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COMPARISON OF WOUND CLOSURE TECHNIQUES IN SURGERY

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Wound closure is a fundamental component of surgical practice, directly influencing healing outcomes, infection rates, and cosmetic results. Over time, a wide range of closure techniques has been developed, allowing surgeons to tailor management according to wound characteristics, tissue type, and patient factors. The primary goal of wound closure is to achieve optimal tissue approximation while minimizing tension, preserving blood supply, and reducing the risk of complications. A thorough understanding of different closure methods is therefore essential in general surgery.

Sutures remain the gold standard for wound closure due to their versatility and reliability. They are classified into absorbable sutures, used for deeper layers to reduce tension and avoid removal, and non-absorbable sutures, which provide prolonged strength for skin closure. Common techniques include simple interrupted sutures for precise approximation, continuous sutures for faster closure with even tension distribution, and mattress sutures for high-tension wounds with good edge eversion. Subcuticular sutures are preferred in cosmetic areas as they minimize scarring.

Staples are an alternative to sutures, particularly in surgical incisions involving the scalp, trunk, or extremities. They offer rapid application, which is advantageous in emergency and high-volume surgical settings. Staples are associated with similar infection rates and healing outcomes compared to sutures, although they may provide less precise wound edge approximation. Their ease of use and time efficiency make them especially useful in long linear incisions, such as those encountered in abdominal surgery.

Tissue adhesives and adhesive strips represent less invasive closure methods and are increasingly used in selected cases. Skin adhesives, such as cyanoacrylate-based glues, are suitable for superficial, low-tension wounds and pediatric patients, offering the advantages of reduced procedure time, minimal pain, and no need for suture removal. Adhesive strips can be used alone for minor wounds or as adjuncts to reinforce sutured closures. However, these methods have limited tensile strength and are not appropriate for deep or high-tension wounds.

From a surgical perspective, the choice of closure technique is influenced by wound depth, contamination, vascularity, and tension. Deep wounds often require layered closure, where absorbable sutures are placed in deeper tissues to eliminate dead space and reduce tension on the skin surface. Proper surgical technique emphasizes atraumatic tissue handling, accurate alignment of wound edges, and maintenance of adequate perfusion. Excessive tension or tight suturing can compromise blood supply, leading to ischemia and delayed healing. In contaminated or high-risk wounds, delayed primary closure (tertiary intention) may be preferred, allowing time for infection control before definitive closure.

Each closure method carries potential complications, including infection, hematoma formation, wound dehiscence, and undesirable scarring such as hypertrophic scars or keloids. The risk of these complications can be minimized through appropriate technique selection, meticulous surgical handling, and proper postoperative care. Additionally, patient-related factors such as nutrition, comorbidities, and medication use must be considered when planning wound closure.

In conclusion, the comparison of wound closure techniques highlights that no single method is universally ideal. Sutures remain the most versatile and widely used technique, while staples and adhesives provide valuable alternatives in specific clinical scenarios. The optimal approach requires careful evaluation of wound characteristics and surgical goals, combined with sound technical principles, to ensure effective healing and favorable functional and cosmetic outcomes.