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Original study

Historical overview of wound care: Evaluation of Alâ'im-i Cerrâhîn from the 16th century

Yara bakımına tarihsel bir bakış: 16. yüzyıl eserlerinden Alâ'im-i Cerrâhîn üzerine değerlendirme

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ABSTRACT

The study was conducted by using the content analysis method, one of the qualitative research techniques, to examine the subject of "wound" in the medical text Alâ'im-i Cerrâhîn, which was written at the beginning of the 16th century. In this study, the first part of the work, titled "Describes Acute Wounds/Tâze Yaraları Bildürür", in which the treatment and care methods of newly formed wounds are explained, was evaluated. Based on the findings of the analysis, three themes were identified: classification of wounds, wound treatment, and care of the injured patient, respectively. The text mentions stopping bleeding related to wound treatment, suture applications to the wound, dressing applications, and herbal treatments. In addition, the text includes information on the care of the wounded in maintaining a safe environment, eating and drinking, washing and dressing, controlling temperature, and mobilization. Consequently, while the majority of the treatment and care practices described in the work are no longer in use today, some practices remain relevant, despite the limited resources available during the period in which the work was written.

Keywords: Wound; content analysis; nursing; qualitative research

ÖZET

Çalışma 16. yüzyılın başında kaleme alınmış olan Alâ'im-i Cerrâhîn adlı tıp metnindeki "yara" konusunun incelenmesi amacıyla nitel araştırma tekniklerinden içerik analizi yöntemi kullanılarak yapılmıştır. Çalışmada eserin, yeni oluşmuş yaraların tedavi ve bakım yöntemlerinin anlatıldığı "tâze yaraları bildürür" başlıklı birinci babı değerlendirilmiştir. Eserin incelenmesi sonucunda yaraların sınıflandırılması, yara tedavisi ve yaralı hastanın bakımı olmak üzere üç tema belirlenmiştir. Yara tedavisine ilişkin olarak kanamanın durdurulması, yaraya sütur uygulamaları, pansuman uygulamaları ve bitkisel tedavilerden bahsedildiği görülmektedir. Ayrıca yaralı hastanın bakımında güvenli çevrenin sağlanması ve sürdürülmesi, yeme içme, kişisel temizlik ve giyim, hareket ve beden ısısının kontrolü konularına değinilmiştir. Eserde tedavi ve bakıma yönelik bahsedilen uygulamaların çoğu günümüzde geçerliliğini kaybetmiş olsa da eserin yazıldığı dönemin kısıtlı imkânları göz önünde bulundurulduğunda bazı uygulamaların hâlâ geçerliliğini koruduğu görülmektedir.

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Anahtar kelimeler: Yara; içerik analizi; hemşirelik; nitel araştırma.

INTRODUCTION

The skin is the body's largest organ and performs significant such functions as forming a physical barrier, regulating body temperature, and preventing water loss. When the skin barrier is damaged, wounds are formed and a complex healing process begins with interacting with various cells (1,2). Wound treatment and care interventions are critical in the wound healing to reduce the risk of infection, accelerate healing, and prevent complications.

The treatment and care of wounds have been a priority problem for humans throughout history due to various reasons such as animal attacks, natural events, wars, and infections (3). The first traces of wound treatment and care were recorded approximately five thousand years ago in Mesopotamia, and since then, various principles of wound care have been passed down from generation to generation (4). The merging of knowledge and experiences from societies throughout history has led to significant advancements in contemporary wound care practices. In this context, conducting historical research and continuing to unearth information significantly contribute to ensuring the continuity of knowledge related to wound treatment and care (5).

In summary, historical analyses of wound treatment and care practices not only enhance our understanding of past methodologies but also provide valuable insights that can inform and enrich contemporary approaches. Furthermore, these studies serve as significant resources for tracing advancements and changes in this field. Accordingly, this research focuses on examining information regarding wound treatment and care found in the medical text 'Alâ'im Cerrâhîn,' authored in the early 16th century, comparing it with current literature in the field.

