Getting a fix on
YEARS AGO, if you’d cared for someone with a severe fracture, you’d get to know him pretty well. He’d probably spend weeks in traction and you’d frequently assess his skin, provide pin care, and check the traction equipment to ensure proper function. These days, treatments for fractures and other orthopedic problems are designed to keep the patient more mobile and discharge him from the hospital faster. And for you, the nursing care is much less cumbersome. Let’s look at four case studies to see how improvements in care are helping patients with fractures and other orthopedic problems.

**MULTIPLE OPTIONS FOR HIP FRACTURE**

Claire Johnson, 78, maintains her neat, two-story house and exercises twice weekly in a program designed to help older adults minimize bone loss. This morning, she slipped on her church’s rain-slicked steps and fractured her right hip. Recalling that her friend spent 8 painful weeks in traction after a hip fracture, Mrs. Johnson waits apprehensively in the emergency department (ED).

The orthopedic surgeon in the ED diagnoses Mrs. Johnson with a femoral neck fracture. Years ago, a patient with this type of fracture would have been placed in skeletal traction for 8 to 10 weeks while the injury healed. But being bedridden that long would place her at risk for severe muscle atrophy, poor healing, skin breakdown, nutritional deficit, pulmonary compromise, confusion, delirium, and long-term or lifetime disability. Fortunately, surgical treatments have reduced these risks.

**First, skin traction**

Mrs. Johnson’s orthopedic surgeon decides to place her in skin traction (such as Buck’s traction) for 24 to 48 hours and medicates her for pain. Complications of hip fracture, such as nonunion and avascular necrosis of the femoral head, are major risks, so anatomic reduction is necessary before internal fixation. Skin traction limits movement and reduces the fracture to help decrease pain and swelling around the fracture site.

You ensure that the traction works properly and administer muscle relaxants, opioid analgesics, and ice applications as ordered to control Mrs. Johnson’s pain. To make sure she’s stable before proceeding with surgery, the surgeon requests a medical consult.

**Cannulated screw fixation, prosthetic replacement, or traction?**

The orthopedic surgeon has several options to treat Mrs. Johnson’s fracture. For a nondisplaced femoral neck fracture, he may use internal fixation with cannulated screws to hold the bone pieces in place. He may decide to replace the fractured area with a prosthesis.
Complications of hip fracture, such as nonunion and avascular necrosis of the femoral

like the type used for a hip replacement (more about hip replacement later), or he may apply skeletal traction.

Because Mrs. Johnson is in good health and exercises to reduce her risk of osteoporosis, the surgeon feels optimistic that he'll find strong bone when he operates on her. He decides to treat her fractured bone with open reduction/open fixation rather than replace it with a prosthesis.

When Mrs. Johnson returns to her room after surgery, the Buck's traction is gone. Her hip has a bulky dressing and a drain coming from the surgical site. If she had epidural anesthesia, the epidural catheter may remain in place for postoperative pain control. You'll make sure she knows how to administer patient-controlled analgesia (PCA) via the epidural catheter or an intravenous (I.V.) line.

Soon after Mrs. Johnson fully awakens, you give her clear liquids to drink. The next morning, you remove her indwelling urinary catheter and she eats a full breakfast. Later that morning, a physical therapist helps her out of bed and into a chair. He teaches her to use a high-seated chair and commode to prevent dislocating her hip while it's healing.

In the afternoon, the physical therapist helps Mrs. Johnson stand at her bedside and teaches her how to use a walker to stand from a sitting position. A discharge planner discusses rehabilitation options with her and together they determine that a short stay at a rehabilitation hospital will best help her return to normal activities.

On Mrs. Johnson's second postoperative day, the orthopedic surgeon discontinues her PCA and starts her on oral analgesics. She learns how to use her walker, knowing that the side with the fracture should bear only limited weight for at least 6 weeks. On her fourth postoperative day, she's discharged to an inpatient rehabilitation hospital.

Factors that complicate care

Unfortunately, not all hip fractures are as easily treated as Mrs. Johnson's. Although most can be treated with open reduction/open fixation, some types call for significant amounts of internal orthopedic hardware. In a frail patient with evidence of severe osteoporosis, a hip prosthesis may be less risky than applying screws and nails to brittle bones. Using hardware in such a patient could delay healing or cause failure of internal fixation, avascular necrosis, infection, and severe pain.

Although not commonly used, skeletal traction is an option if surgery poses a high risk to the patient or if she has a severe comminuted fracture with a severe dislocation. When you care for someone in skeletal traction, keep in mind the importance of maintaining correct body alignment and monitoring for complications. Provide meticulous care at the screw insertion site and monitor it closely for signs of infection, such as erythema, drainage, warmth, and edema. Infection of the pin tract could lead to osteomyelitis. Monitor the leg's neurovascular status, regularly checking pulses and sensation. Assess the skin for breaks or signs of irritation.

RESPONDING TO AN OPEN FRACTURE

Construction worker David Barnes, 30, fell from a 10-foot-high scaffold. When the emergency medical technicians arrived, they saw that he had an open fracture of his left wrist, and he reported considerable pain in his left ankle. They immediately immobilized and wrapped his wrist with a sterile dressing and applied a short splint to his ankle.

