

An In-Depth Analysis of the Bench Press

By Bruce Algra

The free-bar bench press is considered the fundamental or foundation exercise for developing and strengthening the upper body muscles. Because it is a widely performed and crucial exercise component of any strength training program, this article will provide an in-depth look at how and why the exercise is performed correctly. Also presented will be an examination of the improper techniques commonly performed in strength training facilities nationwide.

Part One

The bench press is an exercise which

develops upper body strength and musculature. The specific muscles exercised are the chest (pectoralis major and minor), shoulders (anterior and middle deltoids), and the back of the arms (triceps brachii).

Modalities

The exercise can be performed with many different types of equipment. However, the free-bar is the most widely used apparatus in strength training facilities across the country and also is the most challenging and complex in technique. Therefore, the following information pertains to the free-bar

bench press. The principles and fundamental techniques described are appropriate to the exercise, however, regardless of the apparatus used.

The founding logic of proper technique is that every second spent performing the bench press exercise will produce maximal results. The muscles should have complete control of the weight at all times, whether the weight is being lowered or pressed up off the chest. By doing so, the lifter can be assured of achieving the greatest possible benefit from each repetition. Of equal importance is that proper technique prevents damage to the body that is trying to be improved. Complete control of the weight on the down-phase protects the rib cage and its fragile bones, as well as the ligaments, tendons, and muscles. Coaches and athletes should keep in mind that if the weight is out of muscle control at any time during the lift the desired results cannot be attained, time is wasted, and the body is susceptible to injury.

Preparation for the Lift

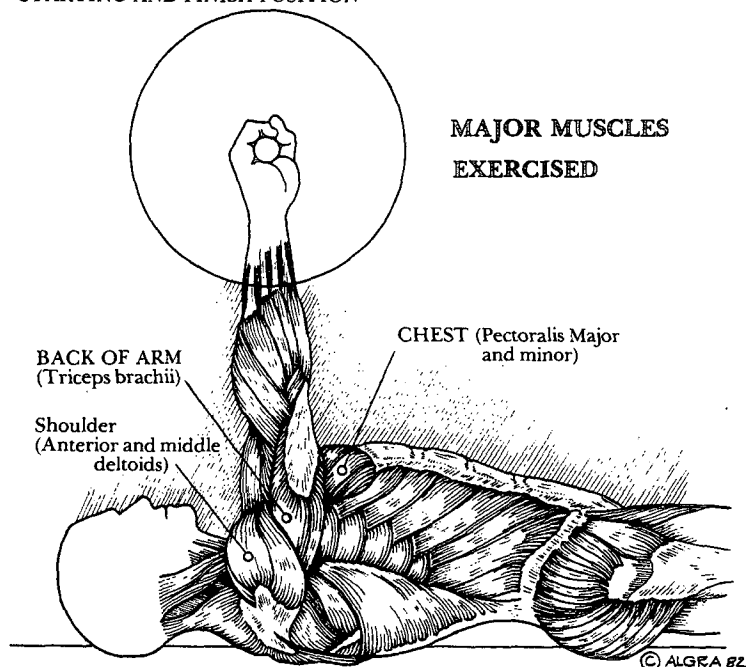
Before performing the bench press the lifter should see if the bar is balanced. This is important because the bar is symmetrical and the weight must be equally distributed on the support racks. Failure to check the weight placement on each set can result in an unbalanced bar which is awkward and uncomfortable to use. And, the lifter may be injured trying to compensate for this imbalance.

Balance is determined by the positioning of the iron plates. Each side should have the same amount of weight placed in the same sequence. The weight of the plates should decrease as they proceed toward the end of the bar.

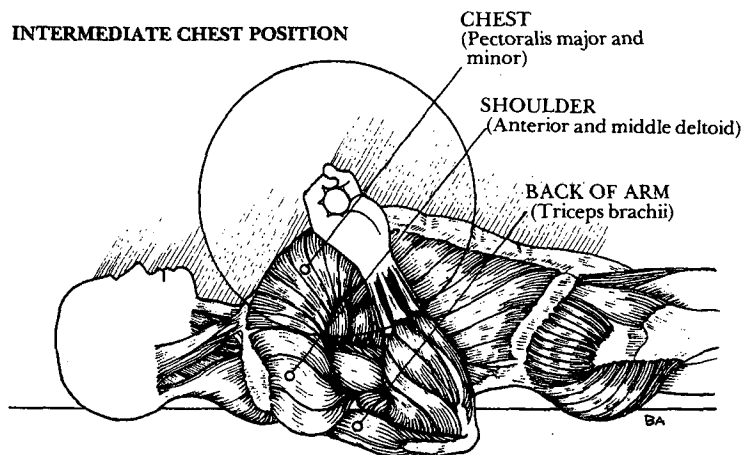
Ready Position

After checking for balance, the lifter positions himself on the bench in a position in which the bar is located above the eyes. Positioning the body too far under the bar makes the lift impossible to complete. Being too far away from the bar makes it very difficult to initially push the weight off the support racks. The back and buttocks should be firmly in place on the bench pad, with the feet placed flat on the floor.

STARTING AND FINISH POSITION



INTERMEDIATE CHEST POSITION



SIDE VIEW

All illustrations by the author.

Proper Grip and Hand Placement on the Bar

The position of the hands is important in successfully completing the exercise. The most important factor is to have the hands placed an equal distance from the center of the bar, ensuring proper balance before the lift begins. The easiest way to determine this is to use the rough part of the bar, the knurl, as the guide. After placing the left hand on the bar, the right hand is simply placed in the same position on the other side of center.

