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Observed Changes in Skin Integrity Risk Following 30° Lateral Positioning and Virgin Coconut Oil Massage: A Case Report

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Abstract

Background: Impaired skin integrity is a common complication among immobilized stroke patients, particularly in home-care settings with limited professional supervision. Combined preventive strategies such as repositioning and topical skin care are frequently recommended, yet evidence describing their application in community-based practice remains limited.

Objective: To describe observed changes in skin integrity risk following the combined use of 30° lateral positioning and effleurage massage with Virgin Coconut Oil (VCO) in a home-care stroke patient.

Methods: This descriptive exploratory case report involved a 58-year-old female patient with non-hemorrhagic stroke and prolonged immobilization. The intervention consisted of 30° lateral repositioning and VCO effleurage massage, administered twice daily for four consecutive days. Skin integrity risk was assessed daily using the Braden Scale.

Results: The Braden Scale score improved from 12 (high risk) at baseline to 17 (low risk) after four days (Δ = +5). Improvements were mainly observed in the moisture, mobility, and friction/shear domains, while sensory perception and activity remained unchanged.

Conclusion: This case report describes a short-term improvement in skin integrity risk following combined 30° lateral positioning and VCO massage. Due to the single-case design and short follow-up, the findings should be interpreted cautiously. However, the intervention appears feasible for home-care settings and merits further investigation.

Keywords
Pressure Injury; Skin Integrity; Stroke; Repositioning; Massage Therapy

Introduction

Stroke is a leading cause of long-term disability worldwide and is frequently accompanied by persistent motor impairment and prolonged immobilization. These conditions substantially increase the risk of impaired skin integrity, including pressure injury, particularly among stroke survivors who are dependent on caregiver assistance for mobility and positioning. Pressure injuries are associated with increased morbidity, prolonged recovery, reduced quality of life, and a higher burden on caregivers, making prevention a critical component of post-stroke management.[1–3]

Pressure injury prevention strategies commonly emphasize regular repositioning, skin care, and the reduction of extrinsic risk factors such as moisture, friction, and shear. Among various repositioning techniques, the 30° lateral position has been widely recommended in clinical guidelines due to its ability to redistribute pressure away from bony prominences, particularly the sacral region, compared with conventional 90° lateral positioning.[4,5] Evidence from hospital-based randomized controlled trials and systematic reviews has demonstrated that structured repositioning protocols can reduce pressure injury incidence and improve skin integrity outcomes.[6] However, most of this evidence originates from acute or long-term care facilities with standardized equipment, trained healthcare staff, and continuous professional supervision, which may limit its applicability to home-care environments.

In addition to repositioning, topical skin care interventions have been proposed to support skin integrity by maintaining hydration and reducing friction and shear forces. Coconut oil–based preparations, including Virgin Coconut Oil (VCO), have been reported to improve skin moisture and reduce mechanical stress in immobilized patients.[7,8] Massage techniques such as effleurage may further enhance superficial circulation and patient comfort, potentially contributing to skin protection when applied appropriately. Despite these theoretical and empirical benefits, most existing studies have examined repositioning and topical interventions as isolated strategies, rather than as integrated approaches addressing multiple modifiable risk factors simultaneously.[9,10]

The relevance of these preventive strategies becomes particularly pronounced in community and home-care settings. Stroke patients receiving care at home often rely on family caregivers with limited formal training, minimal access to pressure-relieving devices, and reduced professional monitoring. Epidemiological studies have shown that pressure injury prevalence remains substantial among stroke survivors in home-care contexts, highlighting a gap between guideline recommendations and real-world implementation.[3,11] While large-scale studies provide valuable population-level insights, they often lack contextual sensitivity to rural or low-resource environments, where simple, low-cost, and caregiver-assisted interventions are most needed.

From a methodological perspective, high-level evidence such as randomized controlled trials offers strong internal validity but may not capture individual clinical trajectories, feasibility, or practical challenges encountered in daily home care. Case reports and case studies play a complementary role by documenting detailed clinical observations, implementation processes, and short-term responses in specific contexts, thereby contributing to practice-based evidence. Within the framework of the CARE guidelines, a case report is particularly valuable when it highlights clinical reasoning, contextual factors, and lessons learned that are not readily addressed in experimental designs.

To date, there remains limited published evidence describing the combined application of 30° lateral positioning and effleurage massage using VCO in a home-care stroke patient, particularly with repeated short-term assessment of skin integrity risk.

