

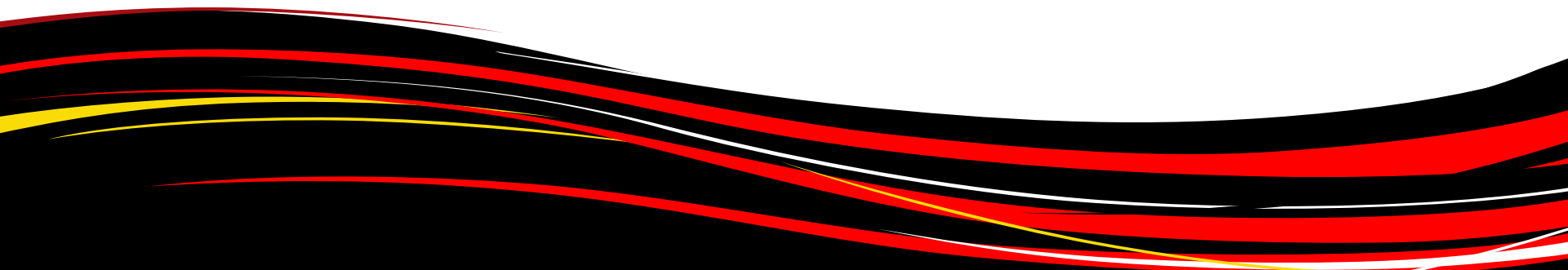
# Concussion management



# WHAT IS A CONCUSSION

## **A concussion is a brain injury**

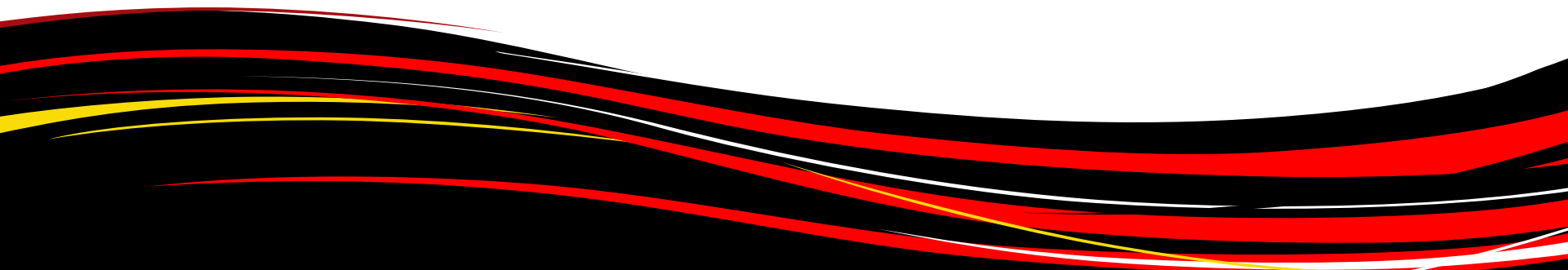
**When dealing with concussions, your primary concern is that this is a potentially serious injury with long term consequences on an athlete's quality of life during and after their sport career.**



# **RECOVERY IS POSSIBLE...**

**If the brain is given enough time to rest and recuperate.**

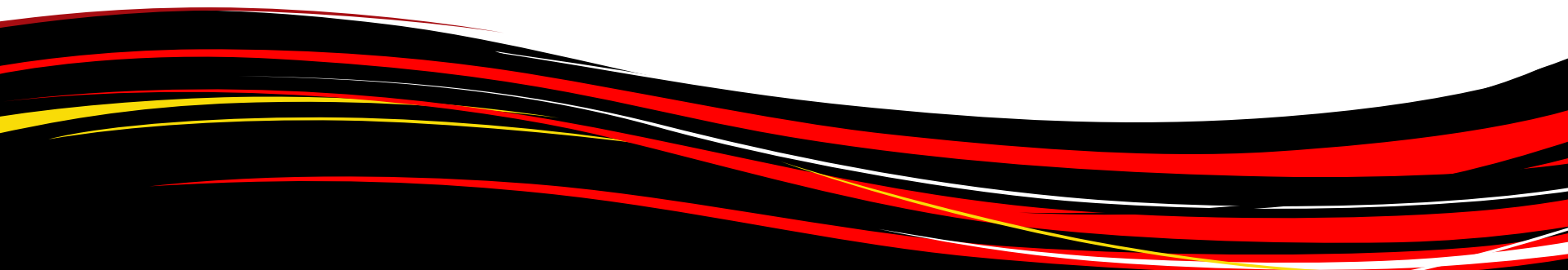
**Returning to normal activities,  
including sport participation, is a  
step-wise process that requires  
patience, vigilance, and caution.**



# RETURN TO NORMAL

Sometimes returning to normal activity can cause symptoms of a concussion to return.

