



Australian Parachute Federation

APF Injury Prevention Exercise Program



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Status: Educational

Warning

Parachuting and flying in parachuting aircraft can be dangerous.

About this Publication

This guide is published by the Australian Parachute Federation Ltd (APF) for the information of APF members. While the writers have attempted to ensure that the information in this guide is correct, it may contain information which is out of date or inaccurate. If you want more information or copies of this guide for yourself or your friends, please ask the instructional or coaching staff at your DZ or contact the APF Office.

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Version Control

It is important that members refer to the current version of this Guide, which is current only at the time of download. See cover page for date of publishing. This version makes minor changes for consistency with new regulations. The current version can be found on the [APF website](#).

Credits

The APF gratefully acknowledge and thank Emily Drew and Sally Baker who produced this guide for APF members.

Cover photo: Designed using resources from Freepik.com

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Alternatively, contact the APF Office for a paper copy at a cost of \$5.00



Disclaimer

This program was written as a guide only. It is not specifically tailored to suit any injuries or health problems, which could be aggravated by low, moderate or high intensity physical activity. As with any physical activity, it is important that before beginning any fitness regime, you consult with your health care professional to ensure that you are mindful of your current health and any restrictions that are appropriate for you. You should immediately seek medical attention if there are any unanticipated changes to your physical condition at any time. You must consult your doctor if you are pregnant, have high or low blood pressure, any organ disease/failure and spinal injuries before you can start the program.

A moderate level of strength is required to undertake this Exercise Program recommendations after Week 4. If you are a beginner you must build up slowly using Weeks 1-4 Base Conditioning and Strength Endurance, before attempting Weeks 5 and 6. If an individual does not follow this recommendation, they may risk injury.

This guide does not include any supervision or monitoring of your activity, and we are not responsible for any injuries that you may suffer as a result of following the exercise program or regime. It is recommended that you obtain the guidance of a qualified health professional in a gym setting if you are unsure of any equipment or exercises. General knowledge of the muscular system and exercise variables is essential to participate safely so if unsure you must seek professional guidance.

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PART 1: PURPOSE OF THIS PROGRAM

Tandem Instructors require strength in specific areas, coupled with physical endurance to meet the demands of instructing. To assist in reducing the chance of injury it is important to build and maintain strength to handle these physical demands. A Tandem Instructor should be regularly participating in a training regime to prepare and maintain physical fitness and mitigate the chance of injury. The risk may also be reduced by simply correcting techniques and making an effort to lift and bend correctly. Additionally, specific strength training of stabilizing muscles reduces the strain on joints and larger muscle groups.

1.1 Risk of Injury

Exercise Physiologists Emily Drew and Sally Baker (who is also an experienced Tandem Instructor), examined the complete Tandem process; from picking up the rig to laying the open parachute down on the packing floor. They analyzed the injury risks during each specific task, looking at the vulnerabilities of particular muscles and joints. Through this analysis they have compiled a specific six-week exercise program that aims to strengthen the body in preparation for all aspects of being a tandem instructor.

Job Specific Task	Major Injury Risks
Picking Up and Putting on Tandem Rig	Spinal disc injury/ prolapse, lower back muscle strain
Tightening the Side Adjusters	Back muscle strain
Exiting the Aircraft From Knees and Seated Position	Back muscle strain
Throwing The Drogue	Right shoulder strain, rotator cuff strain/tear, frozen shoulder
Holding the Handicam	Left shoulder strain, elbow strain
Opening the Parachute	Neck muscle strain
Steering the Parachute	Rotator cuff tear, shoulder strain
Landing	Lower back and limb injury
Picking Up Parachute and Carrying	Lower back strain
Laying Parachute Out For Packing	Lower back strain

Note: Frozen Shoulder- refers to stiffness and pain in the shoulder joint

PART 2: TANDEM PROCEDURES

2.1 Picking up and putting on a Tandem rig

Injury Risk: Lower back muscle strain, spinal disc injury if flexing forward plus rotating under load (22kg rig) is performed.

Solution: Bench installed: Instructor to place rig on a bench and sit in front of it to place straps of rig over shoulders. Keeping back straight, instructor must have rig in position on back and use legs to stand up. If no bench available, then another instructor must pick up rig and hold up to put on/team work. Instructor must avoid bending forward and twisting to lift rig onto their back at all times.

Exercise solutions: Sit to Stands body weight - Sit to Stand 5kg - progressing to Sit To Stand 25-30kg. Regressions: If can't do sit to stand/squat correctly - regress to Pilates Bridge – Hip Extensions Back on Ball then to body weight Sit To Stands. Should be able to squat and lift over 22kg relatively easily.



2.2 Tightening the Side Adjusters

Injury Risk: Lower Back Muscle strain: over use of lower back muscles if not correctly engaging obliques and core musculature when performing this movement. Shoulder strain if shoulder supporting muscles aren't correctly engaged.

Solution: Learn correct breathing pattern for core activation and stabilization, then demonstrate a proficiency in core activation using the exhalation to stabilize the spine during unilateral strength exercises. Instructor aware and able to activate their shoulders, obliques and core during this unilateral movement and have the strength through the core to stabilize the lower back during the movement.