Determining the width of the grip should be accomplished by each lifter experimenting with what feels comfortable. The grip most commonly used places the hands slightly wider than the shoulders. Lifters with longer arms usually prefer a somewhat wider grip, while those with shorter arms often find that narrower grip provides the needed stability.

An additional factor in determining the proper grip is the purpose of the exercise. Advanced or experienced lifters place specific pressure on the chest muscles by changing the position of the hands. By adjusting the grip to a wider position, more pressure is placed on the outer part of the chest muscle and on the deltoids. As the hand position moves closer, so does the point of pressure put on the pectoralis major and minor. By using a grip with the hands very close, "close-grip," the pressure will be placed primarily on the inside of the chest and triceps muscles.

Proper Breathing

While in the ready position, just before lowering the bar to the chest, the lifter inhales. When the lifter is confident the weight will be pressed, the process of forceful exhaling begins. This sequence is important because it allows the rib cage to provide a stable foundation from which the chest, shoulder, and triceps muscles can create force to press the heavy weight. When the lifter inhales, the lungs fill up with air.

The Importance of a Spotter

The main purpose of the spotter is to help the lifter. The spotter usually does very little; but, when the lifter is becoming tired or has trouble pressing the weight up, it is more comforting for him or her to know that the spotter is there. It is important to remember that when spotting, the main function is providing assistance. The spotter should help the lifter by exerting only the minimum amount of pressure necessary to lift the bar, while the lifter does most of the work. This assistance is best applied to the center of the bar, with the spotter using only finger-tip or palm pressure

applied according to the lifter's needs.

When two spotters are used, they often pull unevenly, and tend to remove the entire weight from the lifter, rather than assisting the completion of the lift.

When it is not possible to lift with a partner, the following information can be a life-saver. If the weight becomes "stuck" on the chest, the lifter has two possible choices. The best way to remove the weight is to explosively push one arm up, causing the plates to slide off the opposite end. When this happens it will cause an immediate imbalance to occur and the bar will rotate off the chest. For this reason, collars should not be used when performing the bench press alone.

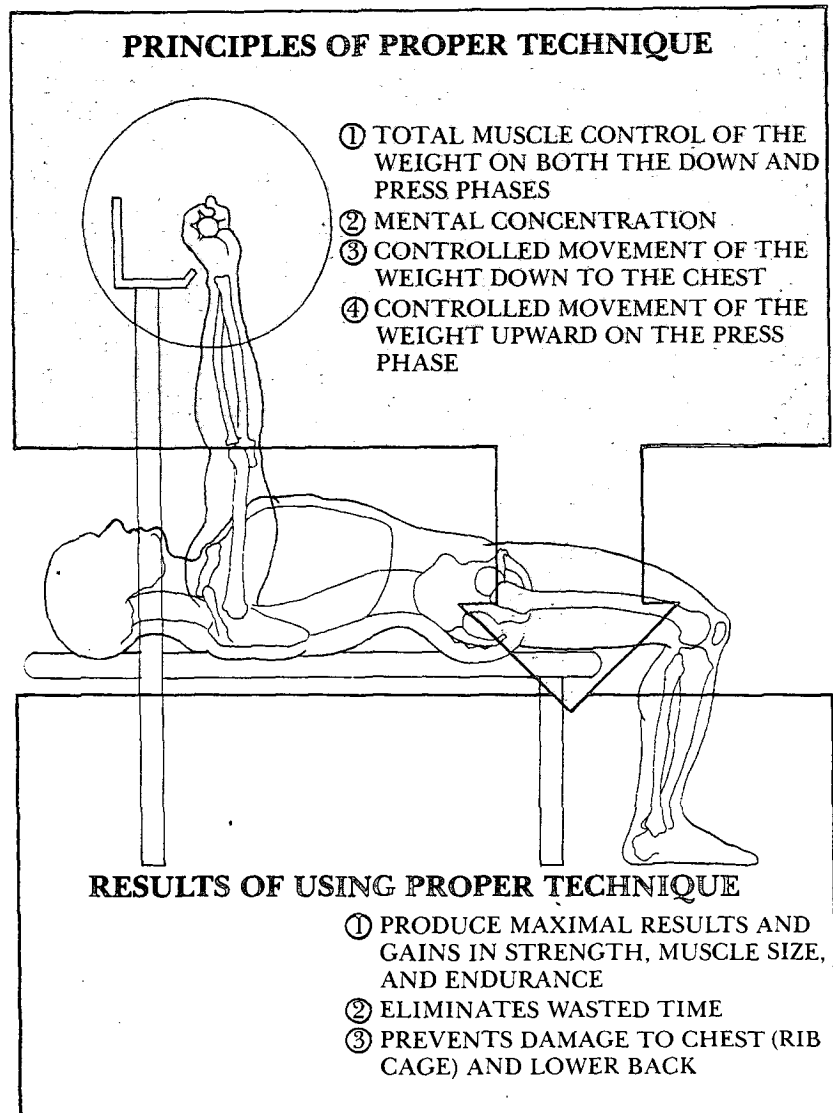
The other alternative is to quickly roll the bar from the chest to the waist area. This can be done only if the weight is considerably lighter because it will com-

press the rib cage and stomach area as the weight rolls down, making breathing difficult. Once the bar has reached the waist the lifter can breathe and, out of danger, roll the bar down the thighs onto the bench or floor.

