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Effectiveness of an Injury Prevention Program on Division I Track & Field Runners

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Effectiveness of an Injury Prevention Exercise Program on Division I Track & Field Athletes

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BACKGROUND

Running overuse injuries are very prevalent in track and field (T&F) with 15-40% of athletes reporting having an overuse injury during their career.[1] Many factors contribute to an individual's risk of sustaining an injury. Some of those factors include running surface, training volume, previous injury, age, gender, with previous injury being the strongest risk factor for injury.[2] However, there is limited research regarding various screening tools which could be utilized to identify at risk individuals, and no research conducted on the effectiveness of individualized exercise programs on reducing injury within this population.

PURPOSE

Investigate the effectiveness of a tailored injury prevention exercise program on reducing the risk of RRIs in previously injured Division I T&F athletes over the course of one full competition season.

METHODS

Prior to the 2019-2020 indoor track pre-season, the athletes completed a survey to qualify for the study. Athletes who were eligible were randomly placed into a control group (CTRL) or injury prevention exercise group (IP).

Athletes

- CTRL (n=2) did not receive any intervention
- IP (n=6) group participated in a movement screen before the indoor track pre-season and at the end of the indoor track pre-season, and received tailored exercise sessions
- Both groups were monitored for injury throughout the season by record of the track athletic trainers

Movement screen

- Dynamic balance: modified version of the Y-balance test (mYBT) consisting of four reach directions anterior, posterior, posterior-medial, and posterior lateral (ANT, POST, PM, PL)
- Ankle mobility: calf length and tone and ankle joint mobility assessed
- Hip strength: hip extension and hip abduction strength were measured with a hand-held dynamometer

Injury Prevention Exercise Program

- Sessions with athletes scheduled on a weekly to monthly basis
- Prescribed 1-3 tailored exercises including ankle mobility, specific hip strengthening, and dynamic functional strengthening
- Athlete could progress to more advanced exercises once they demonstrated excellent technique as observed by the researchers

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DATA ANALYSIS

IBM SPSS Statistics 25.0 Software (IBM, NY, USA) was used to analyze the data collected in this study. Paired t-tests and effect sizes were used to compare the pre and post movement screens. Independent t-tests and effect sizes were used to compare injury rates between CTRL and IP groups. Alpha levels were set at 0.05.

RESULTS

Upon the conclusion of the indoor competitive track and field season, it was found that one out of the six (16%) athletes in the IP suffered an injury, while neither of the two athletes in the CTRL group suffered an injury. No significant difference was found in the IP group (p=0.363), and no p-value could be determined for the CTRL group.

Table 1 displays average pre- and post-test scores along with score differences, effect size, and statistical significance. Values increased for each post-test; however, most demonstrated poor significance. The only variable found to be statistically significant was dominant hip abduction strength (p=0.029, d=0.73, mean difference=61.72 N), indicating that the exercise program was effective in improving strength in this area. Table 3 displays the population demographics.

Table 1. Pre- and post-assessment results for hip strength and mYBT scores.

		Pre-Test	Post-Test	Difference (post-pre)	Effect Size (d)	Significance (P)
Strength (N)	Hip abduction, dominant*	257.17	318.89	61.72	0.73	.029
	Hip abduction, nondominant	256.24	296.01	39.77	0.41	.335
	Hip extension, dominant	216.78	226.12	9.34	0.10	.685
	Hip extension, nondominant	209.16	236.80	27.64	0.31	.247
mYBT reach (cm)	Anterior, dominant	0.62	0.62	0.00	0.00	.995
	Anterior, nondominant	0.61	0.61	0.00	0.00	.916
	Posterior, dominant	0.86	0.88	0.02	0.18	.420
	Posterior, nondominant	0.86	0.89	0.03	0.27	.253
	Posteromedial, dominant	1.09	1.12	0.03	0.29	.349
	Posteromedial, nondominant	1.08	1.11	0.03	0.35	.245
	Posterolateral, dominant	1.04	1.05	0.01	0.08	.843
	Posterolateral, nondominant	1.01	1.07	0.06	0.57	.109

* Indicates a significant difference between the groups (p=<.05)

Table 2. Post-season injury rates.

	CTRL	IP
Injury Rate (%)	0	16
Significance (P)	-	.363

Table 3. Descriptive statistics of groups.

	CTRL	IP
Age*	18	20 +/- 1.7
Gender	1 F, 1M	4 F, 2 M
BMI*	19.9 +/- 0.7	22.69 +/- 1.2
Grade	2 Freshman	2 Freshman 2 Juniors 2 Seniors

* Indicates a significant difference between the groups (p=<.05)

Figure 1. mYBT POST

Figure 2. mYBT PM

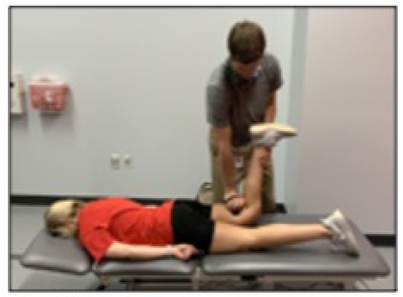

Figure 3. Hip extension strength test

Figure 4 . Hip abduction strength test

DISCUSSION

This study demonstrates an injury prevention exercise program was not effective in reducing injury prevalence in Division I T&F athletes because no significant differences in injury rates between IP and CTRL groups was found. The reasoning for this insignificance may be due to a small sample size resulting in low power (1-β=0.95). Still, the overall injury rate in this study was 1/8 (12.5%), which is lower than the reported 15-40%.[1] The below average injury rate in this study may be due to implementing an individualized injury prevention exercise program versus a generic injury prevention program. Additionally, the results of our analysis suggested the implementation of an injury prevention exercise program was successful at significantly improving hip abduction strength. Hip abduction weakness was a common impairment among the IP group, resulting in the addition of hip abduction strength exercises within 5/6 athlete's injury prevention exercise programs. This increase in hip abduction strength has the potential to decrease injury prevalence since hip abduction weakness is correlated to an increased prevalence of a variety of lower extremity overuse injuries.[3,4,5]

CLINICAL IMPLICATIONS

Currently, this study is unable to support the use of an injury prevention exercise program to reduce injury rates in Division I T&F athletes. However, the injury prevention exercise program was effective at increasing dominant limb hip abduction strength among Division I T&F athletes. Further research is needed to confirm these results on a larger, more diverse population of T&F athletes.