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DEREK CHAUVIN TRIAL

## NEWSMD Special Report: The risks of police restraint

Experts say restraint asphyxia killed George Floyd. Why are some police told it doesn't exist?

Written By: Paul John Scott | 7:00 am, Mar. 6, 2021

Troy Becker, Forum News Service

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ROCHESTER, Minn. — “Should we roll him on his side?” rookie cop Thomas Lane asked. “I just worry about the excited delirium or whatever.”

A veteran officer said no. His name was Derek Chauvin, and as the world now knows, he was kneeling on George Floyd’s neck. Lane was holding down a leg, Officer J. Alexander Kueng had a knee on Floyd’s lower back, and Officer Tou Thao was standing guard nearby.

After three final calls of “please,” [according to transcripts](#) filed with the court, George Floyd had stopped talking.

**ALSO READ: [As Derek Chauvin stands trial in the killing of George Floyd, the world watches Minnesota](#)**

“This was murder,” Minneapolis Chief of Police Medaria Arradondo [would say](#) of the May 25 killing at the corner of 38th and Chicago in south Minneapolis — an event which unleashed waves of protest and a global call for reckoning over the treatment of Black Americans at the hands of police.

In a trial set to weigh murder charges against Chauvin beginning on Monday, March 8, a Minneapolis jury will decide if they agree with the city’s top officer of the law. The three other officers will face charges of aiding and

abetting later this summer.

Hennepin County Medical Examiner Dr. Andrew Baker has noted cardiac arrest during police "subdual, restraint, and neck compression" as the cause of death. Baker noted but did not attribute meaning to the presence of heart disease and drugs in Floyd's system.

Armed Forces Medical Examiner Dr. Paul Uribe has added "elements of positional and mechanical asphyxiation" to this determination. The world has remained fixated on the sight of Chauvin's knee on Floyd's neck.

But Lane's odd remark in the middle of the slow-motion killing raises another troubling question, whether contested research has led officers to misidentify the factors at work during death in custody, and if that worsens the treatment of those being restrained.

For nearly 9 minutes, Chauvin, Lane and Kueng remained atop a prone man immobilized in handcuffs, conditions known for decades as capable of causing sudden death from a process alternately known as compression-, positional- or "restraint asphyxia."

Yet Lane listed "excited delirium" as the reason for his worry, and repeated this arcane term during an interview with investigators.

This would suggest compression asphyxia has become entangled in the minds of officers with the contentious psychiatric diagnosis that is "excited delirium." The officers clearly believed [a related fallacy](#) — that asphyxia cannot occur in the presence of speaking.

With the eyes of the world on the refusal by Chauvin to lift his knee, the failure of his fellow officers to force him, and [whatever plans the defense may have](#) for assigning blame to the methamphetamine and fentanyl in George Floyd's system, a separate question still lingers:

How did prone restraint, a known risk whereby officers can kill, become co-opted by excited delirium, an exotic determination in which police are held blameless? Did policing science play a role?

## 'I can't breathe'

Floyd had been saying "I can't breathe" since before Lane and Kueng tried to get him into the back of their patrol car. Now he was saying it from the ground.

Twenty years earlier, this kind of warning from the mouth of a prone, handcuffed subject might have led Lane to worry about restraint asphyxia. Instead, he would tell Chauvin and investigators, he was worried about something called "excited delirium."

A term for catatonic madness dating to the age of the asylums, beginning in the 1980s, excited delirium had become slowly resurrected within policing research to describe police actions involving agitated people acting in a bizarre fashion.

As presented in studies [often funded by policing interests like the manufacturers of Taser](#), excited delirium can make a person hyperthermic and incoherent, violent, hallucinatory and unpredictable.

Excited delirium has been invoked in connection to fatalities after being stunned by conducted-electricity weapons, while on stimulant drugs, and almost exclusively while being restrained by police.

Persons with excited delirium are usually encountered naked, moving aimlessly, perspiring and in a state of disorientation.

This raises a question: Are police called to the scene of those about to die from a mysterious condition? Or is the excessive restraint of those in such a state the true cause of death?

Policing materials assert there has been evidence of death from excited delirium without police on the scene, in the form of people found naked and surrounded by cold and wet towels. Research has found [no evidence](#) of death from excited delirium without restraint.

"Excited delirium is a medical emergency usually brought on by acute drug intoxication or psychiatric illness," [Dr. Judy Melinek](#) wrote in an email to Forum News Service last summer. Melinek is a forensic medical examiner and author unaffiliated with the case, formerly based in California, now practicing in New Zealand.

She adds that in the video evidence there was never any reason to suspect excited delirium in George Floyd.