Most prior studies have focused on outcome incidence or long-term prevention in institutional settings, providing little insight into early risk modulation and feasibility at the individual level in community physiotherapy practice. This gap underscores the need for detailed clinical observations that can inform hypothesis generation and guide future controlled studies.

Therefore, the purpose of this case report is to describe observed changes in skin integrity risk following the combined use of 30° lateral repositioning and effleurage massage with Virgin Coconut Oil (VCO) in an immobilized stroke patient receiving home-based care. This report aims to highlight feasibility, short-term risk dynamics, and clinical lessons relevant to community and home-care physiotherapy settings, rather than to establish causal effectiveness.

Methods

This study was conducted as a descriptive exploratory case report and reported in accordance with the CARE (CAse REport) guidelines. This design was chosen to document detailed clinical observations, short-term changes in skin integrity risk, and the feasibility of a combined preventive intervention implemented in a home-care setting, rather than to establish causal effectiveness or generate generalizable outcomes.

The case involved a 58-year-old female patient diagnosed with non-hemorrhagic stroke accompanied by prolonged immobilization. The patient received home-based care in Liakutu Village, East Nusa Tenggara, Indonesia, and was fully dependent on family caregivers for daily positioning and mobility assistance. The home-care environment was characterized by limited access to professional supervision and the absence of specialized pressure-relieving equipment, reflecting typical community physiotherapy conditions in rural settings.

The patient was purposively selected based on several eligibility criteria, including a confirmed clinical diagnosis of stroke with significant mobility limitation, prolonged immobilization requiring regular repositioning, a high risk of impaired skin integrity as indicated by the Braden Scale, and receipt of care in a home-based setting. This case was considered appropriate for reporting due to the presence of multiple modifiable extrinsic risk factors for pressure injury and the feasibility of implementing low-cost preventive strategies with active caregiver involvement.

Baseline clinical assessment included documentation of demographic characteristics, clinical diagnosis, and an initial evaluation of skin integrity risk using the Braden Scale. This instrument assesses six domains—sensory perception, moisture, activity, mobility, nutrition, and friction/shear—with total scores ranging from 6 to 23, where lower scores indicate a higher risk of pressure injury.[10] The Braden Scale was selected due to its established validity and reliability in predicting pressure injury risk across various care settings, including community and home care.

The intervention consisted of a combined application of 30° lateral repositioning and effleurage massage using Virgin Coconut Oil (VCO). The protocol was standardized and administered twice daily for four consecutive days. Repositioning was performed by placing the patient in a 30° lateral position using simple positioning aids available in the home-care environment, such as pillows and rolled towels. Supports were placed behind the back to maintain the lateral tilt, between the knees to prevent bony contact, and under the ankles to reduce heel pressure. This positioning technique aimed to redistribute pressure away from high-risk bony prominences, particularly the sacral and gluteal regions, in accordance with evidence-based recommendations.

Effleurage massage was applied immediately after repositioning using Virgin Coconut Oil as the massage medium. The massage was delivered using light to moderate pressure with long, rhythmic strokes directed from distal to proximal areas. Treatment focused on pressure-prone regions, including the sacral area, lower back, gluteal region, posterior thighs, heels, and ankles, while areas with persistent redness or compromised skin integrity were avoided. Each session lasted approximately 10–15 minutes and was intended to enhance skin hydration, reduce friction and shear forces, and support superficial circulation.

All intervention sessions were delivered by the researcher, a trained physiotherapy practitioner, with supervised participation from a family caregiver. Caregiver involvement was incorporated to enhance feasibility and sustainability of the intervention within the home-care context. Adherence to the intervention schedule was monitored daily, and all planned sessions were completed throughout the four-day intervention period.

The primary outcome of this case report was skin integrity risk, assessed using the Braden Scale. Assessments were conducted at baseline prior to the first intervention session and repeated daily at the end of each day during the intervention period. Changes in total Braden Scale scores as well as domain-specific scores were recorded to capture short-term risk dynamics. Data analysis was conducted descriptively. Daily Braden Scale scores were compared across time points to observe patterns of change during the intervention period. Inferential statistical analysis was not performed due to the single-case design and exploratory nature of the report.

Written informed consent for publication was obtained from the patient prior to participation, with explicit permission granted for the use of anonymized clinical data for scientific and educational purposes. All identifying information was removed to ensure confidentiality and privacy. The intervention involved non-invasive preventive care procedures and posed minimal risk to the patient. The study was conducted in accordance with ethical principles for research involving human participants and adhered to CARE reporting standards.

