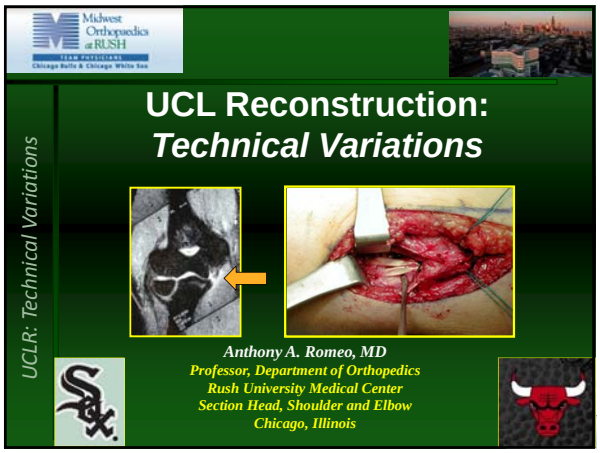
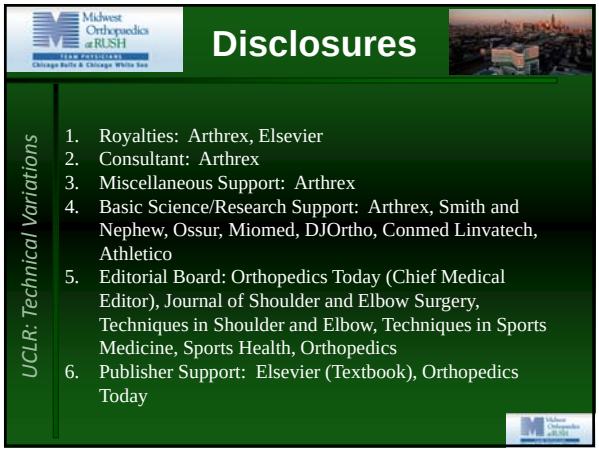

UCLR: Technical Variations
UCL Reconstruction:
Technical Variations
Anthony A. Romeo, MD
Professor, Department of Orthopedics
Rush University Medical Center
Section Head, Shoulder and Elbow
Chicago, Illinois


UCLR: Technical Variations
Disclosures
1. Royalties: Arthrex, Elsevier
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3. Miscellaneous Support: Arthrex
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6. Publisher Support: Elsevier (Textbook), Orthopedics Today


Brandon Erickson

UCLR: Technical Variations

1. Biomechanical testing of the reconstructed ulnar collateral ligament: a systematic review of the literature.
Saltzman BM, Erickson BJ, Frank JM, Harris JD, Nicholson GP, Bach BR, Verma NN, Romeo AA.
Musculoskelet Surg. 2016 Sep 14. [Epub ahead of print] Review.
PMID: 27628911 [PubMed - as supplied by publisher]
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2. Medial ulnar collateral ligament reconstruction of the elbow in major league baseball players: Where do we stand?
Erickson BJ, Bach BR Jr, Bush-Joseph CA, Verma NN, Romeo AA.
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Arthroscopy. 2016 Jul;32(7):1271-6. doi: 10.1016/j.arthro.2016.01.034.
PMID: 27017566 [Unknown status]
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4. Ulnar Collateral Ligament Reconstruction of the Elbow: A Systematic Review of the Literature.
Erickson BJ, Chalmers PN, Bush-Joseph CA, Verma NN, Romeo AA.
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5. Is Tommy John Surgery Performed More Frequently in Major League Baseball Pitchers From Warm Weather Areas?
Erickson BJ, Harris JD, Tetreault M, Bush-Joseph C, Cohen M, Romeo AA.
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6. Ulnar Collateral Ligament Reconstruction: Anatomy, Indications, Techniques, and Outcomes.
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Sports Health. 2015 Nov-Dec;7(6):511-7. doi: 10.1177/1941738115607208. Review.
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7. Trends in Medial Ulnar Collateral Ligament Reconstruction in the United States: A Retrospective Review of a Large Private Payer Database From 2007 to 2011.
Erickson BJ, Nwachukwu BU, Rosas S, Schairer WW, McCormick FM, Bach BR Jr, Bush-Joseph CA, Romeo AA.
Am J Sports Med. 2015 Jul;43(7):1770-4. doi: 10.1177/0363546515580304.
PMID: 26129959 [PubMed - indexed for MEDLINE]
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8. Rate of return to pitching and performance after Tommy John surgery in Major League Baseball pitchers.
Erickson BJ, Gupta AK, Harris JD, Bush-Joseph C, Bach BR, Abrams GD, San Juan AM, Cole BJ, Romeo AA.
Am J Sports Med. 2014 Mar;42(3):536-43. doi: 10.1177/0363546513510890.
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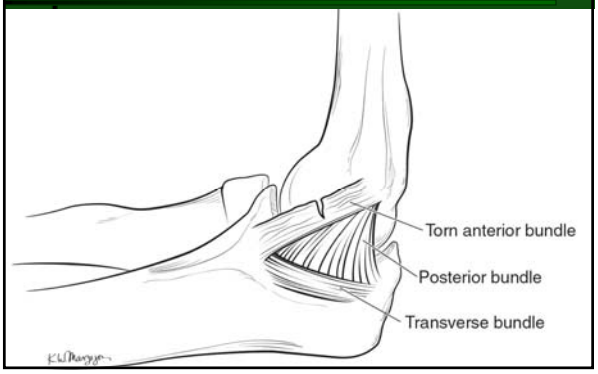
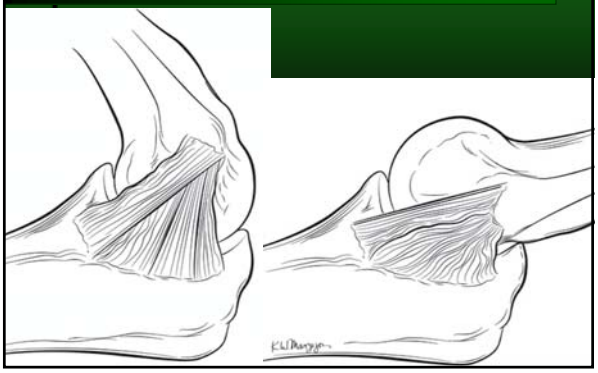
Erickson, BJ