The Alâ'im-i Cerrâhîn (Figure 1), translated as Surgery Symptoms, is an adaptation of a medical text titled Çindâr, originally written in Greek and Syriac. Surgeon İbrahim reported discovering the original manuscript during Sultan Bayezid II's campaign at the fortress of Modon in the Peloponnese. Proficient in both Greek and Syriac, İbrahim undertook the translation, believing it would benefit those newly entering the field of surgery (6–8). However, an analysis of the content reveals that the text is not a direct translation but rather a condensed version that integrates summaries from earlier Ottoman physicians and incorporates İbrahim's personal experiences. The work synthesizes classical Western and Islamic medical traditions, drawing on the ideas and practices of figures such as Plato, Hippocrates, Galen, Ibn Sina, Muhammad ibn Zakariya al-Razi, and Jorjani. It also reflects the influence of prominent Ottoman physicians, including Hekim Şirvânî, Sabuncuoğlu Şerefeddin, Akşemseddin, and Hacı Paşa (6,8).

Figure 1: Alâ'im-i Cerrâhîn

This study focuses on the first chapter, titled "Describes Acute Wounds/Tâze Yaraları Bildürür," which examines the treatment and care methods for newly formed wounds. This chapter, drawing on the perspectives and methods of Galen, Ibn Sina, and Hippocrates, spans folios 3b to 9b and comprises a single section.

MATERIAL and METHOD

Design

This study was conducted to examine the subject of "wound" in the medical text Alâ'im-i Cerrâhîn, which was written at the beginning of the

16th century in the Ottoman era. The study was conducted using the content analysis method, one of the qualitative research techniques. Content analysis is a systematic and repeatable technique that allows us to see and reveal the content of a text (9).

Procedure

The research was conducted between July and December 2023. The researcher translated the first chapter titled 'tâze yaraları bildürür' from the transcribed text by Gürlek (2016) into modern Turkish. Simultaneously (7). To enable a comparison with the original text, a request was sent via email to the Süleymaniye Library for the relevant section of the Ottoman text (cataloged under Inventory Number 568 within the Hekimoğlu Ali Paşa Collection) (10).

Data analysis

The content analysis method was utilized in examining the work. After the text was translated into today's Turkish, the themes were determined by the researchers. These themes were transformed into a report. Findings were supported with original excerpts from the text. Moreover, the translation of the text into modern Turkish and the reporting of findings involved insights from two experts, one in nursing and the other in philology. Finally, all documents were recorded akin to a scholarly article.

Ethical considerations

Ethical approval for the study was obtained from the Ethics Committee of Isparta University of Applied Sciences (Decision No: 160/1, Date: 24.08.2023).

RESULTS

Investigation of the topic of 'wounds' in the medical text 'Alâ'im-i Cerrâhîn' resulted in identifying three themes: wound classification, wound treatment, and care of ınjured patient. Information related to these themes is provided below.

Theme 1. Wound classification

This theme illustrates how they identify wounds to determine treatment and care interventions (Figure 2). Upon examining the text, it is evident that wounds can be classified into two types: untreatable wounds and treatable wounds. Treatable wounds can further be classified based on the cause of occurrence and the wound shape.

The parts related to the subject in the text are given below.

- *Four types of wounds are incurable: Brain injury, intestinal injury, lumbar fracture, and bladder injury (4b/10-11, 5a/01-02).*

- *Acute wounds are caused by swords, knives, guns and rifles, arrows, spears, falls, fractures, and dislocations. Each of these wounds has different locations and types. The wounds may be flat, straight, round, long, deep, wide at one end, narrow at the other, with tissue loss, or with some of the tissue separated from the wound (5b/05-11, 6a/01-03).*

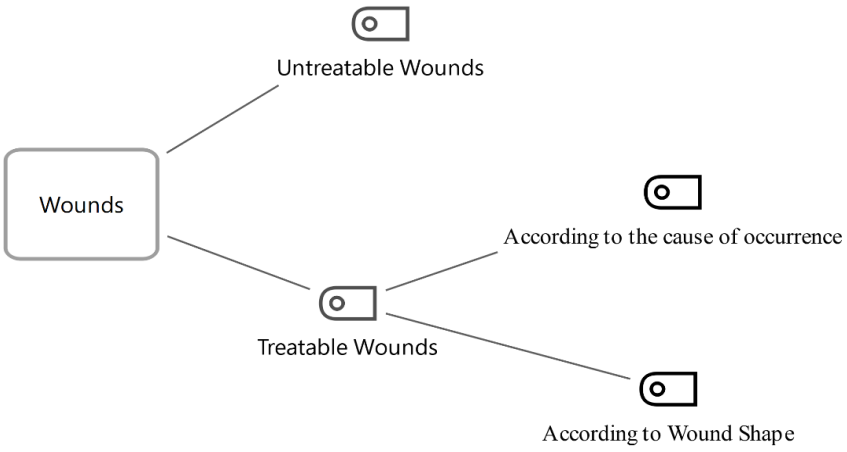

Figure 2. Wound classification when the text is analyzed.

