

Perfect Your Breathing With a Better Body Position

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Very often, the reason beginning swimmers struggle in the water is due to an ineffective breathing motion.

Excess head motion distorts the body position, increases resistance, and slows swimming speed. Mastery of breathing can make a huge difference in performance. Improving the breathing motion requires first optimizing the non-breathing head position.

Non-Breathing Head Position

While recommendations for the non-breathing head position have varied dramatically over the last century, the position that minimizes resistance has not. There is one head position that makes it possible to optimally orient the body when not breathing, and breathe without distorting the torso and legs. Cues (specific information about what to see or feel to orient the body parts) are a precise way to position the head and keep it stationary.

Feeling the water level just above the hairline is a kinesthetic cue that helps to effectively position the head (Figure 1). However, humans are better at processing visual information. *Seeing* both the pool wall and bottom within the field of view are visual cues that ensure an optimal head position.

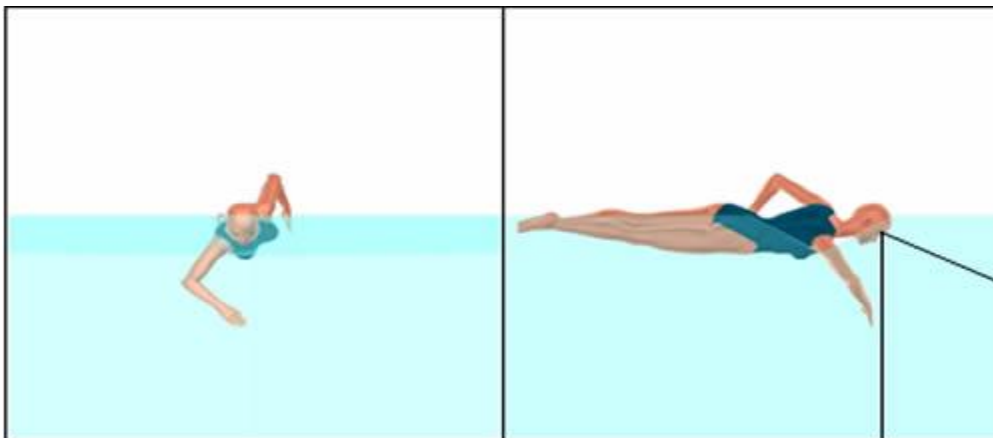


Figure 1. The non-breathing head position from the front and side views. The side view shows that the swimmer's field of view includes the pool wall and bottom.

Once the head is in an optimal position, it is much easier to orient the rest of the body. Arching the lower back lifts the legs to bring the heels to the surface. If the legs stay behind the torso (as in the front view of Figure 1), resistance is minimal. The smaller the area of the body perpendicular to the direction of motion (the body cross-section), the lower the resistance (Havriluk, 2005).

One of the many misconceptions about swimming technique is that the head must be submerged for the legs to stay behind the shoulders. Although lowering the head may help to raise the legs, breathing then requires excessive head motion that distorts the body and increases the cross-section.

Breathing Head Motion

An optimal non-breathing head position forms a bow wave along the side of the head. Then, only minimal head rotation is necessary to breathe in the trough of the bow wave. The head rotates until one eye (goggle) is above the surface and the top of the water is in the visual field (Figure 2).

The head rotation only needs to be enough to bring the mouth above the surface. The eye that is above the surface can sight a point on the side wall directly opposite the head. When inhalation is complete, rotation returns the head to the non-breathing position.

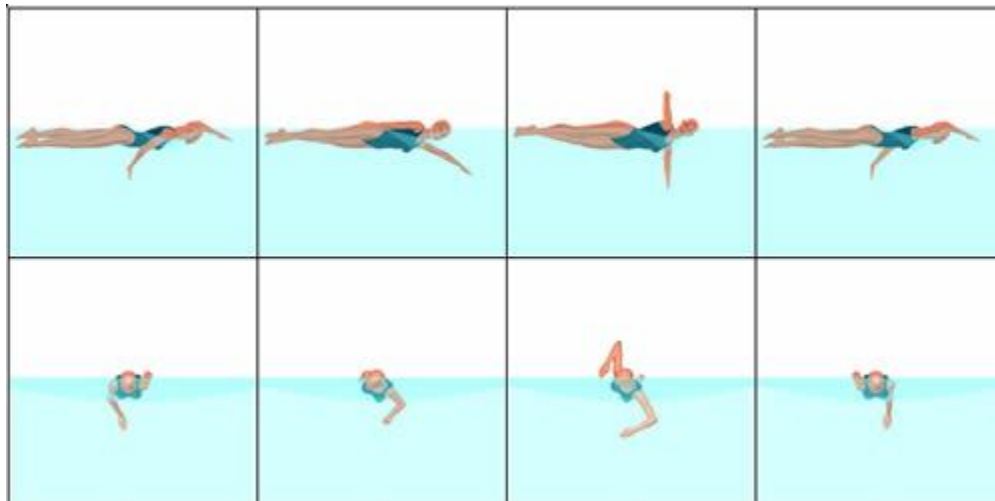


Figure 2. Head rotation to the breathing position and return to non-breathing position.