Anatomy



Anatomy



UCLR: Technical Variations

What Techniques Are Currently Available???

Techniques

Technique	Routine arthroscopy	Management of FP mass	Ulna Preparation	Ulnar fixation	Humeral Preparation	Humeral fixation	Graft configuration	Management of ulnar nerve
ASMI modification[3]	Yes	Split	Tunnel	None	Tunnel	Sutured to itself	Figure-of-eight	Routine subcutaneous transposition
Bisuspensory[4]	n/a	n/a	Socket	Suspensory cortical	Socket	Suspensory cortical	Linear	n/a
DANE-TJ[5]	No	Split	Socket	Interference screw	Socket	Docking over bone bridge	Linear	Only if symptomatic
Docking[11]	Yes	Split	Tunnel	None	Socket	Sutured over bone bridge	Triangle	Only if symptomatic
Docking plus[6]	No	Split	Tunnel	None	Socket	Sutured and graft over bone bridge	Figure-of-eight	Only if symptomatic
Double Docking[14]	No	Split	Socket	Suture over bone bridge	Socket	Endobutton	Linear	Only if symptomatic
Hybrid[8]	No	Split	Tunnel	None	Anchor	Suture anchor, sutured to itself	Triangle	Only if symptomatic
Jobe[9]	No	Transection	Tunnel	None	Tunnel	Sutured to itself	Figure-of-eight	Routine submuscular transposition
Modified Jobe[15]	No	Split	Tunnel	None	Tunnel	Sutured to itself	Figure-of-eight	Only if symptomatic
Tension slide[7]	n/a	n/a	Socket	Suspensory cortical, interference screw	n/a	n/a	n/a	n/a
Ziploop[16]	n/a	n/a	Socket	Suspensory cortical	Socket	Interference screw	Linear	n/a

Surgical Technique Variables

UCLR: Technical Variations

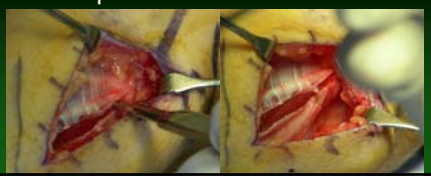
- Exposure
  - Treatment of the ulnar nerve
  - +/- elbow arthroscopy
- Graft Choice
- Management of the Ulna
- Management of the Humerus

Exposure Options for UCLR

UCLR: Technical Variations

Flexor Pronator Mass:

- Transection
  - Higher morbidity
- Split



Graft Choices

UCLR: Technical Variations

Ipsilateral Palmaris

Contralateral Palmaris

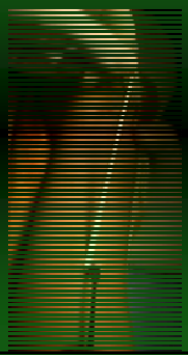
Hamstring

Allograft

Achilles

Plantaris

Toe Extensor



Outcomes Based on Graft Choice

	KJOC	Andrews-Timmerman	RTS	Complications	Reoperations
Palmaris Autograft (N=54)	90.39±7.06	91.67±8.59	92.59%	6	4
Hamstring Autograft (N=20)	89.62±9.12	93.75±5.82	95.0%	2	2
Allograft (N=11)	91.66±3.20	94.55±4.72	100.0%	0	0
P-Value	0.251	0.181	0.999	0.664	0.622

