Hughston Health Alert

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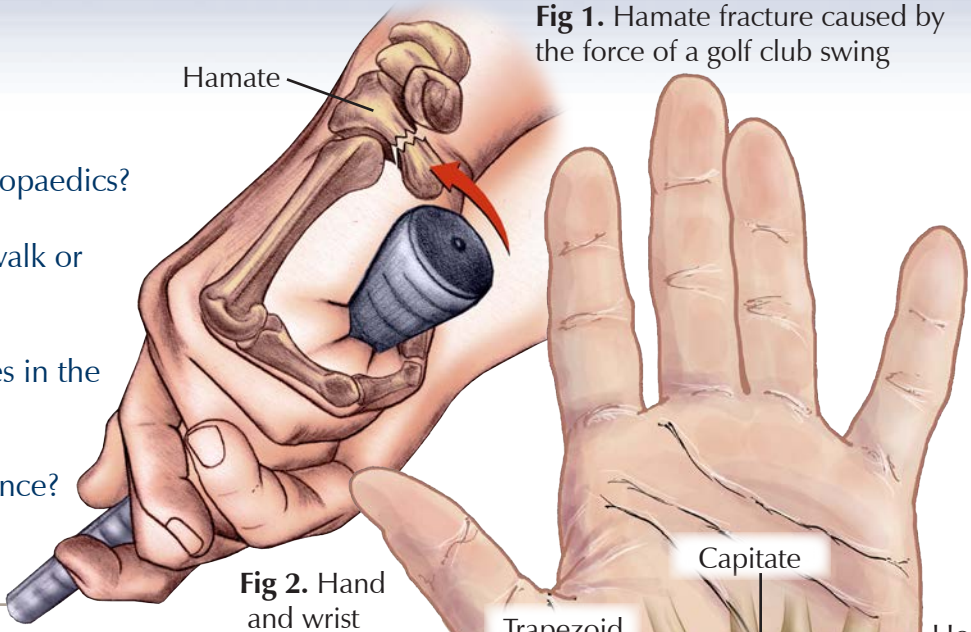

Fig 1. Hamate fracture caused by the force of a golf club swing

Fig 2. Hand and wrist anatomy and cross section of the wrist

Hamate Fractures

Hamate fractures are uncommon injuries, representing only 2% of all wrist fractures. The break is often sustained by athletes who play sports where some type of object is swung or wielded, such as a stick or club that causes a direct blow to the hamate bone (**Fig. 1**). A golfer, for example, can fracture the hamate when hitting the ground during a golf swing. Golfers are not the only athletes at risk, however, baseball, hockey, racquetball, and tennis players are also known to injure the hamate bone. It rarely occurs, but a fall onto the palm can result in a hamate fracture, as well.

Hand anatomy

One of 8 carpal bones, the hamate is found in the hand, close to the wrist and below the ring and small finger (**Fig. 2**). The bone is triangular shaped and has a small hook-like bony projection on the palm side called the hook of the hamate. A fracture to the bone is either diagnosed as a fracture of the hamate body or to the hook. The hamate bone articulates (connects loosely to allow motion) with 5 other bones—2 in the hand and 3 in the wrist. The hook of the hamate also serves as the site of attachment for ligaments and it forms part of the Guyon, or ulnar canal. The ulnar nerve and the ulnar artery pass through the Guyon canal very close to the hamate, which explains some of the symptoms a patient may develop after a fracture.

Symptoms and diagnosis

A hamate fracture can be diagnosed with a physical exam and x-rays. Often, the patient will touch the area over the hamate to describe the location of the pain or complain of pain in the palm while holding an object. The physician may confirm the site by applying pressure over the area to see if it is sensitive or elicits pain. The physician may also use a resistance test since the hook of the hamate acts as a pulley

for 2 of the fingers. To complete the test, the doctor places his or her fingers against the patient's small and ring fingers while the patient tries to resist the hold. If the resistance produces pain similar to what occurred during injury, there is a good chance that the hook of the hamate has been fractured. Other symptoms of a hamate fracture include decreased wrist strength and sometimes numbness or tingling in the ring and small fingers because the ulnar nerve that supplies both muscle stimulation and sensation is being compressed. If a fracture is suspected, the physician will order x-rays to capture the image of the hamate body and the hook that might otherwise not be visible. An x-ray image can confirm the fracture; however, there are occasional difficult cases that require more advanced imaging, such as a computerized tomography (CT) scan.

