

Oral Punch Biopsy: A Comprehensive Review of Pre-Procedural Assessment, Technique, and Post-Operative Care

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ABSTRACT

Background: Oral mucosal diseases often require a biopsy for a definitive diagnosis. Although originally developed for dermatology, the punch biopsy has become widely accepted in dental practice due to its simplicity and minimally invasive nature.

Objective: This technical note reviews the essential protocols for oral punch biopsy across the pre-, intra-, and post-operative phases.

Technical Considerations: Key pre-procedural management is outlined for patients with comorbidities. Step-by-step intra-operative techniques including site selection, proper tool manipulation, and tissue handling are detailed to ensure high-quality specimens with minimal tissue artifacts. Furthermore, post-surgical care guidelines are emphasized to reduce potential complications and support optimal healing.

Conclusion: The oral punch biopsy is a rapid, efficient, and reliable diagnostic technique that provides adequate tissue depth for histopathological assessment while maintaining low patient morbidity.

Key words: Punch biopsy, biopsy technique, oral lesions, oral mucosa, pre-operative care, post-operative care

INTRODUCTION

Oral mucosal diseases are frequently encountered in dental practice and often require a biopsy to establish a definitive diagnosis.¹ These lesions can range from benign to malignant and various biopsy techniques are available to assist clinicians in diagnosis or management.² Among these, punch biopsy is one of the widely accepted and commonly performed methods.

Originally developed for dermatological applications, the punch biopsy technique was later widely used in the oral cavity owing to its simplicity, low morbidity, and ease of use.²

³ The technique involves the use of a circular, sharp-edged blade trephine attached to a pencil-like handle to obtain a full-thickness mucosal specimen, often including the epithelium, lamina propria and superficial submucosa.³

In view of the scarcity of articles focusing specifically on oral punch biopsies, this article aims to review the techniques, indications, contraindications and practical considerations involved in performing oral punch biopsies, with the hope of providing guidance to dental surgeons in their clinical practice.

2. Principles and biopsy site.

A punch biopsy is an alternative to conventional incisional biopsy, primarily used to diagnose oral potentially malignant disorders, reactive lesions, vesiculobullous or

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mucocutaneous diseases before definitive therapy³. Examples include oral lichen planus, leukoplakia, erythroplakia, and mucous membrane pemphigus. It is especially useful for multiple mucosal lesions with variable appearances, such as erythematous, ulcerated, or white patches³. The biopsy site determines the suitability of this technique. Punch biopsy is not recommended in areas with poor access, such as the

lingual gingiva or maxillary tuberosity, or near vital submucosal structures like Stenson's duct or the mental foramen, due to the risk of injury. The specimen should include epithelium and underlying lamina propria from the lesion margin.

3. Clinical Indications, Advantages, Disadvantages, and Diagnostic Value

3.1 Clinical Indications: Punch biopsy, as one of the established tissue biopsy techniques, represents a valuable diagnostic modality applied in diverse clinical contexts to facilitate accurate diagnosis and appropriate management. It is particularly indicated for lesions with a high suspicion of malignancy, including erythroplakia, non-homogeneous leukoplakia, persistent ulcerations, and lesions that remain non-healing for more than two weeks.³ Moreover, punch biopsy serves an important role in the evaluation of vesiculobullous disorders, chronic inflammatory conditions, pigmented lesions, and suspected oral manifestations of systemic diseases or dermatoses.³ In addition, it provides a useful means of monitoring disease progression and assessing therapeutic response.

3.2 Advantages: The technique offers several advantages, including simplicity, minimal invasiveness, good patient acceptance and the ability to obtain adequately sized specimens containing both epithelium and underlying connective tissue for histopathological assessment.

3.3 Disadvantages: However, its limitations include difficulty in accessing certain anatomical sites, the risk of inadequate sampling in large or heterogeneous lesions, and possible injury to adjacent vital structures if improperly performed.

3.4 Diagnostic Value: Despite these limitations, punch biopsy demonstrates good diagnostic value in appropriately selected oral lesions and may serve as a practical alternative to conventional incisional biopsy in suitable clinical settings.

4. Pre-procedural

The initial assessment should include a thorough medical and dental history to identify systemic conditions, medications, surgical history, and allergies that may affect pre- and post-operative planning. For patients with relevant cardiac conditions, it is advisable to refer to the 2024 American Heart Association (AHA) guidelines to determine the need for antibiotic prophylaxis prior to dental procedures. The current recommended guidance is summarised in Supplementary Table 1.⁴

In immunocompromised patients, prophylaxis or postoperative antibiotics may be indicated, particularly in those with human immunodeficiency virus (HIV), neutropenia, uncontrolled diabetes mellitus or undergoing chemotherapy, immunosuppressive therapy, radiation, or organ transplantation. The American Academy of Oral Medicine recommends preoperative investigations, including an international normalised ratio (INR) test for patients on anticoagulant therapy, with values up to 3.5 considered safe for moderately invasive oral surgery.⁵ Antiplatelet or direct-acting oral anticoagulants therapy should not be discontinued, and bleeding should instead be managed using local measures.⁵ Patients with bleeding disorders may require deferral.

