

## Measurement of the distance from invasive tumour to the resection margin.

Most large polyps detected by the Bowel Cancer Screening Programme are removed by diathermy snare or similar devices. Diathermy resection produces a thick zone of diathermy burn due to coagulation, and this introduces a number of other artefactual changes:

- a. The diathermied plane of resection is drawn back into the stalk of the polyp and may be buried beneath the less affected mucosal rim (Figure 1A).
- b. Coagulated blood vessels do not shrink to the same degree as the surrounding stroma and may stand proud of the rest of the retracted diathermy plane (Figure 2A).
- c. There may be marked clefting along-side the coagulated blood vessels because of the differential shrinkage of vessels and stroma. The coagulation zone is brittle and so may split or fragment during dissection (Figure 2A).
- d. Beyond the zone of diathermy burn the loose submucosal stroma may appear markedly disrupted, probably due to a vaporisation effect (Figure 2A).

Care should be taken to take account of artefact which could give rise to a false assessment of distance of tumour to the margin. Whilst it may be tempting to draw a straight line to join the two edges of the retracted plane and use that as a putative plane, this will give an erroneous result if either the tumour is close to the margin and also retracts back into the polyp, or the lesion is sessile but develops a curved shape due to diathermy and fixation. For this reason it is advised that the outer edge of the diathermy zone is used for assessment of the margin.

1. Starting from the muscularis mucosae on one side, draw a smooth line following the outer edge of the diathermy burn to run to the muscularis mucosae of the opposite side. Include any indentations, but ignoring any artefactual splits and clefts (Figure 1B, 2B, 3B).
2. Measure the distance of invasive carcinoma to the notional line. Distances should be recorded in millimetres to 1 decimal point (Figure 1B, 2C, 3B).

Cancer in whatever context (for example, in blood vessels or present as pools of mucinous carcinoma) should be considered when assessing tumour proximity to a margin, with the proviso that if there is coexisting pseudo-invasion care should be taken to ensure benign epithelial elements such as mucin lakes are not included. If definite invasive elements extend into the diathermy zone and it is not possible to determine their extent, the margin should be regarded as involved and a distance of "0.0 mm" should be recorded.

Inking the diathermy line is not recommended because of the artefactual clefting and the disruption of loose connective tissue stroma within the polyp stalk, both of which can "wick" marking ink for a considerable distance into the stalk. The zone of diathermy burn should provide adequate evidence of a true margin. Problems in assessment may also arise because the axis of section does not include the diathermy line or because of cross-cut elements in convoluted lesions. A common-sense approach should be adopted in such instances.

In general:

1. When dissecting polyps ensure that the plane of section includes the diathermy line
2. When assessing polyps be aware of their three-dimensional configuration and their orientation
3. Sections cut at deeper levels may assist assessment, particularly of the lesion in convoluted or the artefact is marked.
4. In cases of doubt, adopt a conservative approach and only measure to a margin that you are confident about.

