AXIOM Veterinary Laboratories Ltd

'The Quality Clinical Pathology Service'

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Tumour Margin Assessment

There are different forms of margin assessment available for excisional tumour biopsy samples. These include both cross-sectional and tangential margin techniques, which provide different forms of information about tumour margins. This fact sheets aims to explain how these different forms of margin assessment work and what they can and cannot tell you; cross-sectional margin assessment is the routine form, but additional tangential margin assessment is now also available via a new test code.

Routine margin assessment:

- Every tumour received will always undergo route margin assessment

This will be performed using the cross-sectional technique (see below) and will be provided as part of the standard histopathology report. This will typically include lateral and deep margins where the complete excisional biopsy sample has been submitted and is suitable for this form of margin assessment. Remember that indicating any margins or areas of particular concern and/or orientation of the sample using suture tags or surgical ink can also be very helpful.

- Routine reporting of margins for ***malignant*** neoplasms normally includes:

1. The distance between the edge of the neoplastic tissue and the margin in the sections at the narrowest point (called the histological tumour free margin, or HTFM).

2. The degree of invasiveness and demarcation of the tumour itself (i.e. terms such as well-demarcated, encapsulated, infiltrative, invasive, expansile, poorly demarcated used to describe the tumour itself).

3. The types of tissues between the mass and the margin, plus the presence and intactness of any "fascial planes", for example, if an intact muscle layer is present.

To help us to provide you with the most accurate margin assessment, please avoid submitting samples in specimen pots which are too small; tissues swell once placed in formalin, and where pots are too small this swelling results in the tissue specimen taking on the form of the sample pot, rather than retaining its original shape – this can make it impossible to determine where the true surgical margins actually are upon receipt of the specimen at the laboratory. Please refer to our client fact sheets for further information on sample submission: www.axiomvetlab.com/fact-sheets

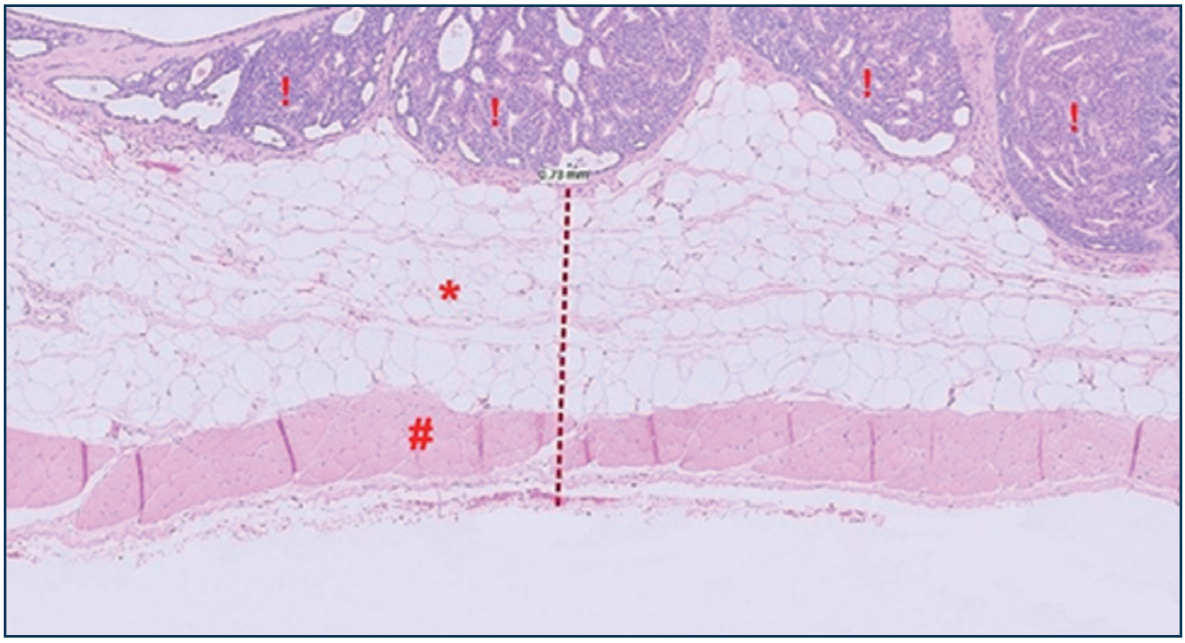
Fact sheet 6: "How to get the best out of your histopathology service"
Fact sheet 9: "Submission of whole organs, large and challenging samples for histopathology"

Case example:

1. In this slide, the distance between the edge of the neoplastic tissue (!) and the margin at the narrowest point (indicated by the **red dotted line**) is 0.7mm.

2. This tumour (!) is well-demarcated and expansile.

3. The tissue between the edge of the tumour and the margin includes fat (*) and an intact muscle layer (#).



Please note that the measurement supplied by the pathologist is only a guide, and not an absolute value. Changes that occur within tissues following surgical excision, and during fixation, mean that the absolute gross margin as it appears "in situ" in the patient does not directly equate to the distance measured on the slide.

