

Endoscopic Extrabursal Excision of Olecranon Spur



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Abstract: Olecranon spur is a common underlying clinical problem in patients with inflammatory conditions such as triceps tendonitis, olecranon bursitis, and gout. It is often managed conservatively. Conventionally, symptomatic olecranon spurs that have failed conservative management are excised along with the overlying bursa using an open technique. We describe an endoscopic extrabursal technique, where the spur is dissected out and excised in its entirety under endoscopic vision. Using this technique, a satisfactory view is achieved with less morbidity compared with the open excision; it also avoids a wound over the sensitive skin over the olecranon.

Historical Perspective

Olecranon spur is a common underlying clinical problem in patients with inflammatory conditions such as triceps tendonitis, olecranon bursitis, and gout. It is often managed conservatively. Current literature is scant, with only a few reports of surgical management of this condition and limited follow-up data. A significant amount of literature has been published on the diagnosis and management of olecranon osteophytes, with some reports using the terms “spur” and “osteophyte” interchangeably, although both are enthesophytes, and they differ in their location, symptom, diagnosis, treatment, and probably their etiology.¹

The mainstay of surgical treatment for olecranon spurs refractory to conservative management is open excision. Open excision is performed under general or regional anaesthesia through a posterior or a posteromedial midline incision, raising full-thickness skin flaps. Partial or total bursectomy can be performed when indicated, and the spur is usually found to be covered by a layer of

triceps tendon. The spur can be removed with an osteotome/rongeur or burr while carefully preserving surrounding attachment of the triceps tendon and smoothing sharp bony edges.¹⁻³ Traditionally, healing of these wounds can be problematic in up to 57% of patients. Wound problems after open surgery vary from prolonged wound ooze to frank skin necrosis requiring further debridement. Techniques to avoid wound complications include preserving an adequate skin flap, drainage tubes, compression bandage, and limb immobilization.^{4,5}

Endoscopy for olecranon bursitis has been described elsewhere.⁶ This involves the use of an arthroscope directed into the bursal sac and an arthroscopic shaver/burr through a proximal port to carefully resect the bursal/spur tissue inside out. One publication reported lower morbidity with the endoscopic technique when compared with the open technique. Endoscopic

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Fig 1. A Karl Storz endoscopic instrument set for endoscopic cubital tunnel syndrome surgery was used for the endoscopic extrabursal excision of the olecranon spur technique.

