



Incorporating an in-season basketball strength maintenance program

During the long basketball season, injuries and fatigue can affect a player's performance and the success of the entire team. To help prevent this from occurring, Dr. Steven Chudik, orthopaedic surgeon and sports medicine physician with the Sports Performance Institute at Hinsdale Orthopaedics and founder of the Sports Medicine Teaching/Research Foundation, recommends incorporating an in-season program of low level plyometrics and strength exercises into basketball players' schedules. Plyometrics have been shown to help athletes maintain their peak strength, power and performance. In the May 2008 *Journal of Strength and Conditioning Research*, investigators reported that basketball players who participated in a two-day per week, in-season strength and plyometric program improved on four different performance measurements including their vertical jump.

An in-season strength maintenance program should be quick, efficient and timed appropriately. It requires some planning to properly schedule workouts around games and practice schedules and avoid training too close to a specific competition and negatively impacting performance. In season, schedule two days for full-body workouts at least 20- to 30-minutes in duration. Players should perform strength workouts after a game or practice and plyometric workouts before any conditioning because fatigue affects proper form. Ideally, players should have 48-hours rest between workouts and 48-hours rest between workouts and games.



Precautions

With any exercise program, it is very important to follow precautions and maintain proper form. This is especially important with plyometrics because they are impact exercises which may cause injury if done incorrectly. This most often occurs on landings if players don't come down softly on their toes and roll their weight to the heels. Or, if a player twists the knees. To minimize injury, these safety precautions should be followed:

- Athletes should be well-conditioned with a high level of leg strength.
- Warm up thoroughly before starting if not done after a game or practice.
- Start slowly with small jumps and gradually build.

(Continued on page 2)

(Continued from page 1)

- Land softly to absorb the shock.
- Perform the exercises on cushioned surfaces and wear shoes with plenty of cushioning.
- Allow rest time between workouts.
- Stop immediately if there is any pain.

Maintenance Program Guidelines

When using the in-season basketball strength maintenance program it is important athletes rest 48-hours between the first and second workout and rest 48-hours between workouts and a game. Also, these workouts should be done after a game or practice, but before any conditioning so fatigue doesn't affect proper form and risk injury. During the season, plan for two days of full-body workouts that are 20-30 minutes in length.

The purpose of a low repetition (rep) maintenance program is not to go until fatigue occurs, but to be just heavy enough to maintain absolute strength. So, start by finding that point, or approximately a 85 percent of your 1-rep max. This is done by first determining 100 percent of your 1-rep max. A safe approach to calculating this is by performing a 3-rep max and then use the formula below to get the estimated 100 percent of your 1-rep max .

**Take the 3-rep max weight and multiply it by 1.1 to get
100 percent of the 1-rep max.**

*Athlete example: 3-rep max = 250 lbs.
250 lbs. x 1.1 = 275 lbs.
1-rep max = 275 lbs.
275 lbs. x 0.85 = 234 lbs (85% of 1-rep max)*

Warm Up Program

Exercise	Sets	Reps/Time	Rest Between Sets	% 1-Rep Max
Jump Rope	2	1 minute	30 seconds	
Push-Ups	1	15	30 seconds	
Side Squats	1	5 per leg	30 seconds	
Bent Over Row	1	8	30 seconds	70 percent



Maintenance Program

The exercises below are to be followed based on the level of experience and age of each athlete. Perform the last three exercises for each workout in a circuit format—one after the other, then repeat. All the others are done one at a time for the number of sets indicated.

First Workout

Exercise		Sets	Reps/Time	Rest Between Sets	% 1 Rep Max
High Pull from Hang		3	4	2 minutes	85 percent
Split Jumps		3	30 seconds	30 seconds	
2 -to 1- Leg Jump		3	30 seconds	30 seconds	
180 Degree Jump		2	60 seconds	30 seconds	
A	Plank Leg Lift	Repeat Circuit 2 Times	40 seconds	No rest, continue to next circuit exercise	85 percent
B	Bench Press		4		
C	Bent Over Row		4	Rest 30 seconds after completing circuit	85 percent

Second Workout

Exercise		Sets	Reps/Time	Rest Between Sets	% 1 Rep Max
Barbell Push Press		3	4	2 minutes	85 percent
1-Leg Lateral Hop		3	30 seconds	30 seconds	
Alternate 1-Leg Bound		3	30 seconds	30 seconds	
2-to1 Leg 90-Degree Hop		2	60 seconds	30 seconds	
A	Side Plank Leg Lift	Repeat Circuit 2 Times	40-60 seconds	No rest, continue to next circuit exercise	*Add 10% of body weight
B	Pull Down/Chin-Up*		4		
C	Side Lunge		5 each leg	Rest 30 seconds after completing circuit	

