

## Skin incisions for the excision of spherical cutaneous and subcutaneous lesions

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### Abstract

Spherical cutaneous and subcutaneous lesions such as sebaceous cysts are often removed via an ellipse, particularly if they are relatively large. Deciding the width of the ellipse can be difficult. We calculated that if the width of the ellipse is one-third of the half circumference, then the wound should close satisfactorily.

**Key words:** Operative Surgical Procedures; Skin; Face

### Introduction

Spherical cutaneous and subcutaneous lesions such as large sebaceous cysts and soft tissue tumours present on the skin surface as hemispherical lumps. Small lumps may be excised via a straight central incision, whereas larger lumps are usually excised via an elliptical incision, a configuration more accurately described as lenticular (see shaded areas in Figure 1a and 1b). This allows primary closure of the skin edges without excessively redundant skin.

### Method

The length of the elliptical incision usually spans the diameter of the hemisphere, in order to allow removal of the lump. Calculating the width of the elliptical incision can be problematic. If the width of the elliptical incision is too narrow, there will be excess skin at the wound producing a wrinkled appearance and potential space for haematoma collection. If the width of the elliptical incision is too wide, the wound will be under excessive tension.

It can be shown from the calculations below that the optimal width of the elliptical incision (i.e. from point B to point C) is about one-third the length of the half circumference of the spherical lesion (i.e. A–B–C–D); such an incision produces skin edges that meet neatly. In other words, A–B = B–C = C–D, approximately.

Thus, when marking elliptical incisions for excision of hemispherical lumps, the width of the ellipse is one-third the half-circumference of the lump. The ellipse can be marked by imagining a hemispherical ‘bucket handle’ moving from the midline to the required position (see Figure 1). Alternatively, the markings can be considered to delineate three equal sized segments, in the manner of a segmented orange.

It should be noted that a hemispherical lesion with overlying skin under significant tension will require an elliptical incision of slightly narrower width, in order to compensate and to produce a wound without excessive tension.

The senior author has used this technique in a number of cases, such as sebaceous cysts up to 4 cm in diameter and lipomas. An example is shown in Figure 2.

### Calculations

Consider a hemispherical subcutaneous lesion (see Figure 1).

A–O = O–D = radius =  $r$ .

In a mathematical model, A–B must = A–O and C–D must = O–D.

Therefore, A–B = C–D =  $r$ .

Now, A–B–C–D (half-circumference) =  $\pi r = 3.14r$ .

B–C (ellipse width) = A–B–C–D – (A–B + C–D) =  $3.14r - (r + r) = 3.14r - 2r = 1.14r$ .

Thus, B–C is approximately the same as A–B and C–D.

Therefore, in practical terms, A–B = B–C = C–D which will be one-third of the half-circumference =  $\pi r / 3 = 1.05r$ .

Therefore, A–B will be slightly greater than A–O, and C–D will be slightly greater than O–D; however, as the skin over these lesions is usually under some tension, this should achieve satisfactory closure.

### Conclusions

In general, when employing an elliptical skin incision to excise spherical cutaneous and subcutaneous lesions, using an ellipse width of one-third of the half circumference should ensure satisfactory closure.

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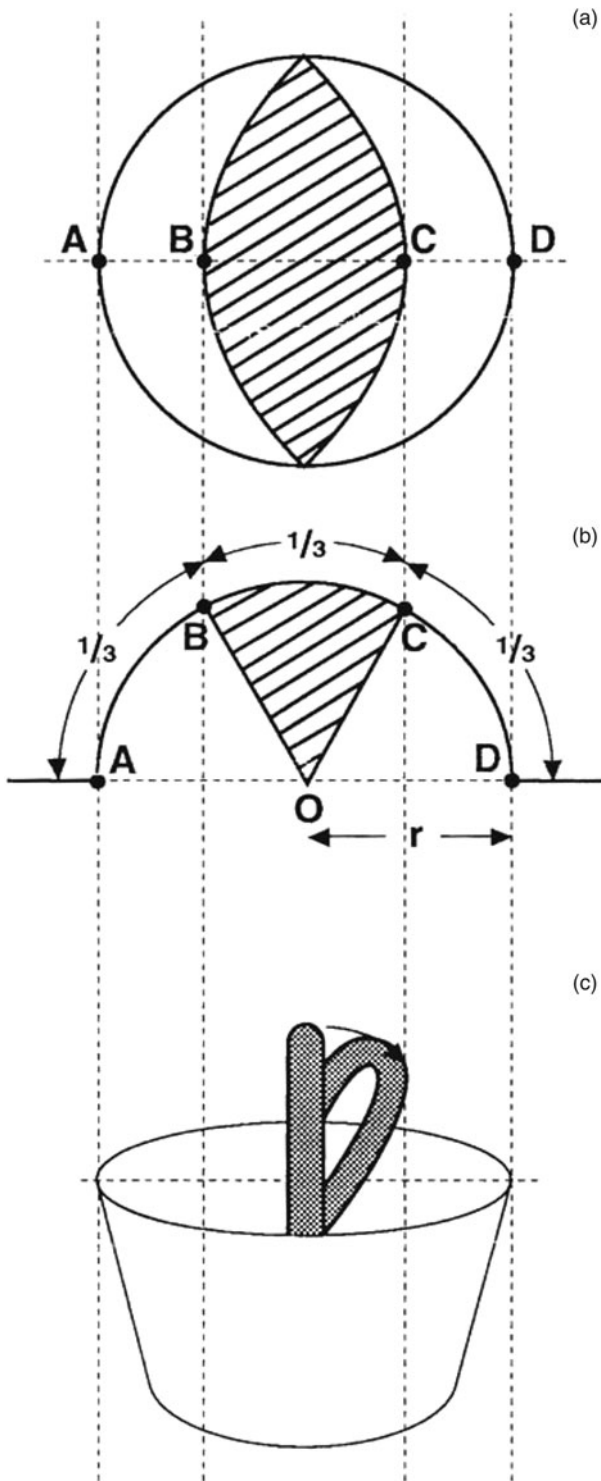