Therefore, preoperative blood investigations, including a full blood count and coagulation profile, are crucial.

In diabetic patients, particularly those with poor glycaemic control, the risk of postoperative infection and delayed healing

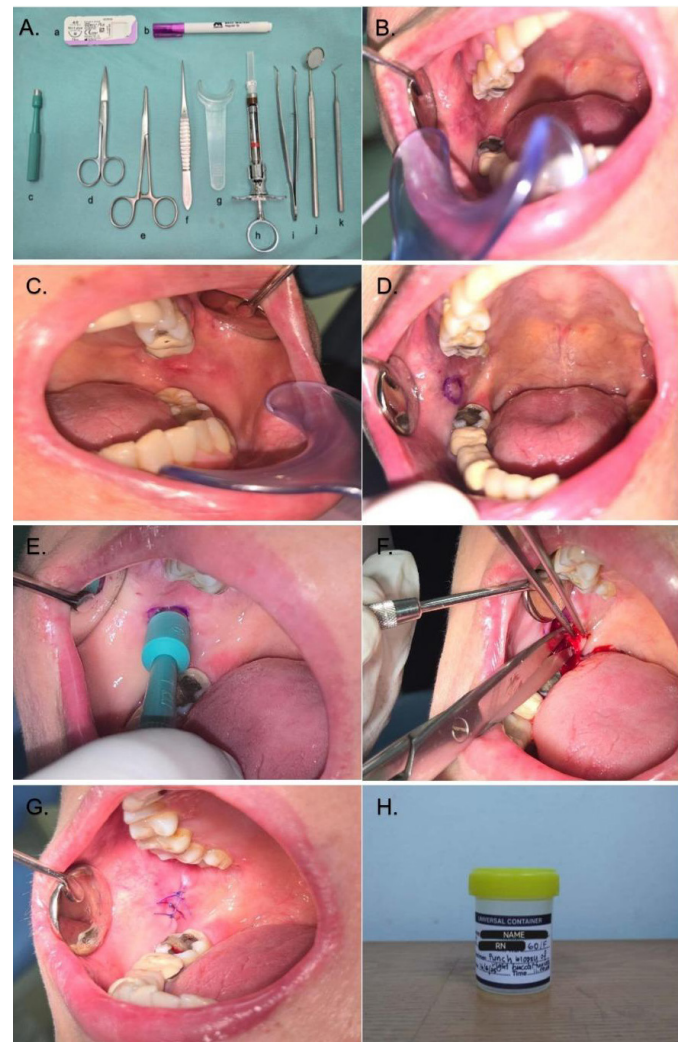


Fig. 1: A. Set-up for oral punch biopsy: a-suture material; b-sterile marker; c-biopsy punch; d-scissor; e-needle holder; f-tissue forceps; g-cheek retractor; h-dental syringe; i-tweezer; j-mouth mirror; k-dental probe. Patient presented with white striation with mild erythematous background bilaterally on buccal mucosa (B and C). The biopsy site on the right buccal mucosa is marked with a sterile marker (D). Biopsy punch is oriented perpendicular to the mucosa surface (E). It is pressed gently against the biopsy site and rotated in a twirling motion while applying constant pressure. Note that the biopsy punch has reached its hub indicating sufficient depth of incision. The cylindrical tissue specimen is gently lifted with tissue forceps and excised at the base using scissors (F). The surgical site is approximated by 3 simple interrupted sutures (G). The specimen is transferred to a specimen bottle containing 10% neutral buffered formalin (H). The specimen bottle should be labelled with the patient's name, registration number, with age and gender and label the site and nature of the specimen.

is increased. Biopsies should be scheduled in the morning after food and medication intake, with blood glucose fasting levels maintained at 4.0–7.0 mmol/L and 2-hour postprandial levels at 5.0–10.0 mmol/L.⁶ Chlorhexidine rinses and antibiotic cover may be considered.

Patients with adrenal insufficiency or on long-term corticosteroids may be at risk of adrenal crisis during or after stressful procedure. Those taking ≥ 10 mg prednisolone daily, or within three months, may require supplemental steroids whereas lower or discontinued does usually do not.⁷ Preoperatively, the morning steroid dose is often doubled. However, according to Liu et al⁸, for dental surgeries and

biopsies, continuing the usual daily dose may be sufficient.

