AO Foundation (ASIF) – “Arbeitsgemeinschaft fur Osteosynthesfragen”, or “AO” is the German word/abbreviation for “Association for the Study of Internal Fixation”. AO is the association founded in Switzerland in 1958 to study and promote the use of internal fracture fixation. The four AO principles of fracture fixation are 1) anatomical reduction of the fractured bone fragments, 2) fixation with absolute or relative stability, 3) preservation of blood supply to soft tissues and bone, and 4) early and safe mobilization of the injured part and the patient as a whole.

Allograft – Human tissue, such as bone or tendon, from a cadaver that is used to surgically repair or replace damaged tissue in a patient.

Anteroposterior (AP) View – Anterior-posterior view in which the x-ray tube is in front and the film cassette is in back. The x-ray beam passes from front to back.

Arthrodesis – The surgical fusion of a joint. The procedure removes any remaining articular cartilage and positions the adjacent bones to promote bone growth across a joint. A successful fusion eliminates the joint and stops motion. The usual purpose is pain relief or stabilization of an undependable joint.

Arthroplasty – A procedure to replace or mobilize a joint, typically performed by removing damaged, arthritic surfaces and replacing them with an implant. A total joint arthroplasty involves replacement of both sides of a joint. A hemiarthroplasty involves replacement of only one side of a joint.

Arthroscopy – A form of minimally invasive surgery in which a fiberoptic camera, the arthroscope, is introduced into an area of the body through a small incision.

Articular Cartilage – A smooth, glistening surface that covers the ends of bones that articulate with each other to form a joint.

Autograft – Biologics tissue from the patient’s own body that is used to surgically replace damaged tissue.

Avascular Necrosis – A condition in which cells die as a result of inadequate blood supply (osteonecrosis when referring to bone).

Avulsion Fracture – A fracture located where a tendon or ligament attaches to the bone. The tendon or ligament pulls off a piece of the bone.

Biomechanics – The study of external and internal forces applied to the body and their relationship to stability and motion.

Bone Morphogenetic Proteins (BMPs) – Proteins that stimulate bone growth.

Callus (Bone) – Bone developed after a fracture; initially formed from a hematoma at the bleeding edges of bone, it eventually forms a cartilage mass that is remodeled into mature bone.

Cartilage – A cellular tissue that, in the adult, is specific to joints, but in children forms a template for bone formation and growth. Hyaline cartilage is a low-friction cellular tissue that coats joint surfaces. Fibrocartilage is tough with high collagen content, such as found in the meniscus of the knee, or the anulus fibrosus portion of the intervertebral disk.
**Chondrocyte** – Cartilage cells.

**Collagen** – The main structural protein in the extracellular space in various connective tissues of the body.

**Comminuted Fracture** – A fracture with more than two fragments.

**Compound Fracture** – Any fracture in which the overlying skin has been penetrated.

**Fusion (Arthrodesis)** – The joining of two bones into a single unit, thereby eliminating motion between the two. May be congenital, traumatic, or surgical.

**Greenstick Fracture** – A fracture that disrupts only one side of the bone. This fracture pattern is seen in children because of the greater plasticity of their bones.

**Growth Factors** – Proteins that are produced and released by one cell, and then act on the same cell, adjacent cells, or remote cells to influence growth and division.

**Hardware** – A generic term that encompasses all metallic implants. By extension, it also includes nonmetallic materials associated with metallic components such as polyethylene components of joint prostheses. See implants.

**Implants (Prosthesis)** – Any surgically placed, non-biological material whose purpose is to promote healing of tissues or serve as a replacement of structures such as joints.

**Internal Fixation** – Surgical insertion of a device that stops motion across a fracture or joint to encourage bony healing or fusion.

**Intramedullary Nailing or Rodding (IM Nail / Rod)** – A procedure for the fixation of fractures in which a nail or rod is inserted into the intramedullary canal of the bone from one of its two ends.

**Joint Capsule** – A collagenous structure that surrounds a joint like a sleeve. The capsule allows motion of joints and protects the articular cartilage. The capsule, along with ligaments, tendons, and bony structure, provides stability of the joint.