Theme 2. Wound treatment

This theme shows the methods used in wound treatment (Figure 3). The text mentioned stopping bleeding, suture applications, dressing applications, and herbal treatments related to wound treatment.

The parts related to the subject in the text are given below.

- *The treatment for each of these wounds varies; foremost, it is imperative to cease bleeding* (6a/03-06).

- *The tissue of a new wound should not be cut. If it becomes necessary to excise the tissue, it should be performed carefully between three to seven days after the injury. If bleeding persists, a paste should be prepared by mixing a small amount of green vitriol, sarcocolla resin, and dried Dragon's Blood resin with egg white. This paste must be applied to the wound and securely covered with linen, not to be unwrapped for three to five days* (6a/09-11, 6b/01-06).

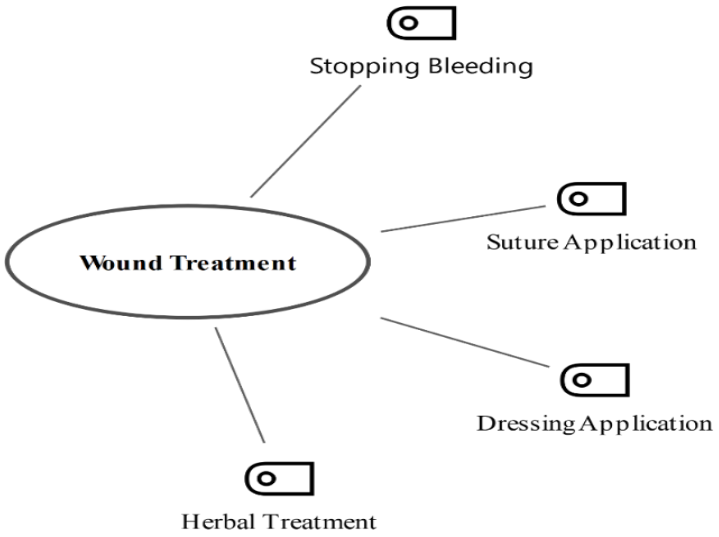

Figure 3: Wound treatment when the text is analysed.

- Surgical instruments used in wound treatment should be delicate and clean. To prevent harm to the wound, these instruments should ideally be made of gold, silver, or tin (4b/08-10).

- If there is a detached portion of wound tissue, it should not be sutured but rather treatable *by placing the tissue back in its natural position. If stitching the wound becomes necessary, after thoroughly pulverizing a quantity of sarcocolla resin into a fine powder and sprinkling it within the wound, the wound should be sutured. The needle used for suturing should be thin and long. A slightly wider area around the wound should be taken during stitching. There are two methods for suturing a wound: one with silk thread and the other by leaving the needle in the wound. The needles in the wound should be close to each other and secured* (7a/04-10).

- The dressing of the wound is what facilitates its healing. Regardless of other treatments, an improperly dressed wound will not heal. In wound care, the preparation of dressing materials is of primary importance. For long and deep wounds, absorbent dressings treatable *with medications should be placed as a tampon* (7b/03-10).

- Wounds can heal in forty days, yet they might get infected even after eighty days. Infections have been observed even after a hundred and twenty days. Occasionally, wounds can turn purple, darken, and even necrotize. If a wound turns purple, it should be treatable *with lysimachia talaverae. Subsequently, the wound must be* treatable *with Red Anatolian Ointment* (8a/02-07).

- If the patient's fever rises, a syrup made of lemon and tamarind should be prepared. This syrup, consisting of two hundred barley grains mixed into water boiled with five hundred dirhams of anise, should be administered to the injured person. If this mixture causes constipation, a laxative suppository can be applied to the patient or they can be given a rose syrup (6b/08-11, 7a/01).

Theme 3. Care of injured patient

This theme included information about the care of the injured patient. In the text, care interventions were analyzed according to the activities of daily living of Roper and colleagues (11). In the source, the issues of maintaining a safe environment, eating and drinking, washing and dressing, controlling temperature, and mobilization were mentioned.

