

# Threads of Healing: Tracing Gauze's Journey from Gaza to Global Staple

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## Abstract

The evolution of gauze from an ancient fabric to a modern medical staple highlights its critical role in wound care. Originating in Gaza, its application extended beyond medical to cultural and religious significance. This article examines the shift from natural remedies to medical gauze, revolutionizing standard wound treatment and infection control. By exploring gauze's advancements, including impregnated materials for improved care, this article fills a research gap on its historical and technological evolution. Contributing to the medical field by underscoring gauze's significance in enhancing healing processes and patient care, emphasizing the need for ongoing innovation in wound management.

## Exploring the Origin of 'Gauze'

Gauze, a widely utilized fabric especially prominent in the medical field, has an etymology deeply connected to the city of Gaza in Palestine. (1) The term "gauze" likely stems from the Arabic word "qazz," meaning "silk," and from the Persian word "kaz," which translates to "raw silk". (1) These terms link back to Gaza, historically recognized for its thriving textile industry situated along the Palestinian coast. (1, 2) Gaza has been continuously inhabited for more than three millennia, evidencing its long and storied past. (2) Its strategic position on the Via Maris, an ancient trade route connecting Egypt with the Levant, established it as a critical centre for commerce and cultural exchange. (2) This location facilitated the dissemination of various goods, including textiles, which were integral to Gaza's economic and historical prominence. (1, 3)

Beyond its commercial importance, Gaza was significant during various historical epochs, including the Philistine era and throughout the Hellenistic, Roman, and Ottoman periods (4) Each of these eras contributed to the city's complex cultural and social dynamics (2). The textile industry in Gaza, renowned for producing exquisite silk garments, played a vital role in the Mediterranean trade networks (2, 4). The evolution of gauze from a luxury fabric to a medical essential is also noteworthy. Originally used in clothing and decorations, gauze became indispensable in medicine due to its lightweight and breathable properties, ideal for dressing wounds and aiding in infection prevention (2).

Its medical application was notably advanced by figures such as Dominique Jean Larrey, a surgeon in Napoleon's army, who promoted its use in surgical settings (2)

## **Gauze Beyond Medicine: Exploring Its Diverse Applications Through History**

Gauze initially gained prominence for its role in wound care but also found extensive use in non-medical domains throughout history (1). Ancient civilizations, such as the Egyptians, primarily utilized gauze-like materials in religious ceremonies and rituals due to their symbolic significance and association with purity (2).

During the Byzantine period, gauze played a crucial role in religious practices, particularly within the Christian Church, where it was employed as altar coverings, vestments, and ceremonial drapery, symbolizing sanctity, and divine presence (3). The translucent and lightweight nature of gauze made it ideal for creating an ethereal atmosphere during religious ceremonies.

Gauze's application in religious contexts extended beyond Christianity, as evidenced by its use in Judaism for covering Torah scrolls and ceremonial objects, reflecting its universal symbolism of reverence and sanctity (4). This cross-cultural adoption of gauze highlights its intrinsic value as a symbol of spiritual connection and cultural significance.

Apart from religious applications, gauze found use in various secular settings, including the arts and fashion. During the Renaissance period, artists utilized gauze as a canvas for delicate paintings and tapestries, showcasing its aesthetic appeal and versatility in artistic endeavours (5). Additionally, gauze fabrics were favoured by fashion designers for their lightweight and breathable qualities, contributing to the creation of elegant and ethereal garments (5, 6).

## **Routes and Barriers: Trade Dynamics of Gauze Distribution**

In the European Middle Ages, the pursuit of gauze—a fabric both delicate and sought after—illustrated the complexities of trade and the thirst for medical advancement. Originating from regions famed for textile craftsmanship, gauze became a symbol of luxury and a necessity for medical care, despite significant barriers posed by geopolitical and religious constraints (7)

Control of Mediterranean trade routes by Muslim traders from the 8th century significantly hampered European trade, with religious and political conflicts further complicating the importation of goods like gauze (8). However, the demand for gauze, fuelled by its medical applications and luxury status, spurred the development

of covert trade networks, ensuring its flow from the Islamic world to Europe (7)

The clandestine nature of gauze trade, necessitated by legal and logistical challenges, highlights the lengths to which merchants would go to secure this valuable fabric (7). This period also saw innovations in gauze, including antimicrobial infusions aimed at enhancing wound care, demonstrating the fabric's enduring relevance in medical practice (8).

