Remote Restraint

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Definition

A remote restraint device is a projectile-launched mechanical system intended to entangle, wrap, tether, ensnare, or otherwise restrict a person's movement from a distance without relying primarily on pain, chemical irritation, electrical incapacitation, or blunt-force trauma.

This category includes:

- tether-launching systems such as BolaWrap-type devices;
- projectile-launched wrap or cord restraints;
- pneumatic or cartridge-powered net guns designed for human restraint;
- mechanically deployed remote entanglement systems; and
- comparable technologies intended to impede movement from a distance.

It excludes manually applied handcuffs, leg restraints, or hobble systems; conducted energy weapons; chemical irritants; impact projectiles; police service dogs; and devices whose primary intended effect is pain or injury rather than mechanical restriction.

This definition corresponds with the research dataset, where `I_RemoteTether` is coded when an officer actively discharges a remote mechanical restraint or tether system toward the decedent. Manual restraints and devices that are merely displayed or pointed do not qualify.

How It Is Designed to Work

Remote restraint devices attempt to achieve control through mechanical interference with movement rather than through blunt trauma, electrical incapacitation, chemical irritation, or tissue injury.

Tether systems

A tether-based device typically launches a cord or filament with weighted or barbed anchors designed to wrap around the legs, arms, torso, or combinations of these areas. The intended effects may include reducing stride length, preventing running, limiting arm movement, interrupting an advance, creating a momentary pause, facilitating officer approach, or permitting transition to handcuffing.

Net systems

Projectile-launched net systems are conceptually similar but use a broader net or mesh to entangle a person rather than a narrow tether. The design goal in both cases is to create remote mechanical control without requiring the officer to first enter grappling distance.

Remote Restraint Is Conceptually Different from Other Less-Lethal Force

Most less-lethal technologies produce control through pain, physical trauma, neuromuscular incapacitation, sensory irritation, or fear of injury. Remote restraint is unusual because its design goal is to achieve control through movement restriction rather than physiological disruption, which gives the technology an intuitively attractive harm-reduction rationale. A theoretically lower-injury mechanism does not, however, establish real-world effectiveness or safety; those outcomes require empirical evidence.

Evidence of Effectiveness

Overall assessment

Among established police less-lethal technologies, remote restraint has one of the weakest peer-reviewed evidence bases. As of this review, no robust body of independent peer-reviewed policing research with deployment denominators establishes real-world first-shot effectiveness, overall apprehension success, injury reduction, officer-injury reduction, firearm substitution, CEW substitution, comparative effectiveness, or failure rates. This is the most important conclusion of the evidence review.

Manufacturer-reported effectiveness

BolaWrap's manufacturer has publicly described the device as a remote restraint tool designed to entangle the arms or legs at approximately 10–25 feet and to provide officers with a pre-escalation option before pain-based or injurious force. The company has reported successful field uses and has characterized the technology as effective for reducing reliance on higher-force options. Those claims are relevant to understanding intended purpose, deployment doctrine, engineering assumptions, and claimed operational benefits, but they should not be treated as independent effectiveness evidence. Manufacturer claims are affected by commercial interest, selective reporting, absence of standardized denominators, variable definitions of "success," and incomplete reporting of failed deployments.

Agency pilot evidence

The Los Angeles Police Department approved a pilot program to evaluate BolaWrap deployment in the field. The pilot framework is useful because it confirms that large police agencies viewed the technology as sufficiently novel to require controlled evaluation, specific training, policy restrictions, and post-deployment data review. Agency pilot material is, however, generally administrative and operational in character, unpublished in peer-reviewed literature, and not equivalent to controlled comparative research.

Policy evidence recognizes failure

Agency policies themselves provide an important clue about real-world limitations. Police policy guidance for BolaWrap commonly emphasizes that the device is not a substitute for deadly force, that officers should have backup or transition options, that the device may fail to achieve the intended result, that officers should be prepared to transition to another force option, and that appropriate range and target access are required. This is not evidence of ineffectiveness; it is evidence that failure is sufficiently foreseeable to be operationally important.

