Case Report

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Suture Thread Incisional Biopsy of Oral Tissues: A Case Report of a Unique Technique

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ABSTRACT

Oral mucosal pathologies have varied presentations, and their innocuous appearance can occasionally misguide even the specialist. Various oral diseases can be detected by sampling the mucosa. The biopsy is a process of removing an altered viable tissue from a living being to determine the nature of pathology by microscopic evaluation. This approach allows for confirmation of the histopathologic features of suspicious pathologies, their grade and stage, and an appropriate treatment plan. The biopsy is a primary diagnostic test for a range of oral lesions. It is required for those oral mucosal surfaces which demonstrate significant and tenacious changes in the colour or appearance. Although an array of biopsy techniques and tools exist, the utmost intention is to pick up a representative tissue that will aid in preparing an explicit histopathology report. We present a case of a suture thread incisional biopsy (IB) technique performed on a 32-year-old patient with an oral white lesion that resulted in a successful sample for histopathology. The sample taken provided flawless sections with precise histopathological features. This report illustrates a modified IB sampling technique and its utility. The suture thread IB technique was found to have many advantages over conventional IB techniques. However, the procedure needs highly skilled clinicians to perform it. Future investigations could elaborate on the merits and demerits of this technique.

Introduction

Biopsy of oral tissues is mandatory for the pathologies that cannot be diagnosed solely based on history and clinical oral examination (COE) [1]. In routine practice, most biopsies are from the oral mucosa. They are undertaken not only for suspected oral premalignant lesions (OPLs) but also for the diagnosis of vesiculobullous, chronic ulcerative, and desquamative lesions of the oral mucosa [2]. A biopsy is defined as "the removal of tissue from the living organism for microscopic examination and diagnosis" [3]. The word biopsy is derived from the two root Greek words, "bios" (life) and "opsis" (vision). Practically, the biopsy is a process of extracting a tissue specimen from a living being to examine it under a microscope with a diagnostic intent [4]. It is an investigative technique that is considered the gold standard for diagnosing most diseases [3,5]. Histopathological assessment of tissue gives information regarding the clinical behaviour of the disease and prognosis apart from being a gold standard for diagnosing several pathologies [6]. The biopsy report can aid the clinician in determining the course and predicting recovery, recurrences, or progression of pathology [4]. The rationale for carrying out a biopsy is as follows: to confirm a definitive diagnosis quickly so that appropriate treatment can begin, to assess the prognosis in malignant and OPLs, to ascertain whether a lesion has been entirely excised and if the histopathology report is a document with medico-legal importance [7,8].

According to the American Academy of Oral and Maxillofacial Pathology, any altered tissue removed from the oral and maxillofacial region should be subjected to histopathologic examination [9,10]. Pathologies such as a swelling, red or white patch or ulcer that does not heal within three weeks, malignancy, or any other chronic condition must be ruled out by a biopsy procedure [11]. The sample procured with oral biopsy techniques is usually small, and the chance for the artefact is higher [9]. Representative biopsy of an oral mucosal disease must encompass the full epithelial thickness with some supporting connective tissue, not only to evaluate invasion but also to provide physical support for the specimen [5,12]. A satisfactory and suitable tissue sample is critical when obtaining a biopsy [10]. A good biopsy ideally contains tissue that is indicative of the notable change in the lesion and is apt for pathologic evaluation [13]. Biopsies should be about 10 x 5 x 5 mm in size. The ideal shape of a mucosal biopsy is either elliptical or round, as either shape gives a sufficient volume of tissue [13]. Multiple biopsy specimens may be necessary if the disease is substantial or exhibits a diverse clinical picture [5]. Precise identification of oral lesions is dependent upon the biopsy quality, relevant clinical details and accurate interpretation of the report [13].

