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Effect of Continuous Lateral Rotation Therapy Vs Manual Lateral Positioning on Bed Sore For Prolonged Bed Ridden Patients.

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ABSTRACT

Introduction- Pressure ulcers are common among prolonged bedridden patients and can result in pain, anxiety, and extended hospital admissions. This study examines two strategies for preventing and treating pressure ulcers: Continuous Lateral Rotation Therapy (CLRT) and manual lateral positioning. CLRT employs a specific bed to rotate the patient to relieve pressure, whereas manual positioning requires caregivers to turn the patient on a regular basis. Both strategies aim to lower the risk of pressure ulcers while also improving patient comfort and health. This study examines the effectiveness of these treatments to determine the best way to care for people who are unable to walk independently.

Objective-1] To Evaluate the effectiveness of CLRT vs Manual lateral positioning in prolonged bedridden patients.

2] To Assess the effects of CLRT vs Manual lateral positioning on Blood circulation

Method- This experimental comparative study, conducted over six months at Krishna Vishwa Vidyapeeth, Karad, aims to evaluate the effectiveness of Continuous Lateral Rotation Therapy (CLRT) versus manual lateral positioning in preventing and treating pressure ulcers in bedridden patients. The study will include 30 patients aged 18-50 years, randomly assigned to either Group A (CLRT on a programmable bed) or Group B (manual lateral positioning every two hours). Inclusion criteria include patients who are immobile for at least 48 hours and unable to reposition themselves, while exclusion criteria include a Glasgow Coma Scale (GCS) below 6 or increased intracranial pressure.

Result-Both interventions resulted in significant improvements. The CLRT intervention led to a notable reduction in pain during activity ($p=0.0033$), while the MLP intervention significantly decreased pain at rest ($p=0.0016$). Norton Scale scores improved in both groups, with more better outcomes observed in physical condition, mental state, activity, mobility, and incontinence.

Conclusion- CLRT (Continuous Lateral Rotation Therapy) and MLP (Manual Lateral Positioning) are effective strategies for preventing pressure ulcers and managing pain in bedridden patients. CLRT is particularly beneficial for improving mobility and activity tolerance, while MLP is more effective at reducing resting pain. The choice between these strategies should be based on the specific needs of the patient and the available healthcare resources.

Keywords: *Pressure ulcers, bedridden patients, CLRT, manual lateral positioning, mobility, pain, Norton Scale.*

1. INTRODUCTION

A pressure ulcer is a localized damage to the skin, underlying tissue, or both, typically over a bony prominence caused by pressure or pressure and shear. Several contributing or confounding factors are also related with pressure ulcers; the relevance of these factors is still to be explored. Because persistent mechanical loading is the primary component contributing to pressure ulcer formation, they usually occur in patients who are unable to shift themselves to relieve pressure. [1] Some patients arrive to acute care hospitals with pre-existing pressure ulcers, while others acquire them during their stay. It is well known that pressure ulcers are not solely the consequence of pressure itself and occurs most often in older and immobile persons with severe acute and neurological disorders. However, it is unclear whether persons who develop pressure ulcers during their stay in hospital differ from those with existing pressure ulcers. Knowledge about characteristics of patients who develop pressure ulcers compared with patients with existing pressure ulcers present on admission to hospital may have implications for current risk assessment scales and preventive measures. [2] Pressure ulcers have a significant impact on

quality of life; it is known that patients with pressure ulcers frequently experience pain paired with fear, loneliness, and anxiety concerning wound healing. To prevent and treat pressure ulcers, it's important to change positions frequently, evaluate the skin regularly, care for the skin, utilize specialist pressure relief devices, and address malnutrition and incontinence issues. [3] Pressure ulcers affect all hospitalized patients, and the annual cost of preventing and treating them is estimated to be D.Fl 700,000,000. PUs can lead to unfavorable patient outcomes include pain, depression, loss of function, infection, sepsis, and longer hospital stays. Pressure ulcers (PUs) not only cause pain and discomfort, but also significantly increase nursing workload per patient by 50%.[4]

