

## An amalgam tattoo of the soft palate: a case report with energy dispersive X-ray analysis

F. G. MAYALL, M.B., Ch.B.,\* JOY HICKMAN, B.D.S.,† L. C. KNIGHT, M.Phil., F.R.C.S.,‡ SIM SINGHARO, M.I.Biol.\*

### Abstract

A pigmented lesion of the soft palate was excised to exclude melanoma. The histology suggested an amalgam tattoo which was confirmed on energy dispersive X-ray analysis by the detection of silver and copper. This represents a very rare mimic of melanoma of the soft palate.

### Introduction

Amalgam tattoos usually occur in the gingival and alveolar mucosa (Cawson and Eveson, 1987). They are formed by the deposition of metal pigment in the subepithelial connective tissue, often due to mucosal abrasion during a dental procedure or to a residual fragment of amalgam following tooth extraction.

### Case report

A pigmented lesion was excised from the soft palate of a 66-year-old woman to exclude melanoma. The specimen, consisting of two fragments of mucosal tissue measuring up to 0.8 cm, was formalin fixed, paraffin embedded and sectioned. H and E staining showed squamous epithelium overlying connective tissue containing minor salivary glands. Within the connective tissue there was a deposit of minute granules of black pigment which had a striking affinity for elastin-containing

structures including blood vessels (Figs. 1 & 2) giving a low power appearance reminiscent of a silver elastin stain. There was no inflammatory reaction or fibrosis. Perls' stain for iron was negative. A provisional diagnosis of amalgam tattoo was made. Regions of densely pigmented tissue were lifted from unstained dewaxed 4 µm paraffin sections and processed (Glauert, 1975) for transmission electron microscopy and energy dispersive X-ray analysis (EDAX). Silver and copper were found but mercury was not detected (Fig. 3). Questioning the patient revealed that she had suffered a laceration to the soft palate during a dental procedure some years before.

### Discussion

There are a variety of materials that can give rise to lesions which mimic amalgam tattoos if they are implanted in the mucosa [Levison *et al.*, 1984] but in the case described above the dia-

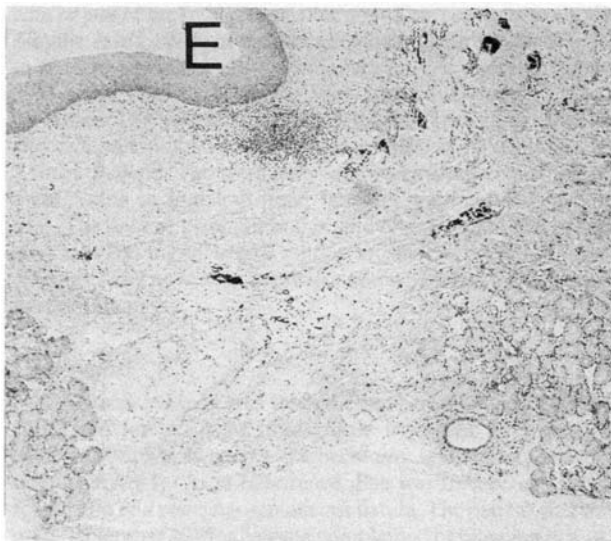


FIG. 1.

Low power microscopy showing squamous epithelium (E) overlying tissue with foci of pigment.

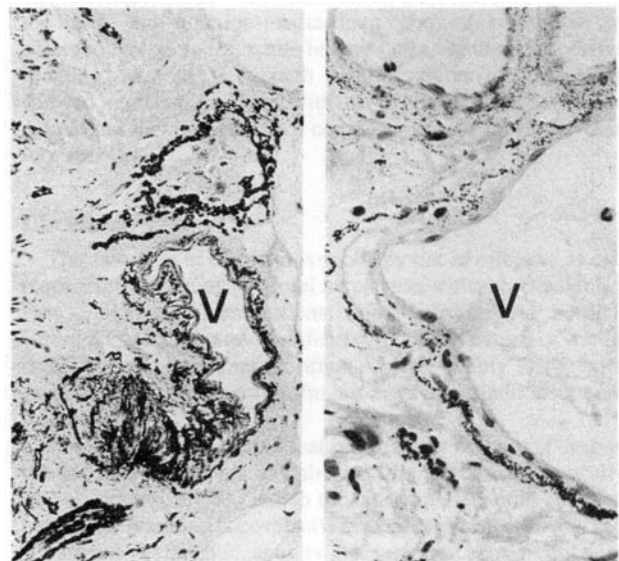


FIG. 2.

Medium and high power microscopy showing the elastin stain-like pattern of pigment deposition around blood vessels (V).

From the Departments of Pathology,\* Oral Surgery and Medicine and Pathology,† and ENT Surgery,‡ University of Wales College of Medicine, Heath Park, Cardiff, South Glamorgan CF4 4XN.  
Accepted for publication: 29 May 1992.

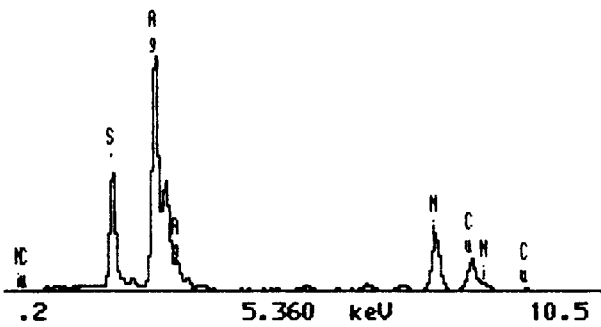


FIG. 3.

The EDAX spectrum showing peaks for silver (Ag) and copper (Cu). The peak for sulphur (S) is due to this element within the resin used for embedding. Nickel (Ni) grids were used to mount the sections.

agnosis is strongly supported by the EDAX results as the metals detected are used in amalgam alloys but have few other applications that are likely to place them within the mouth. EDAX has proved useful in the diagnosis of amalgam tattoos at conventional sites (Levison *et al.*, 1984) and in the diagnosis of similar non-amalgam lesions (Daley and Gibson, 1990). It appears to be usual for little or no mercury to be detected in amalgam tattoos as it forms salts that are readily dispersed. The cause of the previous

laceration to the soft palate is unclear but it is reasonable to speculate that some instrument, possibly a dental drill, implanted the amalgam during the injury. Amalgam tattoos are hardly ever encountered in the soft palate and they represent a very rare differential diagnosis of melanoma.

#### References

- Cawson, R. A., Eveson, J. W. (1987) *Oral Pathology and Diagnosis*. 1st edn. Gower Medical, London, pp. 15.15–15.16.
- Daley, T. D., Gibson, D. (1990) Practical applications of energy dispersive X-ray microanalysis in diagnostic oral pathology. *Oral Surgery, Oral Medicine, Oral Pathology*, **69**: 339–344.
- Glauert A. M. (1975) Embedding. *Practical methods in electron microscopy*, Volume 3, (Glauert AM ed.), North-Holland, Amsterdam, pp. 123–176.
- Levison, D. A., Crocker, P. R., Lee, G., Shepherd, N. A., Smith, A. P. (1984). Unexpected inorganic elements in oral lesions: results of X-ray energy spectroscopy (XES) on particulate matter in paraffin sections. *Journal of Pathology*, **144**: 119–129.

Address for correspondence:

Dr F. G. Mayall,  
Department of Pathology,  
University of Wales College of Medicine,  
Heath Park,  
Cardiff,  
South Glamorgan CF4 4XN.

**Key words:** Palate, soft; Pigmentation; Tattoo.