

<http://www.kaisermedicaltech.com/solomax-mini-drillscrewdriver/>

Manual [cranial drilling](#) is an old but in modern [neurosurgery](#) still established [procedure](#) which can be applied quickly and universally in [emergency](#) situations. Electrical [drilling](#) requires more complex equipment and is usually reserved to the [Operating Room](#) (OR). It also seems desirable to apply an electrical drill for bedside usage but a suitable [product](#) does not exist so far.

An [experimental](#) study using a manually and an electrically driven skull drill included a total of 40 holes drilled into synthetic biomechanical sheets. Half of the holes were produced with a prototype electrical drilling machine of the company [Kaiser Medical Technology](#) and half of them with a traditional manual drill. Different drilling parameters such as the geometry of the borehole, the drilling forces and the drilling vibrations were captured during all experiments.

The electrical drilling needed higher vertical force by the operators and a longer time to penetrate the sheet. A reason was the relatively lower rotational speed provided by this particular drill. When drilling electrically the vibrations were substantially less which in turn led to a more precise shape of the holes (revealed by observation via a microscope).

The electrification of bedside drilling can in principle enable emergency craniostomies to be performed with greater ease and accuracy. The power of the electric drive, however, must be at least equivalent to the power of the traditional manual drill. Otherwise, the vertical forces exerted on the skull by the operator become inhibitive. The challenge is to combine cost-efficiency and re-sterilizability of an electrically driven drilling machine which at the same time is small and simple enough to qualify for emergency applications ¹⁾.

¹⁾

Carolus A, Richter W, Fritzen CP, Schmieder K, Brenke C. Experimental investigations of a manually versus an electrically driven skull drill for bedside usage. PLoS One. 2019 Apr 18;14(4):e0215171. doi: 10.1371/journal.pone.0215171. eCollection 2019. PubMed PMID: 30998712.

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