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## Lesson of the Week

### Brain abscess complicating cervical traction

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Skull tongs and callipers that lack a mechanism for limiting depth of penetration of bone are associated with a definite risk of brain abscess and should be abandoned

Patients with a diagnosis of fracture-dislocation of the cervical spine must have their fracture immobilised immediately. Traction can be applied with skull tongs and various types are used. We report two cases of brain abscess complicating the use of Cones callipers.

#### Case reports

**Case 1**—A 66 year old man sustained a fracture-dislocation of C4-5, which was treated orthopaedically by traction for seven weeks with the use of Cones callipers. Five months later a right temporal osteomyelitis developed and sequestrectomy was performed under local anaesthesia. Seven months after that procedure the patient was admitted to the regional neurosurgery unit with headache, drowsiness, left hemiparesis, and a fever of 38.5°C. Computed tomography (CT) showed multiple abscesses in the right temporal lobe; the neck was stable. The abscesses were excised at craniotomy. Culture disclosed a heavy growth of *Staphylococcus aureus*, and benzylpenicillin and chloramphenicol were started. The hemiparesis resolved by the second postoperative day.

**Case 2**—A 52 year old man suffered a fracture-dislocation of C6-7. This was treated by skull traction with use of Cones callipers. Three weeks later he began to have focal seizures affecting the face and arm and increasing drowsiness. Radiographs and CT of the cervical spine showed the fracture to be stable, and CT in the regional neurosurgery unit disclosed an abscess in the right temporal lobe. This was drained through a small craniectomy, and culture grew *Staph aureus*. Chloramphenicol and benzylpenicillin were given, and by the 10th postoperative day the patient was alert and had minimal drift of the left arm.

#### Discussion

Brain abscess has been reported in 13 patients treated with skull tongs<sup>1-4</sup> and two treated with halo fixators.<sup>5</sup> The diagnosis may not be obvious and a high level of suspicion is required; five of the 13 patients quoted above died. The abscess may be preceded by local osteomyelitis of the skull, for which limited sequestrectomy or antibiotics, or both, are rarely adequate.

All the reported cases of brain abscess occurred after the use of tongs that lacked a mechanism for limiting the depth of penetration into the skull. In 12 of the 13 cases there was a definite breach in the inner table. In six, however, the dura was found to be intact at exploration, suggesting that penetration of bone was the relevant factor. There have been no cases of abscess reported after the use of Gardner-Wells tongs, which have a spring loaded mechanism that prevents penetration of the inner table of the skull (table). Cones callipers lack this mechanism. They and similar types of skull tongs should no longer be used.

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#### Mechanisms of skull tongs in common use and list of those that should be abandoned

Type of tongs	Mechanism	Comments	Recommended for use
Gardner-Wells	Spring loaded, 13.6 kg pressure	Does not penetrate inner table of skull	Yes
Cones callipers	Screw thread	Tightened by hand; no limit to depth of penetration	
Ice tongs			Tong inserted into twist drill hole
Crutchfield tongs	Tong inserted into standard burr hole	Dura always exposed	
Blackburn callipers			

Risk of infection of central nervous system is present when dura is exposed, greatest when dura is penetrated.

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