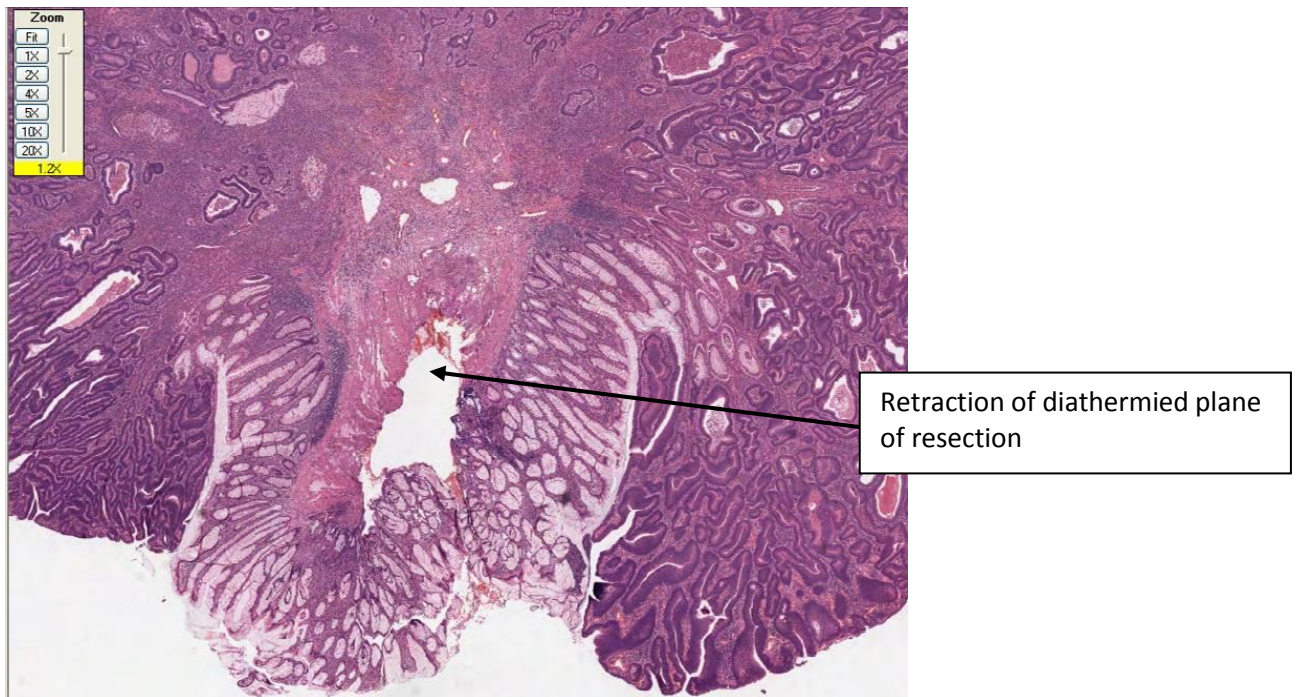


Fig. 1A: Note the marked retraction of the diathermy plane of resection which is drawn back into the stalk of the polyp. There is a thick zone of diathermy burn.

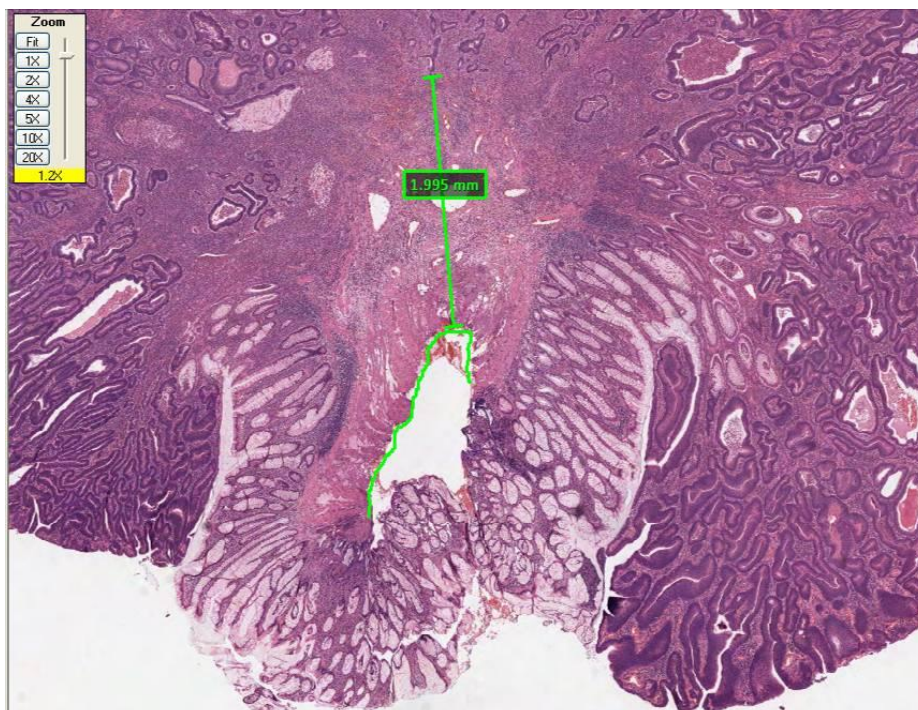


Fig. 1B. A line is drawn to follow the contour of the outer aspect of the diathermy zone, joining the muscularis mucosae on either side and representing the notional resection margin. The distance to the nearest element of convincing invasive carcinoma is measured in millimetres and reported to one decimal point.

