Operative NanoNeedle Scope Surgery Using Local Anesthesia

Developed with Brian B. Gilmer, MD

Arthrex®

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Preoperative Instructions

NPO in case anesthesia is needed.

Equipment

- Standard OR draping
- Pump tubing
- 1 L NS bag for standard cannula

Medications

Preprocedure

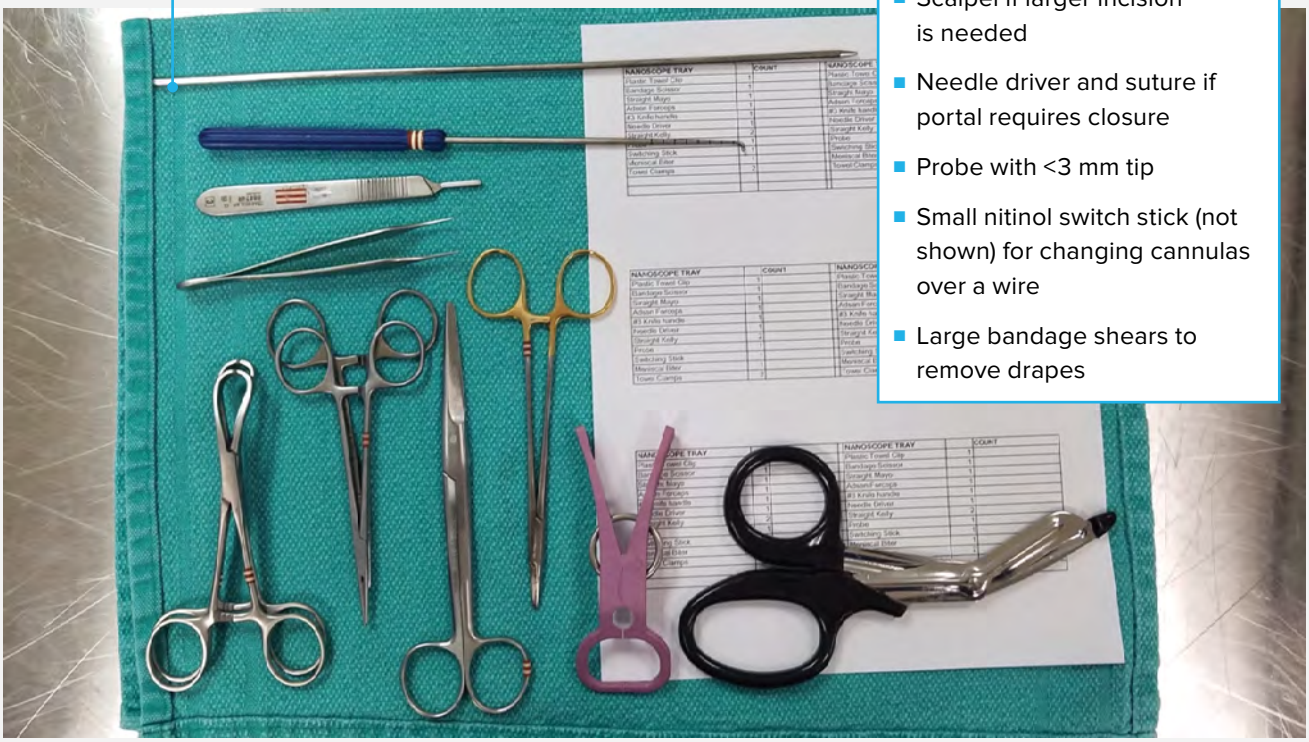
- No medications are required
- Optional for anxiety: 2 mg PO diazepam 30 minutes prior; may repeat 1×

Postprocedure

- OTC Tylenol® 650 mg PO q 6 hours PRN pain
- OTC anti-inflammatory (eg, ibuprofen) as instructed per package insert

Tylenol is a trademark of Johnson & Johnson Consumer Inc.