UCLR: Tec

Our outcomes based on graft choice – no difference seen between grafts


Ulnar Collateral Ligament Reconstruction

The Rush Experience

Options for Addressing the Ulna

UCLR: Technical Variations

- Tunnel
- Tied over a bone bridge
- Suspensory cortical
- Interference screw

Proposal: UCL Recontruction Set June 2006

UCLR: Technical Variations

June 26, 2006

Anthony A. Romeo, MD
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1725 W. Harrison St., Suite 1063
Chicago, IL 60612
312-243-4244
anthony.romeo@rushortho.com

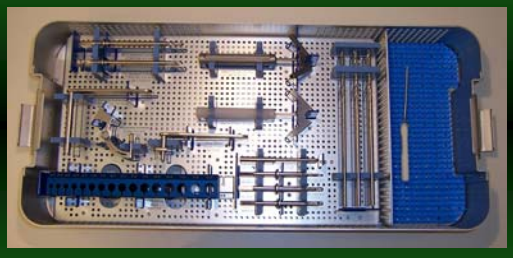
RE: Proposal for Ulnar Collateral Ligament (UCL) Reconstruction of the Elbow Instrument Set

Dear Arthrex Upper Extremity/Elbow Team,

Ulnar collateral ligament injuries of the elbow occur primarily in baseball players, specifically, pitchers. However, they can occur in other throwing sports. The incidence of this injury is steadily increasing. This is related to the fact that more youth and young adults are pursuing future opportunities as a baseball player, and a torn or stretched UCL limits prohibits their participation in sport.

Arthrex Elbow UCL Set

UCLR: Technical Variations



Ulna Offset Guide

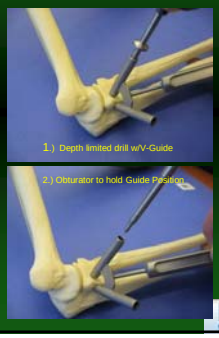
UCLR: Technical Variations

- Ulna Offset Guide for single socket fixation
  - 1.) Place pin with guide
  - 2.) Ream proximal cortex with 5 mm cannulated reamer (in set)
  - For fixation use either 5.5 mm Tenodesis Screw or RetroButton (BicepsButton technique)

Ulna V-Guide

UCLR: Technical Variations

- 55 degree V-Guide (shown) produces a 6.5 mm bone bridge
- 70 degree V-Guide produces a 8 mm bone bridge
- V-Guides will accept a 3.5 mm or 4 mm drill with auto depth stop (drills In set)
- V-Guide Obturator placed in drill hole to hold instrument position while the second drill hole is formed



Ulna V-Guide

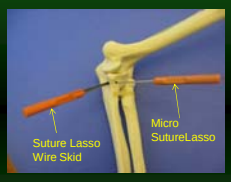
UCLR: Technical Variations

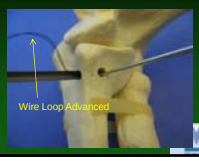
- Intersecting ulnar tunnel on Sublime Tubercle is shown using 55 degree V-Guide providing a 6.5 mm bone bridge
- Either 3.5 mm or 4.0 mm intersecting drill holes can be formed with either V-Guide

Suture/Graft Passing

UCLR: Technical Variations

- SutureLasso Wire Skid with Micro SutureLasso to perform all suture passing
  - 1.) Insert SutureLasso Wire Skid fully into tunnel
  - 2.) Insert Micro SutureLasso into opposite tunnel until you feel the tip contact the Skid
  - 3.) Advance Micro SutureLasso wire loop





Options for Addressing Humerus

UCLR: Technical Variations

- Sutured to itself
- Sutured over bone bridge
- Docking over bone bridge
- Suture anchor
- Suspensory cortical
- Interference screw

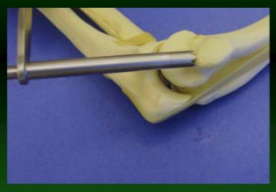
Humeral Socket

UCLR: Technical Variations

Humeral Socket Drill Guide

UCLR: Technical Variations

- Humeral Socket Drill Guide will accept the 4.5 mm or 5.0 mm depth stop limited drills (in set)
- This will form a 15 mm deep socket



