Females in Uniform: Physiological Adaptations to Military Training

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INTRODUCTION

- There has been a dramatic increase in the number of female soldiers in armed forces worldwide
- A large proportion of the New Zealand Defence Force is male, however the intention is to increase female representation across all ranks and trades

BACKGROUND

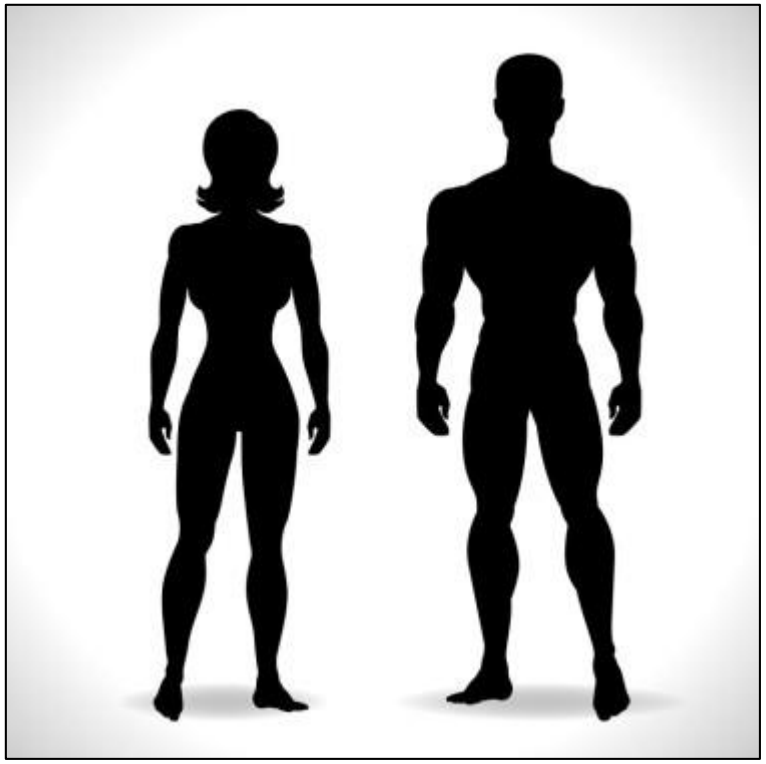
- All soldiers, regardless of their gender, are required to serve under the same conditions and to participate equally in all duties
- Military service is physically demanding, soldiers must maintain high levels of physical readiness for optimal performance of their duties

BACKGROUND-NZ

- Fewer women than men meet the standards of physically demanding jobs in the military
- Available data highlights that more females fail the LCFT than their male counterparts
- NZDF Accredited Employee Programme data reveals that, proportionally, significantly more females are injured annually than males

PHYSIOLOGY : Male and Female

- less muscle mass,
- more body fat
- lower red blood cell counts
- lower haemoglobin levels
- smaller cardiac outputs which affects oxygen consumption



PHYSIOLOGY : Male and Female

- Aerobic and anaerobic fitness levels are generally lower in women than in men
  - most women must exert themselves more than most men to achieve the same output
- Work at a higher percentage of their maximal capacity to achieve the same performance levels as men
  - women tire earlier and are at increased risk of overuse injuries.

PHYSIOLOGY : Male and Female

- Lower body weight but higher body fat of women
  - associated with lower muscle strength and endurance
  - placing women at a disadvantage compared with men in carrying out military tasks such as lifting and carrying weights, or marching with a load

PHYSIOLOGY : Male and Female

- An increase in circulating oestrogen levels in females plays a role in the response to exercise and recovery
- Oestrogen may play a protective role in minimising exercise induced muscle damage
  - exercise induced muscle damage is characterised by inflammatory cell infiltration – higher in males than females
- The protective effect of oestrogen reduces the inflammatory response
  - decreases muscle regeneration, therefore delaying muscle recovery in females

MILITARY TRAINING

- Gender-free (males and females together) military training has typically been implemented and supported by militaries
- Growing evidence that gender-free basic military training is a risk factor for overuse injury in women

MILITARY TRAINING

- Studies examining the risk factors for injury during gender-free basic training
  - twice the number of training-related injuries in women than men
  - attributed to the lower aerobic capacity in female recruits
- British Army gender-free basic training injuries among female recruits more than doubled those of males
- South African Defence Force study – large differences in strength and power output between male and female recruits
  - remained unchanged after completion of basic military training

MILITARY TRAINING

- Israeli Defence force study – significantly more severe stress fractures during gender free military training
  - recommendation is made for single sex training programmes
- These studies highlight the differences between female and male soldiers in their physical capabilities

MILITARY TRAINING

- Integrating women into physically demanding military roles requires either redesign or modification of tasks, redesign of physical conditioning programmes, or rethinking how the task is approached
  - Previous research has shown appropriate physical training can narrow the gender differences
  - Study by British military - training male and female recruits separately reduced the risk of injury and optimise fitness gains

MILITARY TRAINING

- The marked physiological difference in upper and lower body strength between men and women, combined with the need to complete military tasks that require the same absolute mission requirements, has sparked a renewed emphasis on the importance of including upper body power and strength activities for female soldiers

FEMALES IN UNIFORM STUDY

- Gender-specific training incorporating such activities has not been investigated in the NZDF
- Doing so has the potential to increase the number of females in uniform, and in specific roles, and reduce attrition
- The aim of the study is to determine whether gender-specific physical conditioning produces significantly better improvements in fitness compared to gender-free training and whether this translates in to an improvement in both physical and operational fitness