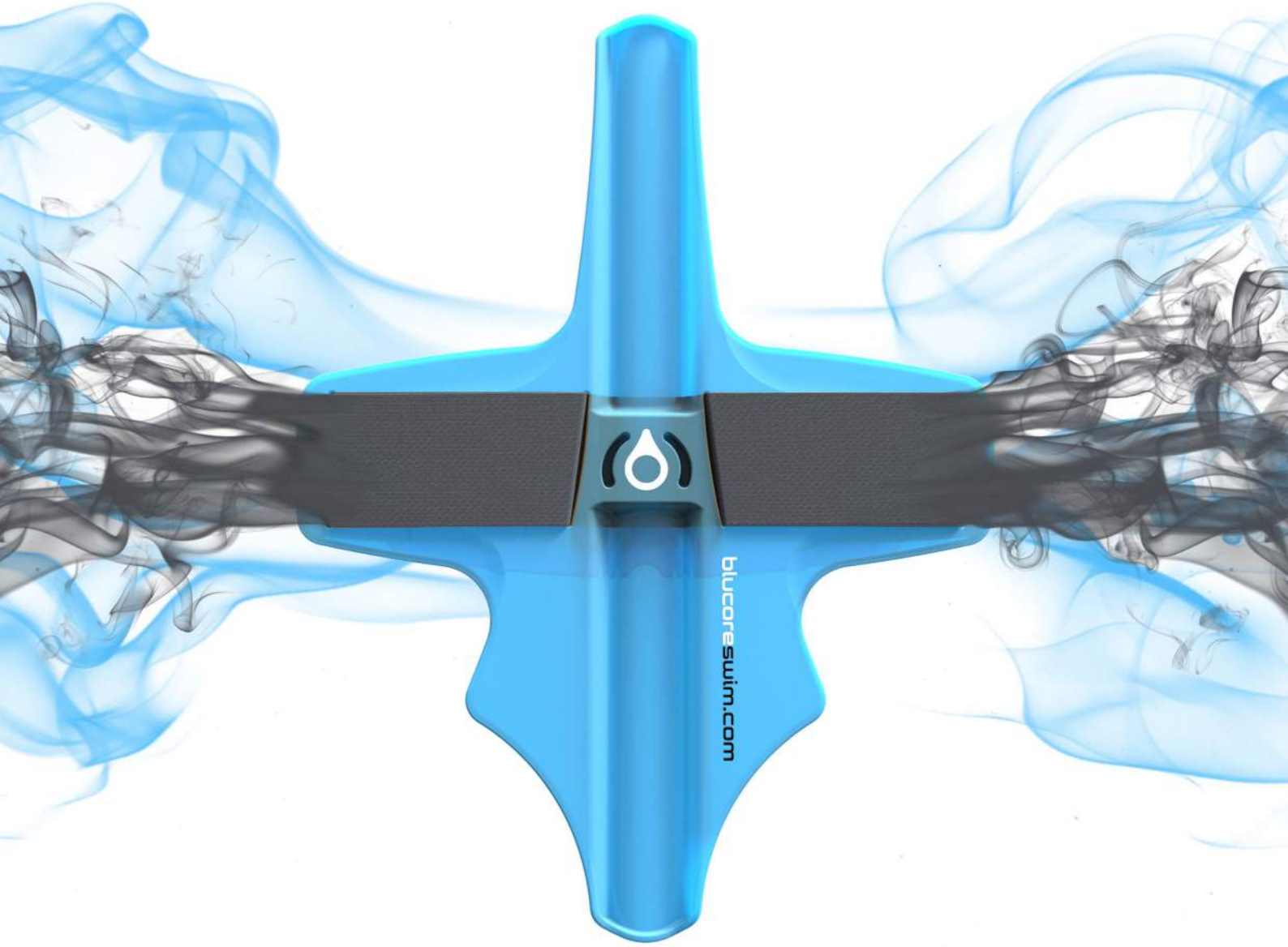
blucore™

INTELLIGENT SWIMMING



CORSUIT™

ADVANCED

USER GUIDE

CORSUIT™ ADVANCED USER GUIDE

The Corsuit is Patent Pending.

CONTENTS

CLICK ON HEADING TO JUMP TO SECTION

1 INTRODUCTION 3
1.1 TERMINOLOGY 4
1.2 POSTURE 5
1.2.1 Land Posture: *Neutral Spine* 6
1.2.2 Swimming Posture: *Flat Spine* 7
1.2.3 Things to Note About Posture 9
2 TRAINING PRINCIPLES 10
2.1 SWIMMING TECHNIQUE TRAINING 10
2.1.1 Contrast Swimming 11
2.1.2 Kick 13
2.1.3 Underwater Breakout 15
2.1.4 Streamline Position 17
2.1.5 Dive 18
2.1.6 Backstroke Start Position 20
2.1.7 Turn 21
2.1.8 Finish 23
2.2 ENERGY SYSTEM TRAINING 24
2.2.1 Lactate State Training 24
2.2.2 Aerobic State Training 24
2.2.3 Hypoxic State Training 24
3 SPORTS 25
3.1 SWIMMING (POOL) 25
3.1.1 Swimming Strokes 25
3.1.2 Distances 31
3.2 SWIMMING (OPEN WATER) 32
3.3 TRIATHLON 33
3.4 DRY LAND / STRENGTH AND CONDITIONING 34
3.4.1 Bracing 35
3.4.2 Bracing and Control 37
3.4.3 Bracing, Control and Resistance 41
4 EXAMPLE SESSIONS 47

JOIN US

WEB www **blucoreswim.com**

EMAIL **info@blucoreswim.com**

FACEBOOK facebook.com/**blucoreswim**

TWITTER **@blucore_swim**

INSTAGRAM **@blucore_swim**

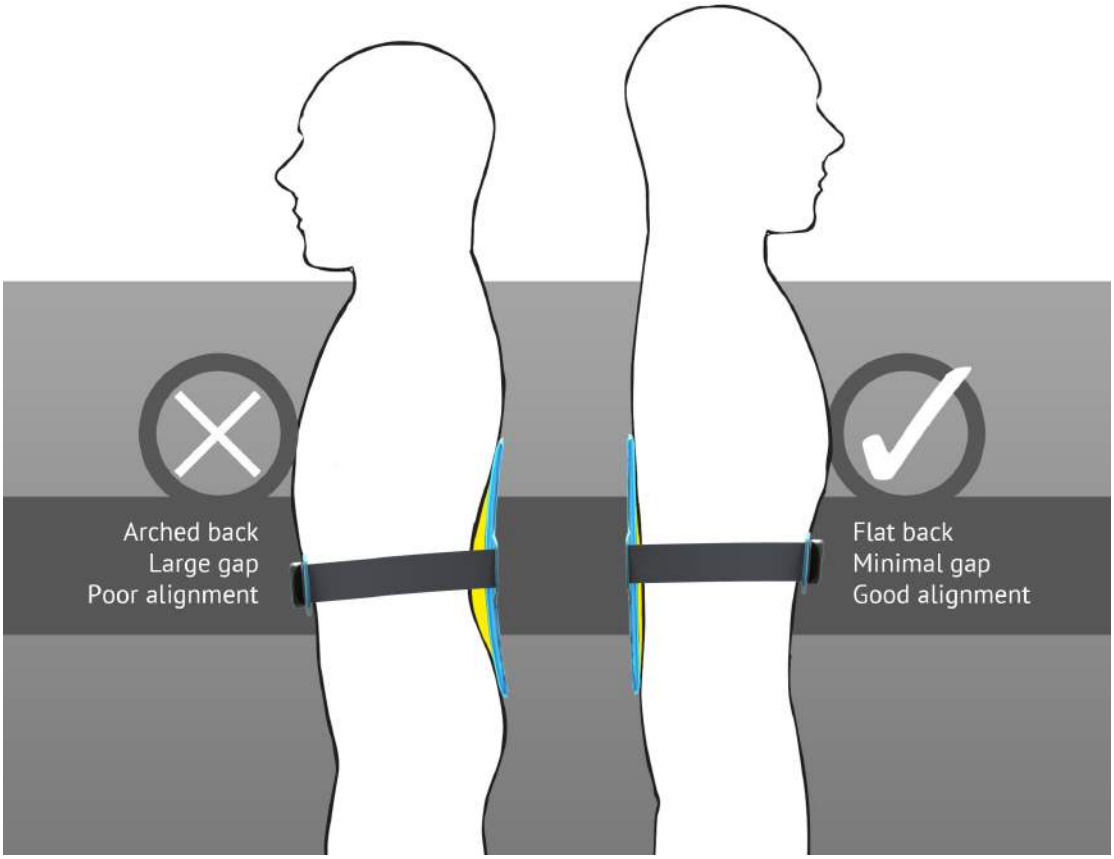
BACK TO CONTENTS

1 INTRODUCTION

The Corsuit is a simple, yet advanced tool for developing posture, body position and core strength in swimming. The Corsuit Advanced User Guide explores some of the most effective ways it can be incorporated into your training.

The Corsuit is worn around the waist, and provides the user with tactile feedback on their postural alignment. If the user is well aligned, they will feel the Corsuit fit comfortably, with pressure evenly distributed along the length of the device. If the user begins to fall out of alignment, they will feel the pressure redistribute to the ends of the Corsuit, signalling to the user that they need to realign themselves.

Below is an excerpt from the Corsuit User Guide, demonstrating the difference between normal standing posture and ideal swimming posture while using the Corsuit.



The Corsuit can be used for every stroke, and even outside of swimming, for example during strength and conditioning or dry land training.

BACK TO CONTENTS

The Corsuit Advanced User Guide is not intended to be an exhaustive resource, and we welcome feedback and new ideas. Always use the Corsuit with caution, under the supervision of a coach and in accordance with the Corsuit User Guide, which can be found here:

http://blucoreswim.com/corsuit-user-guide/

1.1 TERMINOLOGY

In swimming, there are often many ways of saying the same thing. We like to use the following terms to describe how swimming with the Corsuit works:

Posture
Posture refers to the alignment of the spine, as well as the body as a whole. A well-aligned body will move through the water more efficiently, creating less drag than a poorly aligned one. For differences in normal posture ('Neutral Spine') and swimming posture ('Flat Spine'), see Section 1.2.

Synonyms include:	***posture, postural alignment, body position, body line, Neutral Spine, Flat Spine.***
Antonyms include:	***misalignment, slouching, rounding, arching, snaking, hyperlordosis, hyperkyphosis.***

Feedback
The Corsuit provides simple ***tactile feedback*** in the form of pressure. If the swimmer is well aligned, pressure will be even along the length of the Corsuit. If the swimmer slouches, pressure will relocate to the ends of the Corsuit, indicating to the user that they have fallen out of good alignment.

Other types of feedback swimmers might typically receive include ***verbal feedback*** (i.e. from listening to a coach/teammate), ***visual feedback*** (i.e. looking at video footage or images) and ***proprioceptive feedback*** (i.e. spatial awareness). In this way, verbal, visual, proprioceptive and tactile feedback work together to enhance skill acquisition.