On the basis of the distinctive attributes of the specific lesion, a biopsy is labeled as direct (superficial, accessible) or indirect (deep and hardly accessible). Biopsies can also be classified based on the techniques, tools employed, timing, location of the lesion, sample processing, and intent. Depending on the working technique, biopsies can be classified as incisional biopsy (IB) or excisional biopsy (EB) [14]. The location, size, and form of the lesion dictate the decision to perform an IB or EB [15]. Most of the oral mucosal biopsies are IBs [16]. IB demands the removal of a representative wedge of the lesion in question and a portion of healthy mucosa [14,15]. IB is a reliable diagnostic approach for oral lesions [17]. Based on tools employed for biopsy, the scalpel and punch biopsy techniques are recommended for the oral cavity proper [18]. Scalpel biopsy is the frequently used mode that usually gives satisfactory samples from both incisional and excisional procedures [5]. A detailed history and COE are essential in preparing a provisional or differential diagnosis which will specify the type of biopsy to be done [2]. The sampling problem needs to be addressed for all IBs, and when required, biopsy techniques are modified to enable a more appropriate sampling. Adequate size and depth of tissue sample will better the agreement and reveal the salient diagnostic features [17]. A focused surgical procedure will reduce the tissue artefacts, which can hamper pathological diagnosis or even make the sample non-diagnostic [16]. Regardless of the method employed, the purpose is to provide a satisfactory representative specimen for the histopathologist to report, in the interim reducing patients' perioperative distress. This paper presents a case in which effective IB was done by a suture thread biopsy technique which is an alternative or modification to the traditional scalpel biopsy or conventional IB.

Case Report

A 32-year-old male reported to the outpatient dental clinic with the chief complaint of the appearance of painless white patches under his tongue. The patient had discovered the patch 3 months before his visit. Complete oral examination showed a 2 cm × 2 cm, non- scrapable white lesion on the ventral surface of the tongue. An IB was performed to confirm the provisional diagnosis of oral leukoplakia (OL). Verbal and written informed consent were obtained before the procedure. The surgical details were discussed with the patient, as well as potential complications. Local anesthesia of mepivacaine 2% combined with epinephrine (1:100 000) was injected around the biopsy site. After this, a special technique using a suture needle and thread was inserted at a 90-degree angle along the tissue surface, followed by pulling the grasped tissue with the thread and cutting it with a size 15 scalpel blade. Hemostasis was achieved with single interrupted sutures. Postoperative healing was uneventful (Figure 1). Gross examination revealed a tiny wedge of oral mucosa with a whitish surface and yellowish base measuring approximately 4×3×2mm. Microscopic examination of the altered mucosa showed a stretch of stratified squamous epithelium and the supporting connective tissue. The epithelium showed variable thickness, mostly thin, with prominent stratum granulosum and corrugated hyperkeratosis. In addition, the epithelium showed mild dysplastic change with a focal area of moderate dysplasia. Basal cell hyperplasia, loss of polarity, increased Nuclear: Cytoplasmic ratio, hyperchromatic nuclei and pleomorphism were noted at focal areas. The dysplastic changes were confined to the lower third of the epithelium. Cytologic and architectural changes were confined to the lower third of the thickness of the epithelium. The rete ridges were inconspicuous with flat epithelial and connective tissue interface. The superficial lamina propria was infiltrated by a dense band of lymphocytes. The submucosa was composed of fatty tissue, vasculature and focal aggregates of lymphocytes. The final diagnosis was leukoplakia with mild dysplasia. The patient was put on close follow-up protocol (Figure 2).