## **Gauze's Evolution: From Concept to Medical Staple**

Joseph Lister, a pioneer in antiseptic surgery, played a pivotal role in advancing the use of gauze in medical practice (5)(6). Emphasizing the importance of using sterilized gauze for dressing wounds to mitigate infection risks and improve patient outcomes (5). Lister's contributions marked a significant turning point in the history of wound care, highlighting the critical role of gauze in maintaining a sterile surgical environment and preventing postoperative infections.

Gauze is sterilized through various methods, including autoclaving, gamma irradiation, and ethylene oxide gas sterilization, to eliminate microorganisms and ensure its safety for medical use (5)(10). Sterilization is essential to prevent infections and maintain aseptic conditions during surgical procedures, minimizing the risk of contamination and promoting optimal wound healing. The use of sterile gauze is a fundamental aspect of modern wound care protocols, emphasizing the importance of infection control measures in healthcare settings (5)(10). By adhering to stringent sterilization procedures, healthcare providers can uphold the highest standards of patient safety and ensure the efficacy of gauze in medical practice.

Gauze, with its absorbent and flexible properties, emerged as a preferred material for wound dressing (5)(10). Its open weave structure facilitates air circulation and fluid absorption, creating an optimal environment for wound healing. Moreover, gauze can be easily sterilized, making it suitable for maintaining aseptic conditions during surgical interventions (5)(10). These characteristics make gauze indispensable in medical settings, contributing to improved patient outcomes and enhanced infection control measures. Throughout history, gauze surpassed previous wound care methods due to its effectiveness and versatility (5)(9). Unlike primitive practices that relied on natural substances like honey and herbs, gauze offered a standardized approach to wound management, ensuring consistent and reliable

results. The Greeks and Egyptians, while pioneering early wound care techniques, lacked the scientific foundation to understand germ-related infections fully. The introduction of gauze represented a significant advancement, providing a sterile and absorbent material for dressing wounds, thereby reducing infection risks, and promoting faster healing (5)(9).

### Exploring Gauze Varieties: Woven vs. non-woven

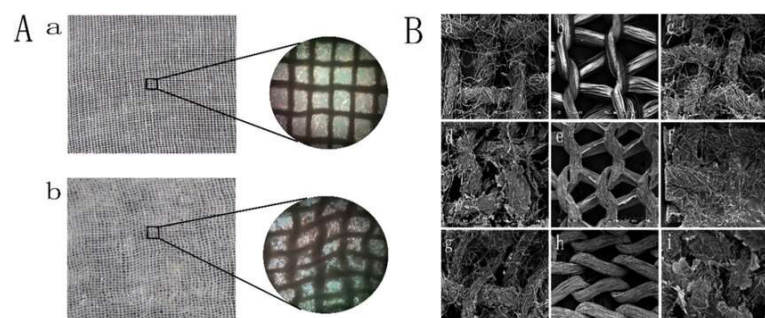
Within the realm of wound care, gauze manifests in two primary varieties: woven and non-woven, each with distinct characteristics and applications (9). Woven gauze, traditionally crafted from cotton or silk, features a structured weave pattern, providing durability and versatility in medical settings (10). Its open-weave design facilitates fluid absorption and air circulation, making it ideal for wound dressings and surgical procedures (9). In contrast, non-woven gauze comprises synthetic fibres bonded together through heat, chemicals, or mechanical processes, offering enhanced absorbency and reduced linting compared to woven counterparts (10). The choice between woven and non-woven gauze depends on various factors, including the specific requirements of the clinical setting and patient needs (9). While woven gauze remains a staple in traditional wound care practices, non-woven alternatives have gained popularity due to their superior absorbent properties and reduced risk of lint contamination (10). Healthcare professionals must consider these factors when selecting the most appropriate gauze type to optimize patient outcomes and ensure effective wound management (9).



