

Studies show that skin stapler is best at reducing infection risks in surgical wounds

Wound closure and infection control

By Editorial staff

The skin stapler is a relatively recent innovation in wound closure systems - at least that's what many of us have been led to believe. The fact is, in ancient India, primitive people noted that a certain species of termite formed its nest by squeezing leaves together with their pincer-like heads and binding the leaves together.

These indians, thousands of years ago, used the termites to join the wounded skin together by allowing the termites to bite them where they were wounded. They would then sever the insects' heads, leaving "staples" in place along the length of the wound area.¹

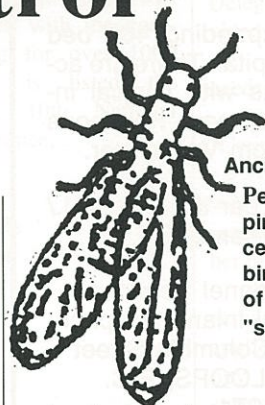
Our ancient forebearers may not have known, what is common knowledge today, that an open wound or incision is an invitation to infection; they did not know, however, that, for whatever reason, wounds should be closed as soon as possible.

Reducing causes of infection

Long before asepsis was theorized about, physicians and surgeons in the Middle Ages, as well as ancient peoples, recognized the need to close wounds as quickly as possible.

The religious cleric, Theodoric, was a physician to the Vatican in the mid-13th Century. While he was 600 years before Joseph Lister and 300 years before Leeuwenhoek, Theodoric counselled the immediate closure of wounds. Even before the invention of the microscope, he sensed the existence of bacteria and was concerned about contamination from air.²

Prior to the 19th Century, surgery was considered a brutal undertaking. Even in Lister's time (1827-1912) surgery was still practiced in a rudimentary fashion. However, as the ability to control infection improved, together with improvements in anaesthetics and advances in surgical



Ancient indians of the Bharat Peninsula (India) used the pincer-like heads of a certain species of termite to bind wounds together, one of the first recorded uses of "skin stapling."

technologies, the medical profession became increasingly sophisticated and complex.

Today, there are organ transplants, limb reattachments and a host of other operations that were unheard of 20 years ago. There are also more devices - catheters, respirators, intravenous connections, etc. - technologies that merely provide another pathway for infection.

Making the infection situation even more alarming is the development of resistant strains of bacteria caused by the the flagrant overmedication or overkill use of certain antibiotics³ (see page 6, "Resilient Bacteria...").

All these changes, discoveries and new modes of applying surgical technique have led health care agencies, hospitals, the medical community and the medical/surgical equipment manufacturing industry to find better ways to combat infection.

An important step toward reducing infection in the surgical wound has been the introduction of alternatives to ligatures - surgical staples and skin closure tapes. Surgical wounds, according to the Centres for Disease Control in Atlanta, account for 24 percent of all nosocomial infections.⁴

Surgical advancement

In a 1981 study, 96 guinea pigs had wounds closed using different means: monofilament nylon sutures, microporous skin closure tapes and surgical staples. According to the researchers, from the University of Virginia Medical Centre, "wounds

Report claims every year up to 70,000 Canadians acquire infections during hospital stay.[†]



Wound infections are a significant problem in Canadian hospitals.

Over 20,000 of these nosocomial infections could develop in surgical wounds.*

An operating room nurses' publication, in an article, recently stated that nosocomial infections afflict 3%-7% of patients in Canadian hospitals.

According to a report on the subject by the Bureau of Infection Control "...of all hospital services in a 'general' hospital, surgery has the highest rate of infection." The report also stated that: "Not surprisingly, wound infections are the most common infection in the surgical service in all hospital categories where these data were gathered."^{††}

Improved wound care reduces surgical nosocomial infections

In part, the problem of surgically related nosocomial infections can be addressed through improved wound care.

