

THE NEW BACKSTROKE TUMBLE TURN

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In teaching swimmers to do the present backstroke flip turn, coaches have observed many instances where the swimmer attempts to keep the hand touch high and go under the foremost arm rather than to touch deep and pivot around this point. I have timed this turn and have found it faster going under the arm rather than swinging over and around as in the present backstroke flip turn.

After a careful analysis of this "under the arm" turn, it has become evident that the reasons for the greater speed achieved are sound. Also, with further experimentation, it has become possible to execute this turn within the framework of the backstroke ruling, making it the fastest backstroke turn to date.

At present, advanced kinesiological research is being done by Dr. John Mitchum of Northern Illinois University and this author. We are filming a number of swimmers using a slow motion camera and making the analysis with a single frame projector. The purpose is to find the force available, the speed of movement, the resistance encountered, the economy of motion and the joint angles of movement in comparing the two backstroke turns.

Description of the forward somersault backstroke turn (right handed touch): (Numbers refer to illustrations at end of article)

The backstroker swims toward the wall. He starts his arm recovery for the wall from the right hip, reaching his right hand diagonally across the chest and face, while simultaneously executing a one-quarter twist, rolling along the longitudinal axis of the body. Care must be taken at this point not to roll past the vertical position on to the breast. As the hand touch is made at water level, a second one quarter twist (continuation of the first) is executed. The head is tucked and dropped vertically, acting as an anchor, causing the hips to pike. Simultaneously the left trailing hand and arm which are now lateral to the left hip pull upward (flexing) toward the left shoulder, assisting the hips to somersault over the anchor point in a loose tuck position. Immediately following the hand touch at the beginning of the pike, the right hand moves toward the right hip, which by now is approaching the wall and right hand. At this moment, further assistance is given to the forward somersault by pulling the right hand and arm upward toward the right shoulder. Both hands will finish behind the head simultaneously, after having gone through an arc movement of one hundred eighty degrees (semi-circle) from the hips to head positions. (Note: The right arm travels faster than the left as the initial power for the somersault movement comes from the left arm. This somersault movement is possible without the assistance of the arms. However, greater body speed may be attained by the added thrust the body receives from the arms.) The hips are now piked (right hip slightly leading when leaving the water) with approximately a right angle knee bend in the legs. The legs come out and go over the water with the hips at the surface. (Note: At this exact moment the head moves further away from the wall continuing in the opposite direction.) As the torso of the swimmer reaches a point of perpendicular with the water's surface, the hips are rotated (the right hip away from the wall, the left hip toward the wall until a point is reached where both hips are at an equidistant position) and pulled downward as in the completion of a forward somersault with the legs in a whipping motion. The feet position themselves on the wall approximately ten to twenty inches beneath the surface. The knees are at a ninety degree angle with the swimmer completely on his back ready for the push off.

Summary, Comparison and Conclusion:

The 1966 National Collegiate Athletic Association backstroke ruling reads:

"The contestant may not turn over beyond the vertical toward his breast before his foremost hand is touched the end of the pool."

Due to the lack of an appropriate nomenclature for the two turns to be compared, I shall refer to the present backstroke flip turn as the "old" turn and to the introduced turn as the "new" turn.

1. Movement planes: At this writing I will omit the anatomical planes of the body. The two directions necessary for descriptive purposes are the vertical (direction from surface of water to pool bottom) and the horizontal (direction from wall to wall perpendicular to racing direction). Note: racing direction is a line drawn from point to point.

Fig. 1 *HIP



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6

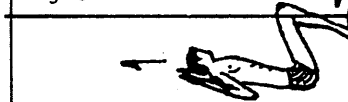
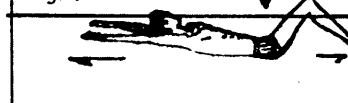


Fig. 7



1. From this position the right arm recovers diagonally across the chest.

1. Right hand wall touch
2. It is here that care must be taken not to turn past the vertical on to the breast.

1. The head drops.
2. The hips pike and the legs flex.

1. The arms assist in flipping.
2. The hips drive towards the wall.

1. The legs whip towards the wall.
2. The head moves away from the wall ... the position is a loose tuck.

1. The legs come downward.
2. The swimmer lands on his back with his hands behind the head.

1. Push off.

Old Turn

(two planes of movement): Starting in the vertical plane the body executes a one half twist forcing the body to make a back landing, changing directions from the vertical to the horizontal plane. Also, the lateral movement usually falls short of the racing direction. Thus, as the feet touch, the shoulders and arms are still moving through a horizontal plane as they return to racing direction.

2. Body Position:

Old Turn

- A tight tuck position is used.
- The hand touch is deep (10"-20").
- Going into the touch, the

New Turn

(one plane of movement): Starting in the vertical plane the movement before the touch is a one quarter twist. Then another one quarter twist and a front somersault are executed still in the vertical plane. As the feet touch, both hands are behind the head and neck with the body in perfect racing condition.

New Turn

- A loose tuck position is used.
- The hand touch is shallow (2"-10").
- Going into the touch, the

(Continued on Page 21)

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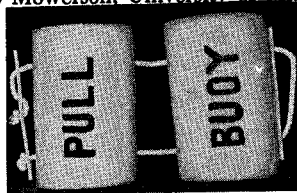
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TUMBLE TURN (Continued from Page 7)

body is at full length position, making a long radius and a longer period of execution.

body is piked at the hips making a short radius. Thus, there is a shorter period required for execution.

3. Water Resistance Encountered During Execution:

Old Turn

The frontal area of the thighs, hips and torso lift against the water during the initial movement toward the wall.

New Turn

During the front somersault, the hips are at water level. The main resistance is encountered at the back of the head and upper shoulders. This serves as an ideal anchor for a "pole vaulting" movement. The hips pike and the legs lift over the water, encountering little resistance.

The new backstroke turn seems to have less wasted movements, less negative resistance, uses a shorter radius for greater speed of movement, and allows the swimmer to stay in one plane. When done correctly, the swimmer using the new turn appears to be bouncing off the wall like a rubber ball rather than momentarily "hanging up". Extreme care must be paid to the near vertical position from back to breast at the moment of touch in order to stay within the NCAA ruling.

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