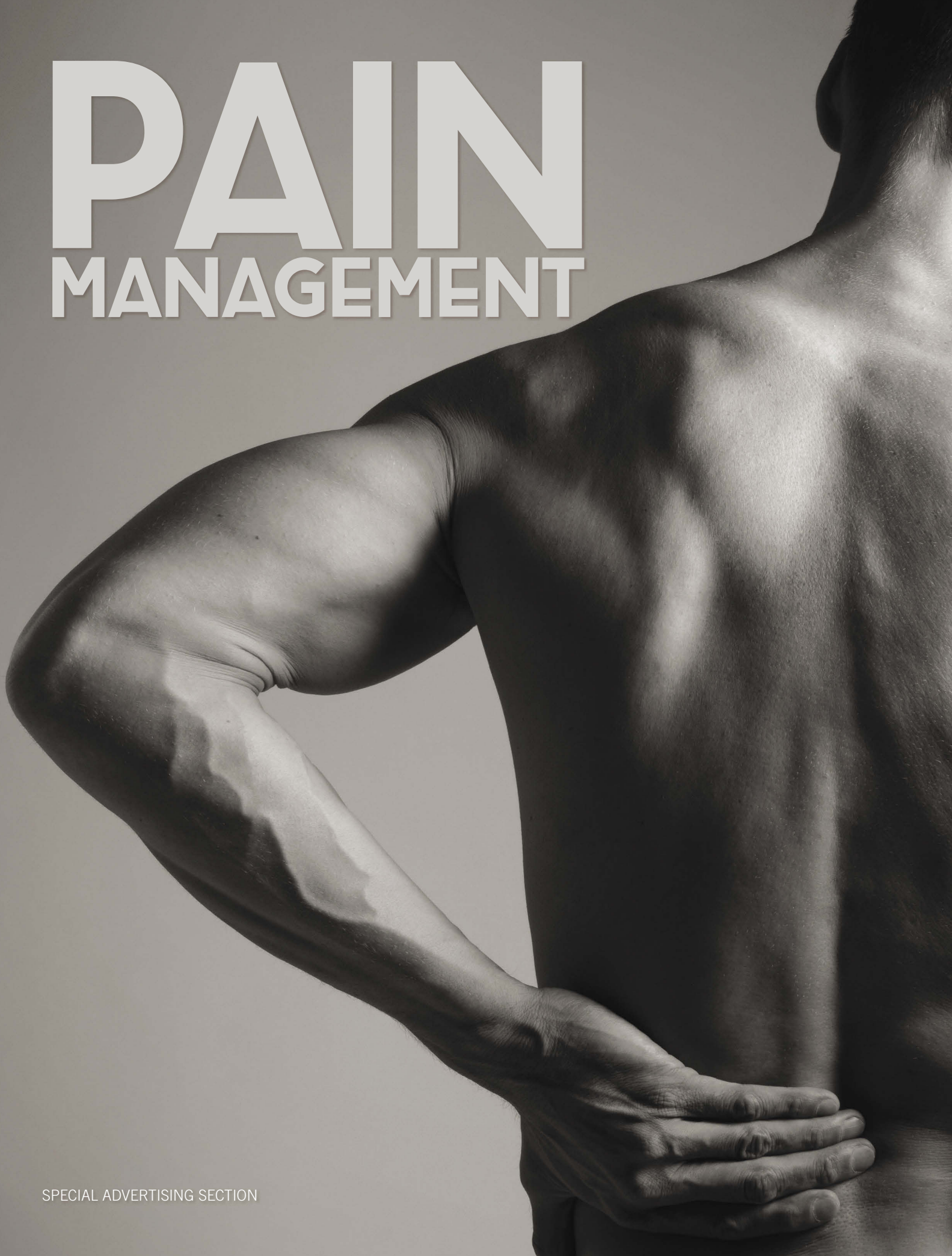


PAIN MANAGEMENT



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While learning about some of the recent advances in pain management, as well as others that will be available in the near future, it is obvious the leaders in this space have taken on the philosophy that less is more. From less invasive surgical procedures to new pre-surgical pain management treatments and less aggressive post-surgical medicine prescriptions, doctors see a positive change with the direction pain management is going.

BACK TO THE FUTURE

Spinal cord stimulation has been used since the 1980s but a recent advance in this area has increased the number of patients that can benefit from this treatment, as it is becoming a more efficient tool for treating chronic back pain.

