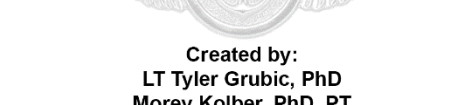
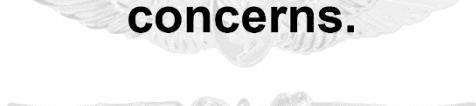
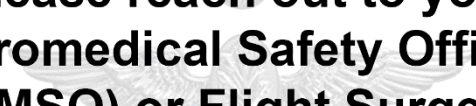


Version: 2021



**Please reach out to your
Aeromedical Safety Officer
(AMSO) or Flight Surgeon
with any questions or
concerns.**



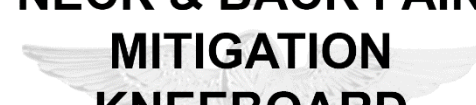
**Created by:
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NAVY AND MARINE CORPS



AIRCREW



**AIRCREW NECK & BACK
PAIN MITIGATION**

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**AIRCREW NECK & BACK
PAIN MITIGATION**

TOOLS

1. FOAM ROLLER
2. ELASTIC RESISTANCE BANDS
3. CHAIR
4. EXERCISE MAT
5. STRETCHING STRAP



AIRCREW NECK & BACK PAIN MITIGATION

EXERCISES / ACTIVITIES TO AVOID

1. ROUTINE STRETCHING INTO CERVICAL & LUMBAR FLEXION (I.E. BENDING FORWARD AT HIPS WITH ROUNDED BACK OR NECK).
2. OVEREMPHASIS ON ABDOMINALS OR GLOBAL CERVICAL FLEXORS. IT IS RECOMMENDED TO PERFORM POSTERIOR OR "PULLING" EXERCISES AT A RATIO OF 2:1 WHEN COMPARED TO ANTERIOR "PUSHING" EXERCISES.
3. HIGH BALLISTIC MOVEMENT (ESPECIALLY TIMED EVENTS SUCH AS CURL UPS FOR TIME OR BOX JUMPS FOR TIME). ESPECIALLY FOR THE LESSER TRAINED INDIVIDUAL.
4. HIGHLY REPETATIVE MOTIONS AND EXERCISES EXCEEDING 20 REPETITIONS. HIGHLY REPETITIVE MOTIONS CAN LEAD TO JOINT PAIN.
5. AVOID LOWER BACK EXERCISES THAT INCREASE PAIN OR PRODUCE LEG/FOOT PAIN.
6. AVOID NECK EXERCISES THAT INCREASE OR PRODUCE ARM/HAND PAIN.



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AIRCREW NECK & BACK PAIN MITIGATION

PREFLIGHT

CERVICAL RETRACTION (SEATED) WITH OVERPRESSURE

1. SIT WITH BACK SUPPORTED.
2. RETRACT THE HEAD STRAIGHT BACK WHILE KEEPING EYES ALIGNED FORWARD.
3. WITH HAND PRESS GENTLY STRAIGHT BACK ON CHIN.
4. HOLD 2 SECONDS.
5. REPEAT FOR 10 REPETITIONS.



CERVICAL RETRACTION (SEATED) WITH EXTENSION

1. SIT WITH BACK SUPPORTED.
2. RETRACT THE HEAD STRAIGHT BACK WHILE KEEPING EYES ALIGNED STRAIGHT.
3. THEN PRESS GENTLY UNDER THE CHIN TO TILT THE HEAD UPWARD ~45 DEGREES
4. HOLD 2 SECONDS.
5. REPEAT FOR 10 REPETITIONS.



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

CORE FITNESS FRONT PLANK

Exercise may be advanced by increasing hold duration.

Isometric strength more closely resembles the needed in-flight spinal stabilization for stressful activities.



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

CORE FITNESS FRONT PLANK

1. ASSUME STARTING POSITION
DEMONSTRATED IN THE FIGURE.



2. SPINE SHOULD BE NEUTRAL
AND IN LINE WITH THE TORSO.
STOMACH SHOULD BE DRAWN IN.

3. LEGS COMPLETELY EXTENDED.

4. HOLD FOR UP TO 2 MINUTES.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

CERVICAL RETRACTION (SEATED) W/ OVERPRESSURE

Cervical retraction mobility is a requirement to achieve full neck extension and rotation for movements such as check-six, and proper head movement during flight.

CERVICAL RETRACTION (SEATED) W/ EXTENSION

Cervical retraction mobility is a requirement to achieve full neck extension for movements such as check-six. Initiating cervical retraction prior to and during cervical extension allows recruitment of the mid to lower cervical spine. Incorporating retraction prior to extension as shown allows full cervical extension with proper biomechanics.



