



Hughston Health Alert

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Inside...

- EMG Testing
- Concussion Software
- Hand Arthritis
- *Hughston Health Alert*

Patient Reported Outcomes

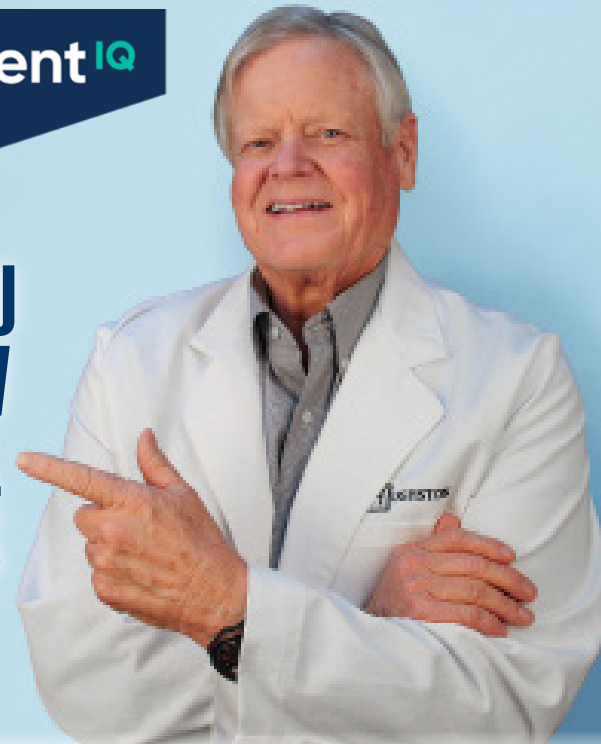
We are living during an era of exciting discovery and innovation in the fields of technology as well as in medicine. With such rapid advancements in healthcare, it is fundamental to keep the patient, who is the recipient of such progress at the center of focus. Injured athletes seek pain-free restoration of performance as quickly as possible. Patients with arthritis are living longer and desire to remain active. How we apply technology to improve an individual's outcome is called patient reported outcomes.

The US Food and Drug Administration defines patient reported outcomes (PROs) as any report of the status of a patient's health condition that comes directly from the patient without any interpretation of the patient's response by a clinician or anyone else. Some examples include a patient's report of their symptoms, physical abilities, function, or satisfaction with treatment.

History of using patient reported outcomes

We have used PROs in medicine for decades. In fact, Jack C. Hughston, MD, used a type of patient-reported outcomes during the 1970s. He developed a questionnaire that asked a patient about their function and pain level. The patient completed the questionnaire during each clinic visit so it provided insight before, during, and after treatment. The patient completed Dr. Hughston's preprinted-paper questionnaire with a pen, then the completed survey became a part of the patient's medical record.

WHAT YOU SAY & HOW YOU FEEL MATTERS



PATIENTIQ IS SIMPLE TO USE:

- 1 | We send you an invitation to enroll by email or text message.
- 2 | You click the link, Patient IQ prompts you to complete some simple tasks, like telling us your pain level or answering a short survey.

Your responses are confidential and sent to your medical team to assist with your care.



Today, patients are sharing their physical well-being and treatment outcomes more than ever. The patient can report symptoms, function, activity limitations, health-related quality of life satisfaction, side effects, treatment experience, work productivity, impairments, adherence to treatment, and much more. Patient goals and the goals set by their physician are more in line when the patient specifically documents their treatment experience. This means physicians can use the data to make effective changes that improve treatment plans for your medical condition. Since the patient gives the information directly to the clinician through an online survey or questionnaire, the physician is able to review it sooner. Providing patient experiences and outcomes can lead to treatment plans that improve function, quality of life, and overall better outcomes for a patient. The feedback does not fall on deaf ears either. Researchers pull together the information with that of other patients so they can study and compare the data.

Why does it matter?

