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Insulator Tip Detachment as an Unprecedented Complication during Arthroscopic Surgery

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ABSTRACT

Complication during surgery is a common incident encountered by any practicing surgeon during their career development. However, it is less documented in the field of arthroscopic surgery due to its high technicality and minimally invasive nature means only experienced operator are permitted to perform such cases. Nevertheless, incidents involving the instruments during surgery have been reported. Due to its size and complexity, some arthroscopic instruments can fail intra-operatively. Our case report describes a complication during a treatment of a 23-year-old male with knee instability. The ensuing arthroscopic anterior cruciate ligament reconstruction surgery was confronted with a broken piece of a tissue ablator. It was successfully removed without compromising any surgical procedure. Patient recovered well without any adverse effects and was able to involve in contact sports after a period of rehabilitation.

Keywords: arthroscopy, broken, complication, knee, tissue ablator

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INTRODUCTION

Arthroscopic surgery has increasingly been the treatment of choice in certain joint conditions. It offers a safe minimally invasive approach and permits rapid recovery, which is appealing to both the surgeon and patient. However, several incidents during the surgery involving failure of instruments have been reported in the literature. As the number of arthroscopic surgery steadily increases, accompanying complications can be expected to rise as well. Here is a case of a broken insulator of a tissue ablator tip while performing anterior cruciate ligament (ACL) reconstruction surgery. To date, no report has been published on this instrument part failure during arthroscopic surgery.

CASE REPORT

A 23-year-old footballer presented with persistent right knee instability after an awkward fall during a competitive match 2 months prior. He was not able to resume playing due to the instability and keen to get back into the game again.

On examination, he walked with a quadriceps avoidance gait. The right quadriceps muscles had atrophied. There was no evidence of scar, swelling or deformity detected while active range of motion was full. Right knee anterior drawer and Lachmann tests revealed grade 3 laxity with no end point. The varus and valgus tests were negative. Patient denied any joint line tenderness and McMurray test was negative.

Plain radiographs were unremarkable while MRI revealed isolated complete rupture of ACL. Due to the persistent instability, he was advised to undergo arthroscopic ACL reconstruction in order to participate in the competitive sports.

During arthroscopy, ACL was confirmed as complete tear, while posterior cruciate ligament, menisci and cartilage were pristine. Shaver and tissue ablator were used in turns to debride the soft tissue and achieve the hemostasis in the joint respectively for better exposure of the ACL footprint. In this case, the surgeon utilized 3.5mm Gator Shaver Blade (Linvatec Corp, Largo, FL, USA) and 90° 2.5mm x 110m UltrAblator (Linvatec Corp, Largo, FL, USA). Femoral tunnel was prepared with standard drilling procedure according to the graft size. Unfortunately, during the soft tissue clearance, the insulator tip of UltrAblator broke off and was floating in the intercondylar region of the knee (Figure 1a).

The fluid in and outflow was stopped immediately to prevent propagation of the tip elsewhere. Migration of the tip to posterior knee compartment would render the removal effort more complex. A grasper was carefully inserted through the medial portal into the notch area to hold the broken tip and it was removed out smoothly (Figure 1b). The surgery was completed successfully. Patient's recovery was uneventful. Rehabilitation regime was completed and return to play was achieved after six months.

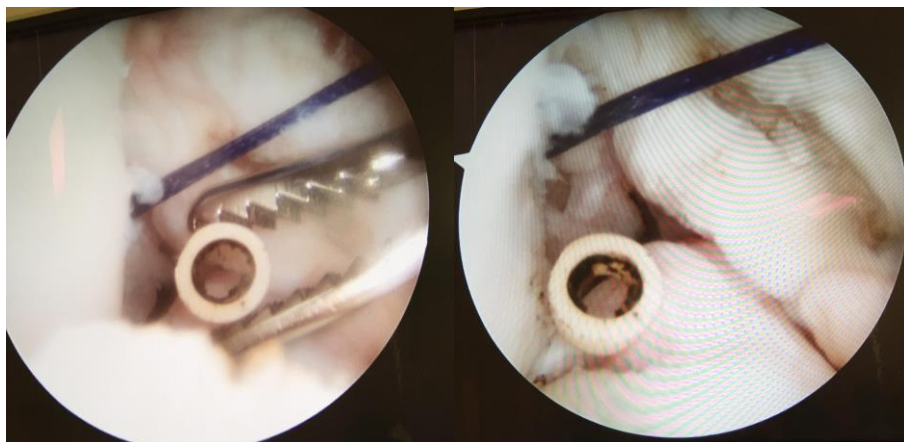


Figure 1: a, b: Arthroscopic view showing the broken insulator tip of tissue ablator found at the intercondylar notch next to the lateral femoral condyle (a). Arthroscopic view of a grasper used to remove the broken insulator tip (b).

