

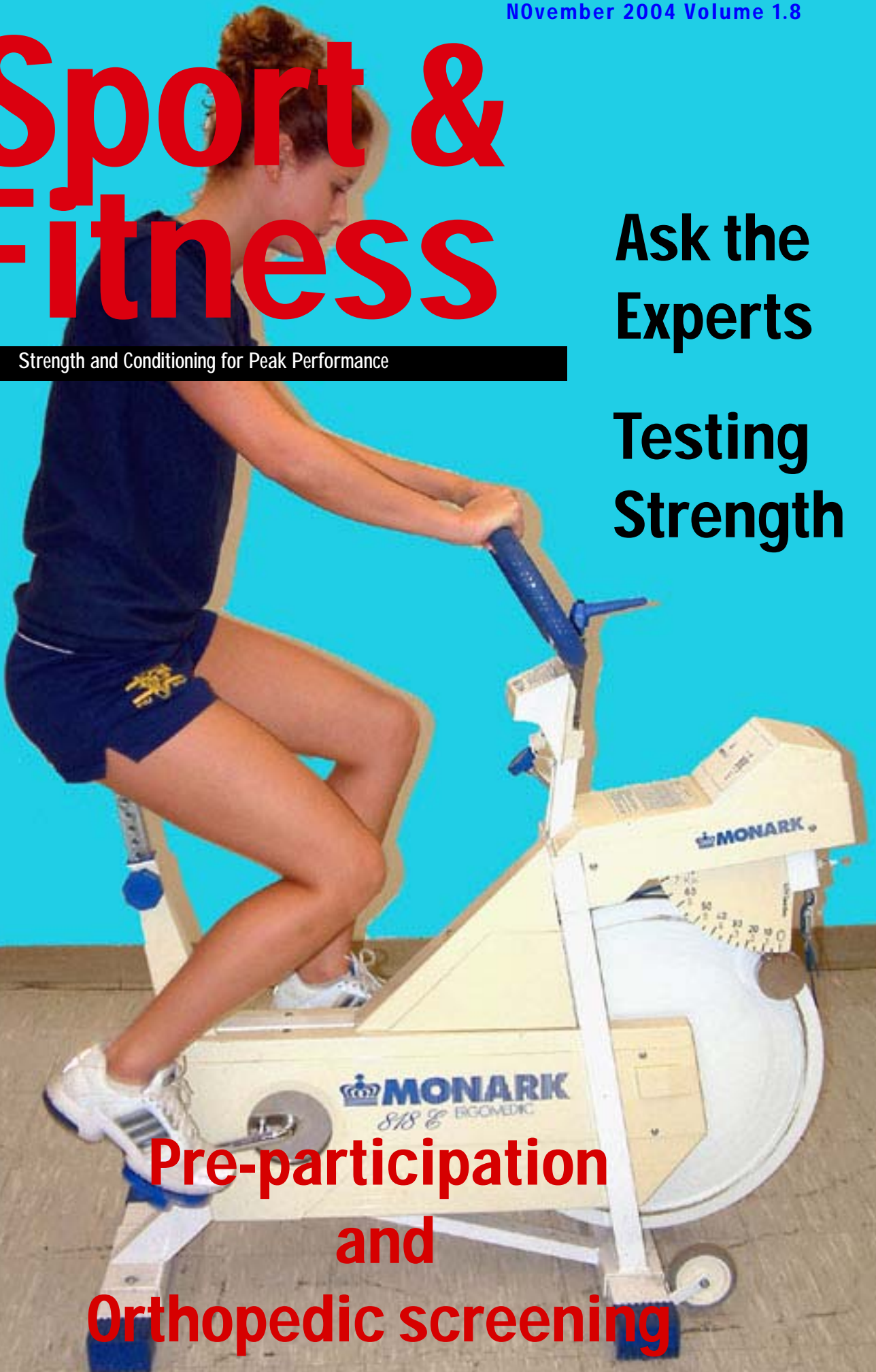
StrengthPro

# Sport & Fitness

Strength and Conditioning for Peak Performance

Ask the Experts

Testing Strength



Pre-participation  
and  
Orthopedic screening

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# Pre Participation Screening

**Ed McNeely, M.Sc**

Pre-participation screening is usually compulsory in health clubs and for many sport activities so that coaches, administrators and support personnel are aware of the physical limitations and health problems of the people under their supervision.

A well performed pre-screening provides several benefits to the trainer and client including:

- Decreased risk exposure for liability purposes.
- Provides detailed information on the health status of the client
- Provides information on potential areas to be trained
- Sets the framework for the development of goals

The pre-screening process involves three steps.