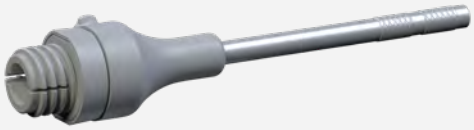
1. Setup of Mini Nano Tray



- Towel clips for draping; avoids adhesive on patient skin
- Scalpel if larger incision is needed
- Needle driver and suture if portal requires closure
- Probe with <3 mm tip
- Small nitinol switch stick (not shown) for changing cannulas over a wire
- Large bandage shears to remove drapes

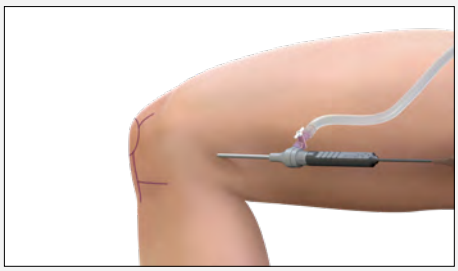
Steps

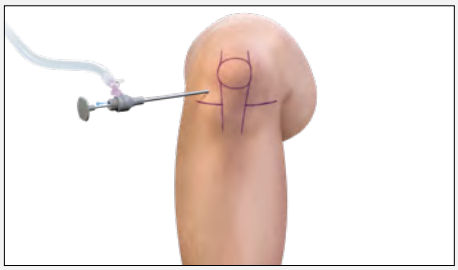
1. Patient comes to OR with nursing staff
2. Nano console is linked to overhead monitors with connector
3. Nano sterile instruments are available as needed
4. Confirm site and side
5. Hang single blue ¾ sheet drape between patient and surgeon
6. Prep portal sites with ChloraPrep™ stick
7. Place knee in position
   a. 90° on the bed; sit on patient's foot to maintain position
8. Mark patellar tendon or portal sites
   a. 2 cm below the inferior pole of the patella
   b. 1 cm from tendon borders for notch and condyle
   c. 2 cm from tendon borders for meniscus
9. 25 gauge or 28 gauge needle is used to inject 1 mL into the skin
10. 22 gauge needle is used to inject through a fat pad in a line toward the anticipated area of pathology; inject the remaining 8 mL; make a wheel along the joint line on both sides



NanoNeedle portal locations with cannula insertion for foot and ankle procedures

11. Surgeon goes to scrub
12. Circulator performs standard prep
13. Surgeon and scrub tech place:
    a. Sterile towel and secure with clips
    b. Sterile extremity drape
14. Staff prepares the tablet while local anesthetic sets in
    a. Connect tablet
    b. Input relevant information
    c. Calibrate
    d. Confirm the function of the camera
15. Lower room lights to improve the view
    a. NanoNeedle system lighting is less bright than with standard arthroscopy
16. Insert trocar into the lateral portal site after testing for skin analgesia using a sharp trocar
    a. Direct toward notch
17. Attach tubing and allow insufflation of knee with some fluid
18. Insert camera and conduct diagnostic scope with the camera alone
19. Make medial portal under direct visualization based on localization with a spinal needle (local anesthetic is applied to the area of the medial portal)
20. A simple probe may be used through the medial portal for additional instrumentation once pathology is confirmed
21. For the standard NanoNeedle system, resection work will typically require a separate inflow cannula to support shaving and resection
22. Inflow sheath should be placed peripherally in the compartment where the primary pathology is located (eg, medial meniscal tear)
23. Insert medial trocar under direct visualization from a far medial position 2 cm more medial to the working medial portal, and use sharp trocar directing toward the notch
24. Move the inflow sheath from the lateral sheath to the far medial sheath and open flow
25. Medial sheath may now be used as a probe or positioned near the posterior horn
26. Meniscal biter (NanoBiter) and shaver may now be used in and out of the medial portal as with standard arthroscopy





Examples

In the image to the right, the standard NanoNeedle inflow sheath is in the far medial portal directed into the notch (superior instrument), and a 2.8 mm Nano Sabre Shaver is in the standard medial portal debriding synovial overgrowth in the intercondylar notch. The inflow sheath's location near the working instrument allows for preserved visualization during resection with good image resolution.