Exercise solutions: Tummy Vacuum, Horse Stance, Double Arm Cable Push and Single Arm Cable Push with slight oblique rotation. Regression to Pilates Pendulum if cannot perform with correct breathing and core activation technique - correct push pattern with the exhale and core activation during a push movement.

2.3 Exiting Aircraft from knees and seated position

Injury Risk: Knees/Lower back: over use of lower back muscles, too much loading though back, not using lower abdominals and glutes while bending.

Solution: Learn the correct bend pattern technique to take weight through the core and glutes and out of the back muscles.

Exercise solutions: Tummy Vacuum, Supermans, Chek Forward Bends, Deadlifts.

2.4 Throwing the Drogue

Injury Risk: Right shoulder issues with rotator cuff strain and frozen shoulder injuries due to specific rotation of shoulder during force.

Solution: The best solution for minimizing the risk of frozen shoulder from throwing the drogue is the combination of rotator cuff strengthening, pectoralis minor stretching and SCM Neck Stretching to alleviate forward rotation of the shoulder. Strength through the rhomboids, serratus anterior and lower trapezius muscles gained from the weighted cable exercises will stabilize the scapula in place, providing the best environment for correct shoulder position, strength and stability.

Exercise solutions: Rotator Cuff Circles as a warm up, Rotator Cuff Strengthening exercises with dumbbells, Chest Stretching, SCM Neck Stretch, Single Arm Cable Pull, Single Arm Cable Pull Downs.

2.5 Holding the Handicam

Injury Risk: Left shoulder/elbow strain.

Solution: Strengthening and stabilization exercises for the rotator cuff, building isometric strength through the shoulder, stretching tight chest muscles that can anteriorly rotate shoulder

Exercise solutions: Strengthen isometric hold with Supermans with DB Hold, starting with body weight then working up to 5kg dumbbell. Chest stretching for better scapula and shoulder position, as well as warming up with Rotator Cuff Circles.

2.6 The Parachute Opening

Injury Risk: Neck muscle and joint strain when not stabilizing the cervical spine during the sudden jolt of the opening parachute.

Solution: Training isometric strength through the suprahyoid and infrahyoid musculature to protect the cervical spine and reduce injury and strain to the cervical extensor muscles.

Exercise solutions: Neck Stabilization 6x6x6 exercise, implementing correct tongue position for cervical spine stabilization during high intensity load.

2.7 Steering the Parachute

Injury Risk: Shoulder strain and overuse. Activation and overuse of the upper trapezius muscle and straining of the neck.

Solution: Focus on scapula retraction and correct shoulder position (down and away from ears) in weighted cable exercises.

Exercise solutions: Single Arm Kneeling Cable Pull Downs, focusing on scapula retraction, core stabilization and latissimus dorsi activation.



2.8 Landing

Injury Risk: Knees/Lower back/Limb Injury: over use of lower back muscles, too much loading though back, not using lower abs and glutes while bending. Possible poor technique or lack of experience when landing.

Solution: This is the most common time for injury due to the unstable nature of unexpected turbulence, weather and customer variances. Ongoing and specific technique training for landing techniques must be undertaken regularly.

Exercise solutions: All exercises in the program will help to stabilize and strengthen the lower back and body when under load. Increased core strength and stabilization will inadvertently help to protect the instructor during a high impact landing, though correct technique and skills will be the ultimate way to minimize injury during this high risk time.

2.9 Picking up Parachute and carrying it back

Injury Risk: Lower back strain when not implementing correct bend and lift technique.

Solution: Correct bend and lift technique with core activation while lifting a load.

Exercise solutions: Cable Squats, Deadlifts, Single Arm Cable Pull



2.10 Laying Parachute out for packing

Injury Risk: Lower back strain when using poor posture while putting the rig down.

Solution: Correct posture and strengthening of core and back muscles.

Exercise solutions: Cable Squats, Deadlifts, Tummy Vacuum, Horse Stance

PART 3: EXERCISE PROGRAM

Week 1+2 (or if injured): Core Stabilization / Base Conditioning

Week 3+4: Strength Endurance

Week 5+6: Strength and Power Conditioning

3.1 Equipment needed

Adjustable Cable Machine

Swiss Ball

Yoga Mat

Pilates Ball

Barbell

Theraband

1x2kg + 1x5kg Dumbbell

1 long dowel rod

Foam Roller

3.2 Weeks 1 + 2 (or if injured): Core Stabilization / Base Conditioning

EXERCISE	REPS	SETS	WEIGHT
Mobilizations/Warm Up	5 Minutes		Bodyweight
Chest Stretch & SCM Stretch	1	1-2	-
Tummy Vacuum	10 x 20 sec holds	1-2	-
Neck Stabilizations 6x6x6	6	6	30% pressure
Pilates Bridge	10 x 20 sec holds	1-2	Bodyweight
Chek Forward Bends	12	1-3	Bodyweight
Hip Extensions Back on Ball	20	1-3	Bodyweight
Pilates Pendulum	12-20	1-3	Bodyweight
Rotator Cuff DB Strengthening	15 each direction	1-2	1kg-2kg
Supermans	20 x 10 sec holds	1-2	Bodyweight

As stability and strength are gained, increase the no. of sets performed when you can perform all reps of each exercise with good form.