Nonsurgical treatment

Treatment for fractures of the hamate body and hook vary slightly and fortunately, both types can often be treated without surgery. Nondisplaced fractures (the bones remain in place) can be successfully treated by immobilizing the wrist with either a removable brace or a fiberglass cast. If the patient has swelling a splint may be chosen instead. After 6 to 8 weeks of immobilization the fracture usually heals and activity can be resumed. If the injury is a displaced fracture (the bone fragments have moved out of alignment) treatment can be more difficult to manage and often requires surgery.

Surgical treatment

An untreated hook fracture can result in nonunion (the fracture fails to heal) if the ulnar artery is injured or pinched causing a poor blood supply to the bone and increasing the risk of osteonecrosis (death of the bone tissue). Additionally, without immobilization, the constant pull exerted on the hook fragment by finger movement does not give the bone time to heal. When nonunion occurs, the hook portion of the bone can be removed. Athletes sometimes choose this type of surgery because they can return to sport earlier. With displaced hamate fractures, the surgeon often performs an open reduction (moving the bone back in the anatomic position) and uses internal fixation, such as a screw or pin.

After surgery, the incision may be tender and hand weakness can affect grip strength. This will improve as the incision heals and rehabilitation begins. Physical therapy with a certified hand therapist can begin 10 to 14 days after surgery.

Early treatment means better outcomes

A common problem with hamate fractures is that an injured patient often believes the injury is not serious and that it will heal on its own; and, therefore, doesn't seek medical attention right away. When the pain continues or recurs after rest the patient seeks help, but with the time that has passed the fracture can fail to heal on its own. Then surgical intervention is needed. Hamate fractures that are treated soon after injury have excellent outcomes, especially when early treatment is followed by a rehabilitation program. Delaying treatment, however, can lead to complications that cause unnecessary pain and inconvenience for the patient.

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What is Damage Control Orthopedics?

Surgeons use damage control orthopedics (DCO) to manage critically injured patients by temporarily stabilizing fractures so that the patient's overall condition can improve. The purpose is to avoid worsening the patient's condition by the "second hit" of a major orthopaedic procedure. The surgeon's strategy focuses on controlling bleeding, managing soft-tissue injury, and fracture stability while avoiding additional trauma to the patient.

When a person is injured, particularly a polytrauma patient where multiple bones are broken and internal organs are damaged, the body responds by releasing inflammatory mediators (fluids, including blood and cells that are meant to heal and protect) (**Fig. 1**). As a result of the injury, the trauma patient also experiences detrimental physiological changes, such as extensive blood loss that leads to decreased tissue oxygenation (blood cells carry oxygen to tissue), and large amounts of blood replacement that can cause abnormalities in clotting. The patient can also be affected by Acute Respiratory Distress Syndrome (ARDS), a condition caused by fluids leaking into the lungs and reducing oxygen. Furthermore, the patient becomes susceptible to infection and can become septic (an infection within the bloodstream). Finally, these factors often affect the trauma patient in a short period of time, and this serious combination can lead to multiple organ failure and death.

Fig 1. Polytrauma caused by a fall

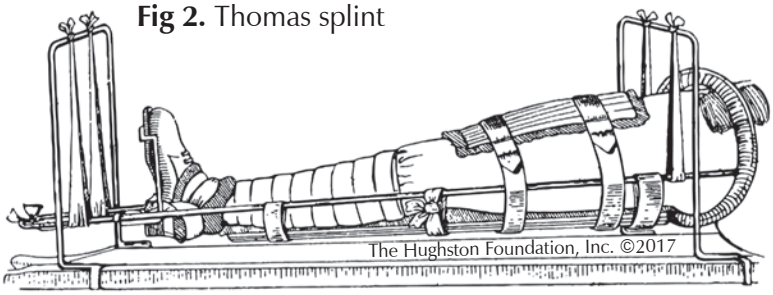
Avoiding the "second hit"

Surgery itself is a type of trauma that can exacerbate the release of inflammatory mediators, increase blood loss, and cause damage to the lungs. Accordingly, surgeons want to minimize what is known as a "second hit" from an extensive surgery in the early period following a traumatic injury. Therefore, the surgeon may temporarily stabilize the fracture to limit blood loss, tissue damage, and the release of inflammatory mediators.

