

A BALANCED UPPER BODY ROUTINE

By Leith Darkin

December 2003

ABSTRACT

In this article we are going to look at the scapula, humerus and surrounding muscles to get a better understanding of how the shoulder works and what to look for when writing and implementing a balanced upper body routine. If you, or a client you are training, are going to be training for many years to come then a balanced routine is important to help reduce the possibilities of future shoulder injuries and maintain good upper body posture.

When writing and implementing a resistance training program for the upper body, it is important that all muscles are treated with equal importance and that an attempt is made to balance all opposing muscles/muscle groups that surround joints.

From my experience of working in gyms over the years, watching individuals implement their own training routines, looking at programs that other trainers have written, even reading through programs that appear in magazines and some books, the majority of focus is placed upon the muscles that,

- 1) Vertically flex and extend the shoulder.
- 2) Horizontally flex and extend the shoulder.
- 3) Abduct and adduct the shoulder.
- 4) Flex and extend the elbow.

(Anterior deltoid, posterior deltoid, middle deltoid, pectoralis major, latissimus dorsi, biceps & triceps)

Generally not enough emphasis is placed upon balancing the muscles that surround and stabilize the scapula (trapezius, levator scap, rhomboids & serratus anterior) and more often than not, additional rotator cuff strengthening is only implemented after a rotator cuff injury.

THE SCAPULA

Over recent times it has been brought to the attention of trainers, coaches and individuals in the medical profession the importance of strengthening “transversus abdominus” (our trunks main support structure) for individuals with back problems and also as a preventive measure for individuals without back problems (this is largely due to the recent introduction of “Swiss Balls” and the reintroduction of “Joseph Pilates” theories). When looking at the shoulder, it is just as important to strengthen all the muscles that surround the scapula as a preventive measure to help reduce the possibilities of future shoulder injuries, maintain upper body posture or help correct upper body postural problems such as “thoracic kyphosis”.

If you were to build a house you would first address the stumps and footings (foundations), if the stumps and footings aren't right then everything from that point onwards will be out. The muscles that surround the scapula are the foundations for shoulder movement; if they are strengthened with a “balanced” program, the humerus then has a firm and stable base to work off of.

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There are 6 movements involving the scapula you need to consider when writing and implementing an upper body routine.

SCAPULA MOVEMENT	MUSCLES INVOLVED
Protraction	Serratus anterior
Retraction	Rhomboids & middle trapezius
Upward rotation	Upper trapezius
Downward rotation	Lower trapezius
Elevation	Levator scapulae & upper trapezius
Depression	Lower trapezius

An exercise to produce “elevation” at the scapula would be a “vertical shoulder shrug” however elevation is rarely used in isolation, it is usually incorporated with “upward rotation” likewise an exercise to produce “depression” of the scapula would be a “straight arm dip” (dips done on parallel bars, producing vertical movement of the body at the shoulder joint with arms locked straight at the elbow joint) however “depression” is rarely used in isolation it is usually incorporated with downward rotation.

As “elevation” is more often than not incorporated in “upward rotation” and “depression” is more often than not incorporated in “downward rotation” when writing a balanced upper body routine there are 4 main movements at the scapula to consider

- 1) Protraction
 - 2) Retraction
 - 3) Upward rotation in conjunction with elevation
 - 4) Downward rotation in conjunction with depression
- (1&2 are opposite joint actions and 3&4 are opposite joint actions).

THE ROTATOR CUFF

The shoulder joint is a shallow “ball and socket” joint with the head of the humerus (ball) being more than twice the size of the glenoid cavity (socket), being a shallow “ball and socket” joint allows the shoulder to go through more variety of movements than any other joint in the human body, unfortunately being able to go through a large variety of movements compromises its stability.

The head of the humerus is held in place by 4 muscles that surround the head of the humerus attaching it to the scapula, these 4 muscles are known as the “rotator cuff”. These muscles consist of

- 1) Teres minor
- 2) Infraspinatus
- 3) Supraspinatus
- 4) Subscapularis

When writing and implementing an upper body routine it is also important that the “rotator cuff” muscles are also strengthened equally, as they are responsible for holding the humeral head in place.