When Mr. Barnes arrives at the ED, X-rays reveal a severe comminuted fracture of his wrist and torn ligaments in his ankle. After he's transferred to your unit, the orthopedic surgeon evaluates his condition and diagnoses Colles' fracture—a fracture through the distal radius epiphysis with radial displacement and dorsal angulation.

The surgeon orders an infusion of lactated Ringer's solution and a stat prophylactic dose of the antibiotic cefazolin. As ordered, you also administer an intramuscular dose of tetanus toxoid and 2 mg of morphine I.V. every hour for pain. When caring for a patient with Colles' fracture, monitor him closely for complications, including:

- **compartment syndrome** from excessive swelling. Uncontrolled, severe worsening pain despite repeated doses of analgesia and immobilization is the first sign. Be alert, too, for tense, shiny skin; sensory deficits; and motor weakness. Absence of a pulse is a very late, dangerous sign. Treatment of compartment syndrome involves keeping the affected limb at heart level, loosening constrictive devices, and possibly fasciotomy to relieve the pressure. (For a comprehensive review of this problem, see “How to Combat 3 Deadly Trauma Complications” in the May issue of Nursing2003.)
- **compression or contusion of the ulnar nerve**, causing numbness, tingling, weakness, and possibly pain in the hand
- **acute carpal tunnel syndrome**, also caused by swelling. The patient may report numbness and tingling in the hand; decreased feeling in the thumb, index finger, and middle finger; or an electric-like shock or tingling sensation if you tap over the median nerve at the wrist.
- **injury of the flexor tendons** by bony fragments.
Bending the finger may be painful or impossible, or you may note mild edema near the fingertip.

**External fixation for stability**
The orthopedic surgeon decides to use external fixation to repair Mr. Barnes’ fracture. In the operating room, he percutaneously places metal pins into the bone fragments. Held in place by an external metal frame and wires, the pins prevent bone movement.

External rigid fixation lets fractures heal by primary bone union. The device provides easy access to the wound for assessment and, because it’s portable, it lets the patient move around soon after surgery. If Mr. Barnes had sustained his injury years ago, he’d have been confined to long-term traction and undergone multiple surgeries.

The orthopedic surgeon debrides Mr. Barnes’ open arm wound after application of external fixation and applies a sterile dressing. He orders I.V. antibiotics for 3 days. You monitor the neurovascular status of the arm distal to the fracture and perform pin care. (See [Caring for an External Fixator Device](#).)

To treat the torn ligaments in Mr. Barnes’ ankle, the surgeon prescribes a partial weight-bearing air cast splint and ice applications. Because he’ll have the external fixation device in place for about 6 weeks, you teach him wound care and how to care for the device at home. Tell him to notify the surgeon if he experiences signs and symptoms of infection, such as increased pain, drainage from the pin sites, or fever.

Mr. Barnes is discharged on the fourth postoperative day with appointments for weekly X-rays to check healing and to have the external fixator adjusted as needed. After the device is removed, he’ll have a short course of physical therapy to strengthen the weakened muscles. He may have a cast or splint applied to the area for support.

**REPAIRING THE RAVAGES OF OSTEOARTHRITIS**
Suffering from painful osteoarthritis for years, retired teacher Jack Marshall, 66, has used conservative treatment to help maintain an active lifestyle. Following his primary care provider's advice, he's used mild exercise followed by frequent rest periods to maintain range of motion and thermal therapy to reduce pain and stiffness. His drug regimen consists of 200 mg daily of the nonsteroidal anti-inflammatory drug (NSAID) celecoxib (Celebrex). Celecoxib and rofecoxib (Vioxx) are newer cyclooxygenase-2 (COX-2) inhibitors that provide greater pain control with a lower risk of certain adverse reactions, such as gastrointestinal bleeding.

Unfortunately, for the past year severe pain in his left hip has kept Mr. Marshall from enjoying his usual activities. He and his primary care provider agree that it's time for a total hip replacement (also known as total hip arthroplasty).

Two decades ago, Mr. Marshall would have been admitted to the hospital and undergone surgery 1 to 2 days later. The orthopedic surgeon would have replaced his hip with a steel ball device and heavy cement. Mr. Marshall would have remained on bed rest for 3 days postoperatively, with a bulky dressing covering the surgical site. For 7 days after surgery, he'd have had an indwelling urinary catheter in place and received I.V. antibiotics.

If you'd cared for Mr. Marshall back then, you'd have monitored his hemoglobin and hematocrit levels for excessive blood loss and you may have had to administer several units of packed red blood cells. After 2 weeks in the hospital, he'd have been discharged to a rehabilitation facility for several more weeks. After all this, he could expect his hip replacement to last only about 10 years—less if he led a rigorous lifestyle.

