



Surgeon's Philosophy and Operating Position

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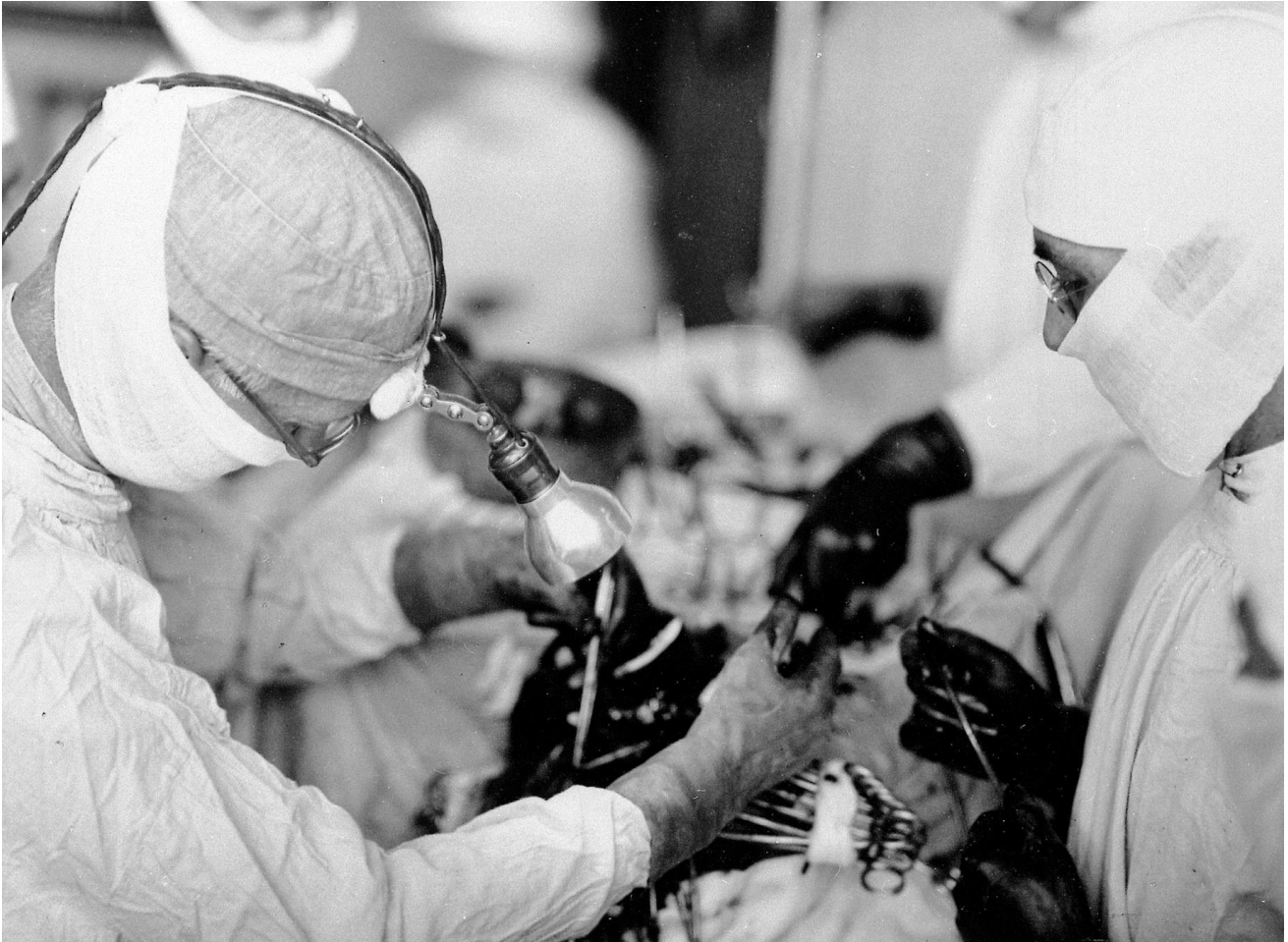


Figure 1: Cushing used the headlamp later in his career. In this picture by Walter Boyd in ~1925, he is elevating the bone flap (Courtesy of Cushing Brain Tumor registry at Yale University).