A company called Nevro introduced high-frequency stimulation as a different, and painless, way to provide pain relief. With traditional stimulation, a doctor applies or inserts wires into a patient's back and, in a controlled manner, uses electricity to stimulate the area by sending a signal to the brain and address the pain. However, it does that by sending a different sensation to the area with the pain to displace it. High frequency stimulation has changed that because the frequency is high enough that a patient doesn't feel the stimulation at all.

"Some patients can't tolerate regular stimulators because they don't like the sensation or it didn't work for them, so we aim to provide the relief without the vibration or sensation they felt from previous stimulation models," said Dr. David Tom, a triple ACGME board certified physician at Nova Spine Pain Institute. "This new technology is changing things in that we can also offer this treatment to patients who failed traditional stimulation. Spinal cord stimulation continues to make gains and change the future impact of chronic pain treatment."

Another application for high-frequency stimulation is using it on a part of the body that suffered a traumatic accident in an area, such as a heavy object falling on your foot, which causes hypersensitivity to pain that can be caused by something as light as when a sock touches the skin.

Initially, this treatment primarily benefitted patients who suffered from back pain and leg pain as well as patients with knee, shoulder and hip joint issues. However, this treatment is still relatively new and as it is researched further, pain management physicians are learning about additional applications.



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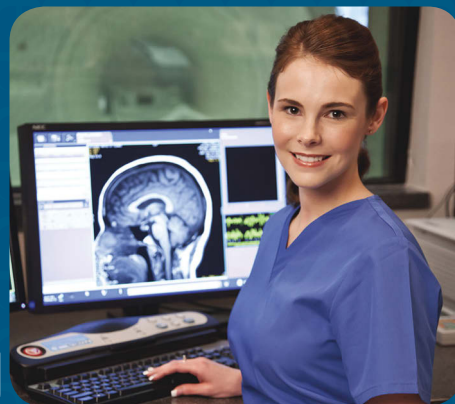
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A RECENT ADVANCE SPINAL CORD STIMULATION HAS INCREASED THE NUMBER OF PATIENTS THAT CAN BENEFIT FROM THIS TREATMENT, AS IT IS BECOMING A MORE EFFICIENT TOOL FOR TREATING CHRONIC BACK PAIN.

nationally who are in this space," said Reiner Kremer, NMD, medical director at Catalyst Pain Solutions. "We are excited to offer patients a traditional approach using traditional therapies that are covered by insurance and also a regenerative approach where we use the body's own blood, to allow the body to regenerate some of the damaged tissue."

Another procedure being studied involves Fibrin, which helps in the formation of blood clots. This study utilizes fibrin on disc tears and measures its ability to heal them by sealing the disc. Initial results have been encouraging with pain measurements dropping from an average of seven to an average of three.

A third procedure being researched is looking at biomarkers as a tool to determine who will be the best patients for these new degenerative disc treatments or if perhaps they don't need any of them and can rehab with physical therapy And avoid surgery altogether.

"Biologics are probably the future, however we have limited studies at this point and we need more to determine the best patients for these procedures and to monitor their potential side effects," said Dr. Chris Huston, who specializes in interventional spine procedures at The Orthopedic Clinic Association. "I think the days of

Another new treatment for the spine is DRG (dorsal root ganglion) stimulation which received FDA approval earlier this year. The advantage this treatment provides is when a patient is suffering from pain in their lower back that travels into the leg, the physician can target a specific nerve root and directly treat the area to provide relief.

Pulse wave stimulation is another method that is currently under development. Once that is widely available, physicians will have a much larger and more efficient selection of tools to provide pain relief to their patients.

"Spinal cord stimulators seem to be the area that is advancing the most the last few years," said Dr. Anuj Daftari, who specializes in interventional spine & pain management at The CORE Institute.

Additional advances in helping patients who suffer from chronic back pain related to degenerative disc disease involve biologics. One procedure that is under development involves platelet rich plasma (PRP) where

blood is drawn from the patient and growth factors are pulled out of the platelets. These growth factors are then injected into the disc with the hopes that the degenerating disc will rebuild itself. The scientific description for this procedure is a "human mesenchymal stem cell re-implantation for interventional orthopedic purposes." In layman terms, it can be summed up in one word - relief.

