

What injuries are attributed to the bench press?

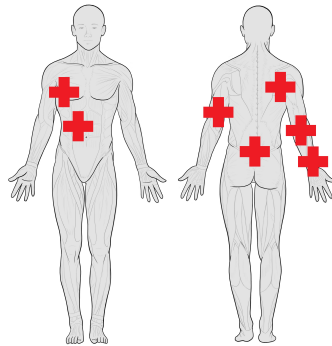
The bench press is a very popular upper body weight-training (WT) exercise primarily used to build the *pectoralis major* chest muscles (commonly called “pecs”) and strengthen associated musculoskeletal (MSK) tissues. It can also strengthen the upper shoulder (deltoids) and upper arm (triceps). In certain cases, however, the stress on shoulders, arms, and back may lead to injury.¹⁻⁷

Most **bench press** injuries are to the **upper body**.¹⁻⁷ Injuries occur either instantly from abrupt high force movements ([acute traumatic injuries](#)) or gradually from repeated lower intensity movements ([overuse injuries](#)).^{3,8} Repeated or untreated injuries can lead to chronic MSK conditions.^{3,4,8}

The most frequently injured area is the **shoulder**.¹⁻⁶ Though less frequently reported, triceps, clavicle, chest, and lower back are also injured.¹⁻⁶ Damage occurs to **muscles and tendons** including the pecs that extend across the chest, the triceps in the upper arm, and the stabilizing rotator cuff in the shoulder. Joint damage to the shoulder (e.g., acromioclavicular, glenohumeral) is also common.¹⁻⁶

Acute injuries associated with the bench press include:

- Ruptures, tears, and strains of muscles or tendons
- Joint dislocation, sprains, and nerve impingement
- Fractures (clavicle, rib)



Overuse injuries and chronic conditions include:

- Tendinopathy, bursitis (shoulders, elbows)
- Low back strain/pain
- Bone damage to clavicle (stress fractures and osteolysis)

Why do bench press injuries concern the Army?

Strength training is an important element of a Soldier’s fitness program.⁹ The Army does not require the bench press for training or testing. Despite alternative exercises, many Soldiers choose to bench press given its popularity as a major powerlift and the wide availability of equipment. Due to individual factors, there is no single best technique for this lift. Though certified personal instruction is best, general guidelines may help reduce some of the risks.

Severe injuries such as *pectoralis major ruptures* can require hospitalization, surgery, many months of rehabilitation, and possible permanent loss of strength.^{8,10,11} Though not common, these injuries are increasing with the growing popularity of WT. Even more concerning are the less severe MSK injuries resulting from the bench press that still require physical therapy, medication, and temporary physical duty restrictions. These contribute to over 95% of costs and lost-duty time from bench press injuries.⁸



Photo courtesy of APHC

How are bench press injuries caused?

The bench press involves laying with your back on a bench while raising and lowering a weighted bar. This action puts your shoulder in an “at risk” high-five position, with heavy weights putting pressure on the traditionally non-weight bearing shoulder joint.³⁻⁶ Acute injuries often occur when a sudden imbalance on one side (usually while lowering the barbell) causes too much force for tissues to react properly.^{3,6,10,11} This can cause tearing of muscles, tendons, and ligaments. The dropping or crushing of weights on the chest can crack ribs and has even caused suffocation. Activities such as the benchpress cause small tears in MSK tissue that must be repaired and remodeled to build strength. Overuse injuries occur when the body has inadequate time to repair this damage.¹² This can result from using weights that are too heavy, bench pressing or working out the same muscles too frequently or for too long, and other factors (see below).

What can increase risk of bench press injuries?

Though quantitative evidence is limited, various observational and descriptive studies¹⁻⁸ suggest the following may predispose Soldiers to bench press injury:

- Inappropriate training principles: Insufficient warm-up, lack of a knowledgeable and capable spotter, and/or excessive repetitions and weight.
- Improper technique: Uncontrolled movements, over-arching the low back, placing hands too wide or too narrow, lowering elbows below the chest, locking elbows, and bouncing the weight off the chest.
- Muscle fatigue: Tends to shorten joint movement reducing the efficiency of the body’s movement.
- Imbalanced training: Over-training to build major muscles (pectoralis major, deltoid, triceps) while under-training stabilizing muscles (rotator cuff) increases joint instability.
- Anabolic steroid use: Building muscle power beyond the tendon capacity increases susceptibility to tears.