We are increasing the use of PROs for clinical care and research. The outcomes are important because they reflect the reason that a patient seeks healthcare services in the first place. There are many measurement tools, which we refer to as patient reported outcome measures (PROMs). By using a direct unfiltered inquiry, PROMs measure what patients are able to do and how they feel. They reflect the patient's direct voice throughout the course of treatment. Therefore, using the details you provide, researchers can study and assess various outcomes. We collect and study the data to help providers with formulating better treatment methods in the future.

How it works

It is easy to participate in PROs and it is simple to use. As a patient, we log your signs and symptoms into your health record and invite you to enroll by email or text message in our new program called Patient IQ®. Once you click the link, Patient IQ® will prompt you to complete some simple tasks, such as telling us your pain level or answering a 3- to 5-minute survey specific to your diagnosis.

Your responses are confidential and sent directly to your medical team, who then plans the best possible care for you. As you continue your treatment, we will check with you occasionally for an update on how you are feeling. Our goals with using this new technology are better patient experiences and healthier outcomes for you.

It's as simple as answering a few questions that come to you in an email or by using a computer or tablet during your clinic visit. In fact, it is easier than when Dr. Hughston years ago asked his patients to complete a paper survey. Nevertheless, just as you are reaping the benefits of those patients and their outcomes, tomorrow's patients, as well as you, will reap the rewards for your efforts today. And for that, your doctors thank you for helping us better serve you.

*Brent A. Ponce, MD
Columbus, Georgia*

EMG Testing: Questions for a Specialist

When you are injured, your nerves tell you where the damage is located in your body. For example, when working properly, the nerves of a stubbed toe send signals to your brain that your toe is hurt and you respond by stepping carefully for a bit. However, when you damage your nerves, disruption of these signals make it harder to pinpoint the problem. A pinched nerve in the neck can cause tingling in the fingertips or inflammation at the wrist can make your whole arm feel like it is burning. Situations like this can be frustrating, but one method to cut through the confusion is for your doctor to order an EMG.

"EMG" is short for electromyography and nerve conduction study. This special test assesses the function of each nerve individually to find out which nerves are damaged, what part of the nerve is affected, and the severity of the problem. If your doctor has ordered an EMG test for you, here are some questions you may have before your appointment:

Why does my doctor want me to have an EMG?

There are many reasons why you might experience pain, weakness, numbness, or tingling. An EMG helps your physician determine if there is nerve involvement and what part of the nervous system is affected.

How does my doctor use an EMG to diagnose my condition?

Knowing which nerve(s) are injured and the extent of the damage helps your doctor to determine the best course of treatment, whether it is medication, therapy, injections, or surgery.

Who performs an EMG? Do they have special qualifications and training?

A doctor of physical therapy (DPT) who is board certified in clinical electrophysiology performs the test. These physical therapists have undergone a thorough and rigorous training process, which includes over 2,000 hours of direct EMG testing, more than 500 individual EMG studies, and they must pass a specialty board examination.

