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Supplementary Material

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Changes in Isokinetic Muscle Strength in Adolescent Soccer Players after 10 Weeks of Pre-Season Training

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SUPPLEMENT 1. DETAILS OF TRAINING SCHEDULE

This supplement shows the detailed training schedule during the 10-week preseason training period.

The Eccentric Hamstring Sessions

The hamstring sessions were progressively incorporated into the training schedule. At the beginning of the 10-week preseason period, players performed one set of five repetitions, once per week. The volume of eccentric hamstring training progressively increased each week and by the 5th week of preseason program, players were performing three sets of 8-12 repetitions three times per week (Table 1).

Table S1. Hamstring sessions.

Week	Sessions per week	Sets	Reps
1	1	1	5
2	2	2	6
3	2	3	6-8
4	2	3	8-10
5	3	3	8-10
6-10	3	3	12,10,8

Legend: Adapted from Mjolsnes *et al.* 2004

Resistance Upper Body Training

The upper body resistance training sessions were performed in combination with core exercises. The 1RM was tested during the 1st and 5th week. The load of 80% of 1RM was used during most of training weeks (weeks 2-4 and 6-8), while 6-8RM loads were used at the end of training programme (weeks 9-10) Table (2). The core exercises were performed during the second part of each training session using body weight, and in the case of the abdominal crunch, with a dumbbell if the body weight was subjectively too easy for the player. The heavy weight exercises were performed with 2-3 minutes of rest and core exercises with 30-60 seconds of rest.

Table S2. Upper body resistance workout and core training.

Exercise	Week 1 Reps/sets	Week 2-4 Reps/sets	Week 5 Reps/sets	Week 6-8 Reps/sets	Week 9-10 Reps/sets
Chest press with T bar	1RM test	8/3	1RM test	10/3	6-8RM
Seated row	1RM test	10/3	1RM test	12/3	6-8RM
Overhead standing triceps extension	1RM test	8/3	1RM test	10/3	6-8RM
Abdominal crunch on Swiss-ball	5/2	10/3	5/2	12/3	15/3
Front plank exercise 8s	5/2	10/3	5/2	12/3	15/3

(Table U4) contd....

Exercise	Week 1 Reps/sets	Week 2-4 Reps/sets	Week 5 Reps/sets	Week 6-8 Reps/sets	Week 9-10 Reps/sets
Side plank exercise 5s	5/2	10/3	5/2	12/3	15/3
Reverse sit-ups on Swiss-Ball	5/2	10/3	5/2	12/3	15/3

*session focused on exercise technique, RM = repetition maximum, ^c = core exercise

Resistance Lower Limb Training

The lower body resistance training sessions were performed using supersets, combining resistance and plyometric exercises. A rest interval of 1 minute was applied between the resistance and plyometric exercises and 2-3 minutes between supersets. The 1RM was tested during the 1st and 5th week. The load of 80% of 1RM was used during most of the training weeks (weeks 2-4 and 6-8), while 6-8RM loads were used at the end of the training program (weeks 9-10) Table (3). The plyometric exercises were performed with body weight during weeks 2-4, with 5kg weighted vests during weeks 6-8, and with 10kg vests during weeks 9-10.

Table S3. Lower body training with plyometric exercises.

Exercise	Week 1 Reps/set	Week 2-4 Rep/set	Week 5 Reps/set	Week 6-8 Rep/set	9-10 Rep/set
Split squat with barbell	1RM test	8/3	1RM test	10/3	6-8RM
Deep drop jump (35cm)*	----	10/3	-----	8/3	8/3
Calf raise	1RM test	8/3	1RM test	10/3	6-8RM
Calf drop jump (35cm)*	----	10/3	-----	8/3	8/3
Leg press	1RM test	8/3	1RM test	12/3	6-8RM
Sideway plyometric jumps* (20cm)	-----	10/3	-----	8/3	8/3

RM= repetition maximum, *plyometric exercises.

Game-Like Aerobic Training

Game like aerobic training has been performed using small-sided soccer games on a 20x50m field using variations of 3v3 or 4v4 players. The work to rest ratios were approximately 1:1 using a 3 min time periods performed 5 times for first 5 weeks and 8 times during the last 5 weeks. This kind of small-sided game has been estimated to be primarily aerobic (Brandes *et al.* 2012).

Game-Like Anaerobic Training

Game-like anaerobic training was performed using small-sided soccer games on a 20x30m field using variations of 2v2 players. The load period varied between 1-3 minutes with rest interval 1:1 which has been estimated as primary anaerobic due to the smaller field size and increases in accelerations and decelerations in a small space (Brandes *et al.* 2012). During the first 5 weeks, players performed 5-7 sets of 2-3 min and during the last 5 weeks, players performed 9 ?" 11 sets of 1-2 min (Table 4).

Table S4. Progression in anaerobic game like training.

Week (n)	Load interval (min)	Sets (n)
1-2	2	7
3-4	3	5
5-6	2	9
7-8	3	7
9-10	2	11

Speed And Agility Training

Speed and agility training was performed in a circuit using 5 stations and approximately a 1:7 work:rest ratio at each station. Two stations focused on running speed and three on agility and change of direction. The speed stations included 10-20m dash sprint and 10-20m flight sprint, see the progression in Table (5). The players were competing in pairs during the straight sprinting. The agility stations were progressively increased in terms of track difficulty, and a shot on the goal was added at the end of each agility track. Some agility tracks were performed with the ball, see (Table 6).

Table S5. Progression in straight sprinting training.

Week (n)	Distance (m)	Sets (n)
1-2	20	8
3-4	15	12
5-6	10	16
7-8	15	14
9-10	10	20

Table S6. Progression in agility training.

Week (n)	Type of agility track	Sets (n)
1-2	Diagonal cone hops, Lateral cone hops, Lateral jump single leg	8
3-4	Zigzag shuffle (forwards and backwards), Diagonal cone hops	10
5-6	Zigzag shuffle (forwards and backwards)*, Cone hops with 180 degree turn	15
7-8	Hexagon drill, Zigzag shuffle forward*, Cone hops with change of direction sprint	15
9-10	Hexagon drill*, Zigzag shuffle forward* Cone hops with change of direction sprint	20

*track performed with soccer ball.

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