

## **Halsted's seven surgical principals**

Of all the great American human surgeons, William Halsted was particularly influential because of the surgical principles that bear his name. Though they are more than a century old, the principles are just as relevant today in human, small animal, large animal and exotic animal surgery. In his time, Halsted was called "the father of safe surgery."

Let's review Halsted's seven principles of surgical bliss. They will help you, like the singer Sade, become a "smooth operator."

### 1. Handle tissues gently

Let's face it: Surgery is invasive by definition. Yet we should strive to minimize iatrogenic trauma to tissues. Thumb or tissue forceps should be used to grab tissues delicately, as opposed to crushing them.

Whether we use sharp or blunt dissection, it should be as accurately anatomical as possible. Ironically, gentle tissue handling also means using a scalpel blade correctly. Once the beginning and end of the incision are identified, a scalpel should be used to make a single incision in a single pass to the appropriate depth.

Being wishy-washy or using a scalpel like a paint brush is much more traumatizing to the skin because the incision will have jagged edges. In addition, the blade should be kept perpendicular to the skin to ensure proper tissue apposition during suturing.

### 2. Control hemorrhage carefully

Bloodletting went out of fashion in the late 19th century. "All bleeders stop ... eventually" is a common saying and an irrefutable law of volemia. Yet we should do our best to prevent or stop bleeding using meticulous hemostasis. Electrocautery, ligatures and hemostatic agents are some of the many ways to control bleeding.

### 3. Preserve blood supply

Preserving the blood supply is a direct consequence of careful dissection. While many blood vessels, including large ones, can be sacrificed, we should strive to preserve them when possible as they will help with healing.

This is especially important with fracture repairs. For example, muscles should be elevated from the bone fragments only if necessary so to avoid delayed healing or creating a sequestrum.

### 4. Observe strict asepsis

Surgical asepsis encompasses preparation of instruments, the OR, the patient, the practitioner and the staff. This is why we recommend wearing caps, masks, gowns and gloves to perform surgery. Also, thorough scrubbing of the patient, the surgeon and any assistant is critical.

The smallest mistake during any step of this continuum may lead to an infection. At best, it may be an incisional infection. At worst, it can be disastrous when it involves orthopedic implants.

## 5. Minimize tissue tension

Excessive tension during suturing of organs like the intestines, bladder and skin is unnecessary, if not detrimental. Applying sutures is an art form. They can't be too tight—crushing and pressure necrosis could result—and they must allow postoperative swelling. At the same time, they can't be too loose, which could cause leakage or dehiscence.

## 6. Appose tissues accurately

The purpose of wound closure is to bring the edges together to allow healing. Again, this applies, among others, to the intestines, bladder and skin. This is very different from strangulation or crushing, which may have been suggested in the past (e.g. in the intestine) but is now universally discouraged.

Overlapping of the edges of an incision is not recommended.

## 7. Eliminate dead space

This is a corollary to the previous principle except that it mostly relates to muscle and skin closure. In other words, after a laparotomy, we should eliminate dead space by carefully suturing the different layers of the abdominal incision. After excision of a large tumor, eliminate dead space to decrease the risk of seroma or hematoma formation.

If needed, a passive or an active drain should be used if bleeding or drainage is anticipated. By preventing fluid accumulation, we allow tissue layers to adhere to one another, thereby speeding up healing.

## Other Principles

It is remarkable that Halsted understood the importance of these fundamental surgical principles so early. We could add many others, such as:

Keep tissues moist, especially abdominal and thoracic organs.

- Make a skin incision large enough for the job at hand.
- Take biopsies when needed, and always submit them to the lab.
- Provide adequate pain relief.
- Make pretty skin sutures.

Whatever type or level of surgery you perform, whichever species you work on, respect Halsted's principles. They will help you improve the surgical success rate. Follow them and you will become a smooth operator.

<https://www.veterinarypracticenews.com/memorize-7-principles-to-be-smooth-operator/>