The Total Sequence of the Exercise

The exercise begins as the lifter pushes the bar off the support racks to a starting position above the base of the neck. At this point the arms should be extended, with the elbows locked out. Inhale. The down-phase begins as the bar is slowly lowered, completely controlled by chest, shoulder, and arm muscle strength. The weight continues down until it "touches" or rests on the lower chest area, just above the xiphoid process. The pressing phase begins as

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the weight is pushed upward to the original starting position, in an even paced, controlled movement using chest, shoulder and arm strength. Exhale.

The Down-Phase (Lowering of the bar to the chest)

The down-phase is an aspect of the exercise which is often overlooked. Yet, it is the key to the successful completion of the bench press. The down-phase, or lowering of the bar to the chest, is vital because it allows the chest, shoulder, and arm muscles to prepare for the pressing phase. This action also ensures safety to the rib cage, and forces the muscles to work throughout the full range of movement.

The purpose of the bench press exercise is to develop and exercise specific muscles. This can only be accomplished if these muscles control the weight at all times. On the down-phase, this control:

1. Prepares the muscles for the pressing phase.
2. Attains maximal results and eliminates wasted time.
3. Prevents damage to rib cage (sternum).

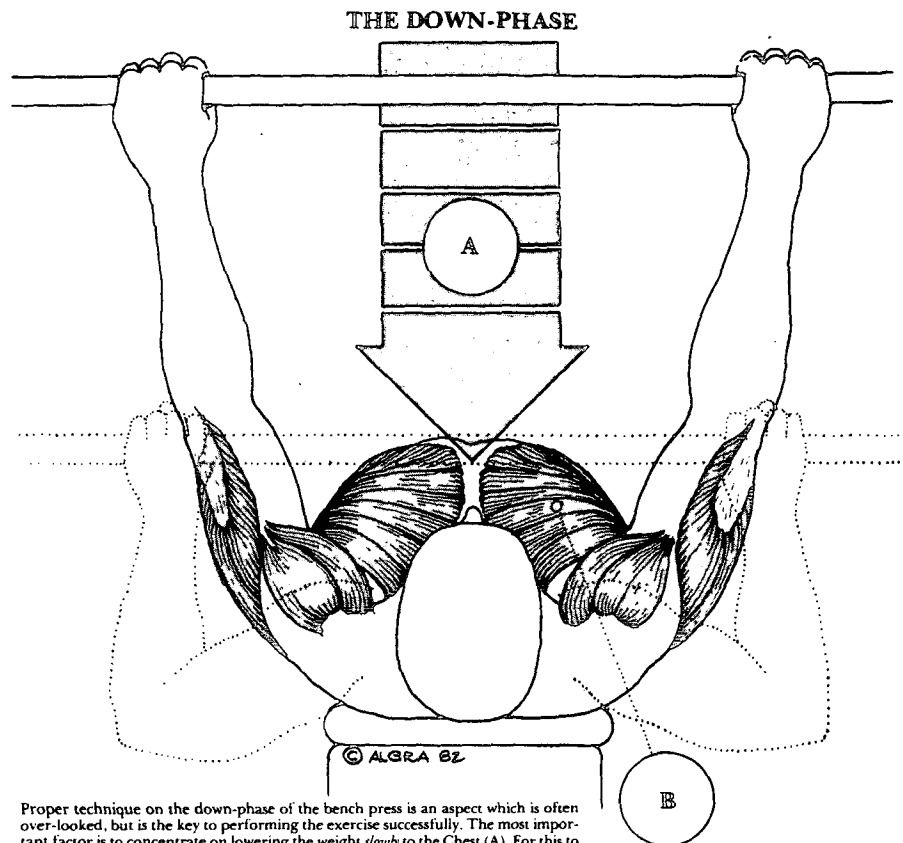
The Pressing-Phase (Pressing the weight from the chest to the locked out arm position)

The pressing phase begins when the bar reaches the chest. The weight is pressed upward from the bent arm position until the arms are fully extended with the elbows locked.