"In the bystander and restaurant videos," Melinek says, "Mr. Floyd appeared to be responding and talking to the officers, and once restrained, he was speaking clearly that he couldn't breathe; he also wasn't dressed inappropriately for the weather, and didn't appear to be sweating profusely. All of these facts argue against excited delirium as being the cause of death or a significant contributor."

[Dr. Judy Melinek is an expert in forensic medicine unaffiliated with the George Floyd case. Contributed photo.](#)

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Contrary to police training that people with excited delirium can "just snap," catatonic madness took weeks to evolve. Critics assert excited delirium is a phantom diagnosis used to exonerate officers charged with murder. It is accepted by some medical societies but not others.

"They always try to bring it up in a case where a person dies and there's any drugs in their system," says Minneapolis attorney Robert Bennett, who could not speak to the specifics of the Floyd killing. "It's a charade that's meant to capture the public's opinions and acquit police officers and find them not liable."

A separate problem seems to be the way in which a heightened urgency surrounding excited delirium has fogged over the risks of asphyxia.

Lane told investigators he learned about excited delirium while working at juvenile detention, then again at the Minneapolis Police Academy, where they taught him "when someone is on drugs, they kind of work themselves up, and they can have issues from that."

In that [interview](#), he never mentioned restraint asphyxia.

## The discovery of restraint asphyxia

First reported in the late 1980s and early 1990s by a Seattle-area forensic pathologist named Dr. Donald T. Reay, “restraint asphyxia” reflected the chief medical examiner’s determination that you can accidentally kill a person who is prone and handcuffed while under compression.

As Reay would argue — and as surgeons have known for almost 60 years — when you place a person on their stomach and take away their ability to shift position, the abdomen cannot expand, the diaphragm is disabled, and the brain can become deprived of oxygen.

Add compression, obesity, struggle, disease, stimulants or stress to the equation, Reay wrote, and sudden death can result.

“The original studies on asphyxia were done by Dr. Reay,” said John Ryan, co-director of the Legal & Liability Risk Management Institute and a trainer for police departments on safe uses of force. “Dr. Reay said position and compression weight on somebody's back could compromise breathing.”

Use of force expert Jack Ryan of the Legal & Liability Risk Management Institute. Submitted photo.

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Ryan, who agreed to be interviewed on the condition he could not speak to the particulars of the Floyd killing, says that today, “I think in most of the country they are being trained to immediately get off the person, and they're being trained that it can cause harm. I train thousands of officers per year, and that's certainly what I train them.”

He has also learned, however, “that a number of trainers misunderstand the issues related to positional asphyxia and prone restraint,” as he wrote on his blog last fall. Some police trainers erroneously believe it has been debunked, Ryan says, something he calls dangerous.

Reay made his discovery while investigating the cause of death for three hog-tied subjects who died during rides downtown on the back of a police cruiser. As he wrote in 1992 in [The American Journal of Forensic Medicine and Pathology](#), “it is obvious that any restraint that prevents a change in position could restrict breathing.”

His work was eventually joined by [lab studies](#) demonstrating cardiovascular and pulmonary harms from prone restraint, many of which can be found in an extensive [online archive dedicated to the question](#), a website maintained by a retired EMT and restraint asphyxia advocate named Charly D. Miller.

Reay, who died in 2018, believed “each death (should) be evaluated using all available information, especially historical and scene investigative material, rather than relying on solely anatomic and toxicologic information.” The need for on-the-ground evidence in determining cause of death is underscored by the fact that there [are often no physical signs of asphyxia](#).

“I’m not a witness for the defense or for the prosecution,” [Reay remarked](#) on the occasion of his retirement in 1999.

“I am a witness for the dead. I’m the one person who can say anything about that person’s last minutes on earth.”

## Surgeons: Prone asphyxia is real

In sounding the alarm on restraint asphyxia, Reay had identified a risk known to physicians for decades.

Surgical [research](#) has determined prone immobility restricts not only lung function but [blood supply and heart rate](#), and that it can happen to both the lean and the obese.

To this day, the need to let the abdomen move freely while immobilized is the reason why, prior to spinal surgery or the “proning” of sedated COVID-19 ICU patients, nurses will place pads elevating the shoulders and pelvis.

These findings have failed to quash an industrious effort to cast doubt upon restraint asphyxia, one exhibiting many of the hallmarks of so-called "industrial research," including the involvement of scientists from private industry, and the use of studies for legal defense in liability suits.

Much of the effort to "debunk" restraint asphyxia has been at the hands of University of San Diego emergency and pulmonary medicine specialists Dr. Ted Chan, Dr. Gary Vilke and Dr. Tom Neuman.

