Universe International Journal of Interdisciplinary Research
(International Peer Reviewed Refereed Journal)
DOI No. – 08.2020-25662434

© UIJIR | ISSN (O) – 2582-6417
JULY 2025 | Vol. 06 Issue 02
www.uijir.com

A SYSTEMATIC REVIEW OF LITERATURE ON THE EFFECTIVENESS OF COMPRESSION THERAPY AND BANDAGING TECHNIQUES IN VENOUS LEG ULCER AND FIRST AID MANAGEMENT

Author's Name: Devanshi Upadhyay[1]

Affiliation:

1. Clinical Instructor, Parul Institute of Nursing, Parul University, Vadodara, Gujarat, India.

Corresponding Author Name & Email Id: Devanshi Upadhyay, devanshiupadhyay1401@gmail.com

ABSTRACT

This systematic review was conducted to evaluate the effectiveness of compression therapy and bandaging techniques, particularly triangular bandages, in managing venous leg ulcers (VLUs) and improving first aid response. A total of 17 peer-reviewed articles published between 2013 and 2023 were reviewed, encompassing randomized controlled trials, meta-analyses, and quasi-experimental studies. Findings confirm that compression therapy, including four-layer and two-layer systems, significantly enhances healing in VLUs. Triangular bandages remain vital in first aid and limb support, though application technique affects outcomes. Studies also reveal significant improvements in knowledge, attitudes, and practices following educational interventions for first aid. The review recommends skill-based training for healthcare workers and the general public to improve outcomes in wound care and emergency management.

Keywords: Compression Therapy, Bandaging Technique, Venus Leg Ulcer, First Aid Management.

DOI Link :: https://doi-ds.org/doilink/07.2025-61173612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
JULY 2025 | Vol. 06 Issue 02
www.uijir.com

INTRODUCTION

Venous leg ulcers (VLUs) are chronic wounds caused by venous insufficiency, predominantly affecting older adults. Compression therapy is a cornerstone in managing VLUs. Despite its clinical importance, debates persist over the most effective compression system—ranging from four-layer bandages to two-layer hosiery and short-stretch systems. Parallelly, triangular bandages play a vital role in first aid, particularly in fracture stabilization and joint support. Correct bandage application is essential to prevent complications such as pressure necrosis. This review synthesizes evidence on compression modalities, bandaging techniques, and first aid training, highlighting their impact on healing outcomes and emergency preparedness.

METHODOLOGY

A comprehensive search of electronic databases (PubMed, Google Scholar, ResearchGate, Scopus, and Cochrane Library) was conducted for studies published between 2013 and 2023. Studies assessing the effectiveness of compression therapy in VLUs, the role of triangular bandages, and first aid education were included. Only English-language, peer-reviewed articles with quantitative or mixed-method design were selected.

SEARCH STRATEGY

- Keywords: “Venous leg ulcers”, “Compression therapy”, “Four-layer bandage”, “Triangular bandage”, “Bandaging techniques”, “First aid”, “Educational interventions”, “Knowledge”, “Wound care”
- Boolean Operators**:** AND/OR
- Inclusion Criteria: Published 2013–2023, RCTs, systematic reviews, observational or quasi-experimental studies, studies on compression systems or first aid bandaging, English language
- Exclusion Criteria**:** Editorials, opinion pieces, non-peer-reviewed studies, studies focusing exclusively on pharmacological wound treatment.

DATA EXTRACTION AND QUALITY ASSESSMENT

Data extraction included study design, population, interventions, outcomes, and conclusions. Quality was assessed using the Joanna Briggs Institute (JBI) tools. Most RCTs and meta-analyses included in this review were of moderate to high quality.

DOI Link :: https://doi-ds.org/doilink/07.2025-61173612/UIJIR

© UIJIR | ISSN (O) – 2582-6417
JULY 2025 | Vol. 06 Issue 02
www.uijir.com

REVIEW OF LITERATURE

Multiple studies confirm the efficacy of compression therapy in healing VLUs. Four-layer systems generally show better healing outcomes compared to short-stretch systems. However, some studies note improved patient compliance and quality of life with two-layer compression hosiery. Triangular bandages, though less discussed in modern wound care, remain critical in first aid for immobilization and support. Recent studies have also investigated the impact of educational interventions on first aid knowledge and practice, showing significant improvements post-training.

