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ORIGINAL ARTICLE

The Use of Wrist Restraint Gloves in Agitated Patients with Impaired Consciousness

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ABSTRACT

Introduction: *Patients with decreased consciousness often experience agitation, which increases the risk of falls, injuries, and removal of invasive medical devices. The use of wrist restraint gloves is one nursing intervention to maintain patient safety, but clinical evidence of its application is still limited.*
Objectives: *To determine the effectiveness and safety of applying wrist restraint gloves in agitated patients with decreased consciousness.*
Methods: *This study used a descriptive design with a case study approach on one elderly patient who underwent post-operative hematoma trepanation and experienced agitation and decreased consciousness. Observations were conducted for three days using monitoring instruments, including a restraint observation sheet consisting of (Circulation Distal To Restraint, Motor Activity, Breathing, General Appearance, Orientation, Speech, Behavior), Glasgow Coma Scale (GCS), AVPU (Alert, Voice, Pain, Unresponsive), and Ontario modified stratify (Sydney Scoring).*
Results: *During the application of wrist restraint gloves, no distal circulation disorders, skin injuries, or other physical complications were found. Agitated behavior was still fluctuating, but there were no incidents of falls or removal of invasive medical devices.*
Conclusion: *Wrist restraint gloves are effective and safe as a temporary nursing intervention to ensure the safety of agitated patients with decreased consciousness when accompanied by close monitoring.*

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Introduction

Altered consciousness is a pathological condition resulting from severe brain injury with various causes, such as trauma, stroke, anoxia, cancer, infection, and metabolic disorders (Harris *et al.,* 2024). Altered consciousness is characterized by changes in the level of consciousness, alertness, and response to stimuli resulting from severe brain injury (Marino, 2024). Patients with impaired consciousness and cognitive function are at risk of agitation, delirium, and dangerous behaviors that can interfere with medical treatment and endanger patient safety (Wang *et al.,* 2023). Agitation is a medical emergency characterized by behavioral and physiological symptoms that have the potential to endanger the individual or others and have a multifactorial etiology. Individuals experiencing agitation may be found in various settings, one of which is an adult inpatient unit (Sharma & Huecker, 2025). Inpatients, particularly older adults

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with cognitive and functional impairments, are at high risk of experiencing adverse events such as falls and injuries (Sharifi *et al.,* 2021).

Agitation can lead to the accidental or self-induced dislodgement of catheters, tubes, drains, or medical devices, which occurs in 20–25% of cases. These unexpected events can expose patients to life-threatening risks and/or prolong the duration of mechanical ventilation and hospital stays. The economic impact of unplanned removal of medical devices is estimated at approximately $250,000 per year in a 42-bed unit. Agitation is also associated with more frequent infections and repeat surgical interventions. Although sepsis may explain agitation, agitation itself can trigger the development of infections (self-removal of catheters, tubes) and repeat surgical interventions (self-removal of drains, evisceration) (Aubanel *et al.,* 2020). Several recent reviews and empirical studies indicate that the use of physical restraints (PR) in adult care units is crucial in managing life-threatening behavior. The number of days PR are used is associated with the occurrence of adverse events (Kavumpurath *et al.,* 2024). According to Hakverdioğlu Yönt *et al.,* (2023), the prevalence of PR use was highest in Spain (84.9%) and lowest in the U.S. (1.9%). Based on primary data collected by the researchers during a 5-week clinical rotation in the Adult Inpatient Ward, Emergency Department, ICCU, and ICU at PKU Muhammadiyah Yogyakarta, the researchers also found that 23 patients underwent PR procedures due to a loss of consciousness.

Physical restraints (PR) are defined as any action or procedure that restricts a person's free movement to a desired position or limits normal access to their body using methods that are attached to or in close proximity to the body and cannot be easily removed by the patient. In hospitals, one such method involves the use of restraint gloves consisting of gloves and a fastening ring that can restrain patients while simultaneously monitoring oxygen saturation in agitated patients. This device is considered comfortable, low-cost, and effective in preventing device-related pressure injuries (Han *et al.,* 2021). Restraints must be applied by trained healthcare professionals with the consent of the patient or family, using standard equipment and safe techniques in accordance with guidelines, and under close supervision. Older adults who are restrained require continuous monitoring to detect complications. The principles of restraint use emphasize the use of equipment that is standard, comfortable, safe, properly sized, and made of soft, flexible materials such as foam or sheepskin (Sharifi *et al.,* 2021). The results of using these wrist restraint gloves have not yet been reported. Therefore, based on the background information presented by the researchers, they aim to provide stronger clinical evidence for the management of patients with impaired consciousness.

