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Review

Review of the medical and legal literature on restraint chairs

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ABSTRACT

Use of restraint chairs by law enforcement for violent individuals has generated controversy and a source of litigation because of reported injuries and deaths of restrained subjects. The purpose of this study is to review the available medical and legal literature and to allow the development of evidence-based, best practice recommendations to inform the further development of restraint chair policies.

This is a structured literature review of four databases, two medical and two legal. The medical review focus was on the restraint chair with additional review of materials regarding other restraint methods and options. The legal review focused on litigation cases involving the restraint chair.

The review of the medical literature revealed 21 peer-reviewed studies investigating the physiological or psychological effects of using a restraint chair on humans or primates. Of these studies, 20 were performed on primates. The single human study revealed no clinically significant effects from the restraint chair on test subjects. The legal literature review revealed very few cases where the restraint chair was either a major or minor focus. The overall issues relating to the restraint chair cases involved deviations from set protocols and rarely involved issues with the chair itself.

The available medical literature reveals that the restraint chair poses little to no medical risk. Additionally, when used appropriately, the restraint chair alone carries little legal liability. With proper monitoring and adherence to set protocols, the restraint chair is a safe and appropriate device for use in restraining violent individuals.

1. Introduction

Law enforcement encounters that require the use of force resulting in arrest have increased in recent years. Additionally, the prison population has grown, which has increased the need and frequency for law enforcement to use methods to restrain combative and self-injurious individuals. The restraint chair is one such tool used to protect both the law enforcement officer as well as the subject. Individuals are seated in this chair, where their ankles, wrists and chest are secured with a series of straps to limit movement. This procedure usually involves several officers and requires approximately 30–60 s. The development of standardized policies for the use of the restraint chair for inmates in correctional institutions have been ongoing across this U.S. and Canada for decades. Most of these have been done at a local level and vary agency to agency.

The purpose of this study is to complete a comprehensive literature review on the available medical and legal data and to allow the development of evidence-based recommendations to inform the further development and improvement of restraint chair policies.

2. Methods

We performed a structured literature review of four databases, two medical and two legal. The medical review focus was on the restraint chair with additional information on other restraint options and materials relating to other restraint methods. The legal

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review focused on litigation cases involving the restraint chair. The medical literature search was completed using the PubMed and PsychINFO databases. The search of legal proceedings was conducted using two sources focusing on litigation in Canada (CanLII) and the United States (WestLawNext) using the search terms "Restraint Chair" and "Chair Restraint".

PubMed (www.ncbi.nlm.nih.gov/pubmed) is comprised of more than 23 million citations for biomedical literature from a variety of sources such as MEDLINE, life science journals, and other online publications and is maintained by the United States National Library of Medicine (NLM) at the National Institutes of Health as part of the Entrez system of information retrieval. The terms "Restraint Chair", "Chair Restraint", and English language were used for this search.

PsychINFO (www.apa.org/pubs/databases/psycinfo/index.aspx) is maintained by the American Psychological Association and is an expansive abstracting and indexing database with more than 3 million records in the behavioral sciences and mental health, making it an ideal discovery and linking tool for scholarly research in a host of disciplines. The limitations for this search were "Restraint Chair", "Chair Restraint", English language and journal article (Journal, Journal Article, Peer-Reviewed Journal and Peer-Reviewed Status Unknown).

An additional medical literature search was performed to identify other possible pertinent literature covering other restraint options. Due to limited research in the area of restraint chairs, "emergency restraint" and "physical restraint" key words were also searched. When an article was found, "related articles" were searched as well as the references sections.

The search of legal proceedings was conducted using two sources focusing on litigation in Canada and the United States using the search terms "Restraint Chair" and "Chair Restraint". For litigation in Canada, the Canadian Legal Information Institute's (CanLII) online database (http://canlii.ca/) was used with no other limitations to the scope of search (legislation, courts, boards and tribunals). CanLII is a non-profit organization managed by the Federation of Law Societies of Canada. CanLII's goal is to make Canadian law accessible for free on the Internet. This website provides access to court judgments, tribunal decisions, statutes and regulations from all Canadian jurisdictions. Cases were not classified further due to the limited number identified.