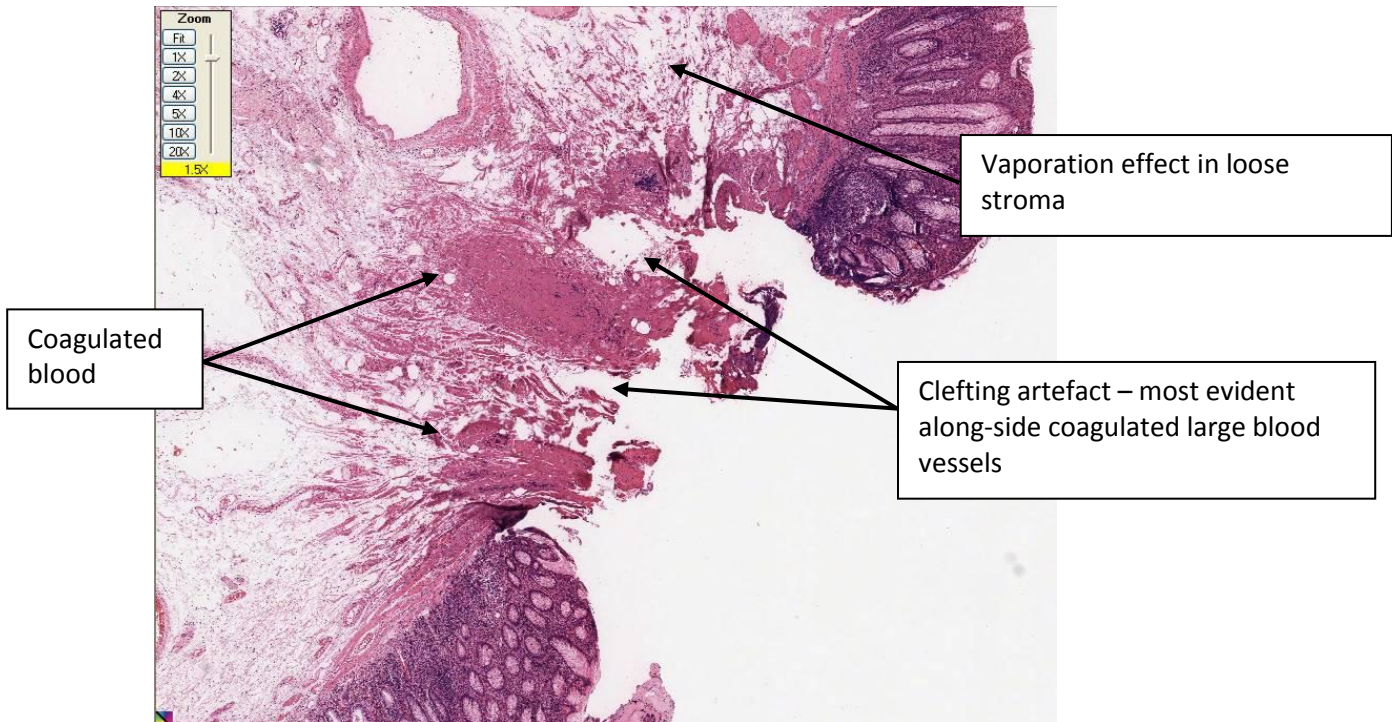


Fig. 2A: Diathermy artefact includes marked clefting along-side the coagulated blood vessels which do not shrink to the same degree as the surrounding stroma. Beyond the zone of diathermy burn the loose stroma may appear markedly disrupted probably due to due a to vaporisation effect.

