

Pressures to Bony Prominences in Lateral Turned Position Comparison of Pressure Reduction Achieved by Support Device Used

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BACKGROUND

The practice of turning and repositioning is the obvious essential intervention to reduce risk and treat trunk pressure injuries.

However, the quality of the turned position in terms of depressurization achieved is not well explored.

There is likely a high variance of pressures exerted onto the sacral region depending on the real angle of the turn and the support device used to support the position.

In this study we explore sacral pressures as measured by the most common support devices used to support the position.

OBJECTIVES

- ❖ This study seeks to measure the level of pressure reduction achieved in the lateral turned position.
- ❖ We compare actual pressures to bony prominences when supported by 4 different commonly used positioning devices.
- ❖ We ask the subject to report relative comfort of each device.

METHODS

- ❖ We measured a volunteer subject with a history of Quadriplegic Spinal Cord Injury. The subject is male, 5'11", and weighs 79kg
- ❖ Subject was on a Linet Protevo GTE low air mattress with MCM and TurnAssist® frame technology
- ❖ The subject was supported in side lateral turn position using each of 4 different support devices listed in materials section
- ❖ We measured pressures to bony prominences of the sacrum, the scapula and buttocks on the supported side, and the trochanter and scapula on the supported side.
- ❖ We asked the subject to report relative comfort of each device.
- ❖ The average of all pressures recorded is calculated to surmise overall performance.

MATERIALS



The Juzo Pressure Monitor Used to measure pressures (Juzo, Cuyahoga Falls, OH)



Measures direct pressures in mmHg



Applied directly to each bony prominence



The Levogage Angle Measure was used to measure body angle in turned position from sternum and pubic bone (Sun Company, CO)

COMPARED SUPPORT DEVICES

We tested a representative sample of devices typically used for supporting a turned position

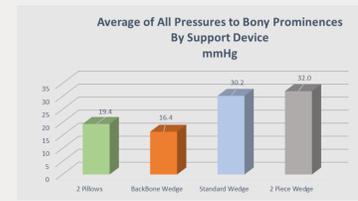
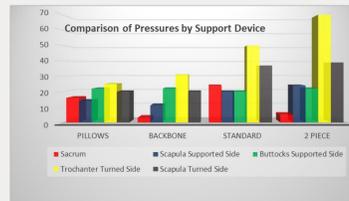


Standard Hospital Pillows Standard wedge BackBone wedge 2 piece wedge

RESULTS

Pressures, angles and comfort turned position varied by device

- ❖ Pressures to sacrum in turned position ranged from as low as 3mmHg (BackBone) to as high at 24mmHg (Standard Wedge)
- ❖ Pressures to other bony prominences were affected by the firmness of the device and the degree of turned angle



2 Pillows	
Average of all Pressures	19.4mmHg
Sacral Pressure	24mmHg
Trochanter Pressure	25mmHg
Angle at Chest	<30°
Angle at Pelvis	15°
Comfort Level	3



BackBone Wedge	
Average of all Pressures	17.4mmHg
Sacral Pressure	3mmHg
Trochanter Pressure	31mmHg
Angle at Chest	>30°
Angle at Pelvis	15°
Comfort Level	4



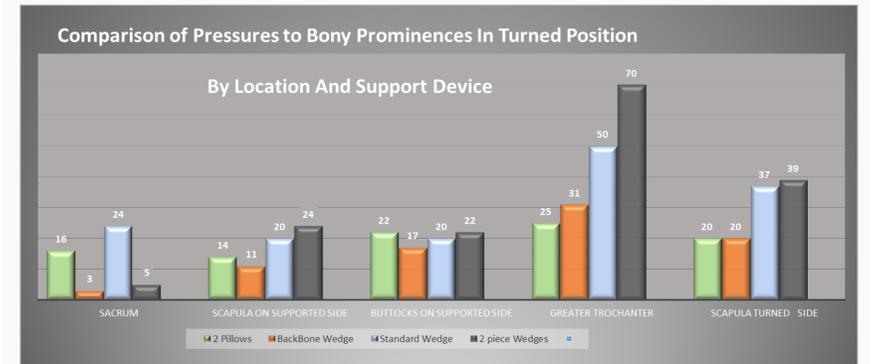
Standard Wedge	
Average of all Pressures	30.2mmHg
Sacral Pressure	24mmHg
Trochanter Pressure	50mmHg
Angle at Chest	>45°
Angle at Pelvis	30°
Comfort Level	7



2 Piece Wedge	
Average of all Pressures	32mmHg
Sacral Pressure	5mmHg
Trochanter Pressure	70mmHg
Angle at Chest	>45°
Angle at Pelvis	30°
Comfort Level	9

- ❖ All devices supported the upper torso by at least 15 degrees greater angle than the pelvis
- ❖ The foam wedges “cut” to 30 degree angles supported the subject at a torso angle greater than 45 degrees.
- ❖ Higher turn angles and firmness were associated with intolerable discomfort.
- ❖ A 30 degree pelvic angle caused excessive pressures to the trochanter in all cases

RESULTS (Cont)



	Sacrum	Scapula on Supported Side	Buttocks on Supported Side	Greater Trochanter	Scapula Turned Side	Avg of All Pressures	Comfort Scale 0 = no discomfort 10 = Unbearable	Chest Angle	Pelvis Angle
2 Pillows	16	14	22	25	20	19.4	3	30°	15°
BackBone Wedge	3	11	17	31	20	16.4	4	>30°	15°
Standard Wedge	24	20	20	50	37	30.2	7	>45°	30°
2 piece Wedges	5	24	22	70	39	32	9	>45°	30°

CONCLUSIONS

- ❖ The level of pressure reduction in lateral turned position varies dramatically depending on the device used and the angle of the turn.
- ❖ Best overall pressure reduction was achieved by the crescent shaped wedge The BackBone as measured by calculating the average of all pressures
- ❖ Triangle shaped wedges angled at 30 degrees support the torso to 45 degrees or greater and the pelvis to 30 degrees or greater. This angle of turn places excessive pressure the trochanter and puts the patient in an ergonomically uncomfortable position
- ❖ Comfort is significant predictor of effectiveness and stability.

IMPLICATIONS & Future Studies

- ❖ Variability of pressures to bony prominences and turn angles achieved are likely to change greatly over time. Important considerations are stability, level of immersion, distribution of pressure, angle of turn, head of bed angle, and sliding.
- ❖ Future study to measure the capacity of each support device to maintain adequate support and pressure reduction over time is warranted.
- ❖ Additional exploration into how physical movement, physiologic conditions and patient comfort affect position and pressure reduction would be highly contributive to improving the practice of turning.
- ❖ Comparing pressures and performance of positioning support devices on standard mattress surfaces could provide helpful information toward reducing as community acquired pressure injury.

References

Please see attached reference list