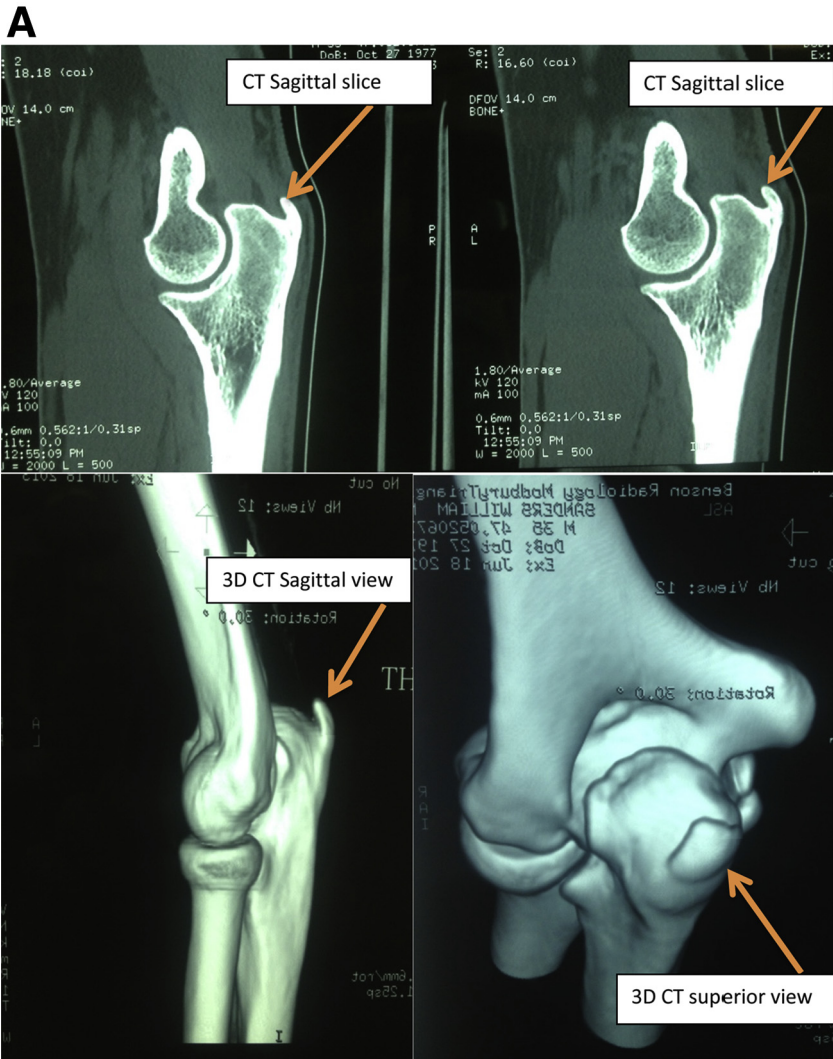
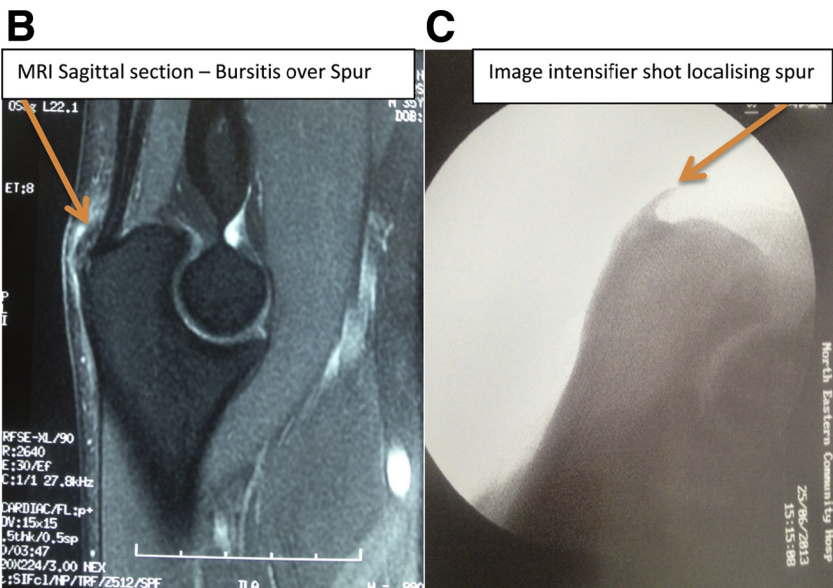


Fig 2. Imaging of left olecranon spur (copyright Dr. Gregory Bain). (A) Computed tomography (CT) scan. Top: sagittal slices; bottom: three-dimensional (3D) recon demonstrating the spur. (B) Magnetic resonance imaging: spur superficial to triceps tendon insertion with overlying bursitis. (C) Intraoperative fluoroscopy: intraoperative fluoroscopy for accurate spur localization.



