



UNIVERSITY OF CALGARY  
FACULTY OF KINESIOLOGY  
Sport Injury Prevention Research Centre

# SHRED injuries

## Rugby

### Neuromuscular Training Warm-Up Program



## NECK CONTROL & ENDURANCE

## AEROBIC

## BALANCE

## STRENGTH

## AGILITY

Level 1	Level 2
Static neck contractions	Stationary bear crawl: Neutral neck
Partner nudges	Stationary bear crawl: Bobbleheads
Snake run	Snake run
Forward zig-zag side shuffle	Partner plant & cut
Skipping: Forward/Backward	Skipping: Sideways
Airplane balance	Hip hinge ball roll
Dynamic squat	Single leg squat pass & jump catch
Front plank	Front plank with leg lifts
Side plank	Side plank with torso rotation
Nordic hamstring	Nordic hamstring
Stationary lunge with partner claps	Walking lunges with torso rotation & leg lift
4-D lunge	Side lunges with arm circles
Multidirectional bear crawl	Bouncers
Single leg hops	Skate jumps
Shuttle run: Outside foot pivot	Shuttle run: Inside foot pivot

# Key Coaching Cues

Each exercise in the SHRED injuries warm-up program typically includes a few of the following key cues:

Head neutral



Pinch shoulders



Shoulders level with hips



Brace through trunk



Chest up  
("Proud chest")



Hip, knee, and ankle in line;  
Soft knee bend



Knees over toes;  
Avoid knees caving inward



## Exercises to develop movement control for the head on neck

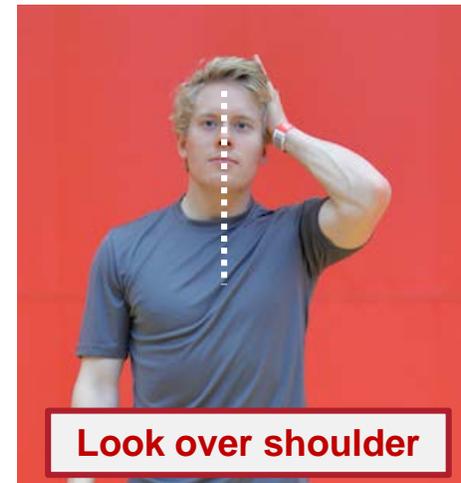
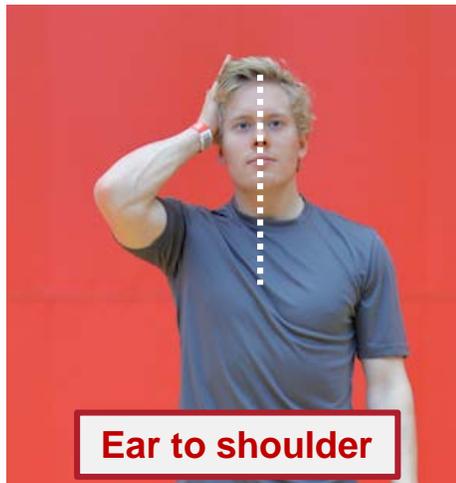
This section includes individual and partner-based exercises to activate the neck muscles for proper head control and to stimulate the vestibular system for proper sensorimotor control. The following neck control and endurance exercises are rugby-specific exercises that have the potential to prevent concussion and properly prepare the athletes for the physical demands of the sport.

For all neck control and endurance exercises, there are a few common things we want to focus on for correct technique:

- ✓ Long and strong neck
- ✓ Good posture: Head/neck neutral, shoulders back

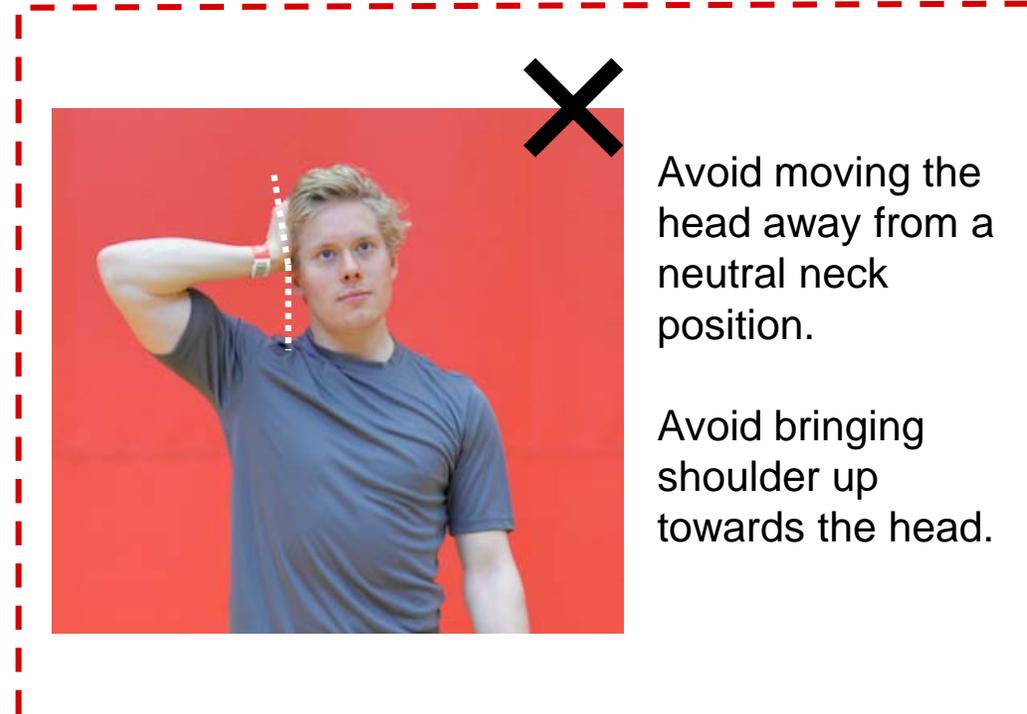
# NECK CONTROL & ENDURANCE

## Static neck contractions



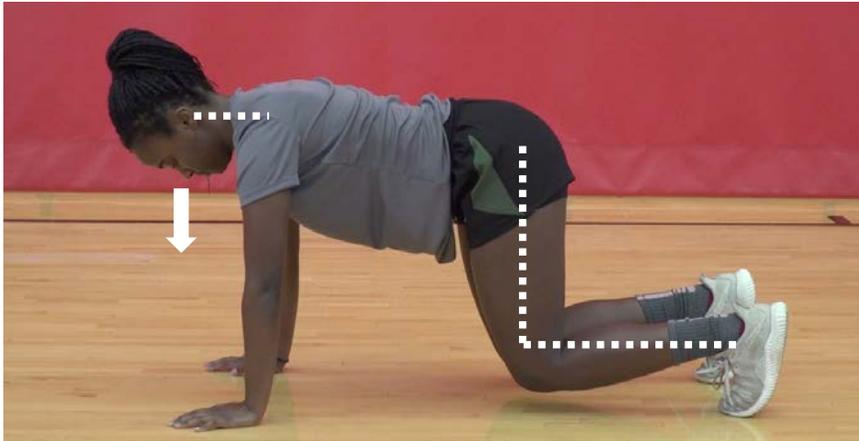
- ✓ Activates neck
- ✓ Multi-directional to encompass all neck movements

- In a **neutral neck** position, use own hand, provide resistance on forehead, back, and sides of head. Attempting to move the head in the following directions with the hand resisting the movement for 10-seconds in each of the following directions:
  - Chin to chest
  - Eyes to sky,
  - Ear to shoulder (both sides)
  - Turn head to look over shoulder (both sides)
- Force application is to the individual's discretion; however, want to apply enough force to activate the neck muscles while ensuring that the neck is not deviating from its neutral position



# NECK CONTROL & ENDURANCE

## Stationary bear crawl: Neutral neck



- ✓ Rugby-specific position
- ✓ Activates trunk
- ✓ Activates shoulders
- ✓ Neck endurance



- Begin in bear crawl position. Bear crawl position is a fundamental rugby position that is integral to the contact component of the game, as it is the basis for scrumming, rucking, tackle form, etc. Key components for bear crawl position include
  - Hands below shoulders, elbows straight
  - Knees directly under hips; **90 degrees** at hip and knee joint
  - Strong core (**brace through trunk**)
  - **Flat back**; proud chest and pinch the shoulders
  - **Neutral neck**; long and strong neck with tucked chin
- For this exercise, initially start with eyes looking straight down at the space between hands. It is important that the appropriate neck muscles are activated here to have a long neck. This can be done by getting a partner to look at the back of the neck and assess if there are any wrinkles at the back of the neck. Wrinkles would signify that the incorrect muscles are being used to support the neck in this position.
- Once comfortable in this position and this position can be held for >30seconds, can introduce moving the eyes up with a slight head lift. It is important to emphasize looking through the eyebrows to look forward and NOT fully bringing head up into a compromising, vulnerable position. Again, assess for back neck wrinkles to ensure correct neck muscle activation.

# NECK CONTROL & ENDURANCE

- In partners, nominate one part as the “nudger”. The other partner will stand with and the “nudger” will use 2 fingers and apply resistance to the torso and head. **Head is neutral** with a **proud chest**
- Partner trying to maintain their balance should engage their core and **brace through the trunk**.
- It is important that the amount of resistance applied by the “nudger” is enough to get the other partner to resist the movement and return to centre, but not too much resistance that the partner is fully pushed off balance and cannot recover.
- When applying resistance, be sure that each force has an opposing force. This is to avoid favouring a particular side or direction.
- This exercise has several variations (double vs single leg; eyes open vs closed) to keep challenging your athlete.

- ✓ Head and neck control
- ✓ Develops vestibular system
- ✓ Balance
- ✓ Ankle stability

## Partner nudges



1. Double leg balance, eyes open



2. Double leg balance, eyes closed



3. Single leg balance, eyes open



4. Single leg balance, eyes closed

# NECK CONTROL & ENDURANCE

## Stationary bear crawl: Bobbleheads



- Begin in bear crawl position. The same key components for bear crawl position can be applied:
  - ✓ Hands below shoulders, elbows straight
  - ✓ Knees directly under hips, **90 degrees** at hip and knee joint
  - ✓ Strong core/**brace through the trunk**
  - ✓ Flat back
  - ✓ **Neutral neck**: long and strong neck with tucked chin
- For this exercise, have eyes looking straight down at the space between hands. A partner will come and apply resistance with two fingers to the head in any direction.
- When applying resistance, be sure that each force has an opposing force. This is to avoid favoring a particular side or direction and allow for proper neck muscle activation.

- ✓ Rugby-specific position
- ✓ Activates trunk
- ✓ Activates shoulders
- ✓ Head and neck control

## Running-based activities to warm-up and develop control & technique

Aerobic exercises are important to elevate the heart rate, get the blood flowing ('warming up the muscles'), and work on coordination. Most people will already include aerobic activities in their existing warm-ups, and these types of exercises are still included in neuromuscular training warm-up programs.

For all aerobic exercises, there are a few common things we want to focus on for correct technique:

- ✓ Ensure we are using our arms. Keep arms bent at 90 degrees, and focus on moving opposite arm with opposite leg.
- ✓ Ensure soft, quiet feet (avoid heavy, loud stomping on foot contact).
- ✓ Keep body upright.