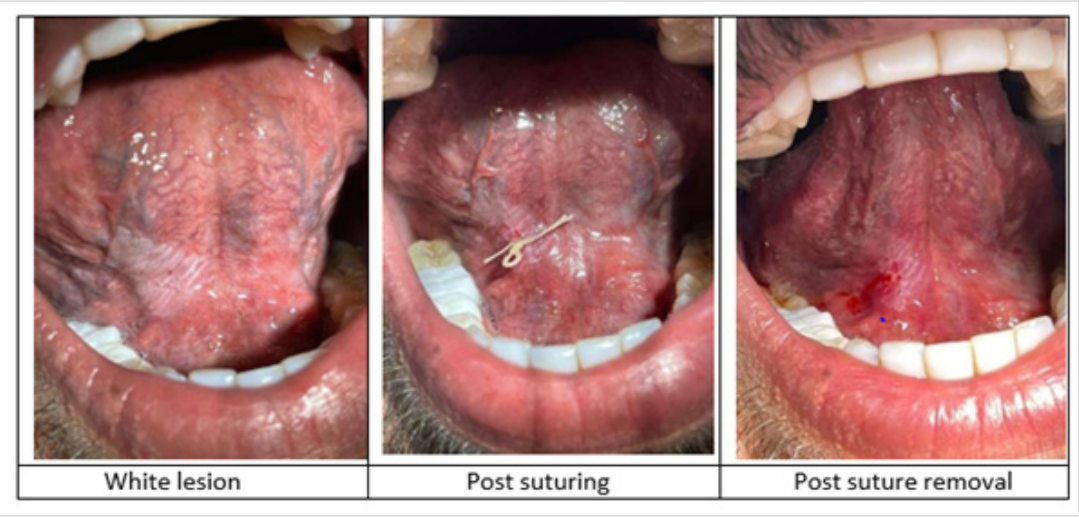

Figure 1.

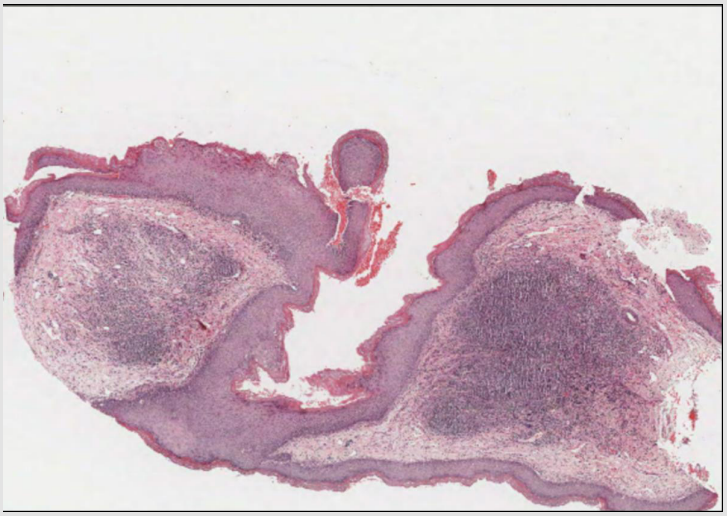

Figure 2: Photomicrograph shows mildly dysplastic oral epithelium with hyperkeratosis.

Discussion

The oral cavity proper accommodates diverse tissue types derived from various germ layers and with different physiologic roles that are intimately related. As a consequence, the oral mucosa is prone to develop various reactive, infectious, inflammatory, immune-mediated, and neoplastic lesions [18]. Clinical suspicion of malignancy exists in a persisting lesion, such as an enlarging lump, chronic non- healing ulceration, tissue friability, lesion with everted borders, indurated margins on palpation, or tenacious mucosal alterations even with the elimination of local irritants, wherein such situations biopsy is mandatory. A biopsy can confirm or deny a clinical impression; it is possible to determine the behaviour and characteristics of the disease process and to give a definitive diagnosis [19]. Detection of abnormal oral mucosal changes begins with a thorough COE, but the precision of the clinical impression is questionable. Histopathological inspection via biopsy is the gold standard for final diagnosis; therefore, any altered tissue sample taken from a patient should be subjected to histopathological evaluation, regardless of the clinical impression [20,21]. A recent meta-analysis by Epstein et al., reported that the COE had a sensitivity of 93% and a specificity of 31% when assessing the oral mucosal lesions for dysplasia or malignancy. So, the definitive differentiation of malignant and benign lesions by clinical inspection only is questionable. This asserts the requirement for refining the COE and the necessity to develop adjuncts that will aid in the

detection and diagnosis [20]. Patel et al., found 96.8% concordance between clinicians and pathologists for lesions regarded as benign. But the rate of agreement decreased to 60% and 56.6% for OPL and malignancy, respectively [22].