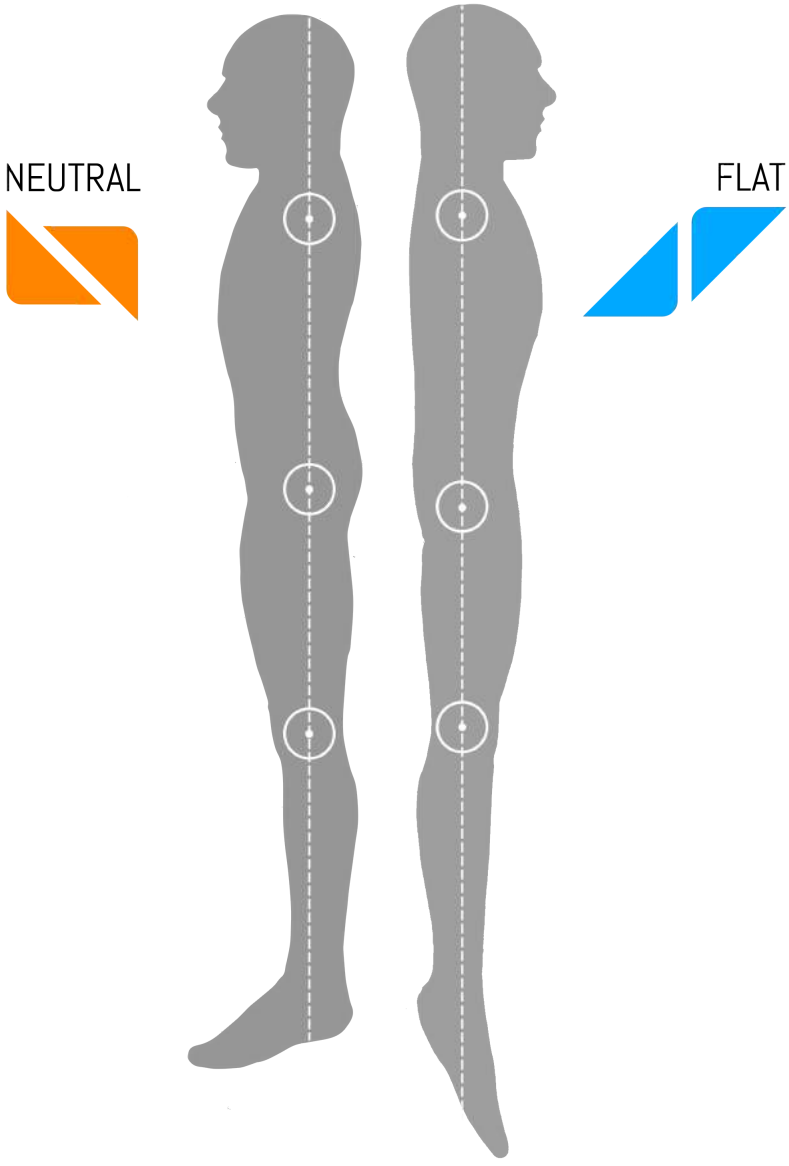
BACK TO CONTENTS

1.2 POSTURE

Because the body is positioned differently while swimming than it is while standing, walking and running, ideal spinal posture for these activities is different too.

We refer to the two major postures as **Neutral Spine** (generally for upright, land-based activities like walking and running) and **Flat Spine** (generally for swimming), and the Corsuit is capable of providing feedback to help you achieve both.

It is important to understand the differences in these major postures in order to ensure you're in the most efficient and safest position possible for what you're doing.

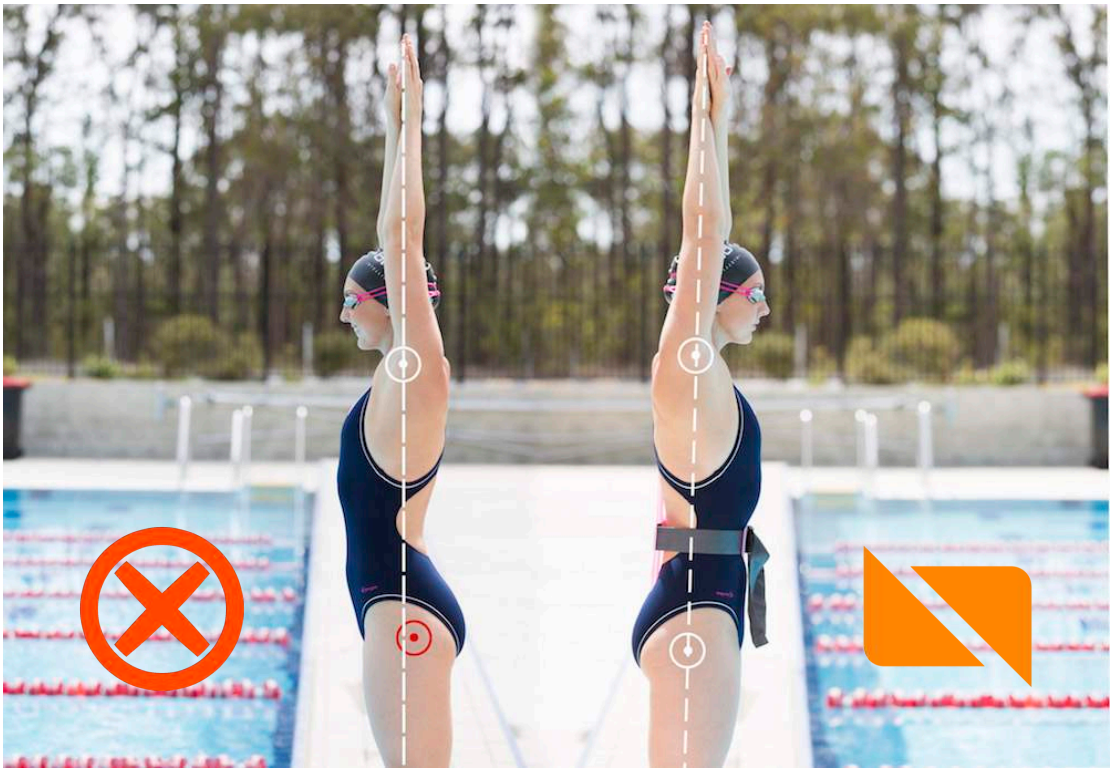


BACK TO CONTENTS

1.2.1 Land Posture: *Neutral Spine*

NEUTRAL SPINE

Neutral spine is a term used to describe ideal day-to-day human posture. This posture is suitable for bipedal land activities such as standing, walking and running. A Neutral Spine is fairly straight, but will have some curvature, as this provides shock absorption while upright. However, the major body parts should still be aligned, so that the major joints sit directly above one another. In this position, the hips have a very slight anterior tilt (butt sticks out), which gives a mechanical advantage to the muscles at the back of the hips that generate the power required for walking and running.



OVERARCHED POSTURE	NEUTRAL SPINE POSTURE
MAJOR JOINTS MISALIGNED -	- MAJOR JOINTS ALIGNED
EXAGGERATED CURVE IN SPINE -	- SOME CURVATURE IN SPINE
SIGNIFICANT GAP BETWEEN BACK AND CORSUIT -	- SMALL GAP BETWEEN BACK AND CORSUIT

When you see the Neutral Spine symbol , this is an exercise in which you should focus on maintaining a Neutral Spine position. Always use caution, and cease the exercise if you experience pain or discomfort. If you have any existing back injuries or relevant medical conditions, see your health professional before using the Corsuit.

BACK TO CONTENTS

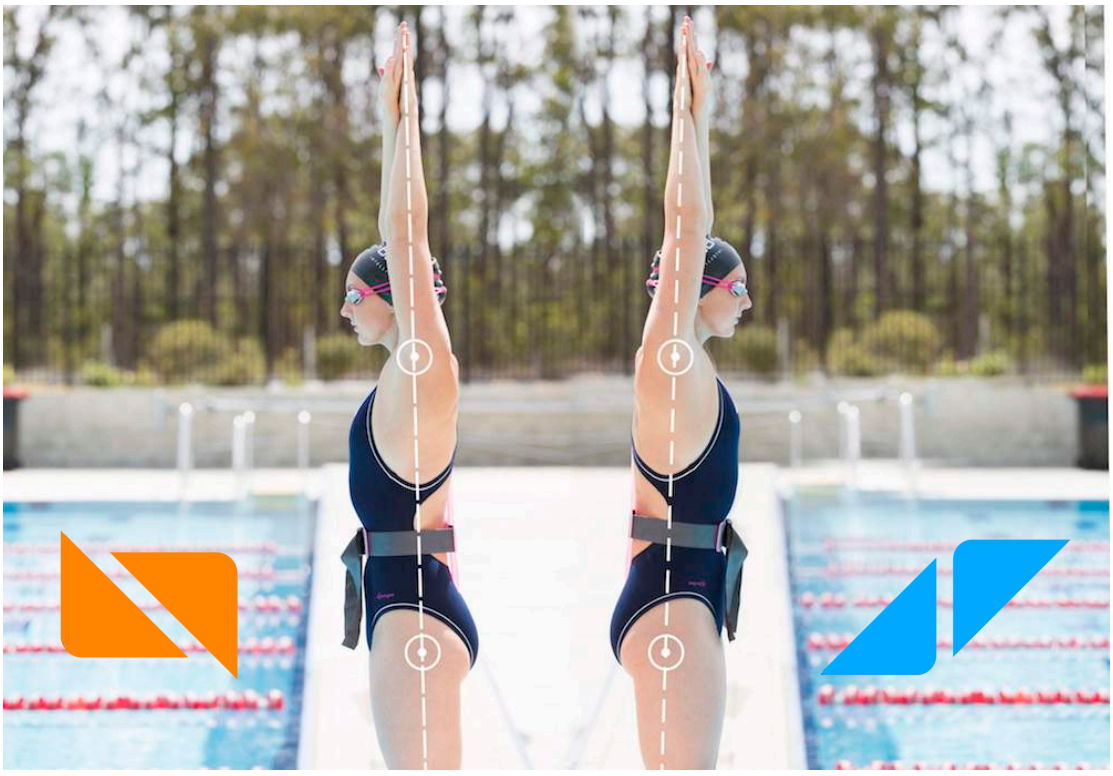
1.2.2 Swimming Posture: *Flat Spine*

FLAT SPINE

For swimming, it is generally ideal to have a spine that is even flatter than Neutral Spine. This is due to the fact that the body moves through the water horizontally instead of vertically, and drag is a much more significant factor.

Like Neutral Spine, a Flat Spine positions all the major body parts in a line. Additionally though, the lumbar and thoracic curves are flattened by tucking the hips under and pushing the chest out. This brings the entire spine into alignment.

In this position, a number of benefits are gained for swimming. In order to flatten the lumbar spine, the hips must tilt posteriorly (butt tucks under), giving a mechanical advantage to the muscles at the front of the hips that generate the majority of the kick power in freestyle, butterfly and backstroke.



NEUTRAL SPINE POSTURE	FLAT SPINE POSTURE
MAJOR JOINTS ALIGNED -	- MAJOR JOINTS ALIGNED
SOME CURVATURE IN SPINE -	- BACK FLATTENED
SMALL GAP BETWEEN BACK AND CORSUIT -	- NO GAP BETWEEN BACK AND CORSUIT

BACK TO CONTENTS

Furthermore, with the chest pressed down in the water, a proportionately larger volume of the lungs is submerged, providing additional buoyancy. This is why, when the upper body and head are kept down, the legs feel as though they are lifted closer to the surface of the water. In this position, the body also creates a smaller hole while moving through the water, producing less drag in the process.

It must be noted that, in many ways, there are only very subtle differences between Neutral Spine and Flat Spine. With this in mind, some swimmers – even elite ones – may never be able to achieve a fully Flat Spine position.

However, most people struggle to maintain even a Neutral Spine, so practicing these postures can be beneficial in many ways. While an athlete may never be capable of achieving and maintaining a perfect Flat Spine position, that's OK! Improvement is the name of the game.

When you see the Flat Spine symbol  , this is an exercise in which you should focus on maintaining a Flat Spine position. Always use caution, and cease the exercise if you experience pain or discomfort. If you have any existing back complaints or relevant medical conditions, see your health professional before using the Corsuit.

BACK TO CONTENTS

1.2.3 Things to Note About Posture

While Neutral Spine and Flat Spine refer to ideal postures for walking and swimming respectively, these are by no means static activities. Particularly in swimming, as you move, rotate, undulate, stroke and kick through the water, your posture will – and should – change accordingly. The postures described herein are purely intended to be foundation positions for each activity, from which any necessary deviations are made.

