NTSESP brain removal options (Queensland)

Sampling for the National Transmissible Spongiform Encephalopathies Surveillance Program

There are a number of ways to remove the brain in the field without damaging the brainstem and cerebellum so that they are suitable for TSE examination. Submitting diagnostic samples is essential for payment of TSE incentives.

The TSE brain removal — sample collection video demonstrates the methods described below.

Method 1 — Remove the skull cap

Three carefully placed cuts with a saw or axe will allow removal of the skull cap (Figure 1).

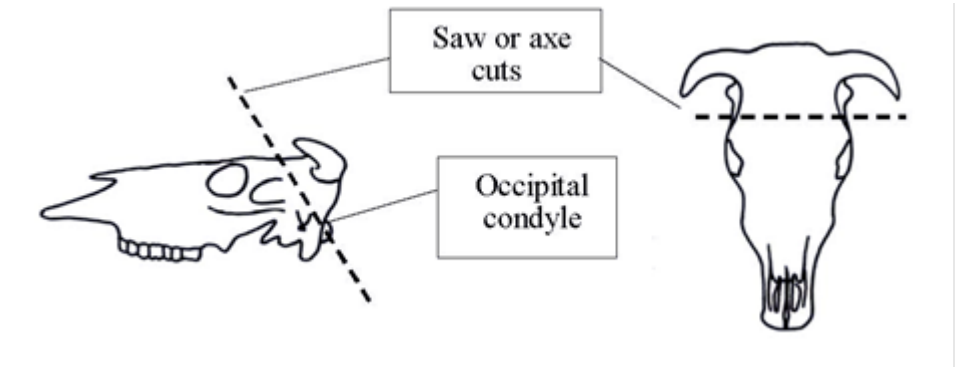
Place the first two cuts along the sides of the skull. These lateral cuts must cut the occipital condyles to allow the brainstem and proximal spinal cord to be removed undamaged.

Make a third cut transversely across the front of the skull, midway between the eye and the horn site. The lateral cuts must intersect with this transverse cut to form a triangle of cuts around the skull.

Lever off the skull cap. Remove the dura mater (fibrous membrane surrounding the brain) and 'roll' the brain out from front to rear using a boning knife to cut the nerve roots so that the caudal brainstem is removed intact.

TIP: Ensure you remove all the dura mater that projects downwards as a transverse partition between the cerebral hemispheres and cerebellum. This may ossify, particularly in cattle, and not removing it may result in damage to key diagnostic sites in the brainstem when the brain is removed from the cranial cavity.

Figure 1 – Removing the skull cap



Method 2 — Submit the whole head

The head must be fresh, promptly chilled, and must NOT have been frozen.

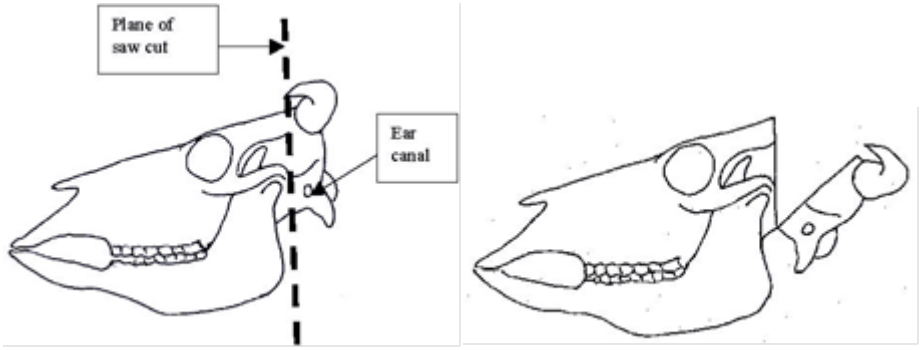
TIP: Remove the mandible and front of the maxilla to reduce the weight and volume for chilling and transport by making a transverse cut through the posterior edge of the bony orbits of the eyes.

Method 3 — Remove the brain by cutting through the skill and brain transversely

Use a saw to cut dorsoventrally in a transverse plane perpendicular to the frontal surface, just cranial (1–1.5cm) to the external ear canal, and parallel to the caudal border of the mandible (Figure 2). The dorsoventral cut should angle forward rather than backward.

CAUTION: There is a risk with this method that a key diagnostic site in the brainstem will be damaged if the cut is not sufficiently cranial, or that key diagnostic sites will be damaged on one side if the cut is oblique.

Figure 2 – Transverse craniotomy



Method 4 — split the skull longitudinally

Split the skull (not the brain) ventrally and dorsally along the midline longitudinal axis with a saw or axe (Figure 3). Lever open the two halves of the brain from the nose end to expose the intact brain.

CAUTION: This method requires practice. Do not section the brain longitudinally because this will damage key diagnostic sites along the brainstem near the midline. Partial sectioning of the brain will lead to distortion of the brainstem during fixation and prevent bilateral histological assessment.

TIP: Use a small sledgehammer to hit an axe for greater control and safety.

Figure 3 – Transverse craniotomy