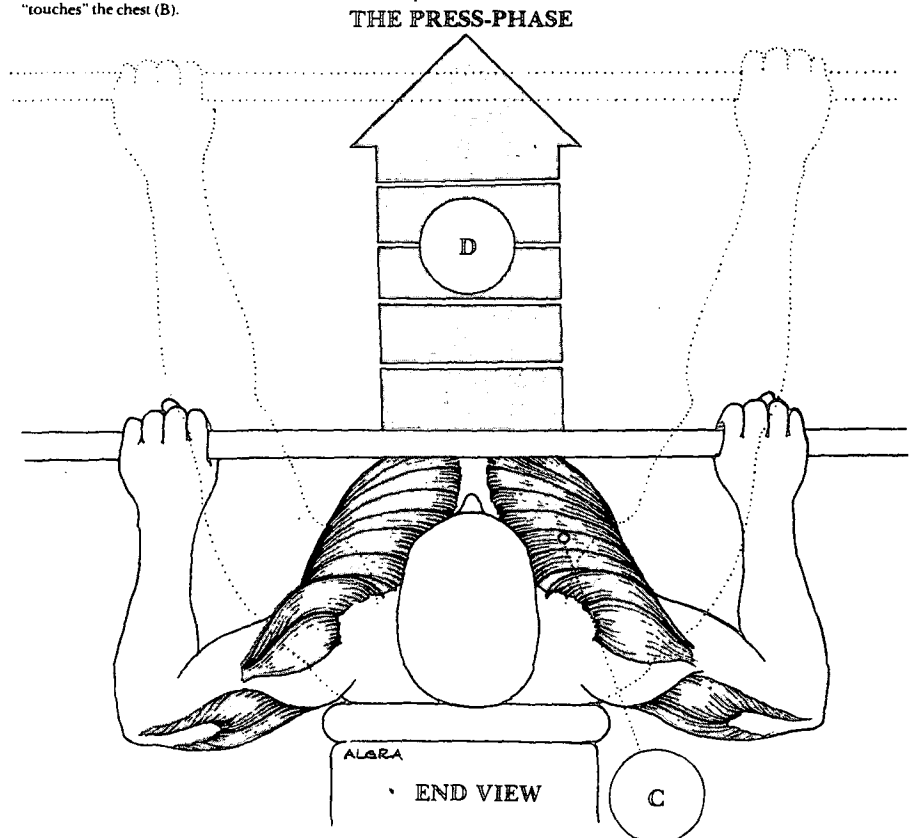
The most important principle of the pressing phase is to use a logical method of pressing the weight upward. The chest, shoulder, and arm muscles will develop quickly and safely if the bar is pressed upward in a deliberate manner. By doing so, the muscles will be forced to "pull" the weight up with pure strength. If the bar moves upward too quickly, momentum is created which results in less work for the muscles. This decreases the value of the lift. Whether the purpose is for athletic competition, bodybuilding, powerlifting, or recreational training, muscles can only develop optimally if they exert maximal force throughout the full range of motion.

Proper Line of Travel and Position of the Bar

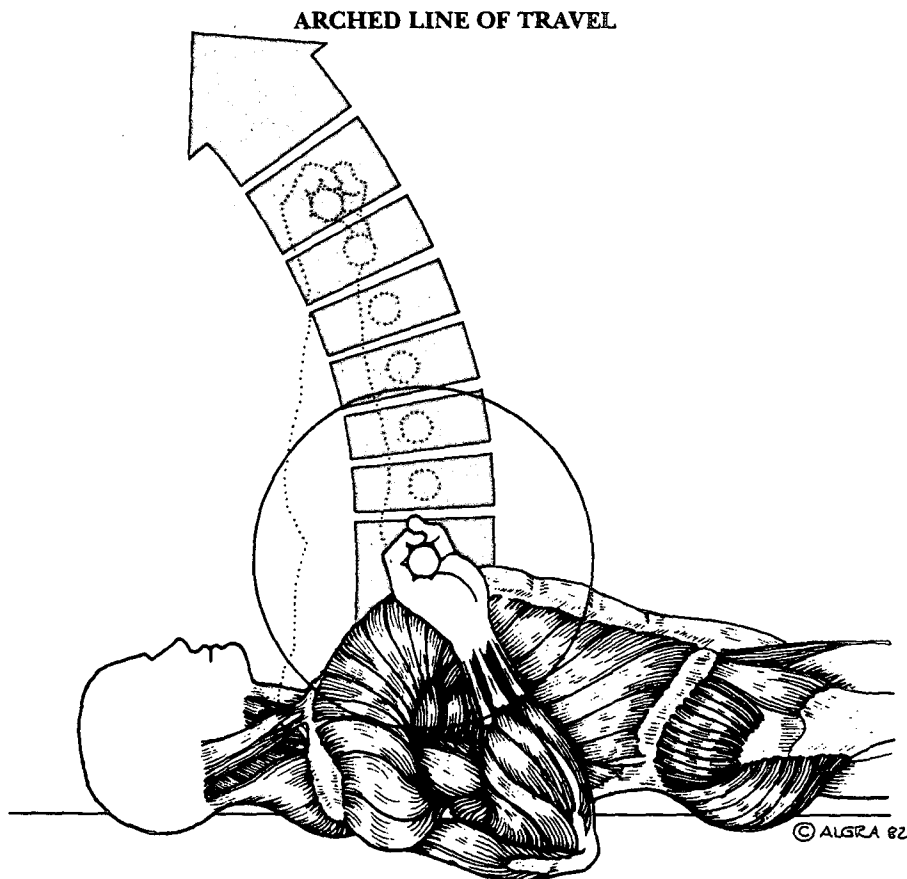
The bar should follow a naturally arched line of travel when the bench press is performed. When the bar is in the starting position, the weight is lo-



Proper technique on the down-phase of the bench press is an aspect which is often overlooked, but is the key to performing the exercise successfully. The most important factor is to concentrate on lowering the weight *slowly* to the Chest (A). For this to occur, the chest, shoulder, and arm muscles must have complete control until the bar "touches" the chest (B).



With the bar resting on the chest, or slightly touching, the press-phase begins. With chest, shoulder, and arm strength, the weight is pressed back up to the original starting position (C). The proper technique, like on the down-phase, is press the weight upward in a slow, even-paced, controlled manner (D).



For efficient and the most advantageous use of the chest, shoulder, and arm muscles, the bar should follow an arched line of travel. It can be seen from the side view that when the weight is pressed up off the chest, the bar arcs up and back toward the head until reaching the full-extended arm position (the bar is now located above the base of the neck). The bar follows the same path on the down-phase.

cated directly above the base of the neck. As it is lowered to the chest, the weight will move in an arc-path to the chest until the bar makes contact with the lower chest. This point of contact is very important. If the bar makes contact with the chest at a position lower than the one described, it will strike the xiphoid process, a thin projection of bone-like material that can very easily be damaged by the weighted bar. If the bar is higher than the ideal contact point, the muscles exercised are in a disadvantageous leverage position in which to press the weight upward.