## Snake run

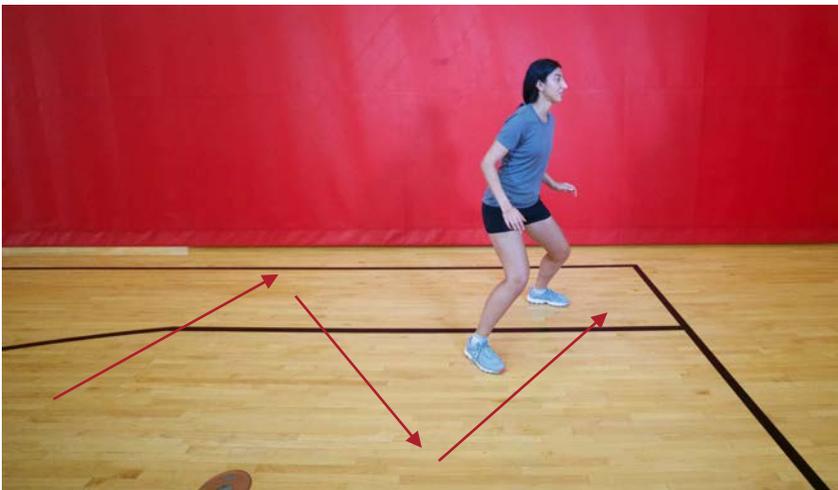


- Using the full width of the channel, alternate swerving from left to right while running
- To initiate swerve at edge of the channel, keep weight on inside foot and lightly swing the outside leg across the body while swerving
- Be intentional with the movements, making sure we incorporate our arms while running
  - Opposite arm to opposite leg, **elbows flexed** at 90 degrees

- ✓ Increases heart & breathing rate
- ✓ Non-linear movement
- ✓ Knee control

# AEROBIC

## Forward zig-zag side shuffle



- ✓ Increases heart & breathing rate
- ✓ Non-linear movement
- ✓ Joint alignment
- ✓ Knee control

- Begin side shuffling at a 45-degree angle towards the edge of the channel
  - Maintain a soft bend at the knees and hips
  - **Knees stacked over ankle**
  - Absorb each step by landing from the ball of the foot to the heel
  - Arms out in a ready position with a **proud chest**
- While side shuffling, ensure **toes, knees, and hips are all facing straight ahead relative to the trunk position**
- Once the edge of the channel is reached, pivot 90 degrees from the ball of the outside foot to begin side shuffling in the opposite direction (i.e. 45 degrees from the original start position).
- Repeat until the end of the channel is reached.
- Ensure the athletes are exiting at alternate directions each time they finish the exercise before jogging back to the start (i.e. the first time they complete the length of the channel they peel right, the second time they peel left).

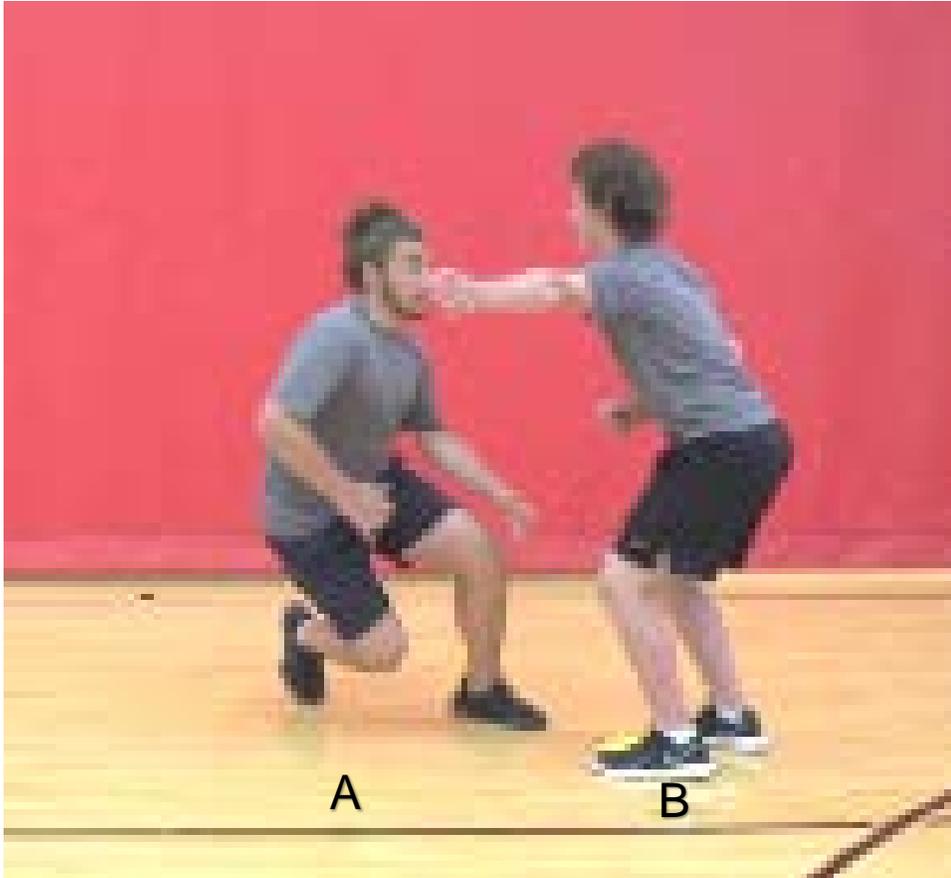
Avoid staying on the toes/balls of the feet. With each step, absorb the landing toe-to-heel



Avoid external rotation of the lead foot; both toes should be facing straight ahead relative to the body



## Partner plant & cut



- Partners set up facing each other approximately 15 yards apart
- Partner A runs towards partner B at a ~70% speed. When Partner A is a few yards away from Partner B, Partner B points right or left. Partner A must then perform a plant and cut movement at a 45-degree angle to accelerate into the specified direction.
  - Ensure good knee control; **knee should remain aligned over the ankle** during the sudden plant & cut maneuver
  - Keep body upright, **proud chest**
- Progression: Partner A cuts into the opposite direction that Partner B points.

