

Effects of 8 weeks strength training on vertical jump performance in elite male volleyball players during the in-season.

García Asencio C.¹, Sánchez Moreno M.¹, González-Badillo JJ.¹

¹ Sport training laboratory, Faculty of Sport Science, University Pablo de Olavide, Seville, Spain.

INTRODUCTION

It has been suggested that to improve the vertical jump performance, volleyball players must complete specific volleyball resistance training (1); however, few data are available about professional male volleyball players. The purpose of this case report is to examine the effects of 8 weeks of combined strength and jump exercises training on the vertical jump ability in a group of senior elite male volleyball players during the competition season.

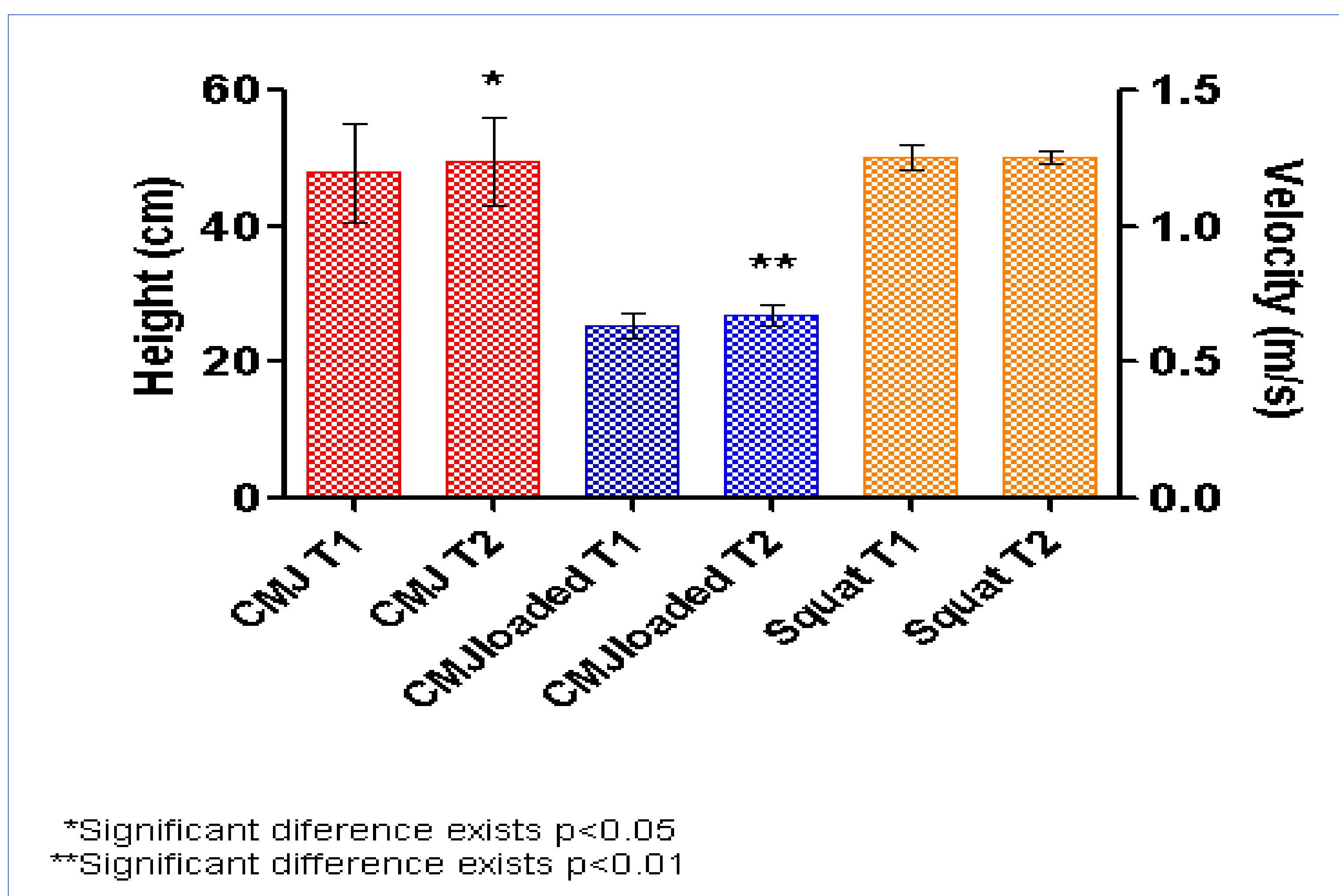
METHODS

Nine professional male volleyball players took part in this study. The neuromuscular performance was estimated by unloaded (CMJ) and loaded countermovement jumps (CMJ_{loaded}) height (cm); and by velocity of displacement in the concentric phase of full squat (FS) (m·s⁻¹). Training took place 2 d·wk⁻¹ during 8 weeks (16 sessions) (table 1). The resistance exercises were FS, hang power clean and loaded jump. In FS, 2-3 series of 4-6 repetitions were realized with a load which was gradually increased from 50% to 65% of 1RM. In power clean, 3 series of 4-6 repetitions were realized with the maximum load that allows a correct technical execution. In loaded jump, 2-3 series of 4-5 repetitions were realized with a load which was gradually increased from 50% to 80% according to the weight with which the athletes reached a height of about 20 cm.

Table 1. Resistance training program employed.

Weeks	Exercises		
	Full Squat	Loaded Jump	Power Clean
1	2x6 / 3x6 (1m*s ⁻¹ -16 %)	2x5 / 3x5 (50%)	3x6
2	2x5 / 3x5 (1m*s ⁻¹ -8 %)	2x5 / 3x5 (60%)	3x6
3	3x6** (1m*s ⁻¹ -8 %)	3x5** (60%)	3x5
4	3x4 / 3x5 (1m*s ⁻¹)	3x4 / 3x5 (70%)	3x5
5	3x6** (1m*s ⁻¹)	3x5** (70%)	3x5
6	2x4 / 3x4 (1m*s ⁻¹ +8 %)	2x4 / 3x4 (80%)	3x4
7	3x4** (1m*s ⁻¹ +8 %)	3x4** (80%)	3x4
