

## Scalp Biopsy Techniques, Histopathological Analysis and its Applications

Khalaf Khera\*

Department of Dermatology, Mazandaran University of Medical Sciences, Sari, Iran

### DESCRIPTION

A scalp biopsy is a diagnostic procedure used to evaluate various scalp conditions, ranging from hair loss disorders to inflammatory scalp diseases. This analysis is on the purpose, types, techniques, and clinical applications of scalp biopsy, shedding light on its importance in dermatology and hair care.

### Techniques and procedure

The scalp biopsy procedure typically involves the following steps:

**Preparation:** The patient's scalp is cleansed, and a local anesthetic is administered to numb the biopsy site.

**Biopsy site selection:** The dermatologist identifies the area of concern or abnormality on the scalp. The choice of biopsy technique (punch, incisional, or excisional) depends on the clinical presentation and suspected diagnosis.

**Tissue removal:** Using the selected biopsy tool (punch, scalpel), the dermatologist removes the tissue sample from the scalp. Hemostatic measures may be taken to control bleeding if necessary.

**Closure:** For punch biopsies, a small suture or adhesive strip may be used to close the wound. Incisional and excisional biopsies may require more extensive closure techniques.

**Post-procedure care:** Aftercare instructions, such as wound care and potential complications, are discussed with the patient. Histopathological examination of the tissue sample follows to obtain a definitive diagnosis [1-4].

### Clinical applications

Scalp biopsies play an important role in dermatological practice and hair care:

**Diagnosis of alopecia:** Different patterns of hair loss, such as scarring *versus* non-scarring alopecia, can be distinguished through histopathological examination of scalp biopsies.

**Identification of scalp infections:** Biopsies help identify fungal, bacterial, or parasitic infections affecting the scalp, influencing treatment decisions.

**Assessment of inflammatory conditions:** Scalp biopsies aid in diagnosing inflammatory scalp conditions like psoriasis, eczema, and lichen planus based on characteristic histopathological findings.

**Monitoring treatment response:** Biopsies conducted before and after treatment provide insights into disease progression and treatment efficacy, guiding therapeutic management.

**Early detection of skin cancer:** Suspicious scalp lesions, including melanoma and basal cell carcinoma, can be biopsied to confirm diagnosis and initiate timely treatment.

### Histopathological examination

Histopathological analysis of scalp biopsy specimens provides valuable diagnostic information:

**Microscopic evaluation:** The tissue sample is examined under a microscope to assess cellular changes, inflammation, presence of microorganisms, and other pathological features.

**Diagnosis confirmation:** Histopathology helps confirm clinical suspicions, differentiate between similar conditions, and identify rare scalp disorders.

**Treatment guidance:** Histopathological findings guide treatment decisions by providing insights into disease severity, subtype, and prognosis [5,6].

### Advantages and considerations

Scalp biopsies offer several advantages in clinical practice.

**Accurate diagnosis:** Biopsies provide definitive diagnostic information, facilitating targeted treatment and management strategies.

**Safety:** When performed by trained dermatologists, scalp biopsies are generally safe with minimal risk of complications such as infection or scarring.

**Patient comfort:** Local anesthesia ensures patient comfort during the procedure, which is typically well-tolerated.

**Correspondence to:** Khalaf Khera, Department of Dermatology, Mazandaran University of Medical Sciences, Sari, Iran, E-mail: kerah@gmail.com

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**Educational value:** Scalp biopsies contribute to medical education and research by enhancing understanding of scalp disorders and their pathophysiology.

However, certain considerations should be taken into account:

**Potential discomfort:** Despite local anesthesia, patients may experience mild discomfort during tissue removal and post-procedure soreness.

**Risk of complications:** Although rare, complications such as bleeding, infection, or allergic reactions to anesthesia can occur.

**Cosmetic concerns:** The location and size of the biopsy site may raise cosmetic concerns, particularly in visible areas of the scalp [7,8].

### Future directions

The development of scalp biopsies is currently formed by advances in science and technology.

**Precision medicine:** Genetic and molecular analyses of biopsy specimens may personalize treatment approaches for scalp disorders, optimizing therapeutic outcomes.

**Non-invasive techniques:** Non-invasive imaging modalities, such as reflectance confocal microscopy and optical coherence tomography, are being searched as adjuncts or alternatives to traditional scalp biopsies.

**Automation:** Automated biopsy devices and techniques may streamline the biopsy process, improving procedural efficiency and patient comfort.

**Biopsy biomarkers:** Identification of novel biomarkers in scalp biopsies may predict disease progression, treatment response, and recurrence risk.

Scalp biopsy is a valuable tool in dermatology, enabling the accurate diagnosis and management of various scalp conditions, including hair loss disorders and inflammatory diseases. Through precise tissue sampling and histopathological analysis, scalp biopsies provide critical diagnostic information that guides treatment decisions and enhances patient care. As technology continues to advance, scalp biopsy techniques are expected to

evolve, offering improved diagnostic accuracy, safety, and patient outcomes in the field of dermatology and hair care [9-12].

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