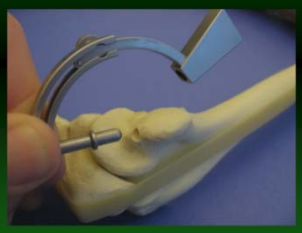
UCLR: Technical Variations

UCLR: Technical Variations

Adjustable Humeral Guide

UCLR: Technical Variations

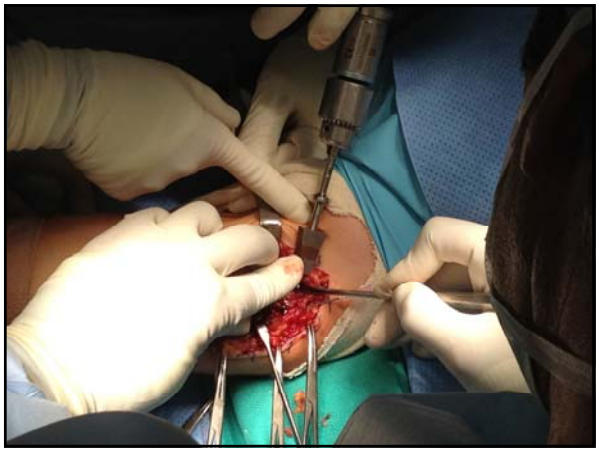
- Pegged end of the Adjustable Humeral Guide fits snugly in previously drilled humeral socket
- Arc length is adjustable and is set with thumb screw. Rotation of Guide can also be used to alter drill location



Adjustable Humeral Guide

UCLR: Technical Variations

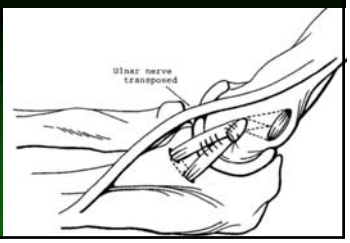
- Drills are depth stop controlled and ensure tunnels will precisely meet apex of previously drilled 15 mm deep socket
- Will accommodate 2.0 mm drill for Docking Technique; 3.5 mm or 4 mm drill for Modified Tommy John Technique. (all drills are in set)



Options for the Ulnar Nerve

UCLR: Technical Variations

- Transpose
  - Every time
  - Only when symptomatic
- Decompress
- Leave alone



Outcomes Regarding Ulnar Nerve

	KJOC	Andrews-Timmerman	RTS	Complications	Reoperations
Transposition (N=37)	90.08±6.30	91.08±7.37	91.89%	3	1
No Transposition (N=48)	90.60±7.05	93.65±6.82	95.83%	5	5
P-Value	0.723	0.105	0.649	0.693	0.226

Our outcomes based on transposition of the ulnar nerve– no difference between groups

Ulnar Collateral Ligament Reconstruction

The Rush Experience

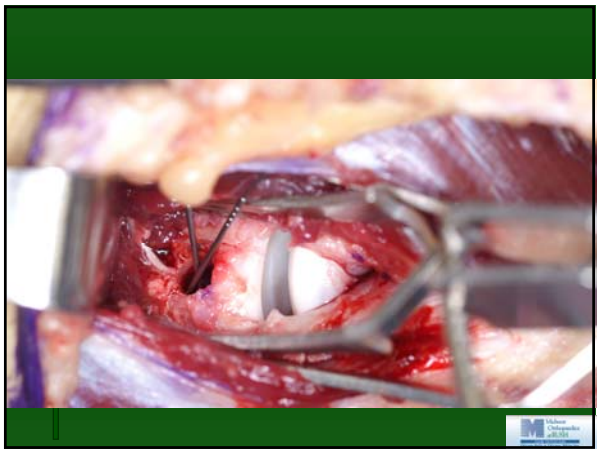
Brandon J. Erickson,*† MD, Bernard R. Bach Jr,† MD, Mark S. Cohen,† MD, Charles A. Bush-Joseph,† MD, Brian J. Cole,† MD, Nikhil N. Verma,† MD, Gregory P. Nicholson,† MD, and Anthony A. Romeo,† MD