The parts related to the subject in the text are given below.

-The injured person should not be given certain foods, and cold water should not be administered (6b/06-07).

-The injured individual should be shielded from wind and cold and should not be engaged in excessive conversation (6b/07-08).

-Whether the wound is on the foot or the arm, the injured person should not be taken out of bed until healed (7b/11, 8a/01-02).

-Regardless of the type of wound, contact with water should be avoided. If washing the injured area is necessary, a linen cloth soaked in olive oil should be warmed and wrapped around the wound. After washing, this dressing should be removed, and the wound should be dressed with a clean cloth (8a/10-11, 8b/01-03).

-If the injured person's fever rises, it must be lowered without fail (8a/07-08).

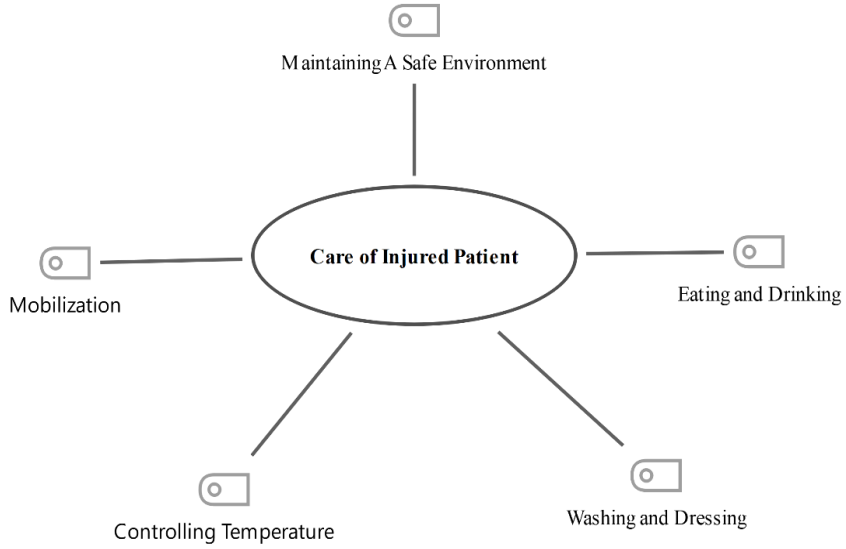

Figure 4: The care is given to the injured patient when the text is analyzed.

DISCUSSION

In this study, the information on wounds in Alâ'im-i Cerrâhîn, one of the works of the Ottoman era, was analyzed and discussed in comparison with the current literature.

Upon analysis of the work, it becomes evident that the wounds are categorized into two types: treatable and untreatable wounds. It was mentioned that Brain injury, intestinal injury, lumbar fracture, and bladder injury were untreatable wounds. Considering the advancements in medical science, these previously untreatable pathologies are now treatable to varying degrees (12–14).

Our analysis revealed that treatable wounds were classified based on their causes and forms. Throughout history, various cultures have categorized wounds. A systematic approach in the modern sense began to develop from the mid-19th century onwards, however (15). Presently, wounds are classified according to tissue integrity, degree of contamination, color status, depth, mechanism of occurrence, and healing duration in the most contemporary manner (16). These findings indicate that the manuscript did not address many dimensions of wounds. However, considering the conditions of the era in which the manuscript was written, such a scenario was expected.

The manuscript contains information on techniques for halting bleeding, applying sutures to wounds, and implementing dressing procedures. Additionally, it mentions the practice of cauterizing wounds. This method, known today as cauterization, is documented in the Smith Papyrus from the Ancient Egyptian era (1700-1650 BC) as part of the surgical practices of that time (17).

It is advised that newly formed wounds should not undergo tissue cutting, and if necessary, cutting should be performed three to seven days post-injury. In newly formed wounds, it is not recommended to cut tissue from the wound unless there is significant infection or necrosis (18). In uncertain situations, a waiting period is recommended to allow wound edges to heal, provided that appropriate wound care conditions are maintained. If the decision is made to quickly remove tissue from the wound edges without clear indications, it may result in tissue loss, enlargement of the existing wound and prolonged healing time (19,20). The alignment between the physiological understanding of the era in which the manuscript was written and the current literature is striking.