Microsurgery is technically demanding, treacherous, venturesome and precarious. For the best outcomes, the surgeon's confidence, prudence, comfort and relaxed body posture are crucial to controlling operator's fatigue and preventing exhaustion. Often the most critical and demanding parts of an operation occur hours into the case when fatigue has worn away the surgeon's patience and self-control—qualities required to pursue calculated and deliberate microsurgical movements.

During these late hours, many variables may contribute to intraoperative difficulties and their resultant poor outcomes. Through their passion and years of practice, microsurgeons have refined their tolerance and self-discipline to keep the patient's best interest ahead of their own personal needs and instincts, despite long hours of surgery. However, [overwhelming exhaustion and burnout](#) can unconsciously compromise a surgeon's decision-making and thought processes.

The following details summarize my personal beliefs for retaining composure and minimizing operator's fatigue. These principles have been instrumental in keeping me relaxed, energetic, and alert during long operative sessions:

1. *Master technical efficiency to shorten lengthy operations.*
2. *Move as quickly as possible through the exposure and early less-risky parts of the operation and save energy for the most critical steps involving microsurgical dissection of neurovascular structures. The surgeon's practice of a focused mindset (on the dissection and not exposure) sets the precedent for an efficient workflow.*
3. *Use a mouthpiece as much as possible to minimize nondeliberate operative movements (repeatedly adjust the scope using the handles).*
4. *Replace hesitant, timid and exploratory microsurgical movements with deliberate, efficient, and purposeful maneuvers.*
5. *Remember that microsurgery is a dance of elegant individual artistic maneuvers with properly executed transitions. Practice it, master it, and pursue its excellence.*
6. *Resolve that every next operation MUST be executed more proficiently than the last one. I review all my operative videos and am always amazed how much I can learn from these videos.*

After completing the craniotomy and exposure, I prefer to sit during the intradural portion of the operation to minimize fatigue.



Figure 2: The proper operating position: one of the most overlooked considerations in patient safety is the surgeon's comfort. Standing may lead to arm and hand fatigue, whereas a sitting position allows the use of an armrest and promotes relaxed and steady hands. Comfortable positions also improve surgical technique by eliminating nondeliberate or unintentional dissection maneuvers.

The Mouthswitch

The operating microscope has vastly increased the scope of microsurgery, but the benefit of the surgeon's comfort during its use is often overlooked. I consider the mouthswitch (mouthpiece) an indispensable part of using the microscope and promoting operative efficiency.



Figure 3: The mouthswitch is adjusted before the microscope is draped at the beginning of the operation.