- ✓ Knee control
- ✓ Reaction to external cues
- ✓ Acceleration

## Skipping: Forward/Backward



- Body upright, using arms
  - Elbows bent at 90 degrees
  - Opposite arm moves forward with opposite leg
- Soft, quiet landings; land on balls of feet, follow through to absorb land on heels
- Toes should face forward during full movement
- Ensure **knees are stacked over the ankles** on landing (avoid knees caving inward)
- Both knees should lift to the same height
- Strive for more reps (smaller steps) rather than height, distance, or speed

- ✓ Increase heart rate
- ✓ Coordination
- ✓ Soft, absorbed landings
- ✓ Hip mobility
- ✓ Lateral movement

Avoid landing on a full, flat foot



Avoid staying on toes only



Avoid back straightening of back elbow



Avoid same arm same leg



## Skipping: Sideways



- Body upright, using arms
  - Elbows bent at 90 degrees
  - Opposite arm moves forward with opposite leg
- Soft, quiet landings; land on balls of feet, follow through to absorb land on heels
- Toes should face forward during full movement
- Ensure **knees are stacked over the ankles** on landing (avoid knees caving inward)
- Both knees should lift to the same height
- Strive for more reps (smaller steps) rather than height, distance, or speed

- ✓ Increase heart rate
- ✓ Coordination
- ✓ Soft, absorbed landings
- ✓ Hip mobility
- ✓ Lateral movement

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Avoid knees crossing inwards as you lift your knee up;  
Knees should remain in line with the hips



See “Skipping: Forward/Backward” exercise on previous page for more common errors

## Exercises to develop movement control and stability in the lower body and trunk

Balance exercises are also not often included in traditional warm-up programs. Balance exercises are key to developing joint stability, which is important not only for sport activities, but also for health in everyday life.

For all balancing variations, there are a few common things we want to focus on for correct technique:

- Maintain a slight knee bend
- Maintain knee-over-ankle alignment (avoid the knee caving inwards)

# BALANCE

## Airplane balance



- Standing on one foot with a **soft bend at the hips and knees**, hold arms out to the sides at 90 degrees to the trunk with thumbs facing upwards.
- Slowly push hips back into a hinge position to bring the trunk parallel to the ground:
  - Ensure **flat back** by maintaining **neutral spine and neck position**; **pinching the shoulders** back
  - Bend is primarily at the hips, with a **soft bend in the knees**
- Once trunk is parallel to the ground (or as close to parallel as the hamstring flexibility and balance ability allows), slowly reverse the hinge to return back up to single-leg standing position

**Avoid knee caving in;** athletes should be able to see inside of front foot



Avoid rounding the back. **Pinch the shoulders back**, and only go as far down as hamstring flexibility and balance allows.



Avoid external rotation of the hips; both hips should be at equal level as they move to become parallel with the floor. Cueing the athlete to point their big toe of their free leg toward their standing leg will help internally rotate the hip.



Avoid neck over-extension. **Neck should remain in line with spine**. Cue athlete to look up through the eyebrows.



## Hip hinge ball roll



- Partners stand on facing each other a few yards apart. Partner B will mirror Partner A's movements
- Both partners balance on one foot, with a **soft bend at the hips and knees**
- Both partners hold their arms straight above their head
- Partner A, holding the ball, pushes their hips back into a hinge position to bring the trunk parallel to the ground (Partner B does the same movements but without the ball):
  - Ensure **flat back** by maintaining **neutral spine and neck position**
  - Bend is primarily at the hips, with a **soft bend in the knees**
- As they reach the ground, partner A rolls the ball to partner B's outstretched arms
- Partner B picks up the ball and slowly reverses their hinge to return back up to single-leg standing position, with ball held above their head. Partner A now mirrors Partner B's movements.

- ✓ Dynamic balance
- ✓ Trunk control
- ✓ Shoulder mobility



**Avoid rounding the back.** If hamstring flexibility limits the athlete's ability to reach the ground while maintaining a flat back, cue them to bend their knee more.



**Avoid external rotation of the hips;** both hips should be at equal level as they move to become parallel with the floor. Cueing the athlete to point their big toe of their free leg toward their standing leg will help internally rotate the hip.

## Dynamic squat

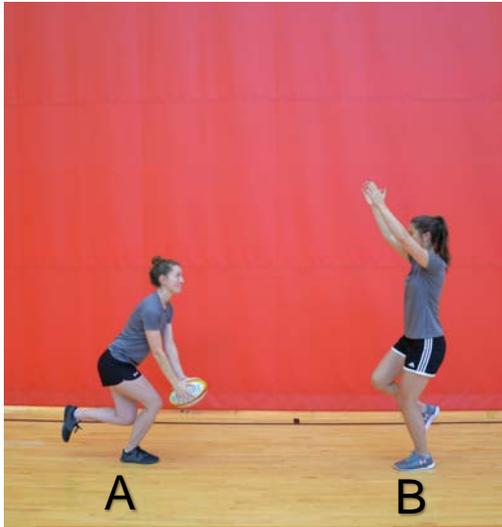


- ✓ Dynamic balance
- ✓ Activates glutes
- ✓ Knee control
- ✓ Shoulder mobility

- Begin in a standing position, with arms held straight above the head (can be holding a ball if available).
- Lower into a bodyweight squat position
  - **Neutral** spine with **shoulders back**
  - **Proud, upright chest**
  - **Knee over ankle** alignment
- While lowering into the squat position, bring ball forward and down towards the floor while maintaining straight arms
- Reverse movement to return back up to starting position, engaging glutes ('squeezing your butt') on the way up

# BALANCE

## Single leg squat pass & jump catch



- Partners stand on facing each other a few yards apart
- Both partners balance on one foot, with a **soft bend at the hips and knees**
- Partner A, holding the ball, sits back into a shallow single-leg squat. Using underhand toss as they come up from their squat, partner A passes the ball up above partner B's head.
  - Engage glutes to support **knee over ankle alignment**.
- Partner B is waiting with their arms outstretched above their head. When the ball is at peak height above, they hop up to catch the ball in the air and land on one foot.
  - Maintain **soft bend in the hips and knees**
  - Engage glutes to support **knee over ankle alignment**.
- Once partner B regains control from their catch, they repeat the exercise by passing back to Partner A.

