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Improve Your Hand-Eye Coordination

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Tune your eyes, improve your game

Getting better at a sport doesn't always mean becoming faster or stronger. There is a subtler way of maximizing athletic performance – training your eyes.

Hand-eye coordination is a fundamental aspect of most athletic movements. While baseball and golf are touted as the ultimate tests of hand-eye coordination, there are

plenty other sports in which it is vital – catching a football, kicking a soccer ball or playing billiards come to mind.

"There is no question that hand-eye coordination can be not only improved, but dramatically improved," says Gavin MacMillan, the founder of Sports Science Lab in San Juan Capistrano, Calif.

Three Areas of Importance

There are three actions relevant to hand-eye coordination training – peripheral vision, proprioception and reaction time, according to Brent Callaway, performance manager at Athletes' Performance in Carson, Calif.

Peripheral vision, in which eyes track action occurring around the main area of focus, is necessary in sports, says Callaway. A fast-eye movement, also known as a saccade, is commenced whenever a momentary action requires an immediate physical reaction. Callaway cites a baseball infielder having to field a ground ball while locating a teammate who can start a double play.

"The term 'keep your eye on the ball' cannot apply here because of the short amount of time in which these actions are happening," Callaway says. Thus, the infielder uses his peripheral vision to finish fielding the ball before turning his attention to the desired base.

Proprioception refers to knowing where your body or parts of your body are in a space. Mark Morrow, a clinical professor of neurology at UCLA who studies the brain's relationship with eye movement, considers walking in the dark a classic example of the body using proprioception. This action is relevant to every type of physical activity performed.

Reaction time is the process by which the brain evaluates and orders a muscular response to whatever physical action the body needs to take.

Eye, Brain Communication

Morrow says the brain's parietal lobe, which integrates sensory information throughout the body, is primarily responsible for creating a series of visual maps for the eyes. "It sets up a

5 Helpful Hand-Eye Coordination Exercises



This video was provided by Athlete's Performance.

Doing the Moves

Brent Callaway, the performance manager at Athletes' Performance in Carson, Calif., and AP trainer Roy Holmes exclusively provide five hand-eye coordination exercise videos.

To intensify a session, Callaway advises trying to catch more balls in the same time frame. "This gives you a target to focus on and the ability to set achievable goals," Callaway says.

Clip 1: This exercise focuses on peripheral vision and proprioception as it's impossible for the eye to track two objects simultaneously. The drill improves peripheral vision because the eye can't track two objects simultaneously (did you mean to repeat this? And is it true? I guess I'm confused on what it means to "track to objects simultaneously. When the infielder notes his teammates position while also corraling a grounder, isn't he tracking two objects at once?), and improves proprioception because the eyes are kept at the peak and not staring at where the balls land. **Perform 3 sets of 6 catches in a row.**

Clip 2: Reaction time during sports is slowest when reacting to a verbal cue

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map that tells you what's going on around you, and tells you what's going on in [the] space [around you]," Morrow says.

This neural mapping system helps the eyes evaluate shifts in an object's movement. That is critical for an oncoming fastball, for example. For that, Morrow says the eyes utilize two kinds of movement – smooth pursuit and the aforementioned saccade.

Smooth pursuit is an eye-tracking movement in which an object is at a distance far enough from an individual that it can be analyzed without that person being overwhelmed. When a baseball pitcher releases the ball from his hand during a pitch, the eyes initially track the ball's flight by using smooth pursuit.

But there is a point at which the eyes must adjust to an object's closing distance. This is where smooth pursuit ends and the eyes utilize saccades, or fast-eye movement. Skilled athletes can consistently follow an object to its impact point – baseball to the bat, foot to the ball – which is why practice is critical.

Train Opposite Legs, Arms

Like any other athletic endeavor, repetition is paramount. MacMillan explains that the body develops a response to the series of information taken in through the eyes. "To make it a conditioned response, you have to do it multiple times – hundreds and thousands of times," MacMillan says.

Ultimately, playing sports regularly will help develop the hand-eye coordination required for that sport. Yet you can take your hand-eye development to a new level by executing a set of exercises devoted to it. MacMillan says the body's neurological system can be sharpened by coordinating opposite limb exercises.

Each side of the body working opposite one another is already natural – walking, for instance, in which each arm swings back and forth with each leg. Given how the body's neural pathways help control hand-eye coordination, exercises dedicated to improving neurological responses are fundamental for improvement.

MacMillan recommends tapping your left foot and right hand, or right foot and left hand. Do that at various points every day and follow it up with afterwork games of ping pong, which requires fast-eye movement. It's necessary to stay upbeat, even if the movements may not come naturally.

"Don't let the initial frustration or the inability to do something get you to stop doing it," MacMillan says.

Unlike exercising your limbs or torso, you won't be able to gauge your training's effectiveness by looking in a mirror. Improved hand-eye coordination will become apparent when drilling a baseball or smashing a soccer ball happens more consistently.

About the Writer

Kyle Stack is a New York-based freelance reporter who also writes for ESPN the Magazine, Wired.com and SLAM.

and processing the necessary movement. As this athlete (Coach Roy Holmes) must process which hand to catch with in the short amount of time that it takes the ball to get out of my hand and into his. (Not understanding this sentence—it's very wordy. Is it a complete sentence?) **Perform 3 sets of 10 balls.**

Clip 3: Peripheral vision and proprioception are needed in this one and it is evident by where Coach Holmes keeps his eyes during the drill. He never looks at the balls. Reaction cues are purely visual, since there's no longer an auditory cue. Use golf balls for longer sets. **Perform 3 sets of 6-8**

Clip 4: This exercise integrates agility work, while catching further distracts from all three training points. Here, we see the only dropped ball of the afternoon. **Perform 3 sets of 10 seconds.**

Clip 5: Integrating neural activation training while catching is very difficult. These short line drills should be done as fast as the person can execute them. **Perform 3 sets of 3-5 seconds.**

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