8	3x4** (1m*s ⁻¹ +8 %)	3x4** (80%)	3x4

m*s⁻¹ = velocity of displacement in the concentric phase of FS (1m*s⁻¹ ≈ 60%1RM). Loaded jump: % weight with which the athletes reached a height of about 20 cm. Power clean: maximum load that allows a correct technical execution



RESULTS

There was a significant increase in CMJ and CMJ_{loaded} (3.4% and 5.8%; p<0.05; respectively). No significant changes were observed in FS (0.14%; p>0.05).

DISCUSSION

The main aim of our study was to evaluate the effect of strength training on jumping ability during the competition phase in professional volleyball players. The results of our study showed a significant improvement in vertical jump ability after 8-wk training period. Results similar to ours were observed by Marques et al., (2) after 12-wk resistance training with training loads ranging from 50 to 75% of 1RM, and by Häkkinen (3) after 10-wk training period (loads>75% 1RM), in competitive phase (3.8% and 4.5%, respectively).

PRACTICAL APPLICATIONS or CONCLUSION

- ✓ Our results suggest that the use of moderate loads could produce similar results on vertical jump performance to the use of high loads, since in our study a load equivalent to 60% 1RM in the FS was not exceeded and jumping exercises were performed with light loads.
- ✓ These results indicate that the specificity of training, which in this case is expressed by the proximity of the velocities of execution of the training exercises to the velocity of execution of the vertical jump, is determinant for the performance.

REFERENCES

1. Marques MC, González-Badillo JJ, and Kluka D. In-season strength training male professional volleyball athletes. *Strength Cond J* 2006; 28: 6-12.
2. Marques MC, Van Den Tillaar R, Vescovi JD, et al. Changes in strength and power performance in elite senior female professional volleyball players during the in-season: a case study. *J Strength Cond Res* 2008; 22 (4):1147-55.
3. Häkkinen K. Changes in physical fitness profile in female volleyball players during the competitive season. *J Sports Med Phys Fitness* 1993; 33: 223-232.