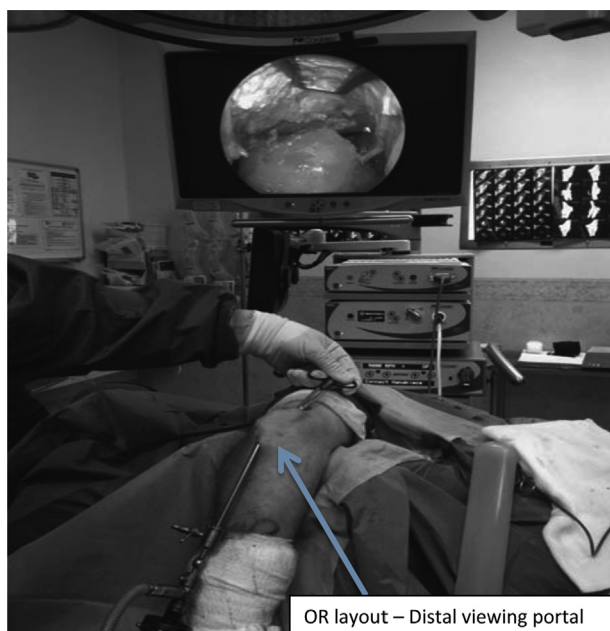


Fig 3. Theater setup for extrabursal endoscopic excision of the olecranon spur. Patient in lateral decubitus position with left with arm over a padded bolster, a high upper arm tourniquet, and position of the 2 portals. An adjacent proximal portal can be used to get a better view. Well thought out operating room (OR) setup helps in preventing intraoperative adjustment that leads to delays.

techniques have evolved around the wrist and elbow to address extra-articular pathology. The working space for the endoscopic equipment can be created with tunneling forceps, illuminated specula, and a hooded scope. Our technique uses the Karl Storz endoscopic instrument set designed for endoscopic cubital tunnel syndrome surgery (Fig 1).

Anatomy

The triceps tendon is broad and consists of 2 aponeurotic laminae that originate in the middle of the muscle. The osteophyte was formed under the superficial tendon, and the superficial common tendon can be disrupted from the base of the osteophyte. On the other hand, the deep part is a muscular tendon, and it is disrupted at the musculotendinous portion.^{5,7} Olecranon spur forms within the superficial portion of the central triceps tendon insertion and protrudes posteriorly, whereas olecranon osteophytes form posteromedially or posterolaterally close to the articular surface of the olecranon.^{1,2}

Clinical Presentation and Imaging

Symptomatic olecranon spurs present with posterior elbow pain, which can be elicited on resisted terminal elbow extension and may have a flexion contracture. A fractured spur on the other hand will present with pain elicited through the range of motion, while engaging in

heavy physical or repetitive activities or with coexisting tendonitis, gout, or bursitis.¹⁻³

The diagnosis can be confirmed by plain radiography, ultrasound, or computed tomography/magnetic resonance imaging scans especially when the patient presents with concomitant pathologies like bursitis or tendonitis. The presence of a spur is likely responsible for making the above entities more resistant to conservative management (Fig 2).

Indications

The extrabursal endoscopic procedure is for the treatment of resistant olecranon bursitis secondary to spur or symptomatic/fractured olecranon spurs; it is a useful alternative for active, independent patients with deranged coagulation and at-risk soft tissue envelope over olecranon, if the institute has access to the Karl Storz or similar endoscopic instrument set for endoscopic cubital tunnel syndrome surgery and the surgeon possesses the skills for performing soft tissue endoscopy.

Surgical Technique

The patient is placed in the lateral decubitus position with the affected arm up on a padded bolster and a high arm tourniquet. Place the arm in about 60° to 70° of flexion, rather than 90°, to ensure optimum working space with the patient under general or regional anaesthetic (Fig 3).

