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Tips of the Trade for Residents

[1]Brittany N. Atuahene, BA
[1]Lawrence Wells, MD

[1]Division of Orthopaedic Surgery, The Children's Hospital of Philadelphia, Philadelphia PA

Introduction

The purpose of this article is to serve as an educational tool for orthopedic residents who will complete a rotation at the Children's Hospital of Philadelphia. With the goal of patient safety in mind, it is important that residents feel comfortable and confident when entering the OR. This article will review helpful preparation tips for performing a knee arthroscopy, the most commonly performed orthopedic procedure,[1] and a closed reduction with percutaneous pinning fixation (CRPP) for supracondylar humeral fractures, the most common pediatric elbow injury.[2]

Arthroscopy

Preparation

The patient is placed in the supine position, and the contralateral leg is secured to the OR table using tape. A cloth towel is placed on the genitalia for protection. Next, the hair on the operative extremity is removed. Cotton cast padding is then applied circumferentially in two layers, making sure not to form any wrinkles. A pneumatic tourniquet is applied over the cotton cast padding and snugly secured. Drapes are placed at the edge of the cuff to prevent prep solution from pooling under the drapes and damaging the patient's skin or become labile to a fire hazard.

After the tubing is attached to the pneumatic tourniquet, the side post is attached to the operative side of the OR table. The side post should be positioned about one handbreadth above the patient's patella. The purpose of the side post is to allow a valgus force to be applied to the knee which allows arthroscopic access to the medial compartment. When the post is lowered, it can serve as a platform for the extremity to rest on while in varus position, exposing the lateral compartment.

The operative foot is temporarily placed in a sling while preparation solution is applied to operative extremity. The lower extremity is held with a sterile towel and removed from the sling, in order to apply preparation solution to the ankle (some surgeons prefer to include the foot as well). An impervious stockinette is used to cover the foot and is held in place by a Coban wrap.

Corresponding author:
Lawrence Wells, MD
The Children's Hospital of Philadelphia
Wood Building, 2nd floor
34th Street and Civic Center Blvd
Philadelphia, PA 19104
Phone: 215-590-1527
Fax: 215-590-1501
wellsl@email.chop.edu

Portal Placement

The standard utility knee portals include the anterolateral and anteromedial portals. They are located adjacent to the patella tendon and above the tibial plateaus. Appreciation of the location of the menisci, the femoral condyles and the intercondylar notch with its contents will assist the surgeon in successfully performing a knee arthroscopy and preventing iatrogenic injury.

Portal placement is key to performing arthroscopy successfully and ensuring that iatrogenic injury does not occur. Drawing out the surface anatomy is important for the beginner to understand the location of intra-articular structures to be examined arthroscopically. A marking pen is used to draw out the patella, patella tendon, and the medial and lateral tibial plateaus[3] (Figure 1a-b). After locating the planned portals, confirmation can be confirmed by using the marking pen cap to palpate the medial and lateral femoral condyles (Figure 1c).

Supracondylar Humerus Fracture - Closed Reduction with Percutaneous Pinning (CRPP)

Position and Set-up

The patient is placed in the supine position on a regular operating room table. The operative extremity is propped on the x-ray receiver, allowing easy access to the humerus for elbow reduction and pin placement. The C-arm fluoroscope is placed at the foot of the operating table and positioned parallel to the patient. The fluoroscope x-ray source is positioned to emit x-rays to the floor and the receiver positioned to support the arm. An arm board is attached to the table and positioned adjacent to the C-arm receiver and support the head of the patient during surgery. For better visualization, the image intensifier screen is positioned directly across the OR table to facilitate a direct line of vision for the surgery team. The scrub tech and instruments are directly behind the surgeon and can readily provide instruments needed to complete the procedure.

