

# **2008 PRONE/SUPINE PERCEPTION SURVEY & LITERATURE REVIEW COMPARISON STUDY**

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## **ABSTRACT**

The concern for safer physical restraints continues to permeate discussions for child and youth residential care facilities worldwide. The most controversial conversation appears to be centered in prone physical restraints versus supine physical restraints. In New York State, the Office of Mental Health (OMH) teaches the use of supine restraints and has banned the use of prone physical restraints in its licensed youth residential centers. The Office of Child and Family Services (OCFS) allow use of prone restraints in its licensed youth residential centers. Many youth residential centers are licensed by both agencies that had resulted in confusion and contradictions in training and program implementation. This three (3) year quantitative perceptions study and literature review is designed to assess basic differences in physical and emotional risk, safety, efficiency, and training associated with using supine, prone, and all physical restraints. The data will be forwarded to the OMH and the OCFS for review to determine if a shift in the type of floor restraints is warranted.

## **LITERATURE REVIEW**

The research was conducted using MasterFile Premier, Academic Search Premier, ERIC, and PsycINFO databases.

## **INTRODUCTION**

Safety of both youth and staff during physical restraints is paramount for any conversation regarding restraints but even more challenging when using floor restraints (CWLA, 2002; Day, 2002, Holden et al., 2001). There has been relatively limited research comparing the use of restraints particularly the prone and the supine physical restraints. A perception survey was conducted in one (1) New York State children's residential center in 2006, 2007, and 2008 at approximately 12 month intervals. The agency uses both the OCFS approved prone restraint and the OMH approved supine restraint and included staff that had experience using both techniques for a total (n-354) for all studies. The study included n-54 in 2006, n-127 in 2007 and n-173 in 2008. The literature review represented 54 articles that were selected based on their relevance to the specifics of this study.

## **METHODOLOGY**

This quantitative study used a Likert scale to measure staff perception in one (1) agency currently using both a prone and supine restraint. The data collected for the study was derived from a staff perceptions survey and included the mean and paired sample correlations as well as an analysis of the variables (ANOVA). A narrative review of the literature was also incorporated.

## DATE ANALYSIS

### 2006-2008 Prone/Supine Study Summary

- The survey was conducted in 2006, 2007, and 2008 at approximately 12 month intervals
- There were n-54 respondents in 2006, n-127 respondents in 2007, and n-173 for a total of 354 completed surveys
- In the 2008 survey, eight (8) reported they completed the 2006 survey, 15 reported completing it in 2007, and 24 respondents reported completing both surveys
- There was a much higher proportion of women (59%) completing the survey in 2008 as compared to prior years in which only 47% of the data came from women prior to 2008. This was the only important difference between 2008 data and prior years

### 2008 Prone/Supine Results

#### *Demographics*

- Of the 173 respondents, all but three (3) said they were trained in TCI/OCFS prone restraints and all but 4 said they were trained in the OMH/PMCS supine restraints
- Respondents reported that they used the prone technique more than the supine technique
- Those who used the prone technique more tended to use the supine technique more as well
- Men reported significantly greater use than women of both the prone and supine techniques
- Respondents ages 30-39 reported significantly greater use of the prone technique than those 18-25 and there was a significant increase in the use of the prone technique as years in child care increased
- Supervisors reported significantly greater use of the prone technique than direct care workers

#### *19-Item Questionnaire Analysis*

Respondents were asked their level of agreement with 19 statements which were made both about prone and supine techniques on a five (5) point Likert Scale with one (1) being strongly disagree five (5) being strongly agree. *Agree* for this report includes a range of 3.26-5.0, *disagree* includes 1.0-2.74, and neither *agree or disagree* (mid range) includes 2.75-3.25. The reliability of the prone and supine scales were tested by factor analysis; using only the 173 most recent completed questionnaires, factor analysis was done for both the 19 item prone technique and the 19 item supine technique. The Cronbach Alpha for both scales was .64, which is close to the cut off of .70 the point at which a scale is considered reliable.

Most of the responder perceptions reported in 2008 indicated there were relatively no significant differences in the prone and supine techniques based on the 19-item questionnaire. This is quite different than previous years (2006 & 2007) when respondents tended to view the supine technique significantly more negatively than the prone technique.