3.3 Weeks 3 + 4: Strength Endurance

EXERCISE	REPS	SETS	WEIGHT
Mobilizations/Warm Up	5 minutes		Bodyweight
Chest Stretch & SCM Stretch	1	1-2	-
Horse Stance	10 x 30 sec holds	1-2	Bodyweight
Sit To Stands	15	1-3	5kg - 15kg
Cable Single Arm Pull	10	1-3	15-30kg
Cable Double Arm Push	10	1-3	30kg +
Cable Single Arm Push	10	1-3	15-30kg
Supermans with DB Isometric Holds	10 x 30 sec holds	1-2	3-5kgs
Pilates Pendulums	12-20	1-3	3-5kgs
Neck Stabilizations 6x6x6	6	6	40% pressure

As stability and strength are gained, increase the no. of sets performed when you can perform all reps of each exercise with good form.

3.4 Weeks 5 + 6: Strength and Power Conditioning

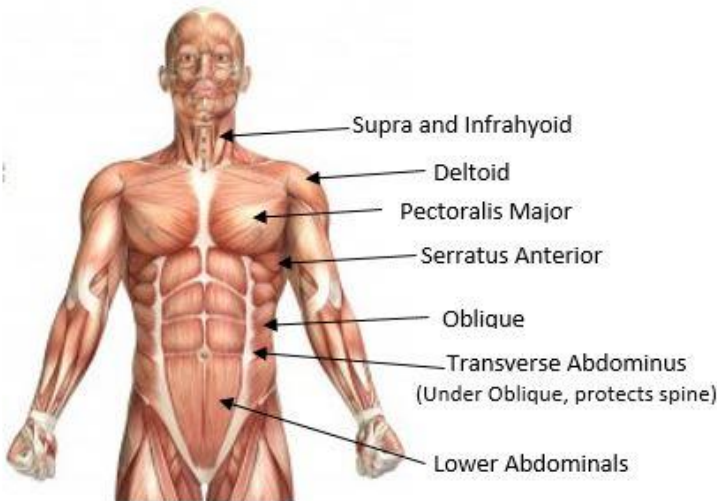
EXERCISE	REPS	SETS	WEIGHT
Mobilizations/Warm Up	5 minutes		00.00
Chest Stretch & SCM Stretch	1	1-2	-
Tummy Vacuums	10 x 20 sec holds	1-2	-
Sit To Stands	4-8	1-3	25-30kg
Deadlifts	6-8	1-3	30-50kgs
Standing Single Arm Cable Pull Downs	12-20	1-3	25kg +
Cable Squats	6-10	1-4	30kg +
Supermans with DB Isometric Holds	10 x 30 sec holds	1-2	3-5kgs
Rotator Cuff DB Strengthening	15 each direction	1-2	1kg-2kg
Neck Stabilizations 6x6x6	6	6	50% pressure

As stability and strength are gained, increase the no. of sets performed when you can perform all reps of each exercise with good form.

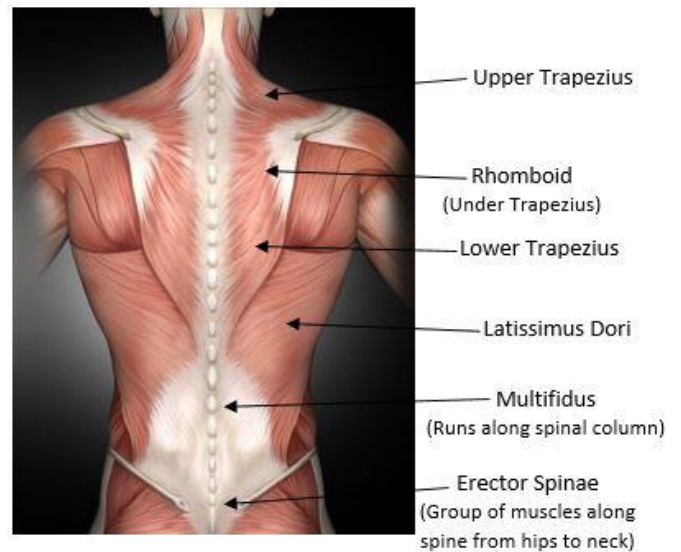
PART 4: EXERCISE DESCRIPTIONS

An instructor must make sure they read through the exercise descriptions and fully understand the movement before attempting it. Intensity and weight prescriptions are a guide only and will vary depending on age, gender and training experience. Prescription is based on weight of rig and intensity and pressure against the joint/muscle in a real life situation. Complete as many reps as possible with correct form and then build up the amount of sets of the exercise as strength improves over time.

4.1 Definitions



Front Muscle Anatomy



Back Muscle Anatomy

QL - Quadratus Lumborum, A deep abdominal muscle in the lower back, attached to the bottom rib, lower vertebrae and top of pelvis.