The history of DCO

DCO is an evolving field. Its benefits were demonstrated during World War I with the use of the Thomas splint for femur (thighbone) fractures (**Fig. 2**). The mortality rate was 80% for these wounds before the splint was used for temporary stabilization. The rate fell to 20% after medics began applying the splint in ambulances. Later in the century, the trend shifted towards surgical treatments for stabilization, usually with an internal fixator, such as a nail to hold the fractured femur bone in place.

Fig 2. Thomas splint



Further studies however, appeared to demonstrate that a surgery stabilizing the femur using a nail may have created a "second hit" that led to increased release of inflammatory mediators and pulmonary (lung) complications. Therefore, the trend then shifted towards less invasive treatments, such as using an external fixator, such as pins inserted through the skin and into the bone to temporarily stabilize the fracture. Still further, larger studies demonstrated that early definitive fixation of femur fractures actually had a lower overall mortality, especially if both femurs were broken.

The "second hit" once blamed on nailing the femur is now thought to be related to the use crystalloids (fluids) in large amounts during resuscitation (administering emergency procedures to sustain life) of the patient. A change to using blood products, rather than crystalloids, and other treatments that improve tissue oxygenation, as well as a shift back to early nailing fixation of the femur has helped improve survival following polytrauma.

At present, we are seeking to identify and refine which patients are at the greatest risk for surgery. We currently use a marker within the blood that reflects the level of recovery and oxygenation of tissues. Lactic acid forms when the body breaks down carbohydrates to use for energy when oxygen levels are low. When a patient has decreased oxygenation of the tissues, lactic acid builds up; therefore, we can measure the serum lactate level to determine the best course of treatment. This has been found to be the most sensitive marker of perfusion (passage of fluids through the body). Surgeons seek to have the lactate level below a certain level, which demonstrates adequate oxygenation and perfusion of the tissues, prior to surgery. Conversely, high lactate levels confer increased risk for surgery and the need for further recovery prior to an operation.

How do surgeons use DCO?

The following cases illustrate how a trauma surgeon can evaluate a patient and determine whether early definitive fixation of life threatening fractures or temporary stabilization of fractures in a patient who is in extremis (critical) is the best treatment.

The first case is a healthy 19-year-old male who sustained fractures of both femurs in a motor vehicle collision. When he arrived at the hospital, his heart rate was elevated, his blood pressure decreased and he was lethargic, indicating that he had lost approximately 30% of his blood volume. He was treated with a combination of fluids and blood products. His lactate level decreased indicating that he is responding positively to the treatment. He is a good candidate for early definitive fixation of his femur fractures with intramedullary nailing (a metal rod placed inside the cavity of the bone).

The second case is a 63 year-old female who is a smoker and is diabetic. She was struck by a car and sustained fractures of both her femurs and tibias (shinbones) as well as an open book pelvic fracture (a compression injury to the pelvis). Her heart rate is elevated above 140 and blood pressure decreased. She is not making any urine and is very lethargic. Her lactate level has not responded to treatment with fluids and blood products and she remains unstable; therefore, an extensive surgery would likely worsen her condition. Thus, she is a candidate for temporary fixation of her femurs, tibias, and pelvis with external fixation while treatment continues.

DCO a better treatment plan

When a patient arrives at a trauma center with life threatening injuries and fractures, rushing into surgery to stabilize the fracture is not always a good treatment plan. The fracture needs to be stabilized to help control the body's responses, but sometimes a temporary fix can be a better option. Initiating DCO and waiting until the patient is stable and in optimal condition for surgery is often the best treatment plan.

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Pedometers: An incentive to walk or just another gadget?

The newest fitness trend—the gadget you see people wearing on their wrist or hooked to their belt, carrying in their pocket, or checking on their smartphone—is a pedometer that tracks fitness activity. The very basic pedometers measure the number of steps an individual takes during a 24-hour period, but the technology skyrockets from there to fitness monitors that track all your daily movement. Some devices record the type of exercise, when you did it, how much exertion you used, how many calories you burned, your heart rate, and some have GPS (Global Positioning System) technology that track where you did your activity (**Fig.**).

The first major design for a pedometer was produced in the 1960s, when studies showed 10,000 steps a day can balance the average caloric intake and expenditure to maintain a healthy body. Today, pedometers can be synchronized to your smartphone or computer, providing data on every move you make during the day and how well you sleep at night. Pedometers are designed to be small and portable, so you can carry the device, wear it on your body, or clip it to your clothing without any hindrances.