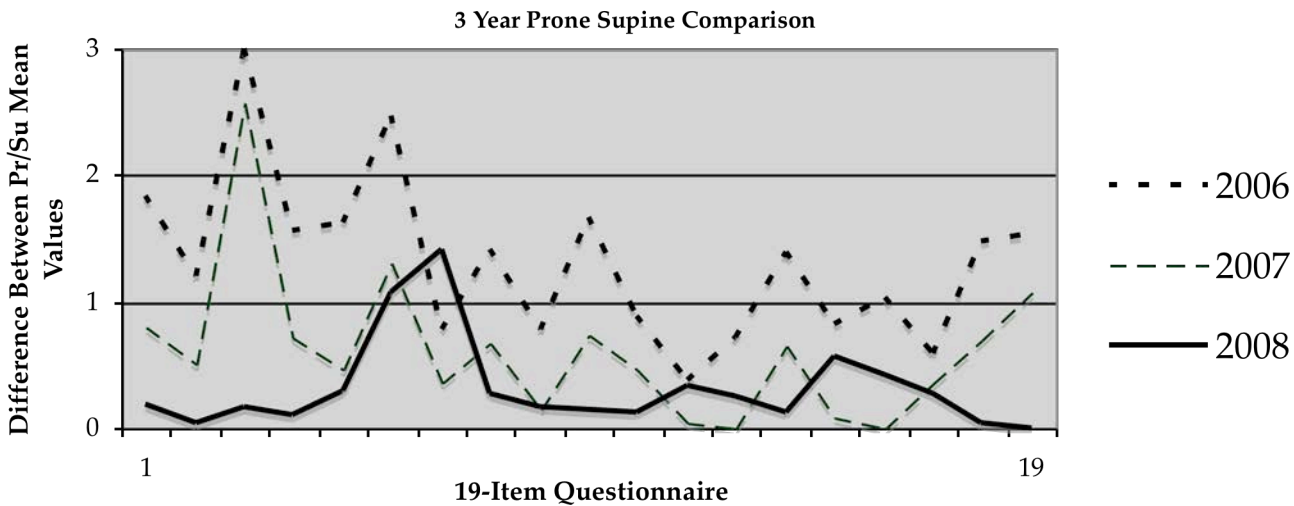
2008 Agreement (respondents generally agree that neither technique):

- increases aggression or counter aggression more than the other
- increases spitting more than the other
- produces longer restraints more than the other
- has a negative effect on the treatment environment more than the other
- has more risk of injury to staff than the other
- has more potential for safety violations than the other
- is more secure than the other than the other

- is safer for the youth than the other
- is safer for staff than the other
- takes longer to learn than the other
- is more difficult to maintain the skill than the other
- is more likely to have injuries during training than the other
- is more difficult to perform with limiting physical conditions
- is more intrusive to the youth than the other
- neither have more risk of injury to youth than the other

A comparison can be drawn by using the differences in means for each of the 19 questions for the three (3) years as indicated in *Figure 1*. Except for questions 6, 7, 15, & 16 (takes more than two (2) staff, conducted by experienced staff, longer to learn & more difficult to maintain) which refer primarily to the mechanics of the techniques, the differences in the means decreased significantly in the remaining 15 questions for all three (3) years. The mean range for 2006 was .72-3.0 with an average of 1.33; 2007 was .01-2.77 with an average of .62; and 2008 was .01-1.42 with an average of .32. Overall, the decrease in mean differences would indicate that responder's perceptions have changed considerably over the period of the study and that in general, neither prone or supine is perceived as more or less favorable.

*Figure 1.* Prone/Supine 19-Item Questionnaire Comparison Study - 2006, 07, & 08



- |                                     |  |
|-------------------------------------|--|
| 1 - increased aggression            | 11 - more safety violation potential                         |
| 2 - increased counter aggression    | 12 - more secure   |
| 3 - increased spitting              | 13 - safer for youth   |
| 4 - longer restraints               | 14 - safer for staff   |
| 5 - negative effect on relationship | 15 - takes longer to learn                                   |
| 6 - take more than 2 staff          | 16 - more difficult to maintain skill                        |
| 7 - conducted by exp. staff         | 17 - more likely for training injuries                       |
| 8 - negative effect on tx env       | 18 - more difficult for staff w/limiting physical conditions |
| 9 - more injury risk to youth       | 19 - more intrusive to youth                                 |
| 10 - more injury risk to staff      |  |

