NON-LETHAL WEAPONS

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LAC+USC Medical Center
DISCLOSURES

✓ None
The Club

- Battle of Crécy (1346)
- Matchlock (Circa 1450)
- Flintlock (1612)
- Percussion Cap (1842)
  - Cartridge (1857)
  - Machine Gun (1885)
“Kneeknockers” circa 1880
Tear Gas (CN) 1912
Flashbangs 1976
Pepper Spray (OC) 1987
“Beanbags” 1994
M-26 TASER 1991
The Club
Non-Lethal Weapon Types

- Chemical Agents
- Impact Munitions
- Vivi-Systems
- Directed Energy
- Mechanical
- Electrical
Non-Lethal Weapon Types

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Non-Lethal Weapon Types

- Chemical Agents
- Impact Munitions
- Vivi-Systems
- Directed Energy
- Mechanical
- Electrical
Impact Munitions

Most commonly

- ‘Pepperball’
- ‘Beanbag’
Impact Munitions

✓ Most commonly
  • ‘Pepperball’
  • ‘Beanbag’
Pepper-ball

- Multiple impacts
- Distance dependent
- Treat as for any blunt force trauma
- Rare to see significant underlying damage, especially clothed
- Eye, face, hands…
Impact Munitions

✓ Most commonly
  • ‘Pepperball’
  • ‘Beanbag’
Beanbag

✓ Usually single impact
✓ Distance dependent
✓ Much more significant energy transfer, even through clothing
✓ Warrants examination, imaging and observation
Beanbag

✓ Significant energy transfer, even through clothing
✓ Warrants examination ± imaging and observation
Non-Lethal Weapon Types

- Chemical Agents
- Impact Munitions
- Vivi-Systems
- Directed Energy
- Mechanical
- Electrical
TASER X26C SALE!
Buy any TASER X26C and receive an INSTANT Rebate of $100.00 off per TASER. The $100.00 discount will apply when the TASER is added to your shopping cart. (Includes a Digital Power Magazine, 6 Air Cartridges, Soft Carry Holster, Training DVD, and Practice Target).
PLUS, FREE shipping!
Sale On For Limited Time Only!

TASER M18L SALE!
Buy any TASER M18 WITH Laser and receive an INSTANT Rebate of $100.00 off per TASER. The $100.00 discount will apply when the TASER is added to your shopping cart. (Includes 4 cartridges, carrying case and training materials. Powered by alkaline or rechargeable NiMH batteries).
PLUS, FREE shipping!
Sale On For A Limited Time Only!

C2 Taser with Laser-1 cartridge-Black
Availability Ships next business day.
Product ID 31098-BL

Regular Price $389.95
Today’s low price $310.00
TASER X26C SALE!
Buy any TASER X26C and receive an INSTANT Rebate of $100.00 off per TASER. The $100.00 discount will apply when the TASER is added to your shopping cart. (Includes a Digital Power Magazine, 6 Air Cartridges, Soft Carry Holster, Training DVD, and Practice Target).
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Taser C2 Black Pearl
Taser C2 Metallic Pink
Taser C2 Electric Blue
Taser C2 Titanium Silver
Taser C2 Red Hot
Taser C2 Leopard Print
Taser C2 Hunter Green Print
Taser C2 Desert Sand Print
Current Distribution

- >16,200 law enforcement agencies, 44 countries
- >543,000 devices
- 2010, 86.9M USD revenue, 79% US
- Civilian purchase, all but 7 states
- >136,000 devices
- >1.3 million documented discharges
New Zealand police to routinely carry Tasers

TOM HUNT
Last updated 15:44, July 31 2015

All frontline New Zealand police are to be armed with taser.
Taser History

✓ Jack Cover-1974 Thomas A. Swift Electric Rifle-TASER

TOM SWIFT AND HIS ELECTRIC RIFLE

by Victor Appleton

1911
X-26

- Single shot cartridge
- Nitrogen propelled
- 2 darts at 170 fps, 35 feet
- Attached by insulated wires
- Darts in skin or clothing up to 2 inches
X-26

- Battery - pulsed electricity
- 1200 V, 2.1 mA, 0.07 J/pulse
- 5 seconds per trigger pull
- Can stop, repeat or hold
- Can be used as a stun gun
For the Trauma Provider

✓ Non-Lethal
✓ Less-Lethal
✓ Less-Than-Lethal...
Lethal weapons are defined by their capability.

Non-lethal weapons are defined by their intent.
Lethal weapons are defined by their capability.

