UNDERSTANDING ORTHOPEDIC INSTRUMENTS

AND HOW TO CARE FOR THEM

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- MDRD certificate and member of MDRAO
- Surgical Program Business Analyst

Disclosure

All information provided within this presentation is based on my personal knowledge and experience. It does not necessarily follow the manufacturer's instructions from DePuySynthes or any other manufacturer on its products. This presentation is meant to provide general information regarding orthopedic instrumentation and the care / handling of this equipment.

Please always follow your hospital's policies and procedures and vendor / manufacture's instructions.

Table of Content

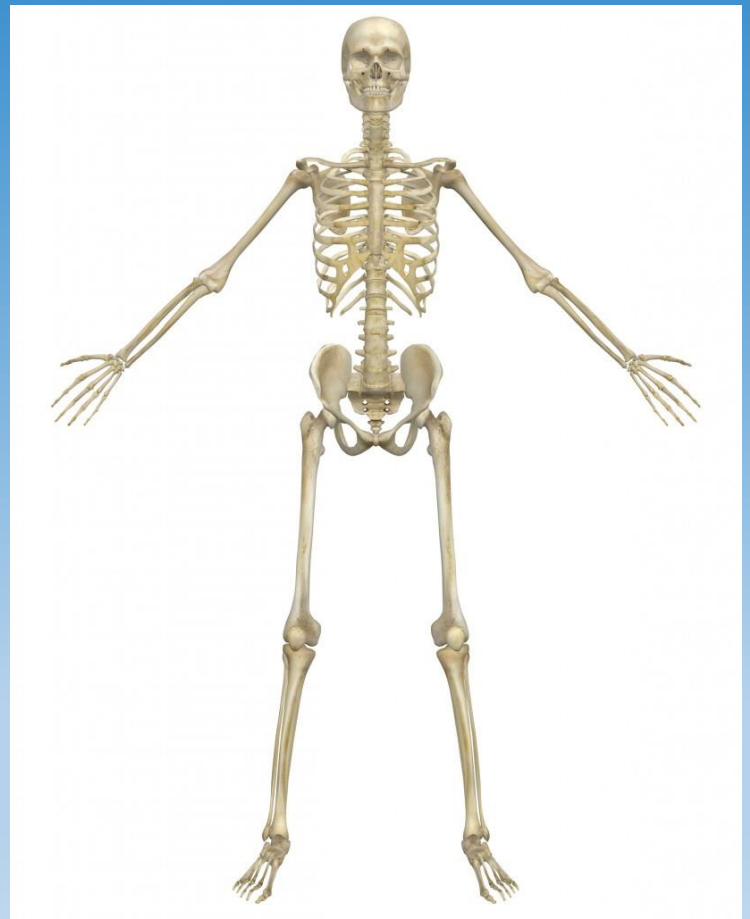
GENERAL OVERVIEW

What is orthopedics

- Is the care of the musculoskeletal system

<u>Includes</u>

1. Reconstruction
2. Trauma
3. Sports Medicine
4. Spinal
5. General Orthopedics



RECONSTRUCTION

- Surgical replacement / repair of joints

<u>Examples</u>

1. Total Knee Arthroplasty
2. Total Hip Arthroplasty
3. Total Shoulder Arthroplasty
4. Revision Arthroplasty

TRAUMA

- Surgical repair of fractures or acute soft tissue damage

<u>Examples</u>

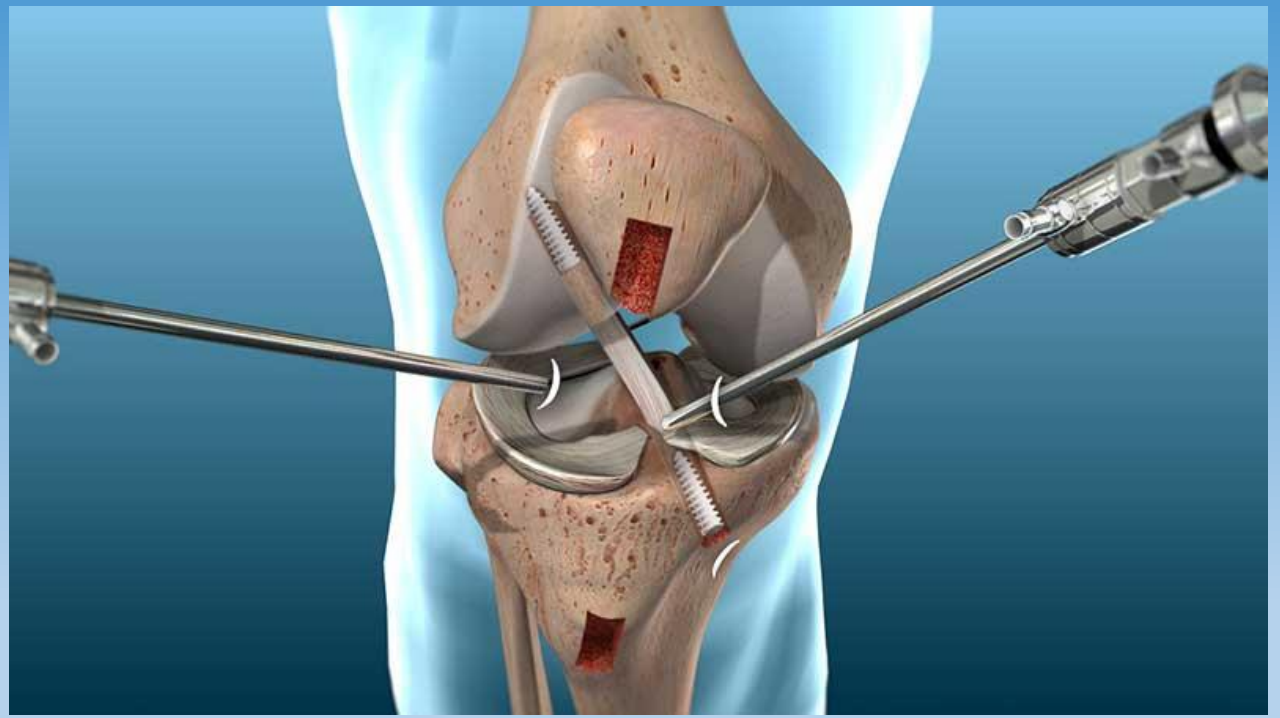
1. ORIF of a fracture
2. IM nailing
3. Repair of an acute muscle rupture
4. Release of a muscle compartment