Mark the critical landmarks after draping—ulnar nerve, olecranon spur, medial epicondyle—using an image intensifier for better definition of the spur. Make a 1.5-cm midline incision about 2 cm proximal to the spur and develop a plane between the subcutaneous fat and the deep fascial layer with Metzenbaum scissors or modified tunneling forceps. Avoid straying medially in the region of the ulnar nerve. Open the scissor blades/forceps to elevate fat off the deep fascia to create a working space, like a pole holding up a tent. Introduce the hooded endoscope into the now defined working space with a hood suspending the subcutaneous tissues and thus maintaining the working space. Make another distal portal (endoscopy) 1 to 2 cm distal to the spur in the midline and connect the endoscopic space (Figs 3 and 4 A, B). Identify the spur initially by palpation and then confirm its location with fluoroscopy. A needle can be used to assist in localizing the spur. Using the burr (4 mm Dyonics straight, Acromionizer/Acromioblaster; Smith & Nephew), distal portal lateral, away from the ulnar nerve, stay right on the spur to minimize disruption of the triceps tendon insertion while debriding the spur (Fig 4 C, D; Video 1). Use intraoperative fluoroscopy to ensure complete spur resection (Table 1).

Deflate the tourniquet while the scope is within the working space and then obtain hemostasis with cautery and irrigate the cavity with normal saline (Fig 5). Close