Advanced margin assessment:

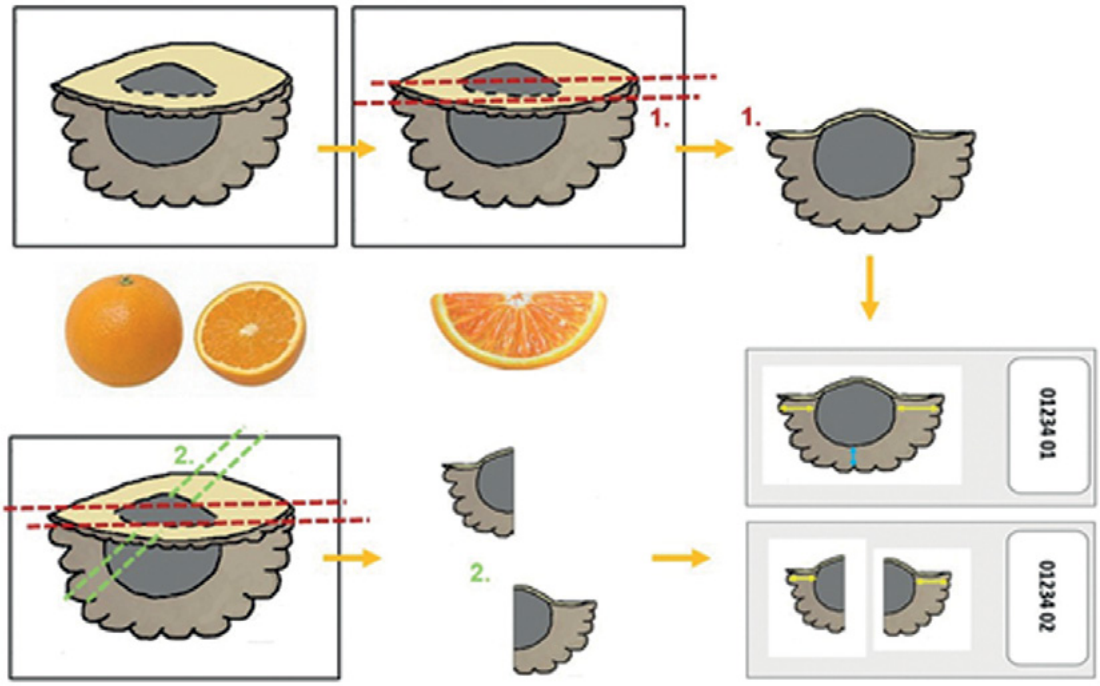
Following on from the routine margin assessment, some cases may benefit from an additional technique called tangential margin assessment (see below), such as those tumours with very narrow or potentially incomplete margins, and/or tumours with an infiltrative, poorly demarcated or irregular pattern of growth, for example some soft tissue sarcomas.

This advanced form of margin assessment is now available via a new test code, HMAR, which can either be requested at the time of sample submission, or after receipt of the histology report (subject to sample suitability). The pathologist may suggest this additional margin assessment in the comment section of the histopathology report. For any case where you are uncertain whether this additional margin assessment would be beneficial, please contact the laboratory for further guidance either from the reporting pathologist, or duty pathologist.

Inking of surgical margins is strongly advised if tangential margin assessment is requested, or if it may be indicated after the initial report. Please refer to our client fact sheet for further guidance on inking of samples (**Fact sheet 10** "Effective inking for tumour margin assessment). Inking is best performed prior to fixation of samples; however tangential margin assessment can still be performed if the sample was submitted un-inked.

How cross-sectional margin assessment works:

- Also referred to as cruciate or radial sections, with bread-loaf and pie as variations for larger samples.
- A full cross-section is through the sample at the widest point (1.), typically together with two additional quarter sections taken perpendicular to the cross-section (2.).
- This enables assessment of four "lateral" margins (yellow arrows) and one "deep" margin (blue arrow).
- This can be modified as a technique for larger masses, where a full cross-section is sub-divided into smaller areas to fit a tissue cassette.
- Inking of such samples prior to submission can greatly aid in the assessment of cross-sectional margins, by confirming the margin seen by the pathologist truly is the surgical margin.
- Imagine the sample is an orange, the mass is the centre, the margin is the peel, and the orange flesh in between are the tissues between the mass and the margin; this technique is like cutting a segment of orange to view down the microscope.



How tangential margin assessment works:

- Also referred to as shaved or orange-peel margins. Tumour bed sampling is a variation.
- Marginal tissues are "shaved off", like peeling the skin off an orange, and these are what are assessed microscopically by the pathologist.
- Inking of surgical margins is strongly advised if tangential margin assessment is requested.
- If the sample is an orange, this technique is the equivalent of removing all of the peel and placing it flat on a microscope slide.

The pros and cons of cross-sectional and tangential margin assessment:

Cross-sectional:

- Allows for measurement of margins ☺
- Assumes centrifugal growth of mass from centre ☹
- Only evaluates a portion of marginal tissues ☹

Tangential:

- Complete assessment of all marginal tissues ☺
- Does NOT allow for measurement of margins or assessment of fascial planes ☹
- Provides only a binary answer – excision is complete or not. ☹

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