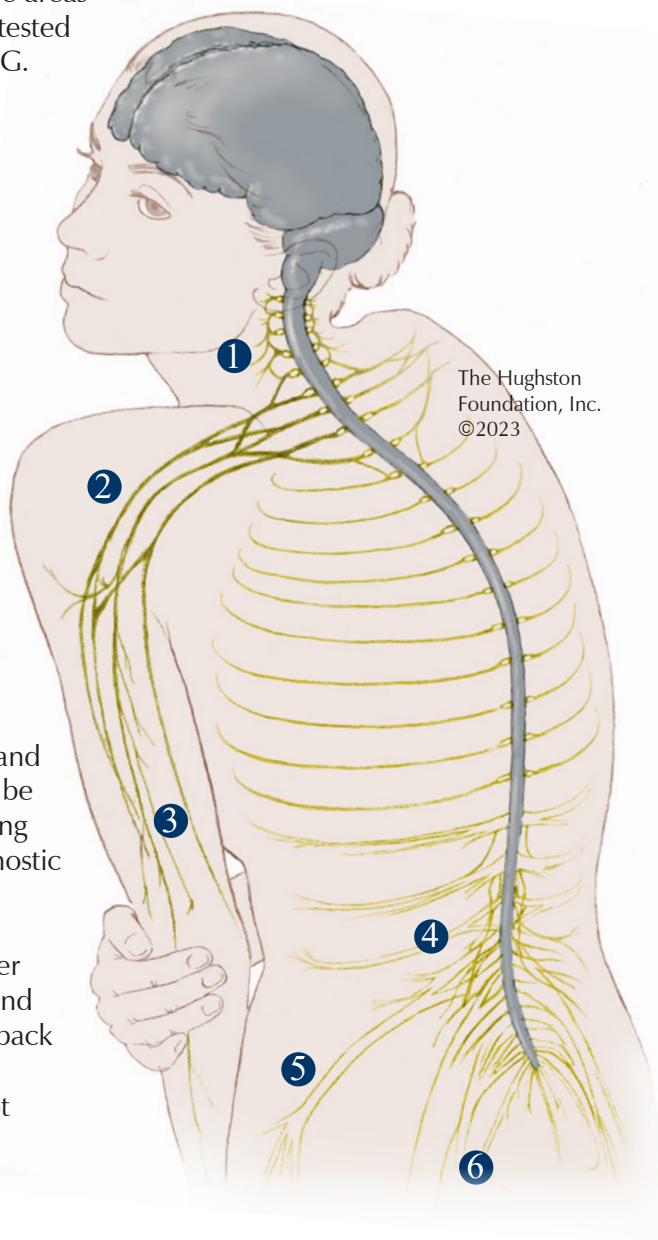
Where do I get the test completed?

Often, your therapist will complete the test in a private treatment room in the physical therapy department. Your physician's office can help you to find a location and time that is convenient for you.

How should I prepare for an EMG?

You should wear loose fitting garments for your test. Wear a short-sleeved shirt or tank top if your neck or arms are to be tested, and a pair of loose shorts if the problem is in your back or legs. Do not apply any lotions, oils, or creams to your skin the day of testing, as it can interfere with the examination process. Most medications will not affect the test, but pyridostigmine products for muscle weakness, such as Mestinon® should be discontinued for 24 hours before testing.

Fig. Nerve areas typically tested using EMG.



Symptoms of pain, weakness, numbness, and tingling can be assessed using electrodiagnostic testing in:

1. Neck
2. Shoulder
3. Arm/hand
4. Lower back
5. Hip
6. Leg/foot

How do you perform the test?

The test is divided into 2 parts. During the first part, your nerves are stimulated electrically, causing you to feel a mild shock sensation. This produces nerve signals which are recorded through small electrodes placed on your skin. During the second part, a small wire in the form of a needle records electrical activity in various muscles.

Does the test hurt?

The physical therapist will position an electrode just under the skin, which can cause a slight prick. Some aspects of the testing may also be uncomfortable, but the physical therapist will work closely with you to make it as pleasant as possible.

Is the test safe?

The testing is safe with minor complications. For example, there may be some bruising or soreness where your physical therapist places the needle electrode, especially if you take prescription blood thinners.

Will an EMG affect my pacemaker or spinal stimulator?

The test does not affect implanted medical devices such as pacemakers or spinal stimulators. However, it is best to turn off the spinal stimulator since it can produce electrical interference, which can make the test more difficult to complete.

How long does it take to complete the test?

It takes approximately 1 hour to complete the full test; with much of this time spent discussing your symptoms and helping you get comfortable before the testing begins.

When will I get the results?

The physical therapist performs the test, interprets or reads the data, and prepares the final report with impressions and conclusions. The physical therapist will send the EMG report directly to your physician within 1 to 2 business days following your test. Your physician may schedule a visit with you to explain the results, or he or she may prefer to call you and discuss the findings over the telephone.