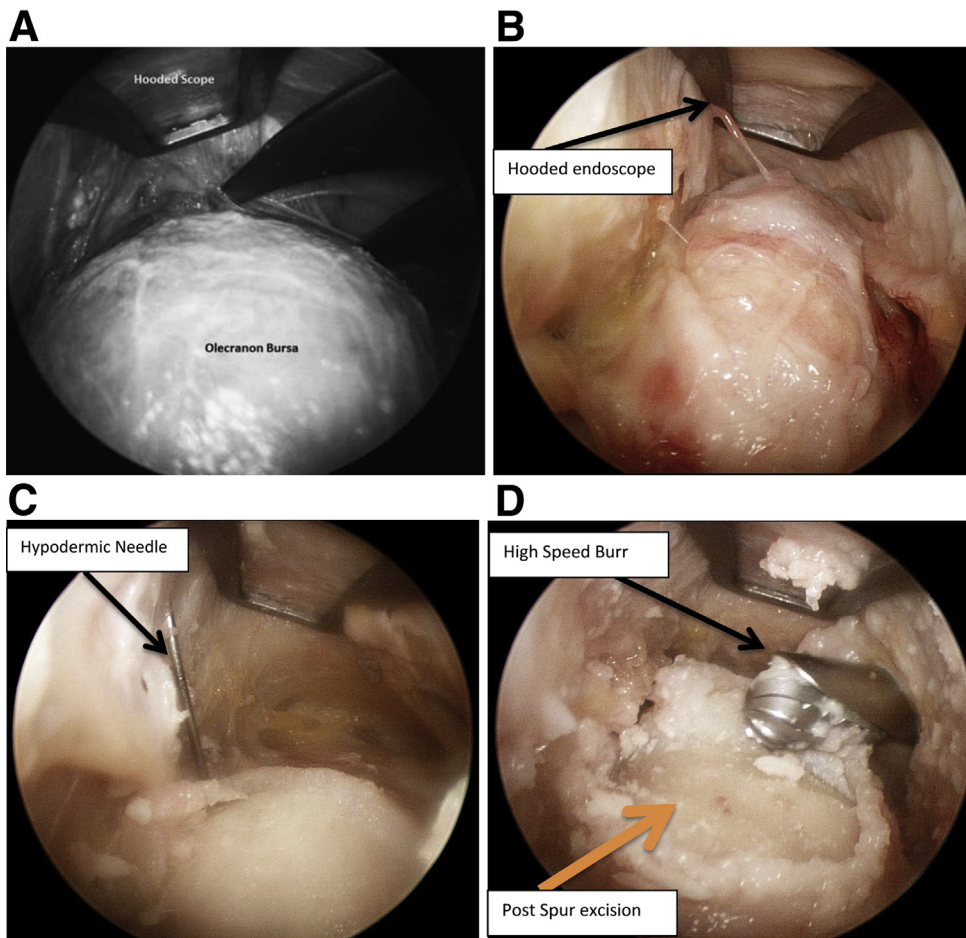


Fig 4. Endoscopic views, left olecranon spur (copyright Dr. Gregory Bain). Distal viewing portal for endoscope and proximal working portal for instrument (scissors, diathermy, burr, forceps). (A) Dissection of the bursa gently from the subcutaneous tissue using Metzenbaum scissors, as a hooded endoscope maintains working space. (B) Olecranon spur bottom, with overlying triceps tendon tissue after preparing the work space with hooded endoscope in situ (black arrow—to top). (C) Fluoroscopy-assisted intraoperative needle localization of the spur (black arrow indicating hypodermic needle use to localise spur). (D) Olecranon spur excision using a high-speed burr (black arrow indicating high speed burr used to excise spur and orange arrow indicating the surface of olecranon post spur excision).

the ports with monofilament sutures, apply dressings, and place the arm in a broad arm sling with the elbow at 90° of flexion. The arm stays in the sling for 1 week to minimize recurrence of hematoma. The patient is reviewed in the clinic at 1 week, and the wounds are assessed; then the patient can commence early active mobilization as tolerable.

Advantages

In our experience, the advantage of the endoscopic technique over the traditional open technique (mini-open or open) is the ability to avoid a relatively larger surgical wound over the sensitive skin of olecranon and thereby achieve lower rates of wound breakdown or prolonged wound ooze, more so in active independent patients with deranged coagulation with or without at-risk soft tissue envelope around the olecranon prominence.

Most endoscopic techniques involve inserting the scope into the bursa and then resecting the bursa in the same way as the synovitis is removed when performing elbow arthroscopy. We refer to this as the “intra-bursal method” of resecting the olecranon bursa. However, we

have had cases where we have caused a small skin perforation with the resector. As a consequence, we describe the “extrabursal technique,” which involves creating an interval between the deep fascia and the subcutaneous tissues.⁶ With this technique the subcutaneous tissues are then elevated off the ulna, deep fascia, and bursa. The hooded scope maintains the space, and the working instruments remove the bursa and any other abnormal tissue. Therefore, the skin over the entire olecranon is not breached by the working instruments.

Disadvantages

Expensive endoscopy equipment setup is needed to perform the procedure, in addition to an image intensifier machine. Expertise in soft tissue endoscopy skills is needed to accomplish the procedure in a reasonable time frame. The well documented miniopen/open techniques can be used at practices when faced with reasonable limitations in terms of equipment and expertise. Endoscopic bursectomy is an alternative to open bursectomy, which may have equivalent results. However, there are no controlled studies comparing the

Table 1. Pearls and Pitfalls

Pearls	Pitfalls
Ensure secure and stable patient positioning with a well-planned operating room layout.	Orient yourself; do not stray into the region of the ulnar nerve medially.
Accurately mark anatomical landmarks and planned portal placements.	Be careful not to perforate skin in cases with coexisting bursitis requiring bursectomy.
Have image intensifier ready to avoid delay.	Do not violate triceps tendon insertion; find the spur and stay on the spur with the burr.

2 techniques with regards to patient outcomes and complication rates (Table 2).⁸

Complications

Potential complications like hematoma formation in the dead space can be improved with ensuring meticulous hemostasis after tourniquet deflation and with the use of a broad arm sling at 90° flexion for a week to close off the dead space.

Another common complication with conventional olecranon bursoscopy is the formation of a persistent sinus from a small skin perforation. This is usually avoided with extrabursal dissection as the skin is more simply elevated.

Discussion

Olecranon spur can be symptomatic in isolation or could be an underlying pathology responsible for resistant inflammatory conditions such as as triceps tendonitis, olecranon bursitis, or gouty arthritis. In patients with deranged coagulation or who are on anti-coagulation therapy for medical disorders, management of these inflammatory conditions can pose a unique challenge.

The treatment of choice for an olecranon spur resistant to nonoperative treatment is open/miniopen excision. Endoscopic excision of olecranon bursa or the underlying spur is an alternative option for active, independent patients with at-risk soft tissue envelope over sensitive olecranon skin.