There are also many times while swimming that it is necessary to alternate between Neutral Spine and Flat Spine.

For example, in butterfly kick (see right), during the down-kick a Flat Spine is advantageous, and during the up-kick a Neutral Spine is more effective.

For activities like this that require both postures, both symbols are shown:

For best results, swimmers should practice both positions during dry land training (see Section 3.4), in order to improve their overall postural awareness and control. The best swimmers in the world are generally able to fluently adjust from Neutral Spine to Flat Spine and back again, as well as brace and execute controlled movements in these positions as required.

The Corsuit is intended to simply support postural training and/or exercises. All postural training should be conducted under the guidance of a qualified professional who is familiar with the different postural requirements of swimming. If you have any existing back problems, postural impediments or other relevant medical conditions, consult your relevant health professional(s) before using the Corsuit and/or undertaking any of the training described herein.

BACK TO CONTENTS

2 TRAINING PRINCIPLES

2.1 SWIMMING TECHNIQUE TRAINING

The Corsuit can be used to improve alignment in the water during any speed of swimming and across all strokes. This includes low-intensity lap swimming, in order to improve general swimming technique and efficiency.

While swimming, the athlete should generally aim to maintain a Flat Spine position, with as much contact between their back and the Corsuit as possible. To do so, the lower abdominals should remain at least lightly activated at all times, while the hips are tucked under and the chest pressed down in the water.

However, this position is dynamic, and will change slightly as the swimmer moves through the water, and relative to the stroke they are swimming. While the body may undulate, twist and otherwise deviate slightly, this position should be considered "default," and should be strived for at most times.

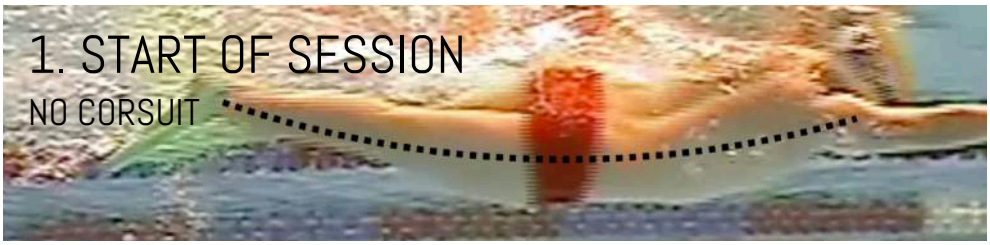
BACK TO CONTENTS

2.1.1 Contrast Swimming

In contrast sets, the Corsuit is worn for a short distance, then removed for a short distance, and this cycle is repeated multiple times throughout a session. This contrast gives the swimmer just enough time to become accustomed to correct alignment with the help of the Corsuit, then encourages them to transfer this alignment to their normal swimming technique without the Corsuit.

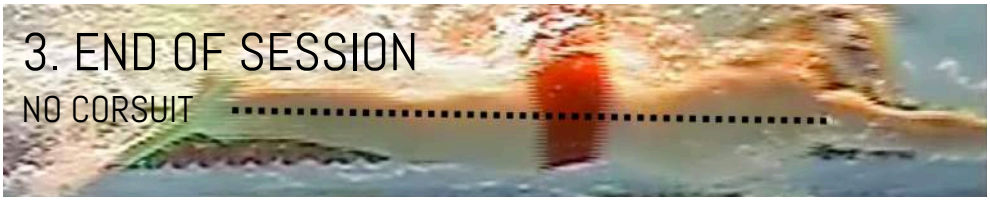
Below is a case study of the Corsuit's effects on a sprint freestyler over the course of a single training session. The swimmer's Personal Best (PB) times are as follows:

50 LCM Freestyle: 24.37
100 LCM Freestyle: 51.33
200 LCM Freestyle: 1:51.85



NOTE
- Poor body line and posture
- Dropped right hip

NOTE
- Significantly improved body line and posture
- Right hip kept high



NOTE
- Significant retention of Corsuit effects

BACK TO CONTENTS

While this is not necessarily indicative of a permanent effect, it demonstrates that the Corsuit can have a very positive influence on swimming technique, even over short periods of use.

This contrast also gives the coach a chance to quickly determine any postural deficiencies in the athlete, and to observe their response to the Corsuit. Then, over a period of days, weeks and months, the swimmer's retention of this new alignment can be monitored.

DRILL

1200M AS 300m FREE / 300m CORSUIT

This will help the swimmer feel the difference in their alignment before, during and after wearing the Corsuit, and understand how to achieve a good body position. Furthermore, this will prevent the swimmer from becoming dependent on the Corsuit, as it is only being used for short periods of time.

Cues:

- *back as flat against Corsuit as possible*
- *core switched on at all times*
- *arms and legs stay relaxed*
- *maintain this position and feeling after removing Corsuit*

BACK TO CONTENTS

2.1.2 Kick

The Corsuit is effective for maintaining body alignment while kicking, which is something typically not true of kickboards. Kicking with the Corsuit allows the swimmer to focus more intensely on their alignment, as the arms are kept stationary, limiting distractions. In freestyle kick, swimmers should aim for a Flat Spine position, while in backstroke kick a Neutral Spine is preferred.

For breaststroke and butterfly kick, swimmers should focus on using the core and hips to alternate between Neutral Spine to Flat Spine as required.

For example, in breaststroke kick, as the swimmer performs the up-kick, posture should move towards a Neutral Spine position, in preparation to drive with the glutes.

BACK TO CONTENTS

Then, during the down-kick, posture should move towards a Flat Spine position, so that the body is long and flat during the glide phase.

DRILL

STREAMLINE FREESTYLE KICK + SNORKEL

Using a snorkel and Corsuit while kicking with the arms in a streamlined position means the head is kept down, in line with the spine. To do so the swimmer should keep the eyes looking straight down at the bottom of the pool. This makes it significantly easier for the swimmer to focus on and maintain spinal alignment, as the snorkel removes the need to crane the head back to breathe.

Cues:

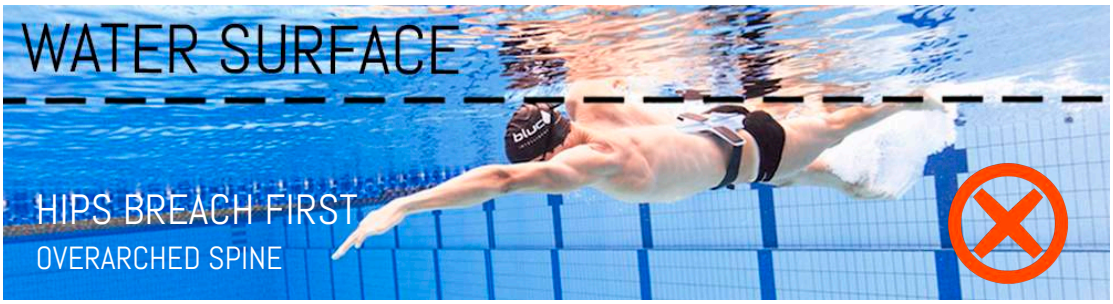
- *eyes face straight down*
- *back flat against Corsuit*
- *core switched on at all times*
- *legs stay relaxed*
- *knee straight during up-kick, slight bend during down-kick*

BACK TO CONTENTS

2.1.3 Underwater Breakout

The breakout from underwater to surface swimming – regardless of stroke – can also be enhanced with the use of the Corsuit.

A common fault in breakouts is exaggeration of the final underwater kick, causing the hips to break the surface of the water before the first stroke. This can cause significant speed loss, as the body breaks from a streamline position and the torso is angled downwards for the first stroke.



The Corsuit helps to prevent this by encouraging the swimmer to keep the body aligned, ensuring that an upward trajectory is maintained until the breakout is complete, minimising speed loss.

BACK TO CONTENTS

DRILL

BREAKOUT + 2 STROKES + FINS

The swimmer should push off the wall to a greater depth than normal, then kick toward the surface at a steeper angle than normal. This exaggerates the breakout angle, making it harder for the swimmer to incorrectly breakout with the hips first. If the swimmer does make the mistake of angling downwards on the final kick, they will feel pressure from the bottom of the Corsuit. Done correctly, the extra propulsion from the fins should allow the swimmer to breach high out of the water during the breakout.

Cues:

- *maintain steep breakout angle*
- *last underwater kick is short and sharp, not exaggerated*
- *head stays in line with body – not craned back, not buried*
- *core braces extra hard for initial stroke*
- *back of head breaks surface first*
- *hips rise to surface during first arm stroke recovery*

BACK TO CONTENTS

2.1.4 Streamline Position

FLAT SPINE

The Corsuit can help swimmers achieve an effective streamline position, which is important for many aspects of swimming, including dives, push-offs, underwater kicking, breaststroke gliding and general drag reduction. Given posture has a large impact on streamlining, the Corsuit can provide feedback to guide the swimmer into an optimal position.

DRILL

PUSH-OFF AND GLIDE WITHOUT KICKING

An explosive push-off and streamlined glide without kicking – aiming for maximum glide distance– is an effective way to gauge improvements in streamline efficiency over time. This also allows the swimmer to focus on a static streamline position after a maximum effort push-off, helping to drill this position.

Cues:

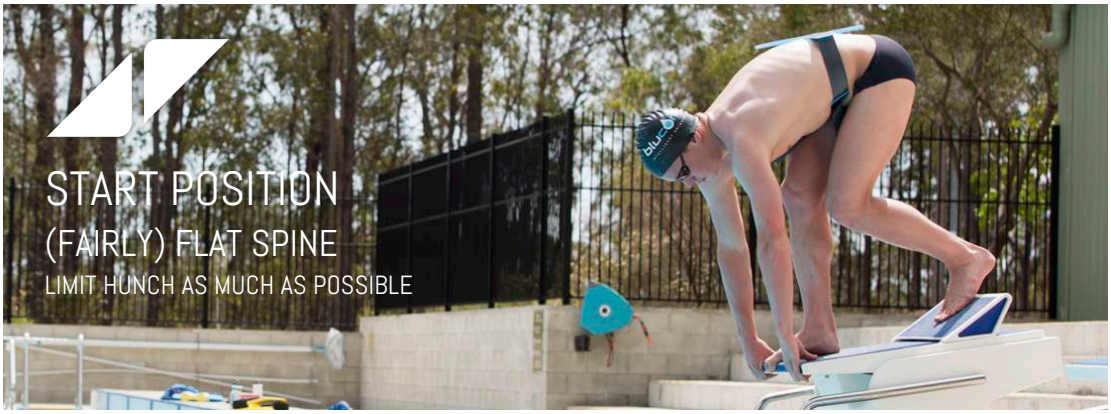
- *feet hip-width apart*
- *back engaged with Corsuit*
- *explosive push-off*
- *back flattens completely into Corsuit*
- *hold streamline position until completely stationary*

BACK TO CONTENTS

2.1.5 Dive

Back extension is difficult to control during dives, due to the explosive nature of the movement. The Corsuit can help swimmers gain an understanding of their alignment as they leave the blocks and as they enter the water, ensuring power and streamline are maximised.

From a starting position on the blocks, most swimmers' backs will not be completely in contact with the Corsuit. This is ok, as long as this hunch in the lumbar spine is not excessive.



As the swimmer explodes from the blocks and the back extends, they will feel their back come into contact with the Corsuit. Swimmers should attempt to not extend beyond this Neutral Spine position, as over-extension can lead to power loss. Limiting over-extension of the back will also help to ensure the hips remain high relative to the shoulders, positioning the body for an ideal entry angle.

BACK TO CONTENTS

As the swimmer leaves the blocks and enters a streamline position in the air, the body should align, without entering a fully Flat Spine position. In this Neutral Spine posture, the swimmer will minimise resistance upon entry, while preparing themselves to angle upwards toward the surface.

