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THE IMPACT OF A STRUCTURED RECONDITIONING PROGRAM ON THE PHYSICAL ATTRIBUTES AND ATTITUDES OF INJURED POLICE OFFICERS: A PILOT STUDY.

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¹School of Health Sciences and Medicine, Bond University.
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BOTTOM LINE UP FRONT

A structured and supervised reconditioning program provided by qualified personnel improves the physical movement performance and perception of general physical health of injured police officers.

ABSTRACT

Specific work tasks represent the most widely recognised risk for Workplace Musculoskeletal Disorders and injuries. Six injured police officers (m=38.8 years of age) volunteered to participate in a study to determine whether a structured and supervised reconditioning program may improve their return to work prospects. Three officers were allocated to the intervention group, receiving eight training sessions over four-weeks of a tailored reconditioning program, and three officers to a control group. Both groups continued to receive standard medical care. Mean total Functional Movement Screen scores increased in the intervention group (+4.3 points) to a greater extent than the control group (+1.0 points). Individual component scores for the Functional Movement Screen were significantly lower in the intervention group (p=0.004) at initial assessment but not at the four-week follow up. Only the intervention group made a significant improvement in movement performance scores (p=0.012) over the four-week period. A minimal difference (2.3 points) was found between groups in SF36 Physical Component Summary mean scores at the initial assessment. At four-weeks the intervention group scores had increased (+10.2 points) and the control group scores decreased (-4.1 points). Results suggest that injured police officers who participate in a structured and supervised reconditioning program in addition to their standard medical care improve in physical performance measures and in attitudes towards their physical health to a greater extent than those who only receive standard medical care. Providing injured police officers with a workplace reconditioning program, conducted under supervision, may improve their return to work prospects and reduce costs associated with workplace injury.

KEYWORDS - Reconditioning, return to work, rehabilitation, police, attitudes.

INTRODUCTION

In Australia, work disability due to work-related musculoskeletal disorders (WMSD) are the most common condition for which workers’ compensation claims are currently lodged (1). A worker is considered to be suffering a work disability if they have suffered an injury, either traumatic or non-traumatic, that results in them missing at least one day of work and includes time off work as well as any ongoing workplace limitations (28). Such injuries can include a wide range of inflammatory and degenerative conditions, which can affect muscles, tendons, ligaments, joints, nerves and/or blood vessels (19). Over the reporting period 2010/2011, ‘body stressing’ was the mechanism of injury accounting for 40% of all serious worker’s compensation claims at a median cost of $8,400 and loss of five working weeks per claim (20). Furthermore, 3.9% (4,990) of these body stressing claims were attributed to human agencies (handling other people) (20).

Police work, by its nature is complex and varied (2). Job duties and descriptions may change from minute to minute, day to day and shift to shift (5). Every year police officers are exposed to factors such as shift work and, as street-level bureaucrats, handling law enforcement, violent situations, negative attitudes and threats from citizens (12). These factors represent the most widely recognised risk for WMSD; being hazards inherent in ‘specific work tasks’ (1). On this basis, it is unsurprising that an auditor-general’s report on Managing Injured Police: NSW Police Force (24), revealed that the number and compensation costs of reported injuries for police staff covered by workers compensation was well above the public sector average. Furthermore, over the recorded period 2005-2007, more than 50% of the New South Wales (NSW) Police Force officers who separated from the force, separated as medical retirements (24). These separations represent a substantial loss of corporate knowledge and skills as well as incurring substantial costs. Apart from the direct fiscal costs of treatment and compensation, comes the cost associated with replacing medically retired officers. In NSW, it is estimated that the State Government invests $85,000 per annum to train and employ a new police officer (27). Optimising a Police Force’s ability to return injured police officers to duties therefore presents as an opportunity to maintain a high level of corporate knowledge and reduce fiscal budget pressures.
Organisations that are actively involved in the return-to-work (RTW) process of employees yield a higher RTW rate and associated reduced work disability duration (7). Evidence suggests that work hardening physical conditioning has a positive impact on the RTW of injured workers (3, 4, 13). Furthermore, conditioning conducted within the workplace may be more effective at returning personnel to work than clinically based work hardening (4, 9). While physical exercise is seen as an essential strategy to speed up return to work for employees with a physical injury (22), an individual’s beliefs about the severity of their health condition may play a significant role in their presenting level of disability (11).