## Step 1: Par-Q

The Par-Q form (figure 1) was originally developed by the British Columbia Ministry of Health to identify those individuals for

whom participation in an exercise program may be inappropriate or who require some form of medical attention prior to becoming more active. The Par-Q should be administered without interpretation. It is important that the teacher does not interpret the student's symptoms or coach them on how to answer a question. If any question is answered with a YES the participant must seek medical advice before starting the exercise

program. It is recommended that written permission be obtained from the doctor and that the trainer keeps a copy in the client's file. If the trainer coaches the client about filling out the form or informs them prior to filling out the form that a YES answer means they will have to delay the start of their activity the results of the PAR-Q will be invalid. To avoid unnecessary delays the Par-Q should be given to the client sever-



**Regardless of age and ability a pre-activity pre-screening should be mandatory for all clients.**

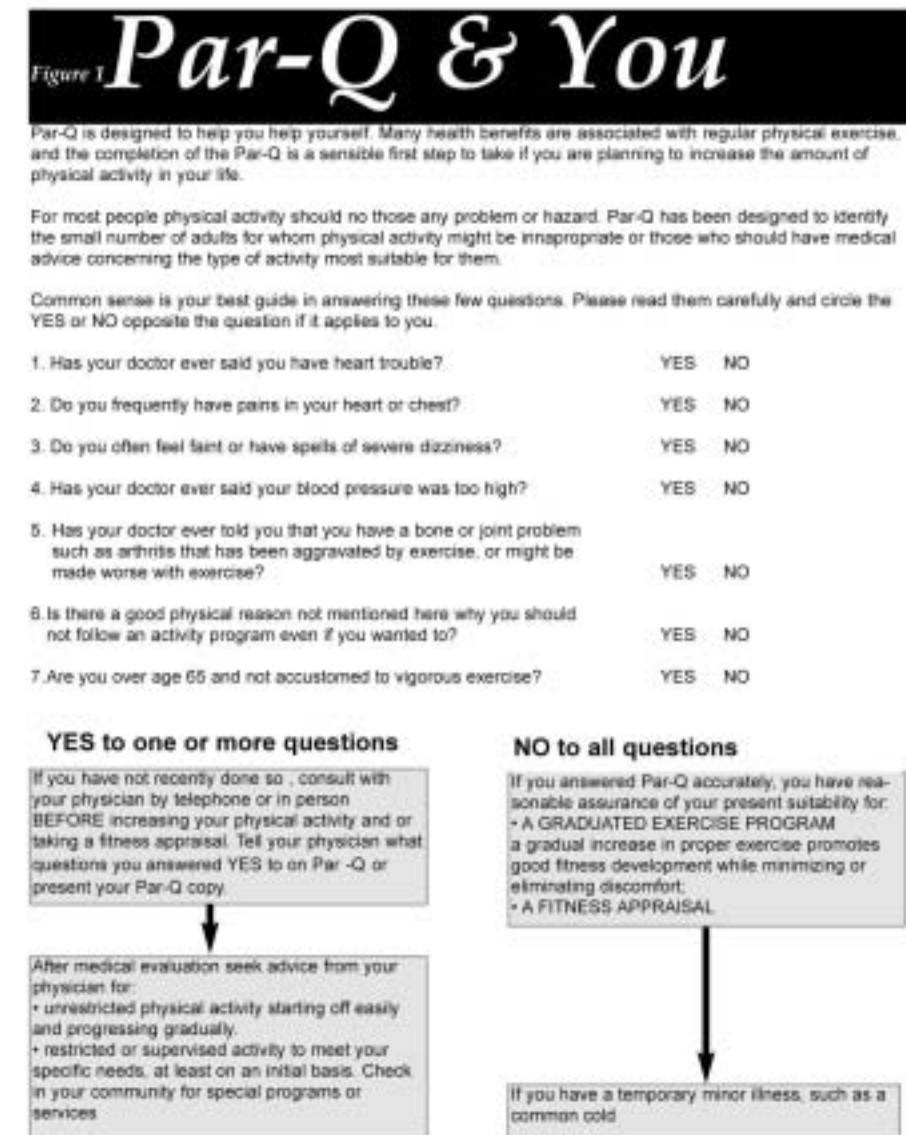
al days before the first meeting is scheduled.

