



THE “GOLDEN PERIOD” FOR WOUND REPAIR

Alan S. Peterson, M.D.

Associate Director, Family & Community Medicine

Walter L. Aument Family Health Center

A typical day in a primary care office or ER might include a patient who comes in for initial care 24 hours after lacerating his forearm. The wound does not appear to be overtly contaminated, is in a location that has good vascular supply and does not appear to have devitalized tissue, and the patient is not known to be immune compromised. The patient recently had a tetanus, diphtheria, and acellular pertussis booster, and he had his basic tetanus series as an infant. The question facing the medical provider is whether or not to close this wound primarily, with immediate approximation of the wound edges to reduce the patient's discomfort, to speed wound healing, and to decrease scarring.

The time that has elapsed since the wound occurred is an important factor in determining whether the wound should be closed primarily. Many studies of the safe or “golden” period during which primary wound closure can be accomplished without an increased risk of infection have been reported in the medical literature. One of the first such studies, carried out in the mid 1970's by Robson et al in burn wounds, showed that three to five hours after wounding, bacteria proliferated to a level that was associated with infection.¹ Those data were subsequently used to support the concept that lowering the strength of the wound inoculum would diminish the risk of wound sepsis. However, rapidly determining the bacterial count within the tissue of a wound is logistically difficult in the average primary care office, especially when the likelihood of successful primary closure is great.

Several studies carried out more recently have found that there may be an even longer period of time during which primary closure is safe. A study from Berk et al in Jamaica in 1987 found no increase in “wound failure” if the wound was closed within 19 hours after the injury.² The study had several limitations, however. The follow-up rate was only about 50%; wound dehiscence rather than an infection was used as the final outcome measure; antibiotics were not prescribed;

debridement was performed only for obviously nonviable tissue; and silk sutures were used for closure of almost all wounds. An interesting finding was that head wounds were significantly more likely to heal, regardless of the time since the wound. The authors conceded that with more readily available sterile supplies and monofilament suture material, results should more consistently show a successful outcome. The last sentence in their article states “in our casualty department we continue to follow the policy of suturing all late presenting, uncomplicated wounds, as long as they are not actively infected.”

Another article from Javaid and coworkers in the U.K. concerned primary repair of dog bites to the face. In 40 cases, primary healing was achieved in all but two patients.³ Mean delay between injury and presentation was 60 minutes, with all patients receiving surgical treatment within 24 hours of admission. There were no significant differences in wound healing if they were sutured within 19 hours. Little difference was noted in healing between blunt and sharp wounds.

A more recent article by Van Den Baar et al addresses this question in “Is Time to Closure a Factor in the Occurrence of Infection in Traumatic Wounds?”⁴ This is a prospective cohort study in a Dutch trauma center. He states that the closure time for wounds was first mentioned in an article by Paul Leopold Friedrich in 1898. In that old study with guinea pigs, he discovered that six hours seemed to be the golden time of survival. Indeed it was Friedrich's study that was used to determine that six hours was a safe time interval for suturing in the treatment of wounded soldiers in World War II. What Van Den Baar did in this most recent study was to provide evidence against any dogma that wounds older than six hours of trauma should not be sutured. There were 425 patients included in this prospective cohort study. Patients' wounds were all closed, regardless of the time after the wound. All patients were seen in 7-10 days for removal of stitches and to observe for wound infection. Only 17 of these patients were lost to follow up. Of the

408 patients who were followed, 45 had wounds older than six hours after trauma. 91% of all patients had no infection. 36 patients had redness of the suture sites or a worse complication. Eleven patients (2.7%) had general redness or pus at the site of the wound. Of those with a wound older than six hours, 3 out of 45 (6.7%) had wounds that were infected, versus 30 of 363 (9.1%) in wounds occurring less than six hours before primary closure ($P=0.59$).

It is difficult to compare Van Den Baar's research with those from the literature suggesting a maximum closing time of 19 hours, as the present study only included five patients with wounds seen after 19 hours. They concluded that they could not advocate a revised maximum time to closure.

Nonetheless, this study demonstrated that wounds of the legs and feet have a higher infection rate than wounds of the head. They also did not find a relationship between bacterial load at the time of wound closure and the risk of infection.

CONCLUSIONS

What's the bottom line from the most recent as well as past studies as far as the "golden period" for primary closure of wounds? It appears that wounds of the face and scalp can be primarily closed whenever they are seen, as long as infection is not already present. There are significant data that primary closure of other wounds can be safely done up to a maximum of 19 hours after the wound. This should take care of 99% of the wounds that present to Western world medical providers.

On the basis of the literature available today, 19 hours must remain only a recommendation, and it is obvious that each wound should be individually evaluated. For example, a poorly controlled diabetic with poor vascular supply to the legs requires individual determination of timing. Aside from the age of the wound, clinical judgment in all patients should take into account factors such as devitalized tissue, retained foreign body, host immune factors, apparent bacterial contamination, location, and causation.

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Alan S. Peterson, M.D.
Associate Director, Family & Community Medicine
Walter L. Aument Family Health Center
317 South Chestnut Street
Quarryville, PA 17566
ASPeters@lghealth.org