

ART107

leadership series

Safe Outdoor Summer Exercise Part 2: Lightning

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SUMMER IS A TIME WHEN MANY PEOPLE EXERCISE OUTDOORS. IT IS IMPORTANT FOR FITNESS LEADERS TO PROVIDE SPECIFIC OUTDOOR EXERCISE SAFETY GUIDELINES. *This is the second in a series of three articles about outdoor summer exercise safety. Article one discusses GENERAL RECOMMENDATIONS regarding protection from the sun. Part two discusses thunderstorms and lightning and part three discusses heat, humidity hydration, pollution, specific summer outdoor exercise activities and outdoor exercise equipment. The information presented in this series is for the average healthy exercising adult. Special populations (athletes, children, infants, elderly, sedentary, people on medication, pregnant women and individuals with cardiovascular, disease, diabetes, asthma, obesity and other illnesses) may need additional information that is not covered in this series*

SUMMER IS A TIME OF INCREASED THUNDERSTORM ACTIVITY AND LIGHTNING AND ACCORDING TO THE NATIONAL LIGHTNING SAFETY INSTITUTE (NLSI), "LIGHTNING IS THE SECOND GREATEST CAUSE OF STORM-RELATED DEATHS IN THE UNITED STATES. The NLSI also states that; "Lightning's behavior is random and unpredictable...a conservative attitude...preparedness and quick response are the best defenses." The National Weather Service states that "the chances are one in 300 that a lightning strike will closely affect a person." That risk increases the more time spent outdoors. Lightning education is important for people who exercise outdoors.

A CLOUD-TO-GROUND LIGHTNING FLASH IS the product of buildup and discharge of static electricity between the charged region of the cloud and earth. Thunder is created when lightning quickly heats the air around it, sometimes to temperatures five times hotter than the sun. The rapidly heated air explodes. According to the International Center for Lightning Research, lightning is more powerful than scientists previously believed. The energy released is equivalent to that of an atomic bomb. Scientists do not completely understand exactly what makes the charges in the clouds and how the lightning attracts to the ground. Lightning bolts are never more than two inches in circumference. The intense heat makes them appear larger. So called, "heat lightning" is lightning happening behind a cloud bank (intra-cloud or inter-cloud). It is possible to have lightning without thunder, but never thunder without lightning.

LIGHTNING CAN STRIKE MANY MILES FROM THE PARENT STORM, WELL OUTSIDE THE RAIN AREA AND EVEN BEYOND THE VISIBLE THUNDERCLOUD (Lopez and Holle,1999). Lightning can strike many minutes before and after the storm. All storms, large or small, can produce severe lightning. Lightning can occur in

sandstorms, snowstorms, volcanic eruption, forest fires, and atomic explosions. The thunder produced by lightning travels about one mile in five seconds. By counting the number of seconds between the flash and the bang and dividing by five provides the distance in miles. If you see a flash and count 40 seconds to the bang, the lightning is approximate 8 miles away. If you can't see the lightning but just hear the thunder, lightning is within striking range. Lightning typically strikes taller objects however NLSI goes on to state; "Short objects in an open area can be struck even if a tall object is nearby. If lightning strikes a nearby object, shock can result either by direct contact or a side flash. If lightning strikes the ground, the high voltage gradients cause currents to flow in concentrated channels on the surface or within the soil, and can injure people nearby. The associated step voltages and surface arcs, respectively can be deadly more than 40 meters from the lightning strike point. In addition, there can be upward discharges tens of meters in length from tall objects (including people) that are located within tens of meters from the strike point."

NO PLACE IN THE UNITED STATES IS FREE FROM LIGHTNING STRIKES. The greatest flash density of lightning is in central Florida. Some places in the United States may have low strike averages but high seasonal periods. For a few weeks in summer, the front ranges of the Rocky Mountains in Colorado approaches the flash density of Florida. Lightning season accelerates in May, peaks in July and decelerates in September, with minimal occurrences in January. Most strikes occur in late afternoon and early evening. Most night strikes occur in the upper Midwest. Most deadly strikes occur in late afternoon and just before a thunderstorm. The top five states with highest number of casualties from lightning per capita in order from highest to lowest are Wyoming, New Mexico, Florida, Arkansas and Colorado. It is essential for fitness instructors and personal trainers to appreciate the lightning hazard, learn the lightning safety guidelines and act wisely as a role model to encourage safe behavior in others. Poor public awareness is one of the major reasons for casualties.



LIGHTNING SAFETY GUIDELINES FOR OUTDOOR EXERCISE

All participants in exercise class should be given a copy of lightning safety guidelines.