The objective of the study was to determine the effectiveness of using Wrist Restraint Gloves (WRG) to manage agitated behavior in patients with impaired consciousness in a safe manner and in accordance with nursing standards.

Benefit

To support improvements in the quality of hospital care through the implementation of safer, standardized restraint procedures, thereby reducing the incidence of patient safety incidents resulting from aggressive behavior.

Method

This study employed a descriptive design with a case study approach to describe the application of Wrist Restraint Gloves (WRG) in agitated patients with decreased consciousness. The research subjects were agitated patients with decreased consciousness admitted to the adult inpatient ward of the hospital who exhibited self-harming behavior or interference with therapy,

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and required restraint intervention as indicated. The study was conducted in the Marwah Ward of PKU Muhammadiyah Hospital Yogyakarta in December 2025. The monitoring instruments used included a restraint observation sheet consisting of Circulation Distal to Restraint, Motor Activity, Breathing, General Appearance, Orientation, Speech, and Behavior; the Glasgow Coma Scale (GCS); Alert, Voice, Pain, Unresponsive (AVPU); and the Ontario Modified Stratify (Sydney Scoring). These monitoring instruments served as tools to assist the researcher in observing and documenting patient responses systematically.

The research procedure began with a comprehensive nursing assessment of the patient's condition, particularly agitation behavior and level of consciousness. Patients with impaired circulation, wounds, or other conditions in the upper extremities that contraindicated the use of wrist restraint gloves were excluded from this study. Family consent was obtained as part of respecting patient rights. The researcher then provided an explanation to the family regarding the purpose, benefits, and risks of the restraint intervention as an effort to maintain patient safety. The application of WRG was carried out in accordance with the hospital's Standard Operating Procedure (SOP) while prioritizing patient safety and comfort. After the intervention was performed, the researcher conducted periodic observations of the patient's responses, including changes in agitation level, consciousness, and extremity circulation status. This study was conducted in accordance with nursing ethical principles, including respect for patient rights and dignity, confidentiality of patient identity, as well as the principles of beneficence and non-maleficence.

Results

Case

The patient, Mr. S, a 93-year-old male, is admitted to the Marwah ward with a medical diagnosis of hypertensive emergency, observation for a decreased level of consciousness secondary to a chronic subdural hematoma (cSDH), and a sleep disorder. Twelve hours prior to hospital admission, the patient fell at home; there were no witnesses to the incident. A 5 cm x 1 cm laceration was found on the back of his head, accompanied by active bleeding and pain. The patient has a history of a stroke two years ago, which resulted in a tendency for his limbs to remain in a flexed position and a gait characterized by dragging his left leg. His family stated that he had ceased routine medical follow-ups, as they believed his treatment was complete. In his daily life, the patient used a cane for mobility, walking with a limp as a residual effect of the stroke. Following the fall, there was no observed worsening or decline in his stroke-related symptoms. Other relevant history includes active smoking (approximately 5 cigarettes per day) and a 15-year history of hypertension, for which he did not seek regular medical care.

Assessment on December 5, 2025, for a patient on postoperative day 3 following trepanation (performed on December 3, 2025). Currently, the patient still appears restless, agitated, and confused, refuses to eat, and experiences disorientation to person, time, and place. The family reports frequent resisting, repeated scratching of the head with both hands, and forceful movements of both legs. The patient is in a semi-Fowler's position with bilateral hand restraints applied due to the risk of pulling out the IV line in the right leg, nasogastric tube (NGT), cranial drainage tube, nasal cannula, and urinary catheter. The family notes decreased hearing and vision, as well as forgetfulness. The fall risk score using the Ontario Modified Stratify (Sydney Scoring) is 28, indicating a high fall risk in older adults. Vital signs: Blood Pressure (BP) 185/87 mmHg, Temperature 36.6°C, Heart Rate 83 bpm, Respiratory Rate (RR) 20 breaths/min, SpO_2 97%. Level of consciousness: AVPU: Voice responsive (V), GCS E3M4V2. Activities of Daily Living (ADL) require total assistance. Currently in place are a nasal cannula at 3 L/min, an IV line in the right leg, an NGT, a cranial drainage tube, and a urinary catheter.

