The Journal of Laryngology & Otology (2014), ***128***, *932–934*.

doi:10.1017/S0022215114001844

SHORT COMMUNICATION

Should we use fingerbreadth measurements in submandibular gland surgery? A critical appraisal of the technique

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Abstract

Objectives: Having observed variation in the breadth of surgeons' fingers whilst they are placing the incision for submandibular gland surgery, we aimed to examine this technique of incision siting, quantify the differences in fingerbreadths and consider any consequences of variability.

Methods: Surgeons trained in salivary gland surgery were questioned on their method of incision placement for submandibular gland surgery. The breadth of index and middle fingers were subsequently measured using Vernier calipers.

Results: The majority of surgeons use a measure of two fingerbreadths below the mandible in planning their approach to the submandibular gland. There is a significant difference in the size of surgeons' fingers, particularly between men and women (mean, 4.2 cm *vs* 3.6 cm).

Conclusion: Fingerbreadth measurements are somewhat arbitrary, with significant inter-surgeon variability. However, based on the results of cadaveric studies, the findings indicate that the technique is safe for marking the incision in submandibular surgery.

Key words: Submandibular Gland; Facial Nerve; Anatomic Landmarks; Intraoperative Complications

Introduction

Submandibular gland excision is a commonly performed procedure by the otolaryngologist. The most frequent indications are non-neoplastic conditions such as chronic sialadenitis and sialolithiasis. Traditionally, surgery involves a direct transcervical approach. This places the marginal mandibular branch of the facial nerve at risk of injury, either directly or more frequently through traction. Reported rates of paresis are as high as 36 per cent for temporary paresis[1] and 12 per cent for permanent paresis.[2]

Careful placement of the skin incision, along with a detailed knowledge of the region anatomy, is crucial in avoiding injury to the nerve. Surgical texts differ in their description of incision siting (Table I).[3–6] In practice, an often-quoted technique is two fingerbreadths below the mandible. Having casually observed an obvious difference in the size and the breadth of surgeons' fingers, we postulated that this might not be a consistent or accurate method of measurement, and its use may put the marginal mandibular nerve at risk of injury. We conducted a study to assess how frequently the technique is utilised, and to evaluate and quantify differences in finger size.

Materials and methods

Prior to an explanation of the project's objective and methods, we questioned 28 otolaryngology consultant and middle grade surgeons (in the Northern Ireland region), who had been trained in salivary gland surgery, as to their method of marking the skin incision location in submandibular gland excision. Subsequently, we used Vernier calipers to measure across the breadth of the middle and index fingers of consultants and all surgical trainees available within the departments. Measurements were recorded at the level of the mid skin crease of the proximal interphalangeal joint of the middle finger. Measurements of both dominant and non-dominant hands were recorded.

Results

Of 28 surgeons questioned, 23 (82 per cent) use the 2 fingerbreadths below the mandible method to mark the incision site for submandibular gland surgery. Two surgeons (7 per cent) specified the tips of the fingers. Other methods described were: a tape measurement of 2.5 cm below the mandible ($n = 2$; 7 per cent); and thumb width measurements below the mandible ($n = 1$; 4 per cent), at the level of the hyoid ($n = 1$; 4 per cent) and in a skin crease ($n = 1$; 4 per cent).

We obtained the bilateral middle and index finger measurements of 42 surgeons (12 female and 30 male). Breadth ranged from 3.1 to 4.7 cm (mean, 4.0 cm). Overall, there was an average of 1 mm difference between dominant and non-dominant hands (4.1 cm *vs* 4.0 cm

Accepted for publication 25 January 2014 First published online 10 September 2014

TABLE I
SUGGESTED LANDMARKS FOR SUBMANDIBULAR SURGERY INCISION

Surgical text	Suggested landmarks for skin incision
Scott-Brown's Otorhinolaryngology, Head and Neck Surgery (Gleeson *et al.*)[3]	In or parallel to a natural skin crease, approximately 2.5 cm below lower border of mandible
Stell & Maran's Head and Neck Surgery (Watkinson *et al.*)[4]	2.5 cm below mandible, in a skin crease, & curved slightly upwards anteriorly
Head and Neck Surgery: Otolaryngology (Bailey *et al.*)[5]	Approximately 2 fingerbreadths below inferior border of mandible in a skin crease
Surgical Approaches in Otorhinolaryngology (Thumfart *et al.*)[6]	Slightly curved incision made 2 finger-widths below body of mandible