EMG tests offer a unique and informative look at the health of the peripheral nervous system. Don't worry, an EMG is easy to perform, and most people are surprised that the test isn't as uncomfortable as they imagined it would be. The information the test provides will help your doctor get you on the road to recovery quickly and more effectively.

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Concussion Software

A concussion is a brain injury, and regardless of whether it is mild, moderate, or severe, it has the potential of long-term consequences. The Centers for Disease Control and Prevention reports that mild traumatic brain injuries (mTBI), also called concussions, account for nearly 75% of all traumatic brain injuries (TBI). Researchers define a concussion as a transient change of brain function caused by a biomechanical force to the brain after a head injury. During a concussion, brain cells or neuronal axons pull, stretch, tear, and twist, damaging the brain’s electrical chemical pathways. Often, the results are a decrease in brain cell activity and reduction in blood flow within the brain, which can lead to temporary or permanent neurological signs and symptoms (**Box 1**).

Box 1. Concussions can affect:

- **Cognitive function**
Impairing your attention or memory
- **Motor function**
Weakness, poor coordination, and balance problems
- **Sensations**
Loss of hearing, vision, perception, or touch
- **Emotions**
Depression, anxiety, aggression, or personality changes

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Adults aged 65 and older and children under 14 years old lead the demographics of age-related falls that result in a concussion while motor vehicle accidents are the third leading cause of TBI among all age groups. Concussions are more frequent in teenagers, young adults, males, and people who are engaged in high-impact, physical activities, such as a contact sport. Since sports-related concussions are the leading cause of mTBI, all 50 states address concussion management in school athletics by using return-to-play protocols to protect athletes. The question is then, when can an athlete safely return to sports?

After a head injury

Following a concussion, patients can experience a number of clinical symptoms, such as headaches, dizziness, depression, memory loss, confusion, blurred vision, and balance problems (**Box 2**). These symptoms can occur with or without loss of consciousness. Some physicians use post-concussion syndrome to describe a range of residual symptoms that persist despite a lack of evidence of brain abnormalities on magnetic resonance imaging (MRI) or computerized tomography (CT) scans. While traditional imaging modalities—such as CT, MRI, position emission tomography (PET) scan, and single-photon emission computerized tomography (SPECT) scans—provide information on brain anatomy, metabolism,

Box 2. TBI Signs and Symptoms

Observable TBI Signs:

- Appearing dazed or stunned
- Forgetting an instruction
- Moving clumsily
- Answering questions slowly
- Losing consciousness (even briefly)
- Showing mood, behavior, or personality changes
- Being unable to recall events prior to or after a hit or fall

Symptoms reported by patients with TBI

- Headache or pressure in the head
- Nausea or vomiting
- Balance problems or dizziness
- Double or blurry vision
- Sensitivity to light or noise
- Sensation of feeling sluggish
- Concentration or memory problems
- Confusion
- Not “feeling right” or “feeling down”
- Mood changes, such as irritability, sadness, nervousness, anxiety, or acting more emotional than normal
- Changes in sleep patterns

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energy consumption, and blood flow, they do not provide information on the functional brain or help diagnose concussions. More specifically, these imaging modalities do not allow us to quantify how the underlying brain networks are performing, such as memory, attention, pain, or depression. Other functional assessment methods, including clinical assessment and neurocognitive tools, reveal only clinical effects and symptoms.

How your brain works

The brain contains a complex cellular network of around 100 billion neurons with each neuron connected to around 10,000 neighboring neurons. Neurons “speak” to each other using special chemicals called neurotransmitters. The messages from neuron to neuron flow through electrochemical signals. The signal from 1 neuron is miniscule and not detectable; however, when there are coordinated electrical pulses from groups of neurons, a detectable brainwave is produced. Brainwaves, much like smart phone applications (“apps”), allow us to communicate our thoughts, emotions, and behaviors.