10,000 steps a day keeps the doctor away

The lack of physical activity can lead to heart disease, hypertension, obesity, diabetes, and some cancers; therefore, most physicians recommend at least 30 minutes of daily exercise. However, recent studies have concluded that even if you do the recommended daily exercise but then sit for most of the day, the exercise will not do you much good. Researchers are now suggesting that if you sit most of the day, you should get up and walk every hour for 5 to 10 minutes plus do 30 minutes of exercise. A pedometer can help you achieve this new recommendation because the goal of 10,000 steps encourages activity throughout the day.

On average, most adults take between 3,000 and 6,000 steps a day during normal daily activities. Adding more steps, for example, if you walked on a treadmill or cut grass with a push lawn mower, you would log about 3,000 steps during 30 minutes. Add to those numbers a 5-minute walk every hour and you would be at 10,000 or more steps before bedtime.

How to walk for health

Your fitness monitor may tell you the specific details about your activity, but if you have a pedometer that simply measures your steps, the "talk test" can help you determine if you are getting the full benefit of your walk. If you are strolling leisurely with no exertion at all, you are not increasing your heart rate; and therefore, not

Fig. Some common pedometer features

benefitting from the exercise. Walk briskly as if you have somewhere to go and try to talk. If you can carry on a conversation while moving briskly, then you are at a good pace. If you are out of breath and unable to talk, you can slow down just a bit. Find the speed that works for you, which means, you may fall a little behind or stride a little ahead of a walking partner.

The motivation factor

Pedometers are a great way to monitor physical fitness but studies have shown that the motivation factor is the major reason they are an effective exercise tool. According to the Harvard Health Publications, pedometers are useful motivational tools because they help to increase daily physical activity over nonusers. Studies show that individuals who use pedometers every day walk at least 2,000 steps a day more than those who do not use them. Additionally, people are discovering that the daily goal is achievable by simply getting up and doing something. Anything besides sitting will help you achieve your 10,000-step goal. You can go shopping, take the kids out to play, walk the dog, or do your housework and your pedometer will record your every move.

Some fitness monitors allow users to add friends through an online app that encourages friendly competition to increase activity. Your friends can be in your phone's contact list or a Facebook friend, depending on the app or software. Some organizations promote a healthy lifestyle in the workplace by offering challenges for employees. In these types of challenges, a specific step count and deadline is set and while the challenge is in effect, the software records the number of steps each participant takes and places the information on a leader board which everyone in the challenge can monitor. The more steps you take, the higher you climb on the board. At the end of the challenge, the one with the most steps wins, but actually everyone wins because they have increased their daily activity level.

A growing trend

Whether the device simply counts your steps or is paired with software, using one to monitor your physical activity can provide the motivation you need to get up and move. As with any exercise program, consistency—doing the exercise day after day and keeping it up for a prolonged period of time—is what matters most. Pedometers are not just another fad or gadget, they are fun tools that can help you achieve your exercise goals and improve your health.

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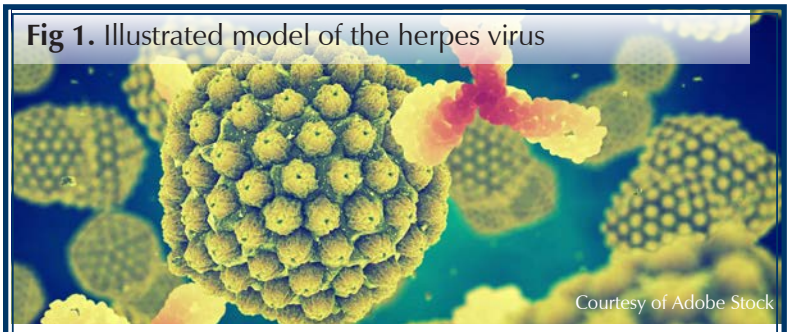
Reducing the Spread of Herpes in the Locker Room

Fig 1. Illustrated model of the herpes virus



Common strains of herpes:

- Herpes simplex virus 1 (HSV1)
- Herpes simplex virus 2 (HSV2) or genital herpes
- Epstein-Barr virus or mononucleosis
- Varicella-zoster or chickenpox
- Shingles virus

Herpes is a viral infection that has multiple strains (genetic variants or subtypes) (**Fig. 1**). All strains are transmitted by direct contact with the virus through either a skin lesion or infected bodily fluids. While the virus stays with a person for life, it can remain dormant within the body; however, symptoms can flare up at any point in time, but especially during events such as stress, fatigue, trauma, or other illnesses that weaken the immune system.