Physical examination results: mesocephal head, there is a surgical wound wrapped in a bandage measuring 5 cm x 1 cm, and a hematoma with a size of 2 cm x 2 cm on the right back of

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the head and pain when pressed. There is a weakness in the muscle strength of the left hand with a score of 1 there is a slight contraction of the muscles of the hand but the joints cannot be moved, the muscle strength of the right hand with a score of 4, the right leg and the left kiki with a score of 4 move through a variety of movements and defend against slight pressure.

Muscle strength:

1	4
4	4

Head CT scan findings: recurrent stroke with chronic subdural hematoma. The patient received intravenous Phenytoin 50 mg every 12 hours, intravenous Ketorolac 30 mg every 12 hours, intravenous Ceftriaxone 1 gram every 12 hours, intravenous Mannitol infusion 125 ml every 24 hours, and oral Ramipril 5 mg daily and Amlodipine 10 mg daily.

Implementation of Measures

Figure 1: Use of Wrist Restraint Gloves



WRG devices were applied on December 5, 2025, to both of the patient's hands as a protective measure to prevent the patient from removing invasive medical devices such as head drains, NGT, IV lines, and urinary catheters. The patient still appeared restless, had impaired consciousness and disorientation, was at high risk of falling, and frequently pulled at their hands and moved their legs forcefully. While restraints are in use, distal circulation is monitored periodically, including skin condition, temperature, capillary refill, pulse, and motor function of the extremities. Restraints are removed on a scheduled basis every morning to allow for range-of-motion (ROM) exercises to prevent joint stiffness, impaired perfusion, and tissue injury, and are then reapplied as indicated for safety reasons.

Fulfillment of the patient's basic needs is assisted in maintaining cleanliness and comfort by changing bedsheets, pillowcases, blankets, patient gowns, diapers, and underpads, as well as nail trimming. Daily care needs are assisted by nurses and family members. The patient's resting position is maintained in a semi-Fowler's position for greater comfort, and right and left lateral turning is performed to prevent pressure ulcers (decubitus). The care environment is arranged to be safe with side rails raised, cleanliness maintained, adequate lighting, and a comfortable temperature, accompanied by a fall-risk identification wristband. Observation and monitoring are conducted every 2 hours for agitated patients with decreased consciousness.

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Observation

Table 1: First-Day Observations

Date			December 5, 2025
Type Of Restraint			WRG
PHYSICAL STATUS	Circulation Distal To Restraint	Skin	Palpable thin, warm, dry, no redness, rash or blisters on the area in restraint
		Vital Signs	BP: 157/57 T: 36.8 HR: 88 RR: 20 SPO2: 97%
		Cap. Refill	<2
	Motor Activity		The fingers are slightly stiff and difficult to bend; there is weakness in the left hand, with a score of 1 there is slight muscle contraction in the hand but the joints cannot be moved; muscle strength in the right hand is rated at 4 the hand can perform a variety of movements and resist slight pressure.
	Breathing		No abnormalities, Vesicular breath sounds, Symmetrical chest wall movement, A nasal oxygen cannula is in place, but the patient keeps shaking his head to remove it.
	General Appearance		Neat, wearing a patient gown, wearing a pillow blanket, wearing Pampers Posis semi fowler, installed O2 nasal kanul 3 lpm, ngt, drainage in the head, catheter, IV infusion in the right leg, attached Wrist Restraint Gloves on both hands, there are ties of gauze on both legs, attached bracelet with Fall Risk sign (risk of falling), mamakai underpad behind the head.
MENTAL STATUS	Orientation		Disorientation of place, time, people
	Speech		Do not connect when asked, often digress own laughter, disorientation of place, time, people, often moan.
	Behavior		Patients experience anxiety, apathy, delirium often move the hands by pulling the restraint and legs uncontrollably chop the bike with strong force no, can not understand the situation at this time, the patient seemed unaware of the existence of the Examiner when he called his name.
GCS			E3M4V2
AVPU			Voice responsive (V)
Ontario modified stratify (sydney scoring)			28