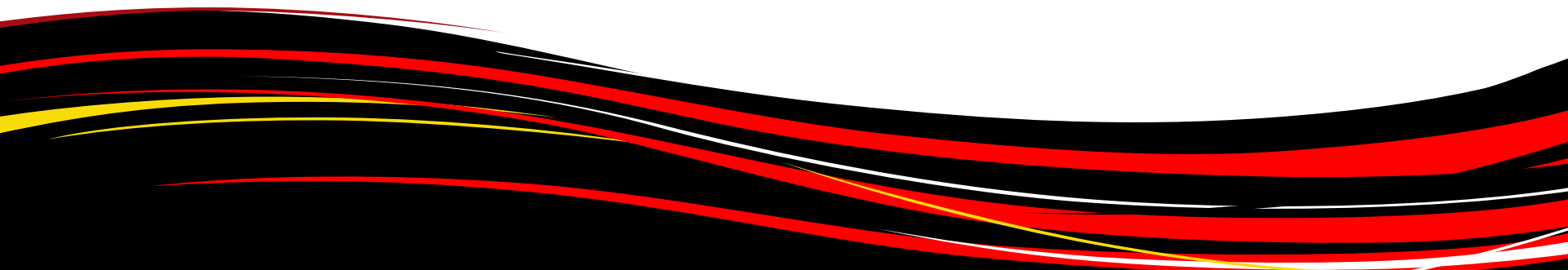
This means that the brain has not yet healed, and needs more rest. If any signs or symptoms return during the *Return To Competition Readiness* process, the athlete must be re-evaluated by a physician before trying any activity again.



# COMPETITION READINESS

Competition readiness is the ability to *consistently perform on demand, demonstrating skill mastery at target speeds while fatigued in a competition environment.*

**Competition readiness is not sport participation**



# High risk environment

A subsequent concussion will set back full recovery by a factor of

**10+**

# Concussion signs and symptoms

Indicator	Evidence
Symptoms	Headache, dizziness, "feeling in a fog"
Physical signs	Loss of consciousness, vacant expression, vomiting, inappropriate playing behaviour, unsteady on legs, slowed reactions
Behavioural changes	Inappropriate emotions, irritability, feeling nervous or anxious
Cognitive impairment	Slowed reaction times, confusion/disorientation, poor attention and concentration, loss of memory for events up to and/or after the concussion
Sleep disturbance	Drowsiness

# Fatigue signs and symptoms

Indicator	Fatigue	Concussion
Symptoms	<ul style="list-style-type: none"> <li>↑ Irritability</li> <li>↑ Confusion</li> <li>↑ Headaches</li> </ul>	Headache, dizziness, "feeling in a fog"
Physical signs	<ul style="list-style-type: none"> <li>↓ Coordination</li> <li>↓ Balance</li> <li>↓ Technical skills</li> <li>↑ Muscular fatigue</li> <li>↓ Power or speed</li> <li>↓ Endurance</li> <li>↓ Speed and agility</li> </ul>	Loss of consciousness, vacant expression, vomiting, inappropriate playing behaviour, unsteady on legs, slowed reactions
Behavioural changes	<ul style="list-style-type: none"> <li>↑ Depression</li> <li>↑ Moodiness</li> <li>↓ Motivation to train</li> </ul>	Inappropriate emotions, irritability, feeling nervous or anxious
Cognitive impairment	<ul style="list-style-type: none"> <li>↓ Memory</li> <li>↓ Decision making</li> </ul>	Slowed reaction times, confusion/disorientation, poor attention and concentration, loss of memory for events up to and/or after the concussion
Sleep disturbance	<ul style="list-style-type: none"> <li>↑ Sleep disturbances</li> </ul>	Drowsiness