A common form of herpes among the athletic population is herpes gladiatorum, a skin infection caused by HSV1. Because it is particularly prevalent in the wrestling community where it can be easily transmitted through the skin to skin contact that takes place on the wrestling mat, it is often called "mat herpes." An HSV1 lesion can appear in various sites on the body, but they are typically found on the head, face, neck, or upper extremities and present as clustered, rigid vesicles on a red base. Cold sores commonly found around the mouth are an example of a HSV1 viral infection.

Signs and symptoms

Symptoms usually present around 8 days following exposure to the virus, but some people exhibit no signs or symptoms at all. Those infected may develop flu-like symptoms, fever, swollen lymph nodes, burning and tingling sensations in the affected area, or cluster formations that may or may not become painful. Cluster formations are multiple skin lesions, also known as vesicles, within the affected area, which are generally surrounded by a reddened area that often produces a clear fluid (**Fig. 2**).

Once the fluid-filled vesicles dry up, a crust, or scab-like cover forms and acts as the body's own barrier to prevent spreading the virus. If fluid is present in the vesicles, then the virus is highly contagious. These skin lesions generally heal within 7 to 10 days. Transmission rates are high if a person has no

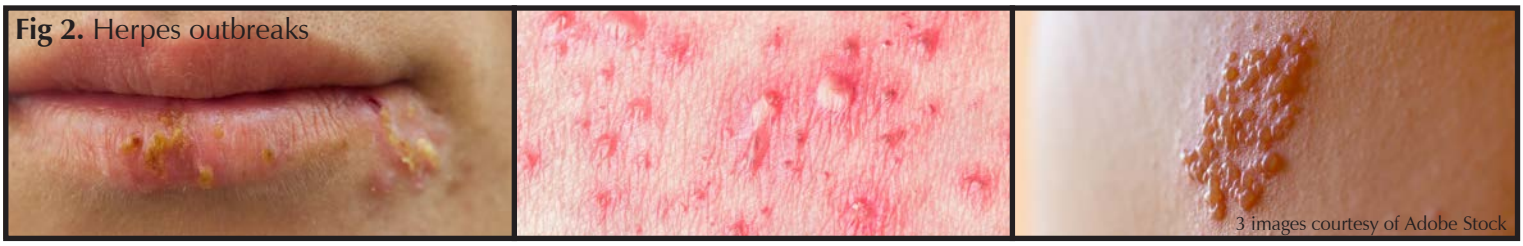


Fig 2. Herpes outbreaks

symptoms or if the vesicles have not crusted over. Because of their weaker immune systems, younger athletes are at greater risk of contracting the virus. While signs and symptoms can be used to try to find a cause, a definitive diagnosis of herpes can only be made by performing a viral culture from vesicle scrapings.

Treatment

There is no cure for herpes; however, there are some treatment options, such as the antiviral medication Acyclovir (brand names Zovirax® and Valtrex®) that reduces the outbreak of sores and blisters. If taken in the daily recommended doses, these medications can help reduce the transmission and recurrence of outbreaks. It should also be noted that once the lesions are fully formed, ruptured, and crusted over, antiviral medications are no longer effective. If an athlete does become infected with HSV1 and exhibits signs and symptoms, such as vesicles, he or she should be prohibited from practice and play until symptom free for 72 hours with no new or moist vesicles. To deal with recurrent flare ups, a physician should be consulted and a preventative treatment, such as an antiviral medication may be prescribed.

Prevention in the locker room

Since the virus is highly contagious and easily transmitted through skin contact with lesions, prevention is crucial. The locker room contains a multitude of shared personal items from soap to drinks, any one of which can be a vehicle for virus transmission. For example, if a cell phone is pressed against a lesion when talking on the phone and then handed off to a fellow athlete for use, it could potentially transmit the virus. Technically, any object that is exposed to a lesion can become a means of transmission. Basic prevention begins with not sharing personal items and includes proper hygiene. According to the 2008 NCAA guideline, "Skin Infections in Athletics," some other ways to reduce exposure in the locker room are:

- Using liquid versus bar soap when taking showers, preferably an antimicrobial soap
- Washing hands or using hand sanitizers where water is not available
- Clean equipment, braces, and arm sleeves
- An athlete who has an open lesion should avoid whirlpools and hot tubs

While prevention begins with athletes practicing good hygiene, a comprehensive prevention program should also involve athletic trainers, coaches, and building maintenance staff. Each plays a role in ensuring a sanitary environment for athletes by using a germicide to clean and disinfect common areas such as showers, benches, practice clothing, treatment tables, water bottles, mats, and equipment. Any shared object should be cleaned daily to prevent the spread of infectious disease. If an athlete has a suspicious skin rash, he or she should consult medical staff prior to practicing in order to prevent the transmission to fellow teammates.