MUSCLE	ORIGIN OF MUSCLE	INSERTION OF MUSCLE	MOVEMENT IN ISOLATION	FUNCTIONAL MOVEMENT
Teres minor	Posteriorly on the upper and middle aspect of the lateral border of the scapula	Posteriorly on the greater tubercle of the humerus	External rotation	Horizontal extension & extension
Infraspinatus	Medial aspect of the infraspinatus fossa just below the spine of the scapula	Posteriorly on the greater tubercle of the humerus	External rotation	Horizontal extension & extension
Supraspinatus	Medial two-thirds of the supraspinatus fossa	Superiorly of the greater tubercle of the humerus	Abduction	Abduction
Subscapularis	Entire anterior surface of the subscapular fossa	Lesser tubercle of the humerus	Internal rotation	Adduction & extension

If the sport you are involved in,

- 1) Relies on complex movements at the shoulder joint such as throwing.
 - 2) Relies on powerful and/or repetitious striking with a bat or racket.
 - 3) Is a contact sport where movement at the shoulder is used to fend off other players or strike opponents.
 - 4) Is a team sport, where at times you have to compete against other players to retrieve a ball from overhead with a straight arm (e.g. basketball).
 - 5) Is a contact sport where there is a chance of falling to the ground or being pushed or thrown to the ground.
 - 6) Involves high intensity resistance training for the upper body.
- Then additional isolation resistance training, specifically designed to strengthen the rotator cuff should be considered.

Isolation exercises to strengthen the external rotators (teres minor and infraspinatus).

- 1) External rotation from adduction where the humerus is braced firmly against the body (with the use of either rubber tubing, cables or dumbbells).
- 2) External rotation from 45 degree abduction (with the use of either rubber tubing or cables). As the humerus is no longer braced against the body a stability component for the shoulder is now added to the exercise.
- 3) External rotation from 90 degree abduction (with the use of either rubber tubing or cables). As the humerus moves further away from the body an even greater stability component for the shoulder is added to the exercise.

Isolation exercises to strengthen the internal rotators (subscapularis).

- 1) Internal rotation from adduction where the humerus is braced firmly against the body (with the use of either rubber tubing, cables or dumbbells).
- 2) Internal rotation from 45 degree abduction (with the use of either rubber tubing or cables). As the humerus is no longer braced against the body a stability component for the shoulder is now added to the exercise
- 3) Internal rotation from 90 degree abduction (with the use of either rubber tubing or cables). As the humerus moves further away from the body an even greater stability component for the shoulder is added to the exercise

The isolation exercise used to strengthen supraspinatus is scaption; this exercise is best performed with dumbbells.

SCAPULOHUMERAL RHYTHM

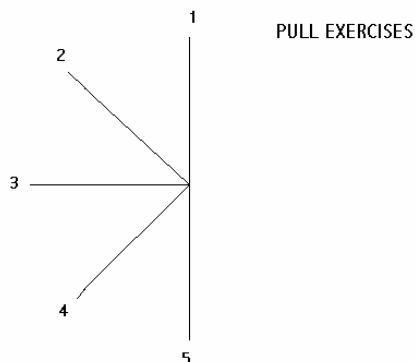
The scapula and the humerus are an inseparable team, working together to produce set movement patterns at the shoulder (scapulohumeral rhythm)

i.e. if the humerus is in horizontally flexed, the scapula is protracted or if the humerus is horizontally extended the scapula is retracted etc.

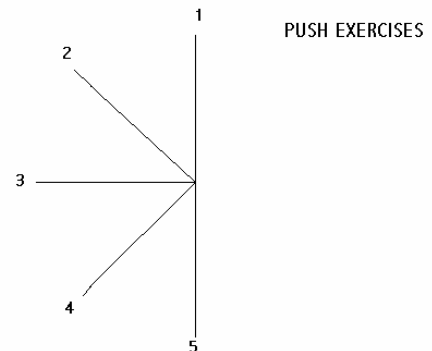
The next 2 table's lists our five push exercises and our five pull exercises along with the movement patterns of the scapula, the movement patterns of the humerus and the muscles involved in producing scapulohumeral rhythm

Pull	Exercise	Movement of Humerus	Muscles	Movement of Scapula	Muscles
1	Chin up	Adduction	Latissimus dorsi & posterior deltoid	Downward rotation & depression	Lower trapezius
2	Incline lat pulldown	Adduction & horizontal extension	Latissimus dorsi, posterior deltoid & middle deltoid	Downward rotation, depression & Retraction	Lower trapezius, middle trapezius & rhomboids
3	Seated row	horizontal extension	Latissimus dorsi, posterior deltoid, middle deltooid, teres minor & Infraspinatus	Retraction	Middle trapezius & rhomboids
4	Bent over row	Abduction & horizontal extension	Anterior deltoid, posterior deltoid, middle deltoid, supraspinatus, latissimus dorsi, teres minor & infraspinatus	Upward rotation, elevation & retraction	Middle trapezius, upper trapezius & rhomboids
5	Upright row	Abduction	Anterior deltoid, posterior deltoid, middle deltoid & supraspinatus	Upward rotation & elevation	Upper trapezius