The litigation in the United States was searched using WestLaw's WestLawNext (http://info.legalsolutions.thomsonreuters.com/westlawnext/default.aspx) search engine to identify cases related to restrain chair use. The WestLawNext search engine is the most comprehensive in the United States and includes over 40,000 WestLaw databases of that include case law, state and federal statutes, administrative codes, newspaper and magazine articles, public records, law journals, and law reviews among others resources. Identified cases were then categorized into the following generalized categories based on the main focus of the case to identify the reasons for litigation associated with restraint chairs. Some cases were included in multiple categories as applicable, and some were included multiple times if more than one ruling was made.

1. Improper Use of the Restraint Chair Causing Pain, Injury or Weakness of a Body Part
2. Improper Monitoring of the Subject Causing Pain, Injury or Weakness of a Body Part
3. Emotional Harm Caused from Use of the Restraint Chair (i.e., Post Traumatic Stress Disorder)
4. Civil Rights Violations in General
5. Civil Rights Violations- Not Given Food/Water
6. Civil Rights Violations – Forced to Urinate or Stool in Restraint Chair due to no Bathroom Breaks
7. Civil Rights Violations - no Medical Care While in Restraint Chair
8. Total Time Too Long in Chair
9. Inappropriate Use of Chair – Used as a Form of Punishment Rather than Safety
10. Inappropriate Use of Chair – Violation of Established Policy
11. Death of inmate placed the restraint chair
12. Restraint Chair Used or Referred to, but Not Focus of Case

3. Results

3.1. Medical literature search

The review of the medical literature revealed 21 peer-reviewed studies involving the physiologic or psychological effects of using a restraint chair on humans or primates.[1–21] Twenty of the studies were animal model evaluations using monkeys placed in a chair to measure various physiologic markers of stress.[2–21] Though interesting, animal models have limited utility when being extrapolated to real world activities and humans in general. These studies showed that the restraint chair does cause measurable levels of elevation of stress markers, but these findings are difficult to interpret and even more challenging to apply to humans. Other literature found in the search focused on using restraint chairs for medical procedures,[22–24] the development or description of restraint chair for primate research,[25–29] or forty additional studies that used a restraint chair for non-restraint focused primate research.

The single human study identified was a prospective cross-over designed human trial measuring the physiologic impact of the chair on respiratory and cardiovascular parameters in ten healthy humans placed in the restraint chair after exercise compared with a regular chair.[1] The subjects were placed in either a restraint chair or a regular chair after a vigorous exercise regimen and had respiratory markers and vital signs monitored for 30 min. The subjects then had a brief rest period, followed by the same exercise regimen and placed into the alternative position for another 30 min with similar monitoring. This study design allowed for the subjects to serve as their own controls for comparison. This study concluded that the restraint chair does result in a small, though clinically insignificant decrease in Maximal Voluntary Ventilation (MVV), the largest volume of air an individual can breathe in and out over a 1-min time period, but did not result in any changes in oxygen saturation or pulmonary end-tidal CO_2. This means the subjects never had a decrease in levels of oxygen in the blood nor did they have any rise in the CO_2 levels - a more sensitive marker for breathing problems. In other words, if there were an impact on breathing or ventilation, the first physiologic marker to be impacted would be a rise in CO_2 levels. This was not demonstrated in this study.

3.2. Alternative searches

We reviewed the websites of restraint chair manufacturers for references to other potential studies, but did not find any.[101,102] Contact with the manufactures directly did not result in any other references being found. Additionally, we contacted well-known attorneys in the field for any other potentially useful data sources, references or research and this yielded the same materials we had already found with the search methods defined in our methods section.

The medical literature was also reviewed for other mechanical restraint methods. The literature in this field was focused mainly on prone restraint, restraint asphyxia, hobble restraints and the physiologic effects that positions have on the human respiratory and cardiovascular systems. The information gleamed from these studies are applicable to field arrest or takedown situations, but do

not have as clear clinical implications for the use of the restraint chair either for medical safety or legal risk mitigation.

