



Hughston Health Alert

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Inside...

- Fractures & Proton Pump Inhibitors
- Skin Cancer: Diagnosis, Treatment and Prevention
- New in Healthcare: Electronic Medical Records
- Traumatic Myositis Ossificans
- Hughston Clinic

Energy Drinks:

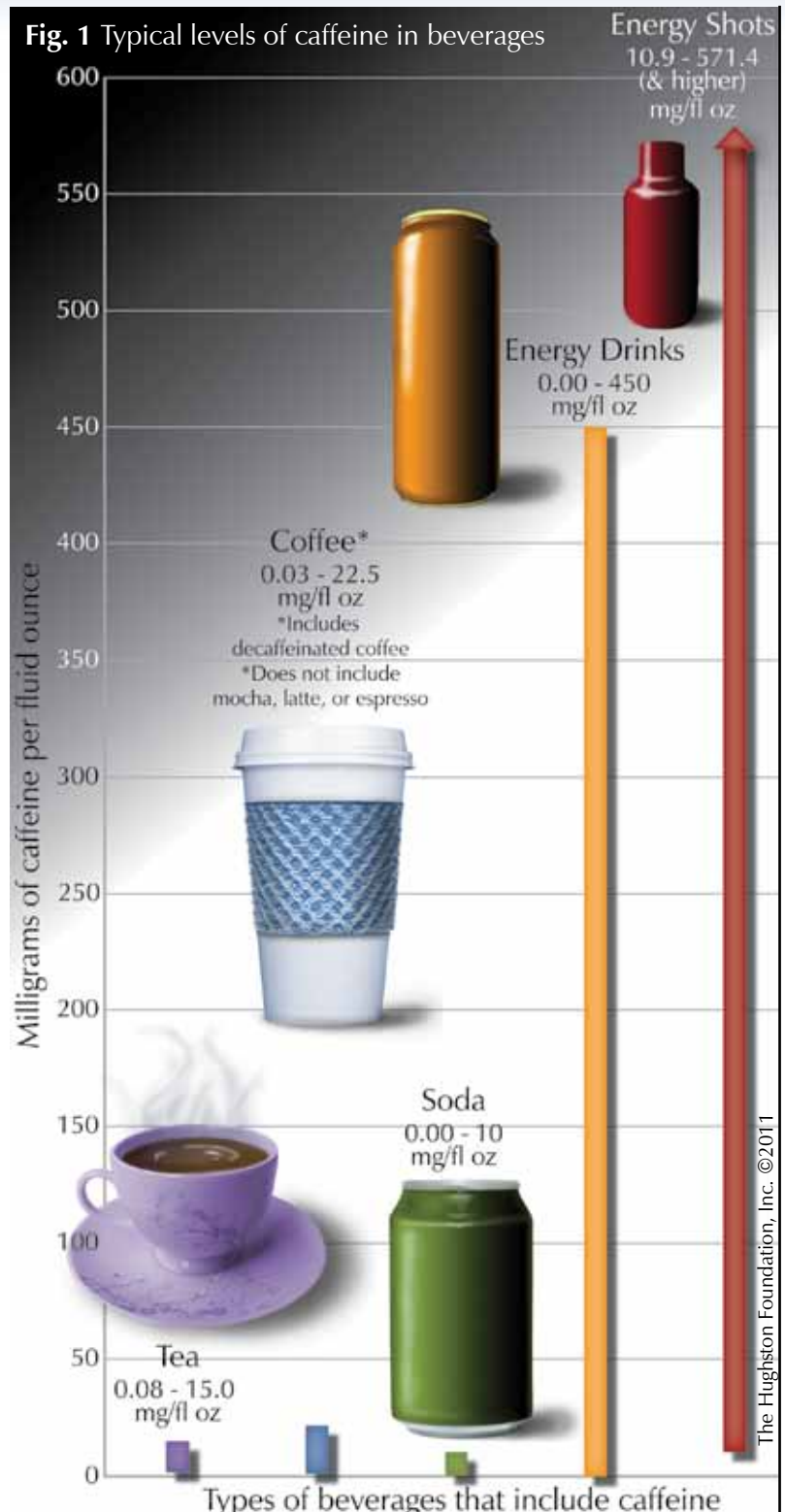
WHAT'S IN THEM AND ARE THEY SAFE?

