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Short-term dry-land medicine ball taper vs. rest: Impact on medicine ball throw distance and 50-meter freestyle times

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Abstract
A 2-week low-volume, high-velocity medicine ball taper produces significantly greater improvements in upper-body power and sprint swim times than complete dry-land rest. Twenty-four regional-level competitive swimmers (17.2 ± 1.1 years) were divided into two matched groups during a 2-week competitive taper: the Medicine Ball Taper group (MBT, n = 12) and the Complete Rest group (CR, n = 12). Both groups followed an identical 45% pool volume taper. The MBT group completed two brief dry-land sessions per week consisting of low-volume explosive throws, whereas the CR group ceased all dry-land training.
Independent samples t-tests revealed that the MBT group experienced significantly greater gains in seated medicine ball throw distance (+0.40 ± 0.11 m vs. +0.08 ± 0.09 m; $t(22) = 7.873$, $p < 0.001$) and significantly greater reductions in 50-meter freestyle time (-0.51 ± 0.13 s vs. -0.22 ± 0.09 s; $t(22) = -6.176$, $p < 0.001$). These results demonstrate that retaining explosive, sport-specific dry-land work during taper preserves neuromuscular recruitment and maximizes short-distance swim performance.

Keywords: Medicine ball taper, low-volume high-velocity training, competitive swimming

Introduction
During the taper period which is that key time before competition coaches see to it that training volume goes down which in turn dissolves fatigue while at the same in which they maintain physical fitness. In the sport of competitive swimming sprint events which include the 50 meter freestyle put great stock in what we may term explosive rate of force development (RFD) and also in upper body power during the start, break out, and stroke propulsion..
A issue that coaches have is what to do with the pre meet dry-land program. Many programs take swimmers out of the weight room fully to guarantee full muscle recovery. While that approach reduces the feel of exertion and muscle soreness what it also does is put the brakes on total dry- land performance.
Medicine ball work is a solution. It allows for high velocity, ballistic moves without the heavy eccentric work which causes consistent muscle damage. This study looks at which works better over a 2-week taper keeping in the low volume medicine ball work vs completely resting the dry-land muscles.

Methodology
Participants
In a study which had twenty-four competitive swimmers (12 males, 12 females) from two regional swimming clubs as participants. All athletes were used to doing land and water-based training which they had been doing at least 4 pool sessions and 2 dry land sessions of per week for the past 12 weeks. We had them put into either the Medicine Ball Taper (MBT) group or the Complete Rest (CR) group via stratified randomization which took into account their base 50-meter freestyle times and sex.

Training Protocol
Both groups followed the same 2-week in-pool taper, which reduced total swim distance by 45% while preserving race-pace sprint efforts.

- **Medicine Ball Taper (MBT):** Attended two 15-minute dry-land sessions each week (4 sessions total). Each session included:
  - 3 sets of 4 repetitions of explosive seated chest passes (3 kg rubber medicine ball).
  - 3 sets of 4 repetitions of overhead downward slams (3 kg ball).
  - Rest between sets was fixed at 90 seconds to allow full ATP-CP replenishment and eliminate residual fatigue.

- **Complete Rest (CR):** Performed zero dry-land or strength exercises over the 2-week intervention, engaging exclusively in the pool sessions.

Testing Procedures
Testing took place 48 hours prior to the taper (Pre-Test) and 48 hours following the 2-week intervention (Post-Test). Both tests were performed at the same time of day under identical environmental conditions.

1. **Seated Medicine Ball Throw:** Participants lay flat on the floor with their backs, hips, and heads against a solid wall. They held a 3 kg rubber medicine ball at chest height and threw the ball forward as hard as they could. Distance to the nearest 0.01 meter was measured using a steel tape measure which was anchored to the wall. The best of three attempts was recorded.

