

BILD - Restraint Master Class - Birmingham 10/11 June 2003

The Debate on Prone Restraint

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The following notes are a personal analysis of the evidence. Any conclusions are the personal opinion of the author:-

To date the debate on prone restraint has tended to centre on 4 specific premises:-

Prone restraints are dangerous because: -

1. Prone reduces ventilatory volume & ability to breathe
2. Prone increases recovery time after exertion
3. Prone is only dangerous in combination with other, pre existing risk factors (i.e. health impairments etc)
4. Prone is a potentially fatal position, without the presence of other risk factors

Various mechanisms have been suggested which act to increase risk in prone restraint. These include:-

Positional Asphyxia:- in which the free action of the diaphragm and intercostal muscles is compromised, thereby causing hypoxia, disturbed heart rhythm and death. This factor will be significantly increased in prone restraints, or any procedure in which the movement of the chest is impeded or in which pressure or weight is applied to the back or chest.

Obesity – so the adipose tissue is pushed up into the abdominal cavity during prone restraints

Excited or Agitated delirium:- A state of mental and physiological arousal, agitation, hyperexia and epiphora and hostility. Symptoms include sweating, bizarre behaviour and speech combined with extreme strength and endurance. This condition is often, but not inevitably, associated with substance or stimulant abuse.

Acidosis:- the extreme exertion encountered in restraint situations produces lactic acid. In situations of prolonged struggle the individual may be unable to adequately clear lactic acid production leading to acidosis due to severe exertion, with consequent cardio-vascular collapse.

Psychological response:- Individuals may find a restraint position so aversive and horrifying leading to struggle beyond the point of exhaustion, with consequent physiological consequences. This is similar to the “capture myopathy” observed in trapped wild animals who die due to exhaustion when netted. This may be particularly significant for learning disabled individuals, people on the Autistic spectrum for whom hyper stimulation is frightening and/or young people who have suffered previous sexual abuse, for whom prone restraints replicate the experience.

Breathing requires 3 components: -

1. A patent airway
2. the lungs where gas exchanges occur
3. a ventilatory apparatus or bellows that moves gases between the external environment and the lungs (Chan 1998)

Fatality occurs where one of these is compromised.

Various studies have attempted to scientifically measure the physiological changes imposed by restraint in a prone position. Many reach contradictory conclusions. All can be criticised on the grounds that these laboratory experiments fail to replicate operational reality.:-

Study	Effect
Reay et al 1988	Decreased heart rate & oxygen saturation
Roeglia 1997	40% reduction in expiratory volume + blood pressure & heart rate
Schmidt et al 1999	Marginal reduction in respiration
Cary et al 2000	Impairment of ventilatory function No impairment of cardio respiratory function
Hicks et al	20% reduction in ventilatory volume between prone & seated
Roeglia et al 1997	Cardiopulmonary functioning dramatically altered after 3 minutes 40% reduction in ventilatory & expiratory capacity – Blood pressure & heart rates reduced
Hick et al 1999 :-	Recovery longer – marked effects on respiratory alkalosis
Chan et al 1997	No significant differences in recovery rates – prone vs seated
Chan et al 1998	No significant difference in oxygen saturation rates

Hartford Courant database

The Hartford Courant database was collated by investigative reporters concerned at the increasing, yet invisible, number of restraint related fatalities in the USA. This lists a total of 142 deaths from 1988 to 1998. Ages of the deceased range from 6 to 84. Although the published data lacks detail and codification therefore presents problems, it is possible to identify certain trends. Around 54% of the cases cited contain no information on the method/type or position of restraint. Of the remainder, 50% were associated with a wide variety of factors in which the mechanical restraint of elderly people featured prominently. However:-

- 31% involved restraint in a prone position
- a further 7% involved some kind of floor restraint
- 11% involved “ take downs “ to the floor
- 3% involved basket holds.

- In all, taking the restrained person to the floor was implicated in around 49% of cases where the method of restraint was specified.