Testing for concussion

Evoked response electroencephalogram (EEG) testing is a new modality that allows concussion specialists to objectively measure and assess the brain’s network of electrical functions (our brain “apps”) at rest and during mental tasks. Researchers report that the inclusion of

Fig. 1. The WAVi EEG device is a noninvasive method that tracks and records brainwave patterns

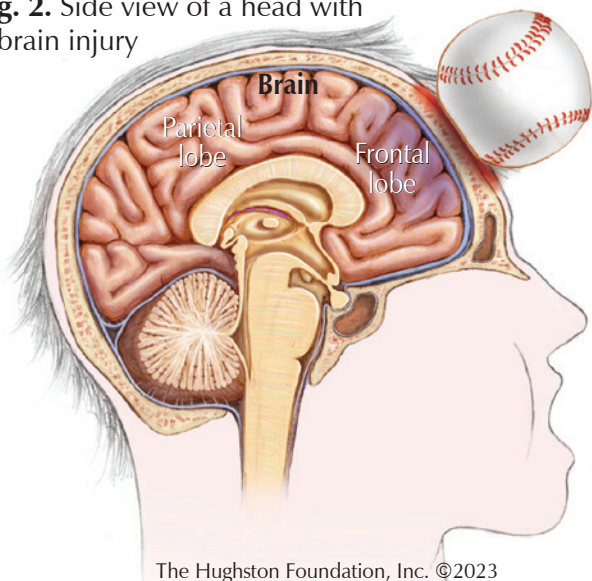


Images courtesy of WAVi ©2023

evoked EEG with concussion diagnostics can improve accuracies to above 95%. More importantly though, they have also found that evoked EEG's are a powerful measure of brain recovery that can detect deficits even after symptoms have resolved. Physicians use WAVi, which is a new device that uses the EEG technology, to help them diagnose, treat, and plan the long-term management of concussions.

The WAVi EEG device is a noninvasive method that tracks and records brain wave patterns via a number of electrodes during a 20-minute scan (**Fig. 1**). This device evokes an EEG to see how well the brain is processing. The evoked EEG signal most sensitive to concussion appears as a positive voltage occurring on average 300 milliseconds after the stimulus, and is therefore known as the P300 response. Physicians can see the P300 signal on an EEG as a fast, single electrical spike in response to a sensory, cognitive, or motor stimulus. Researchers believe the P300 signal comes from the parietal lobe, a portion of the brain, which has an important role in decision-making and response to stimulation (**Fig. 2**). The WAVi device can measure how efficiently the brain is able to use available brain “apps” to complete a given task. For example, the WAVi will look at brain regions “apps” that are not activating consistently

Fig. 2. Side view of a head with a brain injury



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and are therefore not functioning well. This information helps the physician determine the direction of rehabilitation efforts, the types of tasks one should be practicing most, and the training approaches to speed recovery.

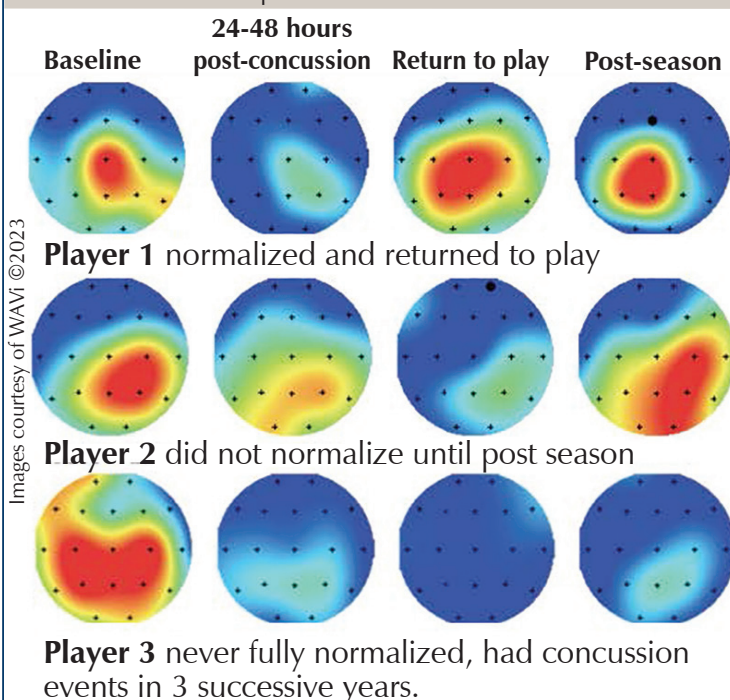
Additionally, the WAVi brain scan allows for a visual representation of the electrical changes in brain neural pathways following a concussion. Depicted is a heat-map visual representation of 3 players: before and after a concussion and at the end of the season (**Fig. 3**). Colors near the red spectrum reflect higher brain voltages, which shows normal functioning of the brain and colors near the blue spectrum reflect lower brain voltages that show the brain after a concussion. Additionally, this graph shows the significant shift from red spectrum to blue spectrum—see the left column, which is a baseline scan to the second column—after a player sustained a concussion. The pictogram of player 3 indicates the electrophysiology of the brain has not returned to normal following the concussion.