## STRENGTH

# Bodyweight or partner-resistance activities to develop strength and control through the lower body, upper body, and neck area

Strength exercises are a key component of neuromuscular training warm-up programs. These exercises help to activate the muscle groups that we require to perform our activities with proper technique and to promote stability in our joints.

For all strength exercises, alignment is key. Consciously engaging the involved muscle groups will support correct technique.

# STRENGTH

## Front plank

- Starting by facing the ground, elevate into a front plank position from elbows by resting on forearms and balls of the feet
- Maintain straight line from shoulders to ankles. To ensure proper positioning of the pelvis and avoid the curved lower back, cue the athlete to tuck their bellybutton up toward their chest
- Keep **neck in line** with spine (avoid looking up or tucking the neck in)
- **Engage shoulders** so to see a “Flat t-shirt” over the shoulder blades
- Elbows should be stacked under the shoulders



- ✓ Activates trunk
- ✓ Trunk control
- ✓ Engages shoulders

Avoid sagging (hips too low)



Avoid rounding or sagging shoulders



Avoid tent shape (hips too high)



Avoid tucking the elbows too far back



*FAQ: Optimal hand positioning?*

\*Hands can be positioned parallel out in front or clasped together; whichever is more comfortable. If athletes choose the clasped method, ensure they are properly engaging their shoulders to avoid the rounded upper back

# STRENGTH

## Front plank with leg lifts



- From a front plank position (see previous exercise for correct cues), slowly raise one leg a few inches above the ground, keeping the leg straight, and **bracing through the trunk**.
- Pause briefly at the top before lowering, slowly and under control, back to the ground
- Repeat for the other leg; continue alternating legs

- ✓ Activates trunk
- ✓ Trunk control
- ✓ Engages shoulders



Avoid lifting leg too fast; movement should be slow and controlled



Avoid lifting leg too high. The leg only needs to be lifted high enough so that the toe of the lifting leg is just above the heel of the lower leg.

# STRENGTH

## Side plank



Feet can be stacked on top of each other or staggered (with the foot from the top leg in front)



- Lie on one side with feet, legs, hips, and forearm in contact with the ground.
- Pressing down into the floor through the forearms and feet, the athlete should elevate themselves upwards
- Elbow should be stacked directly under the shoulder. The athlete may need to position their elbow closer towards their hips before pushing upwards to ensure that it is in the correct position once they are elevated in the side plank position
  - Hand from free arm can be placed on upper hip.
- **Maintain a straight line from head to toes** (this includes the neck as well; the athlete should look straight ahead) by **engaging the trunk**.

- ✓ Activates obliques (lateral trunk)
- ✓ Trunk control
- ✓ Engages shoulders

Avoid deviating from neutral neck position; keep neck in line with rest of spine



Avoid internally rotating top hip towards the ground.



Avoid placing the elbow too far away.



# STRENGTH

## Side plank with torso rotation



- ✓ Activates obliques (lateral trunk)
- ✓ Trunk mobility
- ✓ Engages shoulders

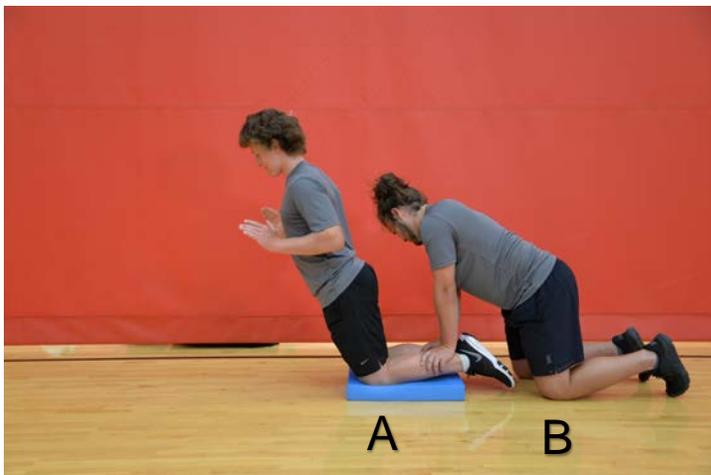
- From side plank position (see previous exercise), reach the upper arm above body, with fingers pointing toward the sky.
- While maintaining a **straight body position** (i.e. without bending at the hips), rotate trunk down towards the ground (initiate movement by internally rotating top hip).
- Bring arm down and reach underneath the body and through the armpit. Pause for 1-2 seconds before rotating trunk back up to initial side plank position with the fingers pointing toward the sky. Follow the moving arm with eyes for the duration of the rotation.



Avoid only moving the arm; the torso and hips should rotate with the movement as well.

# STRENGTH

## Nordic hamstring



- Partner A kneels in front of partner B. Partner B holds partner A's legs below the belly of the calf muscle, above the heels.
  - Partner B will need to lean their bodyweight into their hands to properly support Partner A.
- Maintaining a **straight line from head to knees (engaging trunk and glutes)** and with their hands placed in front of them with a slight elbow bend, partner A slowly falls forward toward the ground.
  - Note that if partner A is performing the exercise correctly (controlled lowering while maintaining straight body positioning), they will feel tightness in their hamstrings that may be similar to a muscle cramping sensation.
- When partner A is no longer able to maintain their controlled body positioning, they can allow themselves to 'let go' and fall the rest of the way toward the ground, catching themselves with their hands.
- To reset to the starting position, partner A should relax and walk their hands back toward their body.

- ✓ Hamstring strengthening
- ✓ Trunk control



Avoid bending at the hips.  
Avoid lowering too quickly.

The good thing about this exercise is that you will know you are doing it correctly because you will feel it in your hamstrings.