A subsequent summary of reports collated by the National Alliance for the Mentally Ill (NAMI, 2000). 58 recorded incidents from October 1998. 13 clearly involve fatalities.

- of these 31% involved prone restraint
- 15% taking to the floor
- 15 % basket holds
- the methods used were unknown in 39% of cases.

Parkes (1999) review of UK literature:-

“ It is concluded that restraint position may be a factor in death during restraint, but only where other factors contribute to the overall situation “

Morrison et al (April 2002)

Protection & Advocacy Inc. – independent, non - profit agency statutory investigative powers for persons with developmental & psychiatric disabilities – investigated 12 fatalities >August 1999 in California. Based on pathological evidence:-

Conclusions:-

“ The prone restraint was a significant contributing factor in the demise of the individuals restrained . p3 “

Timing does not matter – One can only go for a minute or two without breathing before running into difficulties” p26

“ Outcome entirely attributable to the position of restraint or containment – pushing the abdominal contents up to the vertebral column sandwiches them between the floor and the pelvis. They press up against the diaphragm and you cant breathe. This causes sudden death “ p 29

“ So even without any other contributing factors, simply restraining an individual prone restricts the ability to breathe, thereby lessening the supply of oxygen to meet the bodies demands “ p 17

Conclusions:-

Proposition 1 - Prone impairs breathing – supported

Proposition 2 – Prone impairs recovery rates – possibly – more research required

Proposition 3 - Prone is only dangerous in combination with other, pre existing risk factors. Not supported – In combination with other factors prone is certainly dangerous – but:-

Proposition 4 - Prone is a potentially fatal position without the presence of other risk factors – supported

Implications:-

1. **Practice** – to be avoided wherever possible – if a prone position is assumed by the subject – reposition ASAP.
2. **Legality** – a) Evidence is that prone is exceptionally high risk, b) It must also be noted that the use of Prone restraints for Children & Learning Disabled adults are confirmed as high risk and/or advised against in authoritative documents issued by, or on behalf of Government Departments i.e. DoH/Scottish Office 1996; HMSO 1996; CRCC 1997; DoH/DfES 2002 Use would need to be considered in context of human rights (i.e., Human Rights Act 1998 etc) and measured against “*The Principle of Least Restriction*”\ potentially hard to defend, particularly for vulnerable groups. Routine use probably not defensible.

Potentially only defensible (if then) where: -

- supported by systematic risk assessments
- systematic demonstration that alternatives are ineffective
- demonstration that a greater risk would occur if not used

Court precedents are awaited

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Further reading

Allen, D (2000) - Training Carers in Physical Interventions: Towards Evidence Based Practice, British Institute for Learning Disabilities

Allen, D (Ed) (2003) – Ethical Approaches to Physical Restraint – BILD

Day, P. (2002) - What evidence exists about safety of physical restraint by law enforcement and medical staff to control individuals with acute behavioural disturbance NZHTA Tech Brief Series, Sept 2002 Vol1 No 3

Morrison, L, Duryea, P,B. Moore, C, Nathanson – Shinn, A, - (April 2002) The Lethal Hazard of Prone Restraint – Positional Asphyxia. Protection & Advocacy Inc Publication No 7018.01

Paterson, B. & Leadbetter, D (2000) - Restraint & Sudden Death from Asphyxia, *Journal of Safe Management of Disruptive and Assaultive Behaviour Volume VIII/ Issue III, Winter 2000*.

Paterson, B., Bradley, P., Stark, C., Saddler, D, Leadbetter, D., Allen, D (2003) Restraint Related Deaths in Health and Social Care in the UK: learning the lessons, *Mental Health Practice, June 2003, Vol 6, No 9 pp 10 - 17*

Simpson, S, Freeman, M (May 2000) - Addressing the Prone Position in Control & Restraint – Examining the Literature(*web* - see below)

WWW. Prone Restraint (numerous papers & news reports)