Patients often experience loss of sensation, particularly deep pressure sensitivity and proprioception. Decubitus ulcers commonly affect the sacrum, ischial tuberosities, greater trochanters, heels, and ankles, accounting for around 95% of cases. Supine patients get sores on the sacrum and heels, whereas sitting patients may develop sores on the ischial tuberosity. Lying on one's side might cause pressure on the hips and ankles. Grade 3 and 4 pressure sores can lead to life-threatening complications. Infection is the most common problem. Assume that all decubitus ulcers are infected. Polymycrobial organisms consist of both aerobic and anaerobic bacteria. Infections in deeper tissues and bones can cause periostitis, sinus development, osteomyelitis, and septic arthritis. Septicemia occurs during the early stages. Deep infections can cause heterotopic ossification, leading to new pressure sores and an increased risk of tetanus. Chronic infection of decubitus ulcers may result in secondary amyloidosis or chronic anemia. [5]

Continuous lateral rotation therapy (CLRT) is a critical component of progressive mobility that has been utilized since the 1970s to reduce the pulmonary consequences of immobility. This therapy makes use of specialized bed frames that rotate the patient from side to side. CLRT, also known as kinetic therapy, has been the subject of various research throughout the years to assess its effectiveness. Many of these studies have indicated improvements in various lung outcome markers when lateral rotation therapy are used. Patient movement is commonly considered to decrease the consequences of prolonged bed rest. Early mobilization of patients during critical acute illness is challenging. CLRT can enable early movement to critically ill patients who cannot be moved by other means. Identifying patient populations who will benefit from CLRT is crucial for enhancing its effectiveness. [6]Continuous lateral rotation therapy is defined as the gradual turning of a patient along the longitudinal axis to 40 degrees on each side.[7] This treatment involves placing patients using a programmable bed that turns on its longitudinal axis, either intermittently or constantly, to avoid or treat respiratory difficulties in critically ill individuals. This procedure is frequently referred to as continuous lateral rotation therapy (CLRT). CLRT refers to mattresses and beds that move patients in a regular pattern along a longitudinal axis (from head to foot).[8]

CLRT device[8]

Rotating a patient on a bed can promote drainage of secretions in the lungs and lower airways, leading to an improvement in FRC. Increasing the critical opening pressure in the upper lung reduces the risk of venous thrombosis and pulmonary embolism..
This evaluation focuses on the effectiveness of rotational therapy in treating and avoiding respiratory problems and pressure area care.[9]

The major purpose of repositioning immobile and critically sick patients is to eliminate avoidable problems associated with bed rest and inactivity without compromising oxygen delivery (DO2) and tissue oxygenation. [10] However, for some severely ill patients, body position may be chosen to provide therapeutic benefit. That is, in certain situations, goal-directed therapeutic positioning may take precedence over regular placement to improve physiological function while aiding recovery.[11] Manual lateral positioning can improve comfort, minimize pressure ulcers, and lower the risk of deep vein thrombosis, pulmonary emboli, atelectasis, and pneumonia [12] Furthermore, routine lateral posture may enhance respiratory outcomes for critically ill patients. Postural drainage in lateral positions may increase sputum output in patients with excessive secretions[13] The gravitational effects of repetitive lateral placement move pulmonary secretions towards the large bronchus, inducing a cough sufficient to expectorate accumulated bronchial secretions or allow their removal by suction. [14]Manual Lateral positioning typically involves shifting the patient between right and left lateral positions. However, this side-to-side rotation is frequently disrupted by other body positions, such as supine or semi-recumbent.[15] To avoid difficulties from prolonged bed rest, it is recommended to turn every two hours.[16] The chosen therapeutic position might be extended beyond the normal two hours or shortened based on its effectiveness in improving outcomes. The lateral position is advised as a therapeutic body position for people with unilateral lung disease.[17] Continuous Lateral Rotation Therapy (CLRT) vs Manual Lateral Positioning are two regularly utilized techniques for repositioning patients and reducing risk. However, there is limited information to compare the efficacy of these two techniques. This research is necessary to discover which strategy is more effective in reducing pressure ulcers, improving circulatory health, and patient comfort. This study compares these two ways to determine the most effective and efficient method for treating immobile patients, with the goal of increasing patient safety, clinical outcomes, and overall care quality.