Debridement of ACL Cyclops lesion

Positioning

Typical of Standard Arthroscopy With Lateral Post

- Medial compartment: gentle valgus is well tolerated; patients with tight varus knees based on a preoperative exam or those expected to require MCL release may not be ideal candidates for Nano arthroscopy with local anesthesia only; consider patient-specific anesthesia
- Lateral compartment: this is well tolerated
- Notch/condyles: knee remains at 90° off the edge of the bed

Pathology by Portal

- ACL: lateral portal
- PCL: lateral portal
- Medial meniscus (anterior horn and body): lateral portal
- Medial meniscus (posterior horn and root): medial portal under valgus stress
- Lateral meniscus (anterior horn and body): medial portal
- Lateral meniscus (posterior horn and root): lateral portal
- Medial condyle: lateral portal 30° to 90° of flexion
- Lateral condyle: medial portal 30° to 90° of flexion
- Patellofemoral: knee in extension; consider accessory superior medial and/or superior lateral portals for the examination of gutters and suprapatellar pouch as needed

If difficult to evaluate the meniscal root from the contralateral portal, consider:

- Using pre-bent 10° high-flow sheath
- Gently bend the standard Nano sheath to 10°
- Use a transpatellar tendon portal

Apollo^{RF} SJ50 Probe

NanoNeedle Scope

Positioning

- Obtain images
- Remove camera
- Manually express any excess fluid
- Remove sheaths
- Place Dermabond® over portal sites when dry
- Place JumpStart® dressings
- Upload images to PACS/SurgeonVault® system

Operative Nano Arthroscopy Dictation Template

Preoperative Diagnosis:	
Postoperative Diagnosis:	
Procedure Performed	
	Nano arthroscopy
	With partial meniscectomy (29881)
	Partial medial and lateral meniscectomies (29880)
	Meniscal repair (29882)
	3 compartment synovectomy (29876)
	Chondroplasty (29877)
	Removal of the loose body through a separate incision (29874)

Complications: None apparent	
Surgeon:	
Assistant:	
None	Anesthesiologist
Local	Anesthesia
Normal	Complexity
N/A	Devices and implants
N/A	Implant sheet reviewed
None	Estimated blood loss
None	Specimen removed
None	Blood administered
None	Tourniquet time

Dermabond is a trademark of Ethicon US, LLC

Operative Nano Arthroscopy Dictation Template

Description of Procedure
On the date of surgery, the patient was identified in the preoperative holding area. The surgical site was agreed upon, confirmed, and marked by the surgery team, nursing staff, and patient. I marked the operative side. The patient was taken to the operating room and a surgical time-out was performed. The patient was positioned supine on the operating table with attention paid to padding all bony prominences. A local anesthetic was administered. The limb was prepped and draped in the usual sterile fashion. The patient received antibiotic prophylaxis within 30 minutes of incision and mechanical DVT prophylaxis to the nonoperative leg.

Attention was first turned to the diagnostic portion of the procedure. Physical examination performed and revealed [ ].

Diagnostic NanoNeedle arthroscopy was then undertaken. Portal sites were marked using anatomic landmarks. A suprapatellar, then lateral, and then medial viewing portal was established. A probe was introduced, and all structures were thoroughly probed and evaluated for pathology. Results of the diagnostic arthroscopy are as follows:

- Suprapatellar pouch normal
- Patella normal
- Trochlea normal
- Medial femoral condyle normal
- Medial tibial plateau normal
- Lateral femoral condyle normal
- Lateral tibial plateau normal
- Medial meniscus normal
- Lateral meniscus normal
- Medial gutter normal
- Lateral gutter normal
- Notch normal
- ACL normal
- PCL normal

Attention was then turned to the operative portion of the arthroscopic procedure.

