Choice and order of exercises

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When training for sports, the whole body has to be strengthened. All major muscle groups need to be exercised. Holistic exercises should be used as opposed to special strengthening exercises for certain muscles.

Example: The athlete should be building total leg strength rather than just strong quads.

Special strengthening exercises should be performed when:
A) rehabilitating an injury
B) strengthening a muscle imbalance
C) performing auxiliary exercises specific to a sport or position (e.g., linebackers doing dumbbell flies).

Along with strengthening the whole body, the coach should recognize the dominant muscle groups used in the activity and give some “extra” attention to those areas.

Example: Offensive linemen do more “pushing,” while wrestlers do more “pulling.”

The sport activity should be studied and the muscle groups to be strengthened should be identified. The lifting exercises should simulate the movement patterns most often used during the execution of the skill.

Example: A shot putter is arm extension. Much chest and shoulder strength is needed, therefore, all or some of the following exercises should be performed: bench press, incline press, military press, dumbbell presses and push presses behind the neck.

The coach should:
A) identify the muscle group(s) to be strengthened
B) select exercises that will strengthen that muscle group(s)
C) remember to work the antagonistic (opposite) muscle(s) to avoid muscle imbalances.

Choice of Exercises

When choosing what exercises to be performed, the coach should have a basic knowledge of the various anatomical movements. He must look at the movement(s) the athlete will do in his sport and associate the muscle(s) used in the movement(s).

Example: Wrestling - strong biceps and lats are needed, for he does a lot of “pulling” when wrestling. Some exercises for the upper body should be lat pull downs, bent over rows, power cleans arm curls, etc.

Offensive linemen - Strong triceps and chest are needed, since he does “pushing” movements when blocking or pass protecting. His main upper body exercises should be bench press, incline press, etc.

Along with the “main” exercises working the dominant muscle groups used in his activity, the athlete should do exercises to work the antagonistic muscle groups to have total body strength.

Example: Wrestlers can do bench presses and offensive linemen can do lat pull downs.

To put it in a few words, the athlete must have total body strength with “emphasis” on the predominant muscle groups used in his activity.

The time of the year (off-season, pre-season, in-season) is also important when choosing your exercises, and different emphasis and requirements should be considered. In the off-season the athlete is in “active rest” so he should perform a great variety of exercises, mostly for general fitness. He should not be concerned about being “specific” to his sport. Muscle weaknesses should be corrected by doing special exercises to strengthen those areas. Rehabilitation exercise should be performed if the athlete was injured in the preceding season. Now is the time to “balance” the body and do many of the exercises that time does not allow in the pre-season or in-season.

In the pre-season it is time to get serious and work hard on the major muscle groups needed for the sport. The body should be well balanced and ready for some hard work. Little time is spent on “muscle beach” exercises. Training is very specific and all time available is used wisely.

Because of the little time available for lifting in the in-season, the athlete
should concentrate on maintaining strength on the major muscle groups needed for his sport. It is hard to increase strength at this time. Just performing the sport will not maintain the strength gained in the pre-season and the small amount of lifting that is done should be of high quality and very specific to the activity.

**Muscular Balance**

As I mentioned earlier, weight training should be designed to develop total body strength. Workouts emphasizing only certain muscle groups can produce muscle imbalances, which in turn will lead to injury. When one muscle group is disproportionate compared to the antagonistic (opposite) muscle group, injury can easily occur. All athletes love to bench press but few recognize the need to work the upper back so to balance out upper body strength.

Training opposing muscle groups does not mean being “equal” strength. Certain muscle groups are physiologically and biomechanically stronger than others.

**Example:** When training the leg, the quads should be about 50 percent stronger than the hamstrings. Therefore, if the athlete can leg extend 100 pounds he should be able to do about 70 pounds in the leg curl. If he can only do 40 pounds in the leg curl, this would show a muscle imbalance, e.g., hamstrings not strong enough. If he can do 100 pounds in the leg curl, this also would show a muscle imbalance, e.g., quads not strong enough compared to the hamstrings.

When strengthening muscles in isolation with machines or bodybuilding type exercises, the athlete should do at least one exercise for each major muscle group, chest, shoulders, arms, upper back, lower back, waist, hips and legs. When performing multi-joint exercises like the squat, power clean and bench press many muscle groups are trained simultaneously, minimizing the chances of muscle imbalance.

If the athlete does have a muscle imbalance he should concentrate on exercises that will strengthen that imbalance.

**Order of Exercise**

The order in which the athlete performs the exercises is very important so to get the most out of each exercise. If strength-power is wanted, the muscle(s) must be rested before exercising. When performing several exercises in the same workout, they have to be performed in an order so to rest an area while working another area. If muscle endurance and hypertrophy are desired, then the same area should be trained with a variety of exercises with little rest so to get as much of a “pump” as possible. Since the main interest is usually in strength-power gains, rather than just “how the muscle looks,” the rest and fatigue factors are critical in optimal results (much more in this area in my next article).

Lifts working many muscle groups and requiring a lot of mental concentration (e.g. power clean) should be performed early in the workout. Lifts working small muscle groups and requiring little concentration should be performed last.