AIRCREW NECK & BACK PAIN MITIGATION

PREFLIGHT

CERVICAL RETRACTION WITH L&R ROTATION WITH OVERPRESSURE

1. SIT WITH BACK SUPPORTED.
2. RETRACT THE HEAD STRAIGHT BACK WHILE KEEPING EYES ALIGNED STRAIGHT.
3. WITH HAND PRESS GENTLY STRAIGHT BACK ON CHIN.
4. WITH HAND ROTATE HEAD LEFT AND HOLD FOR 2 SECONDS AT END RANGE OF MOTION.
5. REPEAT X5. REPEAT FOR RIGHT SIDE.



THORACIC SPINE EXTENSION FOAM ROLLING

1. SUPPORT CERVICAL SPINE WITH CLASPED HANDS.
2. ALLOW THORACIC SPINE TO RELAX INTO EXTENSION.
3. USE FEET AND LEGS TO ROLL BACK AND FORTH ON THORACIC SPINE.
4. PERFORM FOR UP TO 1 MIN.



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

DEEP NECK FLEXOR DYNAMIC STRENGTHENING

Exercise may be initially performed with head and upper back on an incline if too difficult.

The deep neck flexors along with deep neck extensors provide local spinal stabilization as needed to counter spine strain during flight. Standard strengthening exercises for the neck may not be effective for recruiting deep stabilizers.

CORE FITNESS LATERAL PLANK

Exercise may be advanced by increasing hold duration.

Isometric strength more closely resembles the needed in-flight spinal stabilization for stressful activities.



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

DEEP NECK FLEXOR DYNAMIC STRENGTHENING

1. LAY ON BACK WITH NO PILLOWS.
2. TUCK CHIN AND LIFT BACK OF HEAD 1-2 INCHES OFF THE MAT.
3. CHIN TUCK SHOULD BE MAINTAINED THE ENTIRE TIME AND HOLD FOR MAX OF 1 MINUTE.
4. REPEAT UP TO X3 IF ABLE.



CORE FITNESS LATERAL PLANK

1. ASSUME STARTING POSITION DEMONSTRATED IN THE FIGURE.
2. ELBOW SHOULD BE LEVEL WITH THE SHOULDER. SPINE NEUTRAL AND IN LINE WITH TORSO. LEGS ARE COMPLETELY EXTENDED.
3. LIFT HIPS OFF MAT SO BODY IS INLINE.
4. HOLD FOR 60 SECONDS ON EACH SIDE.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

CERVICAL RETRACTION WITH L&R ROTATION AND OVERPRESSURE

Cervical retraction mobility is a requirement to achieve full neck extension and rotation for movements such as check-six, and proper head movement during flight.

THORACIC SPINE EXTENSION FOAM ROLLING

Prolonged sitting places unusual strain on the posterior soft tissue and intervertebral disks. Foam roller counterbalances this strain and prevents adaptive shortening of flexors.



AIRCREW NECK & BACK PAIN MITIGATION

PREFLIGHT

LUMBAR EXTENSION PRESS-UPS

1. LIE PRONE ON ELBOWS FOR 30 SECONDS.
2. PLACE HANDS SHOULDER WIDTH APART AND RELAX PELVIS.
3. STRAIGHTEN ARMS TO BRING CHEST OFF MAT ALLOWING LUMBAR SPINE TO MOVE INTO EXTENSION.
4. HOLD FOR 2 SECONDS.
5. REPEAT X10.



ISOMETRIC ACTIVATION OF DEEP NECK FLEXORS

1. RETRACT THE HEAD STRAIGHT BACK WHILE KEEPING EYES ALIGNED STRAIGHT.
2. PLACE BOTH HANDS WITH CLOSED FISTS UNDER THE CHIN.
3. MAINTAIN A MILD UPWARD PRESSURE WITH MOUTH CLOSED.
4. TUCK/NOD HEAD TO CREATE AN ISOMETRIC CONTRACTION WHILE EYES ON HORIZON.
5. HOLD CONTRACTION FOR 10 SECONDS.
6. REPEAT X5



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

RESISTED CERVICAL RETRACTION (RESISTANCE BAND)

Activity specific strengthening possesses the needed specificity. Strengthening into cervical retraction will provide the needed muscle activity required during flight for activities such as check-six as well as needed muscle coordination for stabilizing head into seat box/head rest during high +Gz.

CERVICAL/SCAPULA RETRACTION AND ARM EXTENSION.

This exercise provides an advanced platform for recruiting spinal extensors and deep stabilizers.