# STRENGTH

## Stationary lunge with partner claps



- ✓ Knee control
- ✓ Activates glutes
- ✓ Activates quads
- ✓ Trunk mobility

- Partner A performing the exercise performs a static lunge in front of partner B, with partner B holding their hands out to either side of partner A, slightly below partner A's shoulder height.
- Partner A holds the lunge position with their hands out in front (palms facing inwards), then begins to slowly rotate their torso toward Partner B's hands while maintaining **good knee control**:
  - **Knee should be stacked over ankle** (athletes should be able to see the inside of their front foot)
- Using their hand from the opposite side, partner A reaches across their body to clap partner B's outstretched hand, then slowly rotates back in the other direction, again reaching across their body with their opposing hand to clap partner B's other hand
- This exercise should be performed slowly and with control
- The farther back partner B positions their outstretched hands, the more challenging the exercise will be for Partner A. This is because Partner A will need to rotate more to clap Partner B's hand, requiring more balance and knee control.



Avoid rotating too quickly; movements should be slow and controlled.



Avoid having the knee cave inwards; the athlete should always be able to see the inside of their front foot if in good knee alignment.

# STRENGTH

## Walking lunges with leg lift & torso rotation



\*Note this exercise can be performed with or without a rugby ball.

- Step into forward lunge, rotating torso to side of the front foot.
  - **Knee should be stacked over ankle** (athletes should be able to see the inside of their front foot)
  - **Proud chest**; torso angle should match shin angle
- Rotate back to centre as the back leg steps forward
- Continue to bring the knee in front of the body into a 90-degree knee lift, bringing ball above head with arms extended. Pause for 2-seconds.
- Bring the elevated knee forward and down into another lunge, rotating the torso to the side of the new front foot.
- Repeat for each step until recommended distance covered.



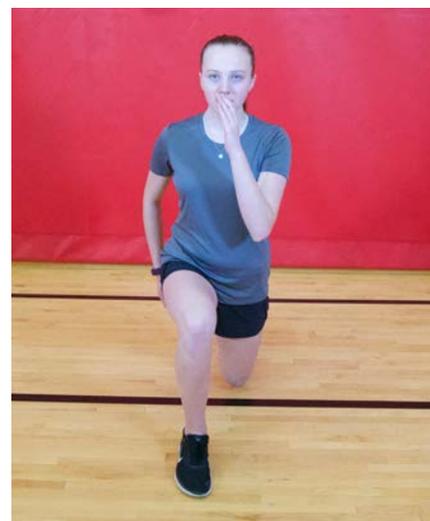
Avoid having the knee cave inwards; the athlete should always be able to see the inside of their front foot if in good knee alignment.

\*Don't forget to also pay attention to the back foot. The toe should point straight ahead, avoid twisting.

- ✓ Knee control
- ✓ Activates glutes
- ✓ Activates quads
- ✓ Trunk mobility
- ✓ Shoulder mobility

# STRENGTH

## 4-D lunges



Cues specific to each lunge direction:

### Forward lunge & Backward lunge:

- Toes of both feet should be pointing forward

### Side lunge:

- Toes of both feet pointing forward
- 'Back' leg should be straight
- Both feet should be flat and sticky on the floor (avoid resting on inside edge of the straight leg)

### Diagonal lunge

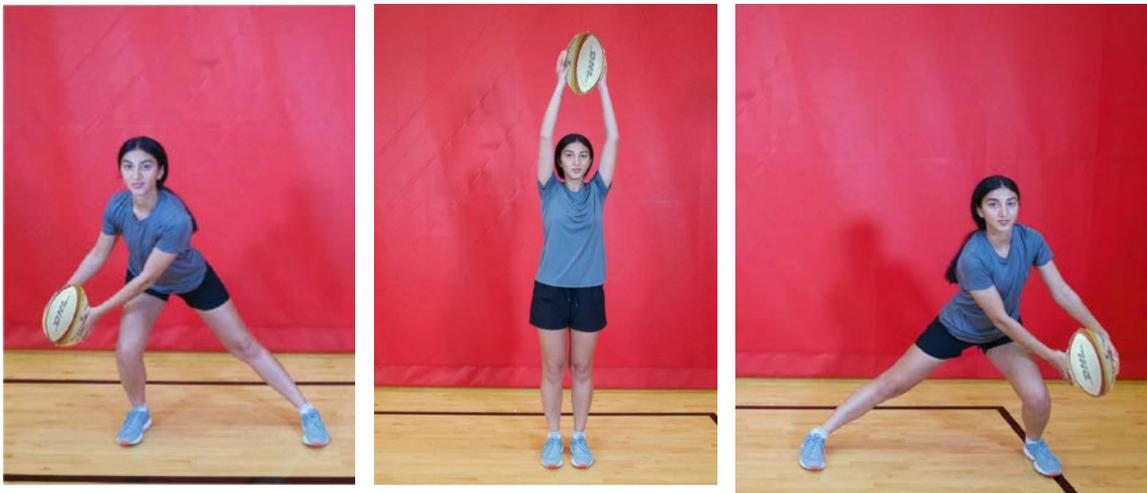
- Toes from 'back'/straight leg should be pointing in original forward direction
- Toes from 'front'/bent leg should be pointing towards SouthWest (or 7 o'clock) direction if left foot, SouthEast direction (or 5 o'clock) direction if right foot

For all lunge directions, ensure:

- **Knee should be stacked over ankle** (athletes should be able to see the inside of their front foot)
- **Proud chest**; torso angle should match shin angle
- Arms bent at 90 degrees, with arm on opposing side of front foot out in front
- Bodyweight should be over bent knee
- Return to standing position between each lunge direction

- ✓ Knee control
- ✓ Activates glutes
- ✓ Activates quads
- ✓ Trunk mobility
- ✓ Shoulder mobility