The technique requires a surgical team efficient in performing soft tissue endoscopic techniques with availability of Karl Storz or similar endoscopic cubital tunnel syndrome surgery equipment and an image intensifier at an institutional practice. The goal is to perform the procedure efficiently without perforating the sensitive skin over the olecranon while still managing to satisfactorily excise the underlying pathology of the spur/bursa. There is a risk of skin perforation where recurrent, resistant bursitis is a result of underlying olecranon spur and/or the patient has deranged coagulation function rendering the soft tissue envelope

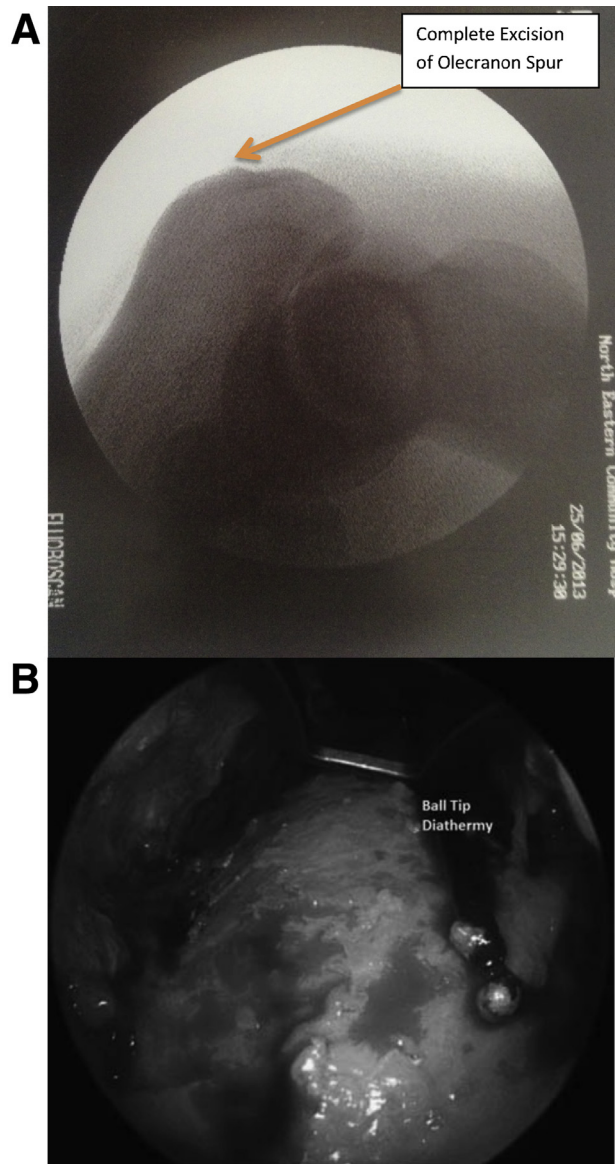


Fig 5. Postoperative images (copyright Dr. Gregory Bain). (A) Postresection fluoroscopy image to ensure and document complete endoscopic and radiological spur resection. (B) Incidence of hematoma formation in the dead space can be minimized with diligent hemostasis with cautery after the tourniquet is released postresection.

significantly at risk; extra care is required in such cases. The limitations of the described technique are the expensive equipment prerequisites, which may not be readily available at all the institutes, as well as the skill

Table 2. Advantages and Disadvantages

Advantages	Disadvantages
Minimally invasive.	Expensive endoscopy instrument setup.
Avoids incision over at-risk skin.	Requires expertise in soft tissue endoscopy skills.
Lower rates of surgical wound breakdown.	Coexisting bursitis may need bursectomy.

to perform soft tissue endoscopy, a technique in which general orthopaedic surgeons may not be proficient. In case of these limitations, the best option is to use the well-described miniopen or open technique while respecting the soft tissue envelope to minimize the wound breakdown complications.

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