SPORTS MEDICINE

- Surgical repair of soft tissue related to sports injuries

<u>Examples</u>

1. ACL repairs
2. Joint arthroscopies
3. Shoulder repairs

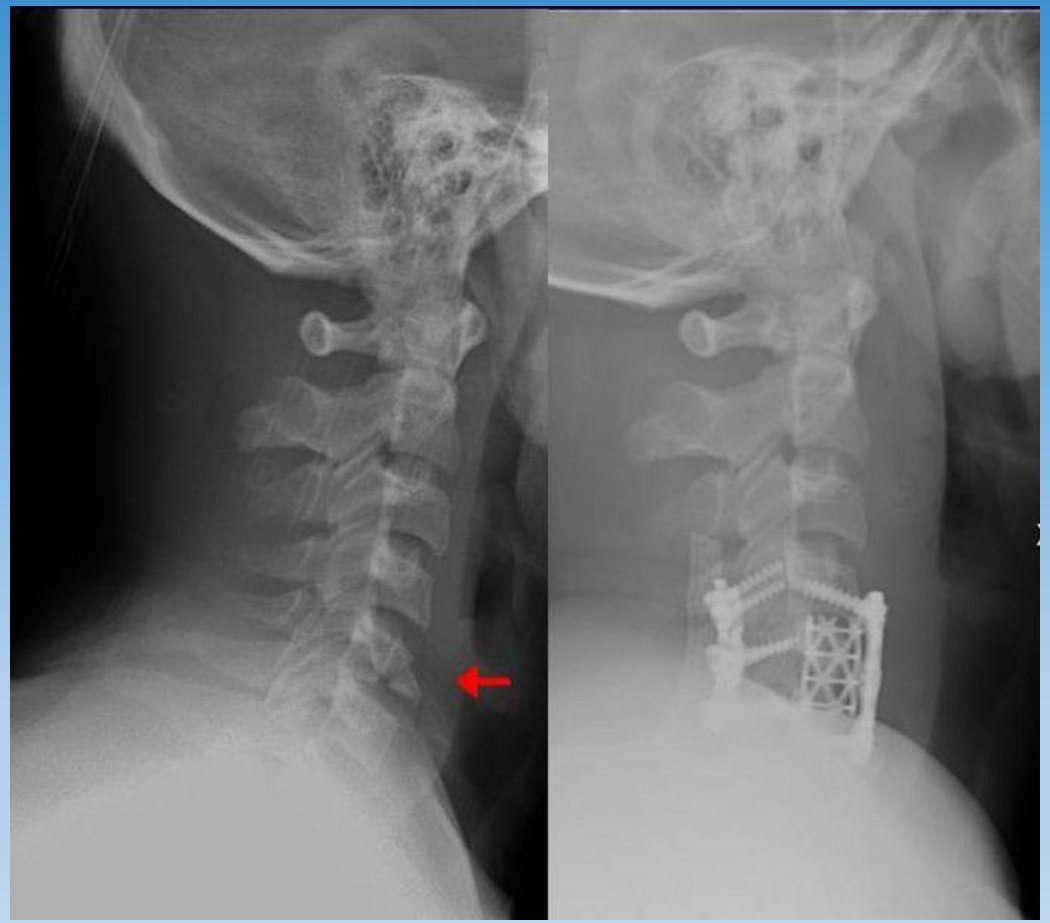


SPINAL

- Surgical care of the spinal column
- Requires segregated instrumentation (prions)

<u>Examples</u>

1. Laminectomies
2. Spinal fusions
3. Decompressions



GENERAL ORTHOPEDICS

- Surgery not covered in the above categories

Example

1. Excision of a ganglion
2. Wound debridement
3. Closed reduction and application of a cast

RECON EQUIPMENT

TOTAL HIP ARTHROPLASTY

https://www.youtube.com/channel/UCOlTVSk9821nfC4bPUITaSA

TOTAL KNEE ARTHROPLASTY

https://www.youtube.com/watch?v=HogLNX5hnzk&t=0s&index=2&list=PL9Jbt1PLPL526MT4ODlbDBnp_TjAPiizI