DRILL

DIVE AND GLIDE WITHOUT KICKING

An explosive dive and inactive streamline glide – aiming for maximum glide distance without kicking – is an effective way to gauge dive improvements over time. This also allows the swimmer to focus on achieving a good streamline position during the dive, maintaining momentum and preventing the common mistake of prematurely initiating the first underwater kick.

Cues:

- *hips high in starting position*
- *back foot drives first after reaction*
- *body extends and back engages with Corsuit*
- *enter streamline position with head down and hips up*
- *knees remain straight*
- *hold streamline position until completely stationary*

BACK TO CONTENTS

2.1.6 Backstroke Start Position

When in the backstroke starting position, the back should be kept as flat as possible. This prepares the swimmer to drive backwards from the wall.

The Corsuit enables the swimmer to practice a tall, Flat Spine starting position by providing feedback on how flat their back is.

In the "take your marks" position, the Corsuit should be fully, or close to fully engaged with the swimmer's back in order to achieve this position.

As with a dive start, level of hip flexibility may prevent some swimmers from flattening their back completely in this position. Nonetheless, they should respond to the Corsuit's feedback to get as flat as possible.

When performing the backstroke start movement, the swimmer will typically arch the back significantly (even more so than in a Neutral Spine position). For this reason, the Corsuit should only be worn for practicing the backstroke starting position, and not the start itself.

BACK TO CONTENTS

2.1.7 Turn

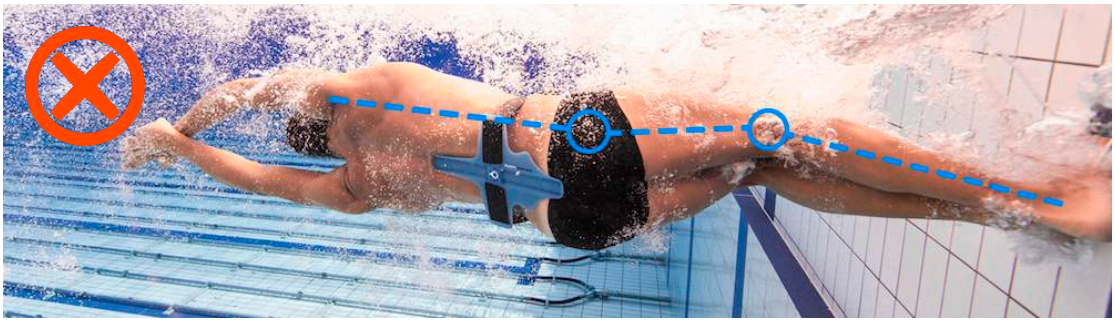
A common mistake made by swimmers in touch turns and particularly tumble turns is to raise the head during the approach to the wall.

In order to maintain speed into the wall, the head should be kept down and aligned, keeping the hips high and ready for the turn. The Corsuit can be used to give feedback on this position, as if the swimmer raises their head before the turn, they will feel increased pressure on the top of the Corsuit, indicating they have lost alignment and momentum.

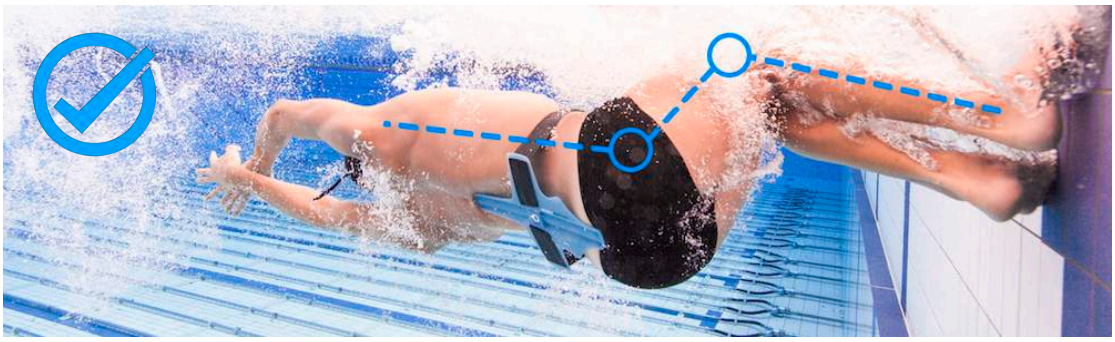
The Corsuit can also be used for improving alignment during the push-off after a tumble turn or touch turn. Given that during turns, swimmers must move from a long, extended position to a tucked position, then back again very quickly, this is often a time during which swimmers exhibit poor alignment and movement sequencing.

As the swimmer's feet strike the wall, the back will often remain rounded or arched, meaning they will not be positioned optimally for an explosive and efficient push-off. Excessive flexion or extension of the back can be corrected through use of the Corsuit.

BACK TO CONTENTS



Swimmers should also practice their foot strike position to ensure they are optimally positioned to transfer maximum power to the wall. To do so, as the feet strike the wall the swimmer should be roughly in a 90° squat position, with the knees at an approximate right angle, the hips in a 'seated' position and the feet roughly hip-width apart.



DRILL

TURN AND GLIDE WITHOUT KICKING

Begin swimming from 10-15m out from wall, accelerating so that top speed is reached before the turn. The turn and push-off should be executed at maximum effort, followed by a streamline glide without kicking, aiming for maximum glide distance. This gives the swimmer the opportunity to focus purely on positioning themselves during the turn for an optimal push-off.

Cues:

- *head down on approach*
- *tight tuck to initiate turn*
- *begin to extend legs in anticipation of foot strike*
- *back engages with Corsuit as feet strike*
- *squeeze streamline and explosive push-off*
- *hold streamline until completely stationary*

BACK TO CONTENTS

2.1.8 Finish

Finishes in all strokes can be aided through the use of the Corsuit, ensuring effective alignment is achieved as the swimmer takes their final stroke.

The Corsuit will discourage hyperextension of the back and lifting of the head during a finish. These movements reduce the overall length of the swimmer's body, increasing drag and reducing the reach of the finishing arm. The Corsuit encourages the swimmer to remain flat and long as they reach for the finish, meaning they touch the wall sooner.

BACK TO CONTENTS

2.2 ENERGY SYSTEM TRAINING

As well as technique and skill training, the Corsuit is suitable for use while swimming under challenging physical states. In this way it can aid in more specific postural training, such as while building speed, anaerobic endurance and/or aerobic endurance.

Regardless of training intensity, at most times the Corsuit and swimmer should work together in a similar way, as described in Section 1. However, higher speeds generally dictate higher levels of drag, greater forces and smaller margins for technical error.

For this reason, sprint training with the Corsuit should generally focus on strong bracing of the core, which resists over-rotation/over-undulation and minimises energy loss. Aerobic training should focus on maintenance of good alignment through core activation, while remaining relaxed through the neck, shoulders and hips.

2.2.1 Lactate State Training

Swimmers can wear the Corsuit throughout high intensity training sets and as lactate fatigue begins to reduce their ability to maintain effective body alignment. Using the Corsuit in this fashion allows the swimmer to practice maintaining alignment under race-specific fatigue, when it is most critical.

2.2.2 Aerobic State Training

Efficient aerobic or long distance swimming requires good posture to be habitual. Wearing the Corsuit for periods of aerobic training allows the swimmer to focus on maintaining at least a moderate level of core activation, while keeping the arms, legs and neck relatively relaxed. This ensures an optimal position is achieved without wasting energy.

2.2.3 Hypoxic State Training

Maintaining an effective body alignment in a hypoxic state is a challenging skill. Postural fatigue is particularly evident when swimmers are in oxygen debt, so practicing good posture in this state can be very beneficial. Always use caution during hypoxic training, and be sure to follow the guidelines set out by your swimming association, such as Swimming Australia's Hypoxic Training Policy.

BACK TO CONTENTS

3 SPORTS

The Corsuit is built for swimmers, and is most useful in the water. However, as a postural feedback tool, the Corsuit has application outside simply the pool. Many activities have similar postural requirements to swimming, and therefore can be enhanced with the use of the Corsuit.

3.1 SWIMMING (POOL)

Pool swimming is arguably the most complex activity in which the Corsuit can be used. With a high demand for efficient technique across multiple strokes, athletes must master a broad range of movements and skills to become a competitive or even proficient pool swimmer.

The Corsuit helps to simplify the acquisition of many of these skills, by providing clear-cut feedback, which enhances focus and retention.

3.1.1 Swimming Strokes

Each stroke works differently with the Corsuit. In this section, we break down each stroke into its ideal posture(s) and describe how they work best to help you get the most out of your Corsuit.

Generally, the four strokes require different postures as follows:

Freestyle	Flat Spine
Backstroke	Neutral Spine
Breaststroke	Neutral Spine + Flat Spine (alternating)
Butterfly	Neutral Spine + Flat Spine (alternating)

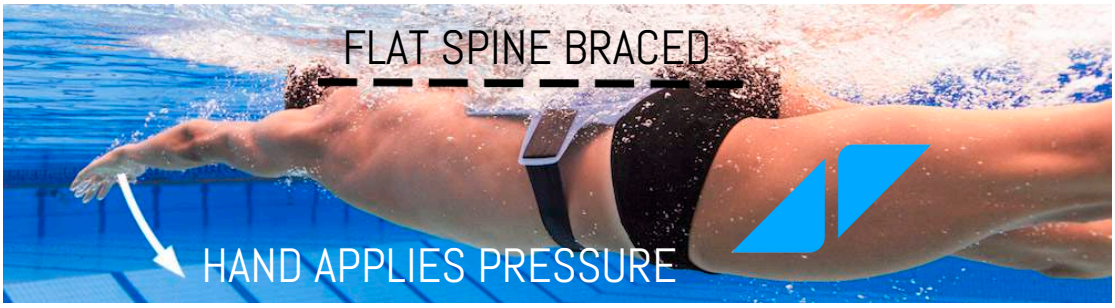
BACK TO CONTENTS

The Corsuit is particularly effective in improving freestyle body position and alignment. The Corsuit helps the swimmer maintain a tall, flat and hydrodynamically efficient position while swimming, which can have a huge impact on freestyle speed.

In freestyle, it is important that the athlete acts upon the feedback provided by the Corsuit. If the swimmer can respond and achieve a Flat Spine position where the back is fully in contact with the Corsuit, they will be positioned in an ideal freestyle posture.

A Flat Spine position is particularly important in freestyle, as the body should remain flat in the water, creating the smallest fontal profile possible. A Flat Spine helps to align the body for minimal drag, and also allows more power to be generated by the front of the hips during the down-kick.

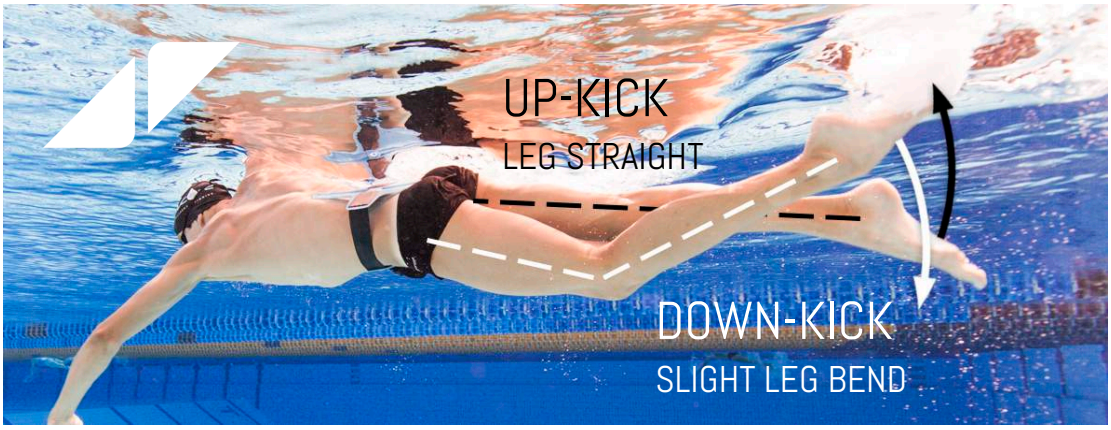
It is particularly important for the core to brace as the initial catch is made. As pressure is applied by the hand, it is common for the lower back to 'buckle,' and momentarily arch. By bracing during the catch, the swimmer ensures that maximum force is transferred to the hand, and not lost through the back.



