Introduction:
Severe traumatic brain injury is associated with high mortality and functional disability. Several interventions are commonly used to control the intracranial pressure to prevent secondary cerebral injuries. Among them, decompressive craniectomy (DC) is widely performed; however, its impact on functional outcome is still under debate. Our objective was to assess the efficacy and safety of this procedure in adult patients with severe traumatic brain injury.

Methods:
We systematically searched in MEDLINE, EMBASE, CENTRAL, Web of Science, conference proceedings and databases of ongoing trials for eligible trials. We included randomized controlled trials of adult patients with severe traumatic brain injury, comparing DC to any other intervention. Our primary outcome was the neurological function based on the Glasgow Outcome Scale. Secondary outcomes were mortality, intensive care unit (ICU) and hospital length of stay, intracranial pressure control, and complications. Two reviewers independently screened trials for inclusion and extracted data using a standardized form. We used random effect models to conduct our analyses and the I² index to assess heterogeneity.

Results:
We identified 5360 citations, from which we included 3 trials for a total of 573 patients. We observed no impact on the Glasgow Outcome Scale with the use of decompressive craniectomy (RR=1.03, 95%CI [0.74 ; 1.44]). We observed no effect on mortality (RR=0.66, 95%CI [0.40 ; 1.10]) or ICU length of stay (DM=-2.12, 95%CI [-7.80 ; 3.57]). However, we observed a decrease in the mean intracranial pressure (MD=-3.73, 95%CI [-5.78 ; -1.68]) and an increased incidence of patients with complications (RR=1.95, 95%CI [1.32 ; 2.89]).

Conclusion:
We did not observe an association between DC and neurological outcome in adult patients with severe traumatic brain injury. Current evidence does not support the use of DC as a standard of care intervention in adult patients with severe traumatic brain injury.