# STRENGTH



## Side lunges with arm circles

- Begin in a side lunge position:
  - **Knee stacked over ankle**; should be able to see inside of front foot
  - Bodyweight over bent knee
  - Toes of both feet pointing forward
  - 'Back' leg should be straight
  - Both feet should be flat and sticky on the floor (avoid resting on inside edge of the straight leg)
- Arms held out below the bent knee in starting position, can be holding ball.
- Begin transferring bodyweight towards straight leg so that feet come together in a standing position, ball tracking down towards both feet
- From standing, continue arm motion to perform an overhead rotation (clockwise if moving right to left; counterclockwise if moving left to right)
- When ball makes full rotation, continue to move it at approximately hip height as bodyweight is transferred toward the original straight leg, which now becomes the bent leg.
- Through the duration, have eyes follow the hands (or ball if doing the exercise with ball in hand).
- Repeat back in opposite direction

Avoid coming up on inside heel



Avoid toes pointing outwards or sideways



Avoid knee caving in



- ✓ Knee control
- ✓ Hip mobility
- ✓ Overhead mobility
- ✓ Dynamic stability

## Landing and change of direction to develop control

Agility exercises focus on control when changing direction, pivoting, jumping, and landing. These exercises will continue to elevate the heart rate and will also allow us to activate the muscles responsible for joint stability.

For all agility exercises, we want to focus on knee alignment:

- Knees stacked over ankles; avoid caving inwards
- Focus on soft, quiet feet during landing and direction changes.

## Multi-directional bear crawl



- ✓ Engages shoulders
- ✓ Engages trunk
- ✓ Develops rugby-specific positioning

- Begin in a bear crawl position:
  - Hands stacked under shoulders
  - Knees stacked under hips (this will create a 90 degree angle at both the hips and the knees)
  - Flat back: **Engage shoulder blades**, tuck in pelvis (pull bellybutton up towards chest)
  - **Neutral neck position** in line with spine (no crink in neck, look forward through the eyebrows)
- Start crawling by moving opposing hand and foot together for each step in the forwards & backwards directions.
- For the right and left directions athletes may move opposing hand and foot together **or** they may move same hand and foot together for each step. Note that opposing hand and foot will be easier as the athlete will be more balanced, while moving same hand and foot together will be more challenging.



✗ Avoid dropping hips to one side; maintain hip position at equal height

✗ Avoid positioning the knees too far back; knees should be stacked under the hips to form 90 degree angles at the hips and knees



✗ Avoid hips too high and rounding of the back; maintain good pelvic positioning and strong shoulder engagement to ensure a flat back



## Bouncers



- Begin on the balls of the feet, knees and hips bent, with arms positioned in front of the knees and stacked under the shoulders, and palms flat on the floor. Feet should be positioned approximately hip-width apart.
- Tuck in pelvis (pull bellybutton up towards chest) to avoid rounded lower back
- Propel body forward from the trunk and legs, landing on hands with elbows slightly bent. **Shoulders should be engaged to maintain a flat back**, and hands should be stacked under shoulders upon landing.
- The distance the athlete propels themselves does not have to be far; knees should maintain at least a slight bend (i.e. no need to end up in a high plank position).
- Propel knees forward towards elbows to return to starting position.

- ✓ Engages shoulders
- ✓ Engages trunk
- ✓ Practices safe landings

## Single-leg hops



- Begin by standing on one leg with a **soft bend at the knees and hips**, holding opposite arm out in front to act as a counter-balance.
- Hop to land on same leg while swinging the arms to switch their positions at peak of the jump, then bringing arms back to initial position upon landing.
- Focus on soft landing; toes to heel, absorbing the landing with a bent knee and hip.
- These should be quick hops, i.e. the athletes should only have enough time to absorb landing into the heel before immediately pushing back up again.
- Keep elbows bent at 90 degrees.

- ✓ Ankle stability
- ✓ Knee control
- ✓ Practices soft landings
- ✓ Arm/leg coordination



Avoid knee caving in



Avoid straight, locked knee



Avoid same arm same leg

## Skate jumps



- Begin by standing on one leg with a **soft bend at the knees and hips**, holding opposite arm out in front to act as a counter-balance.
- Jump sideways to land on other leg, while swinging the arms to switch their positions. Opposite arm should now be out in front.
- Focus on soft landing; balls of the feet to heel, absorbing the landing with a bent knee and hip.
- Keep elbows at 90 degrees.

- ✓ Ankle stability
- ✓ Knee control
- ✓ Practices soft landings
- ✓ Arm/leg coordination

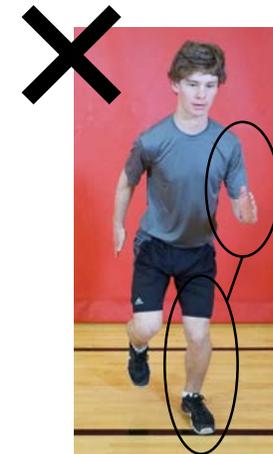


Avoid crossing free leg behind standing leg. This may also cause the hip to drop or twist; we want to keep the hips at an even level, facing forward.

Elbows should not be extended (arms should not be straight) – this tends to happen when the arm swings backwards.



Avoid knees caving in. Rotate hip of standing leg outwards and engage glutes to assist with knee control.



Watch for arm/leg coordination. Avoid having the arm and leg from the same side of the body out in front.