## Step 2: Informed Consent

Many organizations try to use waiver forms which state that the participant waives the right to legal action in the event of an injury or accident. Waiver forms very often do not hold up in court. In place of a waiver form it is recommended that an informed consent form is used. The informed consent form outlines the type of activities that are going to be followed and the potential risks of these activities and exercise in general. This form is signed and dated by both the trainer and the client. A witness other than the trainer should be present during the signing of the form. The witness must be over the age of 18 and also signs and dates the informed consent form. Figure 2 provides a sample informed consent form. Use this form only as a sample, a lawyer should be consulted to help you design a form that is applicable to your situation and the laws of the area where you are working.

## Step 3: Medical History

The Par-Q provides some preliminary data on the health status of the student but it does not tell the whole picture. To find out about other medical conditions or areas, which may be of concern in the future, a more comprehensive medical questionnaire is necessary. This questionnaire should explore



past illnesses, current illnesses or chronic diseases such as heart disease, cancer, diabetes, epilepsy, etc. There should also be a section on family history of certain diseases, and information on current musculoskeletal problems. If answers to this questionnaire indicate that there are problems or potential problems the client should be referred to a professional who is qualified to deal with the problem. Remember a trainer is not a medical professional and cannot diag-

nose health problems. Even if the cause of the problem seems obvious qualified professional advice should be sought.

In addition to the pre screening questionnaires; fitness and orthopedic testing will provide additional information to help you assess your client's current abilities, strengths, weaknesses and provide you a framework for developing your program.

## Figure 2: Sample Informed Consent Form

I, the undersigned, do hereby acknowledge:

my consent to participate in a fitness program consisting of weight training exercises, aerobic exercises, speed, agility, power training and flexibility training that is specific to my age, gender, and current level of activity.

my understanding that the exercise program will be designed following a thorough pre-screening evaluation.

my consent to participate in a program developed by a trainer who has been trained to design programs for apparently health individuals.

my understanding that there are potential risks associated with an exercise program; i.e., episodes of transient light headedness, fainting, abnormal blood pressure, chest discomfort, leg cramps and nausea, muscle soreness, heart attack, death, muscle strains and that I assume willfully those risks.

my obligation to immediately inform the trainer of any pain, discomfort, fatigue or any other symptoms that I may suffer during and immediately after the training session;

my understanding that I may stop or delay any further training if I so desire and that the training session may be terminated by the trainer upon observation of any symptoms of distress or abnormal response;

my understanding that I may ask any questions or request further explanation or information about the procedures at any time before, during and after the training session;

that I have read, understood, and completed the Physical Activity Readiness Questionnaire (Reference: PAR-Q Validation Report, British Columbia Ministry of Health, 1978) and the answers to all the questions were negative:

SIGNATURE \_\_\_\_\_ DATE: \_\_\_\_\_

PARENT SIGNATURE \_\_\_\_\_ DATE: \_\_\_\_\_  
(if under 18 years old)

WITNESS SIGNATURE \_\_\_\_\_ DATE: \_\_\_\_\_

This form must be witnessed at the time of signing and the witness must be of the age of majority

TRAINER SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

## Figure 3: Sample Medical History Questionnaire

Name: \_\_\_\_\_ Date of Birth: \_\_\_\_\_ Gender: M / F

Address: \_\_\_\_\_  
\_\_\_\_\_

Physicians Name: \_\_\_\_\_

1. When was the last time you had a physical ?

2. Do you have any chronic or serious illnesses. If so please list them.

3. Have you been hospitalized in the past 3 years ? If so please describe why.

4. In the past 12 months.....

Has your weight unintentionally fluctuated more than a few pounds?	Y	N
Did you try to bring about this weight change?	Y	N
Have you experienced faintness, or blackouts?	Y	N
Have you occasionally had trouble sleeping?	Y	N
Have you experienced blurred vision?	Y	N
Have you had severe headaches?	Y	N
Have you experienced a chronic morning cough?	Y	N
Have you experienced unusual heart beats?	Y	N
Have you felt nervous or anxious for no apparent reason?	Y	N
Have you experienced periods in which your heart felt like it was racing for no apparent reason?	Y	N

5. Do you currently.....

Take any medication?	Y	N
Experience shortness of breath while walking?	Y	N
Experience sudden tingling, numbness, or loss of feeling in hands or feet?	Y	N
Experience swelling in your hands or feet?	Y	N
Get pain or cramps in your hands or legs?	Y	N
Experience pain or discomfort in your chest?	Y	N
Experience pressure or heaviness in your chest?	Y	N
Have high blood pressure?	Y	N
Have elevated serum cholesterol or triglycerides?	Y	N

6. If you are currently taking medication please indicate the type and purpose of the medication (s).

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7. Do you have Diabetes? If so how is it controlled?