**Joint** – The junction between the ends of two adjacent bones that allows for movement.

**Lateral View** – A view that passes from side to side at 90° to an AP view.

**Malunion** – Healing of a fracture in an unacceptable position.

**Nitinol** – An alloy of nickel and titanium with unique properties including shape memory and superelasticity, commonly used to manufacture bone staples and hammertoe implants.

**Nonunion** – Failure of healing of a fracture or osteotomy. With continued motion through a nonunion, the bone will form a false joint (pseudarthrosis).

**Open Reduction** – An open surgical procedure in which normal or near-normal relationships are restored to a fractured bone or dislocated joint.
**Open Reduction Internal Fixation (ORIF)** – A procedure that involves incising the skin and soft tissue to repair a fracture under direct visualization. See separate definitions for open reduction, and internal fixation.

**Osteoarthritis (OA)** – A deterioration of the weightbearing surface distinguished by destruction of the hyaline cartilage and narrowing at the joint space.

**Osteoblasts** – Cells that form new bone.

**Osteoclasts** – Cells that absorb bone tissue during growth and healing.

**Osteocytes** – The cells of established bone.

**Osteolysis** – Dissolution of bone, particularly as resulting from excessive resorption.

**Osteomyelitis** – Infection of bone.

**Osteonecrosis** – The death of bone, often as a result of obstruction of its blood supply.

**Osteopenia** – Bone fragility as the result of a low-calcium diet.

**Osteophytes (Bone Spur)** – Overgrowth of bone common in osteoarthritis.

**Osteoporosis** – Deterioration of bone tissue resulting in an increased risk of fracture as the result of a low-calcium diet.

**Osteotomy** – Literally, cutting a bone. Used to describe surgical procedures in which bone is cut and realigned.

**Osteoconductive** – Refers to a physical scaffold or structure that facilitates the formation of bone structure. Commonly used to describe the properties of various types of bone grafts and bone graft substitutes. Examples include cancellous bone (allograft or autograft), hydroxyapatite, collagen, and calcium phosphate.

**Osteoinductive** – Refers to a substance that stimulates bone formation by inducing stem cells to differentiate into mature bone cells. For example, growth factors like bone morphogenetic proteins (BMPs).

**Osteogenic** – Refers to cells that form new bone. Mesenchymal stem cells (MSCs) can turn into osteoblasts (cells that form new bone).

**Osteogenesis** – The formation of new bone.

**PEEK** – Polyetheretherketone (PEEK) is an extremely strong, biocompatible plastic material used for various implants, predominately in spine.

**Press Fit** – A method for implanting orthopedic devices. For a press fit, a device is inserted without cement or hardware fixation, like screws. The geometry of adjacent structures holds the device in place. For example, the acetabular cup and femoral stem components of some total hip replacement systems are press fit.
Ream (Reaming) – Usually refers to the process of enlarging a cavity so that a prosthesis can be inserted. Reaming most commonly is performed in the femur for insertion of a femoral nail. However, with respect to foot and ankle surgery, reaming may refer to the preparation and reshaping of the metatarsal head and base of the proximal phalanx into congruent surfaces prior to metatarsophalangeal (MTP) joint arthrodesis.

Reduction – The realignment of fracture fragments to restore normal anatomy of the bone.

Self-Tapping – The feature of a screw that cuts its own threads in bone as it is screwed into place. Non self-tapping screws require the surgeon to use an instrument called a tap, which is inserted clockwise into bone to cut the threads for the screw. Self-tapping screws decrease the number of steps and time required to implant a screw.

Stem Cells – Cells with the unlimited ability of self-renewal and regeneration, which serve to regenerate tissue.

Mesenchymal Stem Cells (MSCs) – MSCs are adult stem cells found in bone marrow. MSCs are multipotent, meaning they can produce more than one type of specialized cell in the body, but not all. MSCs can differentiate into cartilage cells (chondrocytes), bone cells (osteoblasts), or fat cells (adipocytes).

Stress Riser – Places where stress lines from applied forces concentrate within a structure. Breakage is most likely to occur at these places.

Tap (Tapping) – An instrument used to create threads in a hole drilled in bone for a screw. See self-tapping screw.

Ultrahigh Molecular Weight Polyethylene (UHMWPE) – A type of highly durable polyethylene used for replacement of joint surfaces or as entire components in prosthetic joints.