DECREASE IN INJURY RATES AT TRAINING ARMY DEPOT (TAD), NEW ZEALAND ARMY

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INTRODUCTION

Injury rates at Training Army Depot (TAD) All Arms Recruit Courses (AARC's) have been investigated by the New Zealand Defence Force (NZDF) Exercise Physiology team over the last 4 years. These investigations included physiological and biomechanical assessments as well as distance covered and a review of the physical training programme with the Unit Physical Training Instructor.

METHODS

Research identified the following risk factors as a major contributor to injuries:

Time and distance on feet[1]
Entry level fitness[2]
Lower limb strength[3]
Pre existing injuries[4]

In order to determine time spent on feet and distance covered during AARCs GPS tracking was conducted using VX Sport monitors. These revealed recruits were covering approximately 170km in week 3 of AARC training which coincided with a high spike in injury rates. Heart rate, energy expenditure and work load monitoring during AARC's revealed high levels of physiological exertion during this period of AARC training. This indicates a combination of high training activities together with large amounts of time spent on feet which is a risk for injury.

Further investigation included the examination of the physical training programme which exposed initial repetition run distances were excessive (over 1000m). Initial cross country runs were planned to cover 4km, however GPS tracking revealed a total distance of 8km was covered. The 8km distance covered included marching from barracks to the gymnasium, warm up and cool down runs. Large amounts of time were also spent on parade ground work during this time.

Recommendations were made and implemented by TAD these included: a decrease in initial distance covered / time on feet, Physical Training Instructors (PTI) to adjust the physical training programme whereby overall daily load was to be taken into consideration. Once recommendations were implemented GPS tracking data revealed a decrease in initial distance covered (initial time on feet). Adjustments to the physical training programme were initiated by the Unit PTI which included

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[1] Knapik, J. J., et al., (2006). Increasing the Physical Fitness of Low-Fit Recruits before Basic Combat Training: An Evaluation of Fitness, Injuries, and Training Outcomes. *Military Medicine,* 171, 1: 45-54.

[2] Molloy, J. M. et al., (2012). Physical Training Injuries and Interventions for Military recruits. *Military Medicine,* 177, 5: 553.

[3] Bullock, S. H., et al., (2010). Prevention of Physical Training-Related Injuries. Recommendations for the Military and Other Active Populations Based on Expedited Systematic reviews. *American Journal of Preventative Medicine*, 38(1S), 156-181.

[4] Knapik, J. J., et al., (2001). Discharges during U.S. Army basic combat training injury rates and risk factors. *Military Medicine*, 166, 641-647.

decreasing the distance of repetition runs. This included individualised ability groupings (repetition runs staggered according to fitness levels), the inclusion of shorter high intensity intermittent training rather than long duration endurance type training. Initial cross country runs being completed mainly on grass rather than on tarmac. Other initiatives included the incorporation of a neuromuscular warm up before the start of physical training sessions.

RESULTS AND DISCUSSION

Comparative data analysis between AARCs 2014 and 2015 shows a significant decrease in distance covered and time spent on feet (Fig 1).

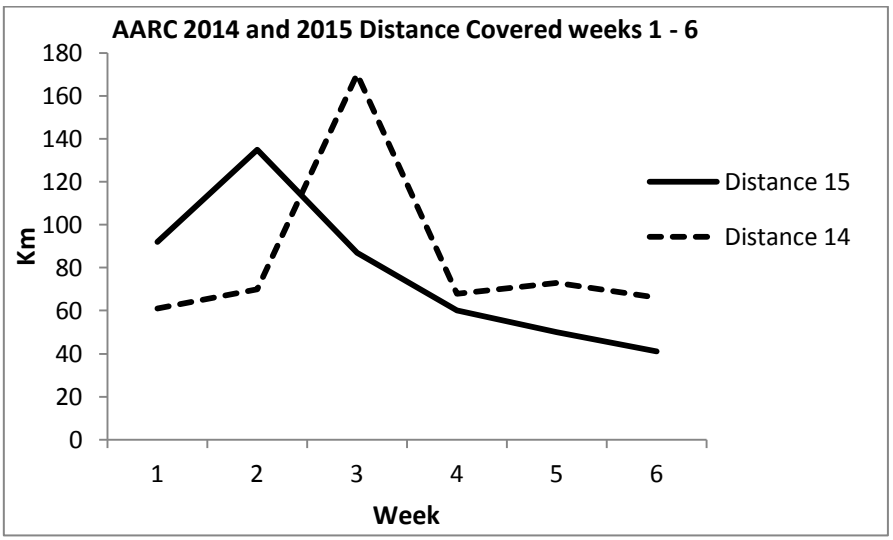

Figure 1: Total distance covered

Heart rate and GPS monitoring during physical and military training indicated there was NO significant decrease in physiological adaptation and fitness levels (Figs 2 & 3).