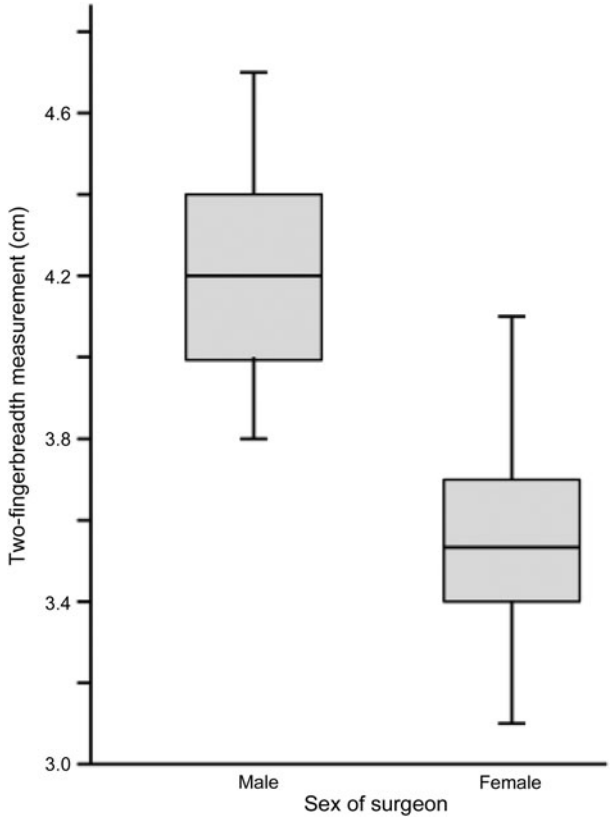

FIG. 1
Box plot of fingerbreadth measurements of male and female surgeons.

respectively). Male surgeons' fingers were significantly broader (mean, 4.2 cm) than those of female surgeons (mean, 3.6 cm) (Mann–Whitney U test; $U = 55$, $p < 0.001$) (Figure 1).

Discussion

The submandibular gland lies between the horizontal ramus of the mandible and the underlying mylohyoid and hyoglossus muscles. It is deep to the platysma muscle and is enveloped in a fine capsule derived from the investing layer of deep cervical fascia. The marginal mandibular branch of the facial nerve lies closely adherent to the outer aspect of the investing fascia. It innervates the depressor anguli oris muscle. Cadaveric anatomical studies have examined the relationship and distance of the nerve from the inferior margin of the mandible. Wide variability in location exists. In up to 66 per cent of cases, the nerve lies below the mandible.[7] The lowest position identified is up to 3 cm from the inferior border of the mandible.[8]

Like patients, surgeons come in all shapes and sizes, including the breadth of their fingers. This is particularly noticeable with an increasing number of women entering surgical training (27 per cent of surgical specialty training year 1 acceptances in 2007, compared with 8 per cent of consultant surgeons).[9] This could in theory have implications for the use of the fingerbreadth technique for incision placement in submandibular gland surgery.

We are the first authors to have objectively measured variation in surgeons' anatomy. The results revealed an inconsistency and large variation in the size of surgeons' fingerbreadth measurements, with the smallest two fingers being measured at 3.1 cm and the largest at 4.7 cm. However, based on cadaveric studies, we have in fact proven that the technique remains adequate for incision placement in submandibular gland surgery. Even for the smaller handed surgeon, the incision will be located below the lowest recorded site of the marginal mandibular branch of the facial nerve. Although the fingerbreadth measurement is a safe technique for placing the incision, only sound anatomical knowledge of the submandibular region will minimise the risk to the patient's marginal mandibular nerve and reduce the chance of a poor cosmetic outcome.

We have highlighted the significant variability between individuals (maximum difference of 1.6 cm in our small series). We believe that surgeons should be aware of what two fingerbreadths actually means in relation to their own hands. This may be particularly relevant in the training environment, where a large inconsistency could arise between a trainer's expectation of incision placement and that actually performed by a trainee.

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https://doi.org/10.1017/S0022215114001844 Published online by Cambridge University Press

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Ms C Smyth takes responsibility for the integrity of the content of the paper
Competing interests: None declared

https://doi.org/10.1017/S0022215114001844 Published online by Cambridge University Press