The intent of this pilot research was to investigate the impacts of a targeted reconditioning program provided and supervised by a NSW Police Physical Training Instructor (PTI) on the movement performance and perception of general physical health of injured police officers as a means of improving their RTW prospects.

METHODS

Approach to the Problem
To investigate the potential impact of a structured supervised reconditioning program on the physical performance and perception of general physical health of injured police officers, volunteers were divided into either a control group (CG) or an intervention group (IG). In addition to continued ongoing standard medical care, the IG also received a reconditioning program intervention. Changes in physical performance were measured through the Functional Movement Screen (FMS) tool and attitudinal changes towards general physical health through the Medical Outcomes Short Form 36 (SF-36) questionnaire. This study was approved by the NSW Police and the Bond University Human Research Ethics Committee (RO1588).

Subjects
Six male (mean = 38.8 ± 9.4 years of age) Police Force officers from the New South Wales Police Force volunteered to participate in this pilot study. Criteria for inclusion in the study were a) volunteer, b) currently serving as a sworn police officer, and c) suffering a musculoskeletal injury recognised by their workplace for which they are, or will be, receiving treatment. Due to the nature of the study two exclusion criteria were also enforced, these were: a) officer had a psychological injury, or b) officer was medically unwell.

Procedures
The officers were allocated to either an IG or a CG. Due to time constraints placed on this pilot study, the first three volunteers were allocated to the IG and the subsequent three volunteers to the CG. Both IG and CG continued to receive standard medical care by their treating practitioner/s for the duration of the study. This care may have included, but was not limited to, a review and treatment by a medical doctor, medical specialist or physiotherapist. In addition, the IG was provided with a tailored reconditioning program consisting of a general body reconditioning program. The programs were devised, and the training supervised, by a qualified NSW Police PTI who, together with fellow PTIs, had received additional education on reconditioning programming for injured police officers at the Annual NSW Police PTI Conference (17, 18).

The focus of the IG program was on relearning correct, pain free, movement patterns that were inefficient due to either the officer’s injury, or the officer’s lack of physical activity due to the injury. These movement patterns where progressed at a rate that was deemed comfortable and safe by both the PTI and the injured officer (see Table 1). In addition to these specific exercises, each IG session included some traditional resistance training exercises to minimise musculoskeletal strength loss and concluded with cardio vascular training on a treadmill, cycle or rower (depending on the nature of the officer’s injury).

Table 1 - Example of reconditioning program for an officer with an injured back.

<table>
<thead>
<tr>
<th>Warm Up</th>
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<table>
<thead>
<tr>
<th>Progressive Exercise examples</th>
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</thead>
<tbody>
<tr>
<td>Clams → Lateral Leg Raises</td>
</tr>
<tr>
<td>Hip Hinge → Potty Squat → Goblet Squat</td>
</tr>
<tr>
<td>Step Up → Lateral Step → Cross over step up</td>
</tr>
<tr>
<td>Lawn Bowlers Squat → Single Leg Squat Pattern</td>
</tr>
<tr>
<td>Farmers Carries → Suit case Deadlifts</td>
</tr>
</tbody>
</table>

Each participant in the IG completed eight reconditioning sessions of up to 60 minutes over a four-week period at an approximate frequency of two sessions per week. At the commencement and conclusion of the pilot study (four-weeks later) all officers completed the FMS and the SF-36 questionnaire.