Similarly, the freestyle kick can also adversely affect posture. As force is applied, there can be a tendency for the lower back to arch, as a reflex to "help" the kick, but instead pulling the body out of alignment.

BACK TO CONTENTS

Athletes should instead practice a smooth kicking motion with no pauses, while the core remains braced. The leg should remain straight during the up-kick, then bend slightly during the down-kick, creating a whip-like action.

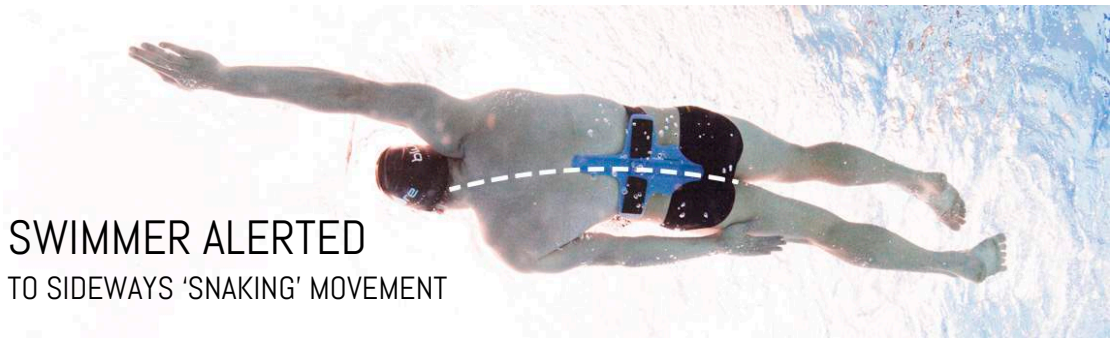


If the swimmer can respond to the feedback of the Corsuit, and maintain a stable posture while pulling and kicking, speed and efficiency will be increased, as power is better transferred through the core.

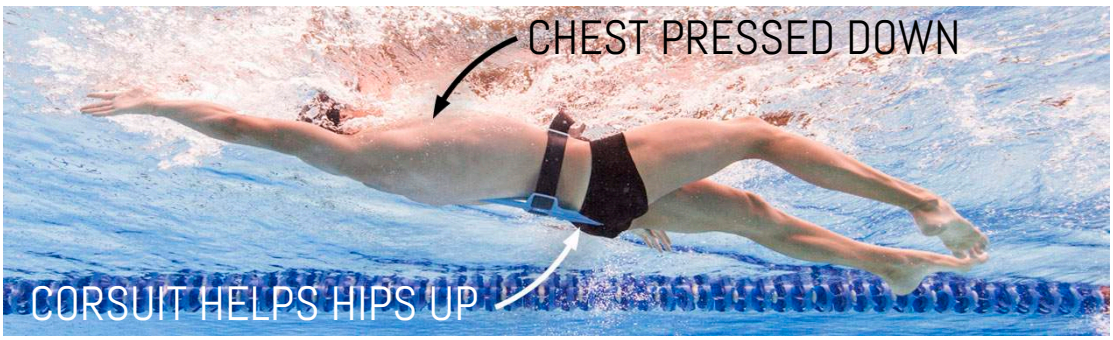
BACK TO CONTENTS

As in freestyle, the Corsuit helps backstrokers remain aligned through the entire stroke. In backstroke, however, the swimmer should aim for a Neutral Spine position, rather than a Flat Spine. Because the swimmer is facing up instead of down, the back of the hips play a larger role in the kick than they do in freestyle.

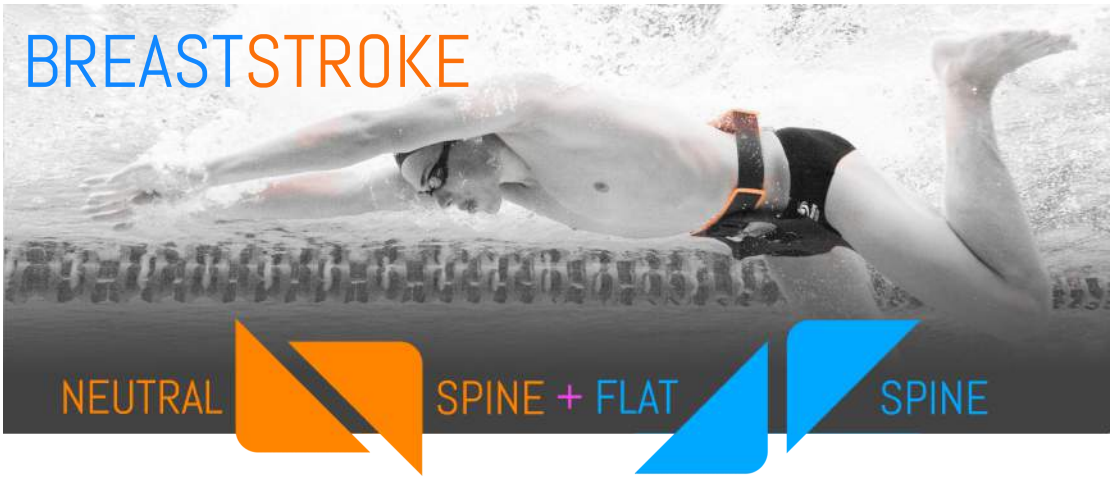
Because the shoulders have comparatively limited range in backstroke, swimmers will often over-rotate and 'snake' from side to side. When this occurs, the athlete can feel the Corsuit moving sideways on their back, alerting them to fact that they are snaking. In this way, the Corsuit helps the swimmer maintain control through the core, keeping the body straight and reducing drag. Simultaneously, the Corsuit allows full range of movement in the shoulders, which accommodates a strong pulling position.



Additionally, if the swimmer keeps the head and shoulders back while swimming, the bottom of the Corsuit helps to elevate the hips and legs.



BACK TO CONTENTS



In breaststroke, because swimmers must raise the head and shoulders in order to breathe, they are often prone to hyperextension/overarching of the back. Hyperextension of the back means the swimmer moves towards a vertical position in the water, which is hydrodynamically inefficient.

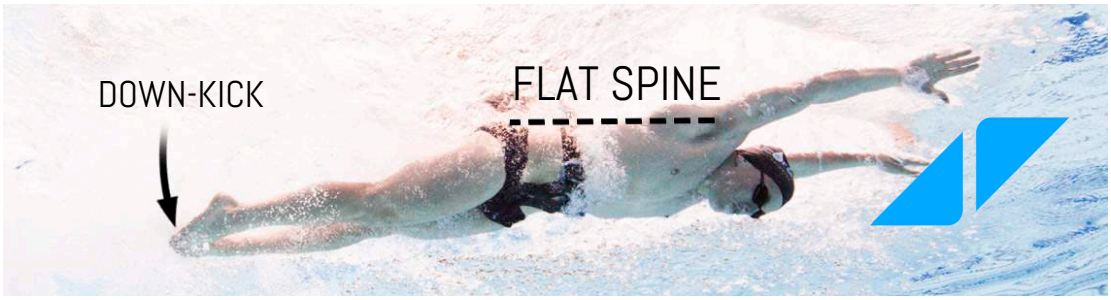
The Corsuit alerts the swimmer to any such movement, as they will feel an increased pressure from the top of the Corsuit. This reminds the athlete to maintain a flatter position as they breathe, helping to maintain forward momentum despite some upward movement.

As the swimmer then reaches forward and initiates the kick, the back flattens and they move towards a Flat Back position for the glide phase.

BACK TO CONTENTS

As in breaststroke, the Corsuit helps prevent hyperextension of the back in butterfly, promoting a streamlined stroke. Even more so in butterfly, the head should be kept low while breathing, which is encouraged by the tactile feedback provided by the Corsuit.

Furthermore, during the butterfly down-kick, the swimmer should move into a Flat Spine position, allowing the hips to generate maximal power. To do so, the swimmer should feel the back flatten completely against the Corsuit as the legs drive down.



As highlighted previously, this Flat Back position in the down-kick will alternate with a Neutral Spine position during the up-kick.

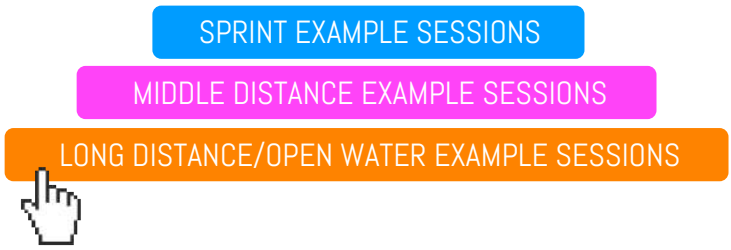
BACK TO CONTENTS

3.1.2 Distances

The Corsuit is suitable for use in training for all distances. The general principles of using the Corsuit, as outlined in Section 1, apply regardless of distance. As mentioned previously though, different speeds generally dictate different levels of drag, forces and margins for technical error.

For this reason, sprint training with the Corsuit should generally focus on strong bracing of the core, which resists over-rotation/over-undulation and minimises energy loss. Aerobic training should focus more on lighter (but still consistent) activation of the core and maintenance of efficient posture, while remaining relaxed through the neck, shoulders and hips.

Distance-specific training examples can be found in Section 4.



BACK TO CONTENTS

3.2 SWIMMING (OPEN WATER)

Given the long periods of swimming during Open Water events, efficient alignment can have a drastic effect on overall performance. A swimmer who can create less drag will more easily keep pace, meaning they may be capable of retaining more energy for a sprint finish, or for pulling away from competitors as the race progresses.

The Corsuit offers a method of monitoring alignment over the course of long training sessions and prompting swimmers to habitually maintain posture for long periods of swimming.

Furthermore, Open Water swimmers must raise the head and 'sight' their direction during races, which will often significantly compromise body position. The Corsuit helps teach the swimmer maintain spinal posture while sighting, in order to minimise any speed losses.

OPEN WATER/LONG DISTANCE EXAMPLE SESSIONS

BACK TO CONTENTS

3.3 TRIATHLON

The benefits of efficient posture in triathlons are similar to those in Open Water swimming events, but can be amplified by the necessity to conserve energy for the bike and run legs.

Triathletes come from many different backgrounds, but are most often biased toward one leg more than the remaining two. For athletes coming from a cycling or running background, this means that swimming posture is often particularly unfamiliar and difficult to achieve. These athletes often have a natural inclination toward anterior pelvic tilt, favouring the muscles at the back of the hips. For this reason, the tactile feedback provided by the Corsuit can help these athletes familiarise themselves with a more Flat Spine position.

Even more so than swimmers, triathletes should strive to become familiar with both Neutral Spine and Flat Spine positions, and to move between these with ease. By doing so, the muscles at the front of the hips can be favoured during the swim leg, providing additional propulsion while saving the muscles at the back of the hips for the bike and run legs.

This is particularly pertinent in long distance (e.g. Ironman) triathlons, where energy conservation and efficiency in the early stages are critical.

TRIATHLON/OPEN WATER EXAMPLE SESSIONS

BACK TO CONTENTS

3.4 DRY LAND / STRENGTH AND CONDITIONING

The Corsuit, as a swimming posture training tool, also has application outside the water. Many coaches and swimmers apply the Corsuit to their dry land / strength and conditioning training, in order to focus more intensely on posture and cement these skills.