Energy drinks are beverages that contain stimulants and additives, such as caffeine and vitamins. They are heavily marketed as products that enhance sports performance. According to the *Beverage Digest*, industry sales of energy drinks reached \$7 billion this year, and that number is expected to increase as the beverages increase in popularity with young people and athletes. Young athletes consume energy drinks hoping to increase endurance with little or no concern about the possible side effects or knowledge of whether the drink's ingredients really work.

Recently, ESPN broadcast an episode of *Outside the Lines* dealing with young athletes and their use of energy drinks. In the episode, Dakota Sailor, a 17-year old high school linebacker from Carl Junction, Missouri, was featured. Sailor experienced a life-threatening seizure in February 2010 after consuming two 16-ounce (fl oz) cans of NOS energy drink that contained a combined 520 milligrams (mg) of caffeine. Sailor's experience is an example of how too much of the ingredients can adversely affect your health.

What are the common ingredients in energy drinks?

Caffeine is the most common stimulant found in energy drinks (Fig. 1). More than 130 energy drinks exceed the caffeine limit of 71 mg per 12 oz



that is placed on soft drinks. Although caffeine has been shown to enhance endurance and athletic performance, side effects from caffeine include insomnia, headache, nervousness, and fast or irregular heart rates or rhythms. Caffeine also has a mild diuretic effect that can contribute to dehydration.

What are the regulations on caffeine in athletes? The International Olympic Committee lists caffeine as a restricted drug, and the National Collegiate Athletic Association bans its use and often tests athletes for caffeine levels. However, aside from Virginia, which prohibits its high school athletes from using energy drinks at games and practices, most high school associations permit unrestricted use of caffeine.

Taurine is one of the basic building blocks of proteins that occurs naturally in meats, fish, and seafood and has numerous physiological functions. One of its functions is to help regulate skeletal muscle contractions, and there is some evidence that taurine can improve exercise performance. However, the level of taurine in energy drinks is far below the amount expected to cause either beneficial or detrimental effects. However, 3 European countries banned Red Bull from their markets after animal research revealed rats that were fed taurine exhibited abnormal behavior such as anxiety and self-mutilation.

B vitamins are water-soluble vitamins that play key roles in cellular metabolism, especially energy production. The body easily absorbs water-soluble vitamins, but it does not store large amounts; therefore, the kidneys remove the amount that is not needed. Taking too much of a vitamin can cause problems with medical tests. For example, too much folic acid can hide B-12 deficiencies. Taking too much of a vitamin can interfere with how some drugs work or can mask the levels of other drugs.

Most people get the vitamins they need from the food they eat. Although most excess B vitamins are excreted in the urine, certain B vitamins can reach toxic levels if you take too much. B vitamins are usually safe unless you take too much. For example, too much B-3 (niacin) can cause flushing, or hot flashes, skin redness, and an upset stomach. If you consume too much B-6, nerve damage to the limbs can occur, causing numbness, pain, and trouble walking.

Glucuronolactone is a chemical produced in the liver during the breakdown of sugar. Glucuronolactone, a common ingredient in many energy beverages, may enhance the body's defense system and help eliminate carcinogens (cancer-causing agents). Some energy drinks claim that the ingredient helps detoxify the body; however, there is little information in the medical literature on the beneficial or adverse effects of glucuronolactone. Therefore, the effects of consumption are not conclusive.

Ginseng is one of the most widely used herbal supplements. There are many health benefits attributed to

consuming ginseng, ranging from memory improvement to stress relief. Some athletes use the supplement for its purported ability to enhance performance.

Ginkgo, the extract from the Ginkgo biloba tree, has been used by the Chinese for medicinal purposes for hundreds of years. It is believed that ginkgo has antioxidant properties and can prevent blood clots. For this reason, patients taking an anticoagulant medicine should consult their physicians before taking ginkgo. Currently, there are no credible, scientific studies to confirm or refute any beneficial clinical effects from using ginkgo.

Like taurine, **L-carnitine** is a basic building block of protein. The compound, which is made in the liver and kidneys, plays an integral role in the production of metabolic energy. There have been studies showing that L-carnitine can be beneficial in patients with certain heart-related conditions as well as in patients with diabetes. There is also some evidence to suggest that L-carnitine may benefit athletes during training and competition, as well as during recovery from exercise.

