COMPLEX TRAINING FOR ADVANCED TENNIS

ITF Development Department
In this session we will…

• Explain the definitions of complex training
• Introduce the reasons why it works
• Present some research findings applied to training
• Give examples of complex training exercises applied to tennis
Complex Training: Definition

- Utilizing a strength movement followed by a similar, explosive plyometric movement or utilizing a plyometric movement followed by a related strength movement.
- The power and/or strength movement will be increased, i.e., greater than if the two different movements were not performed consecutively.

LEVEL III COACHES COURSE
Complex Training: Definition

- “Matches pairs of exercises from two sources: a resistance training pool and a plyometric [power/speed] pool."
- “By itself, strength training will produce results, but not to the same level" as training simultaneously with a similar, explosive plyometric movement.
Complex Training: Definition

• “Alternating biomechanically comparable high-load weight training and plyometric exercises in the same workout".
Complex Training: Why it works?

- Strength work has been shown to improve sports performance particularly for sprinters, jumpers and throwers but it is not beneficial in developing rate of force -the speed with which force is achieved in a movement.
- To develop the rate of force the Type IIb muscle fibres need to be targeted as these are ones that produce force most explosively allowing for maximum power.
- The sort of exercises that develop the Type IIb fibres are:
  - Speed strength exercises e.g. weighted squats jumps
  - Plyometric exercises e.g. bounding.
- Many athletes include plyometric exercises in their training programs and are well aware of their benefits.
- However it is slightly less well known that the combination of traditional strength with power and plyometric exercises together results in greater Type IIb recruitment and consequently greater improvements in power and rate of force development.
Complex Training: Why it works?

• The logic behind these matched pair of exercises is that the resistance work gets the nervous system in to full action so that more Type IIb fibres are available for the explosive exercise, hence a better training benefit.
Complex Training: Why it works?

- "High-load weight training increases motorneuron excitability and reflex potentiation, which may create optimal training conditions for subsequent plyometric exercise.
- Also, the fatigue associated with high-load weight training may force more motor units to be recruited during the plyometric phase, possibly enhancing the training state."
Plyometrics Training: Research findings

- A number of studies demonstrate the effectiveness of plyometrics compared to non-exercising control groups (Blakey and Southard, 1987; Diallo et al. 2001; Gehri et al. 1998).

- Other studies demonstrate an enhancement of motor performance associated with plyometric training combined with weight training or the superiority of plyometrics, compared to other methods of training (Potteiger et al. 1999; and Vossen et al, 2000).
Complex Training: Variables involved

• Exercise selection,

• Load, and

• Rest between sets: three to four minutes of rest between the weight training and plyometric training portions of the complex may be optimal
Complex Training: How it works?

• The player needs to be physically fresh and motivated.
• It is important to be focused on the exercises and perform them as explosively as possible.
• Try to avoid hard aerobic or anaerobic sessions for at least 48 hours before a complex session.
• Once a complex session has started do not perform any static stretching exercises as this will relax the muscles and reduce force production potential.
• It is the quality of execution of each exercise that is important, not the quantity.
• To ensure quality is maintained have the correct rest periods.
Complex Training: Important pre-requisites

• The correct technique of the tennis stroke should be fixed and corrected beforehand in order to avoid mistakes later

• Once the adequate technique is mastered by the player, then the complex training sequence can be implemented
Complex Training: Relaxation to improve racquet speed

• To swing faster players need to focus on being relaxed in order to support the natural stretch reflex of the body.

• Recommended drills to help the players relax:
  – Breathing out during contact will lead to a relaxed swing.
  – Swinging with 3 fingers. The player holds the racquet with 3 fingers and swings normally.
  – Heavy racquet head. The player swings with a racquet heavier than normal. (Pre-Stroke)

• Afterwards, start with the acceleration exercises: Training of the neuromuscular co-ordination by loading and unloading the muscles.
Complex Training: Improving serve racquet speed

- A faster swing speed is achieved by alternately swinging heavier and lighter objects.
- Quick medicine ball (½ to 1 kg) overhead throws (6-8 reps, 3-4 series, 1-3 min. Rest) followed by quick serves (8-10 reps, 3-4 series, 1-3 min. rest)
- Quick medicine ball (200 g.) overhead throws (10-12 reps, 3-5 series, 1-3 min. Rest) followed by quick serves (8-10 reps, 3-4 series, 1-3 min. rest)
- Pronation with wrist weights (1 to 3 kg) while lying down followed by serves. (8 pronations and 8 serves) Plyometric jumps (30-40 cms, 6-8 reps, 3-4 series, 2-3 min. Rest) followed by multi jumps (one or two legs, 6-10 reps, 3-4 series, 2-3 min. rest), followed by kangaroo jumps (6-10 reps, 3-4 series, 2-3 min. rest), followed by quick serves (8-10 reps, 3-4 series, 2-3 min. rest),
Complex Training: Improving return racquet speed

- Work on the return technique
- Medicine ball throws (1-1½ kg) imitating the FH/BH return movement (6-8 reps, 3-4 series, 1-3 min rest) followed by
- Return practice to target areas increasing speed of serve (8-10 reps, 3-4 series, 1-3 min rest) followed by
- Same as above but serves are played 2m in front of the baseline (faster) (10-15 reps, 3-5 series, 1-2 min rest) followed by
- Same as above but serves are played from the service line (faster) (10-15 reps, 3-5 series, 1-2 min rest)
Complex Training: Improving FH/BH racquet speed

