DIFFERENCES IN SPRINT PROFILE FOLLOWING RESISTED SPRINT TRAINING IN YOUTH ICE HOCKEY PLAYERS

Anna L. Dorny[1] Matthew P. Gonzalez[2], Samuel Montalvo[3], Sandor Dorgo[2], Martin Dietze-Hermosa[1]
[1]Brigham Young University-Idaho, [2]University of Texas at San Antonio, [3]Stanford University

Introduction

Ice hockey, due to its fast-paced nature and intermittent high-intensity bursts, demands players to possess good sprint capabilities. The sprint profile of ice hockey players is important to determine their on-ice performance and effectiveness.

Purpose

This study explored the impact of resisted sprint training (RST) on the overground sprint profile (maximal force [F_0], power [P_{max}], velocity [V_0], maximal ratio of force [RF_{max}], decrease in ratio of force [D_{RF}], and force-velocity slope [S_{FV}]) of male youth ice hockey players.

Methods

Twenty-four competitive youth ice hockey players participated in the study. Participants were separated into three equal groups: off-ice RST; on-ice RST; bodyweight training. The training program lasted 8 weeks (2 sessions/ week).

Training program for both on-ice and off-ice RST groups

- Repetitions: 6-9 sprints depending on week
- Distance: 20-meters
- Rest Period: 3 minutes between repetitions
- Sled Load: Off-ice= ~50-60% of bodyweight; On-ice= ~70-80% of bodyweight

The load for RST was provided by sleds loaded with weight plates.

This project was supported by the NSCA Foundation

Training program for bodyweight group

- The bodyweight training program incorporated high velocity body weight exercises.

Day 1

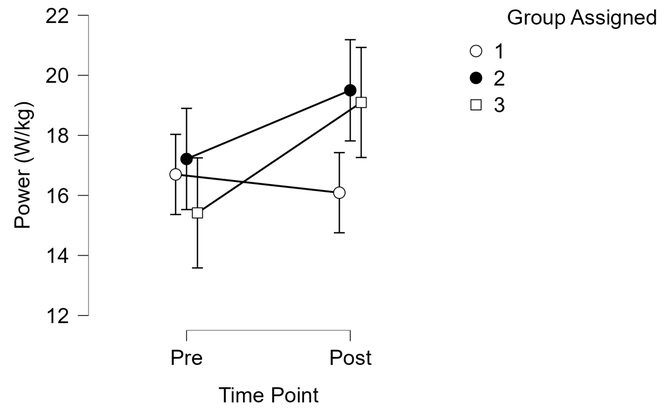
Exercise	Time/Reps	Rest Time	Rounds
Squats	1 min	30 seconds	2
Push Ups	1 min	30 seconds	2
Planks	1 min	30 seconds	2
Glute Bridge	1 min	30 seconds	2
Broad Jumps	5 reps	30 seconds	2
Dead Bugs	1 min	30 seconds	2
Squat Jump	5 reps	30 seconds	2

Day 2

Exercise	Time/Reps	Rest Time	Rounds
Skaters	5 reps each leg	30 seconds	2
SL RDL	5 reps each leg	30 seconds	2
Bird/Dog	1 min	30 seconds	2
Superman	1 min	30 seconds	2
Burpees	1 min	30 seconds	2
Plank	1 min	30 seconds	2
Alternating lunges with arm reach	1 min	30 seconds	2

At baseline and post training, participants completed two 30-meter acceleration maximal overground sprints. A video recording of the sprint trials were obtained using a high-speed camera (iPad Air, Apple Inc., USA) at 240 fps. The video files were then processed in the *MySprint* mobile application and corresponding spreadsheet to obtain measures of interest (F_0, P_{max}, V_0, RF_{max}, D_{RF}, S_{FV}).

Figure 1. Changes in maximal power. Group 1 = Bodyweight, Group 2 = Off-ice RST, Group 3 = On ice RST. Group means and 95% confidence intervals.



A two-way repeated measures ANOVA with follow up analysis measured the differences in sprint profile variables across groups and time point.

Results

There was a group by time point interaction effect for F_0 ($p=0.01$; $\eta^2_p=0.37$). Follow up analyses indicated an increase in F_0 for the off-ice RST group (Cohen's d=0.81; 95%CI [0.37,1.99]; p=0.01) and the on-ice RST (Cohen's d=1.15; 95%CI [0.16,2.47]; p=0.01).

There was a group by time point interaction effect for P_{max} ($p=0.01$; $\eta^2_p=0.34$). P_{max} increased for the off-ice RST group (Cohen's d=0.72; 95%CI [0.29,1.72]; p=0.01) and the on-ice RST group (Cohen's d=1.15; 95%CI [0.01,2.31]; p=0.01).

There was a group by time point interaction effect for RF_{max} ($p=0.01$; $\eta^2_p=0.35$) with the on-ice RST (Cohen's d=1.22; 95%CI [0.12,2.32]; p=0.01) and the off-ice RST (Cohen's d=0.51; 95%CI [0.38,1.40]; p=0.01) both displaying increases.

There was a group by time point interaction effect for S_{FV} ($p=0.02$; $\eta^2_p=0.33$) with both RST groups displaying a greater negative slope; off-ice RST (Cohen's d=-0.70; 95%CI [-2.71,-0.67]; p=0.02) and on-ice RST (Cohen's d=-1.08; 95%CI [-2.50,-0.42]; p=0.02).

Conclusion

RST groups increased in F_0, P_{max}, and RF_{max}. RST groups also displayed a greater negative S_{FV}.

Practical Application

Coaches may consider implementing RST into their training programs when aiming to increase overground sprint F_0, P_{max}, RF_{max} and alter S_{FV}.

Full abstract and graphs

Anna Briggs @Builtbybriggss