A University of Minnesota bioengineering professor named Mark Kroll has published in opposition to restraint asphyxia as well. Kroll [sits on the board](#) of Axon Enterprise, the manufacturers of Taser stun guns, body cameras and facial-recognition AI software.

Chan's disclosure reveals that the decades-old body of research purporting to discredit restraint asphyxia began with work funded by legal counsel defending wrongful death charges against two sheriff's deputies in San Diego.

Working with nearly \$34,000 in funding, Chan, Vilke and Neuman with others conducted a study of blood oxygen levels in healthy volunteers who agreed to be trussed on their stomach after a short bout of exercise.

Critics said the conditions bore little resemblance to those of a true street arrest, as the subjects were fit, calm and lightly trussed on cushioning. A judge found for the defense, however.

The physicians went on to provide papers, chapters and expert witness testimony arguing for the safety of prone restraints and other elements of rough policing. All of this work suffers from a basic limitation — you cannot replicate the conditions experienced in a street arrest prior to death.

Though sworn to the care of patients, the ER and pulmonary physicians-turned tough-policing advocates have nonetheless gone on to argue for the safe use of [pepper spray](#), [neck holds](#), [stun guns](#), [restraint chairs](#), [hog-tying](#) and most of all, [pressing down on the back of a person who cannot lift their chest](#).

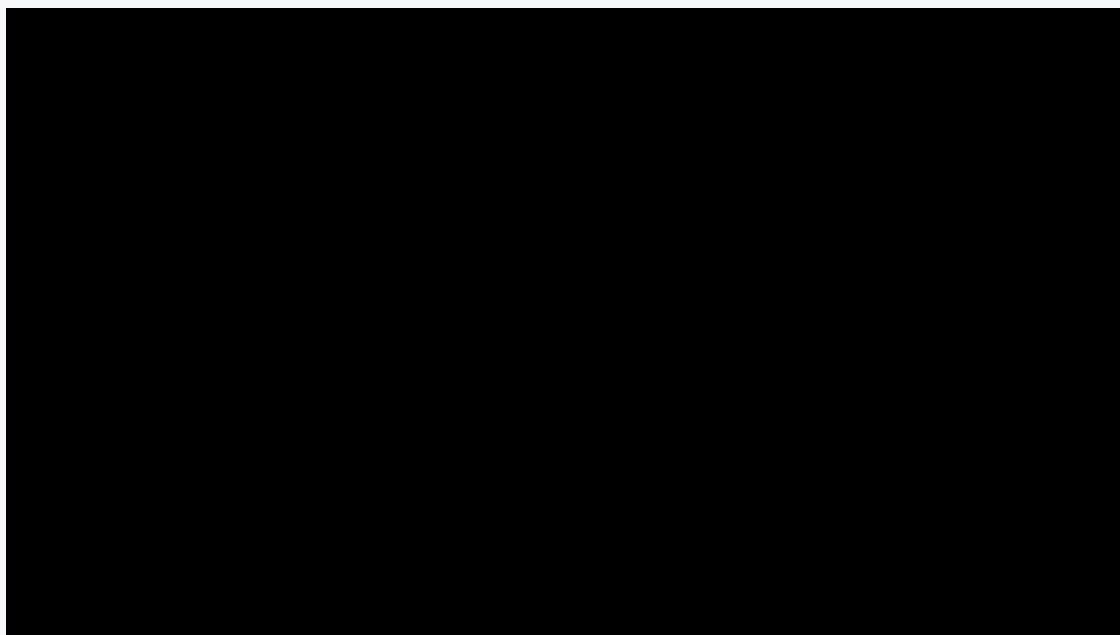
Their work remains influential to this day, with Chan’s research having been admitted as evidence in the Chauvin trial.

## 'The George Floyd case before George Floyd'

Upon his discovery of restraint asphyxia in the early 1990s, Reay's warnings were soon heeded by police departments from Chicago to Wichita.

Dr. Charles Hirsch, chief medical examiner for the city of New York, argued that deaths from restraint asphyxia should be considered homicides. The Department of Justice issued an alert that officers should roll handcuffed persons on their side. The New York Police Department would eventually produce a safety video.

“You enter into a vicious cycle,” Hirsch says in this [video](#), “where compression causes air hunger, air hunger creates struggle, and struggle creates greater compression. The price of tranquility,” it warned, “is death.” Records show this same video was shown to officers of the Minneapolis Police Department. Whether it was heeded is another matter.