On the forefront of concussion care

Concussions cause measurable changes in the electrophysiological functioning of the brain. As such, concussed participants often pass clinical tests while still displaying electrophysiological deficits in the form of a delayed P300. By using evoked response EEGs and technology such as WAVi, we are on the forefront of concussion care and better able to determine when an athlete has still not recovered enough to safely resume their sport.

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Fig. 3. WAVi heat-map of before and after a concussion
Colors near the red spectrum - shows normal brain function
Colors near the blue spectrum - shows the brain after a concussion



Images courtesy of WAVi ©2023

Hand Arthritis

For many reasons 2020 was a challenging year. In particular, it made practicing medicine challenging because many patients had been worried about visiting their doctors for fear of exposing themselves to COVID-19. This left patients searching for answers online. Although the Internet has a wealth of information available, a quick search of symptoms for hand pain and stiffness can be overwhelming. As an orthopaedic hand surgeon, one of the most common presenting complaints is hand pain related to arthritis. Fortunately, when I see these patients, I am able to offer both nonsurgical and operative solutions. When it comes to musculoskeletal disorders of the hand, the key is receiving the appropriate examination, diagnosis, and treatment from an orthopaedic physician who specializes in treatment of hand injuries and disease.

Changes in the hand

Hand arthritis is a common term used to describe the degenerative changes that take place within the small joints of the hand. Arthritis can have varying causes including: osteoarthritis (a degenerative disease caused by overuse), post-traumatic injury, or inflammatory, which is related to metabolic or autoimmune disorders, such as gout, pseudogout, rheumatoid, or psoriatic arthritis. The hand comprises all structures beyond the wrist joint and contains many different bones, tendons (tissues connecting muscle to bone), nerves, and vascular structures. The joints of the hand include the carpometacarpal (CMC), the metacarpophalangeal (MCP), the proximal interphalangeal (PIP), and the distal interphalangeal (DIP) bones (**Fig. 1**).

Osteoarthritis refers to the constellation of radiographic (x-ray) findings associated with wear and tear of the joint cartilage that has no other underlying cause. When cartilage breaks down, the joint loses its natural shock absorber; and therefore, the force transmits to the bone. X-rays may show a narrow joint space that depicts bone-on-bone disease. Additionally, bone spurs or cysts are common findings in patients presenting with osteoarthritis. Additionally, patients often experience inflammation, pain, and swelling around the joint.

Those at risk for developing osteoarthritis are typically elderly patients with a history of overuse of the hands. Furthermore, recent studies have linked osteoporosis to degenerative changes throughout the body including thumb basal joint arthritis. Therefore, primary care physicians should screen patients who are at risk for osteopenia or osteoporosis and discuss medical management for these diseases. Physicians may recommend patients to take vitamin D, calcium, or other anti-bone resorption supplements.