Certain **sugars**, such as glucose, are key to the production of energy in a living cell through a metabolic pathway known as glycolysis. Many energy drinks and soft drinks have high concentrations of sugar. Detrimental effects of long-term consumption of excess sugar can include the development of obesity or a form of insulin resistance, such as diabetes.

A brief history of energy drinks

- **1980:** The FDA (Food and Drug Administration) limits the caffeine content in colas (and similar soft drinks) to 0.02% a drink (71 mg per 12 fl oz).
- **1985:** Jolt cola is introduced, marketing an increased caffeine content (close to the FDA limit).
- **1997:** Red Bull becomes the first energy drink in the US market. Red bull gains popularity with its novel combination of caffeine and taurine.
- **2002:** Monster Energy is introduced with a 16-ounce can that is twice as large as most of its competitors' containers.
- **2004:** The herbal extract Ephedra is banned by the FDA after suspicion regarding its role in the deaths of MLB pitcher, Steve Bechler, and Pro Bowl, NFL lineman, Korey Stringer. (Energy drinks are viewed as an alternative to Ephedra and continue to gain popularity among athletes).
- **2007:** Monster Energy's parent company (Hansen Natural) earns \$1 billion in sales.
- **2010:** Industry sales of energy drinks hit \$7 billion.

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Are energy drinks safe?

With regard to the safety of energy drinks, Dakota Sailor's seizure is not an isolated occurrence. There have been 5 separate reported cases of seizures and 4 documented deaths associated with the consumption of energy drinks. There are also further-reaching deleterious effects associated with energy drinks such as an association between energy drink consumption and illicit or recreational drug use, fighting, risk taking, and alcohol abuse.

It is commonplace for energy drinks to be mixed with alcohol. The concern with mixing the 2 is that the combination can cause caffeine intoxication, produce irregular heart rhythms, mask the symptoms of inebriation, impaired mental ability, or cause dehydration. One such high-profile example of the diminished sense of intoxication occurred when Cleveland Browns wide receiver Dontée Stallworth mixed alcohol with energy drinks. In March 2009, Stallworth struck and killed a pedestrian with his car in Miami, FL. Stallworth, who admitted to ingesting 4 shots of tequila and a can of Red Bull while partying in a south Florida club, stated that he did not feel drunk while he was driving. His blood alcohol level was 0.12 percent, which is over the legal limit of 0.08 percent.

With the documented harmful effects of energy drinks, what are the current recommendations for their consumption? Dr. John P. Higgins, a cardiologist at the University of Texas Medical School at Houston, and his colleagues published recommendations for energy drink consumption in the November 2010 issue of the *Mayo Clinic Proceedings*. They recommend limiting consumption to no more than 500 mL (or 1 can) a day or abstaining completely if you have a serious medical condition, such as hypertension or coronary artery disease.

More is not always better, as some energy drinks can be harmful if consumed in high amounts, consumed over a long period of time, or consumed in combination with other energy drinks or alcohol. People with certain medical conditions, such as high blood pressure, irregular heart rhythms, or heart disease, should not consume energy drinks; excessive consumption or mixing them with alcohol could be deadly. Young athletes, coaches, athletic trainers, and parents should know the adverse and potentially fatal effects of energy drink consumption by athletes, particularly before or during an athletic event.

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Further Reading

<http://sports.espn.go.com/espn/e60/news/story?id=5726418>

Fractures & Proton Pump Inhibitors

Recently, the United States Food and Drug Administration (FDA) issued a warning about a possible increased risk of hip, spine, and wrist fractures associated with high doses or long-term use of proton pump inhibitors (PPIs). The FDA reported that patients who received high doses of prescription PPIs or used a PPI for 1 year or more are at a higher risk for a fracture.

PPIs are medications commonly used to treat certain stomach conditions, such as acid reflux, frequent heartburn, and peptic ulcer disease. They work primarily to decrease the amount of acid secreted in the stomach. Some common prescription brands are Prilosec®, Nexium®, Zegerid®, Prevacid®, Protonix®, and AcipHex® and some common over-the-counter brands are Prilosec OTC®, Zegerid OTC®, and Prevacid® 24 hour. Omeprazole and lansoprazole are generic drugs that can be purchased over the counter as well.

Studies that influenced the warning

The warning from the FDA comes in response to 7 studies that reported an increased risk of fractures in patients taking the medications for more than 1 year or in those taking high doses. The studies also noted that most fractures occurred in patients who were over age 50. Scientists currently do not know exactly how the medicines may contribute to weakened bones, but they believe it may have something to do with insufficient calcium being absorbed in the gut.

