



The effect of surgical resection in the region of the retromolar trigone[☆]

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Summary Tumours in the mucosa of the retromolar trigone (RMT) are rare, but develop insidiously and spread rapidly into surrounding structures. Resection may require radical dissection beginning usually on the medial side of the mandible. Such surgery can put important structures at risk. The normal anatomy of the RMT and its relations has been studied together with simulated surgical incisions and resections. Tissue removed was processed by histological techniques in order to demonstrate structures excised or damaged by the operation. The simulated incision showed that the lingual nerve, submandibular duct and palatoglossus were at particular risk. This could affect sensation, speech, swallowing and movements of the tongue. The findings pose immediate concerns for surgeons operating in this area. Although cancer surgery often involves sacrificing tissue, care should be taken to preserve structures vital to the patient's oral function without compromising oncological principles.

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The retromolar trigone (RMT) is defined as the area of oral mucosa directly behind the third molar teeth, stretching between the superior and inferior alveolar borders. Tumours arising in this area

are rare but serious, due to the possible damage to several underlying structures by tumour invasion and subsequent surgical resection. In a series collected at Canniesburn Hospital, Glasgow, 121 true RMT tumours have been identified in the past 15 years, which is approximately 8 per year (Isakedis – personal communication). Squamous cell carcinoma (SCC) is the most common type of tumour found in the oral cavity.^{1–3} When it first appears, the gross tumour may resemble a simple mouth ulcer or white plaque. Once a retromolar

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tumour has developed, it will grow insidiously and spread rapidly into many other nearby structures. Many cases are not recognised until the disease is quite advanced, the average being 5.1 months after first noticing an abnormality.⁴ The most likely sites of local invasion are the soft palate, buccal mucosa, tonsillar pillar, base of tongue^{5,6} inferior and superior gingivae, floor of mouth and hard palate.⁷ Tumours may invade the muscles of mastication, such as masseter or medial pterygoid, and cause trismus. The most common reason for seeking help is pain due to involvement of local nerves.⁴ Fourteen percent of patients have pathologically proven cancer invading bone,⁵ i.e. the mandible or maxilla, by the time they are seen. Resection of these tumours may require radical dissection of the area surrounding the tumour, including any structures into which it may have spread.

The medial side of the retromolar trigone close to the anterior pillar of the fauces is a notoriously 'busy' area, containing for example palatoglossus, mylohyoid, the pterygomandibular raphe, the submandibular gland and duct and the lingual nerve. Damage to these structures during surgery could thus affect sensation, speech, swallowing and movements of the tongue. Therefore it is appropriate to review the functional anatomy of the RMT and of the surrounding area and relate the findings to surgical treatment.

Methods and materials

The investigation used four half heads from dissecting room cadavers, which had been routinely embalmed through the carotid artery with a commercial embalming fluid. The heads of the cadavers were removed and bisected in a sagittal plane using a band saw. By modifying dissections described in Cunningham's *Manual of Practical Anatomy*⁸ and Grant's *Atlas of Anatomy*⁹ and employing standard dissection techniques and instruments the right half of the first specimen was dissected from the medial side in layers, beginning with the removal of the mucosa, in order to display the gross anatomy of the RMT and surrounding area.

Another right half of a cadaveric head was selected in order to carry out a simulated incision similar to that done in RMT tumour resection. Malignant head and neck tumours are staged according to the Tumour–Nodes–Metastasis (TNM) classification. The clinical criteria used for assigning a tumour a particular T-classification are site-dependent, based on size of the tumour and

the extent to which it has invaded surrounding structures. It was decided that resection of a T2 sized tumour would be the most appropriate operation to imitate, as this was the most common size of RMT tumour to present in the Canniesburn study. T2 in oropharyngeal cancer is defined as a tumour more than 2 cm but not more than 4 cm in greatest dimension. DS represented the tumour by marking on the RMT with a black marker pen. Then a purple marker pen was used to mark a margin for resection; approximately 10 mm all round the pseudotumour (Fig. 1). Using the same pen a second incision line was drawn along the floor of the mouth connecting the tumour margin with the lip. This is a standard incision used to allow splitting of the mandible during surgery. Using a scalpel, the incisions were made along the purple pen lines by DS. The mucosa was then removed from the surgical field allowing examination of underlying structures.

A further two left halves of cadaveric heads were selected in order to carry out complete simulated resections identical to those done in RMT tumour surgery. A T2 sized tumour was drawn on one RMT and a T3 sized tumour was drawn on the other. T3 is defined as a tumour more than 4 cm in greatest dimension, which does not invade adjacent structures. If a tumour invades an adjacent structure it automatically assumes T4 status. Using a different colour of ink, resection margins were drawn 10 mm around each tumour. Finally, the 'access' incision along the floor of the mouth was drawn on each specimen. Resection of these tumours was carried out by DS using a scalpel.

The specimens were photographed using a Nikon Digital Camera and certain structures were coloured using Photoshop version 4 graphics package.

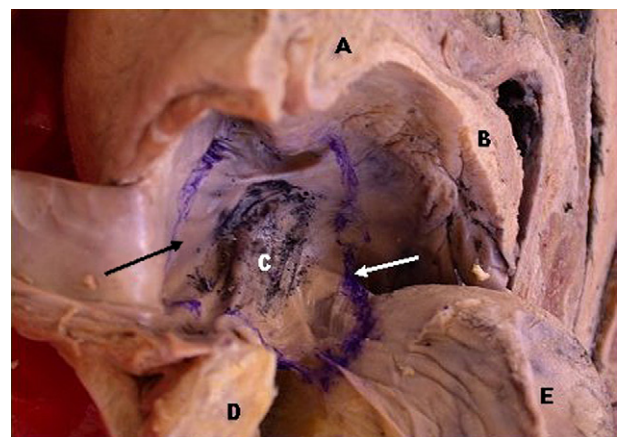


Figure 1 Simulated tumour incision (A – hard palate; B – soft palate; C – T2 tumour; D – cut edge of mandible; E – tongue reflected medially; and arrows – tumour margin).

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