PERCEPTIONS OF EXERCISE INJURY MECHANISMS AMONG INJURED FIREFIGHTERS

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BACKGROUND

- Firefighters are at risk of chronic disease and injury.[1]
- 1 in 18 U.S. fire personnel are injured while responding to an emergency and 64,875 injuries are incurred annually at a cost of $1.6 - 5.9 billion USD.[1,2]
- Overexertion and slip / trip / fall are the most common mechanisms of fireground injuries.[1,3]
- To reduce the risk of occupational injuries, it is important to perform regular exercise. Ironically, physical training is the most common cause of non-fireground injuries, accounting for one-third of all injuries and is responsible for 41% of post-injury absence from work.[4,5] Thus, one of the most feasible strategies to reduce occupational injuries is responsible for inducing non-fireground injuries.
- Unfortunately, there is a lack of literature identifying mechanisms associated with exercise injuries among firefighters. A greater understanding of exercise injury mechanisms will provide tactical strength and conditioning practitioners and executive leadership with information to develop safer exercise programs for fire personnel.

AIMS

- **Aim #1:** To examine/identify exercise injuries among injured firefighters.
- **Aim #2:** To determine intrapersonal, interpersonal, and institutional factors perceived to be associated with exercise injuries among firefighters.

METHODS

- 227 career firefighters confirmed exercise participation and thus qualified for the study. Of these, 86 firefighters (37.9%; Sex: 80 males, 5 females, 1 preferred not to say; Age: 39.9 ± 10.4 yr; Firefighter experience: 15.4 ± 9.2 yr) met the inclusion criteria.
- Inclusion criteria: > 18 years of age, an active-duty firefighter, performs exercise, and sustained an exercise-related injury in the previous 5 years.
- The instrument was composed of 99-items and developed using several firefighter focus groups to ensure ecological validity. The items assessed status and frequency of exercise, injury status and severity, perceived causes of injuries, and primary cause of injury.
- The electronic questionnaire was disseminated to fire personnel from multiple fire departments.
- Self-reported descriptive statistics were used to represent the distributions' central tendency (mean) and dispersion (standard deviation).
- Frequencies were used to describe the prevalence of injury risk factors.
- Selective coding was used to identify overlapping themes on type of exercise, location, severity, and mechanism of injury.

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RESULTS

40.0%	60.0%	40.0%	68.6%	20.9%	36.7%
Injured on-duty	Injured off-duty	Required medical attention	Did not report injury	Lost work time	Occurred at dept. fitness facility

Mechanism	Movement	Exercise Type	Pain
Fatigue: 65.0%	Push / Pull 29.4%	Traditional RT 48.8%	Lower back: 32.6%
Exertion/strain: 51.2%	Bending, Lifting, or Squatting 40.0%	High-intensity RT 20.2%	Shoulders: 22.1%
Improper technique: 40.0%		Endurance training 16.7%	
Sport-related: 16.7%			
Slip/trip/fall: 9.5%			
Contact with object: 1.2%			

Figure 1. Perceived mechanisms of injury and relative outcomes of firefighter injuries. RT: resistance training

Intrapersonal Factors

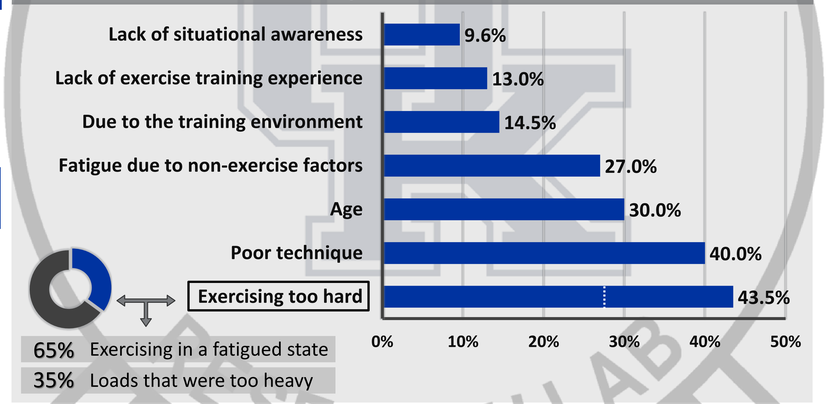

Figure 2. Intrapersonal factors that were perceived to result in firefighter injuries.

Interpersonal Factors

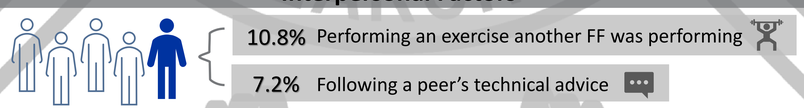

Figure 3. Interpersonal factors that were perceived to be resulting in firefighter injuries.

Departmental Factors

1.2%	3.6%	7.2%	7.3%	14.6%
Lack department-provided exercise equipment	Lack department exercise program	Lack support to provide exercise training & technique resources	Lack exercise supervision provided by a certified dept. instructor	Lack education regarding proper exercise technique

Figure 4. Institutional factors that were perceived to be resulting in firefighter injuries.

CONCLUSION

- Firefighters are **frequently injured** while performing **resistance training** on- and off-duty.
- **Overexertion / strain** was the most common mechanism of exercise injury.
- Injuries commonly occurred during **bending, lifting, squatting, pushing, and pulling** exercise movement patterns that result in **lower back and shoulder injuries.**

PRACTICAL APPLICATIONS

- Fire departments are encouraged to provide certified strength and conditioning practitioners to educate firefighters about proper exercise techniques, especially during compound movement patterns, and stress the importance of utilizing appropriate training loads to limit overexertion injuries.
- Fire departments should adopt a non-punitive injury reporting system to facilitate timely treatment and reduce lost time.

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