Health problem addressed

They are used by physicians to facilitate the diagnosis and/or treatment of a wide variety of joint diseases and injuries (e.g., synovitis, arthritis, ligament/tendon/cartilage tears).

Product description

Arthroscopes are telescopic devices that enable visualization and therapeutic treatment of the interior of a joint (e.g., knee, shoulder, wrist, elbow, hip, ankle). An arthroscope consists of a magnifying-lens system sealed within a rigid tube and is available in two basic optical designs: rod-lens system (long, rod-like lenses separated by small spaces) and single-image fiber system (narrower in diameter and containing one image-transmitting fiber bundle). In both designs, the lens system is surrounded by optical fibers that transmit light to the interior of the joint from a distant source. Accessory equipment includes irrigation/distention systems, fiberoptic light sources, camera systems, laser, and electrosurgical and shaver accessories. Diagnostic and operating arthroscopes function similarly.

Principles of operation

Once the arthroscope is inserted, the lens system magnifies the inside of the joint by gathering light and focusing that light to form a real image. Surrounding optical fibers transmit light to the far end of the scope to aid visibility. The field of view is proportional to an arthroscope’s diameter and a variety of diameters are offered by manufacturers. An instrument channel can allow tools to be passed down the optical line of the arthroscope.

Operating steps

- The patient is prepped and given an anesthetic (local or general).
- A small incision is made and the arthroscope is inserted.
- An insufflator is used to enlarge the working space, providing room to insert instruments and for increased visibility.
- The arthroscopist can view the inside of the joint directly through the scope or attach a camera to its end.
- If additional instruments or illumination are needed, accessory incisions may be made.

Reported problems

Arthroscopic surgery entails a risk of infection or introduction of foreign particles. Major contraindications to arthroscopy include sepsis (generalized infection), blood-clotting disorders, and restricted joint motion. Hemarthrosis (blood entering the joint or its synovial cavity) is a complication that can be treated by aspirating the blood from the joint. Other complications include breakage of surgical instruments inside the joint, lethal air embolism, and reflex sympathetic dystrophy.

Use and maintenance

User(s): Orthopedic surgeon
Maintenance: Medical staff, manufacturer/servicer, biomedical engineering staff, technicians
Training: Initial training by manufacturer and manuals

Environment of use

Settings of use: Hospital operating room, outpatient surgical suite
Requirements: Anesthetics, line power, surgical or procedure table; camera system optional

Product specifications

Approx. dimensions (mm): 90-185 length; 11-4 diameter
Approx. weight (kg): 0.45
Consumables: NA
Price range (USD): 500-7,500 (1,500-5,000 typical for diagnostic arthroscope); 3,000-6,000 typical for diagnostic/operating arthroscope
Typical product life time: 10 years
Shelf life (consumables): NA

Types and variations

- Diagnostic arthroscope
- Diagnostic/operating arthroscope