**Improvements even before admission**
Today, the picture for Mr. Marshall is far brighter, beginning with the preoperative process. When he visits the orthopedic surgeon's office to discuss the details of total hip replacement, the orthopedic nurse sched-
One thing that hasn’t changed about orthopedic surgery is that deep vein thrombosis (DVT) and pulmonary embolism (PE) and improved pain control. The advent of aggressive bedside physical therapy has decreased the risk of complications such as deep vein thrombosis (DVT) and pulmonary embolism (PE) and improved mobility of the new joint. This approach also lessens the time the patient needs to spend in rehabilitation after discharge.

• **improved pain control.** During surgery, Mr. Marshall may have an epidural catheter placed for pain control or he may have a PCA pump afterward. Optimal pain control postoperatively is essential because you’ll get him out of bed the day after surgery and he’ll start aggressive physical therapy. The orthopedic surgeon will probably discontinue the epidural analgesia or PCA the day after surgery and start him on a combination of oral opioids and NSAIDs.

• **aggressive bedside physical therapy.** The advent of aggressive bedside physical therapy has decreased the risk of complications such as deep vein thrombosis (DVT) and pulmonary embolism (PE) and improved mobility of the new joint. This approach also lessens the time the patient needs to spend in rehabilitation after discharge.

• **better DVT/PE prophylaxis.** One thing that hasn’t changed about orthopedic surgery is that DVT remains a potentially life-threatening complication. However, along with early ambulation, combination therapy with an intermittent pneumatic compression device and anticoagulants significantly reduces the risk. The options for anticoagulants include adjusted-dose unfractionated heparin, low-molecular-weight heparin, and warfarin.

The American College of Chest Physicians recommends prophylactic anticoagulant therapy for 7 to 10 days after hip replacement surgery. The orthopedic surgeon starts Mr. Marshall on concurrent low-molecular-weight heparin and warfarin. Once his international normalized ratio reaches a therapeutic level (2 to 3), he discontinues the low-molecular-weight heparin.

• **alternatives to maintain adequate hemoglobin and hematocrit levels.** Hip replacement surgery often causes significant blood loss, but today the patient has several options other than receiving banked blood donated by volunteers, such as autologous blood transfusion. Mr. Marshall donated and banked two units of his own blood before surgery to avoid the risk of a transfusion reaction from donor blood. The orthopedic surgeon could also use an autotransfusion device during surgery to collect the patient’s blood from the operative site and reinfuse it.

• **more options for rehabilitation after discharge.** Mr. Marshall may choose to have inpatient or outpatient rehabilitation or home physical therapy. He’ll probably spend less time in rehabilitation than he would have 2 decades ago because of better prosthetic materials and surgical techniques and a more aggressive approach to physical therapy immediately after surgery.

### SPORTS MEDICINE IMPROVES OUTCOMES

At age 17, varsity tennis player Mandy Walsh has a promising athletic future. During practice last week, she twisted her right knee and felt a sharp, tearing pain. Unfortunately, magnetic resonance imaging revealed a torn anterior cruciate ligament (ACL). Now Mandy wonders about her future as a competitive tennis player.

Ten years ago, an ACL injury might have ended Mandy’s sports career and required years of painful rehabilitation. But advances in orthopedic sports medicine have improved the outlook for injured professional athletes as well as “weekend warriors.”

#### Arthroscopy and aggressive physical therapy

Using arthroscopy and aggressive outpatient physical therapy, orthopedic surgeons have made tremendous strides in rehabilitating athletes. Arthroscopic surgery is commonly used to treat shoulder, elbow, knee, and ankle injuries. And physical therapists have adopted techniques used by athletic trainers to design programs to quickly return athletes to their sport.

Following the diagnosis of an ACL tear in her right knee, Mandy is referred to an orthopedic sports medicine specialist. Realizing the importance of tennis to Mandy’s future, he decides to treat her aggressively with outpatient arthroscopic surgery followed by rehabilitation with a physical therapist who specializes in...
remains a potentially life-threatening complication.

athletic rehabilitation.

Mandy's surgery takes less than 2 hours and leaves little scarring. When she awakens in the postanesthesia care unit, she finds a bulky dressing applied to her knee. Her leg is encased in a special brace that’ll let her return to motion by degrees. After she recovers in the short-procedure unit, she’s discharged home. Her postoperative pain management consists of a combination of oral opioids and NSAIDs.

Mandy’s wound dressing is removed the next day and she starts outpatient physical therapy. Initially, she does exercises to strengthen her quadriceps and calf muscles, which help support the reconstructed ligament. At home, she may use a continuous passive range-of-motion machine to continue her strengthening exercises. By preventing muscle atrophy, these exercises will help her return to tennis as quickly as possible.

Mandy may wear a knee brace and will continue an intensive physical therapy regimen for 3 to 6 months before she can return to playing tennis. Until that time, she’ll continue working with the physical therapist and sports medicine specialist to strengthen and protect her knee.

Shorter stays, faster recovery

The four patients presented here had diverse problems, but each benefited from recent advances in orthopedic medicine. Thanks to improvements in pain management, technology, and surgical techniques, each one experienced a shorter hospital stay and faster recovery than patients with the same problems treated 20 years ago.

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Getting a fix on orthopedic care

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