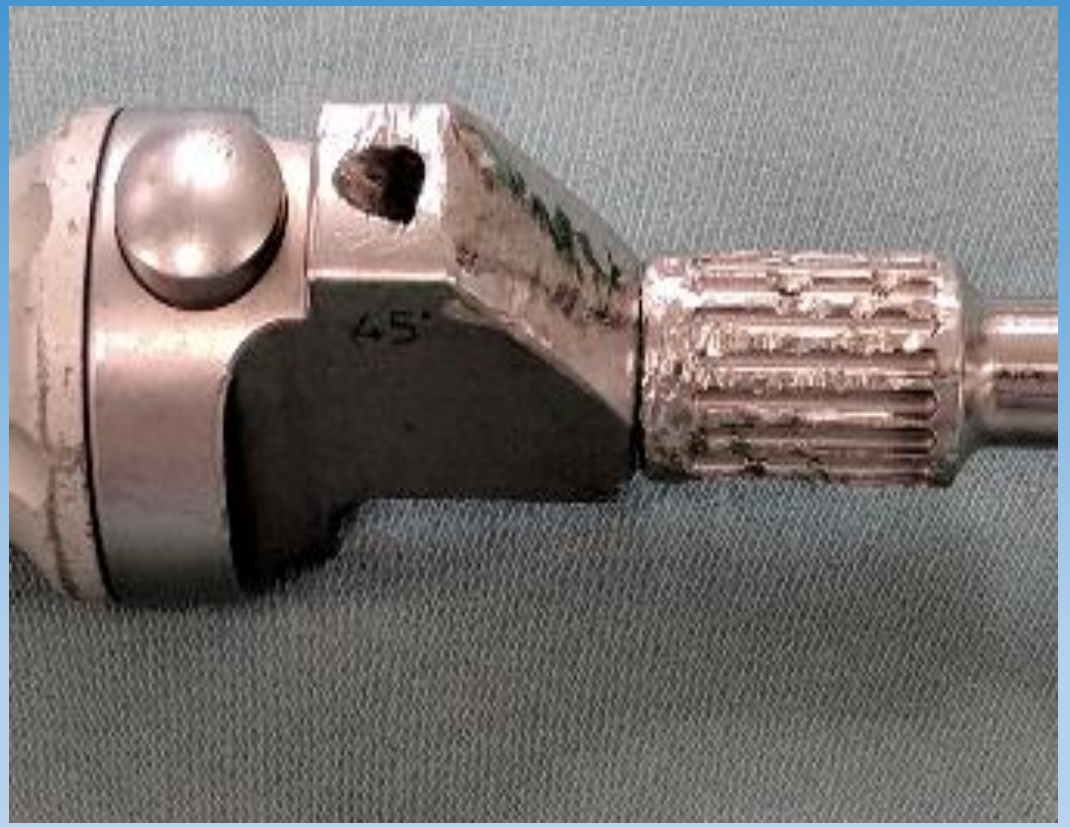
RECON INSTRUMENTATION

- Can be very complex instrument sets
- Consists of many individually specialized trays that form a complete system
- Contains specialized equipment essential to case completion
- Some instruments require disassembly and reassembly
- Trays can be single layer or multi layered
- Individual trays can be heavy
- Some trays may contain implants (example: pins or screws)

IMPACTION INSTRUMENTS

- Used to deliver precise strikes
- Can be one piece or multiple pieces
- These instruments take a lot of abuse and are prone to dent, warp or break

DAMAGE FROM MALLET STRIKES



DRILL BITS AND REAMERS

- Come in many different styles, lengths and diameters
- Some are single use and some are reusable
- Need to be inspected regularly for damage and to ensure sharpness

