High-energy lower-extremity trauma (HELET) is common in modern warfare, often resulting in severe tissue damage, chronic pain, neurovascular injury and significant muscle loss. The Return to Run (RTR) program is an integrated orthotic and rehabilitation initiative designed to return high-level function to wounded warriors. It includes use of the new Intrepid Dynamic Exoskeletal Orthosis (IDEO), a custom-fit device made from carbon and fiberglass that supports the foot and ankle allowing for greater mobility and vigorous rehabilitation. In the study, researchers reviewed RTR records of 14 Special Operations Command (SOCOM) personnel – 10 Army Special Forces, three Navy Sea Air Land (SEALs), and one Air Force Pararescue Jumper (PJ) – who sustained HELET injuries and completed the RTR program. Records were reviewed for functional capabilities – the ability to walk, run and jump without assistive devices; and occupational capabilities – standing continuously for more than one hour, moving with a load of 20 pounds or more, and the ability to return to duty and combat. Recreational capabilities include running and agility sport participation. Following RTR, 13 of the 14 service members (including three who had initially considered amputation) were deemed fit to return to duty, and at least seven returned to combat. Lead author disclosure.

Gauging the Effects of a Sunny Climate on Vitamin D Levels in Hip Fracture Patients

While it is well known that a majority of hip fracture patients of all ages and both sexes have insufficient or deficient levels of vitamin D, a new study looks at whether or not living in a warm, sunny climate improves patient vitamin D levels. Researchers retrospectively reviewed the vitamin D levels of 1,539 patients, including 448 acute hip fracture patients and 1,091 total hip (THR) or total knee replacement (TKR) patients, from December 2010 to December 2011 at a major medical center in southern California. Patients were categorized based on their vitamin D levels – deficient, insufficient or sufficient – and according to age and sex. The mean vitamin D levels for the hip fracture and the THR and TKR patients were 26.38 ng/mL and 29.92 ng/mL, respectively. More patients in the hip fracture group were deficient or insufficient (65.8 percent versus 54 percent), and patients age 71 years and older were more deficient.
or insufficient in the hip fracture group than the joint replacement group (66.7 percent versus 47.13 percent). Overall, the majority of patients age 18 and older of both sexes with hip fractures had insufficient levels of vitamin D, and those age 71 or older had significantly lower levels than the control group of THA and TKA patients. Lead author disclosure.

Measuring the Effects of Smoking on Orthopaedic Healing, Pain

**Smoking Cessation and the Aging Spine Patient** (Embargo: March 19)
- Spine patients who quit smoking report diminished pain

Smoking is a known risk factor for back pain and disc disease. In this study, researchers reviewed smoking cessation rates and related pain in 6,779 patients undergoing treatment for spinal disorders with severe axial (spine) or radicular (leg) pain. Information on each patient’s age, gender, weight, smoking history, assessment of pain, treatment type and co-morbid depression also were assessed. Overall, 8.9 percent of patients over the age of 55 smoked compared with 23.9 percent of those aged 55 and younger. Twenty-five percent of the patients older than age 55 had quit smoking, as did 26.1 percent of those younger than age 55. Current smokers in both age groups reported greater pain than those who had never smoked. Mean improvement in reported pain over the course of treatment was significantly different in non-smokers and current smokers in both age groups. Those who quit smoking during the course of care reported greater pain improvement than those who continued to smoke. As a group, those who continued smoking during treatment had no clinically significant improvement in reported pain, regardless of age. Lead author disclosure.

**Increased Revision Rates Following Total Hip Arthroplasty in Patients who Smoke** (Embargo: March 20)
- Current and past smokers face greater risk for hip replacement failure

Smoking has been linked to prolonged healing time and greater risk for complications in orthopaedic and other surgeries. In this new study, researchers reviewed records of all total hip replacement (THR, or total hip arthroplasty) patients between 2007 and 2009 to identify patients who used tobacco products at the time of surgery, or who smoked regularly prior to surgery. There were 110 patients who regularly smoked, with a mean age of 55 and a mean follow up of 46 months following THR. A control group was matched 2:1 with the smoking group based on gender, date of surgery within six months, age within five years, related medical conditions (co-morbidities) and immunosuppressive conditions. The smoking group was categorized as current or former smokers, and according to the number of packs of cigarettes smoked per year. At the most recent follow up, the patients who smoked had a 92 percent survival rate compared to 99 percent for non smokers. Of the nine THR revisions in smokers, four were done to alleviate pain and/or to repair a loose acetabular component (the hip socket), and five resulted from infection. Of the current smokers, six of 65 had revisions (9.2 percent); of the former smokers, 2 out of 45 patients (4.4 percent). Overall, the patients who smoked had a higher overall revision rate and a higher incidence of other complications. The study authors recommend smoking cessation programs for all patients considering THR. Lead author disclosure.