**If the athlete can do more than 4 chin-ups, use ankle weights, a vest or hold a dumbbell between feet to increase difficulty.*



High Pull From Hang



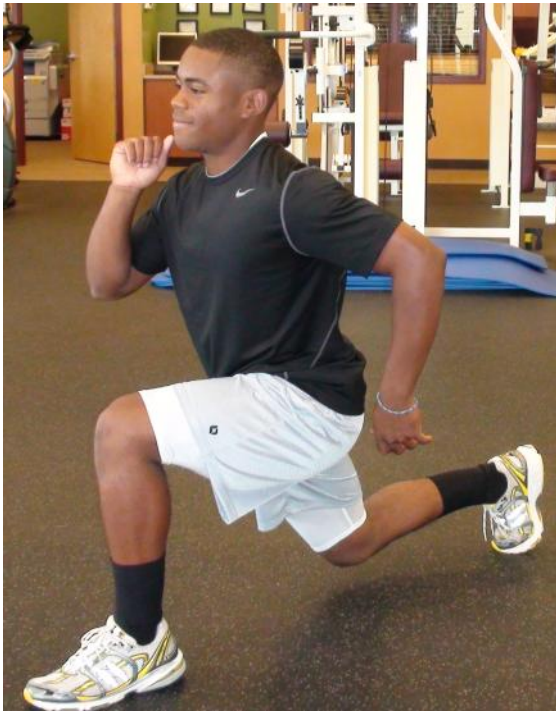
Sets	Reps/ Time	Weight	Rest Mins/ Secs
3	4 Reps	85% of 1-RM	2 minutes



1. Adjust the weight to 85 percent of 1-rep max (see calculation on page 2).
2. Stand with your feet shoulder-width apart. Grab the bar in an overhand grip with your hands positioned just outside your knees.
3. With your back flat, raise the bar to just below your knees. Your shoulders should be over the bar with your arms straight and elbows facing out. Your weight should be in the heels with your knees slightly bent and hips pushed back.
4. Straighten your hips, knees and ankles while bringing the bar up in an explosive vertical pull.
5. Shrug your shoulders to bring the bar up to your chest.
6. Lower the bar and repeat.



Split Jump



Sets	Reps/ Time	Rest Mins/ Secs
3	30 secs	30 secs



1. Start in a lunge position with your arms in a running form.
2. Jump straight up pushing off your front heel and back toe.
3. While in the air, switch legs so you land with the other foot forward. Remember to keep your chest up.
4. Bend the back knee as you land on the floor and explode back into the air landing with the other foot forward.





2-to1-Leg Jump

Sets	Reps/ Time	Rest Mins/ Secs
3	30 secs	30 secs



1. Start in a semi-squat position standing on both feet as shown.
2. Keep your arms at your sides and slightly behind your knees.
3. Begin to swing both arms forward and jump off both feet.
4. Land softly on one foot in the semi-squat position.
5. Repeat the exercise landing on the opposite foot.
6. Continue the exercise alternating landing legs to reach sets and repetitions above.





180-Degree Jump

Sets	Reps/ Time	Rest Mins/ Secs
2	60 secs	30 secs



1. Start in a semi-squat position standing on both feet as shown with your arms at your sides and slightly behind your knees.
2. From this position, jump up and rotate your body 180-degrees. Lead the rotation with your hips.
3. Land softly back in the semi-squat position.
4. Quickly jump back to the right and land softly returning your body to the original starting position.
5. Repeat alternating the turning direction—right, then back to the left.





Circuit A

Plank

Leg Lift

Sets	Reps/ Time	Rest Mins/ Secs
3	40-60 secs	No rest, continue to next circuit exercise

1. Lie on your stomach with your elbows positioned directly under your shoulders.
2. Lift your hips off of the floor until they are even with your shoulders.
3. Tighten your butt (gluteus maximus) and abdominal (abs) muscles as you lift one foot off the floor. Remember to keep your back flat.
4. Hold for 40-seconds, then return your foot to the floor.
5. Repeat alternating legs.



Circuit B

Bench Press



Sets	Reps/ Time	Weight	Rest Mins/ Secs
2	4 Reps	85% of 1-RM	No rest, continue to next circuit exercise

1. Adjust the weight to 85 percent of 1-rep max (see calculation on page 2).
2. With both feet on the floor, lie on your back with your head, shoulders and hips touching the bench.
3. Bend your arms at your elbows so they are at 90-degrees to your shoulders.
4. Place your hands on the bar directly above your elbows.
5. Put your ring fingers on the smooth loop to ensure proper arm spacing.
6. Lift the bar off the rack and lower it until your elbows are even with shoulders.
Note: *The bar may touch the chest only if elbows are even with shoulders.*
7. Push the bar up evenly with both arms until they are straight. Stop, then lower and repeat.