Non-lethal weapons are defined by their intent and can be lethal.
For the Trauma Provider

1. Local
2. Systemic
3. Secondary
For the Trauma Provider

1. Local
2. Systemic
3. Secondary
Prospective, 2004-06, Dallas PD
426 consecutive discharges
Mean exposure 8.6±5.9 sec
Minor bruises, abrasions, lacerations
None required repair
Prospective, 2005-08, 6 US PDs
1,201 pts, 94% male, 13-80yo, 50% +EtOH/Tox
99.75% mild or no injury
2 - head injury from fall, d/c 48-72h
1 - ck↑, d/c, no dialysis required
Secondary

- Examination by EMS, RN or MD as per regional protocol
- Full scene history
- Physical Examination
- Treat as for blunt force trauma
Secondary

- Examination by EMS, RN or MD as per regional protocol
- Full scene history
- Physical Examination
- Treat as for blunt force trauma
For the Trauma Provider

1. Local
2. Systemic
3. Secondary
✓ Most fall out
✓ Follow regional protocol
  • leave wires intact
  • cut wires
  • pull at scene
✓ No further risk of harm to MD
✓ Pull  
✓ Retain and handle as evidence  
✓ Check for other discharge sites  
✓ Document well  
✓ Rarely fracture, PTX, ocular injury
For the Trauma Provider

1. Local
2. Systemic
3. Secondary
For the Trauma Provider

1. Local
2. Systemic
3. Secondary

Involuntary Muscle Contraction
For the Trauma Provider

1. Local
2. Systemic
3. Secondary

PAIN!
TACTICS & SURVIVAL TRAINING CENTER

LOS ANGELES COUNTY SHERIFF'S DEPARTMENT

SHERIFF Lee Baca
Anesthetized swine, X-26, 10 sec
Trans-cardiac Vector
Real time TTE
85.2% ventricular capture with VT
Cardiac Electrophysiological Consequences of Neuromuscular Incapacitating Device Discharges

Kumaraswamy Nanthakumar, MD, Ian M. Billingsley, MD, Stephane Masse, MASC, Paul Dorian, MD, Douglas Cameron, MD, Vijay S. Chauhan, MD, Eugene Downar, MD, Elias Sevaptsidis, DEC

- Swine, 5 and 15 sec discharges
- EPI infusion simulating hyperadrenergic state
- Similar capture with VT/VF
Healthy human volunteers, n=34
Right upper sternal border to apex vector
10 second burst, X-26
No ventricular capture under TTE
Cardiovascular and Physiologic Effects of Conducted Electrical Weapon Discharge in Resting Adults

Jeffrey D. Ho, MD, James R. Miner, MD, Dhanunjaya R. Lakireddy, MD, Laura L. Bullman, MD, William G. Heegaard, MD, MPH

2006

- Healthy human volunteers, n=66
- X-26, standard 5 sec discharge
- No change in 24hr CK, lytes, RF, TPI
- No changes in delayed ECG
Echocardiographic evaluation of TASER X26 probe deployment into the chests of human volunteers

Donald M. Dawes MD\textsuperscript{a}, Jeffrey D. Ho MD\textsuperscript{b,*}, Robert F. Reardon MD\textsuperscript{b}, James R. Miner\textsuperscript{b}
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Prolonged TASER use on exhausted humans does not worsen markers of acidosis

Jeffrey D. Ho MD\textsuperscript{a,*}, Donald M. Dawes MD\textsuperscript{b}, Laura L. Bultman MD\textsuperscript{e}, Ronald M. Moscati MD\textsuperscript{c}, Timothy A. Janchar MD\textsuperscript{d}, James R. Miner MD\textsuperscript{a}
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Physiologic effects of prolonged conducted electrical weapon discharge in ethanol-intoxicated adults

Ronald Moscati MD\textsuperscript{a,\*}, Jeffrey D. Ho MD\textsuperscript{b}, Donald M. Dawes MD\textsuperscript{c}, James R. Miner MD\textsuperscript{b}
Cardiac Capture

✓ Muscle response depends on waveform, strength and duration of electrical stimulation
✓ Duration of stimulation for human cardiac muscle 10-100 fold skeletal motor or sensory nerve
✓ Short duration discharges sufficient for skeletal, but not cardiac muscle
✓ Summary conclusion of US DOJ
✓ Low risk of serious injury
✓ No evidence of cardiac dysrhythmias
✓ Even in patients with Psychois or Agitation or Excited Delerium
THE HEALTH EFFECTS OF CONDUCTED ENERGY WEAPONS

The Expert Panel on the Medical and Physiological Impacts of Conducted Energy Weapons
Council of Canadian Academies and Canadian Academy of Health Sciences

14 member multidisciplinary panel

Review of primary research and technical engineering data

Similar findings
Summary

✓ Document well
✓ Local
  • Pull darts
✓ Systemic and Secondary
  • Likelihood of injury very low
  • Work-up dictated by scene history and physical exam
Summary

- Individualize for select subgroups
  - Drug intoxication
  - Underlying cardiac disease
  - Children
  - Pregnancy

- Admit
  - ECG, ABG/Lac, CK, TPI