**Example:**

1) Power Clean
2) Bench Press
3) Squat
4) Lat pull down
5) Tricep extension
6) Sit-ups

If the athlete has to perform two main exercises working the same general muscle groups they should be spaced as far apart as possible to give as much recovery time as possible before working it again.

**Example:** In the above sample, the bench press is done in between power clean and squat. While the athlete performs the bench, the legs and back have time to recuperate so to get a good squat workout.

I do not recommend that the same muscle group be trained in successive exercises when strength-power gains are desired (e.g., doing incline bench right after doing bench press). I suggest doing one upper body exercise, then a lower body exercise, and so forth. This is one of the reasons I like my athletes to train with weights three times per week, working the whole body compared to the split routine. If a split routine has to be used, it should be split into lower body one day and upper body the next. Here again, the order of exercises should be such to get the most recovery time.

**Example:** Upper Body Day
1) Bench Press
2) Bent over rows
3) Tricep extensions
4) Lat pull down
5) Dumbbell flies

Because of the rest-fatigue factors, the weakest areas should be trained first. This is called priority training. If the athlete’s legs are weak he should start with lower body exercises and then do upper body exercises.

**Example:**
1) Squat
2) Lunges
3) Bench press

The athlete should do the most important lift first in the workout before fatigue sets in. Athletes have the tendency of doing their “favorite” lifts first and the ones they do not like last. This has to be corrected by doing the “hard” and “unpopular” lifts first and then the others.

**Example:** Do power clean or squats first, then do bench press, arm curls, etc.

Keep in mind we are training for performance and not for looks.
Large vs small muscle groups

When exerting a maximum effort in an exercise, it will be the smaller muscles involved in the movement that fatigue first, not the primary movers.

Example: In the bench press, the triceps get tired before the chest.

A strong athlete will not only have strong main muscle groups but also good strength in the smaller stabilizing muscle groups. These smaller muscles assist the larger muscles when lifting a weight. Therefore, with proper exercises the athlete can strengthen all muscle groups.

The main and assisting muscle groups are best trained in “holistic” exercises like the power clean, squat and bench press where a larger number of muscle groups have to work simultaneously to complete the lift. Many times small muscles or stabilizing muscles will limit the athlete from increasing the load for they have not been properly trained. This can be corrected by continuing to do main exercises and by identifying the weak area and strengthening that area with special exercises at the end of the workout.

Example: Work on the main pressing exercises and finish up the workout with some extra tricep or shoulder exercises.

This is also depicted when an athlete who could bench 300 pounds on a machine but can only do 250 pounds with a barbell. His main muscle groups are strong enough to push 300 pounds but his small stabilizing muscles are not since the machine did the “stabilizing work” for him.

Multi vs single joint exercises

There is much to be said when comparing multi-joint to single joint exercises (e.g., bench press to triceps extensions). The sequential muscle action, muscular balance, muscular coordination, time saving and motivational benefits are a few. On the other hand, when there is a weakness in a multi-joint exercise (e.g., poor triceps in the bench press), the exercise is limited to that muscle weakness. The weak muscle will be the only muscle receiving the maximum benefit of the overload. The weak area should be corrected by doing some special single joint exercises at the end of the workout. As you can see both multi-joint and single joint exercises should be included in your workouts.

When planning the workout, the multi-joint exercises should be performed first followed by the single joint (auxiliary) exercises. If the auxiliary exercises are done first, they will “pre-exhaust” the muscle and the performance of the main lift will decrease.

Example: A person does triceps extensions before the bench press. Tired triceps will not be able to exert as much force as a rested chest and delts. The result is less weight being handled in the bench press.

The drawback in doing all single joint exercises in a workout is that the single muscle gets stronger but the surrounding muscles (stabilizers) may be weakened in the process. There are more than 400 different muscles in the human body, and there is no way to “isolate” each of these muscles and in turn strengthen them. A good combination of multi-joint and single joint exercises is recommended.

When a large variety of exercises is used more muscle groups get trained on a variety of different angles.

Example: The bench press, incline press and military press all basically work the same muscles but the difference is that they work those muscles at different angles.

Super-setting

When two or more different exercises are combined they produce a superset. (The different variations were discussed in Part 2 of this series). This type of training is not recommended for optimal strength-power gains. It is ideal for muscular endurance and hypertrophy. Most coaches associate super-setting with single joint exercises. Super-setting can also be done with main multi-joint exercises (bench press, squat). This combination produces the best strength-power gains when super-setting.

When the coach is restricted by time and chooses to work with supersets, he should include mostly multi-joint exercises. These exercises, when compared to the number of muscle groups worked, are time savers.

Example: The workout can only last 20 minutes. The athlete should perform the bench and squat in a superset routine. He should not do single joint exercises for they are not time savers.

Special vs specific strength

New findings from Europe and Eastern bloc countries suggest that there are various “types” of strength. Exercises performed in the weight room to strengthen certain muscle groups can be labeled Specific Strength (e.g., squats). On the other hand when the athlete performs the entire sport movement with an overload it is labeled Special Strength (tackling a sled or a shot putter putting an 18 pound shot). When the athlete performs a sport exercise in water (used often in rehabilitation) it is also labeled Special Strength.

Much is still to be learned about what exercises are best in producing desired results. What we know today is minimal compared to what we will know 10 to 12 years from now.