What is missing

The evidence base does not provide reliable independent estimates for:

- first-shot entanglement rate;
- effective restraint rate;
- probability of escaping the tether;
- probability of cord breakage;
- probability of anchor failure;
- performance against moving targets;
- performance against subjects wearing bulky clothing;
- performance against armed persons;
- time from discharge to physical control;
- probability of fall;
- officer or subject injury reduction;
- reduction in CEW use;
- reduction in firearm use;
- comparative effectiveness versus OC;
- comparative effectiveness versus CEW;
- comparative effectiveness versus K9;
- or effectiveness in edged-weapon confrontations.

This represents a major evidence gap.

Injury and Safety Evidence

Overall safety assessment

The evidence base for remote restraint safety is very low. The design intent is explicitly to reduce injury, and that intent is plausible because the device does not primarily depend on electrical current, chemical irritation, kinetic blunt trauma, or biting; however, insufficient independent peer-reviewed evidence exists to quantify actual injury risk.

Mechanical injury pathways

Potential injuries can arise from anchor or barb contact, skin puncture, abrasion, localized laceration, impact of the launched restraint, entanglement around vulnerable anatomy, falls following sudden restriction, collision with nearby objects, or secondary force used after partial restraint. The absence of widespread published injury reports should not be interpreted as proof that such harms do not occur.

Fall risk

Because remote restraint may alter gait or limb movement suddenly, a successful leg wrap may cause stumbling, a forward or lateral fall, collision with a wall or vehicle, or an inability to use the arms normally to protect against impact. Risk becomes more significant when the person is running, on stairs, near traffic, near a ledge, on a hard surface, operating a bicycle or other conveyance, or otherwise positioned where a fall could cause serious injury, and the literature does not provide a reliable incidence rate for these outcomes.

Vulnerable anatomical entanglement

A tether intended for the limbs or torso may strike or wrap around unintended areas. Potentially higher-risk locations include:

- neck;
- face;
- eye;
- throat;
- groin; and
- hands or fingers.

This risk is especially relevant because real-world subjects may turn, crouch, raise their arms, move suddenly, or partially obstruct the intended target area.

Anchor/barb injury

Some tether systems use small anchors or barbs to help the cord catch on clothing, with potential consequences including superficial puncture, abrasion, laceration, and localized bleeding; the evidence base is insufficient to establish how often these injuries occur or how often they require medical treatment.

Failure Modes

Because real-world success depends on a mechanical wrap, several failure pathways are plausible.

Miss

The tether may fail to contact the person or may strike only partially.

Inadequate wrap

The cord may contact the body but fail to complete enough revolutions to meaningfully restrict movement.

Clothing interference

Bulky, loose, rigid, or slippery clothing may alter anchor engagement or wrapping behaviour.

Obstruction

Nearby objects may intercept the tether.

Limb position

A person's arms or legs may be positioned in a way that prevents effective entanglement.

Movement after impact

The subject may step out of, break through, or otherwise defeat partial restraint.

Insufficient restriction

The device may reduce movement without preventing weapon use, striking, stabbing, running, or reaching.

Need for follow-on force

Even a mechanically successful wrap does not complete the arrest, as officers must still approach, physically control, disarm if necessary, handcuff, and manage continued resistance. Remote restraint is therefore best understood as a transitional control tool, not a complete restraint system.

When Its Use May Be Appropriate

Because empirical evidence is limited, recommendations should remain cautious. A remote restraint device is most defensible where the person presents active resistance or likely flight, officers benefit from maintaining distance, the person is not presenting an immediate lethal threat requiring reliable stopping capability, the target area is unobstructed, the person is within the device's intended range, a fall would not create disproportionate injury risk, backup officers are present or readily available, and officers can immediately transition to physical restraint after a successful deployment.