## LIMITATIONS

### *Perception survey*

- The sampling was from one agency
- The agency had been using prone restraints primarily for years and the supine had been introduced in the past 4 years
- Injury data was not available
- Some of the survey questions scales were reversed in error and the survey results had to adjust for that reversal

### *Literature review*

- Some of the prone restraint data included hobble and “hog-tie” application of the prone restraint
- There is no apparent data available relevant to the number of restraints used in residential care settings comparing prone, supine, and other restraints
- A few of the reviewed data had limited research cites available

## CONCLUSIONS

In prior years respondents agreed that the supine technique was more likely to increase counter aggression, increase spitting, produce longer restraints, have more negative effect on the treatment environment, and was more intrusive to the youth than the prone restraint however, the 2008 survey indicates otherwise. This change seems to reflect that respondents over the course of three years for the study and as they became more comfortable with the supine technique have changed their perceptions of the two (2) techniques. Respondents appear to find no significant advantages or disadvantages for either the prone or the supine technique including the most important consideration, safety for staff and youth.

The literature review indicates there is agreement that all restraints present considerable risk to the youth, are intrusive to the youth, have a negative effect on the treatment environment, and have a profound effect on those youth who have experienced trauma in their lives. Additionally, other factors such as pre-existing physical or medical conditions may affect risk more than the type of restraint that is used.

## FURTHER WORK (RECOMMENDATIONS)

Based on the current literature available and the findings from the limited perception survey, additional extensive research remains to be done. First, a study should be initiated to determine the percentage of prone, supine, and other restraints currently being used in residential care. Next a comparison of injury data for all types of restraints should be initiated. Finally, the field might be most informed by studies related to youth perceptions of restraints, for those who reside in residential care and have been physically restrained.

**PRONE/SUPINE PERCEPTION SURVEY 2006/2007/2008 COMPARISON**

Independent Variables	Paired Sample Statistics 2006 (N-54)			Paired Samples Statistics 2007 (N-127)			Paired Sample Statistics 2008 (N-173)		
	Mean	Sig.	Outcome	Mean	Sig.	Outcome	Mean	Sig.	Outcome
1) a. Prone increases aggression	2.22	.000	Disagree	2.72	.000	Disagree	2.63	.026	Disagree
b. Supine increases aggression	4.06		Agree	3.52		Agree	2.83		Agree
2) a. Prone increases counter-aggression	2.19	.000	Disagree	3.02	.004	Neither agree or disagree	2.77	.586	Neither agree or disagree (both)
b. Supine increases counter-aggression	3.39		Agree	3.52		Agree	2.82		
3) a. Prone increases spitting	1.85	.000	Disagree	2.22	.000	Disagree	2.19	.195	Disagree
b. Supine increases spitting	4.89		Agree	4.79		Agree	2.02		Disagree
4) a. Prone produces longer restraints	2.24	.000	Disagree	2.85	.000	Disagree	2.78	.150	Neither agree of disagree (both)
b. Supine produces longer restraints	3.80		Agree	3.62		Agree	2.89		
5) a. Prone has a negative effect on relationship	1.98	.000	Disagree	2.76	.001	Disagree	2.61	.001	Disagree
b. Supine has a negative effect on relationship	3.61		Agree	3.23		Agree	2.91		Agree
6) a. Prone takes more than two staff	2.44	.000	Disagree	3.15	.000	Neither agree or disagree	3.11	.000	Neither agree or disagree
b. Supine takes more than two staff	4.91		Agree	4.47		Agree	2.03		Disagree