The FMS was selected as the tool for measuring the physical movement performance of the subjects at baseline and following implementation of the reconditioning program. The FMS is an assessment tool used in screening for...
Musculoskeletal injury risk in tactical personnel (16). This tool measures the musculoskeletal stability of a participant to identify functional limitations and asymmetries through the use of seven movement patterns. Consisting of movements that include a deep squat, hurdle step, in-line lunge, push-up and rotary stability task, the FMS is designed to place the body in challenging positions that may reveal muscle weaknesses, imbalances and compensatory movement patterns (6). Participants are given a score of between zero (lowest score) and three (highest score) for each movement. The FMS also includes three clearing tests, these being; the shoulder impingement, push up and posterior rocking clearing tests. These clearing tests are graded either as a positive or a negative based on the participant’s pain. On this basis, the highest aggregated score that can be attained in the FMS is 21. All FMS assessments were conducted by a NSW Police PTI formally certified in the FMS assessment tool.

The SF-36 was selected as the tool for measuring the attitudes and perceptions of injured officers towards their physical health at baseline and following implementation of the reconditioning program. The SF-36 is a 36 item questionnaire frequently used, either in part or in full, in the field of return to work literature (23, 25). Considered to have a good internal consistency (10), the questionnaire measures eight multi-item dimensions of health. The first four measures are; role limitations due to physical problems (4 items), physical functioning (10 items), pain (2 items), general health perception (5 items), relate to physical health and are used to generate a physical health summary score or the physical component summary score (PCS). The subsequent four measures, energy/vitality (4 items), social functioning (2 items), role limitations due to emotional problems (3 items), and mental health (5 items), relate to mental health and are used to generate a mental health summary score or the mental component summary score (8). As the focus of this pilot study was on physical attributes (capability and perception of general physical health) only the PCS scores were analysed.

Due to the nature of the working environment, the NSW Police PTI (MS) allocated to the project, while having no control over group allocation, knew the members in both groups. Furthermore, as the reconditioning program was based on dysfunctions identified through the use of the FMS tool, the PTI (MS) responsible for the conduct of the FMS at baseline was responsible for the implementation of the intervention program. To limit potential bias, all baseline data was sent to and held by a member of the research team (RO) who did not know, or have interaction with, the participants. This research member (RO) was responsible for aligning gathered data and performing the statistical analysis.

Statistical Analysis
In addition to total FMS scores, individual scores for each of the seven components of the assessment were extracted to increase data sensitivity for statistical analysis. This method provided 21 data scores per group (7 scores x 3 participants per group) for the analysis within groups (pre and post intervention) and between groups (IG and GG).

In analysing the SF36 PCS scores, the formula and transforming scales for raw scores as described by Ware, et al. (26) were applied. Following the transformation of scale scores, the scores were normative based through z-score standardization using the formulas designated by Ware, et al. (25).

Before any statistical analyses were conducted, consideration was given to the assumption of normality and the assumption of homogeneity of variances. Statistical analysis for individual component FMS scores was conducted using independent t-tests to compare numeric data between the two groups (IG and CG). Paired t-tests were used to compare pre and post intervention individual component measures within groups. Data were analysed using the IBM Statistical Package for the Social Sciences (SPSS) Statistics Version 20.0 for Macintosh and Windows (21) with the level of significance set at p ≤ 0.05.

RESULTS
The participants presented with work related musculoskeletal injuries to the back (n=4: IG n=2, CG n=2) and knee (n=2: IG n=1, CG n=1). The FMS results are shown in Table 2. The CG had a higher mean total FMS score than the IG at both the initial assessment (+5.67 points) and at the four-week follow up (+2.33 points). The CG increased in performance by an average of 1.0 points while the IG improved by an average of 4.3 points. The initial IG FMS individual component scores were found to be significantly lower than the component scores reported for the CG (t(40)=3.07, p=0.004). However, there was no significant difference between groups on the follow up assessment four-weeks later. When the follow up results of both groups were compared to their initial scores, only the IG was found to have made a significant improvement in FMS performance scores (t(20)=2.75, p=0.012).
Table 2 - Injured police officer FMS results (total and by individual components) pre and post four week reconditioning program.