In dry land training, the Corsuit is used in a similar manner as in swimming, giving tactile feedback to the athlete on their posture.

Depending on the exercise, swimmers should usually aim for either a Neutral Spine or a Flat Spine. Regardless though, the athlete should generally ensure the back doesn't hunch and come away from the top and bottom of the Corsuit during exercises.

For exercises where the swimmer is upright and either weighted or performing ballistic movements, it is most effective to aim for a Neutral Spine, which will help to absorb shock and transfer force. For highly swimming-specific exercises, or exercises directly aimed at replicating/training swimming posture, swimmers should strive for a Flat Spine position.

The exercises detailed herein are intended to provide a progression from static postural practice to controlled movements applying this posture. These exercises are not intended to be exhaustive, and may be built upon by a qualified swimming coach or strength and conditioning professional.

IMPORTANT NOTE

For all explosive and/or weighted exercises, the Corsuit should only be used for light warm-up sets or light technique-focussed sets. The Corsuit is intended for technique training, and should not be used for heavily weighted lifts or ballistic movements.

All exercises should be performed under the supervision of an accredited strength and conditioning coach. Always use caution, and cease the exercise if you experience any pain or discomfort. If you have any existing back complaints or relevant medical conditions, see your health professional before using the Corsuit.

BACK TO CONTENTS

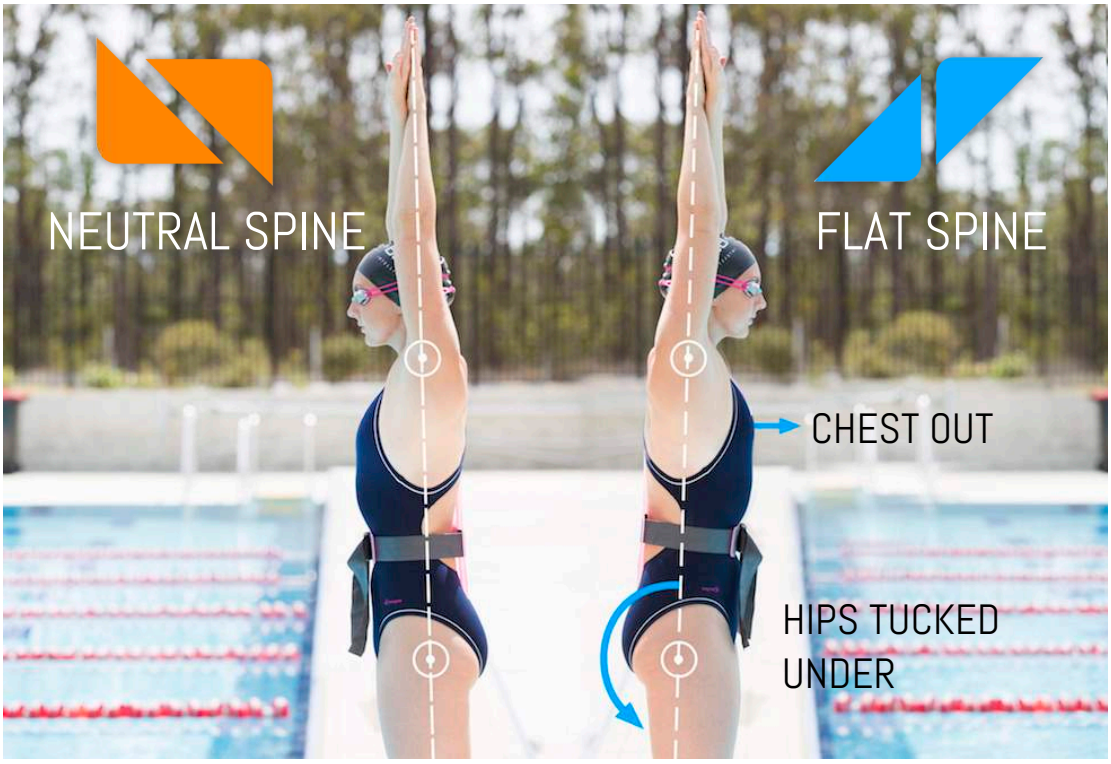
3.4.1 Bracing

Advanced swimming should be built on a foundation of movements, which require a foundation of positional awareness. To do so, swimmers should become familiar with achieving and maintaining certain positions that are commonly used in swimming.

By using the core to brace in common swimming positions such as the streamline, the athlete will become more comfortable in these positions while swimming, as well as more capable of maintaining efficient technique under fatigue.

#1 STANDING STREAMLINE

The streamline position is the cornerstone of swimming technique. Swimmers capable of maintaining an efficient streamline will create less drag in the water, and therefore require less effort to achieve the same speed as an inefficiently streamlined swimmer. The image below shows how to adjust from a Neutral Spine position to a Flat Spine position.



BACK TO CONTENTS

#2 BRIDGE

FLAT SPINE

The bridge (or 'plank') is a common exercise in swimming, but is difficult to perform correctly. In an ideal plank position the body should form a straight line, from the ankles all the way to the head.

Common mistakes include hunching of the upper back, arching of the lower back and a piked hip position (where the hips are elevated and not in line with the ankles and head.)

The Corsuit aids in refining the bridge position by ensuring any hunching and/or arching is minimised. In doing so, when the hips are tucked under the core is activated more strongly, increasing the intensity and specificity of the exercise.

BACK TO CONTENTS

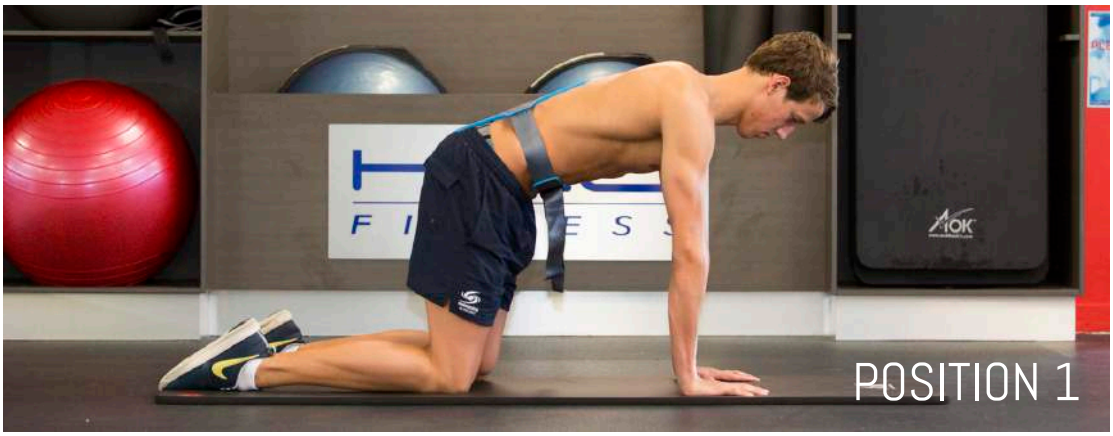
3.4.2 Bracing and Control

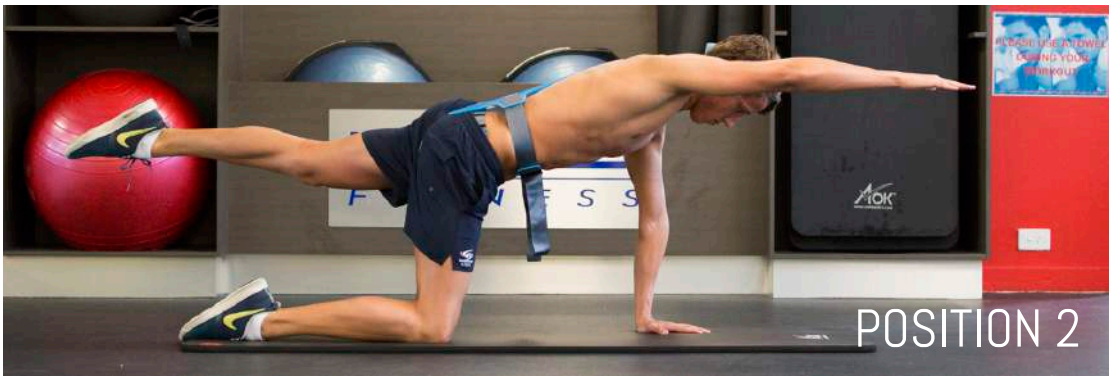
With a foundation of good posture and positioning, movements can be introduced to build coordination and proprioception. These exercises promote a stable core, while the arms and/or legs perform smooth, relaxes movements.

#3 BIRD-DOG

The Bird-Dog is a low-impact awareness exercise, intended to help swimmers improve proprioceptive awareness of their arms, legs and posture.

To perform a Bird-Dog correctly, the core should braced in Position 1, with the back flat against the Corsuit. As the legs and arms extend towards Position 2, the back should remain flat against the Corsuit.





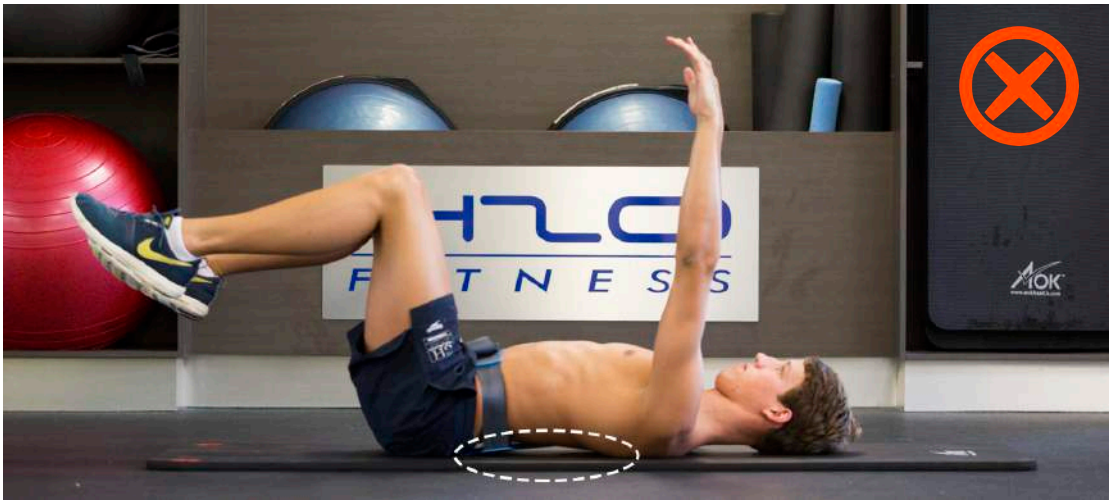
Common mistakes include arching of the back, which is often evidence that a swimmer is not entirely aware of where their arms and legs are in space.

BACK TO CONTENTS

Have your coach or a friend watch you and give feedback on when your arm and leg have reached full extension (or over-extension or under-extension). If you cannot keep your back flat with your arm and leg fully extended, this may indicate a limited range of movement in the hips and/or shoulders.