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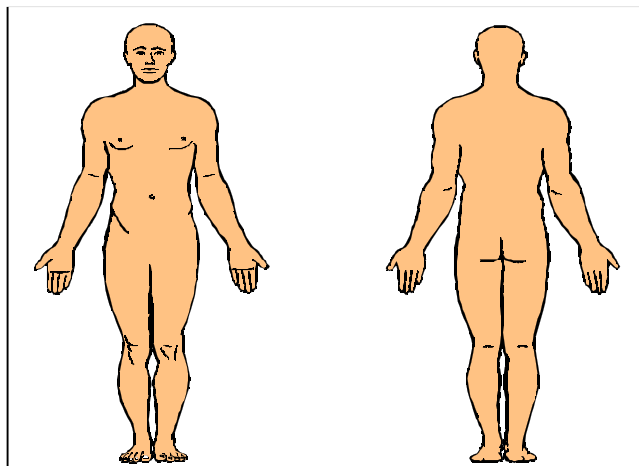
8. Does your family have a history of any of the following

- |                     |   |   |
|---------------------|---|---|
| Diabetes            | Y | N |
| Heart disease       | Y | N |
| Stroke              | Y | N |
| High blood pressure | Y | N |
| Lung disease        | Y | N |
| Obesity             | Y | N |
| Stroke              | Y | N |
| Arthritis           | Y | N |

If you answered yes to any of the above please indicate which family members have experienced the problem.

---

10. Please indicate any areas of muscle or joint pain on the diagram below



Describe the injury (ies):

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# Ask the Experts

## answering your questions



The one question that I had about sports performance training because I am somewhat new to this concept of training is what is the progression of events in a program? For example in normal weight training you have reps and sets, after a certain number of reps you rest 30-90sec and start the next set. How is this done with let's say agility training or plyometric training. Do you go through the ladder once (in and out's) and that is a rep and rest and do it again and that is the 2nd set? or Do you go 30 yards on resistive runs and that is a rep and rest and do it again and that is the 2nd set? or what. How do you flow from one exercise to another in a fluid pattern.

Doug

Dear Doug,

Excellent questions! Firstly, the exercises in a speed, power, or agility program need to be from the easiest exercises to the hardest, but not within the same workout, within the entire program itself. Meaning, the first time you do drills you should start with the easier ones and slowly from one workout to another progress to harder exercises. An example of this would be when beginning your training with ladders, the first movements you should learn would be the linear and lateral movements, then moving on to more difficult movements such as an ickey shuffle or buzz saw. It is the same with plyometrics. Begin with body weight exercises and progress to harder exercises such as depth jumps.

The rest time depends on the type of training and why you are doing certain exercises. The rest time between plyometric sets should be greater to allow for maximal recovery of the creatine phosphate system, the energy system that powers explosive activity. When the body is not fully recovered and the next set is performed, then you are not getting the full benefit of training explosively. For agility exercises as well as speed training, the rest time should start longer and decrease the closer the athlete gets to their season.

As far as flowing from one exercise to another it depends on the given amount of work you want to do. As far as sprinting goes it depends on whether you are sprinting for conditioning purposes or if you are sprinting because you run the 200m for the USA. Generally speaking, again, start with a lower workload and progress to a heavier one. For plyometrics, foot touches are the indicator of the amount of work you should perform during a training session. The table below shows the proper workloads depending on athletic level:

Table 1: Total Contacts per Training Session

Level	Low Intensity	Medium Intensity	High Intensity
Beginner	80	60	40
Intermediate	100	80	60
Advanced	140	120	100

Agility Ladder Drills are recorded by the number of sets through the ladder. Each set has a given number of repetitions, or foot contacts. For some drills the feet might only touch the ground 5 times each. In other exercises they might touch the ground 20 times per set. Beginners should stick to the easier drill patterns and a workout session should consist of between 12-15 total sets. Intermediate ladder users should begin to test themselves with the harder drills and should perform 18-21 training sets per workout. Advanced ladder users should also stay in the 18-21 set range, however the drills they select should be the ones that tax the body the most.

Contacts per set refers to whether or not to use the full ladder or just half the ladder. When training with the Agility Ladder the main goal is to improve speed and footwork. This means that the step pattern used in each drill needs to be perfect. If the athlete is unable to perform the pattern correctly, then they are not making any improvements in their footwork. This also means that once the athlete begins to tire, and their footwork becomes sloppy, then they are no longer working on improving speed and footwork. Therefore the correct number of ladders to use is the greatest amount of work that can be performed correctly. As soon as there is fall-off, a decrease in performance, then the drill needs to be stopped. Begin with half the ladder and as the athlete becomes better at performing the drills, add the other ladder to increase the intensity of each exercise.

