FIT TO FIGHT
Evaluating the efficacy of a psychosocial and fitness intervention in wildland firefighters

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Overview

- CROSH-MNRF Research Collaboration
- ‘Fit to Fight’ Intervention
- Methodology
- Data Collection
- Next Steps
FIT TO FIGHT
PREVENTION THROUGH RESEARCH

REDDING FATIGUE

- Decreased physical and mental stress
- Sufficient sleep quantity and good sleep quality
- Proper nutrition
- Managing work hours
- Adequate energy intake
- Sufficient recovery time

PREVENTS INJURY

- Slip, trip and falls
- Decreased awareness and attention lapses
- Equipment release
- Impaired cognitive and physical functioning
- Impaired ability to make decisions

Workplace specific training programs have been shown to reduce injury rates.

FITERANGERS ARE OCCUPATIONAL ATHLETES

Preventing injury requires:
1. Knowledge of specific protocols and contingency plans
2. Ongoing skill development
3. Activity-specific physical conditioning
4. Proper injury rehabilitation
5. Proper nutrition to replenish energy stores
6. Regular rest periods to promote mental and physical recovery

APTÉ À COMBATTRE
LA PRÉVENTION PAR LA RECHERCHE

RÉDUIRE LA FATIGUE

- Réduction du stress physique et mental
- Suffisance d’heures de sommeil et un sommeil de qualité
- Bonne alimentation
- Repos suffisant
- Apport énergétique adéquat

POUR PRÉVENIR LES BLESSURES

- Glissades, tribulations et chutes
- Rehaussement de la vigilance et maîtrise de l’attention
- Maxime utilisation de l’équipement
- Fonctions cognitives et physiques affaiblies
- Attention de la capacité de prendre des décisions

It has been demonstrated that training programs in the workplace promote the reduction of injury rates.

LES GARDE-FEUX SONT DES ATHLÈTES PROFESSIONNELS

La prévention des blessures nécessite:
1. La connaissance des protocoles et des plans d’urgence spéciﬁques
2. Une formation continue
3. Un entraînement physique propice à une activité d’entreprise
4. La récupération sanguine après une blesure
5. Une nutrition adéquate pour renforcer les réserves d’énergie
6. Des périodes de repos réguliers pour favoriser la récupération mentale et physique.
Injury Rates

MNRF-AFFES 10YR AVG:
- 354.9 lost work days/year
- 4.6 Lost Time Injuries/100 workers

WSIB (2013 AVG)
- Ontario AVG – 1.4 LTI/100 workers
- Forestry – 2.25 LTI/100 workers
- Health Care – 1.82 LTI/100 workers
Wildland Firefighting

Physically Demanding
- Injury Data 2011-2015
  - Slips/Trips/Falls
  - Exertion/Exhaustion

Psychologically Demanding
- Stress/Psychosocial factors 2011, 2014
  - High levels of stress
  - Organizational and psychosocial risk factors
Research Question

What is the efficacy and outcomes of a psychosocial and fitness intervention designed to improve physical fitness, decrease the impact of psychosocial risk factors and subsequently reduce injuries over the course of a fire season among wildland firefighters?
WORKPLACE HEALTH MODEL

1. ASSESSMENT
   - INDIVIDUAL
     (e.g. demographics, health risks, use of services)
   - ORGANIZATIONAL
     (e.g. current practices, work environment, infrastructure)
   - COMMUNITY
     (e.g. transportation, food and retail, parks and recreation)

2. PLANNING & MANAGEMENT
   - LEADERSHIP SUPPORT
     (e.g. role models and champions)
   - MANAGEMENT
     (e.g. workplace health coordinator, committee)
   - WORKPLACE HEALTH IMPROVEMENT PLAN
     (e.g. goals and strategies)
   - DEDICATED RESOURCES
     (e.g. costs, partners/vendors, staffing)
   - COMMUNICATIONS
     (e.g. marketing, messages, systems)

3. IMPLEMENTATION
   - PROGRAMS
     (e.g. education and counseling)
   - POLICIES
     (e.g. organizational rules)
   - BENEFITS
     (e.g. insurance, incentives)
   - ENVIRONMENTAL SUPPORT
     (e.g. access points, opportunities, physical/social)

4. EVALUATION
   - WORKER PRODUCTIVITY
     (e.g. absenteeism, presenteeism)
   - HEALTHCARE COSTS
     (e.g. quality of care, performance standards)
   - IMPROVED HEALTH OUTCOMES
     (e.g. reduced disease and disability)
   - ORGANIZATIONAL CHANGE, “CULTURE OF HEALTH”
     (e.g. morale, recruitment/retention, alignment of health and business objectives)
Fit to Fight Intervention Design

- **Pre-season Training**
  - **Baseline Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Time: 2 Hours
  - **Intervention:**
    - 'Commit to be Fit' Program
    - Time: 1 Hour