Note- Isometric Strength involves contracting specific muscles with no movement in the joint (for example- a wall squat hold)

Warm Up Mobilizations

4.2 Rotator Cuff Circles, Hindu Squat, Spidermans

Description

Rotator Cuff Circles: This is a great mobilization for increasing rotator cuff range of motion and stretching the muscles through the chest, back and shoulders. Start with a theraband around your thumbs with your palms facing forward. Gently open the theraband until you feel tension through it. **INHALE:** Keeping tension on the band, slowly raise your hands above your head, allowing the movement to come from your shoulder blades. **EXHALE:** Squeeze the shoulder blades down your back as you lower the band behind your head and down your back. **INHALE:** Slowly raise the band back over to the top of the head. **EXHALE:** lower it back to the start position. *Repeat 8 times.*



Hindu Squat: This is a great hip-opening and flexibility exercise. It tones the pelvic floor and allows the body to sit in optimal flexibility, while stretching the lumbar spine region. Take a wide, comfortable stance and then sit down onto your haunches, trying to keep your heels on the ground. If you can't sit up straight with your hands resting at your chest, then practice holding onto a pole while leaning into the heels. *Hold for 3 minutes.*



Spidermans: This is a great hip flexor and quad mobilization for warming up the hips. Start in a plank position and gently step the right foot forward in line with the hands. Hold for a few breaths and allow the hip flexors to relax into the stretch. On the next exhale, step the right foot back to meet the left. Repeat the same on the left side. *Complete 5 holds on each side.*



Areas warmed up: Shoulders, hips, legs, back, chest, arms

4.3 Chest Stretch

Description

This is a great stretch to release the pectoralis minor muscle, which can tighten through overuse and poor posture, pulling the shoulder forward into bad postural alignment. Keeping the pec minor muscle released can allow a better resting shoulder position, allowing for decreased risk of frozen shoulder injuries. This with the SCM stretch below and Rotator Cuff Strengthening exercises can be the best way to prevent the common injury of frozen shoulder as well as rotator cuff injuries.

Stand beside the cable machine or a doorway and place your right elbow against it at chest height. Make sure your shoulder is rolled back and down and chest lifted. Step your right foot slightly forward as you turn your chest to face away towards the left. Breathe slowly into the stretch and hold for 1 minute. There should be no pain through the shoulder. If there is, then roll the shoulder back more and relax your shoulder away from your ear. Can also be done with the hand as the anchor point for more of a pectoralis major stretch.



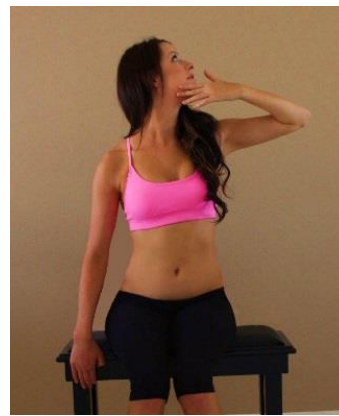
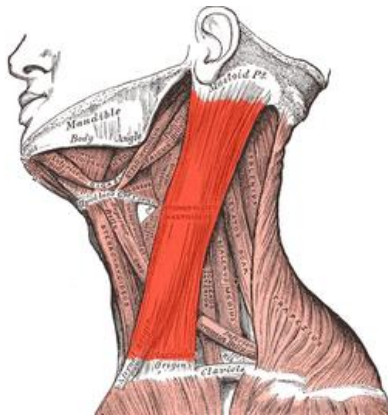
4.4 Sternocleidomastoid (SCM) Stretch

Description

The sternocleidomastoid muscle helps to flex (chin to chest) the neck and can be an accessory muscle during inhalation. During stress it can contribute to shallow chest breathing and become aggravated, tight and sore, while contributing to a forward head posture. When the SCM muscle is tight, the jaw protrudes forward. This pulls the head out of its correct alignment. When the head is out of postural alignment, there is much more stress through the shoulders and neck. Stretching the SCM allows the muscle to relax and return to its normal length so the jaw can stay in its correct position. **This stretch, as well as the Chest Stretch above are two important postural releases to aid and prevent frozen shoulder and rotator cuff injuries.**

Correct length and strength of the SCM can help to stabilize the cervical spine and allow better activation of the other stabilizing neck flexor muscles.

HOW: The SCM stretch with a chin raise involves tilting the chin up gently to allow a stretch. Sit on a bench or chair, then turn your head to one side. This begins the stretch and then **lifting the chin** gently up to the ceiling elongates the muscle. To begin the SCM stretch with chin raise, turn to look to the left and then slowly bring the chin up diagonally to point toward the back ceiling. Do not lift the shoulders. You can gently anchor your hand onto the right collar bone to stop the shoulder lifting. Hold the stretch for 20 seconds and then reverse the movement. Rest for 15 seconds and then repeat. After three reps, stretch to the right.