# RETURN TO COMPETITION PROCESS

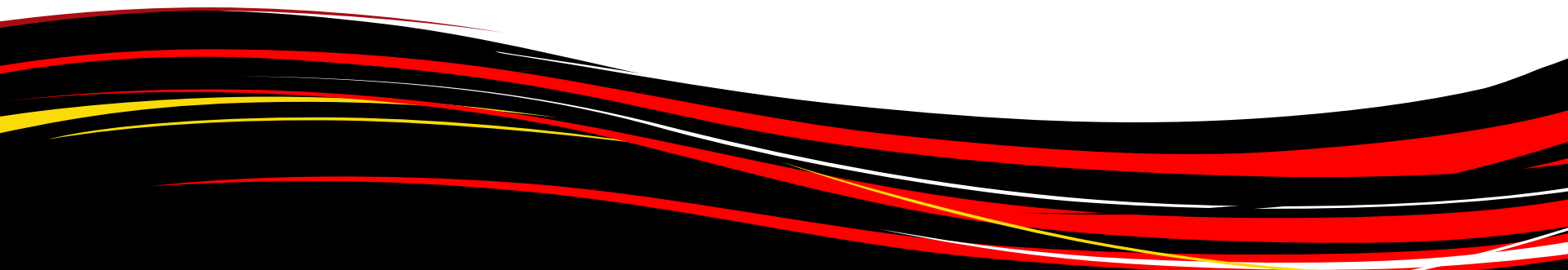
Step	Activity undertake	Athlete age	
		U16	17+
1	No activity, complete rest. Once symptom free and cognitive recovery is demonstrated, proceed to level 2.	7 days	2 – 3 days
2	Light aerobic exercise	8-14	4 – 10
3	Sport specific training	15-19	11 – 15
4	Individual training and drills	21-27	16 – 20
5	Full training after medical clearance	28	21
6	Return to competition	28+	21+

# Step 1: No activity, only complete rest

This means no work, no school, and no physical activity.

- Vegetative: dark, quiet, no stimuli

**This is an essential step.**



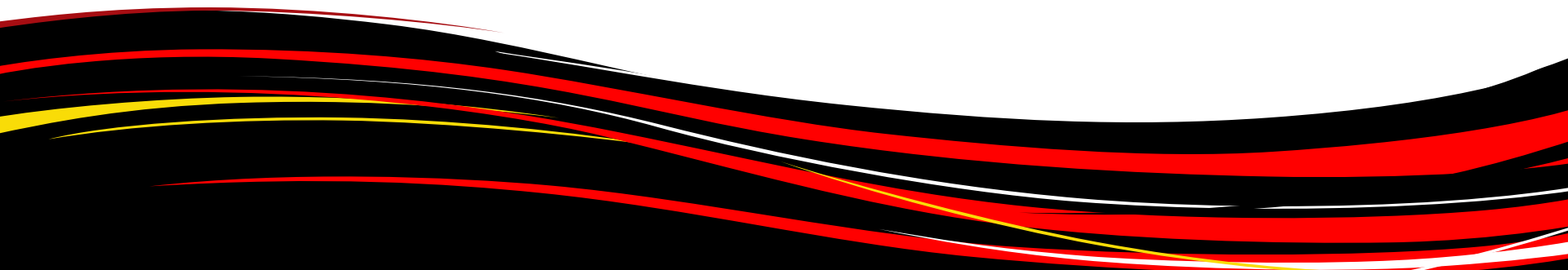
# MOVING AHEAD?

## Symptoms?

- Stay at Step 1

## No symptoms?

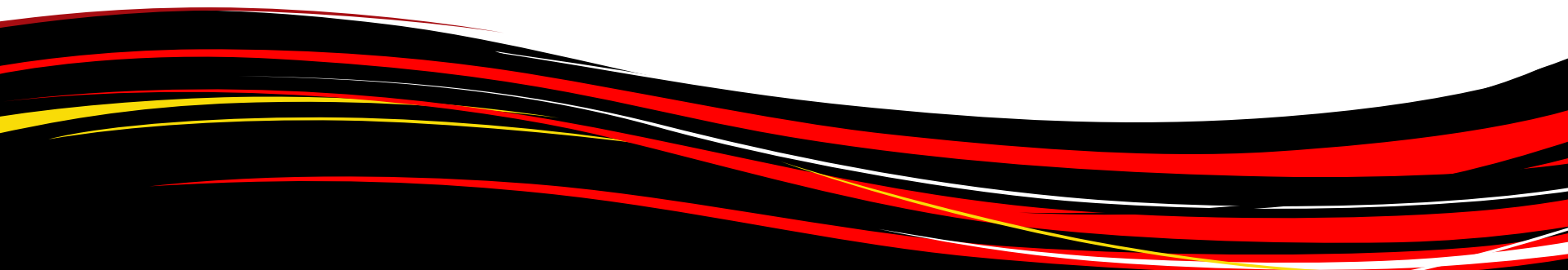
- U15; proceed to Step 3 after 7+ days
- 16+; proceed to Step 3 after 1+ days