Practicing proper hygiene and frequently cleaning communal areas and shared practice items is the best way to prevent transmission. When a skin rash appears, it is important to have it checked by medical staff prior to participating in sporting activities, especially contact sports, to ensure it is not contagious. If a contagious skin rash is present, such as HSV1, report it to the staff immediately so effective precautions can be taken to prevent any potential spread to teammates, coaches, or staff. The key is prevention and everyone has a role.

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MD or DO: What's the difference?

Most of us are quite accustomed to using academic titles such as "Doctor" or "Professor" when addressing someone with a doctoral degree. It is quite natural when referring to someone as "Doctor" to assume that this individual has a degree in the medical arts, but this title also applies to those with doctoral degrees in the fine arts, dentistry, veterinarian science, or law. In the US there are 2 types of doctors licensed to practice the medical arts; allopathic (MD) and osteopathic (DO). A frequently asked question is: what are the differences between a Doctor of Medicine (MD), and a Doctor of Osteopathic Medicine (DO)?

In years past, there were some significant differences between the 2 professions, but today there are many more similarities. Both are capable of practicing the full scope of medicine and specialize in fields like orthopaedics, neurosurgery, cardiology, internal medicine, and family practice. Both attend 4 years of medical school with similar curricula, and complete accredited residency training programs. Overall the training is very similar. There are some subtle differences in the approach to medical care, but the most noticeable difference is the hands on approach to patient care.

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Osteopathic medicine was founded in 1892 by Andrew Taylor Still, MD. Dr. Still was a practicing allopathic physician who lost his wife and children to meningitis. After their deaths, he grew dissatisfied with the medical practices of the day, which were frequently ineffective and often caused more harm than good. The common medical practices during that time period included the use of arsenic, opium, castor oil, and whiskey. Dr. Still's distrust in the medical practices of his day, prompted him to develop a new theory of medicine that would promote the body's innate ability to heal itself.

Osteopathic medicine was founded on 3 key principals: 1) the body is a unit and health is related to the mind, body, and spirit of the individual; 2) the human body has an inherent ability to heal itself given the optimal conditions; and 3) that structure influences function and proper alignment of the musculoskeletal system is key to proper function.

The first 2 principals are not novel concepts; they date back to Hippocrates who said, "It is far more important to know what person the disease has than what disease the person has." DOs are trained to use a holistic approach to patient care, which means they see each person as more than just a collection of organ systems, body parts, or disease. Today most physicians, MD and DO, have adopted this holistic approach to patient care.

The most notable difference between an MD and DO, however, is the hands on aspect. A key concept in osteopathic medicine is that structure influences function. Thus, if there is a problem in the body's structure, function in that area, and possibly other areas, can be affected. Osteopathic physicians use this knowledge to aid in making diagnosis and in some instances to treat. This concept is generally applied through osteopathic manipulative medicine (OMM). A DO receives about 200 extra hours in OMM training during medical school. OMM is most often used by a DO in primary care fields such as family medicine, sports medicine, pediatrics, and internal medicine. It can be used to diagnose and treat a variety of medical conditions, including, but not limited to: low back pain, joint pain, neck pain, headaches, gastrointestinal conditions, and respiratory problems.

Currently there are about 141 medical and 33 osteopathic schools in the US. Each year around 80% of medical students enter MD programs and 20% enter DO programs. The prerequisites for acceptance into either program are the same, as well as the pathway for board certification and maintaining continuing medical education (CME). There are currently over 100,000 practicing DOs that make up about 7% of the medical physicians in the US.

In all 50 states, licensing agencies, hospitals, and residency programs recognize MD and DO degrees as equivalent. Recent studies comparing both disciplines have revealed that there are few remaining differences. While the pathways to becoming either an MD or DO are becoming indistinguishable, a blend of both the allopathic and osteopathic approaches to treating patients may offer patients the most comprehensive form of treatment.

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