3.3. Canadian law case search

A search of all legal cases in Canada using canlii.ca for the key word combination of "restraint chair" yielded a total of 8 cases (list attached). All were reviewed and all cases involved subjects who had either been placed in a restraint chair, but it was not the focus of the case; had the use of a restraint chair discussed, but was not used; or referred to the restraint chair when commenting on other restraints that were actually used (e.g. leg restraints).

3.4. United States law case search

A search of all legal cases in the United States using WestLawNext for the key word combination of "restraint chair" yielded a total of 606 motions and cases. All were reviewed.

Similar to the Canadian cases, many of the U.S. cases involved subjects who had either been placed in a restraint chair, but it was not the focus of the case; had the use of a restraint chair discussed, but not used; or referred to the restraint chair when commenting on other restraints that were actually used (e.g. leg restraints). Alternately, the use of the restraint chair was a major or minor focus of the lawsuit in a number of cases.

Most of the rulings included in the west law search were pretrial motions to get dismissals for specific or all defendants, or other aspects of the claims reduced or adjusted. A number of the rulings were appeals court decisions to either uphold or overturn the lower court rulings. And a few of the rulings were of actual tried cases. Many settled cases are dismissed prior to going to trial, which is why this number is relatively small. The tried cases that resulted in plaintiffs verdicts have been pulled out for highlighting purposes. Though these were the rulings of the trial court, they do not necessarily represent the final determinations, as the individual cases may have gone through the appeals process. These final results would not be available in the original rulings.

In reviewing the cases that went to trial and were ruled in favor of the plaintiffs, the awards to the plaintiffs were in generally small, ranging from $1500 to $10,000. These dollars were awarded based on the use of the restraint chair being interpreted as a form of punishment, and thus a violation of the Due Process Clause. Additional awards were given in compensation for pain and suffering for injuries endured during the use of the chair. Punitive damages were typically not awarded to the plaintiffs. The two large award cases had high dollar amounts awarded that were based on attorney fees and associated trial expenses. The first was for $135,362.50, which constituted attorneys' fees and the second represented $2,389,006.70 in attorneys' fees and $216,585.39 in non-taxable expenses. Appendix A includes an overview of these cases as well as case summaries.

The issues of all cases are summarized in general terms below. The foci of the cases involving the restraint chair were broken down into the following categories, which will be explained in general terms with some specifics below. Some of the cases were involved in multiple categories based on the allegations noted in the lawsuit review and were captured in each applicable section. The complete list of all of the lawsuits is included in Appendix B.

The categories are as follows:

1. Improper Use of the Restraint Chair Causing Pain, Injury or Weakness of a Body Part
2. Improper Monitoring of the Subject Causing Pain, Injury or Weakness of a Body Part
3. Emotional Harm Caused from Use of the Restraint Chair (i.e., PTSD)
4. Civil Rights Violations in General
5. Civil Rights Violations- Not Given Food/Water
6. Civil Rights Violations – Forced to Urinate or Stool in Restraint Chair due to no Bathroom Breaks
7. Civil Rights Violations - No Medical Care While in Restraint Chair
8. Total Time Too Long in Chair
9. Inappropriate Use of Chair – Used as a Form of Punishment Rather than Safety
10. Inappropriate Use of Chair – Violation of Established Policy
11. Death Involving Use of the Restraint Chair
12. Restraint Chair Used or Referred to, but Not Focus of Case

3.5. Improper use of the restraint chair causing pain, injury or weakness of a body part

There were 35 lawsuits that involved allegations of improper use that resulted in the individual complaining of pain, injury or weakness. These included cases of neck and back pain, wrist injuries from restraints being too tight and nerve injuries. Whether or not the allegations were validated cannot be determined, but the knowledge of the complaints and what triggered the allegations are likely as important in formulating a plan to minimize the risk and exposure to these types of lawsuits.