7) a. Prone needs to be conducted by experienced staff	3.00	.000	Neither agree or disagree	3.42	.003	Agree	3.79	.000	Agree
b. Supine needs to be conducted by experienced staff	3.78		Agree	3.77		Agree	2.37		Disagree
8) a. Prone has a negative effect on treatment environment	2.06	.000	Disagree	2.71	.000	Disagree	2.69	.007	Disagree
b. Supine has a negative effect on treatment environment	3.48		Agree	3.39		Agree	2.96		Neither agree or disagree
9) a. Prone has more risk of injury to youth	2.24	.000	Disagree	3.51	.366	Agree	2.89	.030	Neither agree or disagree
b. Supine has more risk of injury to youth	3.02		Neither agree or disagree	3.66		Agree	3.06		(both)
10) a. Prone has more risk of injury to staff	2.07	.000	Disagree	3.18	.000	Neither agree or disagree	2.68	.087	Disagree
b. Supine has more risk of injury to staff	3.72		Agree	3.92		Agree	2.82		Neither agree or disagree
11) a. Prone has more potential for safety violations	2.33	.000	Disagree	3.25	.000	Agree	2.88	.052	Neither agree or disagree
b. Supine has more potential for safety violations	3.22		Agree	3.72		Agree	3.01		(both)
12) a. Prone is more secure	3.39	.156	Agree	3.31	.792	Agree	2.78	.001	Neither agree or disagree
b. Supine is more secure	3.00		Neither agree or disagree	3.36		Agree	3.12		
13) a. Prone is safer for the youth	3.50	.003	Agree	3.35	.956	Agree	2.82	.009	Neither agree or
b. Supine is safer for the	2.78		Disagree	3.36		Agree	3.07		or

youth									disagree
14) a. Prone is safer for staff	3.59	.000	Agree	3.76	.000	Agree	2.68	.113	Disagree
b. Supine is safer for staff	2.19		Disagree	3.10		Neither agree or disagree	2.81		Neither agree or disagree
15) a. Prone takes longer to learn	2.35	.000	Disagree	2.81	.589	Neither agree or disagree	2.63	.000	Disagree
b. Supine takes longer to learn	3.17		Neither agree or disagree	2.90		Neither agree or disagree	3.12		Neither agree or disagree
16) a. Prone is more difficult to maintain the skill	2.15	.000	Disagree	2.99	.962	Neither agree or disagree	2.67	.000	Disagree
b. Supine is more difficult to maintain the skill	3.19		Neither agree or disagree	2.98		Neither agree or disagree	3.09		Neither agree or disagree
17) a. Prone is more likely to have injuries during training	2.17	.001	Disagree	2.98	.032	Neither agree or disagree	2.69	.002	Disagree
b. Supine is more likely to have injuries during training	2.76		Disagree	3.33		Agree	2.96		Neither agree or disagree
18) a. Prone is more difficult to perform with limiting physical conditions	2.37	.000	Disagree	3.02	.001	Neither agree or disagree	2.90	.684	Neither agree or disagree
b. Supine is more difficult to perform with limiting physical conditions	3.85		Agree	3.71		Agree	2.86		Neither agree or disagree
19) a. Prone is more intrusive to youth	2.26	.000	Disagree	2.61	.000	Disagree	2.77	.892	Neither agree or disagree
b. Supine is more intrusive to youth	3.81		Agree	3.68		Agree	2.78		(both)







**2008 LITERATURE REVIEW PRONE/SUPINE COMPARISON STUDY OF RESTRAINTS**

<i>Theory</i>	<i>Supporting Literature</i>		
	<b>Prone</b>	<b>Supine</b>	<b>All Restraints</b>
1. Increases Aggression	(Riley, 2006)  Prone restraint is associated with violence and high-intensity observation after the incident.  The prone position is said to aid in focusing disoriented patients and decreased aggression.	(Leadbetter, 2003; Protection & Advocacy, Inc., 2002; Winston, 2004)  Visual stimulation can escalate behavior. Severe psychological distress can lead to capture myopathy.	(Evans, 2002; Kennedy, 2000; Mohr, 2000)  Restraints can contribute to existing agitation. Restraints can provide stimulus reminders of past abuse situations and can reactivate a hippocampus damaged by chronic increases in cortisol levels. Seen as a perceived threat and elicits a hyperarousal state.
s2. Increases counter-aggression	No Data Found	No Data Found	(Scottish Institute, 2005); (University of Stirling, 2000)  Restraints cause anxiety for staff as well as children and can be traumatic for both. Client aggression can evoke staff counter/aggression
3. Increases spitting	No Data Found	(Winston, 2004)  Position increases the likelihood of spitting.	No Data Found
4. Produces longer restraints	No Data Found	(Winston, 2004)  Supine restraints last longer than prone restraints. The visual stimulation can result in a longer restraint.	No Data Found
5. Has a negative effect on	(Scottish Institute, 2005)  More likely to be perceived by	No Data Found	(Bower, 2003; Kennedy, 2000); Scottish Institute, 2005; Smith, 1995; University of Stirling; Zun,