Nonsurgical treatment

Physicians approach the treatment for arthritis in the small joints of the hand differently than the larger joints in the body. Patients may present with “start up” pain related to the initiation of motion. Hand surgeons encourage finger range of motion exercises to minimize the risk of stiffness. The mainstay of treatment for hand arthritis relies on maximizing nonoperative modalities such as ice, heat, and anti-inflammatory medication. For stiffness, heat can help to loosen the connective tissue in the muscles, tendons, and ligaments (tissues connecting 2 bones) and may improve overall range of motion. Ice can help to minimize swelling, inflammation, and pain. Anti-inflammatory medications such as ibuprofen, naproxen, and meloxicam can help patients overcome a particular flare-up and minimize the inflammatory cascade that results in pain.

Fig. 1. Normal anatomy of the hand joints and a hand x-ray

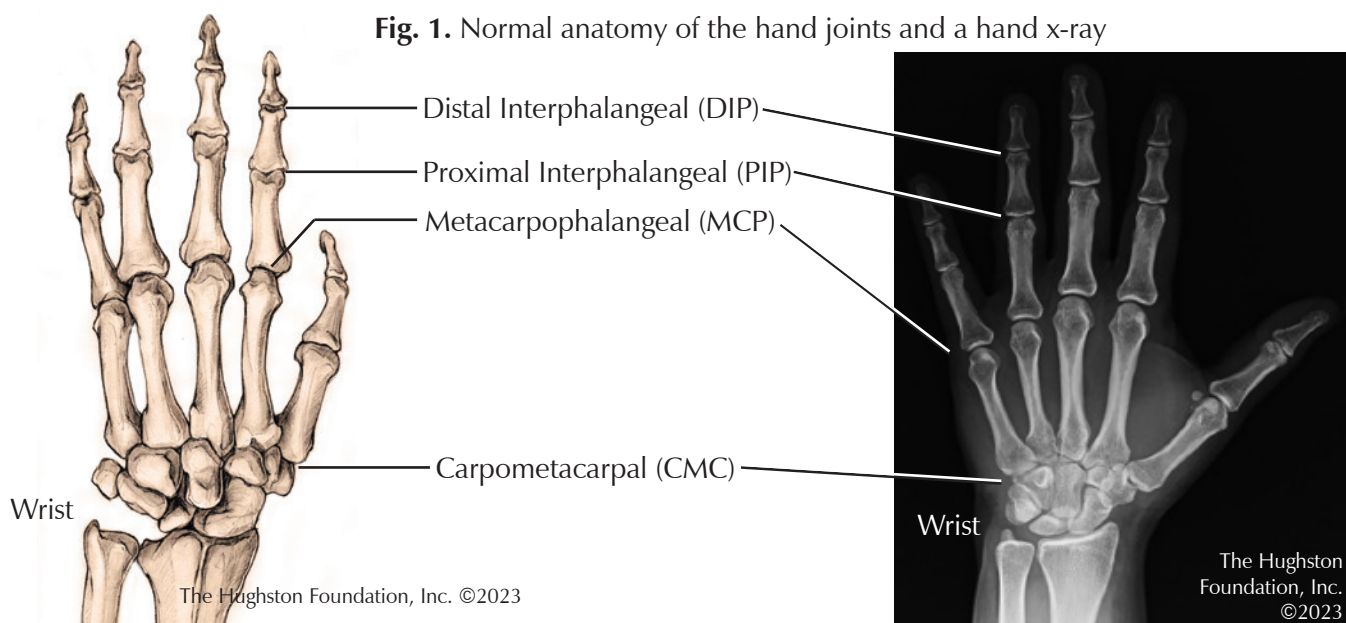
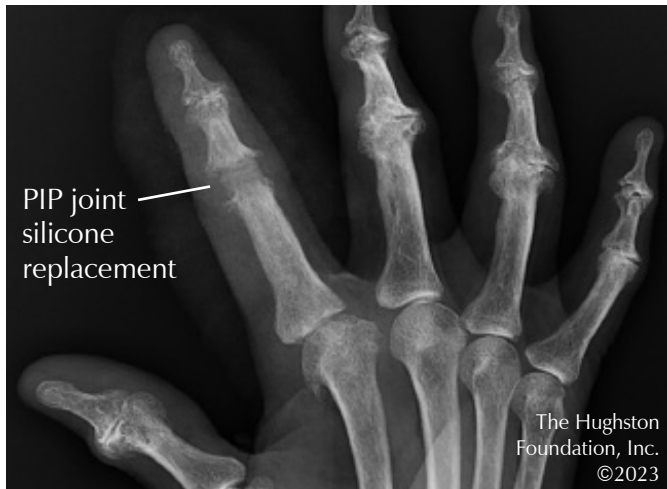