# **Step 2: Return to light aerobic activity**

**The athlete should be supervised by someone who can monitor for symptoms and signs.**

**The duration of the aerobic exercise is gradually increased as long as the athlete remains asymptomatic.**

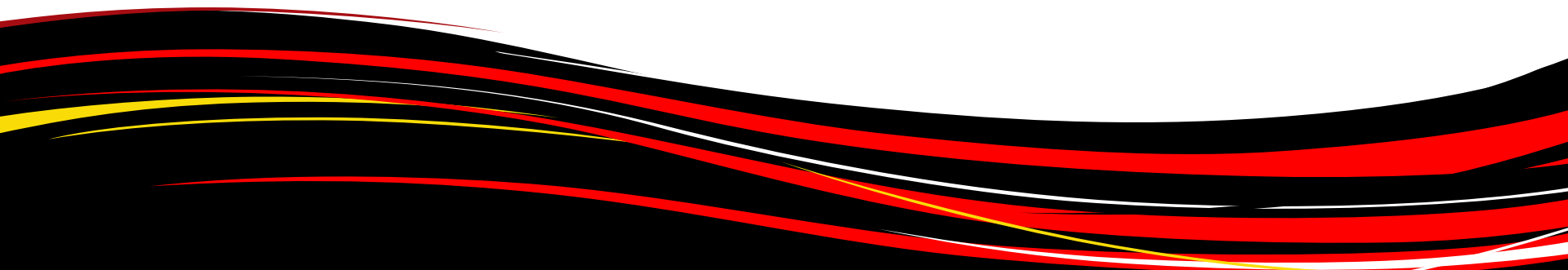


# ACTIVITIES ALLOWED

**Light aerobic exercise, such as walking or stationary cycling in an upright, well balanced position. All activity should be in a stable and controlled environment to help healing process.**

For cycling, rollers are not recommended, but stationary trainers are allowed with modifications to position that ensures the head and shoulders are over the hips.

Treadmills are an acceptable alternative for running/walking



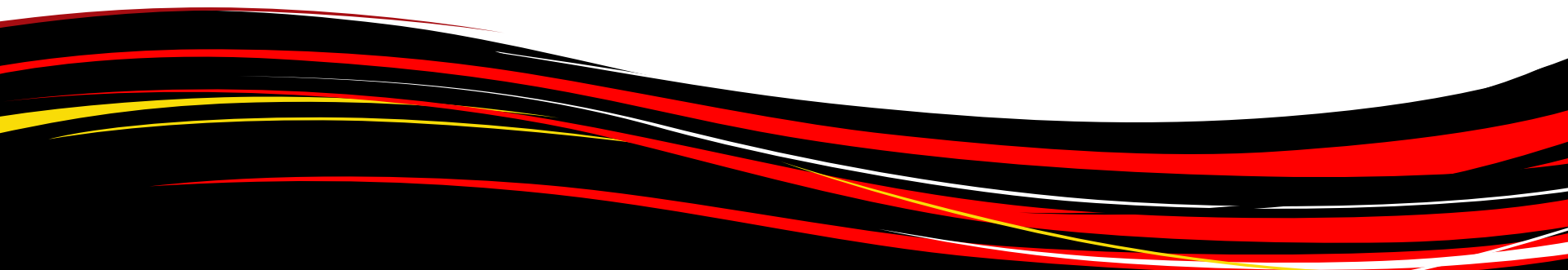
# SPECIFICS

**DURATION:** only 5-10 minutes to begin, adding 5 min per session you remain asymptomatic

**INTENSITY:** Begin at the lower end of your aerobic threshold, or <50% of peak heart rate slowly. Build to higher aerobic training efforts once you are 45 minutes and still asymptomatic