If the head is only rotated to breathe (i.e. the head does not lift or drop), there is no distortion of the body and no increase in the cross-section. As shown in each frame of the biomechanical model of Figure 2 and the swimmer in Figure 3, the legs stay behind the torso to minimize the cross section.

Cues also synchronize head rotation and inhalation with the arm motion (Table 1). While the head is in the non-breathing position, the swimmer exhales through the nose and mouth. As the breathing-side hand passes beneath the head, the swimmer prepares to rotate the head. The head rotates with the push phase of the hand. Exhalation ends as the mouth rises above the surface.

As the arm breaks the surface, inhalation begins. As the arm passes the shoulder on the recovery, inhalation ends and the head rotates to the non-breathing position.

Head Position/Motion	Visual Cue	Kinesthetic Cue
Non-Breathing	See pool wall and bottom	Feel water level just above hairline
Rotation to Breathe	See hand pass beneath head	Feel hand push back
Breathing	See pool wall directly opposite head	Feel water level at corner of mouth
Rotation to Recover	See arm pass shoulder	Feel arm pass shoulder

Table 1. Visual and kinesthetic cues for the head.

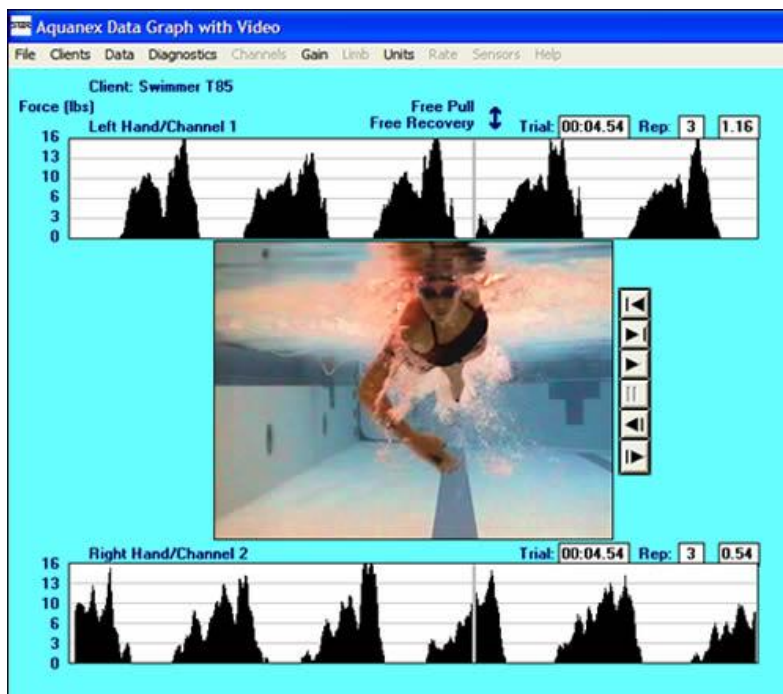


Figure 3. Underwater video and hand force curves for freestyle. The vertical lines on the force curves are synchronized with the video image. An effective non-breathing head position with the water level just above the hairline minimizes the body cross-section and makes it possible to breathe with minimal head rotation.

Practice Repetitions

It takes thousands (and usually tens of thousands) of practice repetitions to develop permanency in a technique change. Slow, short swims of non-breathing strokes allow the swimmer to constantly focus on the cues and maintain an optimal head position (Havriluk, 2006).

An effective drill is to alternate one or two non-breathing stroke cycles with a breathing cycle. This provides continued practice on the non-breathing position with opportunity to work on the breathing motion.

Conclusion

An effective freestyle breathing motion requires first establishing an effective non-breathing head position. An optimal non-breathing head position minimizes the head rotation necessary to breathe.

Visual and kinesthetic cues are critical for checking the non-breathing head position and controlling the breathing motion. An improvement in breathing minimizes the body cross-section throughout the stroke cycle, decreases resistance, and makes any swim less fatiguing. Not only will your swim be more enjoyable, but faster.