

Navy Physical Training Series

Contraindicated Exercises



Assisting Navy health & fitness professionals in providing safe & effective physical conditioning instruction to Sailors.

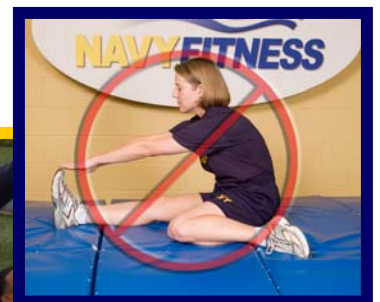
(NMCPHC – TM 2008XXXXXXXXX)



Contraindicated / Inefficient Exercises:

The **Navy Physical Training Series – Contraindicated / Inefficient Exercise Section** is a tool designed to assist Navy health and fitness professionals in providing safe and effective physical conditioning instruction to Sailors. This product may be utilized by health promotion educators, Independent Duty Corpsmen (IDCs), installation / operational platform fitness personal training staff, functional training instructors, or command fitness leaders during the development and implementation of a physical conditioning program.

Industry guidelines and physical fitness subject matter experts in the Navy and the civilian fitness industry served as references for the information utilized during the development of all primary sections included in the **Navy Physical Training Series**.



Exercise: Hurdler's Stretch

Objective: To stretch the hamstring muscles

Contraindication: The Hurdler's Stretch places the knee in a rotated position, which stresses the flexed knee. The hurdler's stretch is apt to stretch the ligaments and capsule and damage the cartilage. It may also cause strain in the groin muscles.

Alternative: Instead of bending the knee of the opposite leg back and putting the foot behind you, bend the knee in front of the body and bring the foot toward the inner thigh of the opposite leg.



Video Demonstration: Available on downloaded .swf file.

Exercise: Quadriceps Stretch with Both Knees Flexed

Objective: To stretch the quadriceps muscles

Contraindication: The quadriceps stretch, with both knees flexed, overly stresses the knee joint which could lead to injury.

Alternative: Lying on your stomach, reach around with one arm and grasp the same foot (i.e. reach with the right hand and grasp the right foot). Gently pull the foot toward the buttocks until a stretch is felt in the front of the right leg. To put less strain on the neck, turn your head to look toward the same side as you are reaching (to avoid putting your face on the floor you can place the opposite hand under the head. For example, look toward the right and place your left hand under your head). When you switch sides, change the direction you are looking.



Video Demonstration: Available on downloaded .swf file.

Exercise: Seated Hamstring Stretch with Both Legs Extended

Objective: To stretch the hamstring muscles

Contraindication: The seated hamstring stretch with both legs extended overly stresses the lower back if the hamstrings are short and/or tight. If performed only on rare occasions as a test, there is less chance of injury than if incorporated into a regular exercise program.

Alternative: Perform the modified Hurdler Stretch with one leg bent in front of the body and the foot toward the inner thigh of the leg you are stretching.



Video Demonstration: Available on downloaded .swf file.

Exercise: Standing Hamstring Stretches

Objective: To stretch the hamstring muscles

Contraindication: By bending forward in an unsupported position and flexing (rounding) the spine, the entire weight of the upper torso is placed on the low back extensor muscles. These muscles are not designed to support this amount of load on their own. Additionally, if the knee joints are “locked out” it can cause hyperextension of the knee joint and place unnecessary stress on the ligaments of the knee.

Alternative: Perform the modified Hurdler Stretch with one leg bent in front of the body and the foot toward the inner thigh of the leg you are stretching. Better hamstring would be the figure 4 stretch.



Video Demonstration: Available on downloaded .swf file.

Exercise: Placing the Neck into Extreme Forward Positions (Overhead Bicycle, Yoga Plow)

Objective: To loosen up and stretch the muscles of the neck

Contraindication: Two classic exercises press your neck into extreme forward positions: the **Overhead Bicycle** (where you churn your legs in the air with all your weight on your shoulders and neck) and the **Yoga Plow** exercise. These exercises both flex the cervical spine in an extreme fashion, putting pressure on the discs and overstretching the long ligament down the back of your neck. Additionally, the weight of the legs is supported by the low back muscles, which were not designed for this kind of stress and load.

Alternative: There are no safe alternatives for these exercises.



Video Demonstration: Available on downloaded .swf file.

Exercise: Neck Hyperextension and Neck Rolls

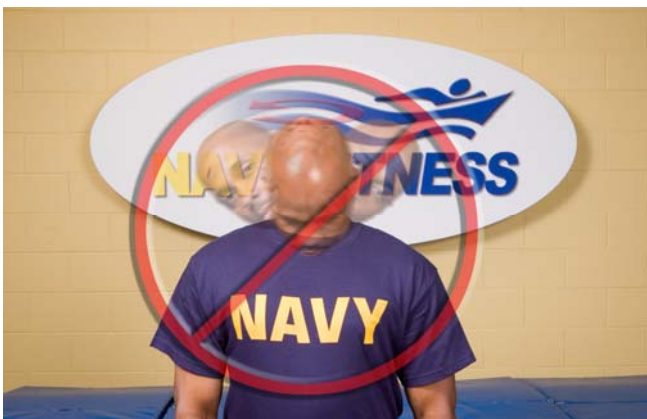
Objective: To loosen up and stretch the muscles of the neck