**FREQUENCY:** Every second day

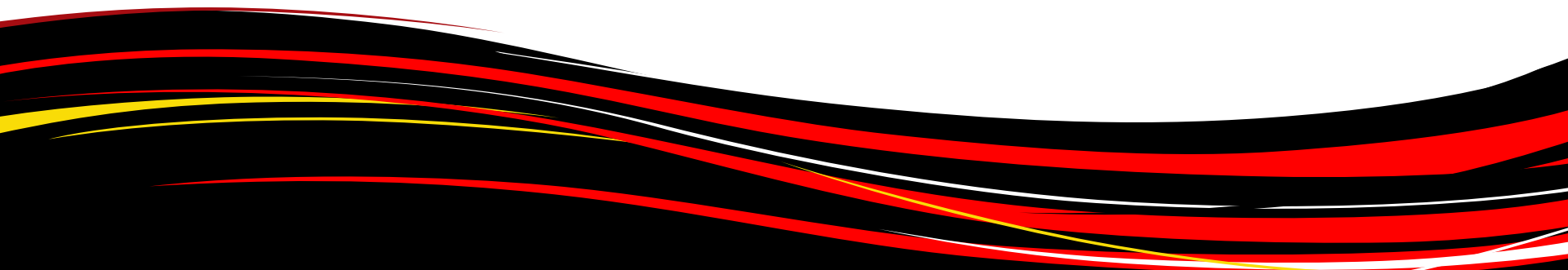
**PROJECTED:** 25-30 min by end of first week



# ACTIVITIES NOT ALLOWED

**The athlete should avoid activities with impact or jarring motions, sudden or repetitive head movements or breath holding such as;**

- trail running,
- hiking,
- swimming,
- yoga,
- pilates and strength training.



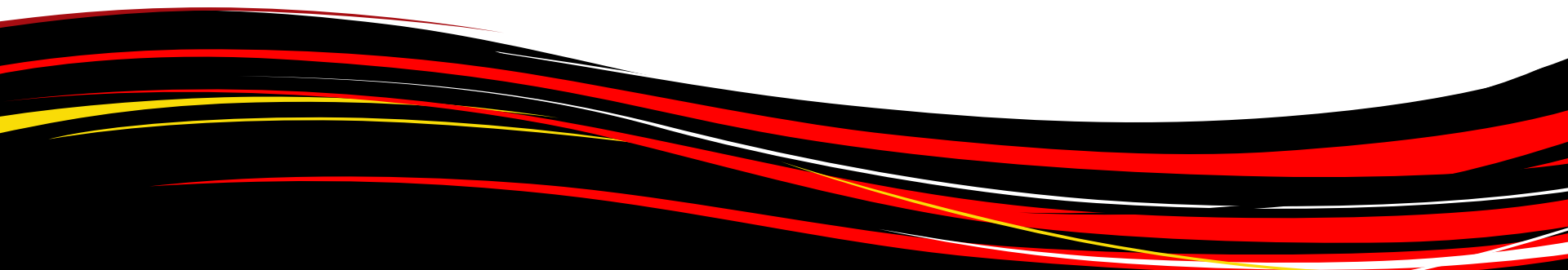
# MOVING AHEAD?

## Symptoms?

- Go back to Step 1.

## No symptoms?

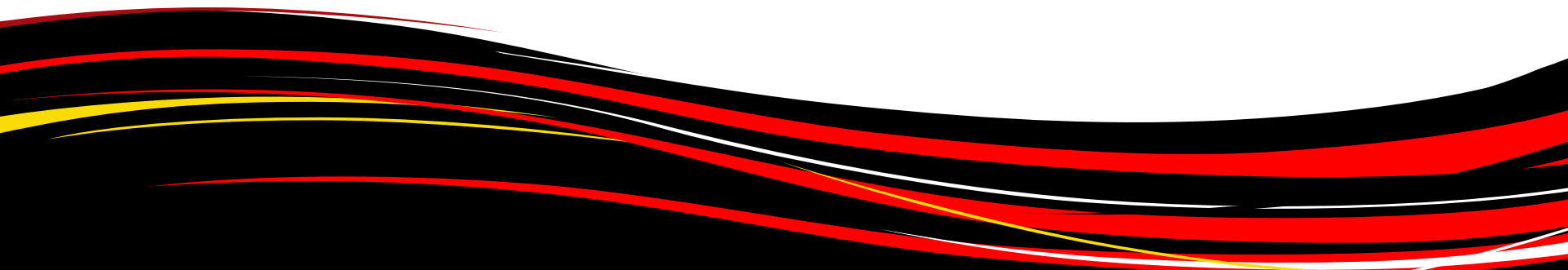
- U15; proceed to Step 3 after 3+ days
- 16+; proceed to Step 3 after 1+ days





# Step 3: Moderate aerobic activity

**ACTIVITIES ALLOWED:** Light aerobic exercise, such as walking or stationary cycling in a well balanced position. Sport specific activities, such as supervised open water swimming and outdoor running on quiet roads or tracks, can begin at step 3. Begin less controlled and introduce less stability.