# Shuttle run (Outside foot pivot)



- Run to touch line, using arms with elbows bent at 90 degrees
- To change direction at the touch line, pivot by keeping bodyweight over outside leg
- **Knee should be stacked over ankle** at direction change
- Arm opposing the pivoting leg should be in front, with both elbows bent at 90 degrees
- Push off outside foot back in opposite direction
- Repeat for direction change at other end of the channel using opposing leg
  - Athletes should be facing the same way at each direction change to ensure they are alternating pivoting legs

- ✓ Knee control
- ✓ Arm/leg coordination
- ✓ Increases heart rate and breathing rate



Avoid knees caving in

# Shuttle run (Inside foot pivot)



- Run to touch line, using arms with elbows bent at 90 degrees
- To change direction at the touch line, pivot by keeping bodyweight over inside leg
  - Almost as if you are trying to cheat on the beep test – barely reaching the outside leg to make contact with the touch line before pushing off in the opposite direction
- **Knee should be stacked over ankle** at direction change
- Arm opposing the pivoting leg should be in front, with both elbows bent at 90 degrees
- Push off inside foot back in opposite direction
- Repeat for direction change at other end of the channel using opposing leg
  - Athletes should be facing the same way at each direction change to ensure they are alternating pivoting legs

- ✓ Knee control
- ✓ Arm/leg coordination
- ✓ Increases heart rate and breathing rate



Avoid knees caving in

# FAQs: How to manage quality control with such a large team?

Have athletes watch each other when performing the exercises so that they may give each other feedback. Peer learning may also help them improve their own technique. This tactic works well for balance, strength, and agility exercises such as:

- Bear crawl variations
- Plank variations
- Jumping/hopping variations
- Airplane balance

# FAQs: Do I have to do everything in this order?

This warm-up program has been designed in the given order for the following reasons:

- The exercise intensity increases as you move through the program (e.g. the Neck control & endurance exercises at the beginning are stationary and thus not very demanding, while the agility exercises at the end will increase the heart and breathing rates to an appropriate pre-activity level)
- Aerobic exercises are performed early on to prepare the muscles for the following exercises by increasing blood flow. For example, we don't want to perform the strength exercises when muscles are 'cold'.
- The research & development team focused on efficient transitions for a team setting. For example, the front plank, side plank, and Nordic hamstring exercises were placed one after another because all three require athletes to be on the ground; therefore making the transition easier.

That being said, it is okay to rearrange some of the exercises within a category if you feel that the warm-up 'flows' better in your team setting (e.g. performing the lunges at the beginning of the strength category rather than the end).

You may also move full categories for the same reason, as long as the aerobic components are completed before the balance, strength, and agility exercises. For example, it is okay to move the balance to the end of the warm-up if you feel it is a better transition into the sport-specific drills you will be completing as some of the balance exercises require rugby balls.

# FAQs: How long does it take?

This program has been tested many times in both an individual and team setting, and each time the program takes approximately 12 minutes.

We understand that it will likely take longer in the early stages while the athletes are becoming familiar with the warm-up program, but once it becomes routine the warm-up should only take ~12 minutes.

We also understand that warm-up program length is a barrier to coaches and kept this in mind when designing the program. We aimed to keep the program under 15-minutes in length.

# **FAQs: How do I know if my team is ready to progress to Level 2?**

The athlete should be proficient at Level 1 before moving up to Level 2. This means being able to easily complete the upper end of the desired number of reps or time with correct technique.

# FAQs: Can I mix and match between Levels 1 and 2?

Yes – you do not have to perform only Level 1 exercises, or only Level 2 exercises. Your athletes will likely be able to progress to Level 2 for certain exercises more easily, while you may need to continue using Level 1 for other exercises.

Once your athletes have reached Level 2, it is okay to regress back to Level 1 if:

- Your athletes are struggling significantly to perform the Level 2 exercise
- You have been at Level 2 for a while and want to add a bit more variety
- You want to decrease the intensity after a heavy game or practice the previous day (e.g. decreasing the number of reps for the Nordic hamstring down from 6-8 reps in Level 2 to 3-5 reps in Level 1).

# FAQs: How do I run this warm-up program indoors?

A large rugby team in a small gym space does not seem ideal, but we can modify components of the warm-up to minimize space while still gaining the benefits of injury prevention. Some examples include:

- Aerobic components: Grouping the athletes in lines along the length of the gym and having one person from each line perform the exercise at a time. The distance may be smaller (running the width vs the length) but it would allow more athletes to perform the exercise at a time and minimize the waiting time between turns. You can add more reps in to compensate for the smaller distance (e.g. perform the snake run 4 times instead of 2).
- Skipping: Encouraging athletes to take small steps to maximize the number of reps in a small space. They can also perform this on the spot.
- Walking lunges, Bouncers: Athletes do not need to use a full gym length/width. They can spread out around the gym and each perform only 3-4 reps before turning around and repeating the exercise within their space.

Additional tips include:

- Selecting the levels of the exercise that can be performed on the spot. For example:
  - Stationary lunges with partner claps vs Walking lunges with torso rotation + leg lift;
  - 4-D lunges vs Side lunges with arm circles
  - Individual balance exercises (Level 1) vs Partner balance exercises (Level 2)
- Performing the exercises in stations rather than together as a full team

# FAQs: Do I always need to lead the warm-up?

No. It is recommended that you lead the warm-up for the first few sessions while the athletes are still learning, but once they are familiar with the program **and with understanding the correct technique for each exercise**, they can perform the program on their own.

\*Designating captains or veteran players to lead the warm-up is a great way to manage the warm-up delivery.

\*Partnering players to give each other feedback on technique while performing the exercises will encourage peer-to-peer learning and help them improve on their own movement execution as well. This also makes it easier for you as the coach, as it would be difficult for you to watch for correct technique and provide feedback for everyone on your team.

As the coach, it is still valuable to oversee your athletes performing the warm-up program regularly to ensure the movements are being performed correctly.

# FAQs: How can I introduce this with my team?

Coaches and teachers who have used the neuromuscular training warm-ups previously have shared a few different strategies on how they introduced the warm-up program with their students/athletes:

- Take a full practice session to teach each Level 1 exercise of the full program in detail, focusing on correct technique.
- Build the program slowly: At your first session, introduce 1 exercise from each category. At your next session perform those exercises you taught them the previous day, but also add one more exercise from each category.
- Book a separate session with a select handful of your veteran players to teach them the full program. They will be able to assist the other players when the program is introduced to the full team.

You will always be introducing new drills that your athletes need to learn. Think of this warm-up program as another drill you would lead at practice, which will become easier to implement over time.