When the bar is pressed upward, the weight must follow the exact line of travel as it did when lowered. This is especially important because the triceps muscle is greatly needed to assist the chest and shoulder muscles with "pulling" the weight up. If the bar does not follow this arc, the lift will probably be unsuccessful because the triceps are in a less advantageous position from which to pull.

Part Two

This section identifies and examines the two most commonly performed improper bench press techniques.

Bouncing the bar off the chest and the use of an arched back during the lift are techniques which can be seen in weight rooms nationwide. With competent instructors and coaches who expound the virtues or proper training, the attractiveness of these destructive practices can be reduced. **Lifters must understand, and be convinced that these practices are a waste of time and effort, and potentially very dangerous to their sternum, rib cage, and low back region.**

"Bouncing the Bar Off the Chest"

The most common improper bench press technique is "bouncing the bar off the chest." The bounce occurs when the lifter allows the weight to travel rapidly down the chest. The rib cage bends to absorb the impact and then rebounds, generating momentum upward and en-

abling the lifter to make up for a considerable lack of strength.

The problem occurs when the lifter begins the downward movement of the weight. As the weight is lowered to the chest it is allowed to move rapidly. This is due to a conscious lack of muscle control, and/or because the weight is simply too heavy. Once the weight is moving quickly, the outcome is inevitable, and the weight comes crashing down on the chest. The results of allowing this to happen are really quite frightening.

What Happens When the Bar Bounces Off the Chest?

The bar accelerates downward until it makes contact with the chest muscle and underlying rib cage. A great amount of force is directed through the chest muscle and absorbed by the rib cage and sternum. The heavier the weight bounced off the chest, the higher the risk of damage.

When viewed in section, the chest area is seen to be composed of skin, muscle, and bone. The ribs are delicate bones, and they can be bruised, cracked, or broken. Even more susceptible to injury is the sternum, the center segment of the rib cage which joins the ribs together. The critical factor in this chest construction is the thickness of the bone and its fragility. The actual thickness where the bar is likely to make contact is about $\frac{3}{8}$ " or less. If contact is made lower on the thinner xiphoid process the likelihood of damage is even greater.

Strength trainers must understand that the chest is not a bouncing pad for the bar. The main function of the rib cage is to protect the heart and lungs. This role is jeopardized by the impact created during the "bouncing" activity. Discontinuing this practice, and lifting properly, assures the safety of the body the lifter is trying to improve.

Results of the Bounce Off the Chest

Aside from the possible damage to the sternum and rib cage, the practice of bouncing the bar off the chest has additional negative effects. When the bar rebounds off the rib cage, the bounce generates momentum upward, reducing the work load of the muscles. Because the chest, shoulder, and arm muscles are exerting little force, much of the potential development is wasted.

The loss of muscle control and potential development manifests itself in three specific ways. First, because the chest, shoulder, and arm muscles are

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“BOUNCING THE BAR OFF THE CHEST”

AREA TAKING SHOCK OF BOUNCING THE WEIGHT

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exerting little force on the down-phase and again during the period when momentum continues from the “chest rebound,” a great deal of time is wasted.

Second, because the bar is bounced, rather than pressed off the chest, the lifter is losing a critical range of strength development. Since little strength improvement takes place in the range where the bounce occurs, graduation to heavier weights becomes impossible (unless the heavier weight is also improperly bounced through the undeveloped area).

Finally, bouncing the weight off the chest inhibits the normal strength gains in the supportive structures for the muscles exercised in the bench press. Injury to the tendons, insertions, or origins of the chest, shoulder, and triceps muscles becomes a serious concern. Muscles are only as strong or efficient as the supportive structures.