# SPECIFICS

**DURATION:** continue from step 2 OR begin at 5-10 minutes to begin any new modes of exercise, adding 5 minutes or 10% / session (whichever is greater) you remain asymptomatic until you return to pre-injury training levels.

**INTENSITY:** Begin at the lower end of your aerobic threshold, or <50% of peak heart rate slowly. Build to higher aerobic training efforts once you are 45 minutes and still asymptomatic

**FREQUENCY:** Every second day for new activities at Step 3, daily for activities continued from Step 2.

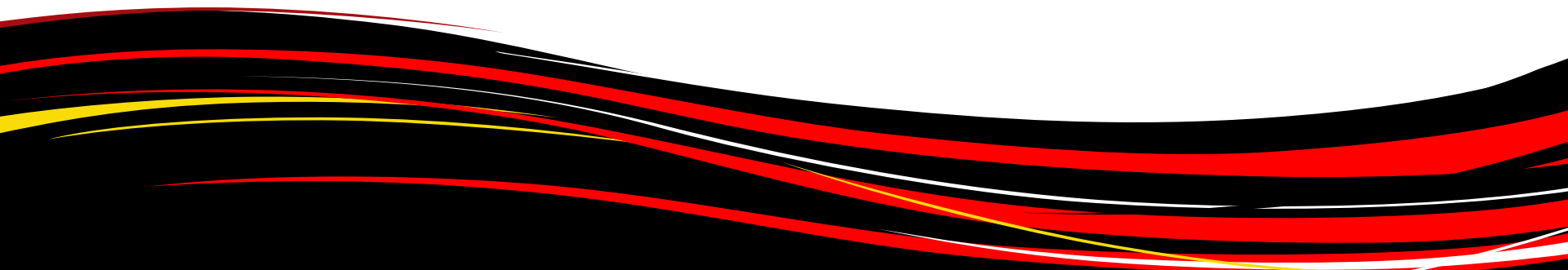
**PROJECTED:** 25-30 min by end of first week for new activities,



# ACTIVITIES NOT ALLOWED

**The athlete should still avoid activities with significant impact or jarring motions, sudden head movements or those that significantly increase blood pressure such as;**

- riding on the road,
- trail running,
- pool swimming,
- pilates and power,
- speed of high resistance strength training.