If you have a training question for StrengthPro please feel free to e-mail us at [expert@strengthpro.com](mailto:expert@strengthpro.com) and we may answer your question in an upcoming installment of this column.

# Pre-Exercise Orthopedic Screening

## Rebecca M. Lopez, MS, ATC, HFI

Before beginning an exercise protocol with a client, it's important to find out as much information about their medical history to ensure it is safe for them to begin exercising. A written medical history form should be used to help the client identify previous medical conditions or orthopedic limitations they may have. Although a written medical history is obtained, there are a few tests you can use to assist in screening for any musculoskeletal problems. A pre-exercise orthopedic screening should not act as a substitute for a physician's evaluation. Instead, a pre-exercise screening could be used to determine if the client should be referred to a physician before commencing the exercise program.

There are certain signs and symptoms that should be flagged as an indication that the client should be seen by a physician and cleared prior to beginning the exercise protocol. A test that elicits pain or discomfort, a decreased range of motion within a joint, or the inability of the client to perform any of these tests should warrant a referral. Any significant lack of strength in a specific muscle or muscle group, when compared to the opposite side, is also indicative of a condition that should be further evaluated by a physician. A pre-exercise screening should consist of simple tests used to evaluate the client's range of motion and some strength tests as well. The tests should be easy to do and pain-free. You should also let the client know that he/she does not have to perform a test if he/she knows it will cause pain or significant discomfort. The well-known phrase "no pain, no gain" should never apply to a pre-exercise screening. Therefore, any pain that is caused by a pre-exercise screening test is not a good sign, and the client should be referred to a physician to determine the cause for that pain.

The order of tests is not really important. You can have the tests listed on a check-off list or simply remember the sequence by starting at the top (with the neck), and working your way down to the feet. A unilateral (one-sided) deficit in range of motion is a sure sign that there is something wrong with that joint or the muscles in the area. For that reason, ask the client to perform every test bilaterally (both sides), so that you can compare one side to the other. All the tests presented below should be performed with the client in the standing position. The following are some of the tests that should be included in a pre-exercise orthopedic screening along with some of the cues you can use to help the client understand what you're asking them to do:

### Neck

**Neck extension\***: Tilt your head back so that you are looking up to the ceiling.

**Neck flexion\***: Look down to the floor. (Cue: chin to chest)

**Lateral rotation\***: Look over your right shoulder then look over your left shoulder.

**Lateral bending**: Try to touch your right ear to your right shoulder. Then do the same with your left ear/left

shoulder.

## Back/Trunk

**Trunk flexion:** Bend down and touch your toes.

**Trunk extension:** With your arms crossed on your chest, lean back as far as you can.

**Lateral flexion:** Stand up straight with your arms crossed on your chest, lean over to your right side. Stand up straight again, and lean over to your left side.

**Trunk rotation:** With your arms still crossed, twist your upper body side to side while keeping your lower body still.

## Shoulders

**Abduction:** Place both arms at your sides (palms up) and lift your arms all the way up until your hands meet. Slowly lower them back to the original starting position.

**Flexion:** With your arms in front of you (resting on your thighs), lift them up as high as you can.

**Abduction/ External rotation\*:** With your right arm, reach back behind your head and try to touch your left shoulder blade. Repeat with left shoulder/ right shoulder blade.

**Internal rotation/ adduction\*:** With your right arm, reach behind your low back and try to touch your left shoulder blade. Repeat with your left arm/ right shoulder blade.

**External rotation:** Bend your elbows 90o, with your arms directly in front of you. Keeping your elbows at your sides, rotate your arms as far out as you can.

\* For these tests, the person conducting the screening should be standing behind the client in order to determine any differences in range of motion between the left and right shoulders.

## Elbows/ Wrists

**Elbow Flexion/Extension:** With your arms in front of you (resting on your thighs), lift them up until about shoulder level (approximately 90o). Bend your elbows all the way. Next straighten them out all the way. (When having your client perform this test, you may want to stand at their side in order to see any differences between arms.)

**Wrist Flexion/ Extension:** (Begin this test immediately following the elbow extension from the previous test so that their arms are straight out in front of them.) With your palms facing the floor, bend your wrists back all the way (extension), then curl your wrists down all the way (flexion).

## Lower Extremity

Make sure there is plenty of room for the following tests:

**Tip-toe:** Stand on your tip-toes and take a few steps forward.

**Heel walk:** Now stand on your heels and take a few steps back.

**Duck walk\*:** Squat down like a baseball catcher, and while staying in this stance try to take 3 steps forward. (Have them stay down in this stance for the next test.)