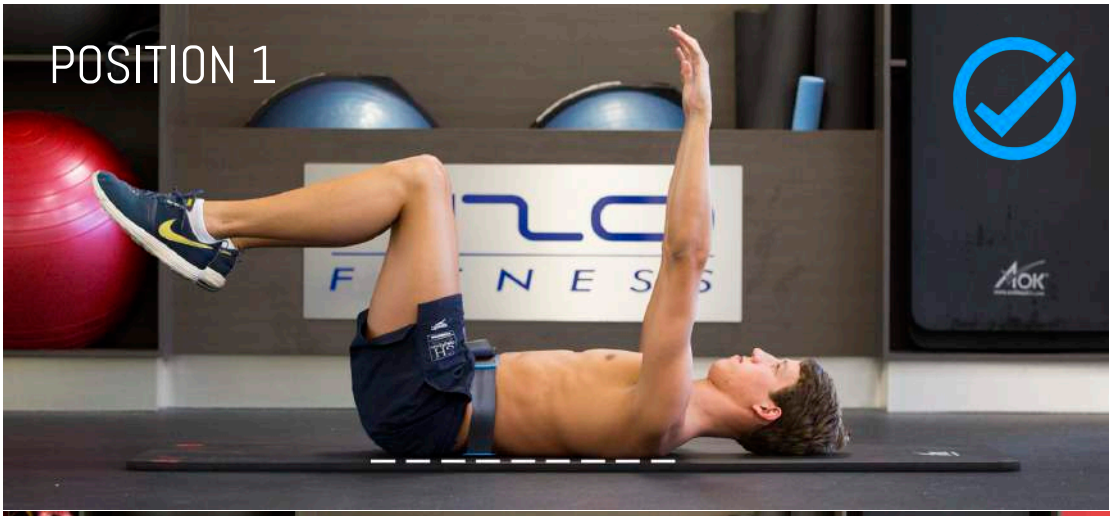
#4 DEAD BUG

The Dead Bug is an advancement upon the Bird-Dog, where a similar movement is performed lying on the back. As with previous exercises, the most common fault in Dead Bug technique is arching of the back.



To perform a Dead Bug correctly, the core should be braced in Position 1, with the back flat against the ground. As the arm and leg extend towards Position 2, the back must remain flat, maintaining pressure on the ground. If the back begins to arch, the athlete will feel feedback at the top and bottom of the Corsuit.

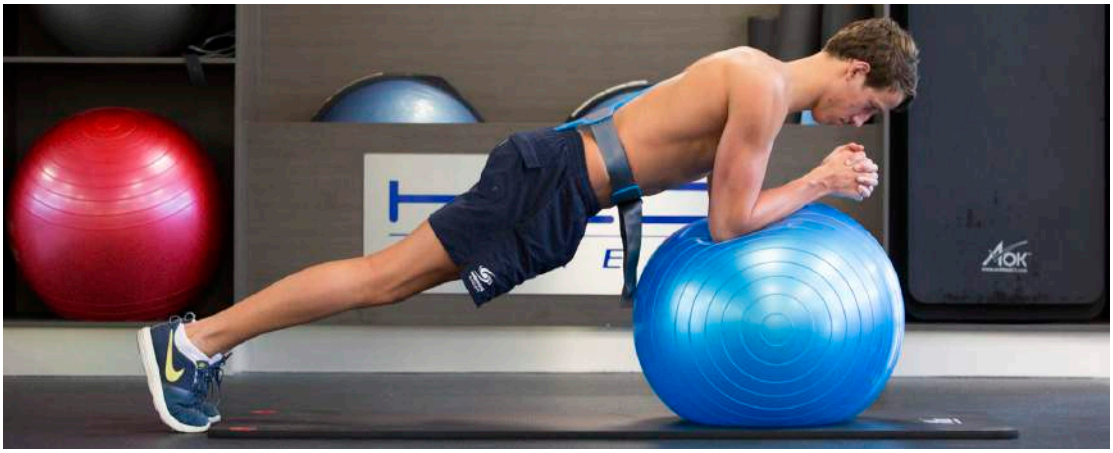
BACK TO CONTENTS



#5 POT STIR

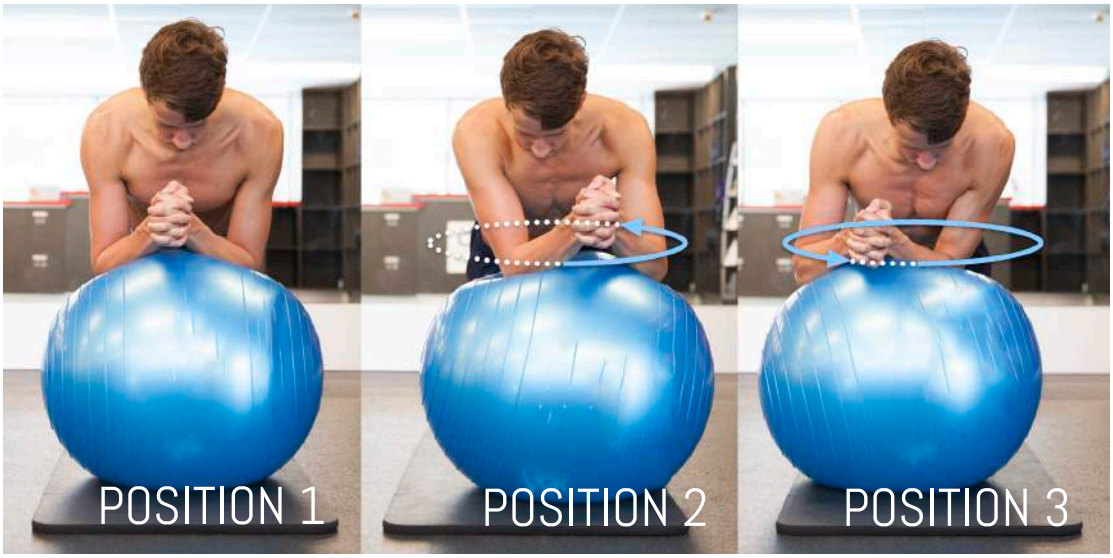
FLAT SPINE

The Pot Stir is an advanced bracing and control exercise. From a bridge position on a gym ball, the arms perform large circular movements in alternating directions.



BACK TO CONTENTS

The athlete should maintain a Flat Spine position throughout the exercise, which requires strong bracing of the core as the arms move.



The most common fault in execution of the Pot Stir is arching of the lower back as the arms move away from the body. This is similar to the catch position in freestyle, where pressure is applied to an extended arm, increasing the force required to maintain a Flat Spine.

BACK TO CONTENTS

3.4.3 Bracing, Control and Resistance

While posture and efficient technique can improve speed, swimmers also require significant power, in order to generate propulsion. Once a swimmer has adequate control of their movements, more significant resistance (e.g. weights) can be introduced. While the Corsuit should not be used for heavily weighted or explosive movements, it can assist in training correct postures for these exercises, helping to ensure they are performed with effective technique.

#6 PULL-UP

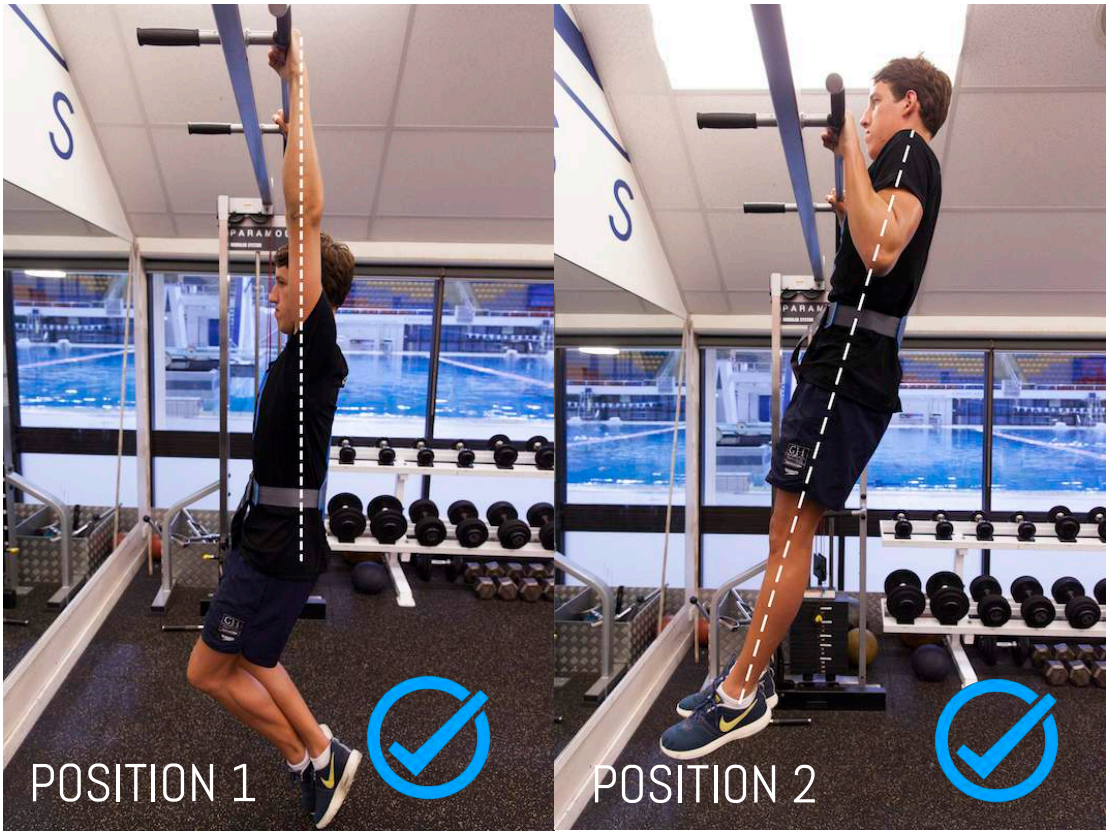
Pull-ups have long been considered the quintessential resistance exercise for swimmers, as the movement is very similar to the pull in swimming. Swimmers should typically perform pull-ups with a Flat Spine, as this most closely replicates swimming technique.

Common mistakes include overarching of the lower back and over-hunching of the upper back. These misalignments can be reduced with the help of the Corsuit.

BACK TO CONTENTS

To perform a good pull-up, swimmers should set themselves in a Flat Spine position with the arms fully extended and relaxed. From this position, the core should remain braced as the arms pull the body upwards. The body will naturally tilt as it rises towards the bar, but the bodyline should still be kept straight.

The chin should clear the bar to complete the pull-up. At this point the shoulder blades should be retracted, with the shoulders pulled back, preventing rounding of the upper back.



BACK TO CONTENTS

#7 DEADLIFT

NEUTRAL SPINE

The deadlift is often considered a potentially dangerous exercise, particularly due to the pressure that can be placed on the back if the athlete is in a poorly aligned position. But with proper technique, it can also be highly beneficial for training posture. The most common fault in deadlifting technique is rounding of the back either at the starting position, or in the early stages of the lift.

The Corsuit can be used for lightweight warm-up sets to drill an efficient setup position for deadlifting.

If the back hunches, the athlete will feel their back separate from the ends of the Corsuit, signalling that they are not adequately controlling the core.

From a good setup position, a Neutral Spine should be maintained through both the concentric (lifting) and eccentric (lowering) portions of the exercise.

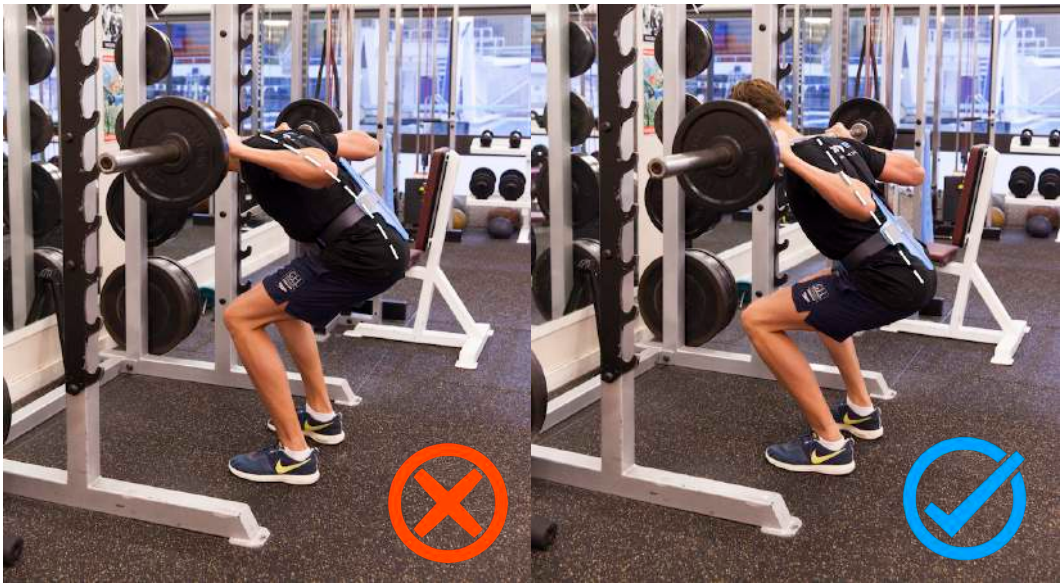
BACK TO CONTENTS

#8 SQUAT

NEUTRAL SPINE

Squats are a highly beneficial exercise for increasing start and push-off power, as well as increasing kicking power. As with deadlifts, the Corsuit can be used to ensure the back does not hunch at the bottom of the exercise.

