

Princeton Squash Strength Training Manual

by

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Introduction

- The best way for squash players to get fitter is to play squash.
- However as young players mature it becomes important to do supplementary off-court physical training to prevent injuries and improve performance.
- Traditional weight training programs are not optimal for developing strength in junior squash players aged 10-17.
- Newly developed core and functional strength training techniques are highly appropriate for squash players.
- The purpose of this guide is to provide examples of strength training most appropriate for young, developing squash players.

Strength in squash players should ideally be developed in three phases of about 4-6 weeks each:

1. Injury Prevention Phase ⇒
 2. Core/Functional Phase ⇒
 3. Speed/Power Phase

Overview of Each Phase

1. Injury Prevention Phase – the purpose is to 1) strengthen those areas that have been shown to be vulnerable to injury in squash: ankle, shins, knee, lower back, shoulder, elbow; 2) develop a strength foundation for training later in the season; 3) develop an aerobic base.
2. Core/Functional Phase – the purpose is to 1) strengthen the abs, hips and lower back so that power can be effectively transferred from the legs to the upper body (and racquet); develop strength-endurance for those muscles (and the muscles complementary to them) used in squash; 3) maintain injury prevention training and aerobic endurance.
3. Speed/Power training – the purpose is to 1) develop speed and power at a volume and intensity appropriate to the athlete's developmental age and strength training experience. This usually means that the number and length of supplementary off-court training sessions should be relatively low (1-2 times a week for about 20 min.); 2) maintain Core/Functional strength, injury prevention activities and aerobic endurance.

Season Physical Training Plan for Juniors

The three phases of strength training can take place over a season of squash play. Many young players compete during the academic year (September to June), or during a squash club's fall, winter and spring season (September to June). The Table below indicates *when* (at what part of a typical season) players need to do the different types of training described above.

Months	June-July-Aug.	Sept.-Oct.-Nov.	Dec.- Jan. -Mar.
Phase of the Season	Pre-Season	Early	Mid- Late
Purpose of the Phase	Prepare	Practice	comPete
Phase of Physical Training			
Injury Prevention	Develop 3 x week	Maintain 1-2 X week	Maintain 1-2 X week
Core-Functional		Develop 3-4 X week	Maintain 1-2 X week
Speed-Power			Develop 1-2X week
Aerobic	Develop 3-4 X a week	Maintain 1-2 a week	Maintain 1-2 a week

Training Principles

Principle of Progression – gradually increase from a low volume (number of hours or number of repetitions) of training and intensity (speed of movement amount of resistance) at the start of the season to a higher level as the season progresses. Training exercises can also increase in complexity.

Principle of Maintenance – it takes 3-4 sessions a week to develop a physical quality like strength, but only 1-2 a week if the quality has already been developed.

Keep it Simple – there are hundreds of different strength training exercises available. It is better to focus on a few key, simple exercises when working with young athletes.

When to do Strength Training? – The order for different types of training that take place in the same day is the following:

1. Technique (strokes, shots, footwork)
2. Speed & Power
3. Tactics & Match Play
4. Strength
5. Aerobic (& Lactic or Speed-Endurance for 15+)

Example Exercises for Each Phase

Here are basic examples of the type of exercise to be performed in each of the phases. Some of the exercises can be found in more than one category since they may for example a) prevent injury; and b) strengthen the core.

Important Notes:

1. Athletes should have a medical physical exam prior to commencing any fitness program. If possible they should also have a pre-participation exam by a certified Athletic Trainer or Physiotherapist.
2. Juniors should perform the training under the supervision of a strength training expert or their coach to verify that the exercises are being performed correctly.
3. Athletes suffering any pain or undue soreness from performing the exercises should consult a medical doctor immediately.
4. Disclaimer: The information used for the exercise instructions has been taken from reputable sources. However no responsibility is accepted for any loss or damage suffered as a result of the use of this information or reliance on it.