<table>
<thead>
<tr>
<th>Group</th>
<th>Total FMS*</th>
<th>By Individual Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial Score M (SD)</td>
<td>4-Week Score M (SD)</td>
</tr>
<tr>
<td>Control group (CG)</td>
<td>14.0 (1.0)</td>
<td>15.0 (1.0)</td>
</tr>
<tr>
<td>Intervention Group (IG)</td>
<td>8.33 (2.51)</td>
<td>12.67 (0.58)</td>
</tr>
</tbody>
</table>

† Significant difference between CG and IG individual component FMS scores, p≤0.005
‡ Significant difference between initial individual component FMS score and follow up individual component FMS scores, p≤0.05

The mean results for the SF36 PCS scores are shown in Table 3. The mean CG scores were higher than the mean IG scores following the initial assessment (+2.3 points). However, a trend was observed whereby the mean IG scores increased (+10.67 points) over the four-week period while the mean CG scores decreased (-4.07 points) (Figure 1). As an increase in PCS scores indicates a positive improvement, these results show an improvement in the perception of general physical health for the IG and a decrease in perceptions of their general physical health for the CG.

Table 3 - Injured police officer SF36 PCS results pre and post four week reconditioning program.

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial PCS Score M (SD)</th>
<th>Follow Up PCS Score M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (CG)</td>
<td>40.20 (9.78)</td>
<td>36.13 (5.38)</td>
</tr>
<tr>
<td>Intervention Group (IG)</td>
<td>37.87 (12.54)</td>
<td>48.54 (5.22)</td>
</tr>
</tbody>
</table>

Figure 1 - Graphical representation of changes to injured police officer SF36 PCS results pre and post four week reconditioning program.

DISCUSSION

This pilot study found that a targeted reconditioning program had a positive effect on both the physical attributes and perception of general physical health of injured police officers. Improvements in FMS scores as a total sum and by individual components were greater in the IG when compared to the CG. PCS scores in the IG group were found to improve while scores for the CG decreased suggesting that perceptions towards individual general physical health improved in the IG but regressed in the CG.

The results of this pilot study supports previous literature in the general population (4, 9). In this study, improvements in movement performance were identified in the IG following a targeted reconditioning intervention undertaken in the workplace over a four-week period. Cheng and Hung (4), who likewise employed a four-week intervention program, observed an improvement in shoulder function for participants undergoing either a Clinic-Based Work Hardening
(CWH) program or a Workplace-Based Work Hardening (WWH) program. Furthermore, the WWH program demonstrated significantly better results than the CWH in several areas (e.g. overhead tolerance, shoulder flexion range and bilateral carrying). When looking at the specific FMS outcome measure results, the mean improvement in this study for the IG group was notably higher than the study by Goss, et al. (9). In the study by Goss, et al. (9), which included a conditioning program of three group sessions per week and an individualized training program over six-week period, the participants improved in FMS performance by a mean of 2.5 points compared to the 4.3 points reported in this study. Apart from a different reconditioning program training dose between our study and the study by Goss, et al. (9), the participants in the later study included both soldiers undergoing rehabilitation and healthy soldiers with no distinction made between the groups for the FMS scoring. In addition, the initial mean scores of participants in the study by Goss, et al. (9) was notably higher (mean of 15.14 points) than either the CG (mean of 14.0 points) or IG (mean of 8.33 points) in this pilot study. A final point to consider when considering the FMS results of this study is the potential impact on scores induced by a learning effect. None of the participants in this study had experience in the FMS prior to the study and, as such, their familiarization with the FMS and its requirements may have influenced the increases in performance following the four-week program. This learning effect would also help explain the increase in performance of the CG, acknowledging that their clinical recovery over a four-week period may also have had an impact.

