Anterior cervical discectomy and fusion has proven to be one of the most successful procedures in spine surgery. It provides safe, reliable access to compressive pathology that is anterior to the spinal cord and nerve roots. There are several goals in performing this procedure that should be considered as part of the surgical technique. These will be described in detail and discussed in the video that will accompany this talk.

I. Decompression of the neural elements

In almost all cases, an anterior cervical discectomy and fusion (ACDF) is performed to decompress the spinal cord and/or nerve roots in the cervical spine. As a result, the primary focus of the surgeon should be performing a complete decompression to the extent that this is possible from the anterior approach. The ACDF approach can reliably access pathology that is retrodiscal and at the level of the vertebral body endplates. It cannot access retrovertebral compression, for which a formal corpectomy would be needed. It can also reliably access pathology in the medial half to two-thirds of the uncovertebral joint. Beyond that point the surgeon runs the risk of injury to the vertebral artery. However, especially in the case of disc arthroplasty following an anterior cervical decompression, it is important to take down a portion of the uncovertebral joint and decompress the exiting nerve at least as far laterally as the pedicle, especially if there is significant foraminal stenosis.

II. Restoration of normal anatomy

An important part of the ACDF procedure is restoring lordotic alignment of what is typically a collapsed and degenerated motion segment. This usually entails placing a graft or cage that is taller than the native disc and should be approximately the same height or slightly taller than a normal disc at a different level. It should be kept in mind that if there is substantial endplate resection as part of the decompressive procedure, then restoration of lordosis will require placement of an even larger interbody graft or device. Typical discs can be anywhere from 2 mm to 5 mm in height and so most interbody reconstructions will range between 6 mm and 8 mm with regards to graft height or cage height. If substantial endplate resection is part of the reconstructive procedure, then a taller interbody device may be necessary.
III. Stabilization of the motion segment

Although restoration of disc height and re-establishment of lordosis is thought to be important to improve kinematic function, an equally important aspect of the reconstructive procedure is to provide long term stability by not only restoring disc height but by promoting the development of a solid fusion at the surgical level. Historically, this was most reliably achieved through the use of iliac crest autograft. However, due to donor site morbidity, the majority of surgeons have moved away from autograft to the use of various allograft sources including iliac crest, fibula, patella, and composites of cortical and cancellous bone. In addition, there are numerous other cage-type devices made of ceramics and metals that can also serve this purpose. In addition, for almost twenty years surgeons have been moving towards greater use of anterior cervical plates to provide rigid stability and to minimize the amount of post-operative immobilization necessary. Although there is no evidence supporting a higher fusion rate for single level procedures, patients treated with an anterior cervical plate do appear to have better long-term maintenance of lordosis. Furthermore, there is good evidence in the literature that multilevel procedures do have a higher likelihood of successful fusion with the use of a rigid anterior cervical plate.

IV. Indications for Corpectomy

The most common indication for corpectomy is the presence of retrovertebral compression. This most commonly includes an extruded fragment of nucleus pulposus or ossification of the posterior longitudinal ligament (OPLL). In cases of a sequestered fragment of disc material, a more limited channel corpectomy may be successful in alleviating the compression. However, if there is ossification of the posterior longitudinal ligament, especially when associated with significant endplate spondylosis, a broader trough will be needed. As the spinal cord measures 14-15 mm in width in the cervical spine, we advocate cutting a trough between 16-18 mm in width to address the compressive pathology while avoiding injury to the vertebral artery which may occur if the trough exceeds 20 mm in width. In addition, it is crucial that the surgeon review the preoperative imaging for any anomalies in the vertebral arteries which may preclude a corpectomy approach. In cases of corpectomy, we typically apply Gardner-Wells tongs and weight which can be increased to apply distraction across the corpectomy trough prior to insertion of the strut graft. 10 pounds of traction is usually increased to 30 pounds prior to graft insertion, then reduced to 10 pounds prior to plate application.