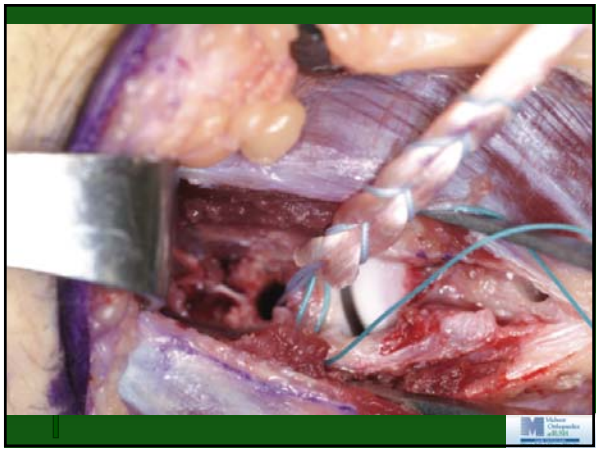
UCLR: Technical Variations

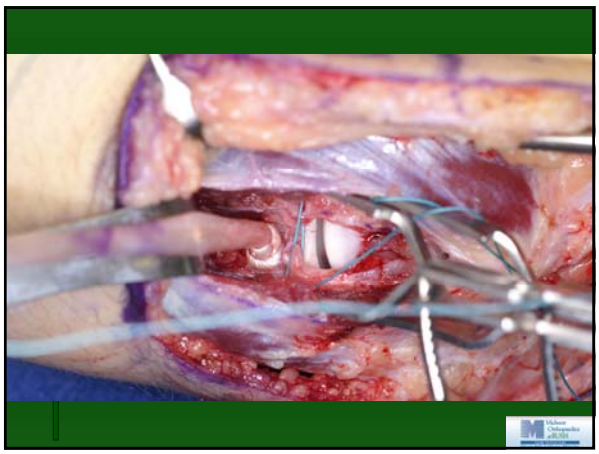
Double Docking Technique

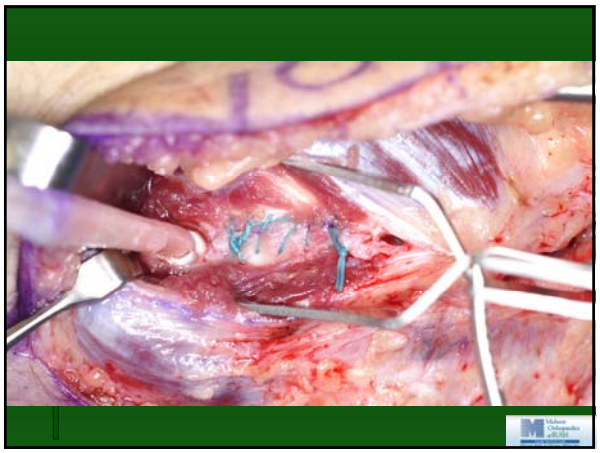
- Split the FP mass
- Bone bridge on the ulnar
- Suspensory fixation (button) on the humerus
- Graft choice: Hamstring auto or allo

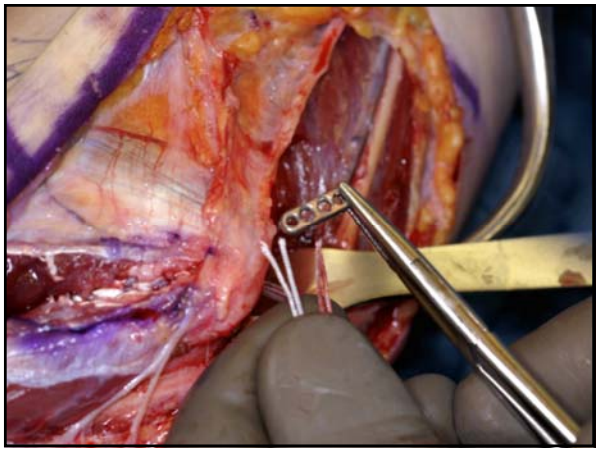
The Orthopaedic Journal of Sports Medicine, 4(1), 2325967115626876
DOI: 10.1177/2325967115626876

