

# A New Era in Stereotactic Brain Biopsy: Frameless Navigation-Based System

Taweesomboonyat *et al.* presented their experience in frameless stereotactic brain biopsy in their article: "Diagnostic yield and complication of frameless stereotactic brain biopsy."<sup>[1]</sup>

Surgery is the mainstay of treatment for brain tumors to make pathological diagnosis, to relieve mass effect, and to improve prognosis. If surgery is not feasible (deep-seated lesion or lesion located in the eloquent brain area, small, and/or multiple lesions), stereotactic brain biopsy is a viable option for histopathological assessment of the tumor to make further treatment plan.

Frame-based stereotactic brain biopsy systems have been used for a long time. Stereotactic brain biopsies have a mortality rate of 3.5%, over than expected even though they provide diagnosis with precision.<sup>[2,3]</sup> With technical and technological advancement, morbidity and mortality rates of stereotactic brain biopsies have steadily decreased from the 1980s to 2000s.<sup>[3]</sup> Through advancement in navigation technology, frameless stereotactic brain biopsy settings have been installed compatible with both magnetic resonance imaging (MRI) and computed tomography (CT).<sup>[2]</sup> Pointer-based referencing that uses either fiducial markers or anatomical landmarks is employed in frameless stereotaxy.<sup>[4]</sup>

Frameless stereotactic brain biopsy has comparable accuracy and complication rates to frame-based systems. Frameless stereotaxy is convenient both for the patient (more comfortable setting) and surgeon (time- and cost-saving).<sup>[2,5-7]</sup> It is even better to use a frameless stereotaxy system free of head fixation equipment (namely, Mayfield head holder), which is intolerable for awake patients, limits biopsy planning, and leads to postoperative complications (bone fracture, cerebrospinal fluid leakage, and epidural hematoma).<sup>[8]</sup>

As a limitation of frameless stereotaxy, its accuracy is less for posterior fossa lesions.<sup>[6]</sup> The error of frameless stereotaxy in phantom subjects is 1.3–1.7 mm with MRI, even lesser with CT (1.1 mm ± 0.5 mm).<sup>[5]</sup> CT is also more beneficial than MRI in financial aspects for rural sites of the world.

As understanding of the main principles of frameless stereotactic brain biopsy is disseminated throughout the world, it would once replace frame-based systems in the near future.

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## Conflicts of interest

There are no conflicts of interest.

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