Fig. 2. Joint replacement exchanging the surfaces with a plastic implant



Unfortunately, there are patients who present with unrelenting symptoms despite nonsurgical treatment. Depending on the diagnosis, intermittent steroid injections may help to ease symptoms. Basal joint arthritis is the most common location for primary arthritis in the hand and often responds well to a steroid injection. According to a 2015 article in the *Hand* journal, when comparing placebo, hyaluronic acid, and steroid injections for thumb arthritis, only steroid injections demonstrated any long-term clinical improvement in symptoms. However, physicians should inform patients that symptoms could return after an injection because the steroid medication does not change the underlying degenerative injury to the joint.

Surgical treatment

Surgical treatment varies based on the joint in question, though the options are to either replace the joint or fuse the joint. A joint replacement procedure eliminates the arthritic joint by exchanging the surfaces with metal and plastic implants (**Fig. 2**). A fusion procedure eliminates the arthritis by permanently connecting 2 bones together (**Fig. 3**). Joint replacement affords the ability to maintain motion whereas fusion inhibits motion. However, both procedures help to eliminate pain.

Additionally, each procedure has its own rehabilitation regimen. Joint replacement allows for early range of motion to minimize the risk of joint stiffness. On the other hand, patients undergoing a joint fusion require a longer period of disuse, typically until the fusion takes. This could be several weeks to months depending on the patient's risk factors, such as other medical problems, or a history of smoking. Patients must also minimize the stress at the joint level following a joint fusion because too much stress can result in broken hardware or a nonunion.

As one can imagine, the outcomes vary depending on the patient's demand and the type of procedure performed. However, patients are generally pleased with

Fig. 3. Partial wrist fusion



surgical treatment because the goal is to minimize pain. Postoperatively, most patients will engage in a treatment protocol involving home exercises and physical therapy. Therapists can help with scar desensitization, motion, and strength training. Working on strength training of the small muscles of the hand is just as important as exercising the larger muscle groups in the body. Small joint exercises may be tedious but formal therapy can result in better overall outcomes and improved patient satisfaction.

Risk factors

Repetitive movements, advanced age, family history, and hand trauma are just a few risk factors for hand arthritis. Osteoporosis can lead to degenerative changes in the body, including the hands; therefore, to maintain good bone health patients should have appropriate vitamin D and calcium levels. Researchers also believe that smoking cessation leads to better pain control and improved efficacy of corticosteroid injections. In terms of post-traumatic arthritis, the only way to minimize the risks are to minimize the dangerous activities that can result in such trauma but more so, to seek early medical attention. Following an injury, a patient should have an x-ray to determine the extent of injury or whether specialty care is needed. Fractures that are missed and diagnosed weeks or months later can result in significant disability.

See a hand specialist

Arthritis is only one of many reasons you may be experiencing hand pain. Managing symptoms may help to avoid invasive procedures and eliminate the need for surgical treatment. If you do find yourself requiring treatment, research your local or regional fellowship-trained hand surgeon for the best care.

Todd Rubin, MD
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- Providing training materials at meetings for healthcare professionals, such as occupational health nurses, and future healthcare providers.
- Materials distributed at sporting events, such as the Georgia High School Soccer Association Championship, and Safe Kids programs to educate the public about safety concerns for our youth.

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