**Explosive jump:** From the squatting position, try to jump up as high as you can.

\* The duck walk is not a recommended activity for regular exercise, but it is often used to determine if there are range-of-motion deficits of the knee. Knee pain with deep knee flexion can also be indicative of various knee conditions.

Throughout the screening, you should be reminding the client to let you know of any pain or discomfort they may have when performing the tests. Also remind them to let you know if they cannot perform a particular test. If they already have a pre-existing injury or condition, the personal trainer should not ask the client to perform a test that may worsen the client's condition. If the above tests were performed without any signs of injury or deficits in range of motion, manual muscle testing can be performed bilaterally to see if there are any strength deficits as a result of injury. Manual muscle testing is performed by applying manual resistance to a body part while the client contracts the muscle against the resistance. For instance, to test the rotator cuff muscles of the shoulders, ask the client to abduct their arms to 90o (as in a lateral raise). Place your hands on their arms and ask the client to hold their arms up as you apply downward resistance. In a person with rotator cuff instability, one arm will drop down much sooner than the opposite arm.

Any deficit in the range-of-motion tests that were described above, however, should be enough for a personal trainer to refer a client to a physician. A personal trainer should not attempt to diagnose a client's injury or make the decision as to whether a client should begin an exercise program. The pre-exercise screening should be used as a guide to screen for possible strength and/or range-of-motion deficits. Once you refer a client to a physician, ask them to obtain a clearance from their physician. You may also want to know if your client has any limitations. For instance, perhaps your client can perform all exercises except any overhead exercises, such as a triiceps extension with the arms over the head.

Once your client is ready to begin the exercise protocol, always perform baseline testing. This will not only enable you to note improvements that have occurred as a result of your protocol, but will also serve as a guide as to what condition or level of fitness your client is at. With a thorough written medical history and the pre-exercise screening tests, a personal trainer can make sure they have done their part to ensure the client is beginning the exercise protocol with no range-of-motion deficits or musculoskeletal impairments.



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# Exercise of the Month: Tuck Jump


When using Plyo Boxes there will be times when it is necessary to pull the knees quickly towards your chest so that you can land on a higher box. Some athletes will be hesitant about jumping onto a high box for the first time. This requires strong powerful hip flexors and confidence in your ability quickly pull the feet up. The tuck jump is a starting point for teaching the technique of landing on a high box.

Stand with feet about shoulder width apart. Swing the arms back and quickly dip until the knees bend to about 120 degrees. Explode upward extending the knees, hips, ankles and trunk while swinging the arms forward and upward as explosively as possible. Focus on completely extending the body, reaching as high as possible. While in the air, quickly pull the knees into the chest, grabbing them with both hands prior to landing.



# Testing Strength

Ryan Koleyak, CSCS

A man in a white t-shirt and dark shorts is lying on a green padded bench, performing a ham bench press. He is holding the handles of the machine with both hands, and a large weight plate is attached to the bar. The machine is black with green accents and has "HAM BENCH PRESS" written on it.

Measuring strength is something that has been done since the beginning of time. Whether you are answering that age-old gym question, "how much can you bench?", or you are an athlete whose current and future success relies on their physical attributes, measuring strength will always have a place in the training world.

There are a number of reasons for strength testing. The primary purpose of strength testing is to assess base levels of strength. Whether you are an athlete or a regular gym user, before you can improve your strength you have to know your starting level. A base measure of strength will not only allow you to judge your progress and the effectiveness of your program it can help you assess the specific areas of weakness that need to be addressed if you are to reach your peak strength levels. In some programs strength testing serves as the basis for program prescription; percentages of one rep max are used to determine training intensity.

## Types of Strength Testing

The one repetition maximum (1RM) is the most commonly used testing procedure. This test involves lifting the maximum amount of weight possible in a given exercise for one repetition. If you are able to perform more than one repetition, or for that matter, not fully complete one repetition without assistance, then you have not found your true 1RM. Maximum strength testing (1RM testing) can be a time consuming process. It will normally take anywhere from 20-40 minutes per exercise to do a true max test.

There are a number of protocols that you can follow to find your true 1RM, they all involve a gradual progression in weight attempted until failure is achieved. Figure 1 shows the most common procedure. Ideally the 1RM will be found within five sets of finishing the warm up. If it takes longer than this fatigue may affect the accuracy of the test. Normally this type of testing is accurate to within 5% of the true 1RM. Keep in mind that a true 1RM is not possible in most gym settings; the minimum weight increment in most gyms is 5 lbs, 2.5 lbs per side of the bar, so the closest you can come to a true 1RM is 5 lbs.