*Image 1: Gauze; woven (left) and non-woven (right)– the light, open-weave cotton (or silk) fabric that’s used for both medicine and tailoring – gets its name from the city of Gaza which was a regional centre of weaving and where it originates. Obtained via: Physical Sports Blog. (2017, December 11). First Aid Dressings Explained. Physical Sports Blog. <https://blog.physical-sports.co.uk/2017/12/11/first-aid-dressings-explained/>*

### Advancements Ahead: The Future Landscape of Gauze

Gauze, a cornerstone in wound care throughout history, is poised for transformative advancements driven by modern technology and medical science (9)(10). Emerging impregnated gauzes, incorporating innovative substances like hydrogels and alginates, are revolutionizing wound management by optimizing moisture regulation and enhancing bacterial barrier properties, thereby creating an ideal milieu for accelerated healing (9)(10). These advancements, supported by research elucidating the evolution of gauze in wound care (9), promise enhanced functionality and efficacy in addressing complex wound healing challenges. Studies have demonstrated that these modern gauze formulations not only maintain optimal wound hydration but also facilitate autolytic debridement and facilitate the controlled delivery of antimicrobial agents, expediting the healing process (9)(10). Furthermore, integration of bioactive compounds, such as nanoparticles and growth factors, into gauze materials has shown promising results in stimulating cellular activities essential for tissue repair, thus augmenting wound healing efficacy (9)(10). These advancements represent a significant leap forward in wound care technology, with implications for improved patient outcomes and enhanced healthcare delivery (10).



*Image 2: (A) Macroscopic images of gauze before (a) and after (b) treatment. The circular insets show enlarged images observed by microscopy. (B) Scanning electron microscopy of gauze (a), (d), (g), OC (b), (e), (h), and GP (c), (f), (I). (a), (b), (c) are the control, (d), (e), (f) are the samples in contact with plasma, and (g), (h), (a) are the samples in contact with blood. Obtained: Properties of a new haemostatic gauze prepared with in situ thrombin induction - Scientific Figure on ResearchGate. Available from: [https://www.researchgate.net/figure/A-Macroscopic-images-of-gauze-before-a-and-after-b-treatment-The-circular-insets\\_fig1\\_312254926](https://www.researchgate.net/figure/A-Macroscopic-images-of-gauze-before-a-and-after-b-treatment-The-circular-insets_fig1_312254926) [accessed 18 Apr 2024]*

The future direction of wound care with gauze is characterized by a paradigm shift towards personalized and technologically driven approaches (9)(10). Smart gauzes equipped with embedded sensors are emerging as invaluable tools for real-time monitoring of wound conditions, enabling timely interventions, and optimizing healing outcomes (9)(10). Ongoing research endeavours aim to further augment gauze functionality through the integration of advanced biomaterials and smart technologies, with the goal of revolutionizing wound care management and enhancing patient quality of life (9)(10)

(Eds.), *The Mercantile Effect: On Art and Exchange in the Islamicate World During 17th and 18th Centuries* (pp. 87-101). London: Gingko Library.

9. Jones VJ. The use of gauze: will it ever change? *Int Wound J.* 2006;3(1):61-67
10. Smith AB, Smith AA. Advancements in wound care technology: implications for medical practice. *J Med Devices.* 2018;12(4):041005.

## References:

1. Rouging A. Gauze: Origin of the Word. *J Am Coll Surg.* 2021;232(1):102-108.
2. Steinberg A. Weaving in Stones: Garments and Their Accessories in the Mosaic Art of Eretz Israel in Late Antiquity. *Archaeopress.* 2020. <https://doi.org/10.2307/j.ctvrxrq1mq>
3. Amaratunga C, O'Sullivan T. "In gauze we trust" Lessons learned from a gendered profession during Severe Acute Respiratory Syndrome. *Prehospital and Disaster Medicine.* 2009;24(2):s130-s131.
4. Frangié-Joly D. Perfumes, Aromatics, and Purple Dye: Phoenician Trade and Production in the Greco-Roman Period. *Journal of Eastern Mediterranean Archaeology & Heritage Studies.* 2016;4(1):36–56. <https://doi.org/10.5325/jeasmedarcherstu.4.1.0036>
5. Broughton G, 2nd, Janis JE, Attinger CE. A brief history of wound care. *PlastReconstr Surg.* 2006;117(7 Suppl):6S–11S. <https://doi.org/10.1097/01.prs.0000225429.76355.dd>
6. Gurtner GC, Werner S, Barrandon Y, Longaker MT. Wound repair and regeneration. *Nature.* 2008;453(7193):314–321. <https://doi.org/10.1038/nature07039>
7. Okumura, S. (2020). The Hidden Story of the Quilted Cover in the Benaki Museum Collection. In *Hidden Stories/Human Lives: Proceedings of the Textile Society of America 17th Biennial Symposium*, October 15-17, 2020. <https://digitalcommons.unl.edu/tsaconf/121>
8. Ballian, A. (2018). From Genoa to Constantinople: The Silk Industry of Chios. In S. Babaie & M. Gibson