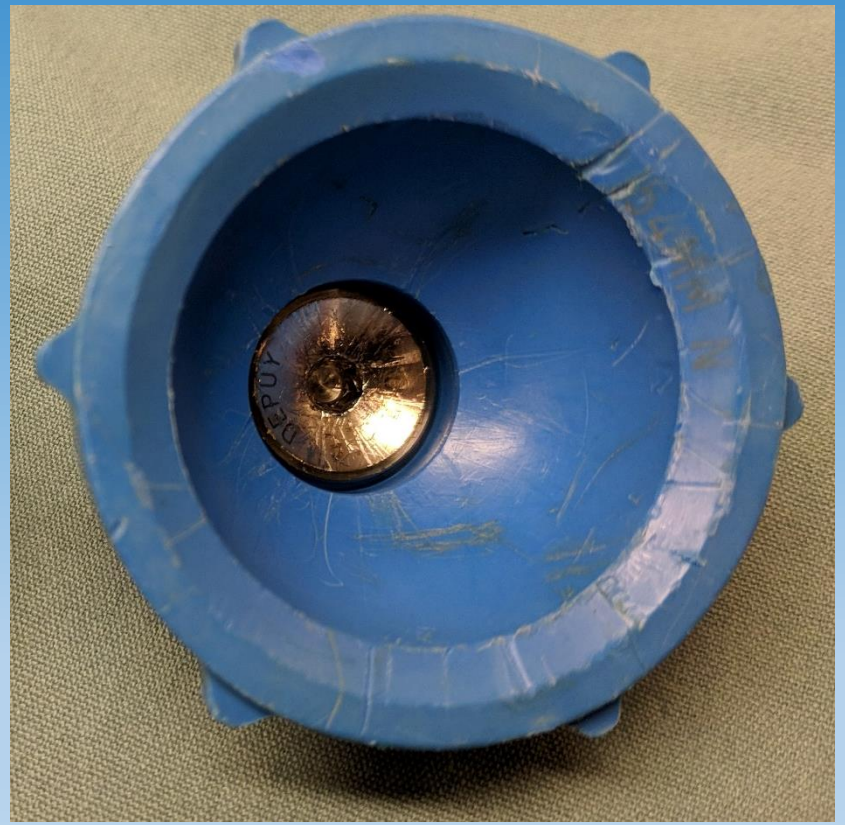
DIFFICULT DRILL BIT TO CLEAN

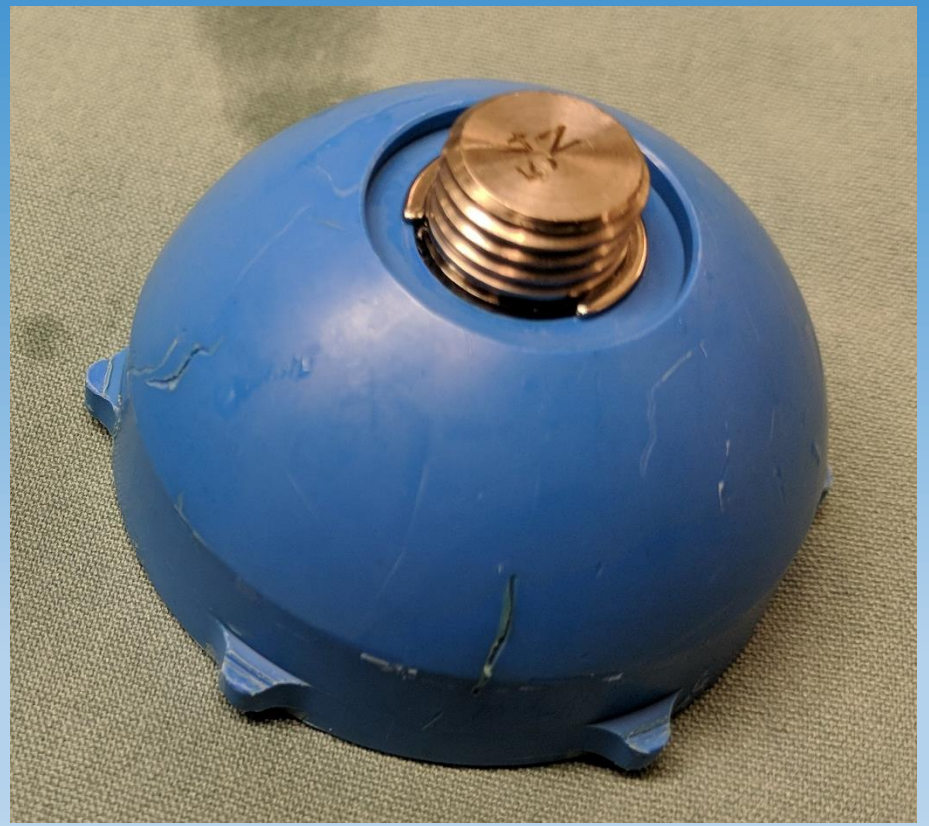
- Flexible drill bit can be particularly difficult to clean
- Blood and tissue debris can get into the tight flexible spring
- Ultrasonic baths can help
- When unable to remove all blood and tissue, remove the device from service and talk to your manager and/or local representative

Plastics

- Colourful and lightweight
- Need to be inspected for cracks and scratches as debris can enter those areas
- If damage is found, remove the device from service and talk to your manager and/or local representative for guidance

DAMAGED PLASTICS





BONE CEMENT

What and Where???

- Used in Recon Surgery to fix implants in place
- Consists of a polymethylmethacrylate
- Can be found on impaction instruments or any others used during the cementing process.
- Can be difficult to see when wet or on white instruments

KEYS TO REMOVING CEMENT

- All starts in the OR with the scrub nurse
- Close and thorough inspection of instruments used in the cementing process
- Can be removed using hard metal objects to “chip” off
- Metal wire brushes on metal components only

COMMON CEMENT LOCATIONS

TRAUMA EQUIPMENT

TRAUMA SETS

- Highly specialized trays used to fix bones in very specific ways
- Some sets are stand alone and some are companion sets
- Many sets contain implants that need to be restocked after every use.
- Some sets require separate sterile implants (example: IM Nail)
- Never substitute instruments (example: depth gauge)
- Instruments and implants of differing companies should not be mixed

SCREW BASICS

EXTERNAL FIXATORS

- Used in trauma cases where the bone cannot be immediately fixed (example: swelling or lack of proper equipment)
- Can be used with large bones or small bones
- Can be used to immobilize joints
- Can be used in cases where there is a void in the bone

IM NAILS

ADVANTAGES

- Fast, easier repair for straight forward fractures
- Creates a strong and sturdy repair
- Minimally invasive
- Minimal discomfort post op, no plate to feel