## Figure 1: 1 RM Procedure

- Warm up with a light weight that can easily be handled for 5-10 reps
- Increase the weight by 10-20% and do a second warm up of 3-5 reps.
- Rest 2 minutes
- Increase the weight by another 10-20% and perform a final warm up of 2-3 reps
- Rest 3-4 minutes
- Increase the load by 5-10% and try one repetition
- Rest 3-4 minutes
- If the last attempt was successful increase the weight by 5% and try another one repetition. If it was not successful decrease the weight by 2.5-5% and try again.
- Repeat this process until only one repetition can be performed with proper technique. Always rest 3-4 minutes between attempts.

Whichever method you choose, be certain that the same protocol is used each time you test to ensure the reliability of your testing. With this type of maximal testing it is also critical that the athlete's safety be kept in mind. If the athlete has never performed 1RM testing, then you must ensure that the athlete is both comfortable with the protocol, and physically able to handle this type of testing. Never push a young or inexperienced individual past their limits.

If you are dealing with a large group or a group of less experienced clients, then predicted 1RM testing is likely more your cup of tea. Estimated tests have been developed as a time efficient alternative to 1RM testing. These tests use formulas to predict maximum strength. In most cases these tests are as accurate as the 1RM test. They lose their accuracy with athletes who train very close to their max for long periods at a time. The procedure can be seen in figure 2.

If you prefer to do the math yourself a formula to predict 1RM maximums for both upper and lower body exercises has been developed by exercise physiologist and university professor David Sandler, and can easily be used to calculate 1RMs.

To calculate 1RM for an upper body exercise use the formula:

$$\text{weight lifted} \times [1/(1-(\text{reps} \times .025))] = 1\text{RM}.$$

And to calculate lower body 1RM, the formula:

$$\text{weight lifted} \times [1/(1-(\text{reps} \times .035))] = 1\text{RM.}$$

While these charts and formulas are relatively accurate, they will never be as accurate as true 1RM testing. However, the closer you are able to get to a single repetition test (eg. a 3RM test as opposed to a 6RM), the more accurate the predicted 1RM will be.

Isokinetic testing determines the maximum muscle force generated at a specific joint, at a predetermined angular velocity. An example of this type of testing would be to determine the max force generated during knee extension at the constant rate of 60 degrees per second. This is done by using an isokinetic dynamometer; a piece of equipment that controls the speed of movement so that no matter how hard you push. These tests allow the evaluator to determine both maximum strength of a joint at different movement speeds and the maximum force production at different joint angles. While this information may be relevant for research, rehabilitation, and very specific athletic movements, for the average person this type of testing does not provide very practical or useful results. Aside from its specificity limitations, this type of testing is also expensive and rare, its availability is typically limited to educational institutions, medical clinics, and very elite training facilities.

Isometric strength testing is used to determine the amount of force that is produced against an immovable object. Strain gauges are typically used to measure isometric strength. In these tests the client is pulling or pushing as hard as possible for 3-5 seconds on a handle that is attached to a cable and an immovable object such as a wall or the floor; the strain gauge measures the tension developed in the cable. This type of test can also be done using the isokinetic dynamometer mentioned previously, by setting the movement speed to 0 degrees per second. Isometric testing can determine muscular strength, as well as muscle imbalances between sides of the body and opposing muscle groups. Isometric strength is specific to the joint angle at which it is tested so to get a thorough picture of a muscles strength through the whole range of motion several joint

## **Figure 2: Predicted 1 RM Procedure**

- **Warm up with a light weight that can easily be handled for 5-10 reps**
- **Rest 2 minutes**
- **Increase the weight by 10-20% and do as many reps as possible. You should reach failure in 2-10 reps.**
- **Look up the weight you lifted and the number of reps you did on the chart. Where the two meet is your 1RM.**
- **If you do more than 10 reps take a 10 minute rest, increase the weight by another 10-20% and try again.**

angles need to be tested; typically one at the beginning, middle and end of the range of motion.

Whether it is a measured or estimated 1RM done in the gym or an isokinetic or isometric test done in the lab strength testing will help you build a better program and gives you the numbers you need to show your clients their improvement.