5. Intra-procedural

The instruments required for punch biopsy are biopsy punch, tissue forceps, scissors, needle holder, gauze packs, suture material and a specimen bottle. A punch biopsy instrument consists of three parts: the handle, the hub and the circular blade, available in presterilized disposable or autoclavable pouches. Biopsy punches are generally available in sizes ranging from 2 mm to 8 mm. For most intraoral procedures, punches measuring 3 mm, 4 mm, or 5 mm are commonly sufficient.² When choosing the biopsy site, it should follow the same principle for incisional biopsy, that includes both the lesional tissue and the adjacent normal tissue.

Before performing the procedure, written consent must be obtained from the patient. Local anaesthesia, typically 2% lidocaine with or without 1:80,000/1:100,000 epinephrine, is administered at the biopsy site to ensure adequate analgesia and haemostasis. The biopsy site is supported using the non-dominant hand; the thumb is used to exert pressure and stretch the tissue for better access. In cases where the biopsy is taken from the buccal or labial mucosa, the mucosa is everted using the non-dominant hand to optimize exposure.

The biopsy punch is held between the thumb and index finger of the dominant hand and positioned perpendicular to the lesion. It is then pressed gently against the site and rotated in a twirling motion—alternating between clockwise and anticlockwise—while applying constant pressure until it penetrates the full thickness of the mucosa or reaches the hub of the instrument. Once the punch is fully engaged, it is carefully removed (Fig 1).

The cylindrical tissue specimen is gently lifted using tissue forceps or an anaesthesia needle and excised below the mucosal surface using an iris scissor or a #15 scalpel blade. The tissue is blotted or rinsed in saline before being placed in 10% neutral buffered formalin. Bleeding is controlled with gauze pressure, and wound is closed with one to two sutures to promote healing and maintain haemostasis. Closure technique depends on biopsy size and site, though simple interrupted sutures are most common. Absorbable sutures (e.g., 4-0 or 5-0 polyglactin 910) are generally preferred for intraoral use.

6. Post-procedural

Following an oral punch biopsy, patients should be advised that mild bleeding or oozing is expected within the first 24 hours and may be managed by applying gentle pressure with sterile gauze. NSAIDs such as ibuprofen are the first-line option for post-surgical pain management. A typical dose is 600 mg every 6 hours. If additional relief is needed, or if NSAIDs are contraindicated, acetaminophen 1,000 mg every 8 hours may be used. To avoid toxicity, the total daily dose of acetaminophen must not exceed 3,000 mg.

Cold compresses may be applied externally in 15-minute intervals during the first 6–8 hours help reduce swelling. Patients should maintain soft oral hygiene, avoiding brushing near the biopsy site for 24 hours and using warm saline rinses thereafter. Alcohol-based mouthwashes, hot or spicy foods, and the use of straws should be avoided.³

A soft diet and adequate hydration are recommended, alongside activity restriction for 24–48 hours. Patients should

Table 1: Antibiotic Regimens for a Dental Procedure Regimen: Single Dose 30 to 60 Minutes Before Procedure

Situation	Agent	Adults	Children
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin	2 g IM or IV	50 mg/kg IM or IV
	OR	1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillin or ampicillin—oral	Cefazolin or ceftriaxone	2 g	50 mg/kg
	Cephalexin*†		
	OR	500 mg	15 mg/kg
	Azithromycin or clarithromycin		
	OR	100 mg	<45 kg, 2.2 mg/kg
	Doxycycline		>45 kg, 100 mg
Allergic to penicillin or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone†	1 g IM or IV	50 mg/kg IM or IV

Clindamycin is no longer recommended for antibiotic prophylaxis for a dental procedure.

IM indicates intramuscular, and IV, intravenous.

*Or other first- or second-generation oral cephalosporin in equivalent adult or paediatric dosing.

†Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema, or urticarial with penicillin or ampicillin.



refrain from smoking and alcohol consumption to support wound healing. Signs of complications such as prolonged bleeding, severe pain, infection, or difficulty swallowing, warrant immediate medical attention. Sutures, if placed, are typically absorbable. A follow-up visit is advised to assess healing and review histopathology, which is usually made within 7–10 days.

7. Complications

Complications following an oral punch biopsy are rare. Previous risk analysis of cutaneous punch biopsies found that the most common complication was postoperative bleeding (0.9%), followed by wound infection (0.2%), and vagal reflex (0.1%).⁹ The safety of oral mucosal punch biopsies is less documented, though Eisen¹⁰ reported 140 cases with bleeding as the main complication. It was managed using pressure, apart from six instances where electrodesiccation was employed. Proper technique and adherence to post-operative instructions significantly reduce these risks.

8. CONCLUSION

Punch biopsies, which don't require specialized training for surgical soft tissue abilities, are a rapid and efficient way to sample intraoral lesions. Punch biopsies are practical, provide adequate tissue and depths, and lower the possibility of artifacts. The result is a specimen that may be used for histological diagnosis of a variety of diseases, allowing patients to receive treatment on time.

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