One of the champions in this form of regenerative science is the team at Catalyst Pain Solutions, an interventional pain facility with multiple locations in the Valley and another in Tucson. Two years ago, it obtained a license from Regenix, a leader in research about orthopedic stem cell procedures, positioning itself as one of the few practices in the U.S. to offer this treatment to its patients.

"We created this partnership because Regenix has the most research for interventional orthopedics, and we are part of an elite network of musculoskeletal specialists



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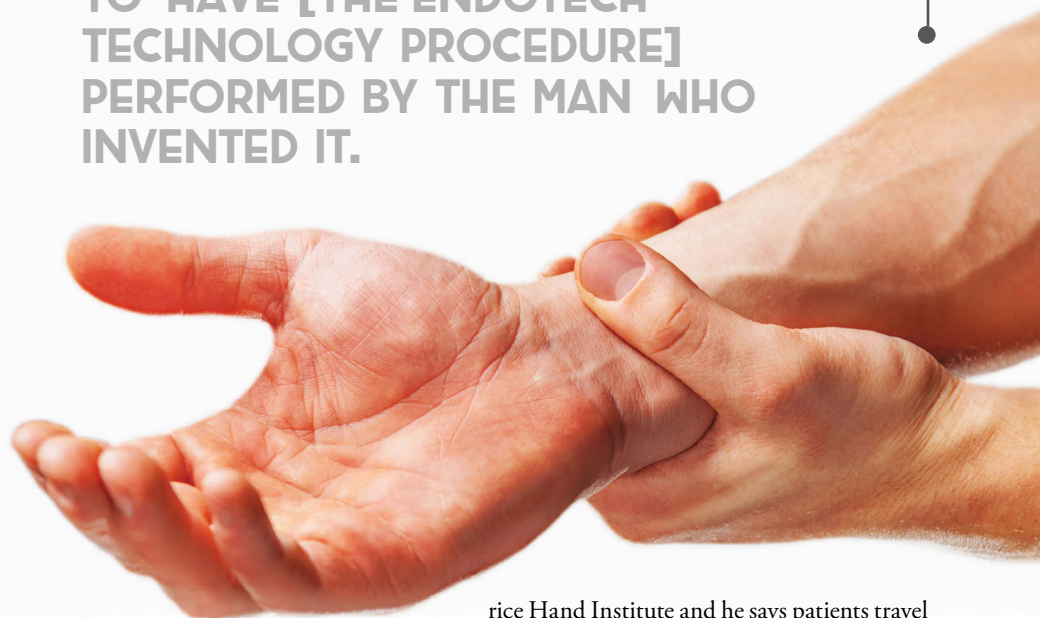
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doing a spinal fusion for a chronic low back pain that is disc related will probably start falling off and using these different biologics will become more routine."

A LIGHTER TOUCH

Another area of pain management that is seeing a less is more approach applied to it is hand surgery. Dr. Michael Fitzmaurice of The Fitzmaurice Hand Institute in Phoenix is leading the charge with his innovative EndoTech Technology.

An engineering background fuels Fitzmaurice's ability to improve current techniques by developing better instrumentation, as he did with his cutting-edge technique. As is the case with most inventions, Fitzmaurice identified a need for minimally invasive techniques that provide adequate visualization of the area during hand surgery. His EndoTech Technology addressed that need, which Fitzmaurice originally intended to help with carpal tunnel surgery but has since expanded to other uses such as relieving pressure on the elbow or tendonitis in a finger.

This procedure is exclusive to The Fitzmaurice

Hand Institute and he says patients travel from around the country to have it performed by the man who invented it.

"The benefit of this is I can do these procedures with a small incision and the patient can increase normal activities much quicker than the other techniques, which makes a big difference, especially for people who make a living using their hands like musicians or athletes," Fitzmaurice said. "I am constantly re-evaluating instrumentation and seeing how I can make a smaller camera and increase visualization. What I couldn't do six months ago, I can probably do now."

Fitzmaurice is also on the forefront of performing arthroscopic techniques that use stem cell therapy after completing a fellowship. His preference is using stem cells from the patient instead of an outside source. He performs a minor liposuction procedure on the patient, processes their body fat and pulls out the stem cell tissue to coat the nerve to increase function and decrease scar tissue.

One application is ortho rejuvenation. A physician can go into a joint with a camera, most commonly the thumb joint, to the spot where arthritis occurs, and if the cartilage is worn out they can shave down a little bit of bone. Then, when they embed the stem cells, it can help grow more cartilage and, more



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importantly, reduce the swelling associated with the arthritis.