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

RESISTED CERVICAL RETRACTION (RESISTANCE BAND)

1. STAND FACING WALL.
2. PLACE ELASTIC BAND (ALT SHIRT OR TOWEL) AROUND POSTERIOR OF HEAD.
3. HOLD OTHER END OF BAND AGAINST WALL WITH ELBOWS AT SHOULDER WIDTH.
4. START WITH MAXIMAL BAND TENSION AND RETRACT HEAD AGAINST BAND WITH HANDS HELD FIRMLY ON THE WALL.
5. PERFORM 3 SETS OF 6-20



CERVICAL/SCAPULA RETRACTION AND ARM EXTENSION.

1. LIE IN A PRONE POSITION.
2. SQUEEZE SHOULDER BLADES BACK WHILE RETRACTING CERVICAL SPINE.
3. LOWER BACK SHOULD SLIGHTLY ARCH.
4. HOLD HEAD/TORSO POSITION AND RAPIDLY RAISE AND LOWER ARMS TOWARDS/ FROM THE MAT USING SHORT AMPLITUDES.
5. PERFORM 1 REPETITION FOR UP TO 3 MINUTES.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

LUMBAR EXTENSION PRESS-UPS

If pelvis is unable to maintain contact with floor hands should be moved forward 2-3 inches.

Discontinue exercise if it increases or produces leg or foot pain.

Prolonged sitting places unusual strain on the posterior soft tissue and intervertebral disks. The press-up counterbalances this strain and prevents adaptive shortening of flexors.

ISOMETRIC ACTIVATION OF DEEP NECK FLEXORS

The spine experiences considerable stress during flight related activities such as vibration and pulling high +Gz. The deep spinal stabilizers are the most suitable muscles to provide the needed stabilization. Activating these muscles prior to flight provide the necessary pre-load for maximum stabilization efforts.



AIRCREW NECK & BACK PAIN MITIGATION

PREFLIGHT

ISOMETRIC CERVICAL RETRACTION FOR DEEP NECK EXTENSORS

1. CERVICAL SPINE SHOULD BE MILDLY RETRACTED.
2. PLACE HANDS BEHIND HEAD TO APPLY COUNTER RESISTANCE.
3. KEEP EYES ON HORIZON.
4. GENTLE ISOMETRIC HOLD OF HEAD AGAINST COUNTER EFFORT OF HANDS IS HELD FOR 10 SECONDS.
5. REPEAT X5



QUADRUPED BIRD DOG STABILIZATION

1. IN THE QUADRUPED POSITION, DRAW THE STOMACH INWARD.
2. ARCH THE LOWER BACK.
3. RETRACT HEAD TO BE IN LINE WITH THE BACK/SPINE.
4. HOLD NECK AND CORE POSITION WHILE RAISING THE RIGHT ARM AND LEFT LEG.
5. HOLD FOR 2 SECONDS. REPEAT WITH THE LEFT ARM AND RIGHT LEG FOR 2 SECONDS.
6. REPEAT FOR 1 MINUTE TOTAL DURATION.



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

The routine spinal conditioning program is designed to serve the aircrew member as an addition to their normal strength and conditioning program. These exercises should be utilized throughout the week, perhaps every other day.

TRUNK EXTENSOR STRENGTHENING

Flight crew and pilots with back pain have been found to possess inadequate strength and endurance of spinal extensor muscles. This exercise will address this issue.

PRONE ALTERNATING UPPER/LOWER EXTREMITY RAISES

Flight crew and pilots with back pain have been found to possess inadequate strength and endurance of spinal extensor muscles. This exercise will address this issue as well as provide an advanced mechanism for recruiting the deep spinal stabilizers.



AIRCREW NECK & BACK PAIN MITIGATION

ROUTINE SPINAL CONDITIONING FOR INJURY PREVENTION

TRUNK EXTENSOR STRENGTHENING

1. LIE ON STOMACH WITH 1-4 PILLOWS UNDER WAIST.
2. EXTEND SPINE WHILE MAINTAINING ARMS OVERHEAD.
3. LEGS MAY EXTEND TO ADVANCE THE EXERCISE.
4. HOLD FOR 10 SECONDS.
5. REPEAT UNTIL FATIGUED BY INCREASING REPETITIONS OR HOLD TIME.