- **Fire Season**
  - **Post-Season**

- **T1** Time: 3 Months

- **Fitness Group**
  - FireRangers from 2 Fire Bases

- **Psychosocial Group**
  - FireRangers from 2 Fire Bases

- **Full Intervention**
  - FireRangers from 2 Fire Bases

- **Control Group**
  - FireRangers from 2 Fire Bases

- **Post-Season Measures:**
  - Fitness Testing
  - Psychosocial Questionnaires
  - Job Stress Survey
  - Time: 2 Hours

- **Secondary Data:**
  - First Aid Injury
  - WSIB Claims

- **Time:**
  - 2 Hours

Fit to Fight Intervention Design

Pre-season Training

T1

Time: 3 Months

T2

Post-Season

Baseline Measures:
- Fitness Testing
- Psychosocial Questionnaires
  Time: 2 Hours

Intervention:
- ‘Commit to be Fit’ Program
  Time: 1 Hour

Post-Season Measures:
- Fitness Testing
- Psychosocial Questionnaires
- Job Stress Survey
  Time: 2 Hours

Secondary Data:
- First Aid Injury
- WSIB Claims

Fitness Group
FireRangers from Fire Bases

Psychosocial Group
FireRangers from Fire Bases

Full Intervention
FireRangers from Fire Bases

Control Group
FireRangers from Fire Bases
Data Collection

T1: MAY 2-18
5088KM BY AIR
T2: AUG 9-24
8792KM BY CAR
## T1: Data Collection (Fitness)

<table>
<thead>
<tr>
<th>Information Session</th>
<th>Fitness Measures</th>
<th>Psychosocial Questionnaires</th>
<th>Commit to be Fit Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Minutes</td>
<td>60 Minutes</td>
<td>30 Minutes</td>
<td>60 Minutes</td>
</tr>
</tbody>
</table>

**Total Time: 3 Hours**
T1: Data Collection (Psychosocial)

<table>
<thead>
<tr>
<th>Information Session</th>
<th>Fitness Measures</th>
<th>Psychosocial Questionnaires</th>
<th>Guarding Minds at Work Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Minutes</td>
<td>60 Minutes</td>
<td>30 Minutes</td>
<td>60 Minutes</td>
</tr>
</tbody>
</table>

Total Time: 3 Hours
T1: Data Collection (Comprehensive)

<table>
<thead>
<tr>
<th>Information Session</th>
<th>Fitness Measures</th>
<th>Psychosocial Questionnaires</th>
<th>Guarding Minds at Work Orientation</th>
<th>Commit to be Fit Orientation</th>
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<tbody>
<tr>
<td>30 Minutes</td>
<td>60 Minutes</td>
<td>30 Minutes</td>
<td>60 Minutes</td>
<td>60 Minutes</td>
</tr>
</tbody>
</table>

Total Time: 4 Hours
T1: Data Collection (Control)

<table>
<thead>
<tr>
<th>Information Session</th>
<th>Fitness Measures</th>
<th>Psychosocial Questionnaires</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Minutes</td>
<td>60 Minutes</td>
<td>30 Minutes</td>
</tr>
</tbody>
</table>

Total Time: 2 Hours
Fitness Measures

- Anaerobic Capacity
- Grip Strength
- Core Strength
- Flexibility
Anaerobic Capacity

- Max/Min/AVG Power (watts)
- Relative Peak Power Output (watts/kg)
- Fatigue Index (watts/second)
Flexibility

Sit and Reach Test

Output variables:

– Best attempt (cm)
– Ranking based on Canadian normative data
Core Muscle Strength

– Eight Stages, maximum of three minutes
– Output Variables
  • Max time and highest stage completed
Grip Strength

Hand Grip Dynamometer

Output variables:
- Max Force/Hand (kg)
- Total Force (kg)
Questionnaires

- Guarding Minds at Work 2.0
- Utrecht Work Engagement Engagement Scale
- Psychological Capital Questionnaire
- Job Stress Survey
Fit to Fight Intervention Design

**Fitness Group**
FireRangers from 2 Fire Bases

**Baseline Measures:**
- Fitness Testing
- Psychosocial Questionnaires
  
  **Time:** 2 Hours

**Intervention:**
- ‘Commit to be Fit’ Program
- Psychosocial workshop
  
  **Time:** 1 Hour

**Post-Season Measures:**
- Fitness Testing
- Psychosocial Questionnaires
- Job Stress Survey
  
  **Time:** 2 Hours

**Secondary Data:**
- First Aid Injury
- WSIB Claims

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**Psychosocial Group**
FireRangers from 2 Fire Bases

**Baseline Measures:**
- Fitness Testing
- Psychosocial Questionnaires
  
  **Time:** 2 Hours

**Intervention:**
- Psychosocial workshop
  
  **Time:** 1 Hour

**Post-Season Measures:**
- Fitness Testing
- Psychosocial Questionnaires
- Job Stress Survey
  
  **Time:** 2 Hours

**Secondary Data:**
- First Aid Injury
- WSIB Claims

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**Full Intervention**
FireRangers from 2 Fire Bases

