

# *Complex Training for Tennis*

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## **Introduction**

Upon reading the title, many different things might spring to a reader's mind ... one might interpret complex training to require players to hit blindfolded while another might associate it with players

drilling and simultaneously rehearsing some Shakespeare! Well, fortunately (or unfortunately, depending on your like of 17<sup>th</sup> century literature!), complex training is nothing quite that abstract.

Contextually in tennis training, it relates

to the sequencing of a heavier resistive exercise with a “matched” (mechanically similar yet less-resistive) plyometric exercise (Ebben and Watts, 1998). The “complexing” of strength and power/plyometric training in this way has



Goals	Set 1** - "Strength"	Set 2** - "Power"
Improve rate of force development in specific muscle groups of the legs and lower trunk to increase racquet and movement velocity	Squats	Squat jumps or vertical jumps (own bodyweight)
	Squats	Jump smashes
	Standing calf raises	Straight line bounding or pogo jumps for height on the spot, concentrating on minimising foot-ground contact time (FGCT)
	Forward lunges	Drop lunges or split squat jumps. Minimise FGCT
	Romanian dead lift	Standing long jumps for distance
Develop power in specific musculature of the arms and trunk to increase racquet velocity	1 arm rotational row	Sidearm FH or BH medicine ball throws
	3 point weighted trunk rotations (on physio ball)	Square stance FH's or BH's hit with maximum speed
	Pull-overs	Overarm medicine ball throws (simulating service motion) for maximum distance
	Open stance sidearm medicine ball throws ##	Open stance FH's or (2H) BH's hit with maximum speed
	Overarm single arm weighted ball throws (i.e. 1kg ball) ##	Tennis serves hit with maximum speed

\*\* If readers are unfamiliar with any of the exercises listed, please refer to texts like *ITF Strength and Conditioning for Tennis* or consult your local strength and conditioning specialist.

been suggested to provide for greater improvements in power than either of these two training mediums on their own (Young et al., 1998). Theoretically the resistance work stimulates the central nervous system such that a very high number of Type IIb fibres are activated. This activation is then applied to the subsequent plyometric exercise, leading to an enhanced training effect.

### Complexing strength/power training

Is complex training new to tennis? The short and correct answer is no! It may not have always been called complex training but in principle it's existed for decades. Accounts of past players swinging racquets still in their covers or with weights attached, as part of their training, are not uncommon (Hohm, 1987). By combining these simple training techniques with normal strokeplay, the players were in effect performing a strength set (swings with resistance) followed by a power set (normal swings) or in other words, complex training! (Schonborn, 1999)

In the following table, we will detail 10 complexes that can be performed with players. Some will require gym equipment and space, while others can be undertaken on court. Coaches and players should always seek specialist help to provide for appropriate exercise prescription and technique. As general rules however, the resistance of strength sets (Set 1) should be close to a player's maximum (1RM) and power sets (Set 2) between 30-60% of 1RM; the repetition and set ranges should be 1-5 and 3-5 respectively; and the rest periods between sets should approximate 1-3 minutes depending on the training phase. Also, some tennis players, in a shift away from *Complex Training* in its purest

form, will complex such that Set 1 comprises of a stroke-related plyometric exercise and Set 2, an actual stroke (as represented by exercises with accompanying ## in the table). In these instances, the equipment used should allow for movement speed in Set 1 to be maximal (Schonborn and Van der Meer, 1999).

### What about complex speed and agility training?

Complexing can also be applied to speed/agility training in much the same way as it is to strength and power training (Schonborn et al., 2000). In fact, all forms of overspeed/overload or resisted running are essentially ways of complexing movement training. The use of running sleds, parachutes, pulley systems, harnesses, weighted vests, etc allow players to perform their "strength sets" and then complete their "power/speed sets" devoid of any additional weight or impedance.

### Summary

In modern tennis, power is at a premium. While appropriate strength work is a foundational and injury preventative must, the rate at which force is developed (RFD) in many strength exercises is not specific to tennis. For example it takes around 400msec to develop maximum force during a bench press, yet the forwardswing of a tennis forehand will last little over 120msec. Complex training however, where strength exercises are paired with mechanically comparable plyometric exercises, may negotiate this conundrum such that power in tennis stroke and movement production can be increased.

### References

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When "complexing", performance of a set of jump squats or jump smashes would be preceded by a set of a heavier resistance exercise such as the conventional back squat.