Large patient populations were used to collect data on patients who had taken the medicine to see if problems arose. Six studies reported an increased risk of fractures with the use of PPIs. Clinical trials have been performed on these medications, and all show them to be safe when taken for a period of 6 months. However, trials involving longer terms or higher doses have not been done.

Patient recommendations

Patients should practice good bone health, which includes supplementing one's diet with calcium and vitamin D, regular weight-bearing exercise, and exposure to sunlight in moderation. PPI medications are highly effective at treating certain stomach conditions; therefore, if you currently take a prescribed PPI and have concerns about your medication, do not stop taking it unless you are told to do so by your doctor. Instead, talk to your healthcare professional about your concerns. If you are using an over-the-counter PPI for frequent heartburn, be aware that the drug should be used as directed for no longer than 14 days. Talk to your doctor if your heartburn continues for longer than 2 weeks. As with all medications, read and follow the label instructions, paying particular attention to the dosage and duration of usage.

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Skin Cancer:

DIAGNOSIS, TREATMENT, AND PREVENTION

Skin cancers are the most common type of cancer. Each year, approximately 1.3 million cases of non-melanoma skin cancers are diagnosed in the United States. Skin cancers are broadly categorized as melanoma and non-melanoma. However, there are many other less common types of skin cancer. Of non-melanoma skin cancers, approximately 95% consist of basal cell and squamous cell carcinoma. Most skin cancers occur on parts of the body excessively exposed to the sun (back, ears, face, neck, scalp, and shoulders), but they can develop on unexposed areas of the body, as well.

Diagnosis

Often, skin cancer is diagnosed during a doctor's examination and is confirmed with a biopsy. The biopsy also helps to define the type of skin cancer you have and assists the dermatologist in determining the best method of treatment. Not only are there many forms of skin cancer, there are also many different subtypes, as well. For example, basal cell carcinoma, the most common skin cancer, has subtypes of superficial, nodular, and morpheaform basal cell carcinomas (Fig. 1).



Fig. 1. Types of basal cell carcinomas (non-melanoma skin cancer); left - superficial, below - nodular

Identifying the many types of skin cancer here can be difficult; however, a few points can be made. Non-melanoma skin cancers, often

characterized by non-healing erosions or ulcers, are often found in sun-exposed areas; however, a new, changed, or non-healing site in other areas should always be checked, as well (Fig. 2). Melanoma can be identified by a dark, flat lesion; however, these, too, may not appear in the usual fashion. Prompt diagnosis and surgical treatment is essential with the diagnosis of melanoma (Fig. 3).

Fig. 2. Types of squamous cell carcinomas (non-melanoma skin cancer).



Treatment

Multiple treatment options are available and are chosen based on the type of skin cancer you have, its anatomic location, and your general health. Non-surgical treatment options include radiation therapy and topical creams. Surgical treatment options include curettage and desiccation, excision, and Mohs micrographic surgery. Mohs micrographic surgery has become the gold standard for recurrent, aggressive skin cancers and those in cosmetic locations, such as the head and neck (Fig. 4). It is a highly precise technique that allows for the removal of both visible tumors and non-visible tumors that may extend beneath the skin's surface. Five-year cure rates approach 99% for first-time treatments and 95% for recurrent skin cancers. Training in Mohs micrographic surgery involves an additional 1 to 2 years of formal training after dermatology residency.

Mohs micrographic surgery involves the systematic removal and microscopic analysis of thin layers of tissue until all of the skin cancer has been removed. The immediate and complete microscopic examination of the tissue that has been removed is what differentiates Mohs surgery from other cancer removal procedures. Cancerous tissue can be removed with minimal disruption of normal skin, thus minimizing the postoperative wound size and the risk of recurrence while maximizing the cosmetic outcome. Mohs surgery can be used for nearly all types of skin cancer, but it is specifically used to treat skin cancers of the head, neck, hands, and feet. It can be useful for

Fig. 3. Examples of melanoma skin cancer.



A. and B. Typical appearance of melanoma



C. Amelanotic (nonpigmented)



D. Acral melanoma found on an African American's heel.

treating recurrent skin cancers, as well. Often, Mohs surgery is performed on an outpatient basis, in one day, under local anesthesia for both cancer removal and reconstruction.