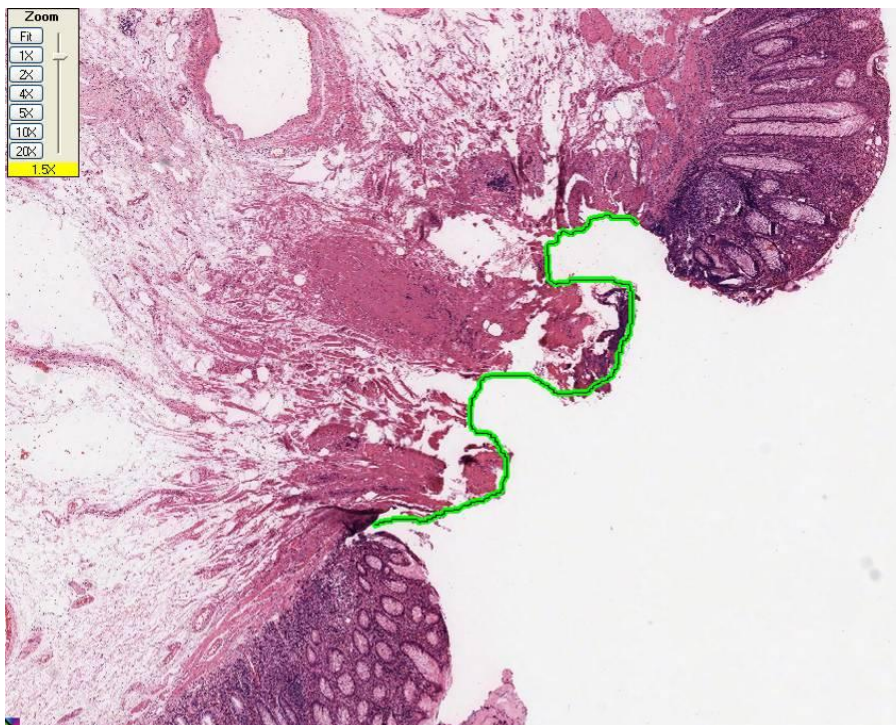


Fig. 2B. The notional resection line follows the contours of the outer aspect of the diathermy burn but ignores the artefactual clefts

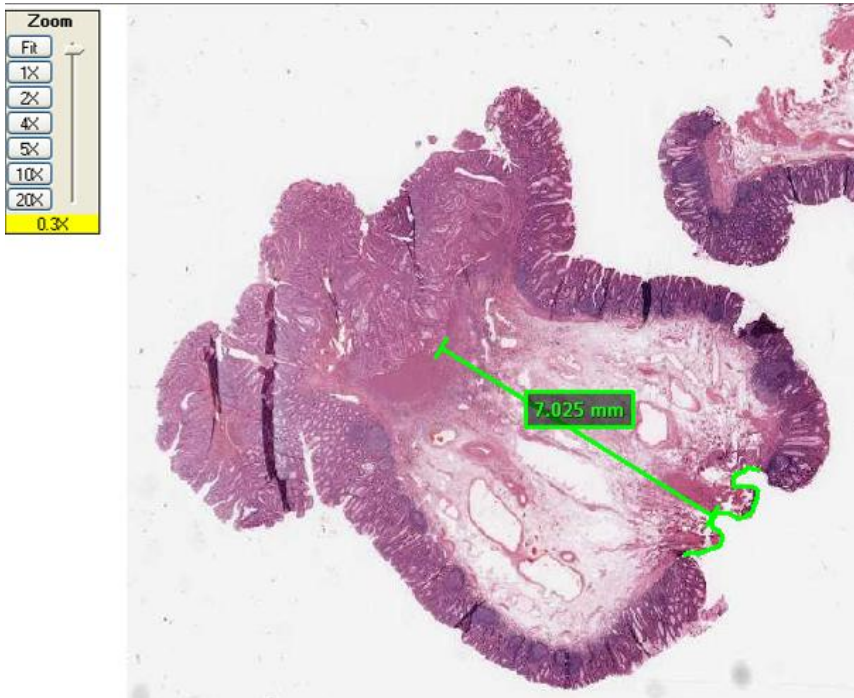


Fig. 2C: A line is drawn from the nearest focus of convincing invasive carcinoma to the notional resection line and the distance measured in millimetres, to one decimal point.