Results

Patient Characteristics

Baseline patient characteristics are presented in Table 1. The case involved a 58-year-old female patient diagnosed with non-hemorrhagic stroke with prolonged immobilization and dependence on caregiver assistance for daily positioning and mobility.

Table 1. Baseline Patient Characteristics (Case Report, n = 1)

Characteristic	Description
Age	58 years
Sex	Female
Clinical diagnosis	Non-hemorrhagic stroke with immobilization
Care setting	Home care
Mobility status	Dependent on caregiver assistance
Initial skin integrity risk	High risk (Braden Scale score = 12)

Changes in Skin Integrity Risk

Daily changes in skin integrity risk, as measured by the Braden Scale, are summarized in Table 2**.** At baseline (Day 1, pre-intervention), the patient had a Braden Scale score of 12, indicating a high risk of impaired skin integrity.

Table 2. Time-Point–Based Changes in Braden Scale Scores During the Intervention

Time Point	Assessment Description	Braden Score	Risk Category
Day 1 (Pre-intervention)	Baseline assessment	12	High risk
Day 2	24 hours after intervention initiation	15	Moderate risk
Day 3	48 hours after intervention initiation	16	Low risk
Day 4 (Post-intervention)	End of intervention (72–96 hours)	17	Low risk

As shown in Table 2, the Braden Scale score increased progressively over the four-day intervention period. A marked increase was observed within the first 24 hours, followed by smaller incremental increases on subsequent days. Overall, the total Braden Scale score increased by 5 points (Δ = +5) from baseline to the end of the intervention period.

Domain-Specific Braden Scale Changes

Domain-specific changes in Braden Scale components are presented in Table 3. Improvements were observed in several modifiable domains during the intervention period, while other domains remained unchanged.

Table 3. Domain-Specific Changes in Braden Scale Scores

Braden Domain	Baseline Status	Change During Intervention	Final Status
Sensory perception	Impaired	No change	Impaired
Moisture	Frequently moist	Improved	Occasionally moist
Activity	Bedfast	No change	Bedfast
Mobility	Very limited	Improved	Slightly limited
Nutrition	Not assessed	Not assessed	Not assessed
Friction / shear	Problem	Improved	Potential problem

As indicated in Table 3, improvements were primarily observed in the moisture, mobility, and friction/shear domains. The sensory perception and activity domains showed no change throughout the intervention period, consistent with the patient's persistent neurological impairment and immobilization status. Nutritional status was not evaluated during the study period.

Overall Outcome Summary

A summary of the intervention characteristics and overall outcomes is provided in Table 4 to contextualize the observed changes.

Table 4. Summary of Intervention Characteristics and Outcomes

Parameter	Description
Intervention type	30° lateral repositioning + VCO effleurage massage
Frequency	Twice daily
Duration	4 consecutive days
Primary outcome	Braden Scale score
Baseline score	12 (high risk)
Final score	17 (low risk)
Total score change	+5 points
Adverse events	None reported

No adverse events, skin breakdown, or intervention-related complications were observed during the intervention period.

Discussion

This descriptive exploratory case report documented short-term changes in skin integrity risk following the combined application of 30° lateral repositioning and effleurage massage using Virgin Coconut Oil (VCO) in an immobilized stroke patient receiving home-based care. Over a four-day intervention period, the Braden Scale score increased from 12 (high risk) to 17 (low risk), representing a total improvement of 5 points. As a case report, these findings do not demonstrate effectiveness or causality but rather describe observed clinical changes within a specific patient and care context.

The observed improvement aligns with established biomechanical and physiological principles underlying pressure injury prevention. Modified lateral positioning at a 30° angle has been shown to reduce interface pressure over bony prominences, particularly the sacral region, compared with conventional 90° lateral positioning.[12,13] Evidence from hospital-based randomized controlled trials and systematic reviews indicates that structured repositioning protocols can reduce pressure injury incidence and improve pressure distribution.[4] However, these studies were conducted in controlled institutional settings with specialized equipment and continuous professional supervision, which differ substantially from the home-care environment described in this case.

In the present report, improvements were primarily observed in the moisture, mobility, and friction/shear domains of the Braden Scale. These domains represent modifiable extrinsic risk factors that are directly influenced by repositioning and skin care interventions. In contrast, sensory perception and activity domains remained unchanged throughout the intervention period, reflecting persistent neurological impairment and immobilization related to stroke. This domain-specific pattern is consistent with prior validation studies of the Braden Scale, which indicate that changes in risk status often result from improvements in extrinsic rather than intrinsic neurological factors.[14,15]

The integration of VCO effleurage massage with repositioning represents a notable aspect of this case. Previous studies have reported that coconut oil–based topical agents can improve skin hydration and reduce mechanical stress in immobilized patients.[8,16] Massage techniques such as effleurage may further support skin integrity by reducing friction and shear forces and enhancing patient comfort. Unlike prior studies that examined repositioning or topical skin care as isolated interventions, this case illustrates the practical application of a combined approach targeting multiple risk factors simultaneously. While the individual contribution of each component cannot be determined within a single-case design, the observed changes suggest that combined interventions may be feasible and clinically relevant in home-care physiotherapy practice.