PRONE ALTERNATING UPPER/LOWER EXTREMITY RAISES

1. LIE ON STOMACH WITH 1-4 PILLOWS UNDER WAIST.
2. ELEVATE LEFT ARM AND RIGHT LEG ALLOWING THE SPINE TO EXTEND.
3. HOLD FOR 10 SECONDS.
4. ALTERNATE OPPOSITE ARMS AND LEGS.
5. REPEAT UNTIL FATIGUED BY INCREASING REPETITIONS OR ADDING ANKLE WEIGHTS.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

ISOMETRIC ACTIVATION OF DEEP NECK FLEXORS

The spine experiences considerable stress during flight related activities such as vibration and pulling high +Gz. The deep spinal stabilizers are the most suitable muscles to provide the needed stabilization. Activating these muscles prior to flight provide the necessary pre-load for maximum stabilization efforts.

QUADRUPED BIRD DOG STABILIZATION

The spine experiences considerable stress during flight related activities such as vibration and pulling high +Gz. The deep spinal stabilizers are the most suitable muscles to provide the needed stabilization. Activating these muscles prior to flight provide the necessary pre-load for maximum stabilization efforts.



AIRCREW NECK & BACK PAIN MITIGATION

POST FLIGHT

STANDING BACK BENDS

1. STAND WITH FEET SHOULDER WIDTH APART.
2. PLACE HANDS ON LOWER BACK WITH FINGERS POINTED DOWN.
3. ARCH SPINE BACKWARD UNTIL MILD PINCH IS FELT IN LOWER BACK.
4. HOLD FOR 2 SECONDS.
5. REPEAT 10 TIMES.



CERVICAL RETRACTION (SEATED) WITH OVERPRESSURE

1. SIT WITH BACK SUPPORTED.
2. RETRACT THE HEAD STRAIGHT BACK WHILE KEEPING EYES ALIGNED FORWARD.
3. WITH HAND PRESS GENTLY STRAIGHT BACK ON CHIN.
4. HOLD 2 SECONDS.
5. REPEAT FOR 10 REPETITIONS.



AIRCREW NECK & BACK PAIN MITIGATION

IMMEDIATE POST FLIGHT FIRST AID

SUPINE 90/90 (PSOAS) POSITION

Spinal shrinkage occurs from the stress occurring during flight. This position provides decompression relief and offsets effects of spinal shrinkage. Adding a lumbar or towel roll to support the lumbar lordosis and lying flat on the floor or mat without a head pillow relaxes soft tissue structures that are under constant strain during flight.

PRONE ON ELBOWS

Discontinue if this position increases or produces leg or foot pain and perform the supine 90/90 psoas position (above) instead.

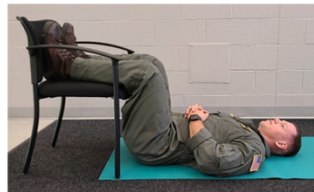


AIRCREW NECK & BACK PAIN MITIGATION

IMMEDIATE POST FLIGHT FIRST AID

SUPINE 90/90 (PSOAS) POSITION

1. PERFORM AFTER COMPLETION OF POST FLIGHT EXERCISES.
2. ASSUME POSITION WITH THIGHS AT 90 DEGREES FOR AT LEAST 2 MINUTES TO RELIEVE NECK AND BACK.
3. A LUMBAR ROLL MAY BE USED UNDER THE BACK, BUT NO PILLOW UNDER THE HEAD/NECK.
4. IF MANAGING SPINAL PAIN, ICE OR HEAT MAY BE USED WHILE IN THIS POSITION FOR UP TO 15 MINUTES.



PRONE ON ELBOWS

1. PERFORM AFTER COMPLETION OF POST FLIGHT EXERCISES.
2. ASSUME POSITION FOR PRONE ON ELBOWS.
3. ICE OR HEAT MAY BE USED WHILE IN THIS POSITION FOR UP TO 15 MINUTES.
4. DISCONTINUE IF POSITION INCREASES OR PRODUCES LEG OR FOOT PAIN AND USE PSOAS POSITION INSTEAD WITH ICE/HEAT.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

STANDING BACK BENDS

Discontinue exercise if it increases or produces leg or foot pain.

Sustained lumbar flexion during flight combined with vibration is likely to stress the posterior soft tissues and the intervertebral disc. This exercise will mitigate the effects of in-flight strain to the soft tissue and intervertebral disc and prevent adaptive shortening of the soft tissue structures anteriorly.

CERVICAL RETRACTION (SEATED) WITH OVERPRESSURE

Flexed postures during flight combined with vibration are likely to stress the posterior soft tissues and the intervertebral disc. This exercise will mitigate the effects of in-flight strain to the soft tissue and intervertebral disc and prevent adaptive shortening of the soft tissue structures anteriorly.