5 PULL EXERCISES



5 PUSH EXERCISES



Push	Exercise	Movement of Humerus	Muscles	Movement of Scapula	Muscles
1	Over head Press	Abduction	Anterior deltoid, posterior deltoid, middle deltoid & Supraspinatus	Upward rotation & elevation	Upper trapezius
2	Incline bench press	Abduction & horizontal Flexion	Anterior deltoid, posterior deltoid, middle deltoid, supraspinatus & pectoralis major	Upward rotation, elevation & protraction	Upper trapezius & serratus anterior
3	Bench press	horizontal flexion	Ant deltoid & pectoralis major	Protraction	Serratus anterior
4	Decline bench press	Adduction & horizontal flexion	Ant deltoid & pectoralis major	Downward rotation, depression & protraction	Serratus anterior & Lower trapizius
5	Dips	Adduction	Ant deltoid & pectoralis major	Downward rotation & depression	Lower trapezius

WRITING A BALANCED PROGRAM

Now we have a better understanding of “scapulohumeral rhythm”, the importance of strengthening all the muscles that surround the scapula, as well as a better understanding of the “rotator cuff” and how it attaches the humerus to the scapula, writing a balanced upper body routine is as easy as combining

(1&3 push and 1&3 pull) or (3&5 push and 3&5 pull) or (2&4 push and 2&4 pull).

Using the above three variations balances all the muscles that surround the scapula, balances all rotator cuff muscles and balances all the muscles that flex and extend the elbow joint. When looking at the main muscles that move the humerus (not including the rotator cuff) you'll find that when using (1&3 push and 1&3 pull) there is slightly more emphasis on muscles posterior to the shoulder (posterior deltoid & latissimus dorsi) and using (3&5 push and 3&5 pull) there is slightly more emphasis on muscles anterior to the shoulder (e.g. anterior deltoid & pectoralis major), however the slight discrepancies can be overcome by cycling your training. (2&4 push and 2&4 pull) balances all the main muscles that move the humerus.

SUGGESTIONS FOR CYCLING YOUR TRAINING

Variation 1

Macro cycle 1 consisting of 4-8 weeks 1&3 push and 1&3 pull

Macro cycle 2 consisting of 4-8 weeks 2&4 push and 2&4 pull

Macro cycle 3 consisting of 4-8 weeks 3&5 push and 3&5 pull

By the end of the third macro cycle, most slight discrepancies in the muscles that move the humerus will be balanced up.

Variation 2

Macro cycle 1 consisting of 4-8 weeks 2&4 push and 2&4 pull

Macro cycle 2 consisting of 4-8 weeks 1&3 push and 1&3 pull

Macro cycle 3 consisting of 4-8 weeks 2&4 push and 2&4 pull

Macro cycle 4 consisting of 4-8 weeks 3&5 push and 3&5 pull

In variation 2 we use (2&4 push and 2&4 pull) as the nucleus of our training as there are no discrepancies in the balance of the main muscles that move the humerus and we alternate between (1&3 push and 1&3 pull) and (3&5 push and 3&5 pull). Once again by the end of the fourth macro cycle, most slight discrepancies in the muscles that move the humerus will be balanced up.

Variation 3

If you were to incorporate a split routine into your training, you again use 2&4 push and 2&4 pull as the nucleus for your program and combine it with our other 2 variations.

Macro cycle 1 consisting of 4-8 weeks (2&4)&(1&3) push for workout A and (2&4)&(1&3) pull for workout B.

Macro cycle 2 consisting of 4-8 weeks (2&4)&(3&5) push for workout A and (2&4)&(3&5) pull for workout B.

Once again by the end of the second macro cycle, most slight discrepancies in the muscles that move the humerus will be balanced up.