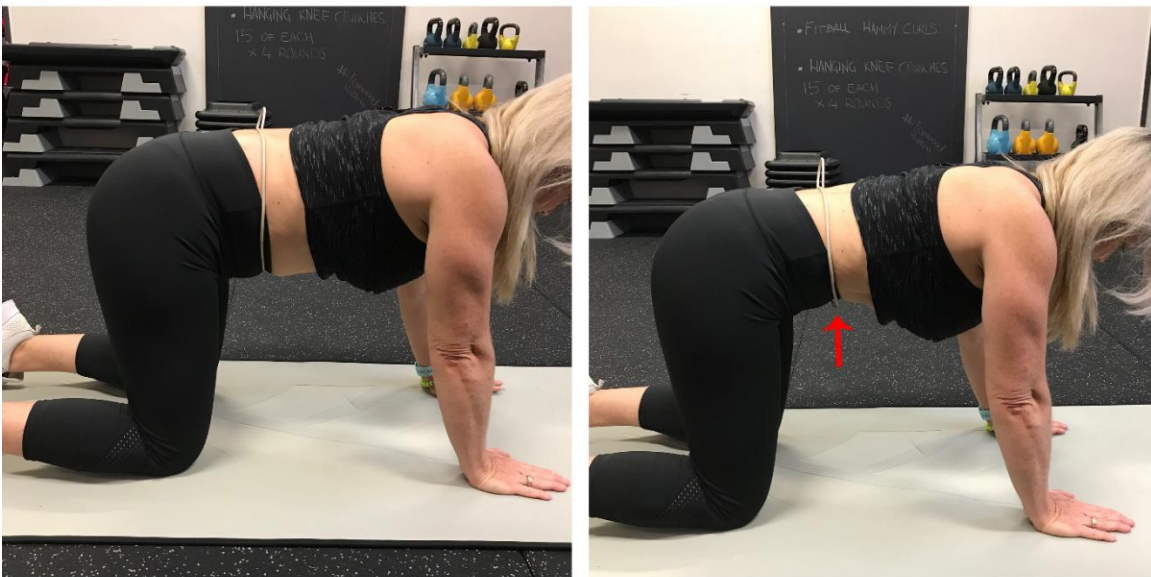
4.5 Tummy Vacuums

Description

Set Up: Assume a kneeling position with your hips over your knees and shoulders over your hands.

Movement: With your spine in neutral alignment, take a deep breath in and let your belly drop towards the floor.
EXHALE: draw your belly button in towards your spine, while keeping your back in the start position. Hold with your Transverse abdominus activated for as long as you comfortably can. When you need to breathe in, relax your abdominal wall as you inhale and repeat the exercise.

Test: To test whether your transverse abdominus is activating, tie an inflexible string tightly around your waist at belly button level. As you inhale the string should dig into your skin as it resists the expansion. As you exhale and hold, the string should be loose, with at least a hand width gap between the rope and your belly.



Muscles worked: Transverse Abdominus. Secondary: Pelvic floor, Obliques.

Job Specific Strength: Tightening side adjusters, Exiting aircraft from knees and seated position, Landing, Laying parachute out for packing

Exercise Prerequisites: None.

4.6 Neck Stabilisations 6x6x6

Description

The supra and infrahyoid muscles are to the cervical spine what the lower abdominals are to the lumbar spine (the stabilising muscles of the spine). They stabilize the head during flexion exercises and support the neck against the force of gravity. The correct position of the tongue to activate these supporting muscles is on the roof of the mouth, behind the front teeth. If the tongue is not held in this position, the gravity load will fall into the Sternocleidomastoid muscle, causing strain and overuse here, resulting in forward head posture, headaches and an increase risk of injury.

Set Up: This simple exercise strengthens the supra and infrahyoid muscles through isometric activations. Start by laying down on your back on a soft mat, knees bent and feet on the floor. There are 6 movements, which will be held for 6 seconds and repeated 6 times. Each isometric move requires a hand position on the face to resist actual movement of the head (see images below).

Movements 1+2 (Turning head left and right): Start by activating your supra and infrahyoid muscles by swallowing and resting your tongue on the roof of your mouth. Press your tongue there until you feel the gentle activation of the muscles in your throat. Once activated, place your left hand on the side of your face (pic 1). Go to turn your head to the left with about 40% pressure into your hand. Hold that resistance for 6 seconds. Repeat on the right side with the right hand for 6 seconds. Repeat 6 times each side.

Movements 3+4 (Ear to shoulder): Activate the throat muscles again, then place your right hand to your right temple. With 40% pressure, go to move your right ear down to your right shoulder, resisting any actual movement again with your hand. Hold for 6 seconds, repeat on the left side, complete 6 times per side (pic 2).

Movements 5+6 (Looking up and looking down): This time, place your hands under your chin (pic 3) and once you have your tongue in position on roof of mouth, use 40% pressure to go to move your chin to your chest. Use your hands again to resist any actual movement of the head, feeling the correct supra and infrahyoid muscles activate and strengthen. Hold for 6 seconds. Then relax your hands and go to look upwards by pressing the back of your head gently into the mat. Hold for 6 seconds. Repeat each way 6 times.



Muscles worked: Supra and infrahyoid muscles

Job Specific Strength: Opening parachute

Exercise Prerequisites: None

4.7 Pilates Bridge

Description

This exercise trains the glute muscles and abdominals to work correctly during a squat pattern, allowing for better activation when standing and squatting under load.

Set Up: Start by laying on a mat, knees bent up and feet on the floor at hip distance apart. Shoulder blades down and chin tucked in.

Movement: EXHALE: draw your belly button in towards your spine (see Tummy Vacuum exercise) as you peel one vertebrae at a time up off the floor. Squeeze your glutes to lift the hips up, keeping the weight in your heels and make sure your knees do not move inwards. Hold at the top for the required time, then EXHALE and press one vertebrae at a time back down into the mat to the start position. Inhale then repeat.



Muscles worked: Glutes, lower abdominals, hamstrings, lower back

Job Specific Strength: Picking up and putting on a tandem rig, Landing

Exercise Prerequisites: Tummy Vacuum.