- Perform 10 FH/BH with a racquet heavier than normal ("pre-stroke" exercise) followed by 8 "quick forehands" or "backhands".
- Alternate two-handed backhands with a bat and with a racquet. (6 to 10 reps)
- Medicine ball side way throws (1-1½ kg) imitating the FH/BH movement (6-10 reps, 3-4 series, 1-3 min rest) followed by
- FH/BH drill with the coach feeding from the basket (8-10 reps, 3-4 series, 1-2 min rest)
Complex Training: Improving FH/BH racquet speed

- **Racket-head drills:** Drills in which the player practices swinging as fast as possible: For example:
  - **Ball against net:** The player stands 60 cm from the net and tries to swing into the net as fast as possible for 6 - 8 times.
  - **Fast feed drill:** The coach stands at the side of the player and tosses 6 - 8 balls to the player. The player swings as fast as possible without letting the ball hit the ground.
  - **Regular feed drill:** The coach stands on one side of the net and feeds the player balls. The player stands 1 metre inside the court and either takes the balls on the rise or in the air and swings as fast as possible with great amounts of spin.

- **Note:** Ball control is not important in these drills. They can also take place outside the court. However, it is very important that all the drills are performed at maximum speed.
Complex Training:
Improving FH/BH movement speed

- Skipping on the spot or slowly forwards (5-8 sec, 3-5 series, 1-2 min rest)
- Rope jumping (5 sec, 3-5 series, 1-2 min rest)
- Foot lifts at max speed with rigid ankles (5 sec, 3-5 series, 1-2 min rest)
- Combination of skips, lifts and short sprints (4-6 sec, 3-5 series, 2-3 min rest)
- Combination of above exercises with weighed jacket, ankle weights (2-3 sec with load, 2-3 without load, 3-5 series, 2-4 min rest)
- Sprint with elastic rope resistance (4-5 sec, 3-5 reps, 3-5 series, 1-3 min rest)
- Same as above but combined with sprint with rope acceleration – the player turns around and sprints with the aid of the elastic (4-5 reps, 3-5 series, 1-3 min rest)
- After one of the above exercises, the coach feeds a fast ball to one corner and the player, who starts from the other corner should run and play it back (10 reps, 3-5 series, 1-2 min rest) followed by
- Same drill but the player starts from the middle and the coach feeds either to the FH or the BH
Complex Training:
Improving FH/BH volley reach

- Multi jumps (one leg, 8-10 reps, 3-4 series, 2-3 min. rest), followed by
- Skips (two legs, 8-10 reps, 3-4 series, 2-3 min. rest), followed by
- Dives with no racquet to catch a ball with the hand (into a mat, 10 reps, 3-5 series, 2-3 minutes rest), followed by
- Dives with racquet to volley the ball back (6-10 reps, 3-4 series, 2-3 min. rest),
Complex Training: Improving FH/BH half volley power

- Medicine ball side way throws (1-1½ kg) imitating the FH/BH half volley movement (5-8 reps, 2-3 series, 2-3 min rest) emphasising the knee bend followed by
- FH/BH half volley drill with the coach feeding from the basket (8-10 reps, 3-4 series, 1-2 min rest)
Complex Training: Improving smash racquet speed

- Use the same drills as per the serve
- Alternate smashes done with a badminton racquet (10-12 reps, 3-5 series, 1-3 min. Rest) followed by quick smashes with a tennis racquet (8-10 reps, 3-4 series, 1-3 min. rest).
- Coach feeds a smash to a player who has to jump with both feet without taking any step forwards or backwards (5-10 reps, 3 series, 1-2 min. rest) followed by a normal smash technical training.
Complex Training:
Improving passing shot speed

- Medicine ball side way throws (1-1½ kg) imitating the FH/BH passing shot movement (6-8 reps, 3-4 series, 1-3 min rest)...or

- Skipping on the spot, rope jumping, foot lifts, short sprints with or without a weighed jacket or ankle weights, or sprint with elastic rope resistance (2-3 sec with load, 2-3 without load, 3-5 series, 2-4 min rest) followed by

- FH/BH passing shot drill to designated targets with the coach feeding from the basket to one corner (10-15 reps, 3-4 series, 1-3 min rest)
Complex Training: Conclusions

• **Complex training** can be an efficient way to organize combined weight **training** and plyometric **training** since both types of **training** can be performed during the same session in the same facility.

• Complex training does not substitute conditioning or coordination training.

• If the player lacks jumping, throwing or power skills, these should obviously be worked in the conditioning sessions.
Complex Training: Conclusions

• Additionally, research suggests that complex training is at least equally effective, and in some cases superior, when compared to other forms of combined weight and plyometric training as evidenced by:
  – increased medicine ball throwing power,
  – superior acute jump performance, and
  – improved vertical jump in response to a chronic complex training stimulus.

• Finally, research shows that complex training may best be suited for more highly trained individuals using RM loads in the weight training portion of the complex.