3.6. Improper monitoring of the subject causing pain, injury or weakness of a body part

Five cases involved allegations that the lack of or insufficient monitoring of the individual while in the restraint chair led to a delay in the recognition of a health or medical issue. These cases involved both law enforcement officers and medical staff. The issues ranged from performing neurological evaluations and well-being checks with enough frequency to inadequate documentation of the actual monitoring.

3.7. Emotional harm caused from use of the restraint chair (i.e., PTSD)

Six lawsuits involved allegations of emotional trauma from being placed in to the restraint chair. A number of these cases reflected needs for subsequent and ongoing psychiatric therapies that were likely unrelated to the chair itself. Many of these cases involved subjects who had a history of psychiatric illness requiring psychiatric care prior to the use of the restraint chair.

3.8. Civil rights violations in general

The second largest category of lawsuits revolves around the general issue of civil rights violations in which there were 97 individual suits. Subjects claimed that the chair was inhumane or a violation of their rights. There are cases in which subjects filed suit for actions that occurred during their restraint in the chair. These allegations included such actions as being subjected to TASER electronic control devices, being sprayed with mace or OC spray, being struck with water from a hose, or having the induced sensation of being unable to breathe. Others have reported being beaten or teased and chastised while restrained in the chair.

A number of lawsuits stemmed from the use of the restraint chair as a means to place a feeding tube and force-feed individuals who were becoming malnourished from hunger strikes. Similarly,

some suits alleged civil rights violations for the placement of intravenous access lines and fluid administration to treat dehydration in inmates on hunger strikes.

3.9. Civil rights violations – not given food/water

Seven lawsuits specifically claim civil rights violations that included denial of access to adequate food or water while restrained in the restraint chair for a prolonged period.

3.10. Civil rights violations – forced to urinate or stool in restraint chair due to no bathroom breaks

Ten lawsuits specifically allege that the subjects were forced to urinate or defecate on themselves while restrained in the chair because they were not allowed bathroom breaks. The allegations also vary in that some claim that they were forced to sit in their own excrement or urine for what they considered an inappropriate amount of time before being cleaned.

3.11. Civil rights violations – No medical care while in restraint chair

There were 14 cases identified that allege inadequate medical evaluations or lack of access to appropriate medical therapies while being restrained in the chair. In some cases, these allegations involved the evaluation of injuries that occurred while placing the individual in the chair, including altercations and physical injuries and the use of chemical agents like OC spray or mace. Some alleged that these chemical agents were not appropriately decontaminated prior to chair placement. Others alleged a lack of access to medications while being restrained in the chair.

3.12. Total time too long in chair

A total of 47 lawsuits involved the allegation of prolonged restraint in the restraint chair. Most complaints stemmed from being left in the chair for a single episode of long duration. The time period typically ranged from 5 to 10 h, but there were a number of cases that reported a chair time of 20–30 h. One individual reported having been placed in the restraint chair for over 300 h over a 33-month time interval. A handful of cases alleged that the subjects were left in the chair for multiple days at a time.

3.13. Inappropriate use of chair – used as a form of punishment rather than safety

The largest category, with 109 lawsuits, revolves around the general issue of the chair being used as punishment rather than for treatment or protection of the individual from ongoing injury, self-harm or trauma. These allegations overlap and are intertwined with generalized civil rights violations and often are difficult to separate out. Subjects often claimed that the chair was being used inappropriately as a punitive measure for actions or behaviors that they may have exhibited. These complaints were typically coupled with other civil rights violations such as not being fed or given access to water, excessive abuse while in jail by being sprayed with chemical agents, beaten prior to or while restrained or by being left in their own excrement or urine.

3.14. Inappropriate use of chair – violation of established policy

A handful of cases specifically commented that the correction officers did not follow their own written protocol and used these policy violations as cornerstone for the initiation of their lawsuit.

