



Selection of Probe Holders For Laser Doppler Flowmetry

In preparing to use a BLF laser-Doppler flowmeter, the method of holding the probe is critical. In general, holding the probe in a manner which fixes its position relative to the tissue under study, without applying pressure (which will occlude the underlying microvasculature) is required for meaningful measurements. There are several methods of probe placement which may be used to meet these requirements. Among these are:

- micromanipulators
- double adhesive disks
- suturing
- bronchoscope/endoscope/cystoscope
- “floating” placement devices
- “non-contact” holders

Hand Holding of the probe is useful for quick measurements, but care must be taken so as not to include a large motion artifact from a less than steady hand. At the least, the hand should be braced against something firm so that a light touch is possible. In general, this technique should be used for preliminary sessions or for qualitative measurements.

Micromanipulators hold the probe rigidly in place and are very useful in tissues that do not exhibit significant motion. These require that the subject be firmly fixed in place (examples: in vivo animal cerebral perfusion measurement, animal intestinal mucosa preparation).

Double Adhesive Disks for use with surface probes or with rubber probe holders for pencil type probes are among the easiest and best methods for probe placement (examples: cutaneous flap monitoring, forearm monitoring during exercise).

Suturing a probe in place may be superior to adhesive disks for relatively long-term placement for moist tissue or for fast moving tissue. To eliminate movement between the probe head and the tissue under study, it is important to eliminate any slack in the sutures. Just as important is to see that the sutures are not so snug that the tissue is compressed, causing occlusion of the underlying vasculature (examples: post-op flap monitoring, bronchotracheal, bladder blood flow measurements).

Floating Placement Device or Balance Arm can be used to hold a probe with a very light pressure on tissue that moves slowly but markedly, such as by peristalsis. In using the balance arm, the weight of the probe and suspended cable is almost totally counter balanced and the probe is fixed to the tissue with cyanoacrylate glue (Nexaband®, Tri-Point Medical, Raleigh, NC) or an equivalent. The tissue is free to move in three dimension and the probe will follow, neither adding probe-to-tissue motion nor compressing the tissue (examples: intraoperative lung surface, intestinal serosa or mucosa).

“Non-Contact” Holders do contact tissue, in a ring around the tissue understudy, but not within several millimeters of the measurement site. The probe is held a fixed distance above the measurement site allowing reasonable control of probe-to-tissue motion while not irritating sensitive tissue (example: dermatological test site monitoring).