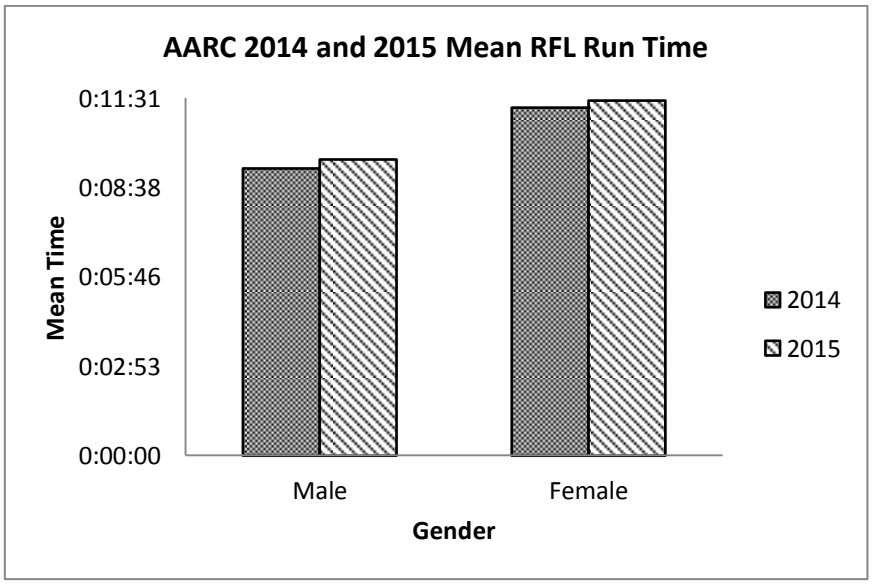

Figure 2: Mean run time

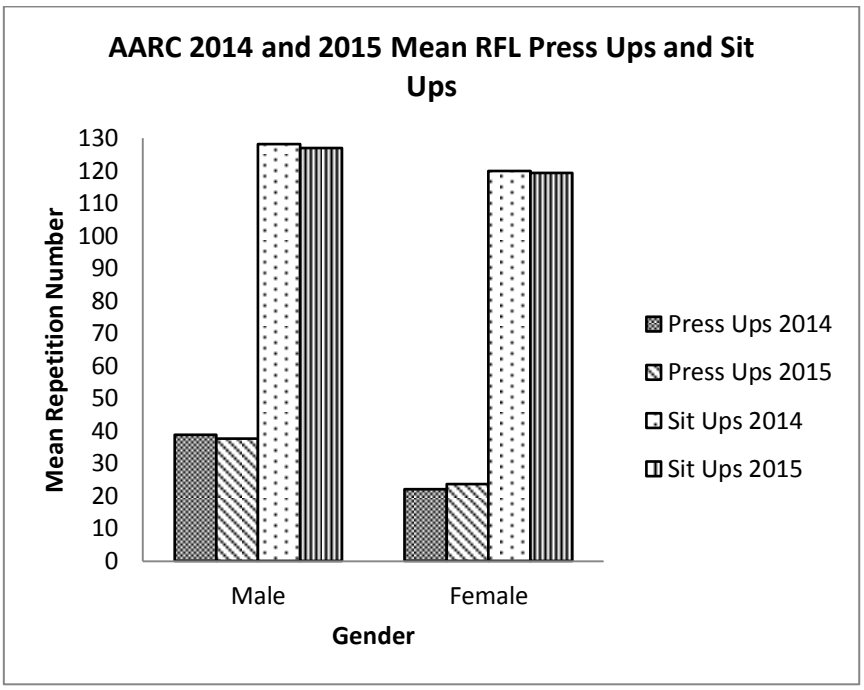

Figure 3: Mean Press Ups and Sit Ups

Accredited Employee Programme (AEP) injury data revealed a significant decrease in injury rates at TAD (~36%) (Fig 4) in 2015 due to the changes made.

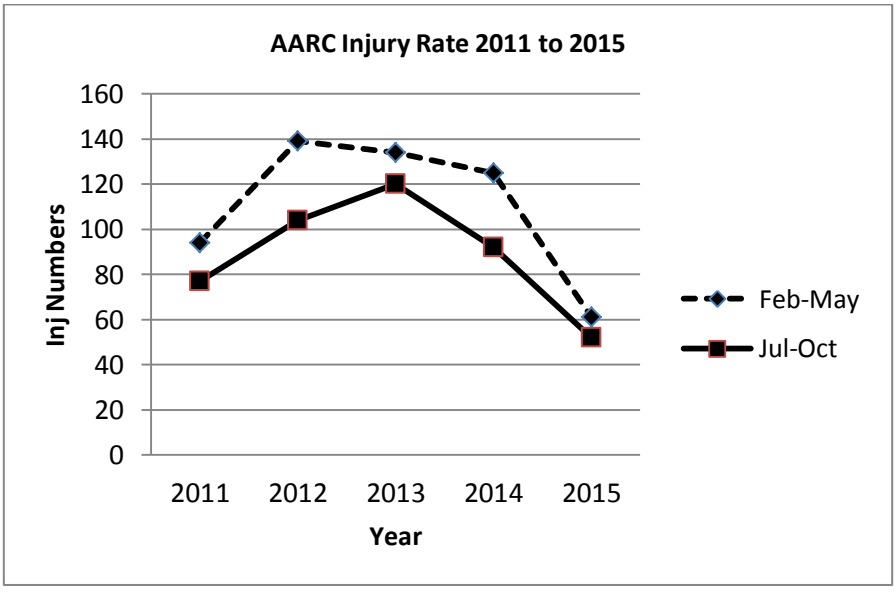

Figure 4: AEP Injury Rates for AARCs

DISCUSSION

The availability of sensors (VX Sport) to collect data in order to monitor physiological responses to physical activity, exercise, biometric responses and real-time tracking highlights the importance and

relevance of utilising this data for the benefit of improved physical performance outcomes and safety for soldiers.

The use of technology to conduct robust investigation/research, data collection and analysis resulted in changes to be made to the programme through evidence based practice. Command support and endorsement was crucial to the success of both the investigation and implementation of the recommendations.

CONCLUSION

In order to minimise injury rates the use of technology such as VX Sport sensors to monitoring physiological responses training programmes should continue at all levels of training. PTI's and the Exercise Physiology Team need to be consistently working together to monitor and adjust training programmes.