In 2013, Minneapolis settled a lawsuit with the family of a man named David Smith for \$3.08 million, one of the largest police brutality settlements in city history. Plaintiffs argued that Smith, after being stunned and then compressed while handcuffed on his stomach, died from compression asphyxia.

“One knelt between his scapula and the other straddled his buttocks and hip area,” says Bennett, the Minneapolis attorney. Bennett argued the case for Smith’s relatives, and deposed Chan, a witness for the city of Minneapolis, for more than seven hours in February 2013 as part of that lawsuit. “He did that for about 6 minutes ... instead of turning him on his side ... which is how they are trained.”

Today, while Bennet says the drugs in the two cases are different, he calls Smith’s death “the George Floyd case before George Floyd.”

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Plaintiff's Attorney Robert Bennett settled the largest police-brutality suit in Minneapolis history for a case of compression asphyxia Submitted photo.

As a condition of that settlement, Minneapolis agreed to train all officers on the dangers of restraint asphyxia.

Following the killing of Floyd, Minneapolis Police Conduct Oversight Commission member Abigail Cerra asked the department what had been done to train officers about restraint asphyxia. In making her request, Cerra says, she never mentioned excited delirium.

“Initially I just got back a couple of items, and it didn’t seem like very much, since the lawsuit was settled in 2013,” she says. “Like, nothing had been done for the past six years, and that felt wrong to me.”

Cerra eventually asked Katie Blackwell of the MPD Training Division, who interceded on her behalf.

“A week after she called them, they released the data to me,” Cerra says. “I went through it and what I saw was a lot of information about excited delirium, and very, very little, just a couple of mentions, about positional asphyxiation. When I asked her about that, she (said) that the two are related.”

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Abigail Cerra, pictured here in a recent meeting of the Minneapolis Police Conduct Oversight Commission, asked the Minneapolis Police Department for information on restraint asphyxia. Instead, they gave her information on excited delirium. Photo: Screenshot from a recent meeting of the Minneapolis Police Conduct Oversight Commission.

Blackwell had written Cerra a letter stating that “excited delirium and positional asphyxiation are related; however two separate things,” and that “those displaying signs of excited delirium are at higher risk to positional asphyxiation due to muscle exhaustion.”

“I can confirm that MPD fulfilled the training requirement” for positional asphyxia, Minneapolis Police Chief Arradondo wrote in a response to Cerra's request last summer. “The reason for getting an arrestee into a recovery position is to prevent positional asphyxiation, and the training covered situations where positional asphyxiation is of primary concern.”

Arradondo said that Chauvin and Thao “both had this training.”

MPD training materials submitted to Cerra on the causes of arrest-related death, however, call excited delirium the “main culprit” for such deaths. Slides list “insensitivity to pain,” “superhuman strength” and “unlimited endurance,” as characteristics of excited delirium.

These materials also included images of The Incredible Hulk, Jack Nicholson in "The Shining," and “Fat Bastard,” the uncontrollable henchman from the "Austin Powers" movies. In Minneapolis, training about airflow was accompanied by messages that subjects can suddenly become like animals.

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When asked for evidence that officers had been trained on restraint asphyxia, the MPD provided images of people with psychosis. Image courtesy of Abigail Cerra.



MPD training materials depict persons with excited delirium as capable of superhuman strength. Image courtesy of Abigail Cerra.

“What the world didn’t hear in the Floyd case was an officer talking about the risks of asphyxiation,” says Jeff Storms, an attorney in the David Smith case who agreed to speak about only what is public in the Floyd case. “We should have heard officers talking about the risks of asphyxiation.”

Storms describes a department preoccupied with excited delirium, all the way to the top.

“Even though they ultimately did not pursue an excited delirium defense,” he recalls, “you still had then-chief of police (Timothy) Dolan saying he believed David Smith died as a result of excited delirium, which has no basis in science. They ultimately say delirium is a thing, and we don’t understand it ... sometimes people just die from this delirium.”

At least one high-ranking Minnesota scientist believes that the causes of accidental death under restraint are often just unknown.

“Sometimes when people fight the police the human body just seems to run out of gas for reasons that aren’t understood,” said the [U of M adjunct professor of biomedical engineering Kroll](#) in a 2017 interview with [The Force Science Institute](#) on “arrest-related deaths.”

A biomedical engineer whose work in electrocardiology has earned him hundreds of device patents and an award of distinction from former Minnesota Gov. Mark Dayton, Kroll is part of an industrious cluster of researchers to have ventured beyond their primary area of expertise by publishing studies in defense of tough policing.

It's an effort that is quick to deride Reay's work on restraint asphyxia as debunked, an assertion the courts have rejected, as well as the assertion that Reay somehow "retracted" his position, in court testimony, something he explicitly refuted.