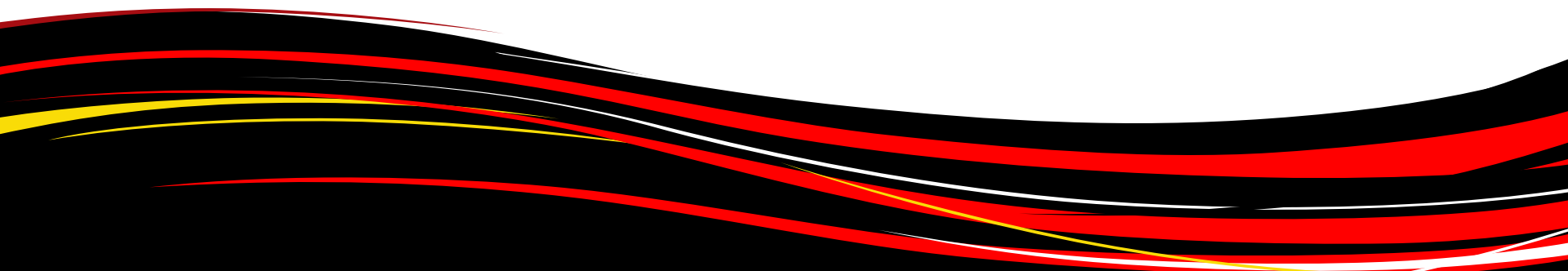


# MOVING AHEAD?

## Symptoms?

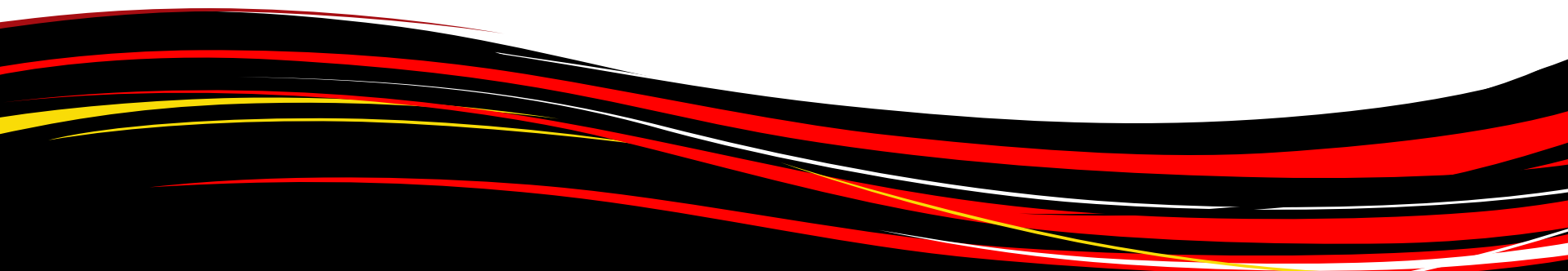
- Go back to Step 2.

## No symptoms?

- U15; proceed to Step 4 after another 3+ days
  - 16+; proceed to Step 4 after another 2+ days
- 

# Step 4: Gradual increase in intensity

## **ACTIVITIES ALLOWED: Aerobic exercise in a stable safe environment;**

- Road cycling can return, but only solo, on safe roads where there is minimal risk of an accident
  - Swim in a lane by yourself or with a safe distance between swimmers
  - Consider using freestyle snorkel to minimize head movement and any breath holding
  - Road, track and trail running
- 

# SPECIFICS

**DURATION:** continue from step 2 OR begin at 5-10 minutes to begin any new modes of exercise, adding 5 minutes or 10% / session

**INTENSITY:** Once you have reached 45 minutes easy, you can increase intensity;

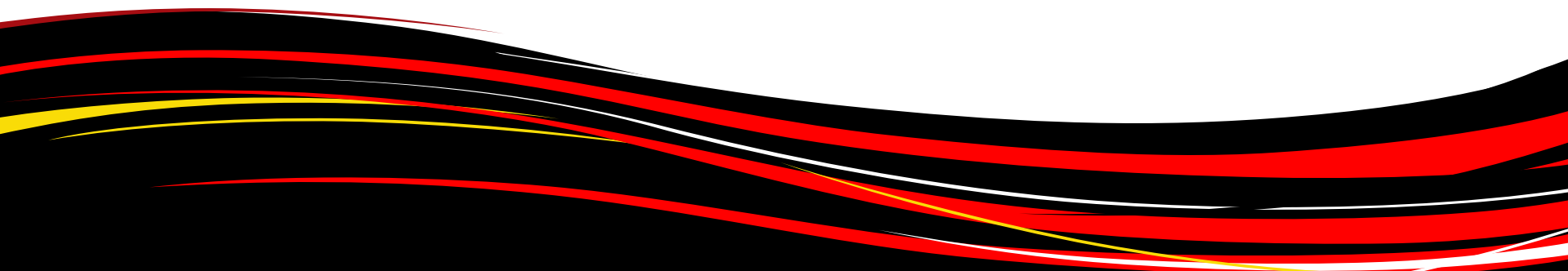
**FREQUENCY:** Every second day for activities introduced at Step 3, daily for activities continued from Step 2. Intensity once per week, until peak heart rate is achieved.

**PROJECTED:** 25-30 min by end of first week for new activities,



# ACTIVITIES NOT ALLOWED

**The athlete should still avoid activities with significant risk of re-injury or increase blood pressure such as;**

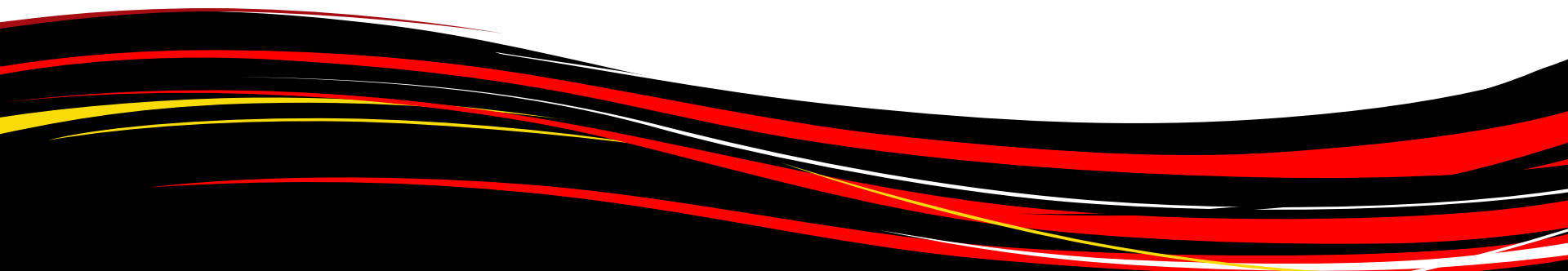
- Pilates, power, speed of high resistance strength training
  - Flip turns or fast turns in the pool
  - Dive or beach starts,
  - Swim to bike or bike to run transitions,
  - Breath holding, isometric contractions, etc.
  - Olympic lifts or plyometrics
- 