(A curved shaver was introduced into the knee. A combination of shaver and biter was then used to perform a meniscectomy, removing enough meniscus to leave a stable base. Loose meniscal pieces were removed. Total meniscus resected at the deepest depth of resection was [ ].)

(Chondroplasty was performed with a mechanized shaver of the chondral damage noted above.)

The NanoNeedle scope was removed. The portals were closed with Dermabond and sterile dressings were placed. The patient was taken to the recovery room in good condition. Sponge needle counts were correct 2×.

Postoperative Plan
[Date of discharge protocol with oral or over-the-counter analgesics.] No restrictions. Begin physical therapy this week. Follow up in the clinic in 2 weeks to review arthroscopic findings.

Example Postprocedure Instructions

Postprocedure Instructions: Nano Arthroscopy of Knee

Activity

- You may put as much weight as comfortable on your leg.
- You may bend and straighten your knee as much as you like.
- Do not engage in prolonged periods of standing or walking the first day after surgery.
- Avoid long periods of sitting or long distance traveling for 2 weeks.

Dressings and Incisions

- The first 2 days after surgery, you can expect a small amount of red-tinged drainage on your dressings. This is normal.
- Please keep the dressing clean and dry; if you are going to shower/bathe, you must protect the dressing. You may not soak in a pool, lake, hot tub, or the ocean for 2 weeks.
- You may remove the BAND-AID® dressing 4 days after surgery.
- After 4 days, you may apply BAND-AID dressings to the portals or leave them open to the air.
- Please do not use bacitracin or other ointments on the portals.

Pain and Inflammation

- Ice: You may apply ice bags in a dry towel as needed for pain relief and inflammation.
- Compression: Use an Ace™ wrap as needed to decrease swelling, but this is not required.
- Elevation: Keep your foot elevated above your heart if you have increased swelling or discomfort.
- Pain Medication: If you need pain medication, you may take Tylenol 500 mg to 650 mg every 4 to 6 hours as needed and as directed per the package insert. Do not take more than 3 grams or 3000 mg in 24 hours.
- Anti-inflammatory medications (eg, ibuprofen, etc.) may be taken as needed and as directed per the package insert.

Emergencies

- Please have someone stay with you for the first 24 hours after surgery.
- Please call the clinic or the orthopedist on call if you experience any of the following:
  - Drainage from the incision soaks the dressings and continues to drain after a bandage change
  - A fever (>101.5˚) or chills
  - Leg or calf pain, leg swelling, or difficulty breathing

Follow-up Care

- Please schedule a follow-up visit to review your surgery 10 to 14 days postoperatively. You may choose to schedule a remote video or phone follow-up at your discretion.

BAND-AID is a trademark of Johnson & Johnson Consumer Inc.
ACE Brand is a trademark of 3M.

Ordering Information

Imaging System

Product Description	Information	Item Number
NanoScope™ Console	13" HD Medical-Grade Imaging Console	AR-**3200-0030**
NanoScope Handpiece Kit, single use	1 Camera, sterile packaged	AR-**3210-0040**
NanoNeedle Scope	125 mm, single use	AR-**3210-0043**
NanoNeedle Scope	180 mm, single use	AR-**3210-0044**
NanoNeedle Scope	250 mm, single use	AR-**3210-0045**
NanoNeedle High-Flow Sheath Kit	1 Straight and 1 Bent Sheath, sterile packaged	AR-**3210-0041**
NanoGrip	1 Grip, sterile packaged	AR-**1090NH-1**

Fluid Management Tube Set Options

Product Description	Information	Item Number
Synergy MSK™ Ultrasound Cart	Mobile Cart	AR-**3502-CRT**
NanoNeedle Console Mount	MSK Cart NanoNeedle Conversion Kit	ATX-**2601**
NanoNeedle Console Mount for AR-6481 Cart	Conversion Kit	5010-**1500**
DualWave™ Pump Cart	Mobile Cart	AR-**6481**

