

Editorial Commentary: Perfect Tunnel Position in Tommy John Surgery Is Critical for Success



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Abstract: The number of primary ulnar collateral ligament reconstructions (UCLRs) has been increasing at an alarming rate, and so has the number of revision UCLRs. Malpositioned tunnels are a technical surgical factor that causes graft failure and need for revision. Malpositioned tunnels result in a nonisometric graft. A common malposition error is to place the inferior humeral tunnel too far posterior, which causes the graft to be tight in flexion; therefore, elbow flexion will be restricted or, if flexion is forcibly obtained, the graft will be loose and nonfunctional. Revision UCLR is technically challenging, especially in the setting of malpositioned tunnels that require correction.

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Ulnar collateral ligament (UCL) injuries in pitchers of all levels have been increasing at alarming rates.¹⁻³ As the number of primary ulnar collateral ligament reconstructions (UCLRs) has increased, so has revision UCLR.¹ Revision rates for primary UCLR are as high as 15%.^{1,4} In fact, in Major League Baseball, there were more revision UCLR procedures in the 3 years from 2012 and 2014 than in the prior 12 years combined!¹ Unfortunately, the results following revision UCLR are inferior to those following primary UCLR, and revision surgery is associated with a higher complication rate.^{4,5}

Although numerous factors can cause primary UCLR failure, malpositioned tunnels are a common and avoidable technical factor. Malpositioned tunnels result in a nonisometric graft. For example, if the humeral inferior tunnel is placed too posterior, which is a common error, this will result in a graft tight in flexion. As a result, either elbow flexion will be restricted or, if flexion is obtained, the graft subsequently becomes loose. The article "The Effect of Humeral and Ulnar Bone Tunnel Placement on

Achieving Ulnar Collateral Ligament Graft Isometry: A Cadaveric Study," by Lall, Beason, Dugas, and Cain concludes that tunnel deviation anterior or posterior from the centroid of the UCL footprint on the medial epicondyle significantly affected isometry at all degrees of flexion recorded with the greatest amount of displacement occurring with pairing of posterior tunnels on both the humeral and ulnar footprints.⁶ This cadaveric study highlights the importance of perfect tunnel position for Tommy John surgery success.

Malpositioned tunnels can result from poor surgical exposure and also from abnormal bone anatomy. The ulnar bone tunnels should ideally be located distal to the joint line and equidistant on both sides of the sublime tubercle with adequate bone bridges. Sublime tubercle morphology can change because of enthesophyte formation and, often, this abnormal bone is more hypertrophic posteriorly. The medial ulnar ridge is a consistent palpable ridge distal to the sublime tubercle and is a useful guide to the proper tunnel location of the sublime tubercle. On the humeral side, the inferior position of the humeral tunnel should start at least 5 mm anterior to the 6 o'clock position of the medial epicondyle. I find it helpful to flex the elbow to approximately 60° to improve the exposure and orientation of the inferior epicondyle for the inferior epicondyle tunnel creation.

When evaluating graft failure following UCLR, I currently recommend a computed tomography scan to accurately assess tunnel size and position. The computed tomography scan provides the exact location of the prior ulnar and humeral tunnels as well as

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the bone quality of these tunnels. Surgical management of malpositioned tunnels are challenging and similar to tunnel management in revision anterior cruciate ligament surgery. During surgery, small curettes are used to identify the prior tunnels on the ulna, both anterior and posterior to the sublime tubercle and inferior epicondyle. If the tunnel positions are normal and bone quality allows for an adequate bone bridge, then standard tunnels are recreated. If malpositioned tunnels are encountered and are a significant distance from the normal position, then the original tunnels are ignored and new tunnels are created in the anatomic position. If the original tunnel overlaps the ideal tunnel location, then the tunnel is created in the anatomic location and a larger gracilis tendon graft is used to fill the expanded tunnel aperture. A single tunnel can be created on either the ulnar or humeral side if bone integrity is compromised. In this setting, alternative fixation with a cortical button is preferred. In summary, tunnel location for Tommy John surgery is critical for success and revision UCLR is challenging.

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