The text discusses the possibility of performing certain steps in wound treatment on the third, fifth, or seventh days. Beliefs on these specific days are widely accepted in Turkish medical history and commonly followed by the public (21–24). However, modern scientific understanding does not support these numbers, showing that the healing processes of wounds can vary from person to person and are usually not connected to symbolic days.

In the work, one noteworthy practice related to wound care involves the use of linen fabric as a wound dressing material. The natural fibers of linen provide breathability (25). Additionally, they facilitate exudate absorption, keep the wound dry, and create a physical barrier to prevent infections (26,27). However, as modern medicine and dressing techniques have advanced, linen dressings have been replaced by more modern and advanced materials (28).

The text mentions the use of ointments prepared with various plant and animal-derived drugs in wound treatment during that era. The history of ointments dates back to ancient times (29). Early examples of medicinal ointments can be traced back to the ancient Egyptian civilization. Written sources like the Ebers Papyrus (1550 BC) contain information about the preparation of ointments by mixing various

plant extracts, oils, and minerals (30,31). Even today, ointments continue to be used in various wound treatments, and the pharmaceutical industry consistently researches to enhance their content and efficacy (32,33).

The text highlights the reported necessity for tools used in wound care to be made of silver, gold, or tin. These metals were believed to be preferred during that era due to their inherent antimicrobial properties, non-corrosive nature, and malleability, allowing for easy shaping (34). However, as modern medical and surgical practices evolved, the preference shifted towards stronger, sterilizable, durable, and lightweight materials. Consequently, the use of metals like silver, gold, and tin in surgical instruments has gradually declined (35).

The text also mentions the application of sutures to wounds, a practice known to date back approximately 4000 years (36). Silk, recommended as a suture material during that period, remained in extensive use until the last century (37). Silk was favored at that time due to its compatibility with body tissues, ease of maneuvering within tissue, and mechanical strength. However, its slow absorption in the body, difficulty in imaging techniques, and allergy risks have limited its use in contemporary medicine (38,39).

When examining information regarding the care of the injured according to Roper and colleagues' daily life activities, it is noteworthy that their insights encompass maintaining a safe environment, eating and drinking, washing and dressing, controlling temperature, and mobilization (11). Although only five out of twelve life activities are addressed, the context of that era indicates a focus not only on treatment but also on care.

As a part of caregiving, it was advised to avoid exposing the wound to water. Instead, if the injured person needed washing, the suggestion was to cover the wound with a linen cloth soaked in olive oil. The soaking of linen cloth in olive oil might have been thought to make it waterproof. However, this method is not aligned with modern medical practices. Currently, a diverse range of wound coverings is utilized to prevent water permeation in wounds (40). This recommendation may also have stemmed from the difficulty of access to clean water at the time. In contrast, current medical practices highlight that washing wounds with tap water is generally considered safe in most cases, particularly in urban settings with access to clean water (41).

It is advised that the injured should not be moved from bed until they have fully healed, whether the injury is on the foot or the arm. Resting aids in the healing of the wound by allowing the body to utilize oxygen and nutrients better, facilitating the recovery process. Additionally, immobilization of the inflamed area accelerates repair by reducing inflammation and metabolic requirements. However, keeping the injured individual in bed constantly is not a universally recommended approach. The duration for which the injured person stays in bed varies depending on the type and severity of the wound (42). Each injury situation is different, and such decisions should be based on the medical assessment results of the injured person (43).

In the literature, it is reported that wounds can heal early, but they can also become infected even after eighty or even one hundred and twenty days. This circumstance can be associated with poor wound care and unfavorable hygiene conditions. The significance of wound care and hygiene in infection control was emphasized in the 19th century; Florence Nightingale conducted significant studies on treating and caring for the wounded in hygienic conditions during the Crimean War (44). Today, modern wound care is performed under aseptic conditions. However, late wound infections may occur depending on various such factors as individuals' general health status, environmental effects, or microbial resistance (16).

