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Tips for Accurate Beath Pin Length Measurement While Using an Arthroscopic Jig to Avoid Neurovascular Injury Due to Over Penetration (Hit-Pat's Method)

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Learning Point of the Article:

Knowing exact beath pin length needed avoids risk of over penetration and complications due to it.

Abstract

Introduction: Arthroscopic jigs are specialized surgical instruments used in arthroscopy for drilling bone tunnels at the desired location. Neurovascular complications are known due to accidental over penetration of the beath pin in the posterior compartment.

Surgical Technique: We have provided a simple method to determine the minimum[t1.1] length needed of the beath pin so that when the chuck of the drill touches the stopper of the drill sleeve, we are sure that the beath pin has just exited at the desired point marked by the targeting guide and cannot go beyond that.

Conclusion: Our technique of accurate beath pin measurement avoids over penetration of beath pin while using an Arthroscopy jig and thus avoids neurovascular complications.

Keywords: Beath pin, arthroscopy jig, neurovascular injury.

Introduction

Arthroscopic jigs are valuable tools in orthopedic surgery mainly used for ligament reconstruction and meniscus repair procedures [1,2,3,4,5]. They help to create accurate tunnel needed for arthroscopy procedures. Many a times when there is slight play in the jig or slight bend in the beath pin, the beath pin might get slip of from the stopping point of the arm of the jig and if the surgeon or assistant missed the feel of second cortex, it may penetrate in the soft tissue which may cause neurovascular injury.

We present a simple trick to accurately measure the exact length of the beath pin so that the drill automatically stops when the tip of the beath pin exits the desired point chosen by the jig.

Surgical Technique

Arthroscopic jig consist of handle, targeting guide arm and drill sleeve (commonly called as bullet). First, we have to completely insert the drill sleeve inside the handle till the stopper (outer end) sits flush to the handle (Fig. 1a). Pass the beath pin completely till it reaches the exit point determined by the targeting guide arm (Fig. 1b). Mark the portion of the beath pin just outside the sleeve and measure the length (Fig. 1c). In our case it is 145 mm. Then apply the jig to the bone (in our case tibia) such that the targeting guide arm is at desire point inside the joint and the drill sleeve touches the bone outside and lock it. Now measure the distance between the outermost part of the

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Author's Photo Gallery


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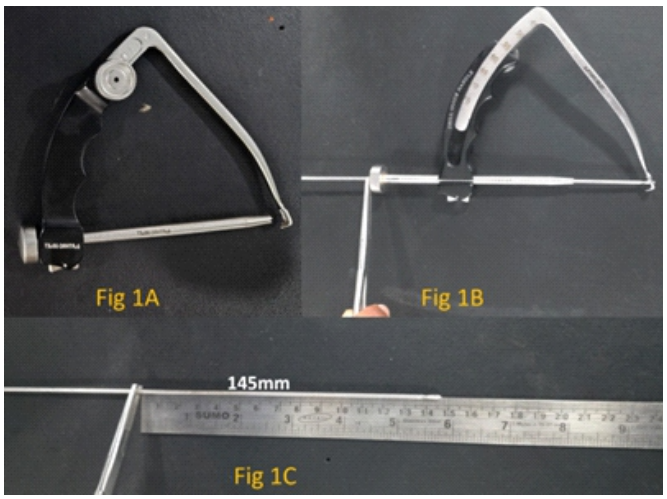

Figure 1: (a-c) When the drill sleeve is fully inserted, the basic length of beath pin measured is 145 mm.

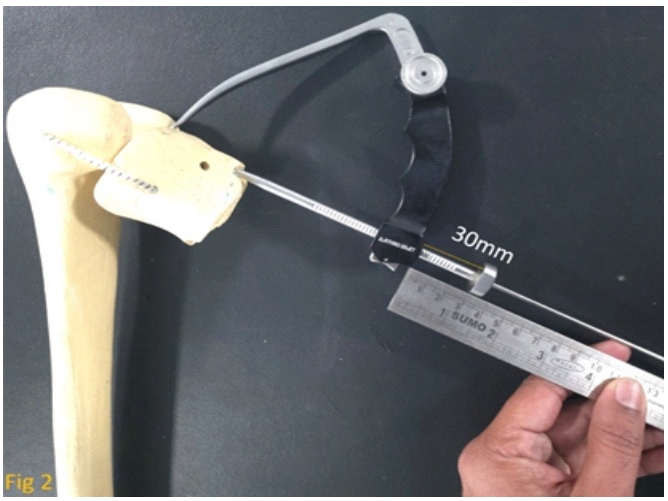

Figure 2: Place the Jig at the appropriate point and lock of drill sleeve. The length of the drill sleeve outside from the handle is measured (30 mm).

