

A novel technique to practice using a high-speed burr for spinal anterior cervical discectomy and fusion

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ABSTRACT

Background: Anterior cervical discectomy and fusion has been a successful procedure in terms of patient satisfaction in the management of cervical myelopathy and radiculopathy. The procedure involves an anterior approach to the cervical vertebral column and decompression of the neural elements.

Aim: A key part of the procedure is the removal of the posterior osteophyte. This is usually performed using a high-speed burr. In inexperienced hands, this part of the procedure can be a challenging one.

Materials: Egg, egg cup, zinc oxide tape and high-speed burr.

Conclusion: We describe a simple and cost effective method of practicing this manoeuvre, enabling the trainee to gain sufficient confidence in handling the tool around delicate tissues.

Key words: Anterior cervical discectomy and fusion, spinal surgery, surgical burr, surgical education

Introduction

Anterior cervical discectomy and fusion (ACDF) was first popularized by Smith Robinson.^[1] Since then, over 500,000 procedures have been performed in the USA alone. The procedure has gone through several evolutions and modifications since it was first described.^[2] The success of the procedure in terms of patient satisfaction have been demonstrated in the management of cervical myelopathy and radiculopathy.^[3-6]

The procedure involves an anterior approach to the cervical vertebral column between the interval of the carotid sheath and trachea/larynx. Once the correct disc is identified using fluoroscopy, the disc is removed. A key part of the procedure involves removal of the posterior osteophyte [Figure 1] to decompress the neural elements and gain access to the spinal canal.

In our practice, this is commonly done using a high-speed burr with usually a 3 mm tip. The posterior osteophyte is gradually thinned until the posterior longitudinal ligament is visualised at the centre of the disc space, the posterior longitudinal ligament (PLL) is visualized. Further decompression is achieved using Kerrison Rongers.

The use of the high-speed burr for osteophyte decompression can be a challenging part of the procedure, for trainer and trainee alike. In inexperienced hands, the burr can tend to “fly-off” causing unwanted tissue damage. In an area like the spine, any such event could be catastrophic.

We describe a simple technique that can be effective in training the beginner at performing this step, allowing the practice of using the burr in a highly controlled manner.

Materials

- A chicken egg (preferably raw)
- Egg cup

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Figure 1: A lateral radiograph of the cervical spine. The arrow shows the posterior osteophyte commonly seen in cervical spondylitis



Figure 2: The disc space drawn is generally rectangular in shape, with elevations laterally for the uncovertebral joint



Figure 3: Two attempts of shaving the eggshell with the burr. In the one, below the membrane has been breached with extrusion of egg white

- Zinc oxide tape
- High-speed burr
- Marker pen
- Small Cardboard tube (optional)
- Microscope (optional).

Technique

The egg is placed onto an eggcup, and the both are secured to a surface using zinc oxide tape. This prevents the egg moving, freeing up both hands to use the burr. A marker pen is used to draw the outline of a disc space [Figure 2].

To replicate the ACDF scenario, a small tube of cardboard, around 4 cm in length, can be placed on top of the egg as well as a microscope.

The burr is then used to thin the eggshell down to the amniotic membrane underneath. The challenge is to avoid disrupting the membrane [Figure 3].

Discussion

Cadaveric sessions are undoubtedly the superior method to teach and practice any surgical procedure. However, this is expensive and opportunities can be limited.^[7]

We feel that this technique is a simple and cheap training tool for anyone learning to perform ACDF and other spinal procedures. The egg-shell and membrane reasonably reproduce the tactile nature of the posterior osteophyte and PLL.

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Conflicts of interest

There are no conflicts of interest.

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