The home-care context is particularly important when interpreting these findings. Stroke survivors cared for at home often rely on family caregivers with limited formal training and restricted access to pressure-relieving devices. Epidemiological studies have demonstrated that pressure injury prevalence remains substantial among stroke patients in community and home-care settings, underscoring the need for simple, low-cost, and caregiver-assisted preventive strategies.[3,17] In this case, the intervention was implemented using readily available materials and involved caregiver participation, highlighting its potential feasibility in similar low-resource environments.

From a methodological perspective, this report illustrates the complementary role of case reports within the hierarchy of evidence. While randomized controlled trials provide strong internal validity, they may not capture individual clinical trajectories, feasibility, or contextual challenges encountered in daily home care. Case reports contribute practice-based evidence by documenting real-world implementation and short-term responses, thereby informing hypothesis generation and guiding future analytical or experimental studies. Within the CARE framework, the value of this report lies in its detailed description of clinical context, intervention delivery, and observed risk dynamics rather than in claims of effectiveness.

Nevertheless, the findings must be interpreted cautiously. The short intervention duration and absence of long-term follow-up limit conclusions regarding sustained risk reduction or prevention of pressure injury development. Furthermore, improvements in Braden Scale scores may have been influenced by factors unrelated to the intervention, such as routine nursing care or spontaneous fluctuations in patient condition. As such, the results should be viewed as preliminary clinical observations rather than confirmatory evidence.

Overall, this case report suggests that the combined use of 30° lateral repositioning and VCO effleurage massage may be associated with short-term improvements in modifiable skin integrity risk factors in an immobilized stroke patient receiving home-based care. The report highlights the feasibility of implementing integrated, low-cost preventive strategies in community physiotherapy settings and supports the need for further investigation through larger case series, controlled studies, and longitudinal designs to better elucidate clinical impact and sustainability.

Conclusion

This case report describes observed short-term changes in skin integrity risk following the combined application of 30° lateral repositioning and effleurage massage using Virgin Coconut Oil (VCO) in an immobilized stroke patient receiving home-based care. Over a four-day intervention period, an improvement in Braden Scale score was observed, indicating a shift from a high-risk to a lower-risk category. These findings reflect changes in modifiable extrinsic risk factors rather than recovery of neurological or functional limitations.

Given the descriptive exploratory nature of this report, the results should be interpreted with caution. The single-case design, short intervention duration, and absence of a control condition preclude conclusions regarding causal effectiveness or long-term clinical outcomes. Instead, the primary contribution of this report lies in documenting feasibility, short-term risk dynamics, and practical implementation of an integrated preventive approach within a community and home-care physiotherapy context.

From a clinical perspective, the combination of 30° lateral positioning and VCO effleurage massage represents a low-cost, caregiver-assisted strategy that may be applicable in resource-limited home-care settings. The intervention targets multiple modifiable risk factors, including moisture, mobility-related pressure exposure, and friction or shear forces, which are central to pressure injury prevention.

Future research should build upon these observations through larger case series, controlled or randomized studies, and longer follow-up periods to evaluate sustainability, safety, and clinical relevance. Such studies are needed to determine whether the observed short-term improvements translate into meaningful reductions in pressure injury incidence among stroke patients receiving home-based care.

Author Contribution

Endah Sulistiyani: Conceptualization; Methodology; Data curation; Formal analysis; Writing—original draft
Dewa Agung Gina Andriani: Methodology; Formal analysis; Writing—review & editing; Supervision
Moreno Herdianto Lay Da Lopez: Data curation; Writing—review & editing
Maria Rin Poa: Data curation; Writing—review & editing
All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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Ethics Statement

Written informed consent for publication was obtained from the patient prior to inclusion in this case report. The patient provided explicit permission for the use and publication of anonymized clinical information for scientific and educational purposes. All identifying data were removed to ensure confidentiality and privacy. This report describes non-invasive preventive care interventions and was conducted in accordance with ethical principles for research involving human participants and the CARE reporting guidelines.

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