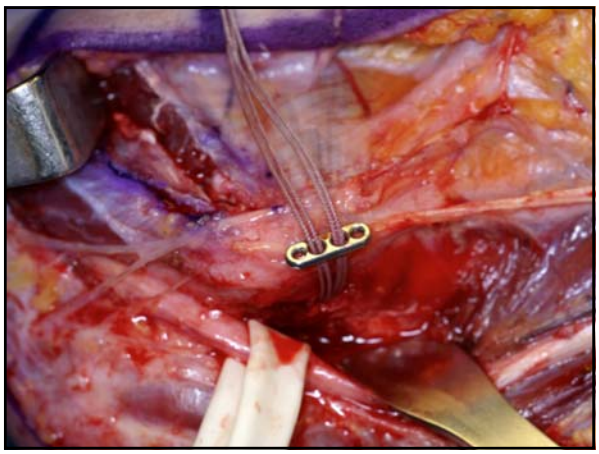


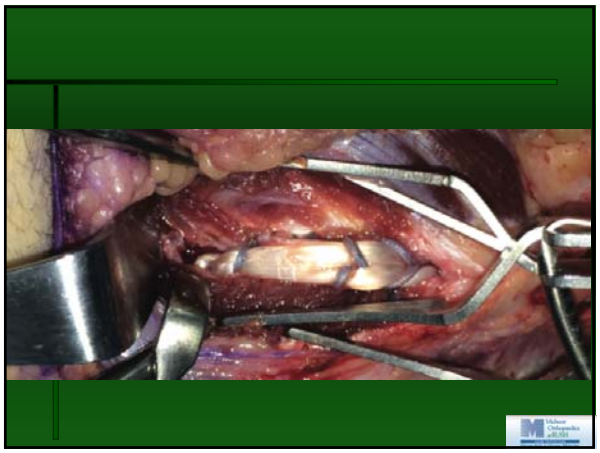




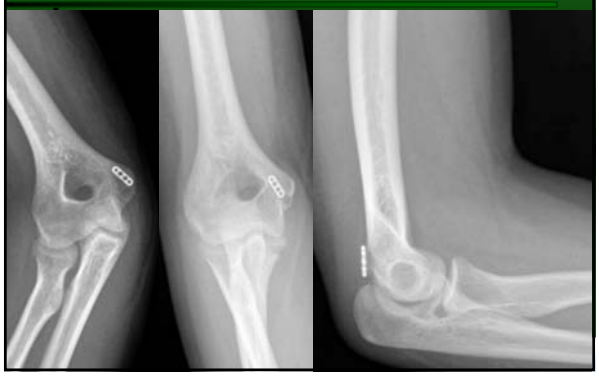


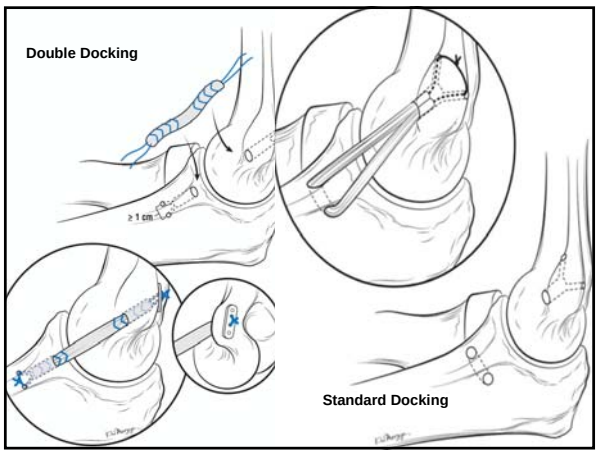


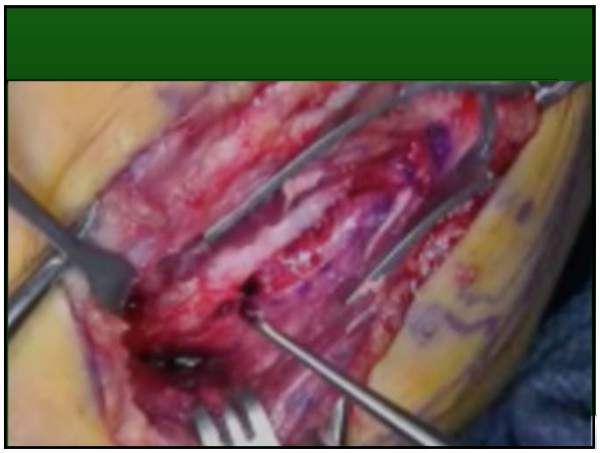


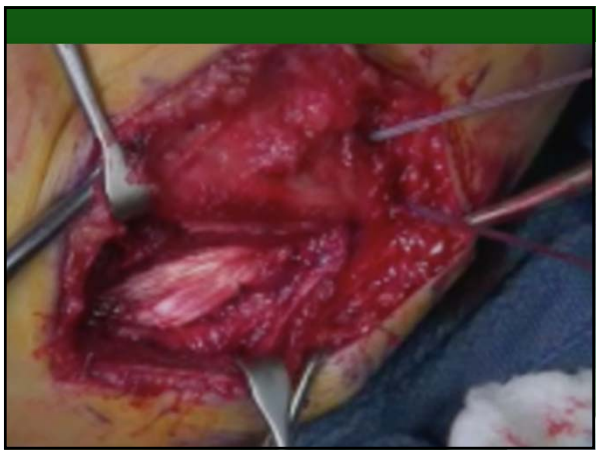


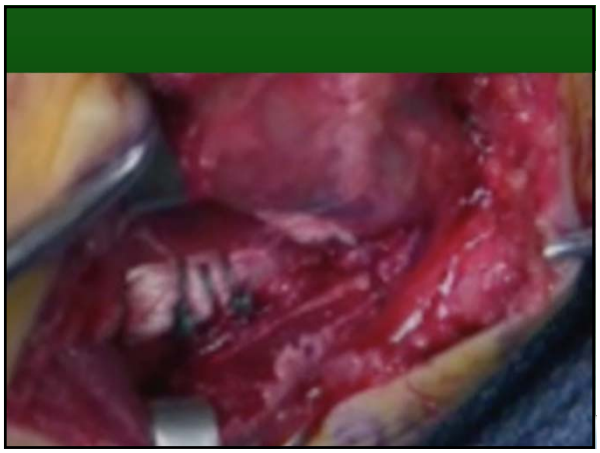
Post-Operative Films - DD











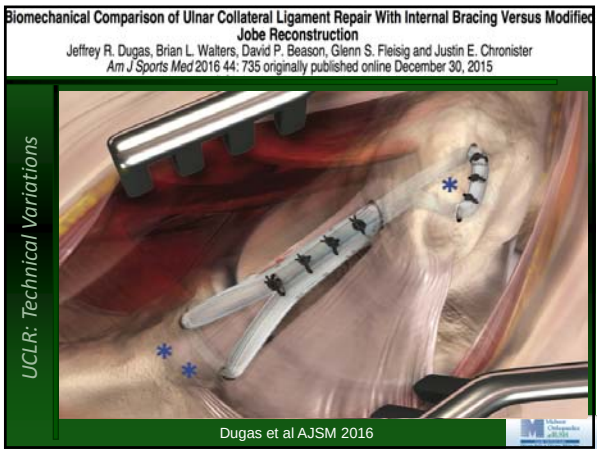
Post-Operative Films - Docking

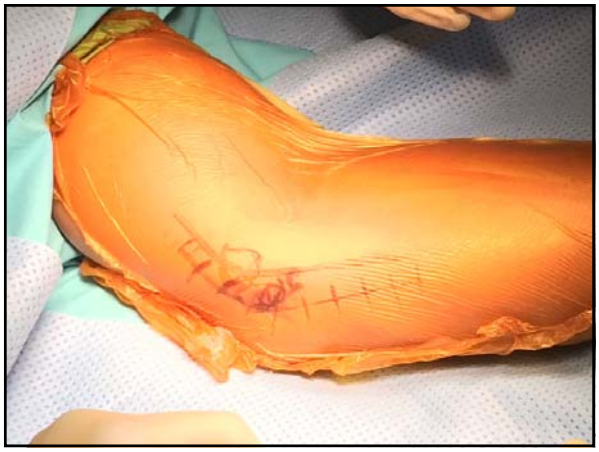