Injury Prevention Phase Exercises

Guidelines for Performing Injury Prevention Exercises

Time of Season: Pre-season, or 4-6 weeks prior to starting on-court squash practicing – or anytime there has been a layoff of more than 1-2 weeks from on-court training.

Speed of movement: In general injury prevention exercises should be performed at a slow rhythm in order to be able to concentrate on correct form.



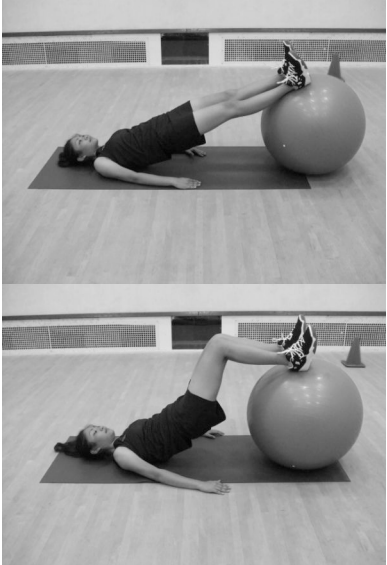
Resistance: Should be relatively low – enough so that a minimum of 12-15 repetitions can be performed. Most of the time resistance can be provided by an athlete's own bodyweight, tubing or therabands, or light medicine balls (e.g., 2 kg.) Resistance can be raised if 20 repetitions is exceeded. Exercises should be performed until fatigue is reached, however it is more important to maintain good form than to do a few extra repetitions.

Rest: Should be 1-3 minutes between exercises. Alternate muscle groups can be worked during the rest period – for example while your lower body rests your upper body can work.

Warm-up: 3-5 minutes of light aerobic activity like jogging, followed by 5-10 minutes of static stretching. The static stretches should include stretches for each of the vulnerable areas in squash.

Cool-Down: 5-10 minutes of static stretching of tight areas.

Injury Prevention Exercise Descriptions

<p>Ankle/Shin</p> <p>1. Ankle circuit – jog between two cones about 10 yards apart, placing the feet in a different position (e.g., feet in/out, toes up/down, etc.) for each lap. Keep legs mostly straight to place load on lower leg. Helps prevent ankle sprains and shin splints. The different foot positions are: toes in/out, on toes/heels, toes curled up/down, on inside/outside edge of foot.</p>	
<p>Knees</p> <p>2. Leg circles – lying or sitting with one leg bent, straighten and tense the other leg trying to tighten “medialis”, the muscle on the inside of the kneecap. Pointing your toes outwards or touching medialis as you do the exercise helps activate medialis”. Keeps kneecap tracking straight and helps prevent sore knees.</p>	
<p>3. Hamstring curls on stability ball – lie down, straighten the body by tightening the abs, and place the heels in the center of a stability ball. Bring your heels towards your bum. Strengthens the hamstrings to minimize knee injuries.</p>	

4. Squats and lunges - ensure that when squatting or lunging that your kneecap is lined up with your 2nd and 3rd toes so that it tracks properly. Do not



Back

5. Crunches and sit-ups strengthen the abs and help prevent lower back injury. Look up at 45 degrees and do not hold your head.



6. Plank - lie on your side up on one arm and tighten your abs and lower back to form a 'plank' 45 degrees to the ground. Helps strengthen the muscles that stabilize the lower back.



7. Supermans/Superwomans - lie on your front, tighten your abs and slowly raise you arms and head and feet together, working your back muscles. Hold for 3-5 seconds. Be careful overarch your back.



8. Seated Row – sit with legs extended and slightly bent. Wrap tubing around either one or two feet to provide appropriate resistance. Pull tubing slowly towards you, making an effort to bring your shoulder blades towards you at the end of the movement. Maintain good posture throughout.



Tennis Elbow

9. Wrist Curl – rest your forearm on your thigh palm upwards, and your wrists just over the ends of your knees. With a small dumbbell or can slowly curl your hand up and down working the muscles of the forehand.








