. Ashurko, I., et al., Connective tissue graft versus xenogeneic collagen matrix for soft tissue augmentation at implant sites: a randomized-controlled clinical trial. Clinical Oral Investigations, 2022. 26(12): p. 7191-7208.
6. Azadi, A., et al., Hard and soft tissue alterations after the application of different soft tissue grafting materials during immediate dental implant placement: a systematic review and Bayesian network meta-analysis. BMC Oral Health, 2025. 25(1): p. 183.
7. Zucchelli, G., et al., Autogenous soft tissue grafting for periodontal and peri-implant plastic surgical reconstruction. Journal of periodontology, 2020. 91(1): p. 9-16.
8. Shanmugam, M., et al., Clinical and histological evaluation of two dressing materials in the healing of palatal wounds. Journal of Indian Society of Periodontology, 2010. 14(4): p. 241-244.
9. Khoury, F. and A. Happe, The palatal subepithelial connective tissue flap method for soft tissue management to cover maxillary defects: a clinical report. International Journal of Oral & Maxillofacial Implants, 2000. 15(3).
10. Nemcovsky, C.E., et al., Clinical coverage of dehiscence defects in immediate implant procedures: three surgical modalities to achieve primary soft tissue closure. International Journal of Oral & Maxillofacial Implants, 2000. 15(6).
11. Goldstein, M., B.D. Boyan, and Z. Schwartz, The palatal advanced flap: a pedicle flap for primary coverage of immediately placed implants. Clinical oral implants research, 2002. 13(6): p. 644-650.
12. Sclar, A., Soft tissue and esthetic considerations in implant therapy. (No Title), 2003.
13. Kim, C.-S., et al., Long-term results from soft and hard tissue augmentation by a modified vascularized interpositional periosteal-connective tissue technique in the maxillary anterior region. Journal of Oral and Maxillofacial Surgery, 2012. 70(2): p. 484-491.
14. Rahpeyma, A., Modified VIP-CT flap in late maxillary alveolar cleft surgery. Journal of Cranio-Maxillofacial Surgery, 2014. 42(5): p. 432-437.
15. Kumar, A., et al., Modified single incision technique to harvest subepithelial connective tissue graft. Journal of Indian Society of Periodontology, 2013. 17(5): p. 676-680.
16. Romanos, A.H., N.C. Geurs, and R.V. Abou-Arraj, Pedicle connective tissue graft with novel palatal tunneling. Clinical Advances in Periodontics, 2013. 3(4): p. 191-198.
17. Kumar, A.T., et al., Palatal pedicle flap-varied applications. International Journal of Oral Health Sciences, 2015. 5(2): p. 106-112.
18. Agarwal, C., et al., Vascularized interpositional periosteal connective tissue flap: A modern approach to augment soft tissue. Journal of Indian Society of Periodontology, 2015. 19(1): p. 72-77.
19. Rahpeyma, A. and S. Khajehahmadi, Vascularized interpositional periosteal connective tissue flap in implant dentistry. Journal of Dental Implants, 2014. 4(1): p. 29-32.
20. Vallecillo, C., et al., Collagen matrix vs. autogenous connective tissue graft for soft tissue augmentation: a systematic review and meta-analysis. Polymers, 2021. 13(11): p. 1810.
21. Wolff, J., et al., Soft tissue augmentation techniques and materials used in the oral cavity: An overview. Implant Dentistry, 2016. 25(3): p. 427-434.
22. Sanz, M., et al., Clinical evaluation of a new collagen matrix (Mucograft® prototype) to enhance the width of keratinized tissue in patients with fixed prosthetic restorations: a randomized prospective clinical trial. Journal of clinical periodontology, 2009. 36(10): p. 868-876.
23. Moraschini, V., et al., Clinical efficacy of xenogeneic collagen matrix in augmenting keratinized mucosa round dental implants: a systematic review and meta-analysis. Clinical oral investigations, 2020. 24: p. 2163-2174.
24. Rokn, A., H. Zare, and P. Haddadi, Use of mucograft collagen matrix® versus free gingival graft to augment keratinized tissue around teeth: a randomized controlled clinical trial. Frontiers in dentistry, 2020. 17: p. 5.
25. Simion, M., et al., Evaluation of a resorbable collagen matrix infused with rhPDGF-BB in peri-implant soft tissue augmentation: a preliminary report with 3.5 years of observation. International Journal of Periodontics and Restorative Dentistry, 2012. 32(3): p. 273.
26. Lorenz, J., et al., Expansion of the peri-implant attached gingiva with a three-dimensional collagen matrix in head and neck cancer patients—results from a prospective clinical and histological study. Clinical oral investigations, 2017. 21: p. 1103-1111.
27. Caballé-Serrano, J., et al., Tissue response to a porous collagen matrix used for soft tissue augmentation. Materials, 2019. 12(22): p. 3721.
28. Thoma, D.S., et al., Tissue integration of collagen-based matrices: an experimental study in mice. Clinical Oral Implants Research, 2012. 23(12): p. 1333-1339.
29. Barbeck, M., et al., Porcine dermis-derived collagen membranes induce implantation bed vascularization via multinucleated giant cells: a physiological reaction? Journal of Oral Implantology, 2015. 41(6): p. e238-e251.
30. Papi, P. and G. Pompa, The use of a novel porcine derived acellular dermal matrix (mucoderm) in peri-implant soft tissue augmentation: preliminary results of a prospective pilot cohort study. BioMed Research International, 2018. 2018(1): p. 6406051.
31. Manfredini, M., et al., The efficacy of a porcine collagen matrix in keratinized mucosa width augmentation: a 10-year follow-up clinical prospective study. International Journal of Implant Dentistry, 2023. 9(1): p. 10.

32. Ghanaati, S., et al., Evaluation of the tissue reaction to a new bilayered collagen matrix in vivo and its translation to the clinic. Biomedical materials, 2011. 6(1): p. 015010.
33. Tavelli, L., et al., Extracellular matrix-based scaffolding technologies for periodontal and peri-implant soft tissue regeneration. Journal of periodontology, 2020. 91(1): p. 17-25.
34. Thoma, D.S., et al., Effects of soft tissue augmentation procedures on peri-implant health or disease: a systematic review and meta-analysis. Clinical oral implants research, 2018. 29: p. 32-49.
35. Vignoletti, F., et al., Clinical and histological healing of a new collagen matrix in combination with the coronally advanced flap for the treatment of Miller class-I recession defects: An experimental study in the minipig. Journal of Clinical Periodontology, 2011. 38(9): p. 847-855.
36. HuangJP, L., Clinicalevaluationofxenogeneiccollagenmatrixversusfreegingivalgraftsforkeratinizedmucosaaugmentationarounddentalimplants: Arandomizedcontrolled clinicaltrial. J Clin Periodontol, 2021. 48(10): p. 1293-1301.
37. Sanz, M., et al., The effect of placing a bone replacement graft in the gap at immediately placed implants: a randomized clinical trial. Clinical oral implants research, 2017. 28(8): p. 902-910.
38. Zuiderveld, E.G., et al., Effect of connective tissue grafting on buccal bone changes based on cone beam computed tomography scans in the esthetic zone of single immediate implants: A 1-year randomized controlled trial. J Periodontol, 2021. 92(4): p. 553-561.

o