DISADVANTAGES

- Limited ability to compress
- Creates a weak point for future fractures
- Cannot use in presence of certain joint replacements
- Not as versatile as a plate repair for complex fractures

TFN & HUMERAL NAIL

FEMORAL & TIBIAL NAIL

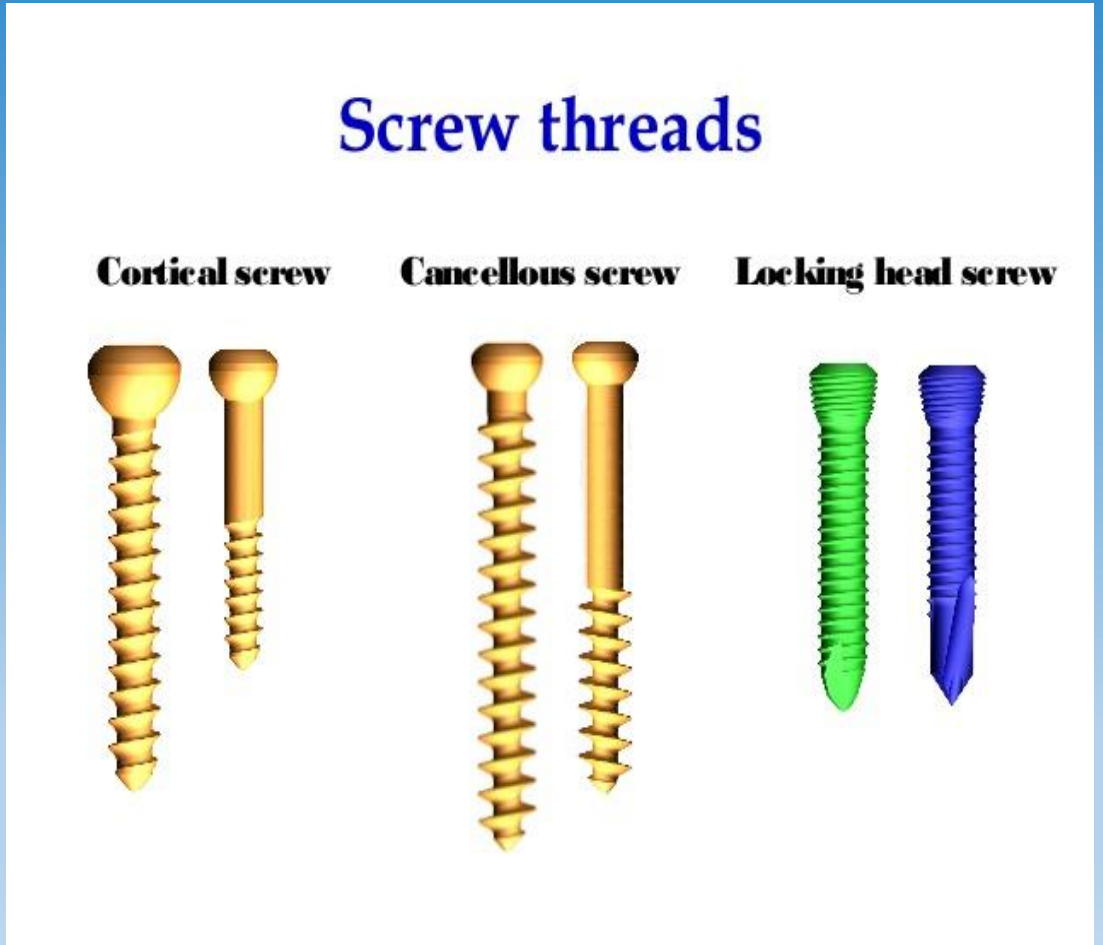
CABLES/CERCLAGE WIRES

- Used in cases where standard screws are not an option (example: periprosthetic fractures)
- Cerclage wires are strand of metal wire that are manually twisted down
- Cables are braided wires that tightened down to a specific PSI and then crimped down to hold

CORRECT REPLENISHMENT

IMPORTANCE OF REPLENISHMENT

- Many sets contain implants
- Those implants are vital to the surgical procedure
- Care must be taken to place the proper implants in the proper sets
- Implants are not interchangeable
- No substitutions
- Cannot mix metals!