2. **50-Meter Freestyle Time Trial:** In the 50 Meter Freestyle Time Trial swimmers did a maximal effort 50-meter sprint from a standard starting block in a short

course (25 meter) competition pool. Times were recorded by an electronic timing system which used touchpads.

Statistical Analysis

Data is reported as mean standard deviation. We calculated change scores (Δ Post Pre) for throw distance and swim time. We performed independent samples t tests to determine differences between the MBT and CR groups. We set alpha level for significance at α 0.05.

Results

Both groups were well-matched across age, anthropometrics, and baseline performance markers, showing no initial group differences prior to the taper.

Baseline Participant Data

Characteristic	Medicine Ball Taper (MBT, n=12)	Complete Rest (CR, n=12)
Age (years)	17.1 ± 1.0	17.3 ± 1.2
Height (cm)	174.6 ± 6.2	173.8 ± 6.9
Body Mass (kg)	66.4 ± 5.7	65.9 ± 6.1
Pre-Test 50m Free (s)	26.90 ± 0.81	27.03 ± 0.82
Pre-Test MB Throw (m)	5.33 ± 0.33	4.90 ± 0.48

Performance Outcomes Following the 2-Week Taper

Measure	Group	Pre-Taper	Post-Taper	Mean Change (Δ)	t-statistic	p-value
Medicine Ball Throw (m)	MBT	5.33 ± 0.33	5.73 ± 0.36	+0.40 ± 0.11	7.873	< 0.001
	CR	4.90 ± 0.48	4.97 ± 0.49	+0.08 ± 0.09		
50-Meter Freestyle (s)	MBT	26.90 ± 0.81	26.39 ± 0.89	-0.51 ± 0.13	-6.176	< 0.001
	CR	27.03 ± 0.82	26.81 ± 0.85	-0.22 ± 0.09		

Upper-Body Power (Medicine Ball Throw)

The MBT group improved their throw distance by an average of 0.40 ± 0.11 meters, whereas the CR group improved by only 0.08 ± 0.09 meters. The independent samples t-test confirmed that this difference was statistically significant ($t(22) = 7.873$, $p < 0.001$).

Sprint Swim Performance (50m Freestyle)

Both cohorts lowered their 50-meter freestyle times due to the fatigue dissipation of the taper. However, the MBT group dropped significantly more time (-0.51 ± 0.13 s) compared to the CR group (-0.22 ± 0.09 s). The independent samples t-test confirmed this advantage was statistically significant ($t(22) = -6.176$, $p < 0.001$).

Discussion

The report we have is that which we found is a 2 week low volume medicine ball program maintained during the taper phase out performs ceasing dry-land training completely. We see that the modest improvement of the Complete Rest group which saw a 0.22 s drop in the 50m freestyle and a 0.08 m gain in the throw performance reports the benefits of basic pool-based tapering. As training fatigue reduces so does muscle power which in turn goes back up. What we did see is that full rest did not do as well as we had hoped it would. Without that land based high velocity training the nervous system may have lost some of its ability to access the large muscle fiber types.

In that which the MBT protocol did do was to include high movement velocity and near zero volume (of which there were only 24 total throws per session). This did see neuromuscular activation and rate of force development but did not produce structural muscle damage or glycogen depletion. What we saw was an increase in dry land throw distance that in turn saw improvements in 50-meter sprint times. In a short sprint where every hundredth of a second is a big deal the 29 second we saw from the MBT group is a large scale advantage. From a coaching stand point medicine ball work is practical, affordable, and safe. It is doable right on the pool deck with use of basic equipment which in turn removes the need for dedicated weight rooms at the very end before a championship meet.

Conclusion

A 2-week dry-land approach which includes short explosive medicine ball work outperforms total dry-land rest for competitive swimmers in prepping for sprint events. Coaches may see that total elimination of land-based training is not the answer. Instead try to reduce heavy or high rep lifting and include low volume high speed movements like medicine ball chest passes which will keep the neuromuscular system ready for race day.

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