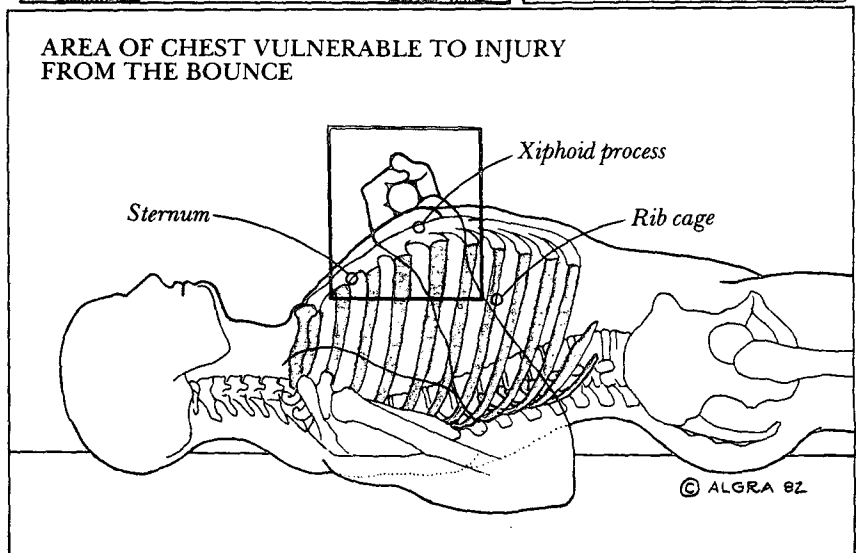
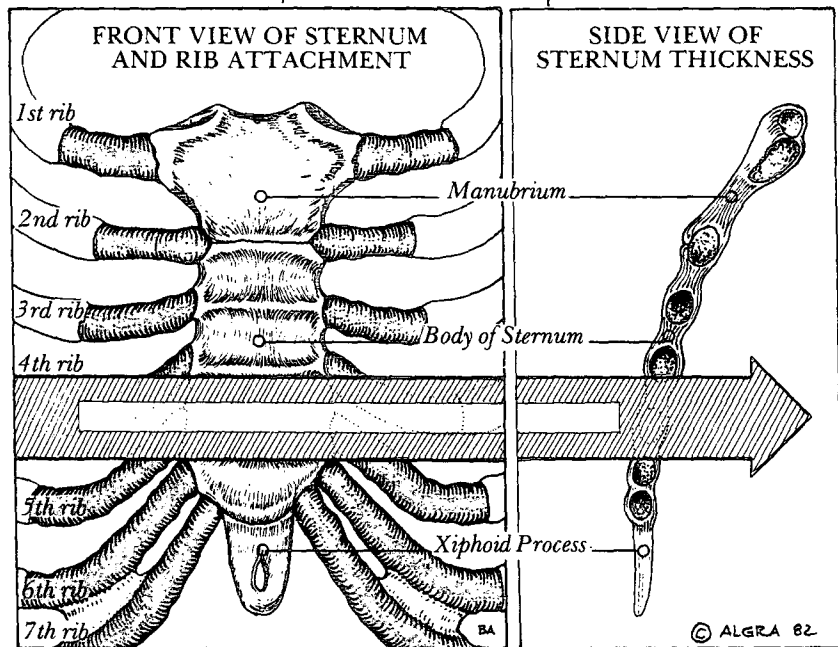
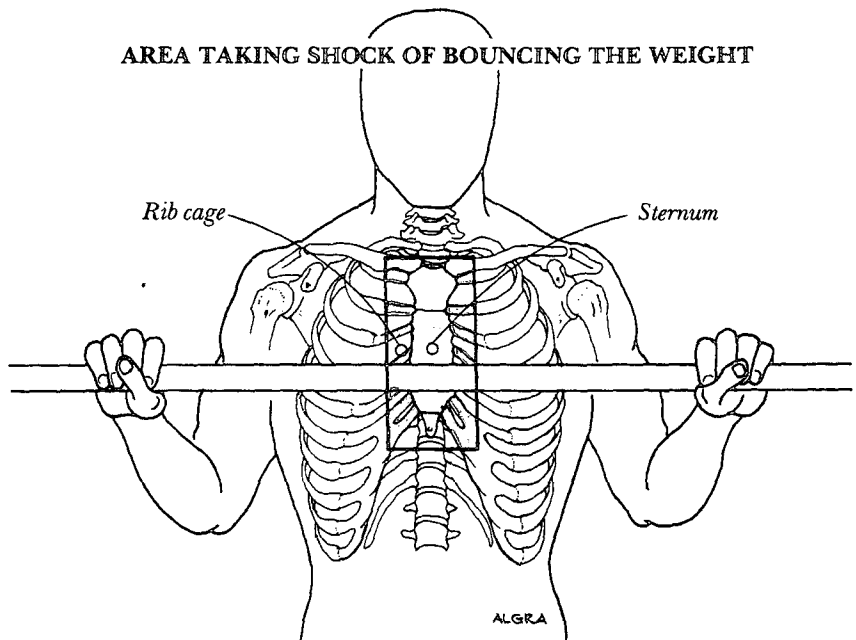
Correcting the Problem

Correcting the problem of bouncing the bar off the chest starts with the lifter wanting to change his or her technique, and understanding that change to proper technique is the most productive and healthy method. Strength trainers have difficulty changing because it is hard to break bad habits. This is compounded for men because of their ego hang-ups. After bouncing incredible amounts of weight off one’s chest, it is a difficult adjustment to be content with lifting considerably less to perform the exercise properly.