Stem cell therapy is also proving effective for treating back pain with a high rate of patients able to find relief and largely able to avoid further procedures.

"At two years out, 80 percent of people with severe back pain were able to avoid back surgery," said Dr. Huston.

"Stem cell therapy has the potential of helping patients out in all sorts of medical situations but we are still in the midst of testing and research to fine tune different approaches to determine which is best," Fitzmaurice added. "Right now I use it for joints and decreasing pain. If you get to the patient early enough, we may prevent the need for surgery for years, which is the big thing. But if I do have to do surgery, this greatly improves recovery from five to six months to six to eight weeks."

To support recovery, Fitzmaurice developed a natural, oral supplement to support nerve function called Neurogen as a natural alternative to an opiate, which is typically prescribed. The combination of the stem cell procedures along with the innovative recovery methods enables him to offer his patients an overall care package that is hard to find elsewhere.

"I like to think we are on the cutting edge of minimally invasive

"I LIKE TO THINK WE ARE
ON THE CUTTING EDGE OF
MINIMALLY INVASIVE AND
REJUVENATION TECHNIQUES
USING STEM CELL WORK."

-Dr. Michael Fitzmaurice



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and rejuvenation techniques using stem cell work," Fitzmaruice said. "And I like to add the nutritional component because I find a lot of physicians aren't as up to date on the amazing capabilities of nutraceuticals. They can improve recovery, especially in neuropathy patients. I like to incorporate all these into my practice to give patients the best possible outcomes."

ADDRESSING OPIATE ADDICTION

The development of the natural supplement is just another advance that addresses the bigger trend of minimizing the amount of opiates prescribed by physicians across the state. This is fueled by the growing rate of addiction to medication such as OxyContin and Vicodin, which has reached epidemic levels.

The State of Arizona now distributes quarterly reports detailing how many opiates are prescribed by every primary care physician in the state and how that compares to others. As a result, primary care physicians have largely moved away from prescribing these painkillers and instead refer these patients to pain management physicians.

"There used to be a push that pain was undertreated and they needed to be treated with medication or you weren't doing your job as a doctor," said Dr. Daftari. "There has been a huge shift because opiate medication is abused more than illicit street drugs. A huge part of the population don't want to be on these at all and I think that is a positive for the direction pain management is going."

However, for those who do need, or can use, opiate medication without becoming addicted, they still faced a common side effect from using these painkillers - constipation. Fortunately, there are a new group of oral medications, such as Movantik, that treat opiate induced constipation by blocking opiate receptors in the gut.

COMPOUND INTEREST

Another area where pain management doctors have stepped to the forefront is in the treatment of compression fractures. Historically, these patients would be treated in hospitals but with changes in medicine and how insurance companies are directing

AS THE LIFE SPAN OF HUMANS CONTINUES TO EXPAND AND WE HAVE MORE PEOPLE LIVING TO AN OLDER AGE, WE ALSO SEE AN INCREASED NEED TO FIND MEDICAL ADVANCES THAT HELP US MAINTAIN A HEALTHIER WAY OF LIFE.



coverage, they are being driven to outpatient care instead of in-patient and steered to interventional pain doctors.

"Primary care physicians send these patients to hospitals thinking old standards exist but with the new guidelines pain doctors are on the forefront with this," said Daftari. "Because we have the clinics and see the patients repeatedly, we are able to provide the conservative care and then follow that with outpatient treatment if necessary."

With this shift in policy is another analysis in the methods for treating compound fractures, especially in seniors who are most susceptible to these breaks due to osteoporosis or weakening bones that are broken during a fall.

"Some studies are looking at people over 70 being treated conservatively for a month after the injury and we are learning those patients do a lot better if the procedure is done earlier," said Dr. Huston. "With some older patients, if they are debilitated in bed for a month, they lose a lot of strength and see other complications come about."

As the life span of humans continues to expand and we have more people living to an older age, we also see an increased need to find medical advances that help us maintain a healthier way of life. In addition, we as a society have adopted a more active lifestyle to help us in attaining better health because of this expanding life span, meaning we also find ourselves susceptible to the injuries that go along with these activities.

These recent advances and upcoming treatments for various medical situations will help us accomplish these goals. Not only are they vital for helping us live more comfortable lives as we get older or suffer an injury, but with an emphasis on a less is more approach, addressing the inevitability of pain at some point of our lives should get a lot easier.

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