Participants in the IG presented with an improvement in their perceptions in relation to their physical capacity as measured by the SF36 PCS. The findings in this pilot study support those of Meijer, et al. (15) who likewise reported improved SF36 scores following implementation of an intervention which included physical conditioning. Similar to this pilot study, the study by Meijer, et al. (15) consisted of a CG receiving traditional medical care and an IG who were provided with a multidisciplinary treatment that included physical conditioning with outcomes measured at two, six and 12 months. The longer duration of the Meijer, et al. (15) study may help explain a key difference between their study and this pilot study whereby the SF36 scores of the CG in the study by Meijer, et al. (15) increased and in this study these scores decreased. Considering this, the potential causes of the decrease in physical capacity perceptions of the CG are not known. While psychosocial factors are associated with separation from work routine (4), the durations over which members in the CG claimed to have been on restricted duties varied from a few months to several years. It should also be noted that the Meijer, et al. (15) study included SF36 scores from all components of the SF36 as opposed to only the PCS scores as reported in this study. On this basis, the aggregation of SF36 data in the study by Meijer, et al. (15) may have masked any potential decreases in the PCS scores. Acknowledging that the small cohort size may have contributed to the reduction in PCS scores in the CG, the results found in this study warrants further investigation.

An individual’s beliefs about their health conditioning are thought to play a significant role in their presenting level of disability for return work (11). The findings in this study, whereby the objective movement findings (FMS scores) mirrored the subjective perceptions of officers towards their physical health (SF36 PCS scores), are therefore not unexpected and have been reported in other studies (11). This does not suggest that the two measures (objective physical score and subjective health score) are mutually inclusive as one of the biggest difficulties in rehabilitation studies is identifying which element of the program is responsible for the observed change in outcome (14, 22). As this study observed an increase in both physical movement and attitudes towards physical movement, it cannot be determined whether improved motivation or feelings of wellbeing may have caused the improved physical movement scores as when these factors operate simultaneously it is difficult to analyse them separately (22). While the inability to differentiate between the role attitude towards physical movement had on improving movement scores deserves consideration, the end state of the reconditioning program for injured police officers was an improvement in physical movement and attitudes towards physical movement. As such, the findings of this pilot study support the use of a structured reconditioning program to improve RTW prospects for injured police officers.

Limitations and Future Research

Several limitations were identified in this pilot study which require consideration. These limitations include a lack of a measure of actual return to work outcomes (i.e. number of officers returning to the workforce on full duties), small cohort sizes, initial differences in FMS scores between groups at the commencement of training and limited time frame for the study. While the data in this pilot program of research suggests that a structured reconditioning program improves the movement performance and perception of general physical health of injured police officers, the question of whether RTW interventions influence actual RTW is not answered. This lack of a direct measure of actual RTW success is a concern noted by Staal, et al. (22) in RTW research. Subjective information from one of the IG participants and their direct line manager support the supposition that there was a correlation between increased movement performance and perception of general physical health and RTW. Considering this result, the relationship between outcomes from the reconditioning program on RTW still needs to be formally examined. The restriction of results to a small cohort size and the difference in initial FMS movement scores between cohorts can be attributed to limitations associated with this pilot program of research, namely small initial cohort size for trialling the proposed research and limited time available for the research. The small cohort size will limit the transferability of these results to the general public, while the physical FMS score differences between the two cohorts at the commencement of the study will limit the transferability of results to officers with less severe movement restrictions and may suggest that a ceiling effect for reconditioning programs may exist. Likewise, the limited time frame to conduct the pilot study did not allow for an investigation into interventions over a longer period or the sustainability of reconditioning gains made once the intervention had ceased. The follow on study, which is employing a larger sample size (approximately 30 officers)
over a longer intervention period (8 weeks), will include measures of return to work and a follow up assessment (4 weeks after either the complete 8 week intervention or once the officer has returned to full duties) to monitor improvement sustainability.

CONCLUSIONS AND PRACTICAL APPLICATIONS

This pilot study found that a supervised workplace reconditioning program improved the physical movement and attitudes towards physical movement of injured police officers. While further research can increase the strength of these findings, these results suggest that structured and supervised reconditioning programs provided by qualified personnel can be used to improve the physical movement performance and perception of general physical health of injured police officers as a means of improving their RTW prospects.

REFERENCES