Potentially appropriate circumstances may include a non-compliant person attempting to walk or run away, a person in behavioural crisis who is resisting physical contact but not actively attacking, a subject whose behaviour is escalating but who has not yet created an immediate lethal threat, an encounter where officers seek to avoid CEW, baton, or physical struggle, or a contained person where officers have time and distance to attempt a lower-injury intervention. The strongest rationale is early intervention before the encounter reaches a level requiring high-reliability force.

When Its Use May Be Inappropriate

Immediate lethal threat

Remote restraint should not be treated as a substitute for deadly force where officers or third parties face an immediate threat of death or serious bodily injury. The technology does not have an independently established incapacitation rate sufficient to justify assuming it will stop a charging knife attack, firearm use, a hostage assault, or another rapidly developing lethal threat.

Insufficient distance or tactical margin

If deployment failure would leave officers inside an armed subject's striking distance, the attempted intervention may increase risk rather than reduce it.

Dangerous fall environment

Deployment may be inappropriate when the person is on stairs, on a roof or ledge, near fast-moving traffic, on a bridge, operating a vehicle, beside deep water, or otherwise positioned where a sudden fall could produce major injury.

Neck or face exposure

Officers should avoid deployment where the most likely tether path would involve the neck, head, face, or other vulnerable anatomy.

Crowded environments

Remote restraint may be difficult to use safely where multiple people are closely grouped, the tether may strike a bystander, the anchors may catch unintended persons or objects, or the subject cannot be visually isolated.

Running subjects

Although remote restraint may be intended to impede flight, sudden entanglement of a person running at speed creates additional fall risk.

Already-controlled persons

Once a person is physically controlled, handcuffed, or no longer resisting, remote restraint provides little additional legitimate force purpose.

Relevance to Edged-Weapon Encounters

Remote restraint has an unusually attractive theoretical role in edged-weapon response because it attempts to restrict movement without relying on pain, blunt trauma, electrical exposure, or firearm injury. Its principal weakness is equally important: there is almost no independent peer-reviewed evidence establishing how reliably it restrains an armed person under real police conditions.

Potential role

A successful remote tether could potentially limit stride length, restrict an arm, interrupt an advance, create a pause, reduce mobility, or create an opportunity for officers to disarm and handcuff, while maintaining more distance than hands-on control. That harm-reduction potential may be especially relevant to a contained person in behavioural crisis who is holding an edged weapon but is not yet actively attacking.

Conditions favouring deployment

Use is more plausible where the subject is stationary or moving slowly, officers have sufficient distance and cover, there is a clear and unobstructed target area, a fall would not create major injury risk, officers have backup, and failure will not immediately place another person within stabbing range.

Failure consequences

A tether may miss, wrap incompletely, fail to meaningfully restrict movement, be defeated by clothing or limb position, or restrain the legs while leaving the weapon-bearing arm functional. Even a successful wrap does not complete the arrest, as officers must still approach and physically secure the person; against an immediately advancing edged-weapon subject, an unsuccessful or partial wrap could consume the limited reaction time available.

Risk trade-off

For the subject, remote restraint may plausibly have a lower direct injury burden than many conventional force options, although fall, anchor, and unintended entanglement injuries remain possible. For police and third parties, the main risk is relying on an inadequately validated technology in a high-consequence encounter. Remote restraint may therefore be most suitable as an early option in a contained edged-weapon incident where failure can be safely managed. The current evidence does not support treating it as a dependable stand-alone response to an imminent lethal assault.

U.S. Legal Considerations

Fourth Amendment framework

Remote restraint deployment during a seizure is generally evaluated under *Graham v. Connor* and the objective-reasonableness standard. Relevant factors include the severity of the suspected offense, immediacy of the threat, active resistance or flight, degree of force represented by the device, foreseeable fall or entanglement risk, warning where feasible, availability of lower-force alternatives, and what officers knew about the technology's limitations.

Sparse device-specific case law

Because remote restraint is relatively new, published federal appellate precedent specifically addressing BolaWrap or comparable tether devices is limited, which means courts are likely to analogize to broader

excessive-force principles rather than apply a mature device-specific doctrine. Relevant analogies may include physical restraint, intermediate force, less-lethal projectile force, CEW deployment, and force used to stop flight.