relationship	the child as punishment.		<p>2004; Ferleger, 2008)</p> <p>Patients believed that they were being punished even though nurses denied the accusation. Patients believed that restraints made the nurses feel powerful and nurses stated that they did not. Conduct disordered children have a damaged perception of adults to begin with therefore, physical interventions are over-interpreted. Feeling overpowered or punished can damage the staff-child relationship. Demoralization and loss of self-esteem. In patients with history of sexual abuse, the procedure is often perceived as re-victimization with the person or people implementing the restraint perceived as perpetrators.</p>
6. Takes more than two (2) staff	No Data Found	No Data Found	<p>(AACAP, 2001; (JCAHO, 1998)</p> <p>Root cause analysis has indicated insufficient staffing levels related to incidents. All restraints require at least 2 people.</p>
7. Needs to be conducted be experienced staff	No Data Found	No Data Found	<p>(Goren, 1996; Kennedy, 2000; Bigwood &amp; Crowe, 2008))</p> <p>Persistent use of restraints may be related to lack of confidence of staff and this influences the management of patients labeled as deviant.</p>

<p>8. Has a negative effect on treatment environment</p>	<p>No Data Found</p>	<p>No Data Found</p>	<p>(Bower, 2003; Mohr, 2000 Scottish Institute, 2005; Sourander, 2002; Vittengl, 2002; Ferleger, 2008)</p> <p>With a history of abuse, restraints witnessed by other children can lead to a stress reaction related to a reminder of past trauma.</p>
<p>9. More risk of injury to youth</p>	<p>(Chan, 1997; Chan, 2004; Day, 2002; Dorfman, 2000; Harvey, 2007; Joint Commission on Accreditation of Health Care Organizations (JCAHO); Mohr, 2000; Nelstrop, 2006; Scottish Institute 2005; Schmidt, 1999; Whittington et.al, 2006; Winston, 2004)</p> <p>Appears to be a risk factor contributing to death. Higher risk of serious harm than supine techniques even when done correctly. The prone position along with contributing factors such as chest or torso compression, acute psychosis, exertion and obesity place the patient at risk for positional asphyxia. Prone restraint is more restrictive than supine. Prone position may predispose the patient for suffocation. The prone position is associated with the majority of restraint-related deaths. Any facedown</p>	<p>(American Academy of Child and Adolescent Psychiatry (AACAP); Chan, 1998, (JCAHO, 1998; AACAP, 2001; Bettina, 2002; Brodsky, 2001; Brodsky, 2002; Gustafsson, 2003; Harvey, 2007; Hick, 1999; Joint Commission on Accreditation of Health Care Organizations (JCAHO); Jonsson, 1984; Leadbetter, University of Stirling, 2003; Nelstrop, 2006; O'Halloran, 2000; Parkes, 2002; Parkes, 2000; Patterson, nd; Peces-Barba, 2004; Scottish Institute, 2005; Whittington et. Al., 2006)</p> <p>Supine position may predispose the patient for aspiration or choking. In the supine position, there is the actual weight of the heart on the left lung. The supine position leads to increased gas trapping in asthmatic</p>	<p>Bower, 2003; Chan, 1997; Mohr, 2000; Parkes, 2002; University of Stirling; Ferleger, 2008)</p> <p>Restraints can result in strangulation, psychological distress and death. Restraints can never be done without risk. Adverse effects of anticholinergic drugs mistaken for behavior can impair assessment. Stress of restraints and some psychotropic drugs can lead to fatal hyperpyrexia. Prolonged struggle and exertion can lead to rhabdomyolysis that can lead to acute renal failure and death. By itself, the restraint position was not associated with any clinically relevant changes in respiratory or ventilatory function in the population of healthy individuals with preserved ventilatory reflexes and normal pulmonary physiology. There is no evidence to suggest that hypo-ventilatory respiratory failure or asphyxiation occurs as a direct result of body position in</p>