Keeping the back in contact with the Corsuit ensures the hips are kept in a mechanically advantageous position, and the chest is kept up. This closely resembles the position swimmers should aim to achieve when the feet strike the wall during a tumble turn or touch turn.



As with swimming starts, hip flexibility can often limit the athlete's ability to keep the back from hunching throughout the entire exercise. Squats should only be performed to a depth at which posture can be maintained, and no deeper.

BACK TO CONTENTS

#9 OVERHEAD PRESS

NEUTRAL SPINE

Overhead Press (or 'Military Press') can help swimmers with maintaining good posture with the arms extended – for example during streamlining or when in the extended position of any stroke.

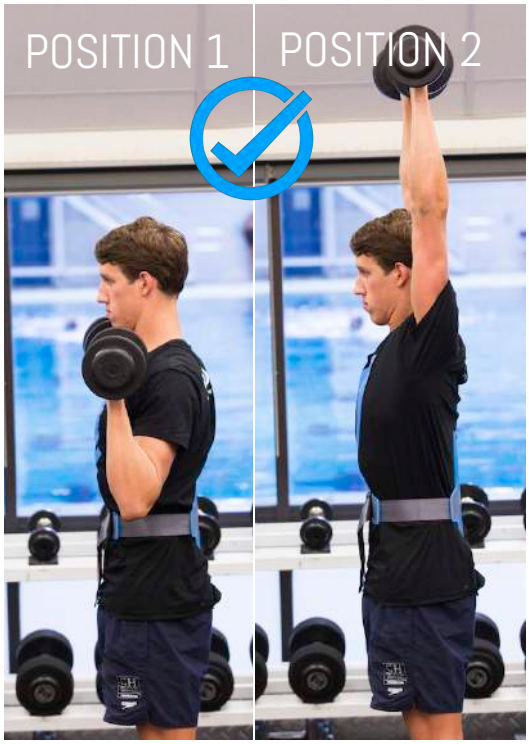
A common mistake in overhead pressing is arching of the back.

Many athletes have the tendency to do so, as it allows the chest muscles to be recruited, making the exercise easier, but less applicable to swimming.

BACK TO CONTENTS

In a correct overhead press, Neutral Spine is maintained throughout the exercise.

Some athletes may struggle to prevent arching as the arms reach full extension, which may suggest a lack of range in the shoulders.



BACK TO CONTENTS

4 EXAMPLE SESSIONS

The Corsuit can be used for almost any swimming training, so here are some example sessions to demonstrate how the Corsuit can be applied to different types of training.

All sessions are penned by Blucore's *High Performance Coach*, who has extensive experience in working with both elite and sub-elite swimmers. However, every coach is different, and not all sessions will apply to all coaching methodologies. The sessions herein are purely intended to provide inspiration for the different ways the Corsuit can augment good swimming training.

DEFINITIONS

Back	Backstroke
Breast	Breaststroke
Fly	Butterfly
Free	Freestyle
Form	Preferred stroke apart from freestyle
IMO	Individual medley order – fly, back, breast, free
U/W	Underwater
Max	Maximum effort
FES	Front end speed - refers to the pace of the first half of a race
BES	Back end speed - refers to the pace of the second half of a race
Dive	Perform this repetition from a diving start
Push	Perform this repetition from a push-off start
Build	Steadily increase speed and effort over the course of this repetition
Target Time	Seasonal goal time for that distance in a race
SRC	Short rest cycle per 100m – roughly best 100m time + 20-25sec
Peloton File	Swimmers swim close together and in line. Each lap the swimmer in last position must accelerate to the front of the group.
Pace	Target speed, based upon goal race times. E.g. if goal 200m time = 2:00, then 50m at 200m pace = 0:30
+1, +2, -1 etc.	The difference between a certain pace and the desired training pace. E.g. 100 BES+2 = Goal time for second 50m of 100m race, plus two seconds.

BACK TO CONTENTS

SESSION

SPRINT 1

DISTANCE: 2700m

MAIN SET GOALS

- Develop postural stability at high speeds
- Build postural awareness under fatigue

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
3 x	200 as 150 free / 50 form 4 x 50 as 15 max / 35 easy	2nd set
	MAIN SET	
5 x	4 x 25 dive, max 100 easy	1st, 3rd, 5th sets
	WARM DOWN	
1 x	400 as 100 swim / 100 kick	First 200

MEASURING PROGRESS

- Feel for change in pressure at top/bottom of Corsuit throughout set
- Use video footage to compare perceived tactile feedback with actual posture

BACK TO CONTENTS

SESSION

SPRINT 2

DISTANCE: 4500m

MAIN SET GOALS

- Develop resistance to lactate-induced postural fatigue
- Become accustomed to spending extended periods at race-specific pace

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
4 x	200 free 4 x 50 as 15 U/W + breakout 2 x 100 with race breathing pattern	Set 2, 4
	MAIN SET	
3 x	2 x 25 as 1 dive, 1 push on 2:00 50 push at 100m BES on 1:30 75 dive, max on 2:00 100 easy on 2:00	Set 2
	WARM DOWN	
5 x	4 x 50 with fins, 15 U/W + breakout on 1:00, 55, 50, 45.	-

MEASURING PROGRESS

- Feel for difference in body position:
  - Over the course of Set 2
  - Set 1 versus Set 3
  - Aim for Sets 1 and 3 to eventually feel the same (this will take practice!)

BACK TO CONTENTS

SESSION

SPRINT 3

DISTANCE: 4300m

MAIN SET GOALS

- Maintain effective posture during resisted swimming
- Maintain stable posture while applying power throughout entire stroke

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
4 x	200 free 100 kick without board 100 free breathe every 8th stroke	Sets 2, 4
1 x	10 x 50 alt. 15 max / 15 underwater	-
	MAIN SET	
4 x	2 x 15 push, max on 1:30 2 x 25 push, max on 2:30 1 x 35 push, max on 3:30 200 easy	Sets 1, 3 (+ drag suit and paddles)
	WARM DOWN	
1 x	400m easy	-

MEASURING PROGRESS

- Feel for changes in Corsuit feedback during catch with paddles
- Lower back should not cave during catch

BACK TO CONTENTS

SESSION

MEDLEY

DISTANCE: 4100m

MAIN SET GOALS

- Practice a range of different postures
- Practice switching between postures
- Particular focus on breaststroke to freestyle transition

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
3 x	100 as IMO (skip free) 200 medley with fast turns 200 free	100s
	MAIN SET	
4 x	200 medley on 4:00 150 as back/breast/free on 3:00 100 as breast/free on 2:00 Build each effort, max on freestyle leg	Sets 1, 3
	WARM DOWN	
2 x	4 x 100 kick IMO	Set 1

MEASURING PROGRESS

- Assess level of Corsuit feedback when transitioning from breaststroke to freestyle
- Correlate perceived level of Corsuit feedback with freestyle leg times
    - Does a flatter spine correlate with faster times?

BACK TO CONTENTS

SESSION

MIDDLE DISTANCE 1

DISTANCE: 5000m

MAIN SET GOALS

- Spend extended period at race-specific pace
- Build resistance to lactate-induced postural fatigue
- Improve distance per stroke and overall efficiency

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
1 x	6 x 200 fins, 15 underwater each wall	-
1 x	8 x 50 alt 25 at 200 pace / minimum stroke count	First four 50s
	MAIN SET	
2 x	2 x 50 at 200 pace on 1:00 4 x 100 at 200 pace BES+2 on 2:00 2 x 50 at 200 pace -1 on 1:00 4 x 100 at 200 pace BES on 2:00 400 easy on 6:30	Set 1
	WARM DOWN	
1 x	6 x 100 alt. kick 2:30 / swim 1:45	-

MEASURING PROGRESS

- Count strokes during main set
- Strokes should drop as speed improves over time

BACK TO CONTENTS

SESSION

MIDDLE DISTANCE 2

DISTANCE: 6000m

MAIN SET GOALS

- Spend moderate period around race-specific pace
- Maintain posture for extra distance while aerobically and anaerobically fatigued

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
4 x	400 as minimum stroke count 4 kicks off each wall 200 kick with snorkel, no board	Sets 2, 4
	MAIN SET	
4 x	4 x 100 on 2:00 at pace Set 1: 400 pace +4 Set 2: 400 pace +2 Set 3: 400 pace Set 4: 400 pace -2	Sets 1, 2
	WARM DOWN	
1 x	5 x 400 fins on SRC	-

MEASURING PROGRESS

- Record and compare times from Set 3 and 4 over time
- Count strokes during warm down

BACK TO CONTENTS

SESSION

LONG DISTANCE

DISTANCE: 6900m

MAIN SET GOALS

- Build habit of holding good posture throughout entire session/race
- Increase distance per stroke and overall efficiency

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
3 x	200 form swim on 3:30 10 x 50 technique focus on 1:00 2 x 100 kick, snorkel + board 2:30	Sets 1, 3
	MAIN SET	
4 x	1000 counting strokes per lap, on: Set 1: SRC+10 Set 2: SRC+5 Set 3: SRC+2.5 Set 4: SRC	Sets 1, 3
	WARM DOWN	
1 x	200 easy	-

MEASURING PROGRESS

- Number of dolphin kicks after each turn should be the same to aid in comparability
- Compare stroke counts and times
- Stroke counts and times should decrease over time

BACK TO CONTENTS

SESSION

TRIATHLON

SWIM DISTANCE: 3.9km
BIKE DISTANCE: 40km
RUN DISTANCE: 10km

MAIN SET GOALS

- Situational training
- Practice switching between land (running/riding) posture and swimming posture

REPETITIONS	SET	USE CORSUIT FOR
	BIKE	
1 x	40km as mix of solo / pack	
	SWIM	
3 x	3 x 100 with pull buoy on 1:50	Set 2
2 x	100 on SRC 200 on SRC 400 on SRC 200 on SRC 100 on SRC 1000m as Peloton File	400s
	RUN	
1 x	10km in pack	-

MEASURING PROGRESS

- Count strokes over time
- Feel for level of Corsuit feedback over time
- Monitor swimming speed at start of set
    - Faster starting speed = more efficient transition to swimming posture

BACK TO CONTENTS

OPEN WATER

DISTANCE: 5000-7000m

MAIN SET GOALS

- Session to be completed in group, at a safe and supervised open water location (e.g. ocean/lake)
    - Note: Coach uses landmarks to gauge rough distance.
- Improve habitual swimming posture
- Maintain posture while 'sighting' direction

REPETITIONS	SET	USE CORSUIT FOR
	WARM UP	
1 x	700-1000 easy, mix of solo / pack	-
	MAIN SET	
6 x	700-1000 at race pace, alt. solo / pack	Solo Sets
	WARM DOWN	
	400-600 easy	-

MEASURING PROGRESS

- Feel for change in Corsuit feedback during sighting
    - Back should be kept flat while head is up
- Ideally, coach observes sighting technique from boat or pier

BACK TO CONTENTS