Surgical excision is routinely performed for less aggressive skin cancers such as basal cell carcinoma that are located on nonfacial areas, such as the back or arm. Superficial basal cell carcinomas can often be treated with a combination of scraping and electrodesiccation called curettage and desiccation.

Radiation therapy is an excellent non-surgical treatment option. With the exception of a few skin cancers (such as melanoma), radiation therapy has proved effective and offers patients a non-surgical alternative.

Prevention

Prompt diagnosis and treatment are important; however, prevention is equally as important. Awareness of skin cancer is high and for good reason. The number of skin cancers being diagnosed has continued to increase, especially in areas with lots of sunshine such as the Southeast. Prevention of skin cancer begins with education and awareness.

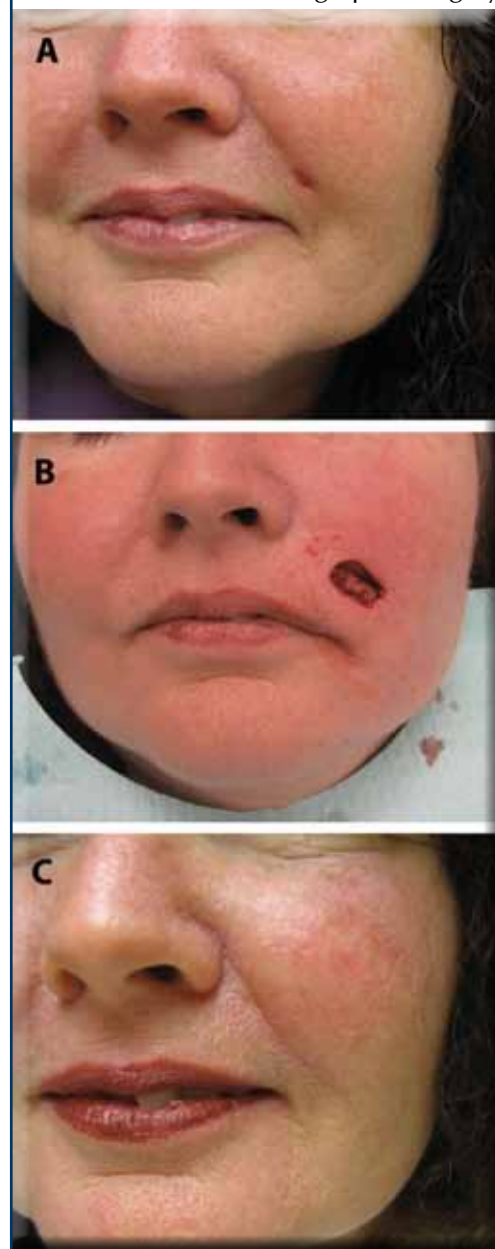
Cumulative sun exposure is considered to be a major risk factor for non-melanoma skin cancer; therefore, use of sunscreens on a daily basis combined with sun avoidance (particularly during peak sun hours of 10 am to 4 pm) and protective clothing offers the best long-term prevention. The days of golden-bronzed skin at the beach and lying in a tanning bed are over and are proven to lead to skin cancer risks and causes of early aging of the skin.

Most skin cancers are curable. Early detection remains critical for a positive outcome, and prompt diagnosis and surgical treatment is essential with the diagnosis of melanoma. Examine your skin monthly, and contact your dermatologist if you find any new or unusual lesion, especially if you have had skin cancer before.

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Photos provided by Joshua E. Lane, MD, MBA ©2011

Fig. 4. Before, during, and after Mohs micrographic surgery



New in Healthcare

ELECTRONIC MEDICAL RECORDS

If you've visited a physician's office recently, chances are you have an electronic medical record (EMR). EMRs are computerized medical record systems used by healthcare organizations, such as a doctor's office or a hospital. With the continued shift toward reliance on computers for business and personal use, it was only a matter of time before healthcare providers followed suit. In fact, according to the National Center for Health Statistics based on data obtained in 2008, 35% of office-based physicians are now using EMRs. The percentage is likely higher today.