Contraindication: Tipping the head backward during an exercise, such as is done in neck circling, can pinch anterior nerves in the neck and at the base of the skull, grind on disks, and produce dizziness. The vertebrae of your neck are not shaped for motion through a circular path. Neck rolls (head rolls) are bad to the neck over time. **As a general rule, exercises that hyperextend the neck should be avoided and full neck rolls should be avoided.**

Alternative: Stretch the neck by tilting the head forward and dropping the chin toward the chest. Hold that position for a count of 10 or 15. Also try tilting the head to the side and moving the ear toward the shoulder, then hold that position for a stretch before repeating on the other side.



Video Demonstration: Available on downloaded .swf file.



Video Demonstration: Available on downloaded .swf file.

Exercise: Donkey Kicks

Objective: To strengthen the glutes and hamstrings.

Contraindication: Donkey Kicks place excessive stress on the lower back because the back is hyper extended during the exercise.

Alternative: This exercise can be safely modified by resting on your elbows instead of your hands and making sure to not hyperextend (arch) your back. Ensure that your spine is in neutral alignment by making an imaginary line from your ears to your shoulders to your hips. Also, keep the knee of the leg you are lifting bent during the entire exercise and focus on “pressing” the bottom of your shoe upward, instead of up and out. In other words, do not straighten the leg when you lift it up toward the ceiling. Avoid letting the torso rotate with the kick, which indicates that you are most likely lifting the leg too high.



Video Demonstration: Available on downloaded .swf file.

Exercise: Deep Knee Bends & Starbursts

Objective: To make a squatting movement more intense.

Contraindication: Deep knee bends, with or without weights, places the knee joint in hyper flexion. This tends to “wedge it open”, which stretches the ligaments, irritates the knee, and possibly damages the knee cartilage. “Starbursts” involve dynamic deep knee flexion, and they are highly contraindicated.

Tibio-femoral joint contact area decreases to 55% as knee is flexed to 90 degrees

- Pressure = Force / Area
- Less contact area = greater pressure in one location
 - Think about getting stuck by a needle as opposed to a finger with same force!
- Possible long-term degenerative changes, i.e. osteoarthritis

Alternative: The alternative to deep knee bends is to not squat as deeply, trying to stop at 90 degrees (hips do not drop below the knees). For starbursts, perform the movement without squatting so deeply to start (again, hips do not drop below the knee).



Video Demonstration: Available on downloaded .swf file.

Exercise: Deep Knee Lunges

Objective: Strengthen the quadriceps, hamstrings and gluteals

Contraindication: When the knee joint breaks a 90 degree angle, that is, the knee joint moves past the lower portion of the leg, it places tremendous stress on the knee joint.

Alternative: Keep the knee over the foot when performing lunges; do not let the knee move past the toes.



Video Demonstration: Available on downloaded .swf file.

Exercise: The Windmill Exercise

Objective: Dynamic warm-up; to stretch and strengthen the muscles of the torso

Contraindication: Unsupported forward flexion with rotation places a tremendous amount of stress on the spine and supporting muscles. As seen in the straight-leg standing hamstring stretch (reviewed above), unsupported forward flexion means the smaller muscles of the low back are responsible for supporting the entire weight of the upper body. The Windmill Exercise also adds rotation in this flexed position, which can put excessive twisting forces on the spine, in an already compromised position. Additionally, by “fixing” the legs in a straight position and then adding movement in the upper body, there is a greater chance of hyper extending and straining the knee joints.



Video Demonstration: Available on downloaded .swf file.

Exercise: Swimmers Arm Stretch

Objective: To stretch and increase range of motion of the chest, shoulders and arms

Contraindication: Typically this move is performed in a ballistic manner, with the exerciser “pulsing” the stretch upward. Ballistic/bouncing movement should always be avoided as they actually induce the stretch-reflex (which can produce tightening of the muscle instead of helping it to release.) The price of this stretch can be shoulder instability and predisposition to long term injury. Also, as the photos show, performing this exercise with the legs straight puts a lot of strain and stress on the low back.

Alternative: Perform the standing doorway chest stretch, or if you do not have a doorway, any type of wall or column can be used. To stretch both sides at the same time, step with one foot forward into the doorway and place your forearms on either side of the door frame, elbows bent up to 90 degrees. Lean forward through the doorway until you feel a gentle stretch on the muscles of the chest and front shoulder. Release and change legs then repeat. To perform one side at a time, follow the same instructions but just use one arm against the wall or pole. In both examples, be sure to keep your shoulders pressed down away from your ear, and try to get a wide positioning of the elbows (in other words, the stretch is more effective if the elbows are farther out from the body, rather than tucked in close).



Video Demonstration: Available on downloaded .swf file.