Conclusion

In an effort to increase resident preparedness, the first step is creating a sturdy foundation. By

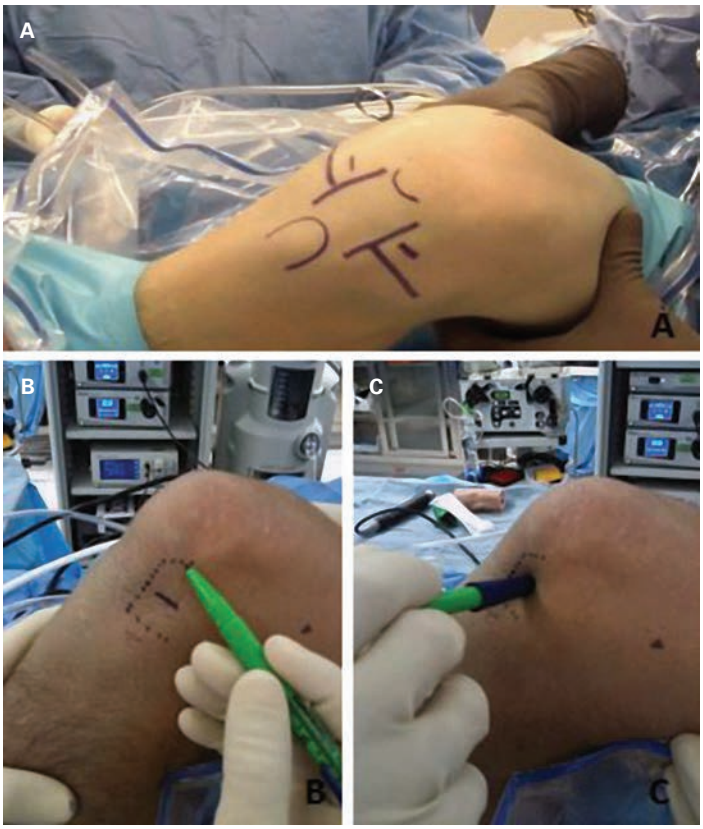

Figure 1. Examples of surface anatomy markings. (A) A marking pen was used to reference the patella, tibial tubercle, patella tendon, and medial and lateral tibial joint line. (B) Another example of portal marking. (C) Accuracy of portal reference is determined by palpating femoral condyle.

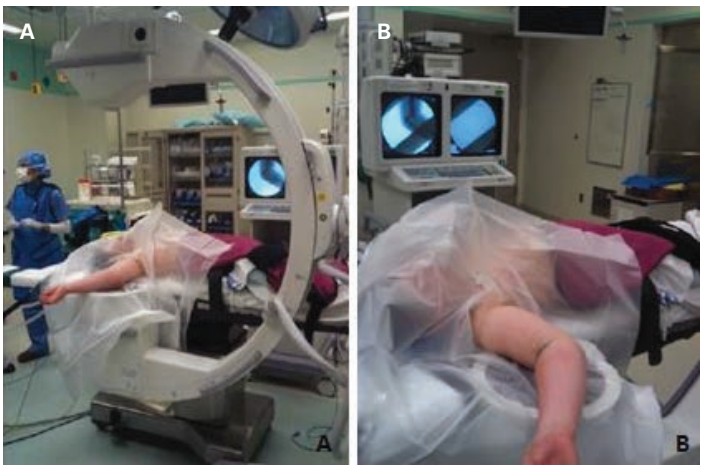

Figure 2. Operating room set up for CRPP. (A) Note where C-arm fluoroscope is positioned. (B) Monitors are positioned on opposite side of patient for easy visualization.

Figure 3. An arm board is attached to the table and positioned adjacent to the C-arm receiver and support the head of the patient during surgery.

reviewing the basics, we hope that our residents will enter the operating room with confidence, and the mindset to make great surgical decisions.

References

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2. Ladenhauf HN, Schaffert M, Bauer J. The displaced supracondylar humerus fracture: indications for surgery and surgical options: a 2014 update. *Curr Opin Pediatr* 2014; 26: 64-9.

3. Ward BD, Lubowitz JH. Basic knee arthroscopy part 2: surface anatomy and portal placement. *Arthrosc Tech* 2013; 2: 501-2.