# MOVING AHEAD?

## Symptoms?

- Go back to Step 3

## No symptoms?

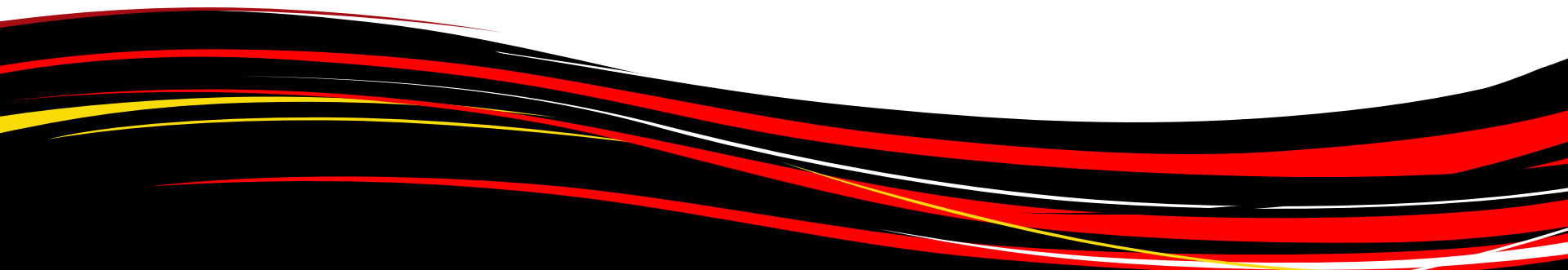
- U15; proceed to Step 5 after another 7+ days
  - 16+; proceed to Step 5 after another 7+ days
- 



# Step 5: Full competition simulations

This includes pack riding and group swimming, transitions, etc.

*The time needed to progress from no risk of contact/reinjury to exercise with a significant risk of contact will vary with the severity of the concussion episode.*



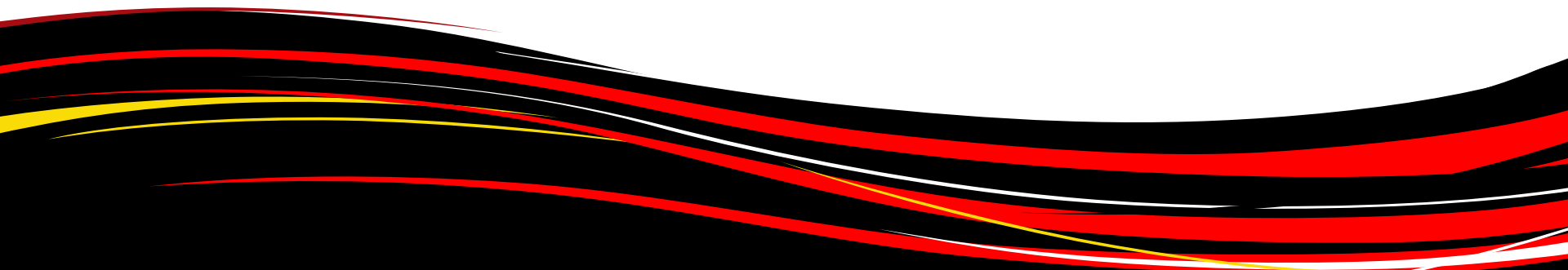
# MOVING AHEAD?

## Symptoms?

- Go back to Step 4

## No symptoms?

- U15; proceed to Step 6 after another 1+ days
- 16+; proceed to Step 6 after another 1+ days



# Step 6: Competition ready

**The risks of a second concussion occurring before the first is fully healed are minimized at this point IF all steps were followed properly.**