Exercise: Flutter Kicks

Objective: To strengthen the abdominals

Contraindication: Flutter Kicks impose a high level of stress on the muscles of the low back and the neck. The majority of people do not have the abdominal strength or body awareness necessary to maintain core stabilization and support both legs extended and lowered at the same time. This results in the back and neck arching (hyper extending). Therefore, as you extend and lower both legs out from the body the muscles of the low back have to work to keep the back from hyper extending, and the neck muscles are also working harder to maintain a neutral spine.

Alternative: “Dead Bugs” are a modified version or flutter kicks that use one leg at a time and incorporate the upper body as well. This exercise will challenge the abdominals and work the opposing sides of the body simultaneously, a function your body utilizes in everyday motion (i.e. walking). To perform, lie on your back with your legs in the air, knees bent to 90 degrees, hands resting on the thighs. Contract the abdominals and raise the shoulders, neck and head slightly off the ground so you are looking toward the ceiling above your knees (do not look straight up to the ceiling). Start to move your legs one at a time, extending one leg out away from the body while the other stays bent at 90 degrees. The hands follow the legs, so when the right leg extends the right arm lowers and the left leg and left arm will remain close to the torso. Start small with the arms and legs not moving much, then progress to fully extending one leg and reaching the opposite arm overhead.



Video Demonstration: Available on downloaded .swf file.

Exercise: 8 Count Body Builders

Objective: To strengthen the “core”.

Contraindication: This exercise can cause increased compression on the spine, fractures and stress reactions in the body, as well as muscle strains resulting from hyperextension of the spine.

Alternative: There are a number of exercises that can strengthen the core safely and effectively without putting undue pressure on the spine:

- **Plank:** Rest your body weight on your elbows and your toes, drawing your abdominals in by compressing/tightening the muscles (not by “sucking it in”). Maintain a straight line from the ears through the shoulders to the hips and ankles. Make sure the elbows are under the shoulders and the shoulder blades are pulled back (do not round the upper back). Maintain a neutral neck by looking at the ground slightly in front of your hands. Depending on fitness levels, the exercise can be modified up or down. The typical line of progression is as follows, from easiest to most advanced: knees down, on your toes but feet wide, on your toes with feet together, on your toes with one foot down and the other “hooked” behind the foot that’s on the ground (note: be sure to change legs).
- **Side Bridges:** Similar to the plank but performed facing the side. Place one elbow under your shoulder and line up your body in a straight line. For beginners, place the knees on the ground.
- **Superman:** Lying on your stomach with arms and legs extended, simultaneously reach out, trying to get your fingers and toes as far apart as possible. Do not focus on lifting up but rather lengthening your body as long as you can. The arms and legs will naturally lift off the floor as you reach. Also, keep a neutral neck by looking at the ground slightly in front of you (not up).
- **Swimmer:** Similar to the Superman exercise, but extend one arm and the opposite leg instead of both arms and legs. Again, focus on reaching out instead of up.



Video Demonstration: Available on downloaded .swf file.

Exercise: Mountain Climbers

Objective: To strengthen the upper body and the “core”

Contraindication: Poor technique usually results in high compressive forces on the spine and can lead to low back pain. The functional transfer of Mountain Climbers is also questionable because it puts the spine in a loaded flexed position and then incorporates movement of the lower extremities. This is not a normal requirement of the body.

Alternative: See Alternatives listed above for 8 Count Body Builders. The plank and side bridge can be made more advanced by lifting one knee or leg off the floor (as you remove contact points the demand on core stabilization increases).

Ballistic Wood Chops:

Any exercise that is conducted that requires straight legs and combined with trunk flexion can be hard on your back, even if you are in good shape. Wood chops that involve ballistic/bouncing movement is contraindicated movement (stretch reflex).

Remember Proper Lumbar Alignment

- Proper lumbar alignment is key for preventing low back injuries
- Compression forces increase as demands on “core” stabilization increase
- Be cautious at all times with stability exercises
- Start off easy and always in control!
 - Kavic et al Spine 2004 29(20):2319-2329



Video Demonstration: Available on downloaded .swf file.

Other Incorrectly Performed Exercises:

1. Bench press (with the person lying on the bench and the feet on the floor – they end up arching their back and pushing off their feet to get the weight up),
2. Dead lifts (people tend to lock out the knees and/or round their low back, flexing from the back not the hips as they lower the weight in front).
3. Behind the head lat pull downs (should only be pulling in front of the head).

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References

Bookspan, Jolie. Health and Fitness in Plain English, Healthy Learning – Produced in Cooperation with the American Council on Exercise, 2002.

Oate, Dr. James, Old Dominion University, Director of Sports Medicine and Human Performance Laboratory. Contraindicated Exercise Information Presented during the 2005 Navy and Marine Corps Public Health Center (prior NEHC) Conference.

Settles, Diana and Cooper Institute for Aerobics Research (March 2000). Stretching and Injury Prevention for Readiness, (NEHC Technical Manual 6100.00-3). Norfolk, VA: Navy Environmental Health Center.

Thompson, Walter, R., Baldwin, Kenneth. American College of Sports Medicine's Resources for the Personal Trainer, 2nd Edition, Lippincott Williams and Wilkins, 2007.