Materials And Methods-

This experimental comparative study aims to evaluate the effectiveness of Continuous Lateral Rotation Therapy (CLRT) versus manual lateral positioning in preventing and treating pressure ulcers in prolonged bedridden patients. The study will be conducted over a period of six months in Karad, with a sample size of 30 patients aged between 18 to 50 years were included in this study.This study was conducted at Krishna Vishwa Vidyapeeth,Karad. Permission was obtained from the institutional ethics committee of Krishna Vishwa Vidyapeeth,Karad. Patients will be randomly assigned to one of two groups: Group A will get Continuous Lateral Rotation Therapy (CLRT) on a programmable bed, while Group B will receive manual lateral positioning every two hours.Participants was selected according to inclusion and exclusion criteria.

Inclusion criteria:

1] Aged 18 to 50 years

2] Patients immobile for at least **48 hours**

3**]** Patients who are bedridden and unable to perform independent movement or repositioning.

Exclusion criteria :

1] GCS below 6

2] Increase Intra cranial pressure

3] Patient who not allow.

Outcome measures will include the Numeric Rating Scale (NRS) for pain and the Norton Scale for pressure ulcer risk. Data will be collected over a four-week period, and statistical analysis will be performed to assess the effectiveness of the two strategies in preventing and treating pressure ulcers.

Intervention-

The study was conducted in Krishna hospital Karad and had sample size 30 participants.Of the total 30 participants they were randomly divided into two groups within 15 in each group. This four-week study will assess the effectiveness of Continuous Lateral Rotation Therapy (CLRT) and Manual Lateral Positioning (MLP) in preventing and treating pressure ulcers in bedridden patients. The intervention group will use a specialized bed that rotates the patient automatically every 2 hours at angles ranging from 30 to 45 degrees, whereas the control group will be manually repositioned every 2 hours by trained healthcare providers, alternating between left and right lateral positions. Both groups will have their skin checked

daily for pressure ulcers, and they will receive additional care such as adequate nutrition, cosmetics, and pressure-relieving equipment.

Results-

Continuous Lateral Rotation Therapy(CLRT)

Table no.1 Age -

Mean	34.466
SD	10.973

Table no.2 NPRS -

CLRT	Pre Mean	Pre SD	Post Mean	Post S D	Pre T - Value	Pre P-Value	Post T value	Post P Value
NPRS ON REST	3.733	1.223	2.066	1.033	11.825	>0.10	0.0813	7.750
NPRS AT ACTIVITY	6.933	1.580	4.06	1.454	16.999	0.0559	0.0033	12.252

Interpretation-At rest, NPRS scores declined from 3.73 (±1.22) to 2.07 (±1.03). The pre-intervention t-value was 11.825, and the p-value was greater than 0.10, indicating no statistically significant differences. A post-intervention t-value of 7.75 and p-value of 0.0813 indicate a trend toward improvement, although it is statistically significant.

During activity, NPRS scores decreased from 6.93 (±1.58) to 4.06 (±1.45). The post-intervention p-value (0.0033) shows a statistically significant reduction in pain during activity.

Table no.3 Norton Scale-

Norton Scale	Group	Mean	SD	T- Value	P-Value
Physical Condition	Pre	2.02	0.8452	9.165	<0.0008
	Post	3.333	0.8997	14.349	0.0006
Mental Condition	Pre	2.733	0.5936	17.833	<0.0001
	Post	3.866	0.3519	42.560	<0.0001
Activity	Pre	2.666	0.7237	14.270	<0.0001
	Post	3.866	0.3519	42.560	<0.0001
Mobility	Pre	1.266	0.4577	10.717	<0.0001
	Post	3.133	0.6399	18.963	0.0003
Incontinence	Pre	0.4577	0.8281	12.160	0.0287
	Post	3.733	0.4577	31.588	<0.0001

Manual Lateral Positioning

Table no.4 Age-

Mean	39.46
SD	9.102

Table no. 5 NPRS-

MLP	Pre Mean	Pre SD	Post Mean	Post SD	Pre T-Value	Pre P-Value	Post T-Value	Post P-Value
NPRS ON REST	4.666	1.589	2.0666	1.163	11.377	>0.10	6.883	0.0016
NPRS AT ACTIVITY	6.333	1.234	2.533	1.125	19.871	0.0213	8.718	0.0869

Interpretation-At rest, the NPRS score decreased from 4.67 (±1.59) to 2.07 (±1.16). A post-intervention t-value of 6.883 and p-value of 0.0016 indicate a statistically significant reduction in resting pain

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During activity, ratings decreased from 6.33 (±1.23) to 2.53 (±1.13). The pre-intervention p-value of 0.0213 was statistically significant, whereas the post-intervention p-value (0.0869) is marginal.