TECHNIQUE

When looking at our 5 push exercises you'll find that generally there is little or no problem with technique. Push exercises 2, 3 & 4 are performed on a bench which holds the body in the correct position while we push an external load away from our body, keeping alignment with gravity. The further we push the external load away from our body the weaker we become, this in turn places greater emphasis on technique to maintain correct alignment with gravity (for push exercise 2 & 4 the bench should be set at 45 degrees). With push exercise 1 the body is in the vertical position while pushing an external load over head (this can be done either standing or in the seated position), once again the further the external load is pushed away from the body the greater the emphasis is on technique or the individual will lose control of the weight or fall over. With push exercise 5, the body needs to be vertically aligned with gravity, however this exercise is often performed with the body leaning forward and therefor should be corrected.

When looking at our 5 pull exercises you'll find that there is a greater likelihood of problems with technique, there are 2 main reasons for this.

- 1) More often than not exercises are performed without a bench or chest support to hold body in a fixed position, the emphasis is then on the individual to maintain correct body alignment and to keep the external load aligned with gravity.
- 2) The closer we pull an external load to the body the stronger we become, this means that when finishing our concentric contraction we can slightly change our alignment with gravity and or get some active trunk movement to assist us getting those last few reps out.

Pull exercise 1) Keep body vertical at all times with no swinging of the torso, make sure the movement at the scapula is downward rotation and depression with no retraction.

Pull exercise 2) Keep upper body alignment at 45 degrees at hips and maintain neutral curvature of the spine (the curvature of the spine should be the same as in the standing position).

Pull exercise 3) Keep upper body vertical at all times through out movement and make sure the movement at the scapula is retraction with no elevation. (With a "seated row" technique varies if your training is sport specific, in which case you may have trunk flexion and trunk extension incorporated into your technique).

Pull exercise 4) Keep upper body alignment 45 degrees at hips and maintain neutral curvature of the spine (the curvature of the spine should be the same as in the standing position). If the load you are attempting to lift is too heavy for you to maintain the correct body posture, you should consider one of the alternative exercises in the next section “EXERCISE VARIATIONS”

Pull exercise 5) Keep body vertical at all times, no trunk hyperextension at end of concentric contraction.

EXERCISE VARIATIONS

- 1) **PULL** chin up, lat pulldown.
 - 2) **PULL** 45 degree lat pulldown, 45 degree chin up (feet flat on ground, body completely straight on 45 degree angle while maintaining neutral curvature of the spine).
 - 3) **PULL** seated cable row (unsupported), seated row (with chest support), bench pull.
 - 4) **PULL** BB bent over row, 45 degree supported t-bar row, t-bar row (upper body 45 degrees at hips), 1 arm DB row (upper body 45 degrees at hips).
 - 5) **PULL** BB upright row, DB upright row.
- 1) **PUSH** standing military press, behind neck press, DB shoulder press.
 - 2) **PUSH** incline BB bench press, incline DB bench press.
 - 3) **PUSH** flat BB bench press, flat DB bench press.
 - 4) **PUSH** decline BB bench press, decline DB bench press.
 - 5) **PUSH** dips, bench dips.

THREE COMMON MISCONCEPTIONS

- 1) **“Dips” are a triceps exercise.** Yes dips involve the triceps, however, lets say you used 1&3 push and 1&3 pull as your compound upper body routine and an additional isolation exercise for your biceps and “dips” for your triceps. As you have added an isolation exercise for your biceps you should add an isolation exercise for your triceps, using “dips” for your triceps has added an extra downward rotation and depression, extra pectoralis major and anterior deltoid which will unbalance your routine.
- 2) **Because “seated row” and “chin ups” involve the back (latissimus dorsi), I can “bench press” 6 sets, “chin” 3 sets and “row” 3 sets.**
Yes “seated row” and “chin ups” involve the back (latissimus dorsi) however if you have 6 sets of protraction (bench press) you need 6 sets of retraction (seated row).
- 3) **“Shrugs” are great for building your traps.** Partly true although however there is more emphasis on levator scap than your upper trapezius, your upper trapezius is more of an upward rotator rather than an elevator. If you are going to incorporate vertical shrugs (elevation) into your training you will need to add a straight arm “chins” or “dips”(depression) into your training to balance your opposing muscle groups.

CONCLUSION

Now we have a better understanding of how the scapula, humerus and surrounding muscles work, writing and implementing a balanced upper body routine becomes quite simple using the 3 variations of our 5 push and 5 pull exercises. If however, you or your client have a shoulder injury, postural problem, or the sport you or your client is involved in predominately uses one type of upper body movement (e.g. base ball pitcher), then a balanced upper body routine may not be appropriate in which case your sports physiotherapist will be of help.