So, why all the fuss over EMRs? For years, paper-based records have been the preferred method of recording patient information for most doctors and hospitals in the

US and many doctors still find the ease of data entry and low cost hard to part with. However, paper records require a significantly larger amount of storage space than digital records. The super storage capability with EMRs creates efficiencies for healthcare providers, their patients, and

health payment systems. Saving trees and space by reducing paper files are obvious advantages, but there are other benefits to using EMRs. Getting started with the systems seems to carry the most disadvantages. However, once the system is in place and patient records are retrieved efficiently, the advantages far outweigh the disadvantages.

EMRs are fast becoming a permanent fixture in America's healthcare system. As expected, when changing a system that has been in place for years, there are going to be bumps along the way. However, the benefits and advantages are continuing to surface as we continue with the process. The US government has encouraged physicians to incorporate EMRs into their practices and has offered financial incentives for them to do so. Additionally, there are penalties for physicians who fail to convert to an EMR system by 2015. In short, EMRs are here to stay.

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Advantages and Disadvantages to using Electronic Medical Records

ADVANTAGES

1. Quality of care. Because patient information is readily at hand, quality of care is enhanced. Access to good care is easier and safer when records can be easily shared among healthcare providers. Important information such as blood type, prescribed drugs, or medical conditions can be found faster.

2. Safety. In the past, physicians obtained your health history by asking you questions. If you forgot a medication, a previous surgery, or other piece of information, you didn't think it was important, the physician was forced to work without all your information. This could be detrimental. EMRs help to eliminate discrepancies and omissions in your history and reduce prescription errors.

3. More convenient data trail. Paperwork can often go uncompleted, but electronically stored information is faster and easier to access, and system checks are in place to assure information is complete. Also, in the past, when a doctor closed his or her practice, retired, moved, or died, patient records would sometimes get lost or relocated. EMRs help assure that new physicians, as well as patients, have the information they need in such situations. Medical audits are made easier as well.

4. Saving money. In addition to the cost of paper and file folders, labor costs and space are also minimized. The initial cost of converting to EMR is eventually offset.

5. Finally, healthcare in general is more efficient. Does that mean faster doctor visits and shorter wait times? Well, maybe. There is a learning curve for physicians and other healthcare providers when converting to EMR. However, once a healthcare organization has made the transition, the flow of patients through the clinic should be maximized.

DISADVANTAGES

1. Financial. Switching to EMRs can be expensive when purchasing new software and equipment and training employees.

2. Training. As with anything new, learning to use the new system and understanding the capabilities of the technology takes training.

3. Technology. New technology must be integrated with existing systems and software.

4. Security. Information must be kept safe and private for patients. Legal issues must also be addressed regarding who should and could have access to private and confidential records.

Traumatic Myositis Ossificans

AN UNUSUAL SPORTS INJURY

Traumatic myositis ossificans is an unusual bone formation, or growth, that can occur after a severe injury causes deep muscle bleeding. During healing, the body produces bone within the soft tissue. The 2 most common sites where the condition occurs are at the quadriceps muscle group of the thigh and the muscles of the upper arm. An athlete with myositis ossificans often complains of pain, muscle weakness, soreness, swelling, and decreased range of motion.

