



## 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.

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## 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](http://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](http://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 restraint 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.<sup>1–21</sup> Twenty of the studies were animal model evaluations using monkeys placed in a chair to measure various physiologic markers of stress.<sup>2–21</sup> 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,<sup>22–24</sup> the development or description of restraint chair for primate research,<sup>25–29</sup> 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.<sup>1</sup> 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<sub>2</sub>. This means the subjects never had a decrease in levels of oxygen in the blood nor did they have any rise in the CO<sub>2</sub> 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<sub>2</sub> 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.<sup>101,102</sup> Contact with the manufacturers 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 gleaned from these studies are applicable to field arrest or takedown situations, but do

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