Multiple Subpial Transections (MST)

– indicated if epileptogenic zone involves eloquent cortex
- special indication - Landau-Kleffner syndrome.
- seizure propagation occurs along long axis of gyri.
- nonresective surgical technique - horizontal association fibers (important for intracortical seizure propagation) are interrupted at 5-mm intervals; vertically oriented projection fibers (important for function) and pial nutrient vessels remain intact - ideal for treating epileptogenesis while preserving intrinsic cortical function!
- because neocortex is organized in functional columnar units, cuts perpendicular to pial surface do not disrupt cortex-subcortical input-output interactions.

PROCEDURE

- as with all surgery for partial epilepsy, margins of epileptic focus must be defined clearly (using subdural grid electrode).
- most cases involve junction of central sulcus with Sylvian fissure.
- entire region of ictal onset should undergo MST + 1-2 cm bordering ictal zone.
- specially designed MST knife (AD-TECH, Racine, Wis) with point angled downwards rather than upwards as originally described:
  - two different 0.55 mm diameter tip styles (dull & sharp).
  - bent distal portion of all tips is 5 mm long
• cutting portion of knife is sharpened to blade - to minimize excessive damage from using blunt instruments such as right-angled dissector.
• actual cuts should be performed **under direct vision through operating microscope**.
• after protecting surrounding cortex with cotton patties, insertion point can be either at side or at crest of gyrus.
• after small pial spot is cauterized, knife blade is inserted and pushed subpially towards gyrus edge, making right-angled cut to long-axis of gyrus.
• horizontal arm to blade should be barely visible through pia at all times. If insertion point is centered in gyrus, then, after first half-cut, instrument is removed and replaced and remainder of slice is completed.
• parallel cuts then are made 4-5 mm apart until entire proposed ictal zone and surrounding area have been sliced.
- take care when encountering *gyrus curves* (outer length of curve is much longer than inner length – use staggering cut lengths so that slices converging at center of curve do not all join at common point or come so close together as to severely damage cortex).
- *pial bleeding* at blade insertion point usually is controlled with bipolar cautery or small square of thrombin-soaked Gelfoam; significant subpial hemorrhage should not occur.

**BIBLIOGRAPHY** for ch. “Epilepsy and Seizures” → follow this [LINK](#)