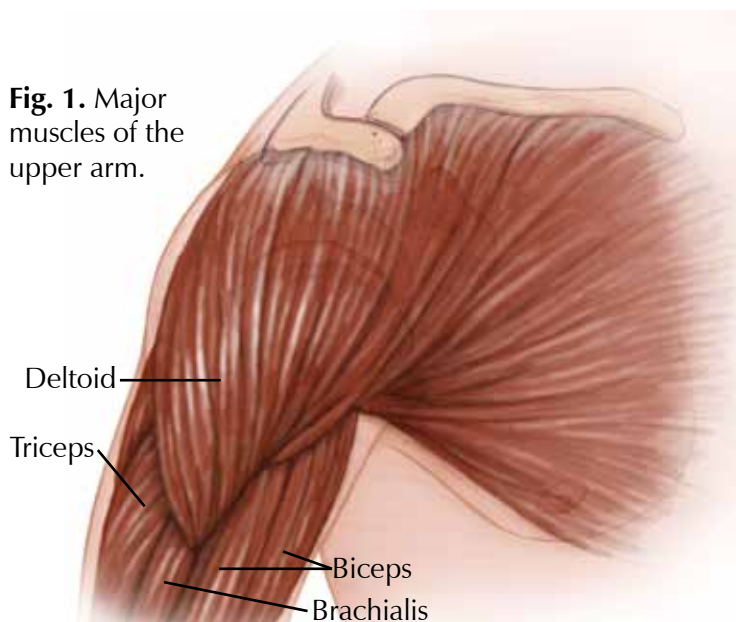
Mechanism of injury

Traumatic myositis ossificans often follows bleeding into the muscle and a hematoma (blood clot) after surgery or an injury. In sports, it commonly occurs after a direct blow or repeated blows to the muscle, causing severe bruising, swelling, and disturbance to the muscle fibers, capillaries, and connective tissue. Calcified formations resembling cartilage or bone are then produced within the irritated tissue. The calcification often starts within a week or 2 after a severe bruise. Often, within 3 or 4 weeks, a hard mass can be felt within the muscle and an x-ray can show the formation of bone. The bone often continues to grow for 6 to 12 months.

Upper arm injury

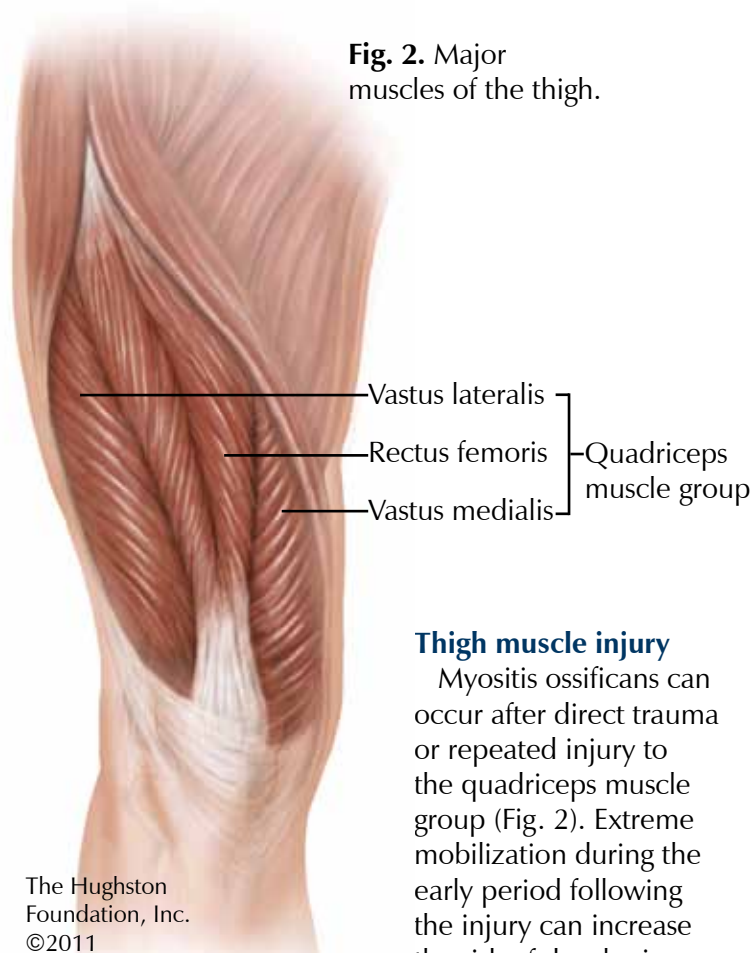
Myositis ossificans often occurs from repeated trauma to the lateral, or outside, muscles that cover the humerus and causes loss of elbow flexion or extension (Fig. 1). When the condition occurs in the brachialis muscle, it is sometimes called blocker's or tackler's exostosis.

Fig. 1. Major muscles of the upper arm.



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Fig. 2. Major muscles of the thigh.



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Thigh muscle injury

Myositis ossificans can occur after direct trauma or repeated injury to the quadriceps muscle group (Fig. 2). Extreme mobilization during the early period following the injury can increase the risk of developing the condition. On examination, there can be

tension in the tissue along with tenderness at the injury site and a loss of knee flexion or extension.

Treatment

The treatment of myositis ossificans consists of rest and ice to reduce inflammation. Often, a physician will follow the bone formation to maturity for 6 to 12 months by examining the patient's x-rays and a physical examination. The bony mass does not always require surgical removal; however, if the condition is painful and limits range of motion, the bone can be removed through surgery. The surgeon often waits one year for the bone to mature, because if the formation is removed too early, it can return. Traumatic myositis ossificans can often be avoided by treating a severe contusion with passive motion and stretching the affected area in conjunction with icing before the process of calcification has a chance to begin.

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