Forman et al., in a study to assess the rate of discrepancy between clinical impression and histologic diagnosis of oral diseases, observed that the overall reliability of clinical impression for oral diseases to be 94.4%. The accuracy when suspecting a benign entity was higher (95.9%) than OPL or malignancy (66.7%). The clinical impression had a sensitivity of 48.6% when analyzing OPL or malignancy. This shows that clinical diagnosis is not an acceptable alternative to histopathology for all oral diseases [23]. The above discussion suggests that a definitive diagnosis is certainly achieved only after IB and histopathologic examination. IB is regarded as a reliable method of evaluating the nature of oral lesions [17]. The rationale for the relative lack of agreement from oral IB to final diagnosis is not specified. Recently, a few reports have assessed the accuracy rates of IB in the oral cavity [17,24-26]. Pentenero et al. noted only 71.4% concordance between provisional and final diagnoses in the unreviewed group of OPL. The above analysis was focused on under- and over-diagnosis rates of IB in OPL and concluded that underdiagnosis occurred in 23.9% of cases, and over-diagnosis occurred in 4.3% [26]. Goodson et al., investigated the consistency of histopathological diagnosis between IB and EB of OL. All in all, 50% of IB reports matched EB; in another 50% of IB reports, there was a mismatch, with IB status 'upgraded' to more severe disease after excision [24]. The accuracy of IB for OL has been debated [25]. Lee et al., investigated the accuracy of IB and found that in the 200 OL cases receiving single-site biopsy, the concordance between clinical and definitive diagnoses was only 56%, and underdiagnosis from IB was noted in 29.5% of subjects. In comparison to homogeneous OL, nonhomogeneous OL was more prone to be underdiagnosed and had a carcinoma unnoticed by IB. IB was found to have constraints in the assessment of nonhomogeneous lesions. Chen et al., in an investigation to determine the accuracy of IB in diagnosing oral lesions, found an overall concordance rate of 88.9% for IB.

The overall concordance rate for dysplasia and malignancy was 81.4%. Concordant biopsies had a larger average volume than those that were discordant. Larger sampling offers more representative tissue for analysis and reliable tissue architecture. Inadequate tissue, sampling errors, tissue artefacts, and pathologists' discrepancy are some limitations of the IB technique [17]. Biopsy artefacts can occur at various stages of tissue processing [27]. Defective sampling techniques, issues while transporting, and errors in tissue processing can lead to biopsy artefacts [14]. An artefact is a false form in a prepared section on a microscopic slide owing to an extraneous factor, and it makes diagnosis strenuous [28]. Artefacts are frequent in scalpel biopsy compared to punch biopsy except for stretch artefact which is usually associated with punch biopsy [27,28]. Generally, during IB the tissue sample must be gently held with forceps or secured with a traction suture. Traction sutures or tissue forceps are to be used to secure the tissue to be removed. A traction suture in a small IB causes squeeze artefacts, so its use should be restricted to sample orientation [29]. Recognizing the causes for inaccuracy in biopsy will lead to technique modification. Avon and Klieb describe the technique used for IB as an elliptical incision made with a size 15 scalpel blade, and the anterior tip of the ellipse is gently lifted with tissue forceps, and the base is severed [5]. In this current case, the investigator has modified this technique to use a suture needle with a thread instead of the blade. The suture thread is inserted around the biopsy site while rolling the thread around the lesion sample. Pulling the suture thread around the biopsy site makes it easier for the clinician to sever the needed tissue sample with no impact on the surrounding tissue. In addition, pulling the suture thread around the biopsy site has several advantages. The technique, however, needs high skill and expertise to be performed; given the size of the needle and the nature of the oral surface, there is a possibility of losing the needle mid procedure if the clinician is not familiar with it. Eventually, the sample taken using this technique was found representative and viable for the histopathological examination.

Conclusion

An oral biopsy procedure is carefully carried out in most cases in the dental clinic under local anesthesia. There is potential for flaws throughout the biopsy path, and these might influence secure and successful patient management. Correct diagnosis and treatment of oral lesions is a significant part of the patient's comprehensive oral care and the basis of quality practice. There is no need for a biopsy if the oral abnormality is clinically definable by an expert. For pathologies of unknown aetiology or importance, a biopsy will be the effortless and quick way to arrive at a final diagnosis. Although a wide variety of biopsy techniques and devices exist, the ultimate underlying goal is to obtain a representative tissue sample to facilitate histologic interpretation. The suture thread IB technique performed in this case is found to have several merits over conventional IB techniques. The technique was noted to have less bleeding and infection, a clean surgical area to work, less patient discomfort, increased accuracy, and less time-consuming procedure. However, the procedure needs highly skilled clinicians to perform it. The technique was successful in obtaining a viable, representative tissue sample to facilitate histologic interpretation. Further investigations are required to validate the clinical and diagnostic reliability of this technique.

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