	<p>position may prevent contraction of the diaphragm to some extent. The prone position reduces ventilatory volume and the ability to breathe. The prone position has been associated with increased pulse rate recovery time. Resistance of rib movement with the prone position. An obese person can have displacement of the abdomen. Prone can interfere with compensatory respiratory alkalosis when lactic acidosis occurs. The prone position is dangerous with or without the presence of co-existing conditions or risk factors. The prone position restricts chest wall movement. Alveolar volume is higher in the prone position. Compression of the abdomen causes compression of the inferior vena cava leading to decreased venous return to the heart. Carbon-monoxide diffusing capacity is lower in the prone position. Over long periods of time, the prone position induces increased heart rate, increased PVR and increases plasma nor-epinephrine.</p>	<p>children. The supine position may induce airflow obstruction in asthmatics. More risk for aspiration with the supine restraint. Supine obese patients have marked reductions in lung volume as well as increased intra-abdominal pressure. Higher risk of choking or aspiration.</p>	<p>healthy, awake non-intoxicated individuals with normal cardiopulmonary function at baseline. In cases where additional factors exist, the position of the restrained person may be more relevant. These factors include extreme agitation, forceful and prolonged struggling, obesity, specific drugs, and pre-existing conditions. Any restraint places a child at risk for injury. Children are at a high risk for comotio cordis during take down. The catecholamine rush experienced during struggle can lead to a fatal arrhythmia. Psychological stress and medications that can prolong the QT interval can lead to a fatal arrhythmia. Complications include aspiration pneumonia, cardiac stress and accidental death. Compression to the upper body and inability to move in any position can lead to asphyxia.</p>
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10. More risk of injury to staff	No Data Found	No Data Found	No Data Found
11. More potential for safety violations	No Data Found	No Data Found	No Data Found
12. Less secure	No Data Found	No Data Found	No Data Found
13. Less safe for the youth	<p>(Albert, 2000; 2001; Brodsky, 2002; Joint Commission on Accreditation of Health Care Organizations (JCAHO); Mentzelopoulos, 2003; Mohr, 2000; Peces-Barba, 2004; Pelosi, 1996, 1995; Sawhney, 2005)</p> <p>It is easier to control a person in the prone position &amp; safer for the patient. Less risk of aspiration. Prone position requires less aspiratory pressure to perfuse the lungs, even with decreased diaphragmatic movement. The prone position has been shown to improve lung mechanics and oxygenation in patients with obstructive diseases such as asthma. The prone position improves pulmonary function and lung compliance in the obese patient. The prone position does not negatively affect respiratory mechanics and it improves lung volume and</p>	No Data Found	<p>(Cein, 2005; Kohr, 2003; Mohr, 2000; Rodriguez, 2002; Zun, 2004)</p> <p>There is no significant difference in lung volume, tidal volume and breathing frequency among the positions. A restraint can be a therapeutic intervention if staff provides psychological and informational support throughout the intervention; uncaring attitude and behavior by staff results in increased struggle and can result in physical and psychological harm.</p>

	oxygenization. Although the prone position results in restrictive pulmonary function patterns, it does not result in clinically relevant changes in oxygenization or ventilation.		
14. Less safe for the staff	(Dorfman, 2000) Safer for the staff.	No Data Found	(Mohr, 2000) Restraint places the staff at risk for injury.
15. Takes longer to learn	No Data Found	No Data Found	(JACHO, 1998; Mohr, 2003) Root cause analysis indicates inadequate training of staff related to incidences. Improved patient care and outcomes can be the result of proper application by well-trained staff under clearly defined circumstances.
16. More difficult to maintain the skill	No Data Found	No Data Found	(JCAHO, 1998) Root cause analysis indicates inadequate competency review related to incidences.
17. More likely to have injuries during training	No Data Found	No Data Found	No Data Found
18. More difficult to perform with limiting physical conditions	No Data Found	No Data Found	(Patrick vs NY) Case report revealed that an aid was unable to stay off of a patients back during restraint because of knee problems.
19. More	(Bower, 2003)	(Protection & Advocacy, Inc.,	(Allen, 2004; Gallop, 1999;

<p>intrusive to the youth</p>	<p>Feelings of anger, being trapped, helpless, sad, powerlessness, frustration and embarrassment are abated more quickly in the prone position rather than the supine position.</p>	<p>2002) Position is said to be the most restrictive and intrusive.</p>	<p>Kennedy, 2000; Mohr, 2000; Nunno, 2006; Sailas, 2006;)  All restraints are invasive procedures in general. Most patients recall and have aversive reactions to restraints. Restraints are not beneficial and are a noxious experience and are often perceived as punishment. Harmful or inappropriate use of restraints can be considered abusive. The experience of restraint for patients with a history of sexual abuse evokes fear, anxiety, rage and it is not seen as therapeutic even years later.</p>
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