3.15. Death involving use of the restraint chair

Eleven lawsuits involved death of an individual that was placed in a restraint chair. These eleven suits involved the death of eight individuals. The restraint chair was not necessarily the cause of death, but was either being used at the time the death occurred or the subject was released from the chair shortly before having a cardiac arrest. The issues typically involve subjects who were medically ill or fragile with dehydration, electrolyte disturbances or other medical conditions; exhibiting signs and symptoms of excited delirium syndrome or clinical presentations of illicit drug intoxication. The lawsuits alleged that the subjects did not get adequate medical assessment and treatment.

3.16. Restraint chair used or referred to, but not focus of case

The majority of the lawsuits identified by WestLawNext search with the key words “restraint chair” fell into this category. The individual in the suit may have been placed in the restraint chair at some point, but the focus of the case did not involve the use of the restraint chair. Many of the cases referenced the restraint chair, but the chair was not actually used on the subject. The last major categories were in reference to the length of time a subject was in a non-restraint chair restraint system (cuffed and shackled, restrained to a bed, etc.) and when references to other restraint cases were made during an individual's lawsuit.

4. Discussion

The risks of the restraint chair fall into two major categories, which are divided into legal liability as well as medical liability. The legal liabilities can be minimized by clear and concise protocols and assurance of adherence to these protocols with education, refresher training and close oversight. As noted in the review of legal cases, the majority of cases did not result in monies being awarded at trial. Moreover, any awards given were usually of low dollar value.

It is not surprising that there is a lack of publications involving the restraint chair in the medical literature. The restraint chair is not a medical device, but rather a law enforcement tool. There have been some deaths reported during and after use of the chair, but typically the deaths were attributed to other factors, such as illicit drug use, excited delirium syndrome, or dehydration, but not directly related to the actual use of the chair. With relatively few deaths actually occurring, there would not be a great deal of interest or funding to support research in this area. Thus, there is a dearth of peer-reviewed published research in the medical literature.

Law enforcement and corrections personnel often confront violent, dangerous individuals and those who are at risk for self-harm, who must be physically restrained to ensure law enforcement safety and that of the individual. Due to these situations, authorities have developed a number of physical restraint techniques to subdue and hold such individuals until the risk dissipates.[30–32] Although these restraint techniques are common in law enforcement, correction, and healthcare settings, the medical literature describing their impact is relatively limited. The vast majority of recent literature involves sudden death due to positional asphyxia[30,31,33–39] and excited delirium syndrome (ExDS).[40–42]

Positional asphyxia is a condition when there is an inability to breathe caused by the position of the body. One of the most commonly studied restraint techniques is the prone maximal restraint position (PMRP), which is commonly referred to as the hogtie or hobble restraint. When an individual is in this position, they are prone with his/her wrists secured behind the back, ankles

bound together, and wrists and ankles tied together using handcuffs, cords, chains, or hobble devices.[30,43] This restraint method has been commonly used in the field by law enforcement personnel and in correctional settings.[30,44]

Reports of sudden death in individuals while in this position have been reported in the medical literature for the past few decades, which has created some controversy regarding its safety.[30,36,45] It has been hypothesized that the PMRP prevents adequate chest and abdominal movement and places the individual at risk for asphyxiation.[36,41,42] The result of these deaths are likely multifactorial, with many factors difficult or impossible to replicate or measure. While the PMRP itself has been shown to result in a small, restrictive ventilatory pattern when compared to the seated position, there was no evidence of hypoventilation (inadequate breathing), hypercapnia (rise in blood CO_2 level), or hypoxemia (decrease in blood oxygen level).[33] Two additional studies of healthy subjects focused on ventilator measures while in the PMRP with progressive weight increases on the subjects back also reported similar results.[30,46]

One of the more recently researched associations with custody deaths is ExDS. Despite the relatively low incidence of ExDS, the syndrome has been reported to have a high fatality rate and is often associated with the use of illicit drugs.[47–49] Individuals exhibiting ExDS often draw the attention and involvement of law enforcement, which can result in a restraint struggle and use of force incident. When deaths occur in these cases, the type of force and weapons used to gain control of the individual, such as PMRP, OC spray and conductive electronic control devices like the Taser, are commonly implicated in the death by medical examiners.[31,35,36,45,50–52]