**Blowing Smoke: A Meta-analysis of Smoking on Fracture Healing and Post-operative Infection** (Embargo: March 22)
In this analysis, the authors reviewed existing literature and research on smoking and the healing of fractures involving long bones (bones that are longer than they are wide). The review illustrates the effects of smoking on acute fractures, primarily that smoking increases the risk of the fracture not fully
healing (nonunion) and infection. The analysis of data from 20 studies found an overall 2.3 times higher risk of nonunion in smokers. Similarly, for all fractures, the average time to fracture healing was longer for smokers (32 weeks) than nonsmokers (25.1 weeks). Smoking presents significant risks to the fracture patient, according to the study authors, which need to be discussed with patients at the time of injury and when considering surgery. Lead author disclosure.

Presenting New Research on Metal-on-metal Implants

**MRI is Predictive of Adverse Tissue Reaction in Failed Metal-on-metal Hip Arthroplasty**

(Embargo: March 19)

- An MRI can predict adverse tissue reaction in MoM patients, expediting treatment

**Magnetic Resonance Imaging (MRI)** can detect a failing, or potentially failing, **metal-on-metal hip implant** (MoM) early on, according to a new study, resulting in timely revision surgery and decreasing the risk for further tissue damage and pain. Researchers reviewed the MRI images of 70 patients who ultimately underwent revision surgery for a failed MoM implant. The images were assessed for the presence of tissue damage, swelling and other characteristics. The study found that an MRI is highly sensitive and specific to identifying tissue damage in MoM **total hip replacement** (THR) patients. Early identification of at-risk patients can result in timely revision surgery, when necessary, decreasing pain and future damage to surrounding hip tissue. Lead author disclosure.

On Friday, March 22, the educational session “Optimizing Management of Patients with Metal-on-metal Hips,” will feature seven orthopaedic experts discussing the identification and treatment of MoM hip failure.

In December 2012, the **American Academy of Orthopaedic Surgeons** (AAOS) issued an **Information Statement on Metal-on-metal Hip Arthroplasty** (replacement) recommending a “low threshold” for commencing the evaluation of a patient with an MoM hip replacement, as “early recognition and diagnosis will facilitate the initiation of appropriate treatment prior to significant adverse biological reactions.” The statement also provides a detailed overview of various diagnostic and treatment methods to limit patient discomfort, and outlines when to quickly initiate treatment, and if necessary revision.

**Utilizing Platelet Rich Plasma (PRP) to Treat Tennis Elbow**

**Platelet Rich Plasma Significantly Improves Clinical Outcomes in Patients with Chronic Tennis Elbow**

(Embargo: March 21)

- Eighty-four percent of PRP patients were successfully treated at six months

Eighty-four percent of patients suffering from chronic tennis elbow (**lateral epicondylar tendinopathy**) reported significantly less pain and elbow tenderness at six months following **platelet rich plasma** (PRP) treatment, according to results from the largest, multi-center study, to date, on PRP and tennis elbow. Tennis elbow is a common, painful condition affecting approximately 1 to 2 percent of the population. In this study, 230 patients suffering from chronic tennis elbow who had failed traditional therapies were treated at 12 U.S. medical centers. Patients were randomized and received either an injection of PRP made from their own concentrated blood platelets, or a placebo, administered with an analgesic at the site of pain. At 12 weeks, 55.1 percent of PRP patients reported improved pain scores compared to 47.4
percent in the control group, and 37.4 percent reported less elbow tenderness versus 48.4 percent in the control group. At 24 weeks, 71.5 percent of the PRP patients had improved pain scores compared to 56.1 percent in the control group, and 29 percent reported less elbow tenderness compared to 54 percent in the control group. At six months, 83.9 percent of the PRP-treated group reported significantly less pain and elbow tenderness, compared to 65.9 percent of the active control group. Lead author disclosure.

Assessing the Variation in Spinal Implant Costs at Major Academic Medical Centers

Variations in Costs of Spinal Implants (Embargo: March 21)

• More transparency and doctor-hospital cooperation in implant component purchases could reduce overall spinal implant costs

In this study, researchers obtained and compared the hospital purchasing records from 45 academic medical centers on the unit costs and volume of spinal products – pedicle screws (PS), anterior cervical plates (ACP) and posterior interbody cages – purchased from a total of seven vendors. Among the results:

• PS had a mean cost of $878, with a range of $400 to $1,843 per patient
• ACP, $1,068, with a range of $540 to $2,388
• Cages, $2,975, with a range of $938 to $7,200.

For every additional implant component purchased, the unit price was reduced by $.29, $4.33 and $6.86 for PS, ACP and cages, respectively. A significant relationship exists between a lower unit cost of implants and the purchase of a larger number of components. The authors suggest that greater transparency, as well as a more coordinated implant selection and purchase process, that includes the surgeon, hospital and manufacturer, could reduce the wide variation in component cost, and contribute to overall lower health care expenditures. Lead author disclosure.

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More than one in four Americans have bone or joint health problems, making them the greatest cause of lost work days in the U.S. When orthopaedic surgeons restore mobility and reduce pain, they help people get back to work and to independent, productive lives. Orthopaedic surgeons provide a great value, in both human and economic terms, and access to high-quality orthopaedic care keeps this “Nation in Motion.” To learn more, to read hundreds of patient stories or to submit your own story, visit ANationinMotion.org.

For more information on bone and joint health, visit Orthoinfo.org.