handle of jig where the drill sleeve is inserted and the inner margin of the stopper of drill sleeve (Fig. 2). In our case it is 30 mm. Hence, now 145 + 30 = 175 mm will be minimum length of beath pin needed. Mark the 175 mm mark on the beath pin and attach the drill at 175 mm mark (Fig. 3a). Hence, now you can safely drill till the chuck of the drill touches the stopper of drill sleeve and you will find the beath pin has just exited at the desire point marked by targeting guide and cannot go beyond that (Fig. 3b).

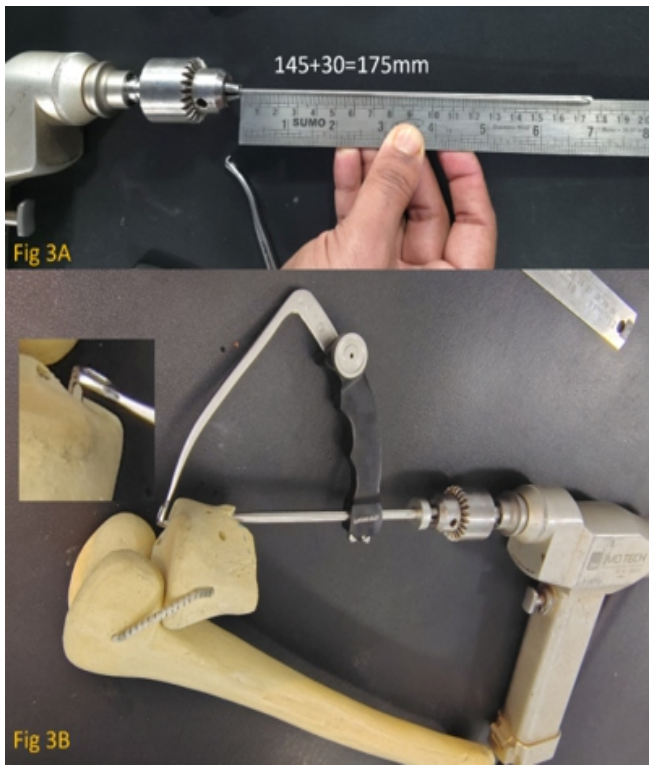

Figure 3: (a and b) Now the minimum length of beath pin needed is 145 + 30 = 175mm. Drill is attached to the beath pin at this length. We will find that when the drill touches the stopper of drill sleeve beath pin has just exited at the desire point marked by targeting guide and cannot go beyond that.

Discussion

The primary purpose of an arthroscopic jig is to guide the precise placement and drilling of tunnels or fixation points in bones during arthroscopic procedures. For instance, in posterior cruciate ligament (PCL) reconstruction surgery performed using arthroscopy, PCL jigs are used to accurately position and drill tunnels in the tibia for passage of the graft. Many a times when there is slight play in the jig or slight bend in the beath pin, the beath pin might get slip of from the stopping point of the guide arm of the jig and if the surgeon or assistant missed the feel of second cortex, it may penetrate in the soft tissue which may cause neurovascular injury. This is a common threat in tibial tunnel placement in PCL reconstruction [6, 7, 8]. Same thing happens while creating tunnel for medial or lateral meniscus posterior root repair at the anatomical point [9, 10]. If the surgeon or assistant miss the feel of second cortex while drilling beath pin it may go in posterior compartment and hit the neurovascular structures.

Our technique of exact beath pin length measurement avoids this complication. Most of the times, surgeon is holding the jig at the desired point, so he has to depend on the assistant to drill. Our trick avoids the need of expert assistant to drill. When the chuck of the drill touches the stopper of the drill sleeve, we are sure that the beath pin has just exited at the desired point marked by the targeting guide and cannot go beyond that.

Conclusion

Our technique of accurate beath pin measurement avoids over penetration of beath pin while using with an Arthroscopy jig and thus avoids neurovascular complications.

Clinical Message

Knowing exact beath pin length needed avoids risk of over penetration and complications due to it.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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