Outcomes Based on Technique

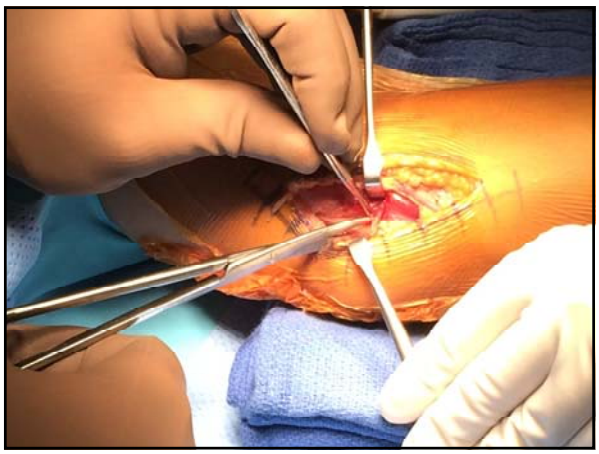
	KJOC	Andrews-Timmerman	RTS	Complications*	Reoperations
Docking (N=49)*	90.53±7.61	92.55±6.86	91.84%	7	5
Double Docking (N=36)	90.15±5.31	92.5±7.61	97.22%	1	1
P-Value	0.783	0.975	0.39	0.0364	0.236

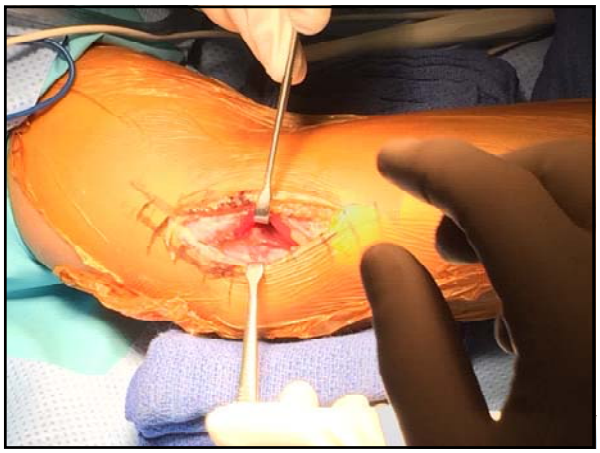
UCLR: Tec

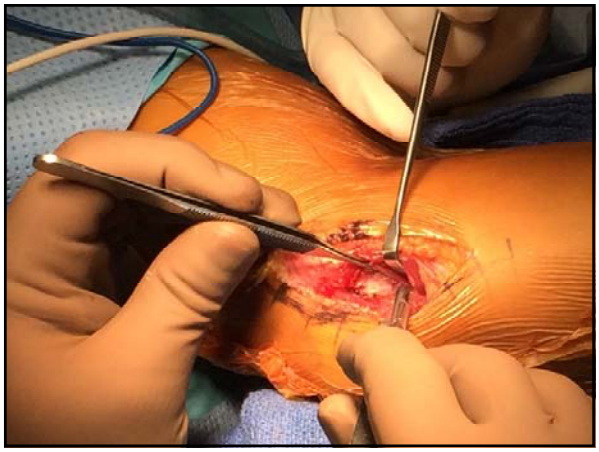
Our outcomes based on surgical technique– no difference seen between techniques