4.8 Chek Forward Bends

Description

This exercise teaches the correct bend pattern by training the glutes and lower abdominals to activate when standing and bending over and while kneeling and bending. The main focus through the exercise needs to be the glute activation that forces the hips forward while the abdominals brace a straight back position. This prevents load going into the lumbar erector muscles and QL, which when overloaded can lead to lower back strain and injury.

Set Up: Start by kneeling on a foam roller, toes touching the floor, straight back and arms crossed over chest (pic 1).

Movement: INHALE: Prepare. EXHALE: draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) and while keeping your spine straight, bend forward at the hip line. Once your body goes past the 45 degree angle point, allow your spine to flex as you curl over. INHALE at the bottom to prepare, then as you EXHALE, straighten your spine to neutral again and push forwards at the hip, using the glutes and lower abdominals to lift you back up and forward.



Muscles worked: Glutes, Lower Abdominals, Multifidus. Secondary: Erector Spinae, QL, Thoracic Extensors.

Job Specific Strength: Exiting aircraft from knees and seated position, Laying parachute out for packing

Exercise Prerequisites: Tummy Vacuum, Horse Stance

4.9 Pilates Pendulums

Description

Set Up: Lie on your back with a light pilates ball or cushion between your knees or inner thighs. Tighten your belly just like in the Tummy Vacuum exercise then lift your knees up so they are on top of your hips, knees at 90 degrees.

Movement: INHALE: Allow the knees to move over to the left, keeping the shoulders on the floor. EXHALE: focus on moving from the abdomen as you squeeze the ball tight and bring the knees back over the hips. Repeat with control over to the right side.

** Not to be performed if a spinal disc injury is present.



Muscles worked: Obliques, Transverse Abdominus

Job Specific Strength: Tightening side adjusters

Exercise Prerequisites: Tummy Vacuum. ** must not have any spinal disc injury present.

4.10 Rotator Cuff Strengthening

Description

There are four small muscles that make up your rotator cuff and these two exercises strengthen the main two rotational movements of the shoulder. The muscles of the rotator cuff are vital in stabilizing shoulder movement. You can perform both exercises standing or sitting on a regular flat bench, unilaterally (one arm at a time) or using both arms simultaneously. Also, this exercise can easily be performed using the cable pulley machine instead of dumbbells.

Set Up: Start with a small dumbbell (1-3kg max) in one hand. Roll your shoulder blades back and keep your chest lifted.

Movement 1: (External Rotation): Place your arm at your side, raise your forearm until it's at a 90-degree angle to your upper arm, and rotate your hand away from your body. Keep your elbow in close without letting it move backwards. Focus on squeezing your shoulder blade back towards your spine.



Movement 2: (Scarecrow Rotation): Start with your forearm parallel to the floor and perpendicular to your body. Then rotate your upper arm back so the weight arcs upward and comes in line with the face if rotation allows. Slowly lower the weight back down to the start position.



Muscles worked: Rotator cuff, Deltoid

Job Specific Strength: Throwing the drogue, Holding the handicam in position

Exercise Prerequisites: None

4.11 Supermans

Description

Set Up: Start by lying face down on a mat, toes touching the floor and arms up at a 45 degree angle to your body, thumbs pointing up. Chin tucked in so neck is long. Hold tongue in stabilization position behind front teeth (see Neck Stabilization exercise).

Movement: INHALE: Prepare. EXHALE: draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) and squeeze your glutes tight. Once glutes and abdominals are activated, slightly lift one leg up from the floor as well as the opposite arm. Think more about making the hand and foot reaching long and away from you than about lifting too high. Hold for the required time, making sure the lower back is not straining and the glutes and abdominals stay on to support it. EXHALE and slowly lower back to the floor. Repeat on the other side.



Muscles worked: Rhomboids, Lower Trapezius, Multifidus, Erector Spinae, Glutes, Abdominals, QL

Job Specific Strength: Exiting aircraft from knees and seated position, Holding the handcam position, Landing

Exercise Prerequisites: Tummy Vacuum, Neck Stabilization 6x6x6

4.12 Hip Extension Back on Ball

Description

Attempt this exercise when you are competent with the Pilates Bridge and Tummy Vacuum exercises. The use of the ball adds instability, which allows engagement of the deeper stabilizing core muscles. This is a great exercise to train a correct squat pattern by focusing on the glutes being the prime mover of hip extension.

Set Up: Start by sitting on a Swiss ball that allows a 90 degree angle at the knee. Do not try this on a ball that is too high. Place your hands on the side of the ball for support as you slowly walk your feet away from you. Allow the ball to roll up your back and stop when your neck and head are supported by the ball, feet underneath knees at hip distance apart and arms resting over your chest.

Movement: INHALE: Keeping your knees on top of your ankles, lower the hips down towards the floor. The ball will move slightly forward. EXHALE: Push through your heels and pull the lower abdominals in as you lift up the hips using the glutes. The lower abdominals must be activated or there will be strain through the lower back muscles. Repeat for the required reps.