Circuit C

Bent-Over Barbell Roll



Sets	Reps/ Time	Weight	Rest Mins/ Secs
2	4 Reps	85% of 1-RM	Rest 30 seconds then repeat circuit



1. Adjust the weight to 85 percent of 1-rep max (see calculation on page 2).
2. Stand with your feet shoulder-width apart.
3. Grab the bar with an underhand grip placing your hands just outside your knees.
4. Without arching your back, pull the bar up to your knees.
5. Squeeze your shoulder blades together as you continue to raise the bar.
6. Lower the bar to hip level to end the exercise.
7. Repeat as indicated above to reach desired sets and repetitions.



Barbell Push Press



Sets	Reps/ Time	Weight	Rest Mins/ Secs
3	4 Reps	85% of 1-RM	2 minutes



1. Adjust the weight to 85% of 1-rep max (see calculation on page 2).
2. Grasp barbell with both hands and stand with your feet shoulder-width apart.
3. Using proper posture, bring the bar to chest level.
4. Quickly push your hips back, bend your knees slightly and without pausing, explode vertically pushing the bar overhead as you rise on your toes.
5. Drop down on your heels as you straighten your arms. Push your head slightly in front of the bar as you reach back with your arms.
6. Pause and repeat to reach sets and repetitions listed above.



1-Leg Lateral Hop



Sets	Reps/ Time	Rest Mins/ Secs
3	30 secs/leg	30 secs



1. Place a tape line on the floor.
2. Stand on your right leg in a semi-squat stance next to the line.
3. Jump sideways over the line* landing on the same foot controlling the landing, then jump back.
4. Remember to keep your knees behind your toes when landing.
5. If doing this exercise quickly, stay on the ball of your foot.
6. Change legs and repeat.

***Note:** *If athlete is more advanced, a low object can be substituted for the tape line.*



Alternate 1-Leg Bound



Sets	Reps/ Time	Rest Mins/ Secs
3	30 secs	30 minutes



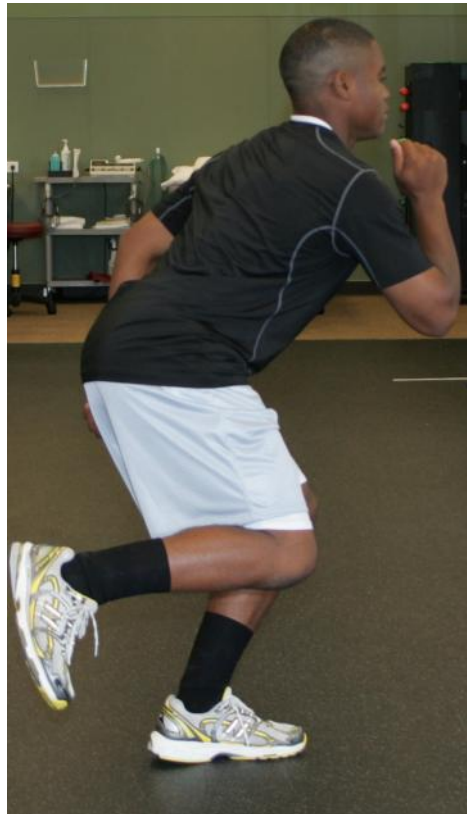
1. Stand on your right leg in a semi-squat position.
2. Jump forward and to the left.
3. Land softly on your left leg in a semi-squat position. Remember to keep proper form during each jump.
4. Repeat left to right leg.





2-to1-Leg 90-Degree Hop

Sets	Reps/ Time	Rest Mins/ Secs
2	60 secs	30 secs



1. Start in a semi-squat position standing on both feet as shown with your arms at your sides and slightly behind your knees.
2. Jump up rotating your body to the left 90-degrees. Land softly on the left foot maintaining a running position.
3. Return to start position and repeat landing on the right foot.
3. Continue to repeat steps alternating the direction of rotation and landings.



Circuit A

Side Plank

Leg Lift

Sets	Reps/ Time	Rest Mins/Secs
2	40-60 secs	No rest, continue to next circuit exercise



1. On the floor, lie on your side with your elbow directly under your shoulder and your feet stacked one on top of the other.
2. Lift your hips off the floor until your body is in a straight line keeping your hips forward and inline with your legs and torso.
3. Once you are able to hold this position for 40-seconds, raise your top leg off your bottom leg to increase difficulty. Do not allow your hips to rotate forward or backward.
4. Lower yourself back to the floor and repeat repetitions alternating legs.