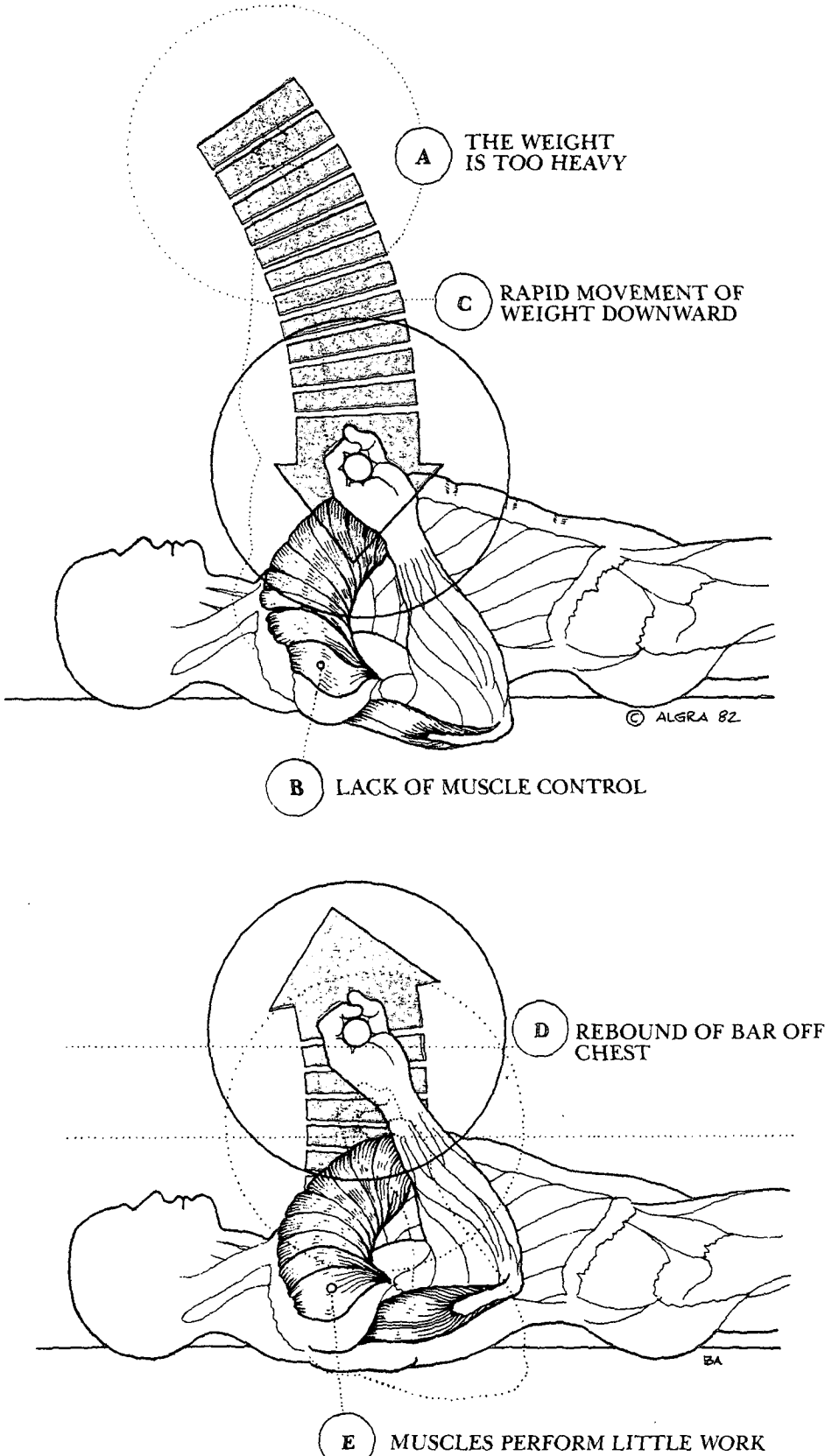
Once the problem has been identified, the best way to eliminate the “bounce” is to work on proper technique using a very light weight. The main idea is to perform the exercise properly and not worry about how much weight is being lifted. The bar should be lowered slowly, giving the muscles a chance to have complete control. The weight continues down until it only touches or rests on the chest. With concentration, regular practice, and patience, the lifter will feel confident during the lift, develop true upper body strength, and be free from injury.

“Arching of the Back”

Arching of the back is another improper technique commonly performed by men in weight training rooms everywhere. This problem develops when the lifter arches the back by bringing the buttocks off the bench. This action is another “cheating” movement



WHY THE BOUNCE OCCURS



Using the improper technique of bouncing the weight off the chest results from three factors that occur almost simultaneously. The first problem is the lifter uses too heavy a weight (A). This is compounded by lack of chest, shoulder, and arm strength (B). Due to these two factors, the weight is basically out of control and rapidly moving downward (C). Therefore, the weight comes crashing down on the chest, and bounces or rebounds upward (D). Momentum carries the weight upward and takes the pressure off the muscles through this critical range of strength development (E).

which assists the push of the weight up off the chest to the press position. This abstraction is easily recognizable and appears contorted even to the untrained eye. The stress put on the lower spine and potential for injury are quite obvious.

How and Why the Arch Occurs

The technique of arching the back can again be attributed to poor instruction and a delicate ego which lures the lifter to attempt a weight which is too heavy to control.

The problem occurs when the lifter lowers the bar with too much weight down to the chest, and then initiates the press by arching the back upward, lifting the buttocks off the bench pad. Simultaneously, the heels of the feet are raised off the floor, making the toes the foundation from which to push and create the forceful arch.

As a result of this action the body develops an exaggerated arc which extends in a line through the tip of the shoulder blade, following the spine, and through to the knee joint.

When the body is arched upward, the force generated by the hips, buttocks, and chest assist the muscles by supplying the extra impetus needed to press the weight up.

Results of Arching the Back

Strength trainers using this technique are forgetting that the bench press is designed to have the bar lowered and pressed up using only chest, shoulder, and arm strength. The use of the back arch technique indicates the lifter is not strong enough to press the weight up correctly. Therefore, more of the body is used to overcome the lack of strength. By cheating, the possibility of injury increases while the development of the desired muscles is reduced.

The real problem of using this technique is that it puts tremendous pressure on the lower spine. The spinal column is made up of 24 separate vertebrae linked together with spinal discs, which serve as shock absorbers. These vertebrae make the spine flexible in design, but unfortunately it was not designed to be "arched" in such an exaggerated position. When the lifter is arching the back, tremendous stress and pressure is placed on each intervertebral junction, especially in the lower back region. If the simultaneous expansion and compression stresses become too great, a potentially serious lower back injury can re-

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sult. And, as many people with lower back problems are painfully aware, once the lower back has been damaged, it is a painful problem for life. Is using this improper technique really worth the risk?

Arching the back cheats the muscles of the opportunity to develop in the quickest and safest possible manner. Muscles can improve only if they are given the chance to work. When the back is arched it helps take the pressure off the muscles the lift is designed to develop. This, of course, defeats the purpose of performing the exercise.