Every fitness leader should write a comprehensive lightning safety policy and emergency action that includes:

- A chain of command that designates who makes and implements the decision to stop outdoor exercise
- A person in charge of watching for signs of threatening weather and notifies the chain of command
 - A means of monitoring the local weather forecasts and warnings
 - A list of specific lightning safe locations for each site
 - Specific criteria for suspension and resumption of activity
 - The use of lightning-safety strategies



A SAFE LOCATION is a substantial frequently inhabited enclosed building with grounded plumbing, electrical and telephone wiring. The inner rooms away from windows and doors are the safest. Once inside do not take showers, use indoor pools, land-line telephones or other electrical equipment. Stay out of the locker room and electrical appliances or equipment. A second choice is fully enclosed vehicle with a metal roof and windows closed. It is important when inside not to lean on the doors or touch any part of the metal framework including ignition and steering wheel. Do not touch any part of the car other than the seat upon which you are sitting. Open picnic pavilions and bus enclosures are not considered safe. Convertible cars, golf carts and open beds of trucks are not protected. Do not take shelter under a tree. Rubber boots and shoes do not protect from lightning strike.

BEFORE EXERCISING OUTDOORS check the weather forecast issued by the National Weather Service. Monitor weather radios that broadcast forecasts and approaching storm systems. Schedule outdoor exercise around local weather patterns.. Watch the sky during storm season. Identify and stay within close range of a safe shelter. Hand held lightning detectors are available but are not all reliable. They can be used as a back up. There are commercial services available that will alert cell phones, fax machines, e-mail or pagers when lightning is in the activity area as detected by the National Lightning Detection Network (NLDN).

IF A STORM APPROACHES do not hesitate to take shelter. Signs of thunderstorm include darkening clouds, high winds, thunder or lightning. Go immediately to shelter. Move from higher to lower elevation at the first sign of storm. Exit water immediately. Dismount metal framed bikes and stay away from metal gates, fences and other metal structures. Use the “30-30 RULE” - See lightning. Count the time until you hear thunder. Thirty (30) seconds or less go immediately to shelter. Wait thirty (30) minutes after the last thunder to leave the safe shelter. Avoid wide open areas, tall trees, poles, light posts and other tall isolated objects. Lightning can arc out of a storm and strike far from where it is raining (as far as 10 miles), even if the sky is blue and perfectly clear. This phenomenon is sometimes called “bolt out of the blue”. Each time lightning is observed or thunder heard the thirty minute clock should be set again.

THE WARNING SIGNS THAT LIGHTNING IS WITHIN STRIKING DISTANCE might include feeling hair stand on end, feeling the skin tingle or hearing crackling noises. If in a group far removed from shelter, spread out several body lengths apart and assume the lightning crouch. The lightning crouch is feet together, squat with the weight on the balls of the feet, tuck head, cover ears. Do not lie flat on the ground.

TO MANAGE A LIGHTNING VICTIM SITUATION overview the site for lightning safety. Ongoing storms may still pose a threat. Move the victim to a safe location if needed. Activate the emergency procedure (call 911 or other). CPR is usually the recommended first aid for lightning victim. Other first aid may be needed hypothermia, shock, fractures and burns. Lightning injury is serious and deadly. It is important to take the recommended precautions when exercising outdoors.

For more Lightning Safety information
www.LightningSafety.noaa.gov.
www.LightningSafety.com/index.html

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END

ART107 QUIZ

In the body of an email to askesaoffice@gmail.com, place your first and last name on the first line and number the page from 1 to 10. **DO NOT SEND AS AN ATTACHMENT.** Answer TRUE or FALSE to the accuracy of each of the 10 statement below based on the information in this ESA article. You will be emailed a CEC validation certificate of completion, which you must keep for your records. ESA cannot replace lost forms and the article would need to be resubmitted.

- 1 - The NLSI also states that; "Lightning's behavior is random and unpredictable...a conservative attitude...preparedness and quick response are the best defenses."
- 2 - It is possible to have thunder without lightning.
- 3 - Lightning strikes only during a storm.
- 4 - To estimate the distance away that lightning is in miles, count the number of seconds between the flash and the bang and divide by five.
- 5 - Short objects in an open area can never be struck if a tall object is nearby.
- 6 - People that are located within tens of meters from the lightning strike point can be injured or killed.
- 7 - The greatest flash density of lightning is in central Florida.
- 8 - Lightning season accelerates in September and peaks in January.
- 9 - A fitness instructor, who conducts exercise sessions outdoors does not need the use of lightning-safety strategies if he or she is with the participants at all times.

10 - Lightning can arc out of a storm and strike as far as 10 miles away, even if the sky is blue and perfectly clear.