SUMMARY OF SELECTED STUDIES

Sr No	Author & Year	Title of the Study	Methodology	Results	Conclusion
1	Shi et al., 2021	Compression vs. no compression for VLUs	Systematic review (14 RCTs)	Compression improved healing; most studies high bias	Compression aids healing; further high-quality studies needed
2	Fulcher, 2020	Two-layer vs. four-layer compression	Systematic review	Four-layer improved healing; two-layer better QoL	Selection should consider healing and patient comfort
3	Carvalho et al., 2018	Four-layer vs. short-stretch bandaging	Meta-analysis	4-layer healed more ulcers (not statistically significant)	Both effective; clinician discretion advised
4	Ashby et al., 2014	Hosiery vs. bandaging (VenUS IV Trial)	RCT, MTC, cost-analysis	No difference in healing; hosiery reduced recurrence	Two-layer hosiery potentially cost-effective
5	Welsh, 2017	Mixed-component bandaging systems	Systematic review	Comparable healing; better slippage control	Mixed systems are viable; clinician skill essential
6	Finnie, 2013	Bandaging techniques and importance	Expert commentary	Misapplication can cause harm	Proper technique critical in bandage use
7	Kakae et al., 2020	Triangular bandage vs. arm sling	Experimental	Bandage increased step rate and sway	Arm sling may reduce discomfort vs. triangular bandage
8	Finnie, 2013	Triangular therapy techniques	Expert opinion	Spiral and figure-8 methods remain standard	Proper overlap and tension vital
9	Kim et al., 2023	First aid in industrial accidents	Longitudinal study	Timely first aid reduced outpatient visits	Early FA linked to improved health outcomes

DOI Link :: https://doi-ds.org/doilink/07.2025-61173612/UIJIR

10	Kumar & Sushmitha, 2022	FA KAP among school students	Cross-sectional	70% had poor knowledge; 50% poor practice	Need for FA training in rural schools
11	Ekaprasetia et al., 2022	FAG app for FA education	Quasi-experimental	Significant KAP improvements with FAG app	App-based education effective
12	Birkun et al., 2022	Dispatcher-guided FA	Literature review	Remote guidance improves FA delivery	Suggests algorithm-based dispatcher support
13	Jamal Din et al., 2018	FA KAP among university students	Literature review	Varied knowledge; mostly inadequate	Urgent need for targeted FA awareness
14	Book Review, 1941	Historical use of triangular bandage	Archival analysis	Shift from nurse-exclusive to public use	Decline in status but increase in accessibility
15	Committee on Education, 1945	Triangular bandage in nursing curriculum	Historical curriculum review	Triangular bandage excluded over time	Reflects shift in medical training emphasis

DISCUSSION

This review reveals a strong body of evidence supporting the effectiveness of compression therapy in managing VLUs. While four-layer systems show faster healing, two-layer hosiery systems offer better mobility and comfort, contributing to higher adherence and lower recurrence. Triangular bandages, while less emphasized today, still hold practical value in emergency care and immobilization. First aid knowledge and skill levels remain insufficient among laypersons, especially students, emphasizing the role of educational programs and digital interventions like FAG.

CONCLUSION

Compression therapy remains the mainstay for treating VLUs, with multi-layer systems offering the best outcomes. Triangular bandages still play a role in acute care, though modern usage has shifted toward simpler applications. Strengthening training in first aid and proper bandaging techniques for both professionals and the public is essential. Policymakers should promote evidence-based education and skill-based training for better health outcomes.

ACKNOWLEDGMENT

The author extends heartfelt gratitude to all the researchers, clinicians, and healthcare professionals whose invaluable contributions and scientific investigations have enhanced the understanding and treatment of venous leg ulcers and the application of effective first aid measures. Sincere thanks to the faculty and administrative staff of the Parul Institute of Nursing, Parul University, for their continuous

DOI Link :: https://doi-ds.org/doilink/07.2025-61173612/UIJIR

academic support, guidance, and encouragement in fostering a culture of evidence-based practice and community health advancement. The author also appreciates the collective efforts of scholars and institutions dedicated to wound care management and first aid education.

