

## **Emergency cricothyroidotomy: an observational study to estimate optimal incision position and length.**

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#### **Abstract**

**BACKGROUND:** A vertical incision is recommended for cricothyroidotomy when the anatomy is impalpable, but no evidence-based guideline exists regarding optimum site or length. The Difficult Airway Society guidelines, which are based on expert opinion, recommend an 80-100 mm vertical caudad to cephalad incision in the extended neck position. However, the guidelines do not advise the incision commencement point. We sought to determine the minimum incision length and commencement point above the suprasternal notch required to ensure that the cricothyroid membrane would be accessible within its margins.

**METHODS:** We measured using ultrasound, in 80 subjects (40 males and 40 females) without airway pathology, the distance between the suprasternal notch and the cricothyroid membrane, in the neutral and extended neck positions. We assessed the inclusion of the cricothyroid membrane within theoretical incisions of 0-100 mm in length made at 10 mm intervals above the suprasternal notch.

**RESULTS:** In the 80 subjects, the distance ranged from 27 to 105 mm. Movement of the cricothyroid membrane on transition from the neutral to extended neck position varied from 15 mm caudad to 27 mm cephalad. The minimum incision required in the extended position was 70 mm in males and 80 mm in females, commencing 30 mm above the suprasternal notch.

**CONCLUSIONS:** An 80 mm incision commencing 30 mm above the suprasternal notch would include all cricothyroid membrane locations in the extended position in patients without airway pathology, which is in keeping with the Difficult Airway Society guidelines recommended incision length.