POWER EQUIPMENT

SPECIAL CONSIDERATIONS

- All power equipment is different and requires special care
- Very fragile and expensive
- Limited life span (5 year average)
- Proper care and maintenance ensures longer lifespan
- Power sources vary (plug in electric, battery, nitrogen gas)
- Many moving parts and components

DRILL/REAMER ATTACHMENTS

DRILL

- Higher RPM, Lower Torque
- Used heavily in trauma cases to create holes (example: drill bone for screws)

REAMER

- Lower RPM, Higher Torque
- Used in Reconstruction surgery to widen canals and openings (example: reaming femoral canal for THA stem)

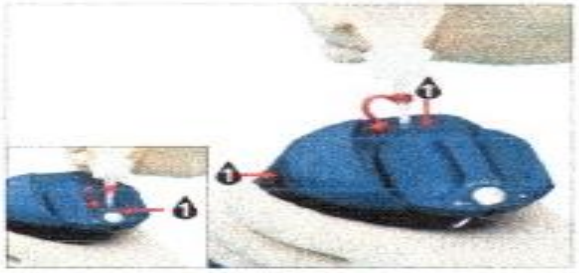
BATTERIES

- Two common types: Nickle Cadmium & Lithium Ion
- Transferred into the drill/saw via no touch sterile transfer
- Some batteries can be autoclaved
- Some batteries contain all the electronics and motor (Power Module)

Lubrication

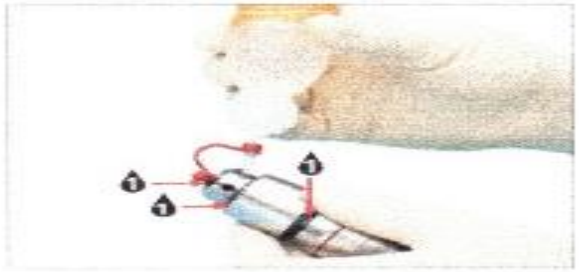
Battery Casings and Lids

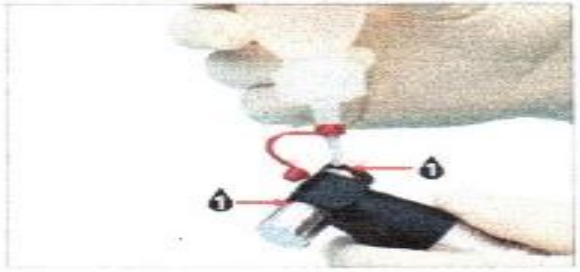
Do not lubricate power module (05.001.202).



Attachments

Do not lubricate the Radiolucent Drive (511.30).





IMPORTANCE OF INSPECTION

Why is inspection so important?

- High precision surgery
- Complex instrumentation
- Instruments are put under great deal of stress
- High risk of damage to instrumentation
- Many types of contamination

BROACHES AND RASPS

IMPACTION INSTRUMENTS

ACETABULAR GRATER

GRATER HANDLE ASSEMBLY

CUTTING BLOCK

FEMORAL IMPACTOR

SHARPS

Types of Sharps

- K-wires
- Hypodermic needles
- Drill bits
- Awls
- Pins
- Blades
- Burrs
- Spiked instruments

SHARPS

DISPOSABLE VS REUSABLE

DISPOSABLE INSTRUMENTS

- Some companies have single use instruments associated with their trauma sets. (example: drill bits)
- These instruments have been approved by Health Canada for single use only and must not be reused. They are manufactured to only be used once.
- Some exceptions can be made but these items must go to an approved 3rd party reprocessor. Speak to your local trauma company representative to see if this is an option.

SYMBOL FOR SINGLE USE ITEMS

WHEN TO THROW OUT AN IMPLANT

DISPOSE OF IT

- Screw has threaded into bone
- Plate was screwed to the bone
- Plate was bent or reshaped
- K-Wire has been drilled into a bone or bent

REPROCESS IT

- Implant has blood on it
- Implant fell on the floor
- Plate was placed on the bone, but no screw was used
- K-Wire used as a “pusher”

QUESTIONS???