Circuit B

(Option 1)

Lat Pull-Down



Sets	Reps/ Time	Rest Mins/Secs
2	4 Reps	No rest, continue to next exercise circuit



1. Adjusts the machine weight.
2. Sit with both feet on the ground and position yourself so you are away from the machine slightly less than the length of your upper arm.
3. Reach up and grab the bar with both hands using an overhand grip.
4. Pull your shoulders down keeping your elbows out.
5. Pull the bar down until it is just below your chin while pulling your shoulders back and keeping your elbows tucked in.
6. Slowly raise your arms back over your head and repeat.



Circuit B (Option 2)

Chin-Up



Sets	Reps/ Time	Rest Mins/ Secs
2	4 Reps	No rest, continue to next exercise circuit



Note: If the athlete can do more than 4 chin-ups, use ankle weights, a vest or hold a dumbbell between feet to increase difficulty.

1. Using a chin-up bar, jump up and grab it with your palms facing towards you.
2. Cross your ankles—one over the other.
3. Pull yourself up, keeping your body at a slight angle.
4. Pull yourself high enough to touch your chest to the bar making sure to keep your shoulders pushed backwards.
5. Pause. Lower yourself and repeat.





Circuit C

Side Lunge

Sets	Reps/ Time	Rest Mins/Secs
2	5 each leg	Rest 30 seconds then repeat circuit



1. Stand with your feet hip-width apart.
2. Keep your right leg straight as you bend your left knee to a squat position.
3. Maintain proper squat form, remembering to keep the knee behind your toes.
4. Push off with your left foot—heel to toe—and return to the standing start position.

Note: *To make the exercise more difficult for your legs and challenge your core, hold a plate with both hands keeping it level throughout the exercise.*



Sports Medicine, Injury Prevention Expertise Provided by Team Chudik

The goal of Dr. Steven Chudik and his health performance team, Larana Stropus and Keith Tesch, is to provide you and your athletes with reliable and proven training information to help the athletes compete and perform at their highest level and ability. This program is based upon research which found athletes need to incorporate specific exercises into their weekly training schedules to not only maintain strength, but more important, help minimize injuries.

To maximize the benefit of this program, it is important for players to follow the recommended number of sets and repetitions while maintaining proper form at all times. Failure to do so could result in an injury. Also, it is important to ensure players working with weights are supervised at all times.

Sports Injury Medicine Clinic

As further assistance to coaches, athletic trainers, players and parents, Dr. Chudik has a Monday evening Sports Medicine Injury Clinic in his Westmont office. During this time, athletes can be seen and treated by Dr. Chudik, a board-certified orthopaedic surgeon and sports medicine physician. An added benefit to athletes seen in the Clinic is the availability of an X-ray suite and an open-bore, high-field magnetic resonance imaging (MRI) machine. This onsite diagnostic capability eliminates the need of added appointments and delayed diagnosis and treatment. To schedule an appointment with Dr. Chudik call 630-920-2350.

Injury Hotline

Dr. Chudik and his staff understand the importance of school athletic personnel needing access to reliable sports medicine and training information outside the hours of the Sports Medicine Injury Clinic. To accommodate that need, Dr. Chudik has an Injury Hotline just for athletic trainers. Athletic trainers interested in learning more about this special service should email Dr. Chudik at stevenchudikmd@gmail.com/.

Important Notice

Not all exercises are suitable for everyone. Consult your physician before beginning this or any other exercise program. Also, always warm up for several minutes before beginning any workout and **NEVER** exercise beyond the level at which you feel comfortable. If at any time you feel you are exercising beyond your current fitness abilities, or feel discomfort, discontinue exercise immediately and reconsider your participation in this program.

The in-season basketball maintenance program provided in this publication should not be attempted by anyone who does not meet minimum fitness requirements or who has a history of hip, knee, ankle, shoulder, elbow, wrist or spinal (neck or back) problems. **THIS WARNING IS NOT TO BE DISCOUNTED.** There are many other fitness alternatives if you have weaknesses or are prone to injuries. The user assumes all risks of injury in the use of this program.



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For more than ten years, Keith has been in the fitness industry working as a personal trainer and sports performance specialist, a position he currently holds with ATI Physical Therapy in Naperville, IL. For the past five years, he has helped individuals regain their strength and range of motion through research-based programs.



Larana Stropus, MS, ATC/L

A certified and licensed athletic trainer, Larana holds a B.S. in Kinesiology and M.S. in Exercise Science. She has more than 11 years of experience in athletic training, personal training and teaching. She also served as the athletic trainer for the Olympic Development Women's Soccer program and helped develop exercise prescriptions and training programs for elite athletes including the Chicago Blackhawks.



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