On the first day of observation on December 5, 2026, following the implementation of the WRG intervention on both upper extremities, the patient exhibited a decreased level of consciousness with a response to verbal stimuli (Voice responsive) and a GCS score of E3M4V2, indicating moderate brain injury. Fall risk assessment using the Ontario Modified Stratify (Sydney Scoring) still showed a high fall risk with a score of 28, indicating a high risk of falling. The patient experienced disorientation to person, place, and time, accompanied by agitation, delirium, pulling hands out of restraints, and raising both legs uncontrollably. Distal circulation monitoring during restraint use demonstrated adequate perfusion, characterized by warm and dry extremity skin; no redness, pressure injuries, or abrasions; capillary refill time of less than 2 seconds; and strong palpable peripheral pulses. There were no signs of impaired perfusion resulting from WRG use. Regarding respiratory status, the patient was breathing spontaneously but still received supplemental oxygen via nasal cannula at 3 L/min inconsistently because the patient resisted

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placement by shaking their head. Throughout the observation period, the patient's agitation level fluctuated, with episodes of restlessness still occurring frequently, yet WRG use was effective in preventing the dislodgement of medical devices and maintaining patient safety.

Table 2 Observasi Hari Kedua

Date			December 6, 2025
Type Of Restraint			WRG
PHYSICAL STATUS	Circulation Distal To Restraint	Skin	Palpable thin, warm, dry, no redness, rash or blisters on the area in restraint
		Vital Signs	BP: 149/51 T: 36.7 HR: 95 RR 20 SPO2: 96%
		Cap. Refill	<2
	Motor Activity		The fingers are slightly stiff and difficult to bend; there is weakness in the left hand, with a score of 3 there is some movement when lifting the hand but it cannot withstand resistance; the right hand has a score of 4 it can perform a variety of movements and withstand slight pressure.
	Breathing		No abnormalities, Vesicular breath sounds, Symmetrical chest wall movement, A nasal oxygen cannula is in place, but the patient keeps shaking his head to remove it.
	General Appearance		Neat, wearing a patient gown, wearing a blanket pillow, semi fowler position, installed O2 nasal kanul 3 lpm, ngt, drainage in the head, catheter, IV infusion in the right leg, attached Wrist Restraint Gloves on both hands, there are ties of gauze on both legs, attached bracelet with Fall Risk sign (risk of falling), mamakai underpad behind the head.
MENTAL STATUS	Orientation		Disorientation of place, time, people
	Speech		Do not connect when asked and often digress laugh themselves, disorientation of place, time, people, often moaning
	Behavior		The patient experiences anxiety, apathy, delirium often moves the hands by pulling the restraint and legs uncontrollably shoots the bike with strong force no, can not understand the current situation, often coughs and sneezes.
GCS			E4M4V3
AVPU			Voice responsive (V)
Ontario modified stratify (sydney scoring)			28

On the second day of observation, December 6, 2026, a change in the patient's neurological status was noted, characterized by an improvement in the level of consciousness. By 08:00 WIB, the Glasgow Coma Scale (GCS) score had increased to E4M4V4; the patient appeared more responsive, although still disoriented regarding person, place, and time. The patient began to show partial awareness of the examiner's presence, asking simple questions such as "Who is this?" and "Where am I?" However, by 14:00 WIB, a decline in the level of consciousness was observed, with a GCS score of E4M4V3, evidenced by reduced responsiveness, increased somnolence, and the recurrence of agitation episodes.