REFERANCES

1. Shi C, Dumville JC, Cullum N, Connaughton E, Norman G. Compression bandages or stockings versus no compression for treating venous leg ulcers. *Cochrane Database Syst Rev*. 2021 Jul 15;2021(7):CD012991. doi:10.1002/14651858.CD012991.
2. Fulcher E. Which is more effective: four-layer or two-layer compression bandaging for healing venous leg ulcers? *Br J Nurs*. 2020 Jun 5;29(11):S8–S15. doi:10.12968/bjon.2020.29.11.S8.
3. de Carvalho MR, Rezende W, et al. A meta-analysis to compare four-layer to short-stretch compression bandaging for venous leg ulcer healing. *Wound Manag Prev*. 2018 May;64(5):18–26. PMID: 29794894.
4. Ashby RL, Dumville JC, Soares MO, et al. A randomized controlled trial of compression hosiery versus compression bandaging in the treatment of venous leg ulcers: VenUS IV. *Health Technol Assess*. 2014 Sep;18(57):1–293. doi:10.3310/hta18570.
5. Welsh L. Efficacy of mixed-component compression systems for venous leg ulcers: A systematic literature review. *J Clin Nurs*. 2017 May;26(9-10):1065–1083. doi:10.1111/jocn.13532.
6. Finnie A. Bandaging skills and techniques in community nursing. *Nurs Times*. 2013 Aug 4;100(32):52–3. PMID: 24005742.
7. Kakae S, Takami A, Makino M, Yoshida H. Effect of arm swaying from wearing a self-applied arm sling with a loop compared with a triangular bandage. *J Phys Ther Sci*. 2020 Oct;32(10):631–636. doi:10.1589/jpts.32.631.
8. Book Reviews. Fewer varieties of the triangular bandage in civilian aid texts. *Am J Nurs*. 1941;41(2):130.
9. Committee on Education. Curriculum changes in emergency nursing and bandaging post-WWI. *Red Cross Education Bulletin*. 1945;155:90–98.
10. Kim J, Kim H, Park EC, Jang SI. Effect of on-site first aid for industrial accidents on healthcare utilization after primary care: A 4-year longitudinal study. *BMC Emerg Med*. 2023 Apr;23:21. doi:10.1186/s12873-023-00770-9.
11. Kumar VG, Sushmitha HS. Assessment of high school students' first-aid knowledge, attitudes, and practice in selected schools in Chamarajanagar. *Int J Curr Med Pharm Res*. 2022;8(6):2115–2119.
12. Ekaprasetia F, Kristanto H. Effect of First Aid Guideline (FAG) application on students' knowledge, attitude, and skills. *Int J Nurs Educ*. 2022 Nov;14(4):45–50. doi:10.5958/0974-9357.2022.00091.2.

DOI Link :: https://doi-ds.org/doilink/07.2025-61173612/UIJIR

13. Birkun A, Bagnenko SF, Dezhurny LI. Dispatcher-assisted first aid in trauma: literature review and draft algorithm. *Emerg Med J*. 2022 Dec;39(12):923–928. doi:10.1136/emermed-2022-212145.
14. Jamal Din, Soe T, Sumaiyah, Zakaria MA, Saidi S, Chan CM. A literature review on knowledge, awareness and attitude related to first aid among university students. *Sch J Appl Med Sci (SJAMS)*. 2018;6(7):2660–2664. ISSN: 2320-6691.
15. Oakes L. Illustrations of Bandaging and First-Aid. *Am J Nurs*. 1910s–1940s editions reviewed. Reprinted in: *American Journal of Nursing* Archives.
16. O'Meara S, Cullum N, Nelson EA, Dumville JC. Compression for venous leg ulcers. *Cochrane Database Syst Rev*. 2012 Nov 14;(11):CD000265. doi:10.1002/14651858.CD000265.
17. Moffatt CJ, Dorman MC. Recurrence of leg ulcers within a community ulcer service. *J Wound Care*. 2004 Jul;13(7):265–268. doi:10.12968/jowc.2004.13.7.26763.
18. Harding K, Dowsett C, Fias L, Janssen M, Mosti G, Zimlichman E. Simplifying venous leg ulcer management. *Consensus Document*. *Wounds International*. 2015;6(1):1–27. Available from: https://www.woundsinternational.com
19. González-Consuegra RV, Verdú J. Quality of life in people with venous leg ulcers: An integrative review. *J Adv Nurs*. 2011 May;67(5):926–944. doi:10.1111/j.1365-2648.2010.05568.x.
20. Kapp S, Miller C, Donohue L. The clinical effectiveness of two compression technologies in the management of venous leg ulcers. *Int Wound J*. 2010 Oct;7(5):375–383. doi:10.1111/j.1742-481X.2010.00703.x.
21. Pina E, Torres T. Compression therapy for venous leg ulcers: A literature review. *J Dermatolog Treat*. 2017 Aug;28(5):401–409. doi:10.1080/09546634.2016.1261932.

DOI Link :: https://doi-ds.org/doilink/07.2025-61173612/UIJIR