Table no.6 Norton Scale-

NORTON SCALE	Group	Mean	SD	T-Value	P- Value
Physical Condition	Pre	2.666	0.8165	12.649	0.0001
	Post	3.733	0.7037	20.546	<0.0001
Mental Condition	Pre	2.733	0.5936	17.833	<0.0001
	Post	3.666	0.4880	29.103	<0.0001
Activity	Pre	2.266	0.7988	10.990	0.0016
	Post	3.08	0.4140	35.546	<0.0001
Mobility	Pre	2.133	1.125	7.341	0.0174
	Post	3.666	0.4880	29.103	<0.0001
Incontinence	Pre	2.266	0.7037	12.475	0.0116
	Post	3.866	0.3519	42.560	<0.0001

Norton Scale both group interpretation-The study contrasted CLRT and MLP therapies, which resulted in reduced pain and improved functional outcomes. MLP resulted in a significant decrease in pain both at rest and during activity, whereas CLRT reduced pain mostly during activity. Norton Scale scores improved significantly in both groups, showing improved physical, mental, and functional state following intervention.

2. DISCUSSION-

The findings of this study provide valuable insights into the comparative efficacy of two patient repositioning techniques: Continuous Lateral Rotation Therapy (CLRT) and Manual Lateral Positioning (MLP). These methods are aimed at reducing pain levels and mitigating the risk of pressure ulcers in patients who remain bedridden for extended periods. The analysis reveals that both interventions yielded statistically significant improvements; however, their effects varied across multiple assessed parameters. In terms of pain reduction, CLRT demonstrated a notable ability to alleviate pain experienced by patients during activities. This was supported by a statistically significant p-value of 0.0033, indicating a robust effect. Furthermore, CLRT suggested a positive trend toward pain reduction in patients at rest, which is significant as it underscores the potential benefits of automated positional changes. The mechanics behind this improvement may relate to the smoother and more consistent rotation cycles offered by CLRT, resulting in enhanced overall comfort during patient movements. Conversely, MLP exhibited significant pain alleviation both when patients were at rest (with a p-value of 0.0016) and during physical activities. This indicates that hands-on repositioning might provide immediate and localized relief for patients experiencing discomfort. The tactile engagement from caregivers during MLP could allow for more precise adjustments based on the unique needs and conditions of each patient, potentially leading to a greater immediate impact on pain levels. To assess the overall health status of the patients, researchers applied the Norton Scale, which evaluates five crucial domains: physical condition, mental condition, activity levels, mobility, and incontinence. Results indicated notable advancements across all these domains for both CLRT and MLP. This finding suggests that both interventions contribute to a more holistic improvement in patient health. Notably, CLRT yielded higher post-intervention scores specifically in mobility and activity domains, emphasizing its potential role in supporting functional recovery for patients who are severely immobile. By facilitating consistent micro-movements, CLRT may aid in the prevention of deconditioning and enhance quality of life. Additionally, it is important to recognize the practical implications of these findings, especially in resource-limited settings. In such environments, the feasibility of performing frequent manual repositioning may be hindered by staffing challenges. In these cases, CLRT presents a compelling alternative due to its ability to automate the repositioning process, thereby reducing the demand for constant human intervention. However, MLP remains a vital technique, particularly in scenarios where personalized assessments and careful manual handling can be safely executed, thus ensuring that patient comfort and safety are prioritized. Moreover, this study aligns with the existing body of literature that emphasizes the critical role of regular repositioning in the prevention of pressure ulcers and supports CLRT as a promising alternative or complement to manual methods. Overall, it is essential for healthcare providers to tailor their choice of intervention based on individual patient needs, the specific capabilities of their institution, and the level of training and expertise available among caregivers. This personalized approach is necessary to optimize patient outcomes and ensure the best standard of care.

3. CONCLUSION-

CLRT (Continuous Lateral Rotation Therapy) and MLP (Manual Lateral Positioning) are effective strategies for preventing pressure ulcers and managing pain in bedridden patients. CLRT is particularly beneficial for improving mobility and activity tolerance, while MLP is more effective at reducing resting pain. The choice between these strategies should be based on the specific needs of the patient and the available healthcare resources.

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