It is mentioned that immediate intervention is necessary if the injured person's body temperature rises, and a recipe for syrup to address this is provided. While high fever was previously considered a harmful occurrence, an elevation in body temperature can be beneficial for the body's defense mechanisms. Mildly elevated temperatures often result from minor disruptions, causing minimal discomfort to the patient and potentially aiding the body's defense. However, moderate fever can be dangerous, especially in very young and elderly individuals, and requires intervention. In particular, temperatures above 40°C can cause damage to body cells, necessitating swift intervention (42). The syrup mentioned in the text for reducing high fever represents the traditional medical practices of the era and does not have a direct equivalent in modern medicine. While many historical herbal remedies have demonstrated pharmacological properties, modern fever management relies on evidence-based treatments tailored to the patient's overall health and the underlying cause of the fever (45).

Conclusion

As a result, although most of the practices for treatment and care in the work are not applied today, some practices are still valid, despite the limited possibilities of the period when the work was written. To trace the advances and changes in wound treatment and care, it is recommended to analyze the works written in different cultures and periods.

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Conflict of interest

The authors have no conflicts of interest to disclose.

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Author contributions

All authors contributed to the conception and design of this study; all authors performed the data analysis and drafted the manuscript; and Sevgi Deniz Doğan reviewed the manuscript and supervised the whole study process. All authors read and approved the final manuscript.

REFERENCES

1. Britto EJ, Nezwek TA, Popowicz P, Robins M. Wound Dressings. StatPearls. 2017.
2. Tottoli EM, Dorati R, Genta I, Chiesa E, Pisani S, Conti B. Skin Wound Healing Process and New Emerging Technologies for Skin Wound Care and Regeneration. Pharmaceutics. 2020;12(8):735.
3. Forrest RD. Early history of wound treatment. J R Soc Med. 1982;75:198–205.
4. Shah JB. The History of Wound Care. J Am Col Certif Wound Spec. 2011;3(3):65–6.
5. Mouës CM, Heule F, Legerstee R, Hovius SER. Five millennia of wound care products--what is new? A literature review. Ostomy Wound Manage. 2009;55(3):16–8.
6. Gürlek M. Alâim-i Cerrâhîn: An Example for the First Written Turkısh Surgical Scriptures in Anatolia. Turkish Stud. 2011;6(3):1423–34.
7. Gürlek M. Ala'im-i Cerrâhîn Cerrâh-Nâme(Review-Text-Typescript). Istanbul: Presidency of the Manuscript Society of Turkey Publications; 2016, p:48–52.
8. Yıldırım N. Some New Information about Alâ'im-i Cerrâhîn. In: I International Congress on the History of Turkish-Islamic Science and Technology. 1981, p:172–4.
9. Baltaci A. The Qualitative Research Process: How to Conduct a Qualitative Research? Ahi Evran Üniversitesi Sos Bilim Enstitüsü Derg. 2019;5(2):368–88.
10. Bin Abdullah I. Alâ'im-i Cerrâhîn (Cerrâh-Nâme). Hekimoğlu Ali Pasha Collection from Süleymaniye Library.
11. Williams BC. The Roper-Logan-Tierney model of nursing. Nurs Crit Care. 2017;12(1):17–20.
12. Lee J, Suh J, Jeong CW, Kwak C, Kim HH, Ku JH. Efficacy of the Treatment of Intraperitoneal Bladder Perforation during Transurethral Resection of Bladder Tumor with the Urethral Catheter Alone: Retrospective Analysis of over 15 Years Using the Clinical Data Warehouse System. Urol Int . 2022;106(2):138–46.
13. Li J, Zhang H, Li Q, Yu S, Chen W, Wan S, et al. Treating Lumbar Fracture Using the Mixed Reality Technique. Zhang Y-Q, editor. Biomed Res Int. 2021;2021:1–6.
14. Hafner J, Tuma F, Hoilat GJ, Marar O. Intestinal Perforation. StatPearls. 2023.
15. Herman TF, Bordoni B. Wound Classification. StatPearls. 2023.
16. Bilik Ö. Wound Healing and Nursing Care. In: Arslan S, editor. Basic in Surgical Nursing Concepts and Care. Ankara: Akademisyen Bookstore; 2021, p:99–124.
17. Çelebioğlu S, Baytop ÖT. A Brief Look at the History of Medieval Pharmacy and the First Herbal Drugs. Pharmacogn Inst Publ. 1948;(3).
18. Attinger CE, Bulan E, Blume PA. Surgical Débridement. Clin Podiatr Med Surg. 2000;17(4):599–630.
19. Rodrigues M, Kosaric N, Bonham CA, Gurtner GC. Wound Healing: A Cellular Perspective. Physiol Rev. 2019;99(1):665–706.
20. Gonzalez AC de O, Costa TF, Andrade Z de A, Medrado ARAP. Wound healing - A literature review. An Bras Dermatol. 2016;91(5):614–20.
21. Aslan N, Arslan M. Traces of Folk Medicine Based on Folk Beliefs in Historical Turkish Medical Texts (16th-18th Century). Milli Folk. 2020;16(128):206–17.
22. Torebekkyzy L. Number Seven in Turkish Folk Culture and Literature. Çeşm-i Cihan E-Journal Hist Cult Art Stud. 2021;8(1):82–91.
23. Durbilmez B. Mythologıcal Numbers in Nakhchıvan-Turkısh Folk Belıef. Turkish Stud Int Period Lang Lit Hist Turkish or Turkic. 2008;3(7):340–52.
24. Yucel U. Numbers in Turkısh Folk Belıefs. Ankara University; 2011.
25. Saygın M. Tababet and Public Medicine in Ali Şîr Nevâyî's Garibü's-Sigar Council. Uzb Lang Cult. 2021;1(1):6–19.
26. Ovington LG. The evolution of wound management: ancient origins and advances of the past 20 years. J Home Care Hosp Prof. 2002;20(10):652–6.
27. Türsen Ü. Wound Dressing in Ulcer Treatment. Turk J Dermatol. 2013;7:61–71.
28. Laurano R, Boffito M, Ciardelli G, Chiono V. Wound dressing products: A translational investigation from the bench to the market. Eng Regen. 2022;3(2):182–200.
29. Arslan M. War Tools and Treatment of War Wounds In Historical Turkish Medical Texts. ERDEM Hum Soc Sci J. 2019;77:281–306.
30. Hartmann A. Back to the roots – dermatology in ancient Egyptian medicine. JDDG J der Dtsch Dermatologischen Gesellschaft. 2016;14(4):389–96.