The patient's behavior continues to fluctuate between periods of calmness and episodes of agitation. At times, the patient appears somnolent and apathetic, while at other times, they become restless, attempting to remove restraints and moving their lower extremities in an uncontrolled manner. Monitoring of distal circulation remains normal, with no signs of compromised skin integrity or impaired tissue perfusion. Regarding motor function, there is a

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slight improvement in the strength of the left extremities compared to the previous day, while the right extremities continue to exhibit greater strength. The fall risk score, assessed each shift, is 28, indicating that the patient remains at a high risk of falling. The use of physical restraints (WRG) is being maintained, as the patient is not yet able to control their behavior or comprehend their own safety requirements.

Table 3 Observasi Hari Ketiga

Date			December 7, 2025
Type Of Restraint			WRG
PHYSICAL STATUS	Circulation Distal To Restraint	Skin	Palpable thin, warm, dry, no redness, rash or blisters on the area in restraint
		Pulse	BP: 156/68 T: 36.5 HR: 60 RR 20 SPO2: 97%
		Cap. Refill	<2
	Motor Activity		The fingers are slightly stiff and difficult to bend; there is weakness in the left hand, with a score of 3 there is some movement when lifting the hand but it cannot withstand resistance; the right hand has a score of 4 it can perform a variety of movements and withstand slight pressure.
	Breathing		No abnormalities, vesicular breath sounds, chest wall movement is normal, no nasal oxygen cannula was applied because the patient did not want to shake his head frequently.
	General Appearance		Neat, wearing a patient gown, wearing a blanket pillow, semi fowler position, ngt, catheter, IV infusion in the right leg, attached Wrist Restraint Gloves on both hands, there are ties of gauze on both legs, attached bracelets containing Fall Risk signs (risk of falling), wearing underpads behind the head.
MENTAL STATUS	Orientation		Disorientation of place, time, people
	Speech		Frequently moans, gives incoherent responses when asked questions, and often rambles; is disoriented regarding place, time, and people.
	Behavior		The patient is in a somnolent and apathetic state; they tend to be quiet and sleep frequently. While the hands are still, the legs occasionally kick out with considerable force. The patient does not comprehend their current situation; when their shoulder is tapped, they wake up briefly before falling back asleep. They are capable of speaking a few words clearly such as expressing a desire to go home but immediately drift back to sleep. At times, the patient sticks out their tongue. They are unaware of the examiner's presence and are unable to respond to their surroundings.
GCS			E3M3V3
AVPU			Voice responsive (V)
Ontario modified stratify (sydney scoring)			28

On the third day of observation on December 07, 2026, the patient was still in a state of decreased consciousness with a response to voice (Voice responsive) and GCS values from E3M3V2 to E3M3V3. A fall risk score of 28 indicates a high risk of falling. Patients appear more often in somnolent and apathetic states, with a decrease in the frequency of agitation of the upper

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extremities. The hand movements are relatively calmer compared to the previous day, although the lower extremities still occasionally show pedaling movements with considerable force.

The patient remains completely disoriented and has not been able to interact adequately with the surrounding environment. The verbal response is still limited to a groan or a few simple unsustainable words. Monitoring of distal circulation during WRG use still shows good results, with no signs of perfusion disorders, tissue injury, or complications on the skin. Overall, the application of WRG for three days is still considered effective in maintaining patient safety and preventing the risk of injury.

Discussion

This case study describes the application of WRG in a 93-year-old patient on the third day following a trepanation procedure for a recurrent stroke complicated by a chronic subdural haematoma (cSDH), who was experiencing fluctuating agitation influenced by advanced age, a history of stroke, hypertension, delirium, impaired consciousness and the use of invasive devices. The most pronounced agitation occurred on the third day post-operation, and the patient, who had been transferred to the inpatient ward, exhibited restlessness, hand-wringing and uncontrolled movements of the lower limbs. Previous research has indicated that cSDH is a condition in which blood accumulates between the dura mater and the arachnoid membrane of the meninges surrounding the brain. This condition is more common in the elderly and is usually triggered by head injury (Hoai *et al.,* 2021). This finding is consistent with the literature, which indicates that in older adults, agitation often arises in the context of underlying medical and/or neuropsychiatric conditions, such as dementia, stroke, delirium, psychotic disorders, catatonia, substance intoxication, or substance withdrawal. When specifically associated with dementia, agitation leads to poorer overall outcomes for both patients and caregivers. Agitation in dementia is defined as excessive motor behavior and verbal or physical aggression, which causes significant disability due to the degree of cognitive decline (Subramanian *et al.,* 2021).