Novelty does not eliminate constitutional limits

The absence of extensive BolaWrap case law does not mean officers have unlimited discretion, as clearly established general principles remain relevant, including prohibitions on gratuitous force against non-resisting persons, disproportionate force for minor offenses, continuing force after control is achieved, and force that creates an unreasonable foreseeable risk relative to the governmental need.

Qualified immunity

Qualified immunity may be particularly significant for emerging technology because highly fact-specific prior precedent may be sparse; however, courts can still find clearly established violations where general constitutional principles give officers fair notice that the force is disproportionate. The legal evidence base remains too immature to support strong device-specific rules.

Ethical and Moral Considerations

Remote restraint has a strong harm-reduction aspiration. The device is intended to create a control option that avoids pain compliance, blunt trauma, electrical exposure, chemical irritation, and firearm injury, making the technology ethically attractive. Evidence quality matters, however: a lower-harm mechanism should not be confused with proven lower harm, and an ethical evidence-based policy should distinguish between design intention and demonstrated real-world outcome. At present, independent empirical proof remains limited.

Early intervention

The strongest moral rationale may be using remote restraint before officers reach a point where they would otherwise use:

- CEW;
- baton;
- K9;
- impact projectile; or
- firearm.

If the device can reliably interrupt escalation without substantial injury, its net benefit could be significant, though the evidence needed to confirm that benefit is not yet mature.

Failure and escalation

A failed deployment may consume time, distance, attention, and tactical advantage. If officers attempt remote restraint against a dangerous armed person and then immediately escalate after failure, the intervention may not reduce total harm.

Transparency

Because much of the publicly available evidence originates from the manufacturer, agency pilots, press releases, or operational reports, policy makers should be transparent about the level of scientific uncertainty.

Vulnerability

A device designed to avoid pain may be particularly attractive for people in behavioural crisis, people who may not understand commands, persons for whom pain-based compliance may be ineffective, or situations where physical struggle is likely to worsen risk. That potential should be treated as a hypothesis requiring continued evaluation rather than a settled empirical conclusion.

Evidence Limitations

Remote restraint has one of the weakest evidence bases in this library. First, no robust body of independent peer-reviewed policing studies directly evaluates modern remote restraint devices. Second, deployment denominators are largely absent from the scientific literature. Third, much publicly available effectiveness information originates from the manufacturer. Fourth, agency pilot reports are generally not peer reviewed. Fifth, “success” is inconsistently defined – it may mean tether contact, partial entanglement, full restraint, reduced movement, voluntary compliance, or eventual arrest. Sixth, failed deployments are likely underreported publicly. Seventh, injury surveillance is incomplete. Eighth, long-term or rare adverse events cannot be estimated reliably. Ninth, comparisons with CEW, OC, K9, or impact weapons are unavailable or methodologically weak. Tenth, evidence on running subjects, armed subjects, and high-stress encounters is especially limited. Eleventh, remote restraint technologies are evolving rapidly, so findings about one generation may not generalize to another. Twelfth, there is essentially no direct peer-reviewed evidence specific to edged-weapon encounters. For this evidence library, remote restraint should therefore be classified as an evidence-gap technology.

Bottom Line

Effectiveness

Very low-quality independent evidence. The technology has a plausible mechanical mechanism and reported successful field uses, but no strong peer-reviewed evidence provides a reliable first-shot or encounter-resolution rate.

Injury

Designed for low injury, but actual injury probability is poorly quantified. Potential harms include anchor injury, laceration, unintended vulnerable-area contact, and falls.

Serious injury/death

No robust independent rate can be established. Serious secondary injury is biologically plausible, particularly through falls or unintended neck/head entanglement.

Comparative safety

Unknown. It is plausible that remote restraint is less injurious than CEW, baton, canine, or kinetic projectiles when it works as intended, but this has not been established through strong comparative research.

Tactical limitation

Mechanical restraint is not guaranteed incapacitation. A wrapped person may remain capable of using a weapon, resisting, or defeating partial entanglement.