10. Reverse wrist curl – rest your forearm on your thigh palm downwards, and your wrists just over the ends of your knees. With a small dumbbell or can slowly curl your hand up and down working the muscles of the backhand.



11. Wrist rotation – sit with a squash racquet resting on thigh, holding the racquet with the proper grip with the tip of the racquet pointing upwards. Slowly rotate the racquet from one side to the other (about 180 degrees). Use a tennis racquet to increase resistance.



	
Shoulder	
<p>12. Arm Over-Under stretch - reach over your shoulder with one hand and behind your back with the other, and attempt to link your fingers together, pulling gently. Use a towel or band to improve reach. Helps shoulder flexibility and mobility to prevent shoulder problems</p>	
<p>13. External arm rotation - place your fist over your belly button so that your arm is at 45 degrees. Using your other hand (or tubing) to provide LIGHT resistance (enough for 15-20 slow reps), slowly move your arm outwards so that your fist points straight ahead.</p>	

	
<p>14. Thumb down arm raise - stand with your arms fully extended to the side and slightly in front (30 degrees) of your body with thumbs pointing downwards. Using tubing, band, dumbbell or partner resistance slowly lower and raise your arms.</p>	

Core/Functional Phase

Recent developments in strength training have emphasized the importance of training the “core” and using “functional” exercises as opposed to the traditional weight training programs consisting of bench press, biceps curls and heavy squats. The importance of training “complementary” (the muscles that balance the major squash muscles) muscles has also been highlighted.

Core Training – train the “postural muscles”, including the abs and lower back, in order to prevent injury and assist in power transfer from the legs to the racquet.

Functional Training – instead of doing single-joint exercises, do multi-joint exercises in movement patterns that are more similar to squash movements.

Complementary Training – work the muscles that balance the major “squash” muscles (e.g. work hamstrings to balance quads).

There is a move in fitness training to do many exercises on a stability ball (SB), forcing the athlete to use their core to achieve balance. Engaging the core means keeping the abdominals firm while performing most exercises. It means drawing the navel in towards the spine, and can involve squeezing the glutes (bum) to stabilize body.

There is also a trend to use medicine balls (MB) in many exercises. Although the actual weight or resistance is less, the exerciser can more easily approximate actual squash movements.

Guidelines for Performing Core/Functional Exercises

Time of Season: Early season, or 4-6 weeks prior to playing in the first important tournament or team matches

Speed of movement: In general these exercises can be performed at a slow to medium sub-maximal speed (depending on the exercise)

Resistance: Should be relatively low – enough so that a minimum of 12-15 repetitions can be performed. Most of the time resistance can be provided by an



athlete's own bodyweight, tubing or therabands, or light medicine balls (e.g., 2 kg.) Resistance can be raised if 20 repetitions is exceeded. Exercises should be performed until fatigue is reached, however it is more important to maintain good form than to do a few extra repetitions.

Rest: Should be 1-3 minutes between exercises. Alternate muscle groups can be worked during the rest period - for example while your lower body rests your upper body can work.

Warm-up: 3-5 minutes of light aerobic activity like jogging, followed by 5-10 minutes of static stretching. The static stretches should include stretches for each of the vulnerable areas in squash. In addition large body movements like arm swings, trunk circles and leg swings can help the athlete prepare for more active movements.

Cool-Down: 5-10 minutes of static stretching of tight areas.

Core/Functional Exercise Descriptions

<p>1. Trunk Traction on SB - lie on the top of the ball and let your body take its shape, letting your lower back relax.</p>	
<p>2. Back Relaxation on SB - lie with your back on the ball with knees bent and flat on the floor - allow gravity to stretch your chest muscles.</p>	

3. Sit-up & Pass – have a partner (or yourself) toss a light (2 lbs.) medicine ball upwards as you reach the top of your sit-up.