DISCUSSION

Complications during surgery can be a frustrating experience to any surgeon. [1] Arthroscopy is a highly technical surgery. Hand-eye coordination and triangulation are some of vital skills a surgeon should acquire before performing arthroscopic surgery. Familiarity with the equipment and how to handle them is necessary to ensure smooth surgery without complication.

Unexpected incidents such as broken shaver, telescope, probe or scalpel when handled within the joint have been reported before. [2-6] Fortunately, such occasion is rare. It has been reported that such incident occurs 2.9% of the time. Recovery of broken parts is crucial to avoid any further complication. Occasionally, a grasper can simply be used. However, metal based pieces are better recovered by magnetic retriever with fluoroscopy assistance, otherwise an open arthrotomy method is necessary. [7]

In our case, the surgeon was fortunate that the broken insulator remained in the field of vision. Therefore, removal of it was made smoothly with a grasper. This broken piece was made of zirconium as an excellent material to function as insulator. The size was 3.5mm width and 2mm in thickness (Figure 2). The size is arguably small and could be left as suggested in some literature. Nevertheless, the surgeon prefers to remove it, as it will be a foreign object in the knee that can trigger possible biological response albeit being zirconium in nature.

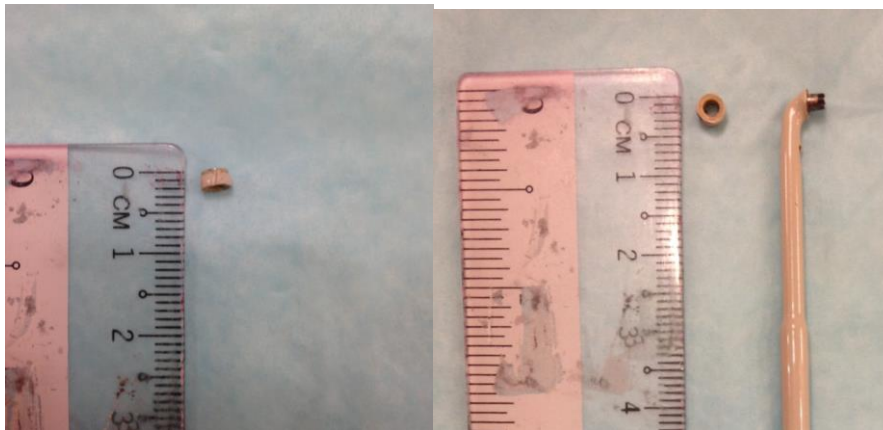


Figure 2: Photograph of the broken insulator tip with the tissue ablator.

Discussion between the surgeon and the distributor regarding the characteristic and longevity of UltrAblator (Linvatec Corp, Largo, FL, USA) was held to ascertain better information on the device. They advocated that it is for single-use and not advisable to recycle as the structural integrity can be compromised. In this case, the surgeon used a recycled UltrAblator. This is due to patient's financial constraint and he intended to help to minimize his cost for ACL reconstruction surgery. Patient was explained in the clinic before the surgery and agreed on using a sterilised, recycled UltrAblator and shaver. The incident was explained to him following the surgery and normal recovery would be expected. He eventually was able to resume playing competitively after 6 months of rehabilitation. He represented his university in the subsequent football inter-university tournament and completed the tournament without any recurrent pain or instability of the knee.

CONCLUSION

This interesting and rare case is reported to add into the literature of the possible causes of intra-operative complications during an arthroscopic surgery. Routine inspection of all instruments is advocated and recycling of single-use devices is avoided to prevent any possible instrument breakage during surgery. Unexpected intra-operative incidents such as instrument malfunction and breakage are rare events. However, a surgeon should be aware of such incident and be vigilant to make certain that good quality instruments are used routinely. Proper equipment must also be available at hand to ensure any problem is appropriately managed.



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