Changes in GCS scores during observation indicated fluctuations in the patients' neurological status, with a temporary improvement on the second day and a subsequent decline by the third day, which more accurately reflected the course of the underlying disease and the postoperative condition than the effects of restraint use. Assessing the level of consciousness using the GCS is an important consideration when using restraints, especially in patients whose level of consciousness is below compos mentis such as those with delirium who are at risk of interfering with invasive devices due to psychomotor agitation (Fitri et *al.,* 2025). Delirium itself generally develops in older adults and is characterized by rapidly developing changes in attention, consciousness, and cognition that fluctuate throughout the day, often accompanied by psychomotor and sleep disturbances (Echeverría *et al.,* 2025). This is consistent with research indicating that PR is considered a better alternative, as it will not alter the patient's level of consciousness *(Holmgren et al.,* 2023).

The scheduled removal of restraints for range-of-motion (ROM) exercises also helps prevent joint stiffness and circulatory problems, which is important given that patients experience post-stroke limb weakness. This underscores that the use of restraints is not a standalone measure but must be combined with supportive nursing interventions. Patients who are restrained must also be continuously monitored and evaluated by trained staff to detect any harmful physical or psychological reactions and to facilitate the removal of restraints as soon as possible (APNA, 2022). Previous research has indicated that ROM exercises also play a role in maintaining or improving normal joint mobility through a mechanism that increases joint pressure during movement, which stimulates the release of synovial fluid to lubricate the joints (Indriawati & Sossa, 2022).

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During the application of WRG, nurses continue to meet patients' basic needs, maintain personal hygiene, adjust patients' positions, and create a safe and comfortable care environment. Family consent is obtained before any action is taken, thereby upholding the ethical principles of nursing care for patients. Previous research indicates that ethical decision-making regarding the use of restraints must be based on four fundamental principles of bioethics: autonomy, beneficence, non-maleficence, and justice. These principles require that physical restraint be used only as a last resort, after all less restrictive alternatives have been tried and it has been determined that the potential benefits clearly outweigh the potential harms (Princeton *et al.,* 2025). Nurses also play a role in protecting patients from potential hazards associated with the use of PR and in creating a safe environment for patients, families, and healthcare workers (Rights, 2020). In addition, decisions regarding the use of PR must take into account the views of the patient, guardian, and family through the provision of adequate information and informed consent, while continuing to meet the patient's basic needs such as nutrition, hydration, hygiene, and elimination and respecting the patient's dignity and privacy. (Sharifi *et al.,* 2021).

During the three days of wrist restraint glove use, there were no incidents of falls or removal of invasive medical devices, even though the patient remained agitated and had a high risk of falling (Ontario Modified Stratify score = 28). The patient's condition improved, with calmer upper extremity movements on the third day. Monitoring of distal circulation remained good, as indicated by warm, dry skin, capillary refill time <2 seconds, and the absence of erythema, pressure ulcers, or perfusion disturbances. This suggests that the WRG, when used in accordance with standard operating procedures (SOPs) and combined with nonpharmacological and pharmacological interventions as well as periodic monitoring, is relatively safe and more effective than conventional restraints in ensuring patient safety. These findings are consistent with research indicating that the design of medical restraint gloves can improve patient protection and comfort and reduce the risk of complications compared to conventional restraints (Wang *et al.,* 2023). In addition, medical gloves with rehabilitation features can provide better protection and help improve upper extremity motor function in stroke patients (Aiyun *et al.,* 2025). The use of modified restraint gloves has also been shown to improve compliance with nursing practice standards, reduce complications, and increase patient satisfaction (Jiannan *et al.,* 2024).

Conclusion

Based on the results of the application and observation of WRG in agitated patients with impaired consciousness at PKU Muhammadiyah Hospital in Yogyakarta, it can be concluded that WRG is a safe and standard-of-care intervention for managing agitation in patients with impaired consciousness. During the observation period, no physical complications such as circulatory disturbances or skin injuries—were observed; therefore, this intervention is considered safe when performed according to standards and with close monitoring for side effects.

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