4. Catch, twist and pass – similar to above but touch the ball on the floor to the side after you crunch.



5. Squat against wall with SB – position the ball in the small of the back with feet shoulder width apart. Slowly Lower yourself until upper thighs are parallel to the floor, and then return to starting position.



6. Bridge on SB – sit on the ball and gradually walk out until you are laying down on the ball. Activate core and squeeze your glutes.



7. Hamstring Curl on SB - lie down, and straighten the body by tightening the abs, and place the heels in the center of a stability ball. Bring your heels towards your glutes.



8. Prone Abs Hold - lie down with elbows bent and positioned below your shoulders. Maintain perfect posture with abs contracted.



9. Back Extension On SB - kneel on the floor and lean hips on the ball. Activate the core and slowly do a back extension being careful not to arch the back too much.



10. Incline Crunch on SB - position the ball in your lower back and lean back with your back on the ball, and with good posture and perform a crunch



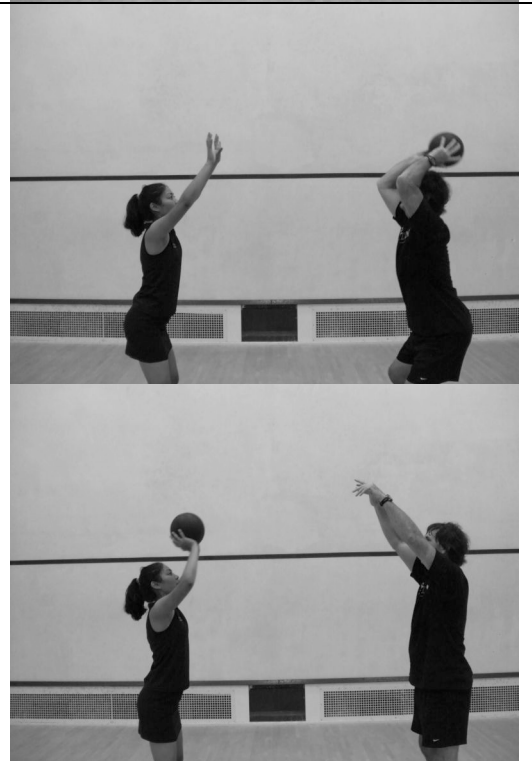
11. SB Perturbations – Hold the stability ball with straight arms, good posture, firm abs and bent knees. Your partner will gently tap the ball in different places to challenge your ability to maintain a solid core.



12. MB Side Passes – With a partner (or against a wall) take an athletic stance with knees bent and slowly pass the ball at waist height to your partner, emphasizing the stretch as you catch the ball, using your legs to propel the pass.



13. MB Overhead Pass – With knees bent, pass and throw the ball overhead to your partner using a light (2 lbs. ball), emphasizing the stretch as you catch the ball.



Speed and Power Phase

For the young athlete, most of their speed and power can be developed through on-court playing and practice activities. The “technical” part of speed and power in squash is extremely important. Moving properly to the ball and recovering to the “T” with good footwork are important aspects of being “fast” in squash. Similarly good stroking technique is the most important part of imparting power to the ball.

Sprinting to the front to retrieve a drop shot is an excellent example of an on-court speed training activity. Leaping into the air to volley a lob, or lunging strongly to the front and pushing back is an example of power.

Since the intensity of training is high and the forces generated are relatively great, speed and power training should be conducted only after the young athlete has developed a solid foundation of strength in the two preceding phases of the season. Additionally, supplementary off-court speed and power training for athletes who have *not* gone through puberty is *not* recommended.

Guidelines for Performing Speed and Power Exercises

Time of Season: Mid- to late season, after a foundation of at least 4-6 weeks of strength training and playing has occurred.

Speed of Movement: As fast as possible, ensuring that the muscle groups being worked have been thoroughly warmed up.

Exercise Time: Each exercise should last anywhere from 3 (a single throw) to about 10 seconds (a sprint or series of jumps).