*Ryan Koleyak is currently a Graduate Student/Assistant at Florida International University. He has a Bachelor of Physical Education Degree from the University of Alberta, and is an NSCA Certified Strength and Conditioning Specialist (CSCS).*

<b>Table 1. Predicted 1 RM Chart</b>									
<b>Reps</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Weight</b>									
45	48	49	51	52	54	55	57	58	60
50	53	55	57	58	60	62	63	65	67
55	59	60	62	64	66	68	70	71	73
60	64	66	68	70	72	74	76	78	80
65	69	71	74	76	78	80	82	84	86
70	75	77	79	82	84	86	88	91	93
75	80	82	85	87	90	92	95	97	100
80	85	88	91	93	96	98	101	104	106
85	91	93	96	99	102	105	107	110	113
90	96	99	102	105	108	111	114	117	120
95	101	104	108	111	114	117	120	123	126
100	107	110	113	117	120	123	126	130	133
105	112	115	119	122	126	129	133	136	140
110	117	121	125	128	132	135	139	143	146
115	123	126	130	134	138	142	145	149	153
120	128	132	136	140	144	148	152	156	160
125	133	137	142	146	150	154	158	162	166
130	139	143	147	151	156	160	164	169	173
135	144	148	153	157	162	166	171	175	180
140	149	154	158	163	168	172	177	182	186
145	155	159	164	169	174	178	183	188	193
150	160	165	170	175	180	185	190	195	200
155	165	170	175	181	186	191	196	201	206
160	171	176	181	186	192	197	202	208	213
165	176	181	187	192	198	203	209	214	219
170	181	187	192	198	204	209	215	220	226
175	187	192	198	204	210	215	221	227	233
180	192	198	204	210	216	222	228	233	239
185	197	203	209	216	222	228	234	240	246
190	203	209	215	221	228	234	240	246	253
195	208	214	221	227	234	240	246	253	259
200	213	220	226	233	240	246	253	259	266
205	219	225	232	239	246	252	259	266	273
210	224	231	238	245	252	259	265	272	279
215	229	236	243	250	258	265	272	279	286
220	235	242	249	256	264	271	278	285	293
225	240	247	255	262	270	277	284	292	299
230	245	253	260	268	276	283	291	298	306

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# STRENGTHPRO

## SPEED AND POWER CERTIFICATION

The quickness to break through the line and accelerate past tacklers, grabbing a rebound out of the hands of your opponent, ripping off a 130 mph tennis serve or driving a golf ball 300 yards all have one thing in common. They all require incredible power.

Power, the optimal combination of speed and strength is essential for sport performance and is the difference between good and great athletes. Not every sport has the same power requirement, being able to determine the ideal relationship between speed and strength for a sport, test an individual athlete for their strengths and weaknesses and teach proper exercise progressions will allow you to develop more effective training programs and separate yourself from other trainers in the field of athlete development.

With this in mind StrengthPro has created a certification that covers every aspect of power and



speed development, from the science, to the exercises, to the development programs to maximize your clients results.

This four session lecture-workshop will provide each participant the skills and knowledge needed to develop explosive power programs. Examining both historical perspectives and the newest, scientific approaches for developing power the workshop will consist of approximately 50% of the time being devoted to lecture and 50% to practical application hands on applications, allowing participants to bridge the gap between science and practice.



### Session 1: The Strength-Speed-Power Continuum

This lecture session will introduce participants to the physiological basis of power development and the Strength-Speed Power continuum. To develop optimal power one must first know whether that power is strength based or speed based. The continuum allows the participant to analyze the power demands of a sport or activity and determine the proportions of strength and speed needed to excel. Other topics covered include:

- Muscle and Nervous system physiology

- Force-velocity curve
- The length-tension curve
- Acceleration, Torque and Impulse
- Elastic energy, the stretch reflex and momentum
- Dynamic Power Expression
- The trade – off between strength and speed
- Where does optimal sport specific power lie?
- Sport and position specific power analysis

## Session 2: Developing a Power Profile

During this practical workshop participants will be lead through a series of specific and general strength, speed, and power tests. They will learn to administer the test protocols, interpret the results and set training priorities and goals based on the testing and how the results match the strength-speed-power continuum analysis.

## Session 3: The 5 Step Power Program

This lecture session provides the program variables and theoretical framework for designing specific power programs. The 5 step model provides participants with a simple, effective means of ensuring that they are covering ever aspect of power development. Topics covered include:



-

Training muscles vs. training movements

- Replication and skill transfer
- The weight training paradox
- Power periodization cycling
- Antagonistic power combinations
- Volume-intensity relationships
- Overload
- Acceleration and deceleration

## Session 4: Power Techniques

Building on the previous session, this hands on session features the drills, exercises and training methods discussed in the previous lecture. The group will be broken into smaller groups and cycle through four different stations where participants will learn and learn to teach ten different exercises and drills for a total of 40 new exercises ranging from releases and throws to plyometrics and Olympic lifts.

**For information on a certification course in your area call 1-800-255-1017  
www.strengthpro.com**

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