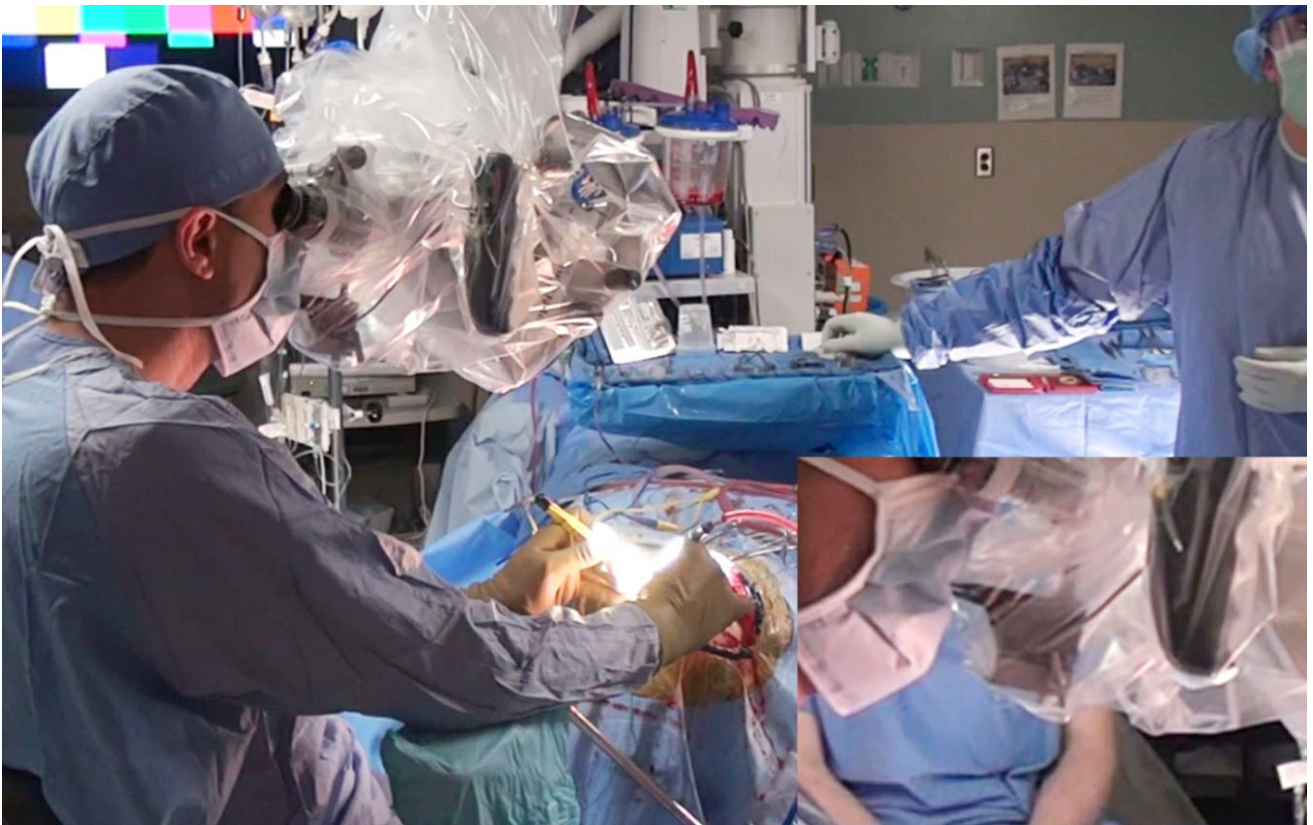


Figure 4: When using the mouthpiece (inset), I position and adjust the scope without moving my hands away from the operative field. Every

time the scope handle is used to adjust the scope, the surgeon must hand the dissecting instruments to the assistant, readjust the scope, and return the instruments into the operative field. This process is time-consuming and unnecessary.

The most important drawback of this maneuver is the need for the surgeon to reorganize his or her thoughts again regarding the next step in dissection. This repeated interruption in workflow is one of the main reasons for inefficient long operative times. *I consider the microscope a part of and extension of my face, as if I am wearing a pair of glasses.* The microscope should adjust to the position of the surgeon, rather than the surgeon constantly adjusting to the position of oculars.

The current version of the mouthpiece uses a lever-arm technology that is somewhat awkward to manipulate in the mouth; its use involves a learning curve. In certain non-neutral ocular positions, the neck of the surgeon must adjust to the level of the mouthpiece so that the mouthpiece remains at a functional level within the surgeon's jaws. Nonetheless, this tool is absolutely essential in the workflow of microsurgical movements.

The Armrest

Another apparent source of fatigue and hand tremor is overuse of the operator's arm muscles for their stabilizing role.

General energy expenditure is reduced through ergonomic posture of the surgeon's body, including the upper extremities. A comfortable operating chair can delay surgeon's fatigue. A slight recline can relax the core muscles, and an armrest allows the arms to be slightly extended, but not stretched at the chest level. The armrest performs the function of the upper arms and shoulders to stabilize the hand.