**Baseline Measures:**
- Fitness Testing
- Psychosocial Questionnaires
  
  **Time:** 2 Hours

**Intervention:**
- ‘Commit to be Fit’ Program
- Psychosocial workshop
  
  **Time:** 2 Hours

**Post-Season Measures:**
- Fitness Testing
- Psychosocial Questionnaires
- Job Stress Survey
  
  **Time:** 2 Hours

**Secondary Data:**
- First Aid Injury
- WSIB Claims

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**Control Group**
FireRangers from 2 Fire Bases

**Baseline Measures:**
- Fitness Testing
- Psychosocial Questionnaires
  
  **Time:** 2 Hours
Fitness Intervention

• 30-minute workshop at T1
  – Educational component
  – Workout schedule
  – Log workouts
  – Support with technology

• Follow-up site visits from OHS Specialist
  – T1 + 1 month
  – T1 + 2 months
Logging Workouts

COMMIT TO BE FIT WORKOUT LOG
CROSH-MNRF Research Project

Please take a moment to complete each of the following questions.

Who are you (e.g. J. Smith)?
J. Smith

What did you do today?
Cardio, Weights

How long was your workout (in mins)?
10-20 20-30 30-40 40-60 50-60 60+

How did you feel during your workout?

When did you workout?
Today Yesterday 2 Days Ago Other

Any additional comments (e.g. workout date, description of activities)
Ran 5k then did leg workout
Supporting with Technology
Psychosocial Intervention

- 30-minute workshop at T1
  - Educational session on psychosocial risk factors
- Weekly fact sheets
  - 1 factor per week
  - Sent to participants by email and posted at the base
Fit to Fight Intervention Design

- **Fitness Group**
  - FireRangers from 2 Fire Bases
  - **Baseline Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Time: 2 Hours
  - **Intervention:**
    - ‘Commit to be Fit’ Program
    - Time: 1 Hour
  - **Post-Season Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Job Stress Survey
    - Time: 2 Hours

- **Psychosocial Group**
  - FireRangers from 2 Fire Bases
  - **Baseline Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Time: 2 Hours
  - **Intervention:**
    - Psychosocial workshop
    - Time: 2 Hours
  - **Post-Season Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Job Stress Survey
    - Time: 2 Hours

- **Full Intervention**
  - FireRangers from 2 Fire Bases
  - **Baseline Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Time: 2 Hours
  - **Intervention:**
    - ‘Commit to be Fit’ Program
    - Psychosocial workshop
    - Time: 2 Hours
  - **Post-Season Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Job Stress Survey
    - Time: 2 Hours

- **Control Group**
  - FireRangers from 2 Fire Bases
  - **Baseline Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Time: 2 Hours
  - **Post-Season Measures:**
    - Fitness Testing
    - Psychosocial Questionnaires
    - Job Stress Survey

- **Secondary Data:**
  - First Aid Injury
  - WSIB Claims
## T2: Data Collection (ALL)

<table>
<thead>
<tr>
<th>Fitness Measures</th>
<th>60 Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychosocial Questionnaires</td>
<td>45-60 Minutes</td>
</tr>
</tbody>
</table>

Total Time: 2 Hours
Fit to Fight Intervention Design

T1 - Time: 3 Months - T2

Pre-season Training

Baseline Measures:
- Fitness Testing
- Psychosocial Questionnaires
  Time: 2 Hours

Intervention:
- 'Commit to be Fit' Program
  Time: 1 Hour

Post-Season Measures:
- Fitness Testing
- Psychosocial Questionnaires
- Job Stress Survey
  Time: 2 Hours

Secondary Data:
- First Aid Injury
- WSIB Claims

Psychosocial Group
FireRangers from 2 Fire Bases

Full Intervention
FireRangers from 2 Fire Bases

Control Group
FireRangers from 2 Fire Bases
Summary & Next Steps

- First to measure anaerobic capacity, core strength, flexibility and grip strength in wildland firefighting
- Comprehensive measurement of physical fitness and psychosocial risk factors pre- and post-season
- Robustness of design with multiple levels of intervention (including control) with randomization
- Inclusion of multiple levels of injury data makes for comprehensive intervention evaluation
Participation by Experimental Condition

<table>
<thead>
<tr>
<th></th>
<th>T1</th>
<th>T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychosocial</td>
<td>44</td>
<td>40</td>
</tr>
<tr>
<td>Fitness</td>
<td>71</td>
<td>67</td>
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<tr>
<td>Comprehensive</td>
<td>67</td>
<td>53</td>
</tr>
<tr>
<td>Control</td>
<td>48</td>
<td>46</td>
</tr>
</tbody>
</table>

The chart shows the number of participants in each condition at two time points (T1 and T2). The Psychosocial condition had 44 participants at T1 and 40 at T2. The Fitness condition had 71 participants at T1 and 67 at T2. The Comprehensive condition had 67 participants at T1 and 53 at T2. The Control condition had 48 participants at T1 and 46 at T2.
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