ExDS has been criticized by some as being a fabricated diagnosis to justify deaths that occur in highly agitated individuals during a law enforcement restraint event. However, ExDS has gained acceptance by the major professional groups who care for and evaluate these individuals. It has become recognized that individuals displaying signs of ExDS are at a higher risk for sudden death. Although non-coercive techniques are preferred for de-escalation in agitated patients,[53] ExDS patients typically have an altered mental status making such techniques less effective.[54]

Due to the perceived risks of injury or death, there has been an increased effort to limit seclusion and restraints in many populations. A majority of the literature on this subject focuses more on institutionalized mentally challenged populations[55] and inpatient psychiatric patients,[56,57] while the interventions are aimed to decrease restraint/seclusion in these specific settings.[58,59]

Although limiting seclusion and restraint would help mitigate the risk for unwanted medical and legal outcomes, restraining an individual for the safety of law enforcement and corrections staff as well as the individual is often necessary. In such instances, it is important for the agency responsible for the individual to have carefully delineated and comprehensive policies and procedures. An article by Metzner et al.[60] discusses developing this documentation with a focus on timeframes, settings, and monitoring. Although these recommendations are relevant, law enforcement and correctional agencies should take the recommendations discussed in the article as a template and modify accordingly to their specific population, setting and resources.

The primary issue with the legal liability surrounding the restraint chair tends to result from lack of adherence to established policies and procedures during use of the chair. The deviation from protocol is usually not specifically an issue until an unexpected or untoward event occurs and experts and attorneys start reviewing policies and procedures for adherence. For the most part, the Ministry policies are well proscribed with criteria for use of the restraint chair, how to use the chair, what needs to be done when the chair is in use and when to discontinue the use of the chair.

The other area of risk of the restraint chair is the potential for medical complications associated or aggravated by the chair's use. By incorporating medical personnel into the protocol with carefully proscribed monitoring practices and documentation standards, these risks are minimal. In addition, the Ministry's more conservative approach (ie. individuals exhibiting AHS are sent out by ambulance) further reduces the medical risks by limiting the use of the chair.

Benefits of the use of the restraint chair include increased safety for individuals exhibiting self-injurious behavior. As noted above, for some facilities that have taken a less conservative approach and have expanded the use to include individuals who are combative and aggressive, there may be cost savings associated with reduced use of EMS, as well as reduced staff costs in accompanying the individual out of the facility.

5. Limitations

As this is a review of medical literature, there is the possibility that some articles that may be applicable would not be captured by the key words used. The combined PubMed and PsychINFO databases compromise approximately 26 million references. There are, however, other medical databases that were not accessed for the purpose of this study, which may contain additional cases relating to the restraint chair. Additionally, the search was limited to the English language, which would not capture possible applicable articles written in other languages. Although the WestLawNext search engine includes over 40,000 databases that include case law, state and federal statutes, administrative codes, newspaper and magazine articles, public records, law journals, and law reviews among others resources, only cases with a final ruling are included. Therefore cases that were settled or where no legal determination was made are not included.

6. Conclusion

Law enforcement and corrections personnel often confront violent, dangerous individuals who must be physically restrained for the safety of the staff as well as the individuals themselves. Through a comprehensive review of the available medical and legal data, we identified very few risks directly related to the restraint chair when used for this purpose. Although the available medical literature is somewhat scarce, the few deaths that occurred during or immediately after use of the chair were generally attributed to other medical conditions and not the chair itself. In regards to the legal liability, most cases identified make mention of the restraint chair, but do not focus on its use. Of the cases that did focus on the chair, many of the issues stemmed from inappropriate use of the chair and deviation from established protocols, not harm inflicted by the device itself. Therefore, with well established protocols that clearly delineate when to use the restraint chair, how to use the chair, and how to monitor individuals that are placed in the chair, this device can be effectively and safely used to restrain violent individuals, ensuring the safety of staff and the individuals themselves.

Conflict of interest statement

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jflm.2015.04.009.

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