It is ideal for the armrest to extend just short of the operator's wrist. It is also desirable to place the operative field below the level of the armrest so the wrists are "dangling" over the operative field. A drape may cover the surgeon's lap for preserving sterile conditions. *This setup provides the most flexible and comfortable position for the hand and grants numerous degrees of*

maneuverability while minimizing the need for fixed retractors to adjust the brain position to the surgeon's working angle.

Operating Room Setup

The proper operating room setup can reduce operative time and the transfer of instruments between the surgeon and assistant who stands behind a Mayo stand over the patient.

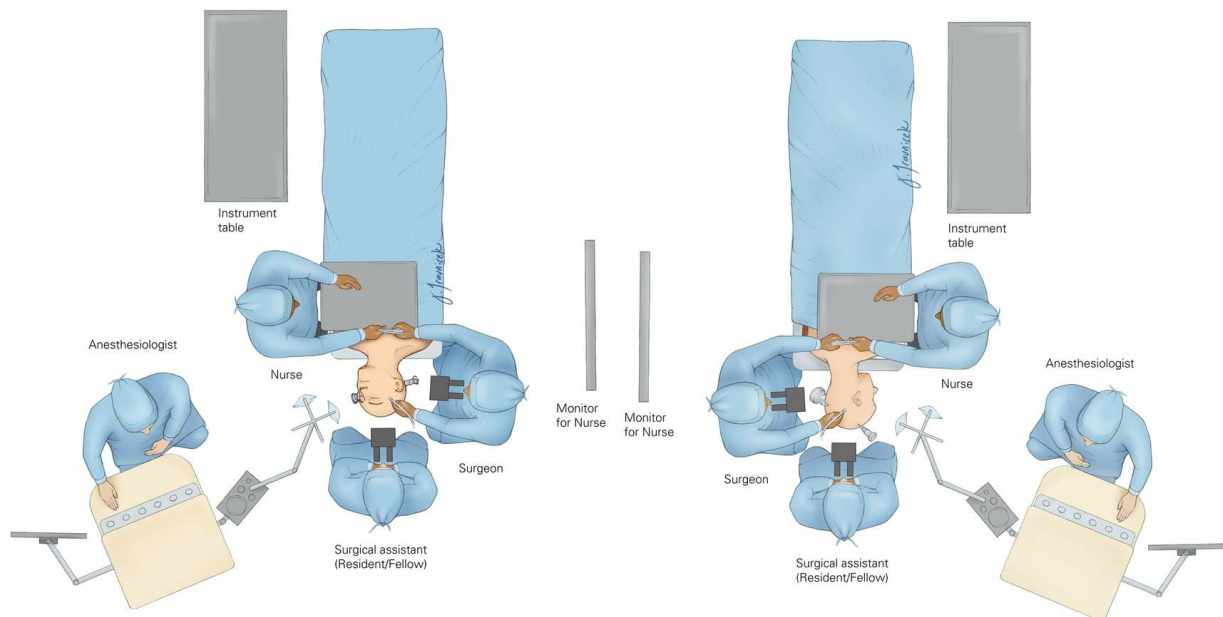


Figure 5: The operating room setup for pterional (left image) and retromastoid (right image) craniotomies. I prefer to sit across the table from my assistant. This facilitates efficient transfer of instruments while allowing me to keep my focus of attention on the operative field. For further details, refer to the chapter on the [Operating Room Setup and Work Flow](#).

Pearls and Pitfalls

- The surgeon's comfort, often overlooked, is critical for an efficient operation. A relaxed surgeon must pay special attention to body posture, use of the microscope, and operating room set-up.
- Master the use of the mouthpiece to improve operative efficiency.
- Do not let the intensity of the case overwhelm important details such as preservation of your energy and concentration for the later,

critical parts of the operation.

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