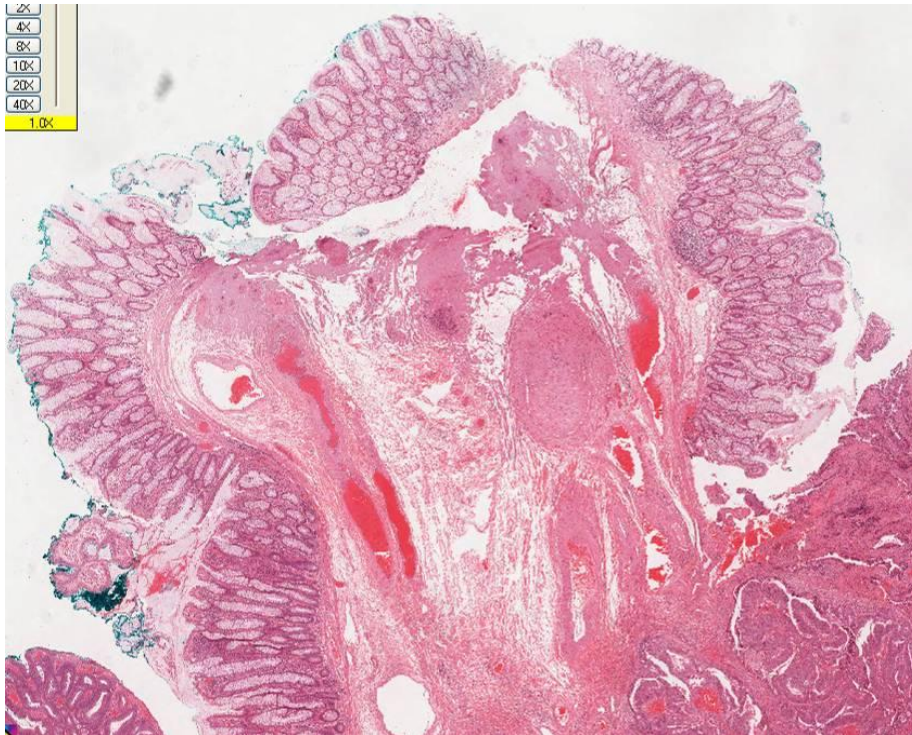


Fig.3A: Note the retraction of the resection line, the clefting along-side blood vessels and the vaporisation effect in the loose stroma

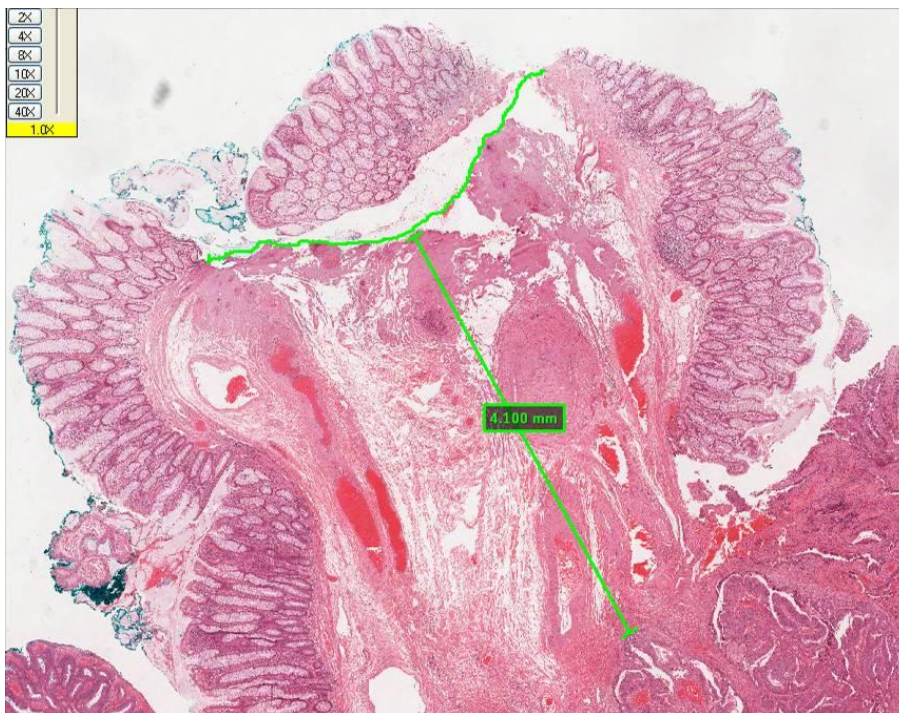


Fig. 3B: The notional resection line follows the contour of retracted margin, but ignores artefactual clefts and vaporisation effect.