Evidence gap

One of the largest in the less-lethal evidence library. Manufacturer and agency claims should not be presented as equivalent to independent peer-reviewed evidence.

Risk-benefit assessment

The strongest justification for remote restraint is an early, tactically controlled intervention against a non-lethal but escalating threat or active resistance, where officers have distance, backup, a clear target area, and the ability to manage failure. Its weakest justification is an immediate lethal assault, dangerous fall environment, vulnerable anatomical exposure, crowded setting, or any circumstance where officers must rely on the device as though it has firearm-equivalent stopping reliability.

Core Peer-Reviewed Evidence

Direct device-specific peer-reviewed evidence

No qualifying peer-reviewed policing study with a DOI was identified that directly establishes BolaWrap or comparable remote-restraint effectiveness, injury probability, or comparative safety. This absence should be preserved as a substantive finding rather than padded with indirect literature.

Supporting Non-Peer-Reviewed Evidence

1. Los Angeles Police Department (2020)
BolaWrap Remote Restraint Device Pilot Program.

Priority: Important agency pilot evidence.

Contribution: Formal large-agency field evaluation framework for BolaWrap.

Key value: Demonstrates how a major police agency operationalized training, deployment restrictions, and field evaluation for a novel restraint technology.

Limitation: Administrative pilot material; not peer reviewed and not a controlled effectiveness study.

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2. Virginia Commonwealth University Police
Police Weapons Policy – BolaWrap.

Priority: Useful policy evidence.

Contribution: Defines operational restrictions for BolaWrap deployment.

Key provisions: The device is not a substitute for deadly force; trained personnel must use it; backup should be employed; and deployment limitations must be considered.

Key value: Shows that police agencies themselves recognize device limitations and the need for transition options.

Limitation: Policy, not outcome research.

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3. WRAP Technologies
BolaWrap product and field-use materials.

Priority: Manufacturer evidence only.

Contribution: Describes intended mechanism, claimed range, reported field uses, and manufacturer-defined success.

Key value: Useful for understanding product design and deployment doctrine.

Conflict: Direct commercial interest.

Critical limitation: Manufacturer-reported effectiveness cannot be treated as independent scientific validation.

Evidence Rating

Operational effectiveness: ★☆☆☆☆ to ★★☆☆☆
No robust independent denominator-based policing research.

General injury evidence: ★★☆☆☆
Potential injury pathways are identifiable, but empirical incidence data are weak.

Serious-injury probability: ★☆☆☆☆ to ★★☆☆☆
Insufficient data for reliable estimates.

Mortality evidence: ★☆☆☆☆
No meaningful deployment-level mortality evidence.

Comparative evidence: ★☆☆☆☆
Essentially absent.

Manufacturer-independent evidence: ★☆☆☆☆
One of the weakest areas in the force-technology literature.

Overall confidence: Low.

Research-library conclusion

Remote restraint devices represent one of the most promising but least scientifically validated categories in contemporary police less-lethal technology. Their design objective is fundamentally different from pain-based, electrical, chemical, or blunt-impact force: they seek to restrict movement mechanically from a distance and thereby create an opportunity for officers to complete physical restraint with less injury. That concept has intuitive harm-reduction value, particularly in behavioural-crisis and early-escalation encounters. However, the independent peer-reviewed evidence needed to validate that promise is largely absent. There are no strong denominator-based studies establishing first-shot effectiveness, injury probability, comparative safety, or reduction in firearm or other force use. Public evidence is dominated by manufacturer reporting, agency pilots, policy documents, and individual field examples. Remote restraint should therefore be treated as an evidence-gap technology: potentially valuable, but not yet supported by the level of independent empirical validation available for CEW, OC, K9, or several kinetic options. Its strongest justification is an early, tactically controlled encounter where officers can tolerate failure and potentially avoid a more injurious intervention. Its weakest justification is an immediate lethal threat or any circumstance where officers must depend on the device as though it provides reliable incapacitation.

HOW TO CITE

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