

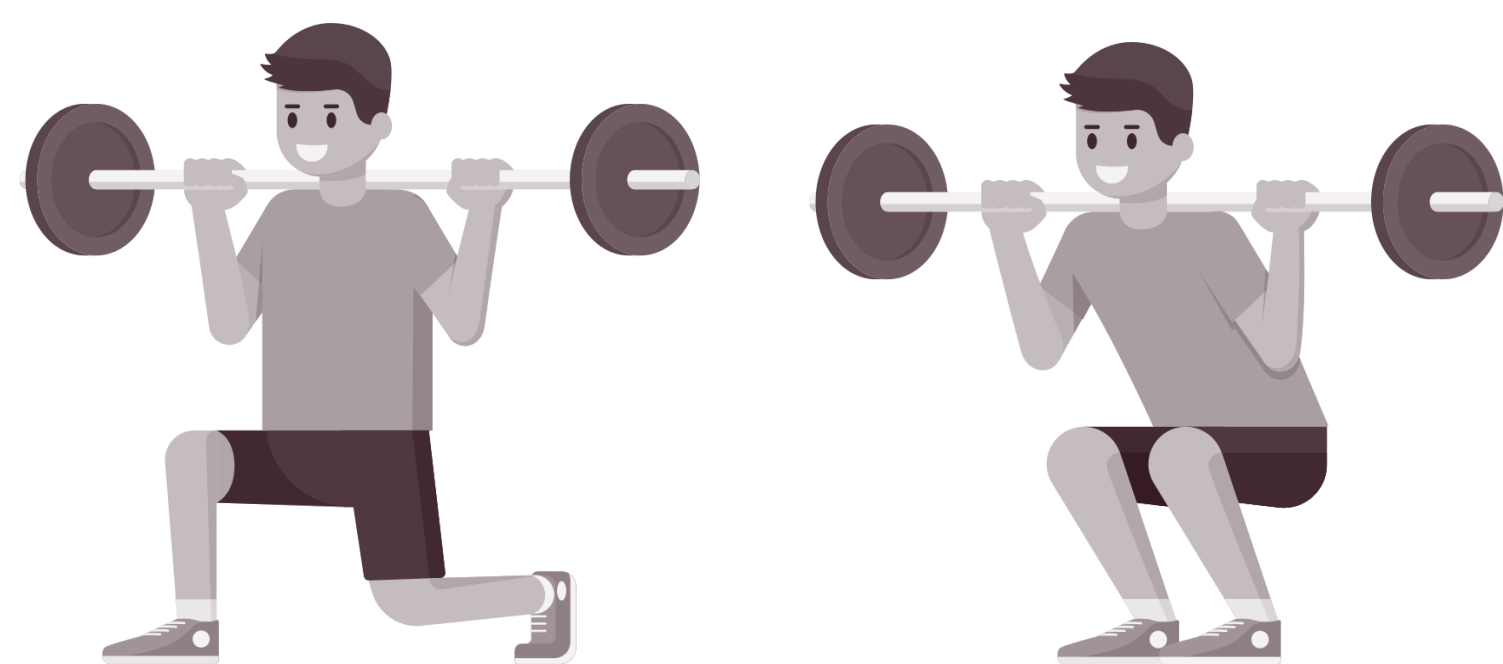
# A comparison of a step load unilateral and bilateral resistance training program on the strength and power of the lower limbs in soccer players

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## Introduction

Unilateral (UNI) and bilateral (BIL) resistance training program



Assessment of the impact of a 3:1 step load training program using **UNI and BIL** exercise forms on the level of maximum torque and peak power of knee extensors and flexors.

Resistance Training Variables		
Variables	Unilateral	Bilateral
Velocity (M/S)	1–0.75	1–0.75
Sets (N)	4	4
Rest Interval Between Sets (S)	80	80
Rest Interval Between Exercises (S)	180	180
Repetitions (N)	10 (10 per side)	10
Number of Exercises [N]	6	6

## Purpose

To determine the effect of a four-week unilateral and bilateral resistance training program on peak torque and peak lower limb power in soccer players.



## Material and methods

The study included 16 division I soccer players having the highest number of matches played in the first round of the season. The motor tests included isokinetic evaluation of peak torque and peak power of the extensors and flexors of the knee joint. The main factor intensifying load progression, in addition to the nature of the exercise, was the movement tempo.



## Results

Both types of training sessions were equally effective. In terms of power during **knee flexion**, UNI training contributed to improvements, while BIL training did not. However, the effect size was larger after unilateral training in each variable tested (**Table 1** and **Table 2**).

## Conclusions

The use of an extended eccentric movement phase in the preparation period in combination with UNI training may increase peak torque and peak power of knee flexors and extensors in soccer players.

Training Group	Relative Peak Torque					
	Dominant Limb		ES	Non-Dominant Limb		ES
	Pre	Post		Pre	Post	
Unilateral	2.88 ± 0.47	3.19 ± 0.5 *	0.6	2.58 ± 0.64	2.87 ± 0.52 *	0.49
Bilateral	3.18 ± 0.47	3.38 ± 0.52 *	0.38	2.79 ± 0.58	2.95 ± 0.58 *	0.29

	Relative Peak Power					
	Dominant Limb		ES	Non-Dominant Limb		ES
	Pre	Post		Pre	Post	
Unilateral	2.36 ± 0.68	2.89 ± 0.79 *	0.63	2.40 ± 0.76	2.74 ± 0.8 *	0.47
Bilateral	2.79 ± 0.78	2.99 ± 0.77 *	0.32	2.66 ± 0.82	2.97 ± 0.68 *	0.39

**Table 1.** Relative peak torque and relative peak power during the knee extension before and after the training intervention.

Training Group	Relative Peak Torque					
	Dominant Limb		ES	Non-Dominant Limb		ES
	Pre	Post		Pre	Post	
Unilateral	1.9 ± 0.2 #	2.12 ± 0.24 *	0.94	1.68 ± 0.25	1.9 ± 0.29 *	0.77
Bilateral	2.08 ± 0.24 #	2.20 ± 0.22 *	0.49	1.86 ± 0.3	1.97 ± 0.3	0.35

	Relative Peak Power					
	Dominant Limb		ES	Non-Dominant Limb		ES
	Pre	Post		Pre	Post	
Unilateral	1.76 ± 0.48	2.15 ± 0.44 *	0.8	1.64 ± 0.58	2.12 ± 0.65 *	0.74
Bilateral	2.06 ± 0.47	2.19 ± 0.49	0.26	2.01 ± 0.53	2.19 ± 0.48 *	0.34

**Table 2.** Relative peak torque and relative peak power during the knee flexion before and after the training intervention.



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