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[†]The Operating Room Nursing Journal Vol. 3 #5 Oct./Nov. 1985
^{††}The Bureau of Infection Control's Interim Report on Canadian Nosocomial Infection Control Surveillance Program.
*Figures calculated from Canadian Hospital Directory, Buyers' Guide and Statistical Compendium, 1985, CHA

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closed by tape exhibited the highest degree of resistance to infection, followed by stapled wounds and then wounds approximated by sutures." The researcher further added that, "wound closure with a stapler is accomplished with considerably less damage to the wound defences than is closure with the least reactive nonabsorbable suture."⁵

Another related study reported in the July, 1984 issue of *Archives of Surgery* describes the experimental use of 180 mice which had *Staphylococcus aureus* injected into the areas of skin incision. The researchers concluded: "Closure with the skin stapler was more resistant to abscess formation...Presumably, percutaneous sutures provide a nidus for bacterial growth...This problem is avoided by the use of skin tapes or staples. For those who are insecure about the strength of a closure with skin tapes, the skin stapler should provide an alternative in potentially contaminated cases where delayed primary closure is not elected."⁶

Conclusion

We have seen where the skin stapler had its roots in antiquity. Primitive man, however, was not concerned with sources of infection. The modern medical community is, and studies sponsored by the CDC in Atlanta less than two years ago, strengthen the reasons for greater and more improved infection control measures.

In one of these studies, "Identifying Patients at High Risk of Surgical Wound Infection", the authors noted: "We recently demonstrated that establishing an infection surveillance and control program oriented around reporting surgical wound infection rates to practicing surgeons led to a reduction in hospitals' overall surgical wound infection rates of approximately 35 percent."⁷

Concluded the authors of the study: "The rationale for focusing attention on surgical wound infection rates in clean operations is that surgeons expect these rates to be very low; finding high rates among these (supposedly clean) operations will prompt them to examine their operating techniques (in order to) identify and change practices that may be increasing their patients' infection risks." From the above referenced research studies, it appears that use of the skin stapler, as an alternative or adjunct to wound closure systems, provides an excellent example of better infection control practice. 

References

1. Brian Inglis, *A History of Medicine*, The World Publishing Co., Cleveland, Ohio, 1956, Pg. 11.
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Charles C. Thomas, Publisher, Springfield, Ill., 1968, pg. 62.

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4. Robert W. Haley, David H. Culver, John W. White, W. Meade Morgan and T. Grace Emori, "The Nationwide Nosocomial Infection Rate," *American Journal of Epidemiology*, February, 1985, Vol. 131, No. 2, Pg. 159.
5. R.M. Stillman, C.A. Marion, S.J. Seligman, "Skin Staples in Potentially Contaminated Wounds," *Archives of Surgery*, Vol. 119, July, 1984, Pg. 821.
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7. Robert Haley, David Culver, John White, W. Meade Morgan, T. Grace Emori and Thomas Hooten, "Identifying Patients at High Risk of Surgical Wound Infection," *American Journal of Epidemiology*, February, 1985, Vol. 131, No. 2, Pg. 206-207.

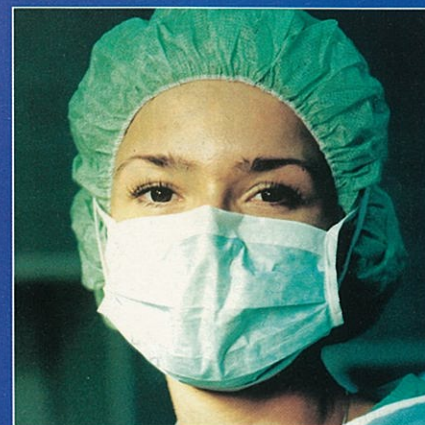
Quotes/Misquotes

The following quotes and misquotes which were gleaned from various sources, could have been taken from patient records in any health care facility:

- "Patient was shot in head with .32 calibre rifle. Chief complaint: headache."
- "This 64-year-old patient complained of abdominal cramps in one hand and constipation on the other."
- "Patient has been married twice, but denies any other serious illness."
- "Patient is separated from his wife, and is also allergic to penicillin."
- "Patient has no children, and doesn't smoke or drink either."
- Dictated the doctor, "Patient had a pap smear today." However, when it was transcribed, it read: "Patient had a Pabst beer today."

And while we're on the subject of misquotations, how about these from the *New England Journal of Medicine*:

- A mince of surgeons
- An affluence of anaesthesiologists
- A blotch of dermatologists
- A squall of pediatricians
- A probe of urologists
- A strabismus of ophthalmologists
- A pile of proctologists...and
- A stand of proctology patients
- A craze of psychiatrists
- A pate of head nurses
- A rinse of scrub nurses
- A cluster of pathologists



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