Muscles worked: Glutes, Hamstrings, Lower Abdominals

Job Specific Strength: Picking up and putting on a tandem rig, Landing

Exercise Prerequisites: Tummy Vacuum, Pilates Bridge

4.13 Horse Stance

Description

This exercise strengthens the spinal muscles and their ability to resist against rotational force. This is super important as the spine is at its weakest in rotation.

Set Up: Adopt a hands and knees position on the floor, 90 degrees at the hip, hands directly under shoulders. Maintain a neutral spine alignment with a dowel rod positioned longitudinally across back, parallel to the floor. You may need to bend at the elbows slightly to make the dowel rod parallel to the floor.

Movement: Keeping the lower abdominals tight in a Tummy Vacuum, lift one hand and the opposite knee slightly off the floor, just high enough to slide a piece of paper under. There should be no physical change in position during this such as sitting back into hips. Hold for the required time then lower. Repeat on the other side.



Muscles worked: Lower abdominals, Multifidus, Obliques

Job Specific Strength: Tightening side adjusters, Exiting aircraft from knees and seated position, Landing, Laying parachute out for packing

Exercise Prerequisites: Tummy Vacuum

4.14 Sit to Stands

Description

Set Up: Start by sitting on a bench with a 90 degree angle at the knee and hip, feet hip distance or slightly wider. Hold a medicine ball or weight plate close to your body or if just beginning to learn a correct squat pattern, just hold your hands out in front of you and use your body weight.

Movement: INHALE: Prepare. EXHALE: draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) and push your weight down into your heels as you stand up from the bench. Make sure your knees track in line with your toes and do not fall inwards. If the knees fall inwards then regress down to Pilates Bridge or Hip Extension Back on ball until you can engage your glutes properly in this position. The knees must also not come forward of the ankle line. INHALE to prepare, then EXHALE and slowly lower your hips back down to the bench, moving from your hips and glutes not the knee.



Muscles worked: Glutes, hamstrings, quads, calves, lower abdominals, arms.

Job Specific Strength: Picking up and putting on a tandem rig, Landing

Exercise Prerequisites: Pilates Bridge, Hip Extension Back On Ball.

4.15 Cable Single Arm Pull

Description

Set Up: Start with the cable attached at chest height. Set the required weight for the exercise. Take the cable in one hand and while facing the machine, take a few steps away from the machine so as the weight plate is off the stand. If you're pulling with your right arm, have your left leg slightly forward, stand up straight and roll your shoulders back and down. Hold your left hand up, ready to push it forwards when you pull with the right.

Movement: INHALE: Prepare. EXHALE: draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) as you squeeze your right shoulder blade back towards your spine, pulling your right hand in towards your chest. Your left hand pushes forward allowing a gentle twist as your right hip comes back slightly. This helps to engage the obliques and core muscles as you hold in your tummy vacuum. INHALE: Control the weight back slowly to the start position, not allowing it to jerk or for gravity to help.



Muscles worked: Rhomboids, Trapezius, Biceps, Deltoid, Obliques, Transverse Abdominus. Secondary: Erector Spinae, Triceps, Glutes

Job Specific Strength: Throwing the drogue, picking up parachute and carrying it back

Exercise Prerequisites: Tummy Vacuum

4.16 Cable Double Arm Push

Description

Set Up: Start with the cable attached at chest height. Set the required weight for the exercise. Face away from the cable and take one cable in each hand and hold it to your body. Take a few steps out from the machine so as the weight plate is off the stand. Have your left leg slightly forward and rest your weight into your right heel, keeping both knees slightly bent. Keep your back straight and roll your shoulders back and down, chest lifted. Then allow your elbows to come out at shoulder height in line with your body.

Movement: INHALE: Prepare. EXHALE: draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) as you push forward evenly with both hands. The hands should be in line with the elbow at the end point, not the body. INHALE and control the weight back to the start position keeping the elbows up in line with the shoulders. Don't let the elbows move behind the shoulder line at the end point.



Muscles worked: Pectoralis Major and Minor, Deltoid, Abdominals, Biceps, Triceps

Job Specific Strength: Tightening side adjusters

Exercise Prerequisites: Tummy Vacuum

4.17 Cable Single Arm Push

Description

Set Up: Start with the cable attached at chest height. Set the required weight for the exercise. Take the cable in one hand and hold it to your body. Turn 180 degrees, facing away from the attachment and take a few steps out from the machine so as the weight plate is off the stand. If you're pushing with your right arm, have your left leg slightly forward, stand up straight and roll your shoulder back and down, chest lifted. Hold your left hand out in front as if you have just pushed a weight with this hand.

Movement: INHALE: Prepare. EXHALE: draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) as you push your right hand forward. Allow a gentle twist as your right hip comes back in line with the left and left hand comes back to the body line. This helps to engage the obliques and core muscles as you hold in your tummy vacuum. INHALE: Control the weight back slowly to the start position, not allowing it to jerk or for gravity to help. Allow the left hand to push forwards again giving the obliques control of the movement.



Muscles worked: Pectoralis Major and Minor, Deltoid, Biceps, Triceps, Obliques, Transverse Abdominus.

Job Specific Strength: Tightening side adjusters

Exercise Prerequisites: Tummy Vacuum

4.18 Supermans with DB Isometric Holds

Description

Set Up: Start by lying face down on a mat, toes touching the floor and left arm up at a 45 degree angle to your body, thumb pointing up. Left arm holding a dumbbell as you would a handcam. Chin tucked in so neck is long. Hold tongue in stabilization position behind front teeth (see Neck Stabilization exercise).

