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TRANS-SCLERAL ESSEN FORCEPS UVEAL BIOPSIES: HOW MANY SAMPLES ARE NEEDED TO ENSURE DIAGNOSTIC SPECIMENS?

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Background: The majority of uveal tumours and tumour-mimics are diagnosed on clinical examination and non-invasive imaging techniques alone, without the need for a tissue diagnosis.[1] However, some uveal lesions present a diagnostic challenge. In these cases, intraocular diagnostic biopsy may be necessary.[2]

Recently, the trans-scleral Essen Forceps biopsy (TSEB) technique has been shown to improve diagnostic yield without increasing complications.[2] The technique involves taking a number of tissue samples, at the surgeon's discretion, to ensure adequate lesional tissue is harvested for analysis. Each pass of the biopsy forceps into the uvea causes trauma and risks complications such as inadvertent retinal or vitreous sampling. This study aimed to establish the optimum number of samples required to achieve a tissue diagnosis when performing TSEB, and to see if the surgeon could tell when diagnostically useful samples had been harvested.

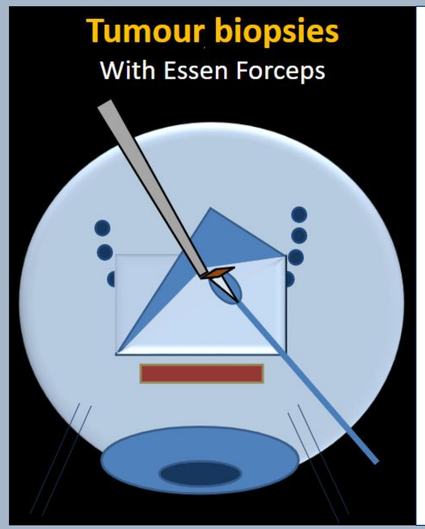


Figure 1: Image courtesy of Professor Bertil Damato.
Diagram illustrating process of TSEB
- *A partial-thickness scleral flap is created over the lesion / intended biopsy site.*
- *A linear deep-scleral incision is made close to the 'hinge' of the scleral flap to gain access to intra-ocular structures.*
- *Essen forceps obtain a sample of tissue from lesion.*

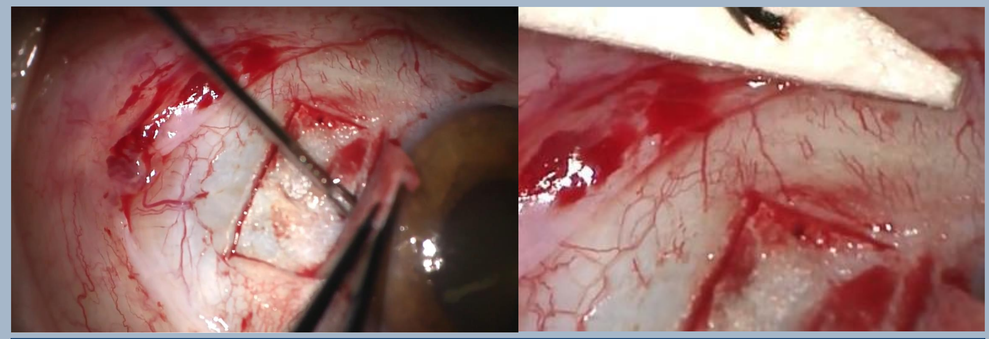
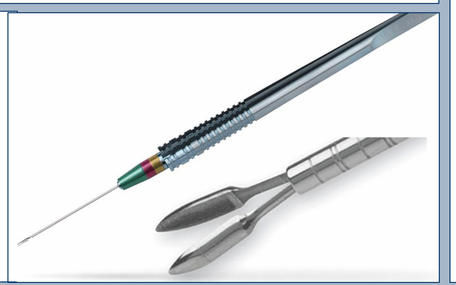


Figure 2: *Intra-operative images of TSEB performed by Ms Hibba Quhill -*
(a) Partial thickness scleral flap already made, forceps entering deep scleral excision.
(b) Biopsy tissue on pre-soaked cellulose sponge ready to transfer to transport medium.

Figure 3: Essen Biopsy Forceps, with shaft engraved depth indicator *as developed by the Dutch Ophthalmic Research Centre and Department of Ophthalmology, University of Duisburg-Essen, Zuidland, The Netherlands . Source: the Dutch Ophthalmic Research Center (D.O.R.C) Global Digital Marketing Manager.*



Methods: A prospective study was performed of all patients undergoing TSEB of uveal tumours at our national ocular oncology centre between January 2023 and November 2024. Data on patient demographics and lesion dimensions were collected.
TSEB was performed as per published techniques, with one exception; the sample from each pass of the Essen forceps biopsy was collected and fixed in formalin separately (e.g. first pass, second pass etc.) Intraoperatively, the surgeon stated which sample they believed would be diagnostic. Data regarding diagnostic yield, histopathological findings, and postoperative outcomes were collected.

Results: In total, 10 patients were included in the study: 6 male and 4 female patients with a mean age of 58 years. Tumours were within the ciliary body in 7 cases, and within 10mm of the limbus in 2 cases. Only 1 tumour was posteriorly located >15mm from the limbus. Tumours had a mean maximal thickness of 4.5mm and mean basal diameter of 10.3mm. All patients underwent TSEB for diagnostic purposes, with an average of three tissue bites taken per case. Transillumination shadows were visible intraoperatively in 6 patients, aiding lesion localisation, two patients had 360-degree ciliary body involvement. In all cases, the surgeon thought the first pass of the TSEB yielded diagnostic tissue. Histological diagnosis was made on the first pass in 80% of cases. In 90% of cases, histological diagnosis was made on first or second pass. Only one case was non-diagnostic: 3 bites were taken revealing paucicellular tissue suggestive of chronic inflammation but with insufficient tissue for definitive diagnosis. This case had 360-degree ciliochoroidal effusions and no distinct mass to sample. No cases benefitted from more than two samples, though in two cases where the second sample improved cytological clarity. Final diagnoses included uveal melanoma (n=4), melanocytoma (n=3), inflammation (n=2), and lymphoma (n=1). No intraoperative or postoperative complications were reported across the cohort.

Conclusion: The first two tissue samples with TSEB are sufficient for achieving a diagnosis in the majority of cases (90%). Where the lesion is easily identifiable, the first bite is usually diagnostic. This study shows a high degree of correlation between surgeon confidence of tissue yield and histopathological diagnosis. Although no evidence to suggest multiple bites increased the risk of intra- or postoperative complications, this study reassures surgeons that two good samples from TSEB are sufficient for diagnosis and they can avoid unnecessary further passes into a traumatised surgical site.