Lower Extremity Injury Prediction from Countermovement Jump Discrete Variables in NCAA Division I Women's Soccer

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Purpose

The purpose of this study was to investigate the relationship between the countermovement jump and non-contact lower body injuries. More athletic programs utilize force platforms now due to the decreased cost. There is, however, a paucity of research indicating the relationship of variables to injury with cutoff scores to indicate the minimum necessary value for the athlete to possess.

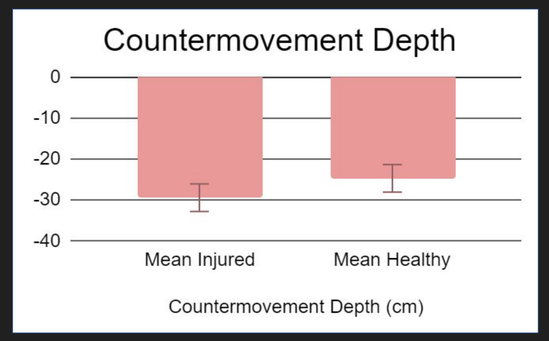
Methods

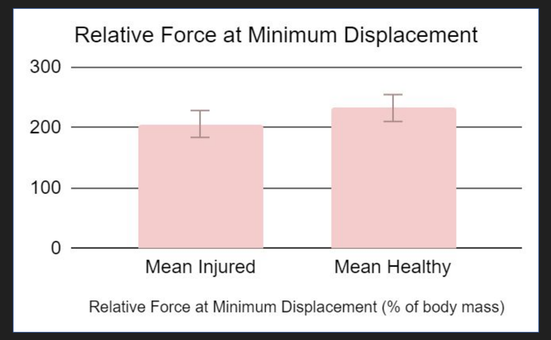
- 25 Women's DI Collegiate Soccer Players
- Height 1.66± 0.04m
- Weight 65.24± 7.45kg
- CMJ with HOH
- Bilateral Force Plates

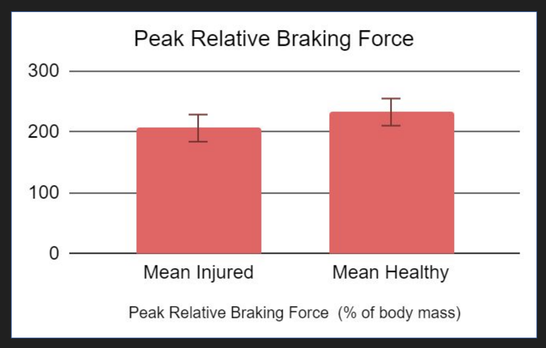
Statistical Analysis

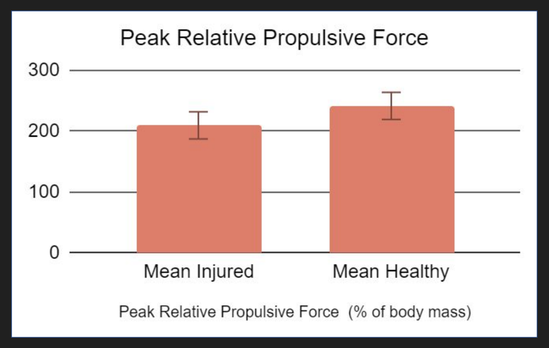
Pearson correlation coefficients for the significant variables, mean of the healthy and injured groups, as well as cutoff values per variable as calculated by a ROC curve are presented in Table 1