In disclosure statements, Kroll (no relation to former MPD union chief Bob Kroll) says he also works as an expert witness in use-of-force cases, and [sits on the scientific and corporate board](#) of Axon Enterprise, the company that makes Taser brand conducted energy weapons and bodycams.

University of Minnesota biomedical engineering faculty Mark Kroll has said restraint asphyxia is discredited. He also sits on the board of the company that manufactures Taser stun guns. Photo: University of Minnesota.

Though [he calls](#) “arrest-related death biomechanics” his academic sub-specialty, contacted last year to comment on the arrest-related killing of Floyd, Kroll replied that he had not studied the effects of kneeling on the neck.

Contacted again last month, Kroll did not respond to follow-up questions about his research.

Kroll made his 2017 remarks that people who fight the police “seem to just run out of gas” in one of his frequent



appearances on the website for the Force Science Institute (FSI), a controversial [Plymouth-based company](#) that has published numerous articles on excited delirium and trains police departments from across the country.

At the time, Kroll had just published [a paper](#) in the journal *Medicine, Science and the Law* seeking to estimate how much weight officers can apply to a person before killing them. In interviews and writings, however, he had already described restraint asphyxia as a [“thoroughly defunct theory,”](#) however, as well as a [“dying, unscientific theory.”](#)

Kroll’s 2017 investigation combined complex mathematical modeling, the notes of 17th-century executioners, and lay observations on NFL hog-piles. It concluded that roughly 600 pounds of compression was the breaking point for the adult male rib cage. The device expert-turned-tough policing scientist cited this work to mock restraint asphyxia on FSI as “crazy” and “junk causation with no basis in science. ”

Broken bones, however, are not a requirement for restraint asphyxia.

## U of M study depicted officer knees very close to the neck

Kroll co-authored a 2019 paper with Michael Brave conducted through the U of M's Institutional Review Board. Brave’s [biography](#) states that he has been on the National Litigation Counsel for TASER International Inc., a company known as Axon Enterprise since 2017.

The U of M study argued for the safety of knees on the upper back during handcuffing, either one or two, provided officers keep their weight “on the ball of their stabilizing foot.”

Photos that accompany the [American Journal of Forensic Medicine paper](#) show volunteers from Plymouth, Minn., police department posing atop prone mannequins, their knees just inches below where Derek Chauvin pressed his weight into George Floyd's neck.

MPD training materials submitted as exhibits in the Lane defense go further, showing an officer with his weight on the ball of his stabilizing foot, and his knee on the neck of a volunteer.

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MPD training materials carry instructions to roll subjects on their side in order to avert positional asphyxia. They also show the placement of a knee on the neck, similar to the method used in the killing of George Floyd . Photo: Traci Westcott/Rochester Post-Bulletin

Observers describe a former-MPD policy allowing neck holds using the leg as out-of-sync with the rest of the country.

"It should be noted that the Minneapolis policy which authorized the use of legs and contemplated putting pressure on one side of the neck is unique in the experience of these authors," Ryan, the use-of-force trainer, noted last year on his blog.

“A person can die within minutes of compressive force on the neck,” forensic examiner Melinek says. “It generally only takes 6 pounds of pressure to compress the jugular veins of the head, and 11 pounds of pressure to compress

the carotid arteries that bring oxygen to the brain.”

“So I am not in the police department,” Minneapolis Police Conduct Oversight Commission member Cerra says, “and I am not a medical professional. But from where I sit, it does not seem like the message that positional asphyxia is a risk is getting down to the rank-and-file.”

“If we train officers that ‘hey, this is all a bunch of baloney, stay on top of somebody and it’s no problem because it’s not going to kill them,” says Ryan, “when it does, the officer will be shocked in trial to find that there’s an expert on the other side saying, and the judge allowing the expert to testify that, in fact it does cause compromised breathing.”

Reay, for his part, believed positional asphyxia and excited delirium “are not mutually exclusive and may coexist.” He held similar views on the deadliness of restraint for persons with heart disease, and on drugs.

“There will be deaths where cocaine, methamphetamine and high levels of alcohol are present in which it becomes tempting to assign the cause of death solely to these intoxicants, and to ignore or discount the final position in which the victim was found dead.”

Reay wrote those cautionary words in his first paper on the dangers of prone restraint, a passage that anticipated issues soon to be weighed in a Minneapolis courtroom.

At the same time, the discoverer of prone restraint argued in an accompanying editorial, "the pathology is often less important than are the investigative circumstances," not to mention, "that most precious (and all too uncommon) of human attributes, common sense."

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