

Suturing with Horsehair

Over the ages, surgeons have sought the perfect suture material—one that does not kink or snarl, is pliable for knotting, non-irritating, non-absorbent, fine enough to leave no scar, easily removed, sterile, and strong.

In his 1892 *Manual of Operative Veterinary Surgery*, Alexandre Liautard noted, “In all the category of surgical detail, there is nothing so effective, or indeed indispensable, as the suture, properly applied, for the retention of breaches of continuity, whether the sewing be done by means of linen or silk thread, animal fibre, metallic wire, needles, pins or other instruments.” (Liautard, pp. 146-147)

By “animal fibre,” did he mean horsehair?

The long, coarse hairs from horses’ manes and tails have been used for many purposes, including upholstery and mattress stuffing, paint and shaving brushes, and bows for musical instruments. They have been woven into lustrous textile fabric, used to embellish women’s hats and undergarments and to decorate military helmets, made into “Gibson Girl” wigs, plaited into fishing line, embedded in wall plaster—and even used to make surgical suture.

In an August 5, 1875 issue of the *Boston Medical and Surgical Journal* (now the *New England Journal of Medicine*), William Warren Greene, MD, called attention to the value of horsehair for sutures and believed it needed “only a fair trial to introduce it into general favor among surgeons.” Although horsehair had undoubtedly been used for centuries as far back as Rhazes (854–925 CE) in Mesopotamia and in Ancient India, Greene had only recently begun using it for a variety of wounds “with the greatest satisfaction,” especially for scalp wounds. He said, “In fact, I am inclined to think it may profitably supersede all other material for sutures, except where greater strength is required.” (Greene, pp. 174-175) To prepare the horsehair, he further noted, “I take a long hair from the tail of a young, healthy horse, and first thoroughly rinse it in warm water. I then boil it for a half-hour in soda-water...remove and rinse it in clean warm water, and it is ready for use.”

A few years earlier in 1862, Thomas Smith, a surgeon at St. Bartholomew’s Hospital in London, had done some experiments with dogs and published an extended paper on “Horsehair as a substitute for wire [sutures]” in *The Lancet*. He compared silver wire with horsehair “such as ordinarily sold by fishing tackle makers” on abdominal incisions and on femoral arteries of dogs. Smith recommended it for suturing eyelids,

conjunctiva, and other parts of the face as well as for loose tissue on genital organs. “For the purposes of sutures, long white tail hairs are the best,” he noted.

Later in 1893, again reported in the *Boston Medical and Surgical Journal*, C.O. Thompson addressed an audience on “Horsehair in Minor Surgery” at the Suffolk District Medical Society meeting. He stated that “its real usefulness is practically unknown to many as evident from the fact, that little has been written regarding its use, and it is found in the hands of very few at the present time.” Catgut [dried twisted intestines of sheep or horses], silk, and silver wire were the principal materials then in use. He said, “It was not until I had used horsehair for three years, and had become thoroughly impressed with its practicability.” Furthermore, “Horse-hair is readily obtained by all surgeons, whether in city or country practice, and its preparation for use is perfectly simple.” (Thompson, p. 346)

One of the objections to horsehair involved the difficulty in sterilizing it. Thompson indicated that boiling in water was one of the most practical methods for removing pyogenic bacteria. But with lingering concern about tetanus and anthrax spores, he gave instructions for treating with disinfectant solutions to render the hair absolutely sterile. Moreover, Thompson said, “The large, black tail-hairs are preferred for sutures, as they are more easily seen when you desire to remove them, which is done by seizing the knot with forceps and snipping the hair to one side, when its smoothness and elasticity greatly facilitates its removal.”

While of limited use and acceptance by surgeons generally, horsehair proved invaluable during military combat in the American Civil War between 1861 and 1865. Kravetz notes that “horsehair was extremely popular among Civil War surgeons,” both Union and Confederate, although of last resort for closing lead-shot bullet and other battle wounds. As Union blockades drastically diminished the supply of medicine and medical materials in the South, “substitutes were devised whenever possible.” In particular, when silk was not available for ligatures or sutures, Confederate doctors were often forced to use cotton or flax thread or readily available horsehair. After being thoroughly washed and then boiled in water to make them softer and more pliable, the horsehair strands were unintentionally being sterilized at the same time, at least temporarily, even though hands and equipment were never sterilized. (Bollet, p. 93; Cunningham, p. 232)

Emergency use of horsehair has also figured in popular period fiction. Readers may remember the story set in 1860s post-U.S. Civil War Texas in which a dog named Old Yeller was sewn up with horsehair after being mauled by a wild animal.

“She said to me: ‘Go jerk a long hair out of Jumper’s tail, son. But stand to one side, so he won’t kick you.’

I went and stood to one side of Jumper and jerked a long hair out of his tail. Sure enough, he snorted and kicked at me, but he missed. I took the hair back to Mama, wondering as much about it as I had about the green-striped lizard. But when Mama pulled a long sewing needle from her dress front and poked the small end of the tail hair through the eye, I knew then.

‘Horse hair is always better than thread for sewing up a wound,’ she said. She didn’t say why, and I never did think to ask her.

...It was a long, slow job, sewing up Old Yeller’s belly....”

Excerpt from *Old Yeller*, by Fred Gipson, 1956, p. 115

While human surgeons appear to have discussed using horsehair as a suitable suture material in the 19th century, it was also used in veterinary medicine. In his 1912 book, *Regional Veterinary Surgery and Operative Technique*, Jno A.W. Dollar mentioned using “prepared horsehair” along with soft metallic wire, silkworm gut, and kangaroo tendon for skin wounds (Dollar, p. 79). He also suggested replacing drainage tubes with “plaited horsehair” or gauze as being more effective in facilitating discharge (Dollar, p. 106).

From around the turn of the 20th century, sterilized horsehair was sold in tubes as part of a line of suture materials manufactured and marketed by Ethicon Suture Laboratories (later to become a division of Johnson & Johnson). Although widely used in the U.S. by plastic surgeons into the 1940s, Kravetz notes that “synthetic [polymer] fiber material brought an end to the natural fiber suture.” Nevertheless, as late as 1976, it seems horsehair was still being used in Russia to close cleft lips. (Snyder, p. 402)

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Vial of 6 sterile ETHICON 000 black 28-inch long horsehair strands in boilable glass tube, likely produced in 1947 or 1948. Photo courtesy Dr. Fred Born.

Cover of 1956 Harper-Collins edition of *Old Yeller* by Fred Gipson.