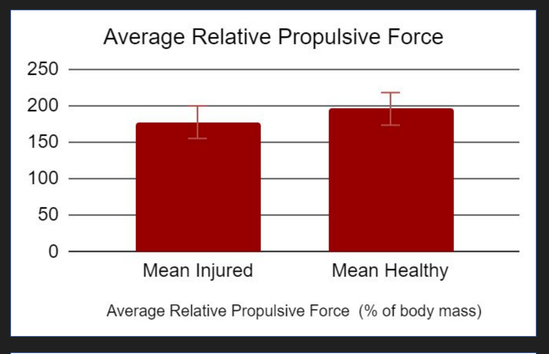
Figures

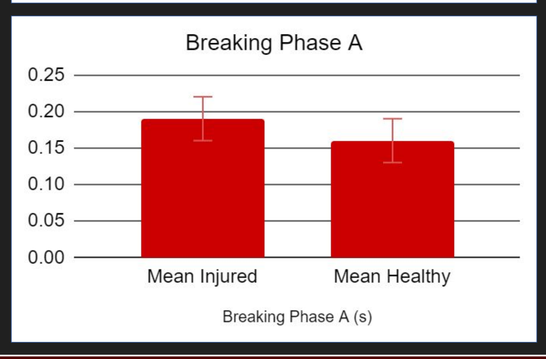


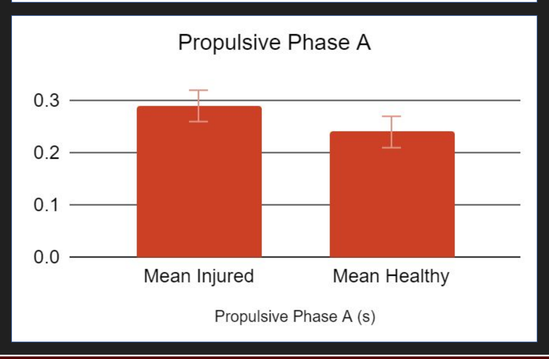


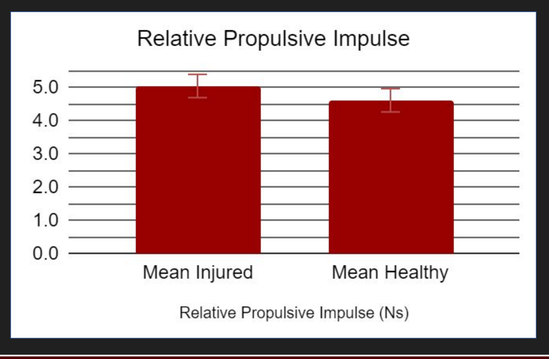












Conclusions

Athletes who were injured had significantly lower values for relative force at minimum displacement, peak relative braking force, and average relative propulsive force. The injured athletes also took significantly longer to perform both the braking and propulsive phases. The injured athlete's group had to perform a greater countermovement depth even though their jump height was not significantly different.

Table 1

	Countermovement Depth	Relative Force at Minimum Displacement	Peak Relative Braking Force	Average Relative Propulsive Force	Peak relative Propulsive Force	Braking Phase A	Propulsive Phase A	Relative Propulsive Impulse
Pearson Correlation r (23)	-.411	-.414	-.413	-.438	-.413	.397	.456	.405
Significance	.041	.040	.040	.028	.040	.049	.022	.044
Area under the curve (AUC)	.763	.798	.798	.789	.851	.228	.175	.798
Cutoff Value	-28.35cm	204% body mass	205.7% body mass	179% body mass	210% body mass	.157s	.237s	4.74Ns
Mean Injured	-29.43cm± 3.37cm	205.65± 17.25%	205.92± 17.38%	177.19± 13.85	209.02± 18.74%	.19± .03s	.29± .03s	5.04± .29Ns
Mean Healthy	-24.72cm± 4.94cm	231.96± 27.67%	232.19± 27.55%	195.4± 17.71%	241.02± 27.35%	.16± .04s	.24±.04s	4.61± .46Ns
Cohen's D	1.25	1.02	1.02	1.07	1.24	-.79	-1.31	-1.01

Practical Application

The use of a cutoff value for pertinent variables such as Force at Minimum displacement and peak relative propulsive forces may illustrate who are below a threshold value are at increased risk of injury. By identifying those individuals through screening with a CMJ, it is possible that an intervention may be employed to decrease future injury risk. Further research is needed to ensure that the cutoff level is appropriate.