Movement: INHALE: Prepare. EXHALE: Draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) and squeeze your glutes tight. Once glutes and abdominals activated, slightly lift Right leg up from the floor as well as the Left arm holding the dumbbell. Hold for the required time, making sure the lower back is not arching or straining and the glutes and abdominals stay on to support it. Can also be done without the leg lift. Squeeze the left shoulder blade back towards the spine to engage the rhomboids and serratus anterior. EXHALE and slowly lower back to the floor. Repeat on the other side so as to balance the strength on both sides of the body.



Muscles worked: Rhomboids, Trapezius, Deltoid, Serratus Anterior, Abdominals, Neck Stabilizers, Glutes, QL, Multifidus

Job Specific Strength: Holding the handcam

Exercise Prerequisites: Tummy Vacuum, Neck Stabilization 6x6x6, Supermans

4.19 Deadlifts

Description

This is a more advanced exercise, if unsure please seek guidance from a trained fitness professional before attempting. Before beginning, assure the bar is evenly loaded and the weight is properly secured.

Set Up: - Stand with bar positioned in front of you, feet hip width apart and your shins against the bar.

- Bend and grip the bar (with either a pronated grip or alternate grip) just outside the knees with the elbows turned back so that the biceps muscle face forward as much as possible.

- Hold your chest high with shoulder blades together. Look forward and hold your head so that it is in neutral alignment with spine.

- Move into the extension lock position. Take a deep diaphragmatic breath, hold and pull the belly button toward the spine to activate the stabilizer mechanism of the body.

Execution - Ascent: Shift body weight back onto heels and pull weight upwards towards the knees. Be sure to hold the trunk rigid and push with the legs.

NOTE: Lift the load with the mental image of 'pushing the Earth away', not pulling with the arms. This is very critical as initiating the lift from the arms encourages over use of the back, underuse of the legs and constitutes poor form.

- As the bar passes the knees, integrate the back and hips into the lift, finishing with the chest high and the shoulders slightly back, but not forced back.

- As you pass through the hardest part of the lift, allow air to begin escaping through pursed lips. This is important because it maintains pressure in the abdominal cavity and keeps abdominal musculature active, (do not hold your breath).

Execution – Descent: - Prior to the decent, the breathing process should be completed again: inhaling, holding and pulling the belly button toward the spine. This may seem awkward in the beginning but it will become second nature after a little training.

- Lower the bar back to the knees using the back, hips and legs while maintaining good form.

- Once the bar reaches the knees, hold the trunk rigid and complete the descent using the legs.

- Again as you pass through the hardest part of the lift, allow air to begin escaping through pursed lips.



Muscles worked: Glutes, Hamstrings, Calves, Abdominals, Upper Back

Job Specific Strength: Exiting aircraft from knees and seated position, Landing, Picking up parachute and carrying it back, Laying parachute out for packing.

Exercise Prerequisites: Tummy Vacuum, Sit to Stand. Use Hindu Squat as Warm Up.

4.20 Single Arm Kneeling Cable Pull Downs

Description

Set Up: Start with the cable attached on both sides at the highest point. Set the required weight for the exercise. Take the cables in each hand and while facing the machine, kneel down onto a mat. You can choose whether to have both knees on the floor for even abdominal engagement, or one knee bent up in a lunge position for more stability.

Movement: Holding the weight securely with your arm outstretched, EXHALE and activate your tummy vacuum while you pull your right elbow toward your body, keeping your back straight and squeezing your right shoulder blade towards your spine. INHALE and control the weight slowly back to the start position. Your body should not move or twist with your arm. Repeat with the left arm, or continue the full reps on the right before switching to the left side.



Muscles worked: Latissimus Dorsi, Lower Trapezius, Biceps, Obliques, Transverse Abdominus, Triceps.

Job Specific Strength: Throwing the drogue, Steering the parachute

Exercise Prerequisites: Tummy Vacuum

4.21 Cable Squats

Description

Squatting with the cable machine is a great way to safely and effectively train a good squat pattern and technique for lifting load up from the ground.

Set Up: Start with the cable attached at the lowest setting. Set the required weight for the exercise. Take the cables in each hand and while facing the machine, take a few steps out from the machine so as the weight plate is off the stand. Extend your arms straight with a microbend at the elbow. Sit down into a squat position, feet hip distance apart with knees tracking over toes and heels down.

Movement: INHALE: Prepare. EXHALE: draw your lower abdominals in (correct technique from Tummy Vacuum Exercise) as you push down through the heels and stand up, squeezing through the glutes all the way to the top. Pull your arms into a bicep curl as you stand and lift the weight. Keep the knees slightly bent and back straight. INHALE as you control the weight down slowly back to the start position, extending your elbows out and keeping the heels down and knees tracking in line with feet. Repeat the required reps.



Muscles worked: Glutes, Quads, Hamstrings, Biceps, Abdominals

Job Specific Strength: Landing, Picking up parachute and carrying it back, Laying parachute out for packing

Exercise Prerequisites: Tummy Vacuum, Sit to Stands