Nano Arthroscopy 2 mm Instrumentation (130 mm Shaft Length)

Product Description	Item Number
NanoBiter Straight Tip, 130 mm straight shaft, bendable w/ FlushPort	AR-**10911F-1**
NanoGrasper Straight Tip, 130 mm straight shaft, bendable w/ FlushPort	AR-**10313F-1**
NanoRetriever Tip, 130 mm straight shaft, bendable w/ FlushPort	AR-**10914F-1**
NanoScissor Tip, 130 mm straight shaft, bendable w/ FlushPort	AR-**10915F-1**
NanoBirdBeak® Retriever Tip, 130 mm straight shaft, bendable w/ FlushPort	AR-**10916F-1**
NanoBirdBeak Grasper Tip, 130 mm straight shaft, bendable w/ FlushPort	AR-**10917F-1**
Bending Tool	AR-**10900**

Nano Arthroscopy 2 mm Instrumentation (70 mm Shaft Length)

Product Description	Item Number
NanoBiter Straight Tip, 70 mm straight shaft, bendable w/ FlushPort	AR-**10901F-1**
NanoGrasper Straight Tip, 70 mm straight shaft, bendable w/ FlushPort	AR-**10903F-1**
NanoRetriever Tip, 70 mm straight shaft, bendable w/ FlushPort	AR-**10904F-1**
NanoScissor Tip, 70 mm straight shaft, bendable w/ FlushPort	AR-**10905F-1**
NanoBirdBeak Retriever Tip, 70 mm straight shaft, bendable w/ FlushPort	AR-**10906F-1**
NanoBirdBeak Grasper Tip, 70 mm straight shaft, bendable w/ FlushPort	AR-**10907F-1**
Bending Tool	AR-**10900**

2.8 mm Nano[Resection™] Devices (11 cm working length)

Product Description	Item Number
Nano Sabre Shaver	AR-**9280NSR**
Apollo[RF®] SJ50 Probe	AR-**9845**

Patient Prep Kit

Product Description	Information	Item Number
NanoNeedle Arthroscopy Prep Kit	Disposable, sterile packaged	74312-**01M**

Ordering Information

Tissue and Fluid Outflow Cannula

Product Description	Information	Item Number
Outflow Cannula, Nano arthroscopy	Disposable, sterile packaged	AR-**1090S-10**
Outflow Cannula, Nano arthroscopy	Disposable, sterile packaged	AR-**1090S-70**

Fluid Management Tube Set Options

Product Description	Information	Item Number
Gravity Tube Set	Disposable, sterile packaged	AR-**6412**
Extension Tube Set	Disposable, sterile packaged	AR-**6220**

Nano Arthroscopy 2.7 mm-Diameter NanoCannula and Insertion Kits

Product Description	Information	Item Number
2.7 mm Cannula and Cannulated Obturator, 1.5 cm length	Disposable, sterile packaged, single pack	AR-**1090C-15-1**
2.7 mm Cannula and Cannulated Obturator, 3 cm length	Disposable, sterile packaged, single pack	AR-**1090C-30-1**
2.7 mm Cannula and Cannulated Obturator, 4 cm length	Disposable, sterile packaged, single pack	AR-**1090C-40-1**
2.7 mm Cannula and Cannulated Obturator, 5 cm length	Disposable, sterile packaged, single pack	AR-**1090C-50-1**
2.7 mm Cannula and Cannulated Obturator, 7 cm length	Disposable, sterile packaged, single pack	AR-**1090C-70-1**
Nano Arthroscopy Percutaneous Insertion Kit	Disposable, sterile packaged, single pack	AR-**1090PK-1**
NanoNeedle Scope Working Cannula	1.5 cm	AR-**3210-0059**
NanoNeedle Scope Working Cannula	5 cm	AR-**3210-0063**

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