AIRCREW NECK & BACK PAIN MITIGATION

POST FLIGHT

CERVICAL RETRACTION (SEATED) WITH EXTENSION

1. SIT WITH BACK SUPPORTED.
2. RETRACT THE HEAD STRAIGHT BACK WHILE KEEPING EYES ALIGNED STRAIGHT.
3. THEN PRESS GENTLY UNDER THE CHIN TO TILT THE HEAD UPWARD ~45 DEGREES.
4. HOLD 2 SECONDS.
5. REPEAT FOR 10 REPETITIONS.



LUMBAR EXTENSION PRESS-UPS

1. LIE PRONE ON ELBOWS FOR 30 SECONDS.
2. PLACE HANDS SHOULDER WIDTH APART AND RELAX PELVIS.
3. STRAIGHTEN ARMS TO BRING CHEST OFF MAT ALLOWING LUMBAR SPINE TO MOVE INTO EXTENSION.
4. HOLD FOR 2 SECONDS.
5. REPEAT X10.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

THORACIC SPINE EXTENSION FOAM ROLLING

Prolonged sitting places unusual strain on the posterior soft tissue and intervertebral disks. Foam roller counterbalances this strain and prevents adaptive shortening of flexors.

SUPINE 90/90 (PSOAS) POSITION

Spinal shrinkage occurs from the stress occurring during flight. This position provides decompression relief and offsets effects of spinal shrinkage. Adding a lumbar or towel roll to support the lumbar lordosis and lying flat on the floor or mat without a head pillow relaxes soft tissue structures that are under constant strain during flight.



AIRCREW NECK & BACK PAIN MITIGATION

POST FLIGHT

THORACIC SPINE EXTENSION FOAM ROLLING

1. SUPPORT CERVICAL SPINE WITH CLASPED HANDS.
2. ALLOW THORACIC SPINE TO RELAX INTO EXTENSION.
3. USE FEET AND LEGS TO ROLL BACK AND FORTH ON THORACIC SPINE.
4. PERFORM FOR UP TO 1 MIN.



SUPINE 90/90 (PSOAS) POSITION

1. PERFORM AFTER COMPLETION OF POST FLIGHT EXERCISES.
2. ASSUME POSITION WITH THIGHS AT 90 DEGREES FOR AT LEAST 2 MINUTES TO RELIEVE NECK AND BACK.
3. A LUMBAR ROLL MAY BE USED UNDER THE BACK, BUT NO PILLOW UNDER THE HEAD/NECK.
4. IF MANAGING SPINAL PAIN, ICE OR HEAT MAY BE USED WHILE IN THIS POSITION FOR UP TO 15 MINUTES.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

CERVICAL RETRACTION (SEATED) WITH EXTENSION

Flexed postures that occur during flight combined with vibration is likely to stress the posterior soft tissues and the intervertebral disc. This exercise will mitigate the effects of in-flight strain to the soft tissue and intervertebral disc and prevent adaptive shortening of the soft tissue structures anteriorly.

LUMBAR EXTENSION PRESS-UPS

If pelvis is unable to maintain contact with floor hands should be moved forward 2-3 inches.

Discontinue exercise if it increases or produces leg or foot pain.

This exercise will mitigate the effects of in-flight strain to the posterior soft tissue and intervertebral disc and prevent adaptive shortening of the soft tissue structures anteriorly.



AIRCREW NECK & BACK PAIN MITIGATION

POST FLIGHT

HIP FLEXOR STRETCH

1. HIGH KNEEL POSITION.
2. LUNGE FORWARD KEEPING OPPOSITE THIGH IN SLIGHT EXTENSION.
3. HOLD FOR 1 MINUTE.
4. REPEAT FOR OPPOSITE LEG.



HAMSTRING STRETCH

1. HOOK STRAP AROUND FOOT OF LEG TO BE STRETCHED.
2. LAY ON BACK WITH BOTH LEGS STRAIGHT OUT.
3. PULL LEG UP WITH STRAP KEEPING OPPOSITE LEG FLAT.
4. HOLD FOR 1 MINUTE.
5. REPEAT FOR OPPOSITE LEG.



AIRCREW NECK & BACK PAIN MITIGATION

SUPPLEMENTAL INFORMATION

HIP FLEXOR STRETCH

Stretch may be advanced by flexing the knee of the extended thigh (knee on the ground) using a strap around the back foot. The back foot may also be elevated and placed on the edge of a seat/couch to advance the stretch, called the “couch stretch.”

During a flight, the hip flexors are shortened from seated positioning. Over time these muscles will adaptively shorten, leading to spine pain. This exercise will prevent adaptive shortening of the hip flexors.

HAMSTRING STRETCH

During flight the knee flexors are shortened from seated positioning. Over time these muscles will adaptively shorten leading to spine pain. This exercise will prevent adaptive shortening of the hamstrings.

