

Head fixation device complications

[Pin fixation](#) and rigid [immobilization](#) of the [head](#) is desirable in many neurosurgical [procedures](#). However, these [techniques](#) are associated with [complications](#) in [infants](#) and young [children](#). A simple modification of a commonly used cranial fixation system allows rigid, safe immobilization of the head in infants and children.

Beuriat et al. performed a [literature review](#) via [PubMed](#) and [Google Scholar](#) using the terms “[Mayfield skull clamp](#)”, “[Sugita head holders](#)”, “[head holder complications](#)” and “[skull clamp complications](#)”. Twenty-six complications directly related to the use of head holders were identified through 19 papers published from 1981 to 2014: mainly skull fractures with or without a dural laceration (50%), epidural hematomas (23.8%), skull fractures with or without a dural laceration (50%), and air embolism (9.5%). The authors propose recommendations for the safe use of head holders ¹⁾.

The Mayfield clamp, often causes brief intense nociceptive stimulation, hypertension and tachycardia. Blunting this response may help prevent increased intracranial pressure, cerebral aneurysm or vascular malformation rupture, and/or myocardial stress.

A [remifentanyl](#) bolus is more effective than a [propofol](#) bolus in blunting hemodynamic responses to Mayfield placement, and possibly for other short, intense nociceptive stimuli ²⁾.

Skull fracture ^{3) 4)}

Epidural hematoma ^{5) 6)}.

A 67-year-old Asian male patient with a history of dialysis-dependent chronic renal failure over 36 years suffered from severe cervical myelopathy. Neurological examination and radiographic images revealed cervical spondylotic myelopathy due to dialysis-related spondyloarthropathy. Laminoplasty was planned on patient consent. A Mayfield skull clamp was applied with the patient supine. Torque was applied to the screws with gentle care, but there was no resistance and it was not easy to reach the standard 60 lb (267 N) to 80 lb (356 N). Because a skull fracture was suspected, we canceled the surgery. Emergency head computed tomography showed depressed skull fractures underlying the single-pin sites with an associated epidural hematoma. The fractures and epidural hematoma were treated conservatively, and spontaneous resolution of the hematoma was confirmed. Cervical laminoplasty was performed successfully using a mask-type head holder on the subsequent day.

As a precaution for fractures and epidural hematoma in neurosurgical patients with bone fragility or a thin skull, use of a mask-type fixing device or halo ring is recommended ⁷⁾.

Head fixation device complications in pediatric neurosurgery

see [Head fixation device complications in pediatric neurosurgery](#).

¹⁾

Beuriat PA, Jacquesson T, Jouanneau E, Berhouma M. Headholders' - complications in neurosurgery: A

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4)

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7)

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