Resistance: Should be relatively low - most of the time resistance can be provided by an athlete's own bodyweight or light medicine balls (e.g., 2 kg.). The number of repetitions should be determined by time - maximum speed and power are developed in short bursts of about 5 seconds - and definitely no more than 10. (The energy for maximum speed and power is depleted in about 5 seconds).

Rest: Should be about 1 minute between repetitions and sets in order to replenish the energy required to work at maximum intensity.

Warm-up: 3-5 minutes of light aerobic activity like jogging, followed by 5-10 minutes of static stretching. 3-4 sub-maximal (70-80%) repetitions of the exercise to be performed should also be included in the warm-up.

Cool-Down: 5-10 minutes of static stretching of tight areas.




Speed & Power Exercise Descriptions

1. Fast feet and go – sprint on the spot as fast as possible and at the signal sprint forward 3-4 steps as fast as possible.

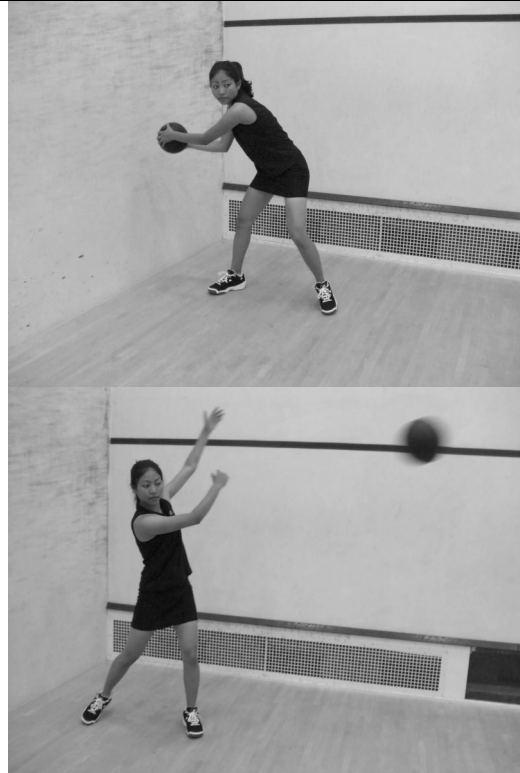


2. Jumping jacks and go – do some jumping jacks and sprint forward 3-4 steps as fast as possible.



<p>1. Side Shuffle and Go - shuffle 3 or 4 steps and turn and sprint forward another 4-5 steps.</p>	
<p>2. Plyometric "Good Mornings" - Jump on the spot with straight legs, landing on the toes.</p>	
<p>3. Plyometric line jumps - use both feet together to jump forward and across a line in front as fast as possible.</p>	
<p>Power Exercises - These exercises should be done explosively only after a good warm-up. Use single throws and lots of rest in between throws - about 1 min. The exercises can be performed against a wall or with a partner about 20 yards away. Do not attempt to catch the ball as fingers can be easily sprained.</p>	

1. Medicine ball side throw – throw a light ball as far as possible using the same technique as described above. Make sure to use your legs and exhale with the effort. 3 per side



2. Medicine ball overhead throw. With knees bent, throw the light ball overhead to as far as possible, making sure to start with your legs. 6



About the Authors

Tim Bacon teaches in the Exercise & Sport Studies Department at Smith College in Massachusetts, where he is also Head Coach of Squash. A Squash Canada Level 4 Squash Coach since 1987, he has coached the Canadian Men's Junior National Team and been Chair of the Squash Canada Sport Science & Medicine Committee. He is a Professional Member of the National Strength & Conditioning Association.



Gail Ramsay and Bob Callahan, in addition to coaching one of the country's most successful college programs, have been involved in Squash Coach Education for more than 20 years. Both have been innovators in the use of strength training programs with their teams.



Credits

Photography by Gail Ramsay

Acknowledgements

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