31. Hayırlıdağ M. The Mystery of Egyptian Medicine, Papiruses. J Acad Hist Stud. 2021;4:68–85.
32. Cancio LC. Topical Antimicrobial Agents for Burn Wound Care: History and Current Status. Surg Infect (Larchmt). 2021;22(1):3–11.
33. Sharma A, Sharma D, Zhao F. Updates on Recent Clinical Assessment of Commercial Chronic Wound Care Products. Adv Healthc Mater. 2023;12(25).
34. Akarsu S, Akarsu BM, Tırpan AA. Medical Tools from Roman Period to Medieval. Lokman Hekim J. 2011;1(3):13–7.
35. Parlak A. Functional Control of Surgical Instruments. In: 7th Sterilization and Disinfection Congress. 2011, p:69–86.
36. Atıcı T, Atıcı E, Şahin N. The historical development of surgical suture materials from past to present. Turkish J Surg. 2010;26(4):233–42.
37. Peker YS. Wound closure techniques and materials in surgery. J Surg Arts. 2020;13(1):25–30.
38. Thilagavathi G, Viju S. Silk as a suture material. In: Advances in Silk Science and Technology. Elsevier; 2015, p:219–32.
39. Byrne M, Aly A. The Surgical Suture. Aesthetic Surg J. 2019;39(Supplement_2):S67–72.
40. Zheng WJ, Chen Q, Zou W, Fu Z, Li Y, Liu Z, et al. Waterproof and Breathable Wound Dressing Composited By Expanded Polytetrafluoroethylene Backing and Hydrogel. Macromol Biosci. 2022;22(8).
41. Fernandez R, Green HL, Griffiths R, Atkinson RA, Ellwood LJ. Water for wound cleansing. Cochrane Database Syst Rev. 2022;2022(9).
42. Akyolcu N. Wound healing and nursing care. In: Aksoy G, Kanan N, Akyolcu N, editors. Surgical Nursing I. Nobel Medical Bookstores; 2012, p:79–113.
43. Benbow M. Best practice in wound assessment. Nurs Stand. 2016;30(27):40–7.
44. Dülcek S, Eryiğit T, Çoban N, Beydağ KD, Ortabağ T. War and Postwar Nursing. Fenerbahce Univ J Heal Sci. 2022;2(2):515–21.
45. Serin M, Uğurluer G. Hyperthermia. Turkiye Klin J Radiat Oncol. 2015;1(3):57–63.