When the spine is arched upward the chest and rib cage also change position by tilting upward. When this happens, the arms also change position and are now in more of an advantageous leverage position to press the weight up. With the chest being at a higher level the bar does not have to travel so great a distance. All of these changes in body position make it considerably easier to lift the weight, therefore reducing muscle development.

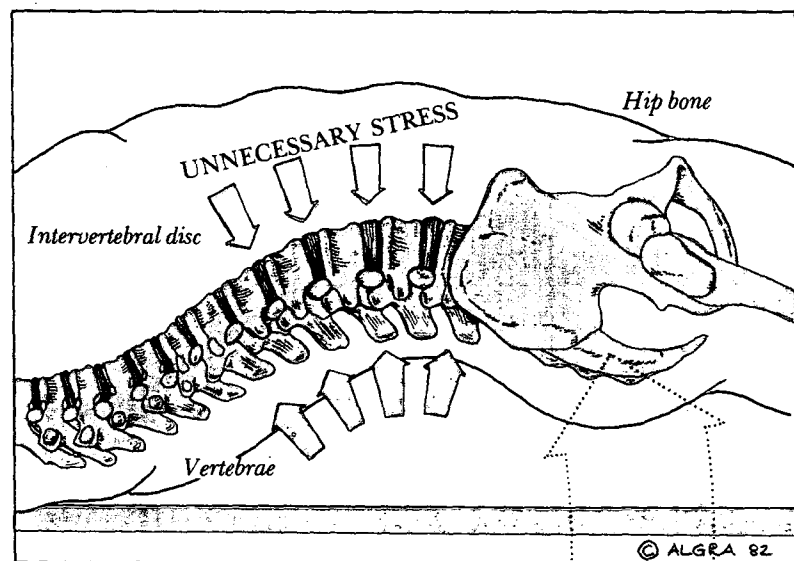
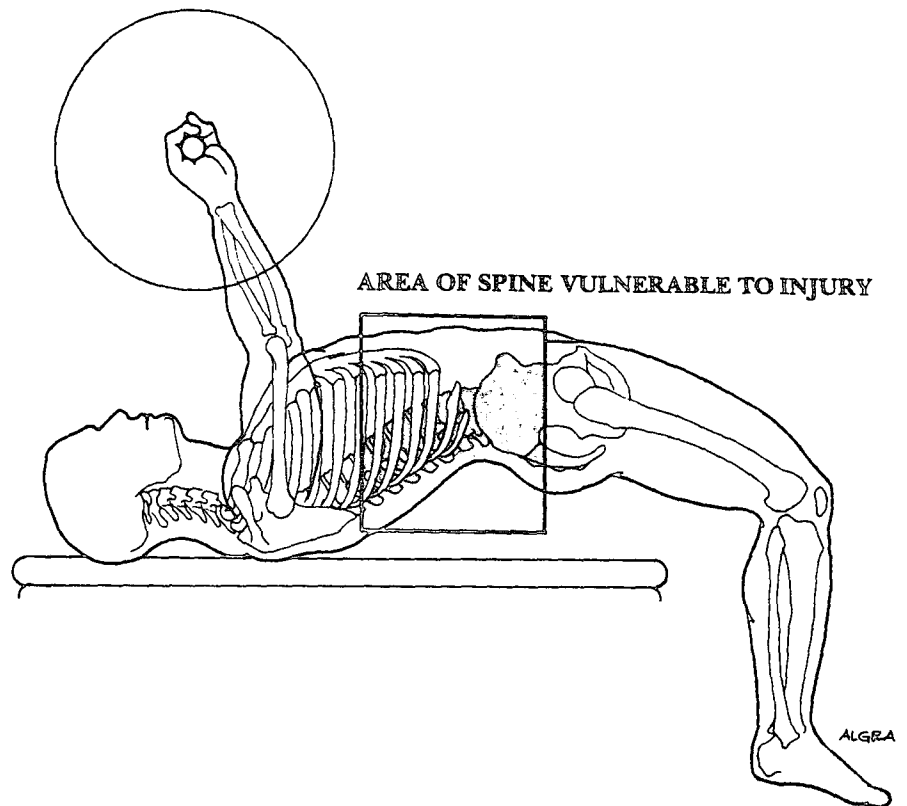
Correcting the Problem

Correcting the problem of arching the back is very similar to eliminating the bounce of the bar off the chest. The lifter can only break the habit by practicing proper technique with a lighter weight. By using a lighter weight, the muscles have the strength to press the weight up, eliminating the need for extra body momentum to assist the muscles. The most important aspect of breaking the habit is for the lifter to consciously keep the buttocks firmly on the bench with the feet flat on the floor.

An alternative method which forces the lifter to maintain proper position is to perform the bench press with the feet placed up on the bench pad, with the knees bent up. The back will now be flat on the bench pad and since the feet are no longer on the floor they cannot be used to create the base of support for the arch.

Once the change from the arching technique to using only upper body strength has been made the lifter will be able to develop very quickly, with confidence that proper technique will eliminate potentially dangerous stress on the body. •

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"Arching of the back" forcefully places the spinal column in an undesirable exaggerated position, which creates dangerous pressure on the spinal discs and adjoining vertebrae. It can be seen from the side view illustration that the spinal column is simultaneously compressed and expanded. This compressing and expanding pinches the intervertebral discs and potentially can develop into a herniated disc condition.