How can bench press injuries be prevented?

Because there are many individual variables associated with weight lifting (e.g., experience, training goals, body build, prior injuries), there is no single perfect technique or training program that best suits everyone. Additionally, evidence supporting the effectiveness of specific procedures to prevent bench press injuries is limited. While individuals using free weights are advised to consult with an Army Master Fitness Trainer or Certified Fitness Trainer** for individualized training guidelines and program design, general best practices for preventing injuries recommended by medical and fitness professionals are provided below:

Suggested Guidelines to Avoid Bench Press Injury

- 1. Warm-up.** At the start of your workout, complete 10 minutes of light cardio and/or moving stretches (e.g., swinging arms in different directions) to increase your blood flow and warm up joints. Since it is also recommended to incorporate movements similar to the exercises planned during the training session, complete 1–2 sets of the bench press with light weights before your training sets.
- 2. Use a knowledgeable and capable spotter.** Choose a spotter who knows how to help and is capable of lifting the amount of weight being used. Ensure that your spotter knows how many repetitions you plan to complete and how much weight you will be using. Spotters should help during initial hand-off of the weight, remain ready to assist during the set with one hand over and one under the bar, and assist with controlling the release of the weight onto the rack at the completion of the lift.
- 3. Select an appropriate weight.** When the shoulder is placed in the at-risk position during the bench press under heavy loads (70–90% of your one-repetition maximum), you are at risk for injury. Consider this when choosing a weight that you are capable of lifting for the desired number of repetitions and/or sets. Over time you will gradually be able to increase the amount of weight.
- 4. Secure weight on the bar with weight clips or collars.** A slight tilt or imbalance from a slipping weight can cause injury; therefore, it is important that the weight plates remain in place. Lightweight metal clips/collars can be used to prevent weight plates from shifting or slipping off the bar during a lift and are required by most fitness facilities.
- 5. Ensure proper technique.** The best bench press technique for you should be based on your body morphology (e.g., height, arm, and torso length), personal fitness and strength level, flexibility, and prior injury history. It is, therefore, best to obtain personalized instruction from a qualified trainer.**
Some general bench press recommendations (for flat position) include:
 - Keep feet on ground and back flat on bench (don't arch back).
 - Select grip width best suited for you – start about 1.5 hand-widths outside shoulders, adjust in or out (too wide can increase shoulder pressure, while too narrow can injure elbows or triceps).
 - Activate your abdominal muscles and lift bar while exhaling, extending elbows to a slight bend (don't lock).
 - Inhale while slowly lowering bar to chest – elbows should not dip below chest or bench.
 - Use slow and controlled movements, avoid holding breath or bouncing weights off chest.
 - Incorporate other exercises to strengthen smaller muscles that support the shoulder joint (e.g., rotator cuff).
- 6. Allow for muscle recovery.** Appropriate rest intervals between sets depend on training goals, but it is generally recommended to rest for at least 2–3 minutes between each set. Allow at least 48 hours between weight-training sessions for any single muscle group.
- 7. Use alternative equipment and/or exercises.** Instead of a barbell, use a bench press machine (using a pin to select stacked weights) or bench press with dumbbells (shown on right). Machines provide support and predetermined movement patterns to prevent imbalance. Dumbbells typically involve lighter weights and promote correction of imbalances since each side moves independently. Because these use similar movement patterns and the same muscle groups there are still risks of shoulder injuries. Push-ups, crossover flies (machine or resistance bands), and chest dips are also alternative exercises to strengthen the upper body without the use of heavy weights.



Dumbbell Chest Press
Photo courtesy of Elizabeth Pinyan

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** E.g., ACSM Certified Personal Trainer® (CPT), ACSM Certified Health Fitness SpecialistSM (HFS), ACSM Certified Group Exercise InstructorSM Certified Strength and Conditioning Specialist®, NSCA-Certified Personal Trainer® (NSCA-CPT), NSCA Tactical Strength and Conditioning-Facilitator (TSAC-F).
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