FIG. 1

(a) Plan view of the spherical lesion with marked ellipse. (b) Side view of the spherical lesion, which appears hemispherical at the skin surface. (c) The outline of the elliptical incision can be discerned by imagining a 'bucket handle' moving from the midline to points one-third and two-thirds along the half circumference, i.e. to points B and C, respectively.

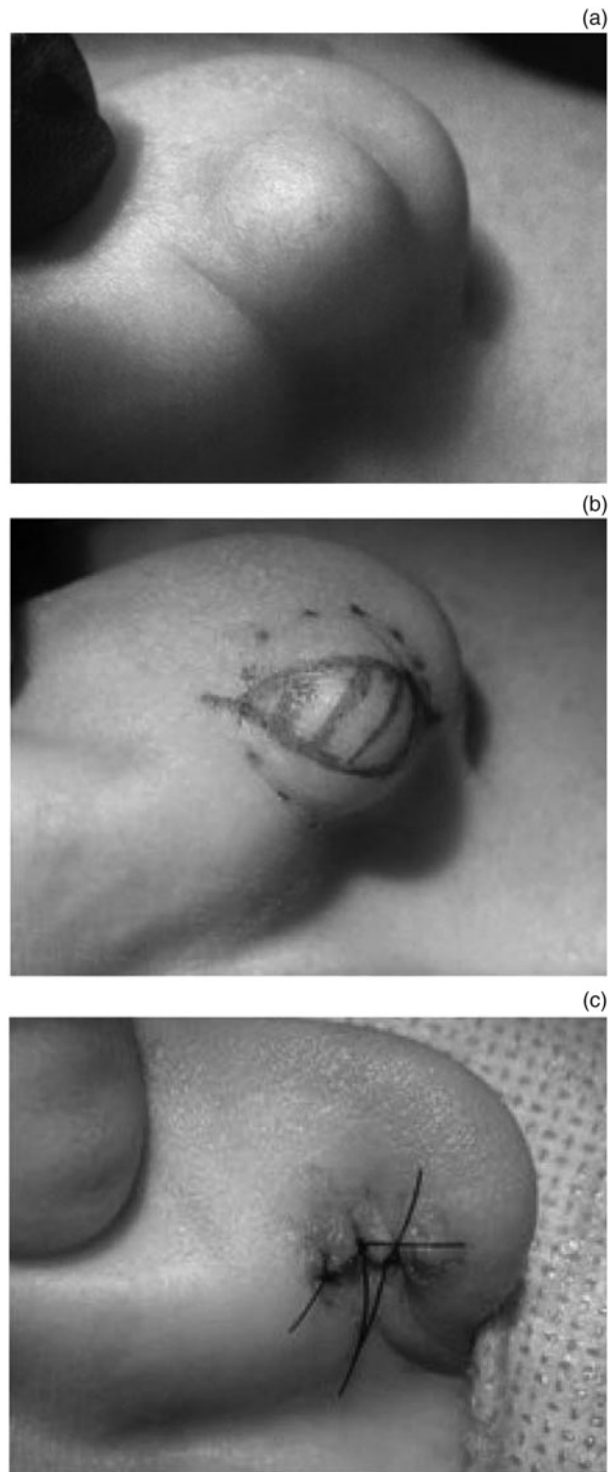


FIG. 2

Sebaceous cyst of the right ear lobe (a), excised using the elliptical skin incision markings shown (b), and closure of the skin after excision (c).