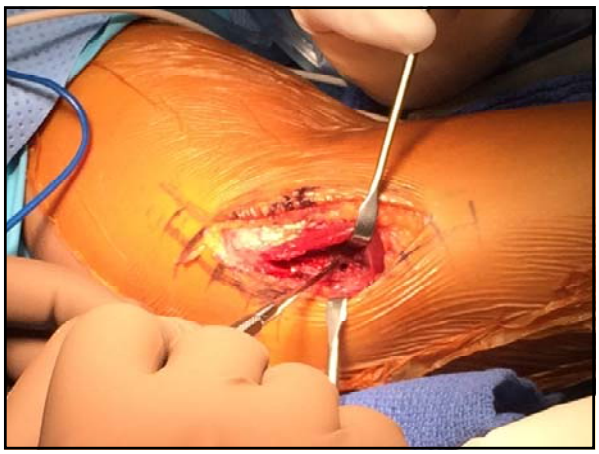

Biomechanical Comparison of Ulnar Collateral Ligament Repair With Internal Bracing Versus Modified Jobe Reconstruction
Jeffrey R. Dugas, Brian L. Walters, David P. Beason, Glenn S. Fleisig and Justin E. Chronister
Am J Sports Med 2016 44: 735 originally published online December 30, 2015
UCLR: Technical Variations
Dugas et al AJSM 2016

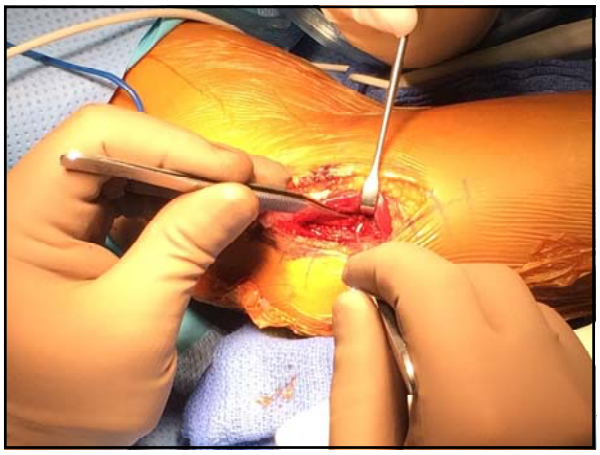


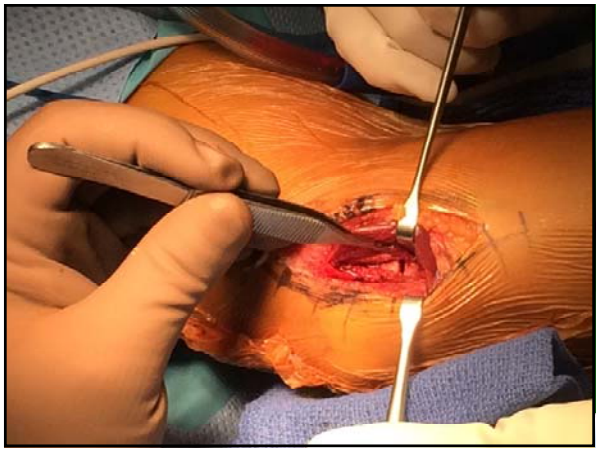


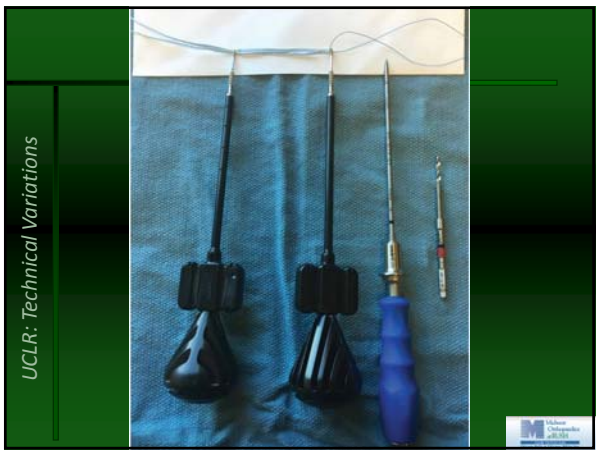


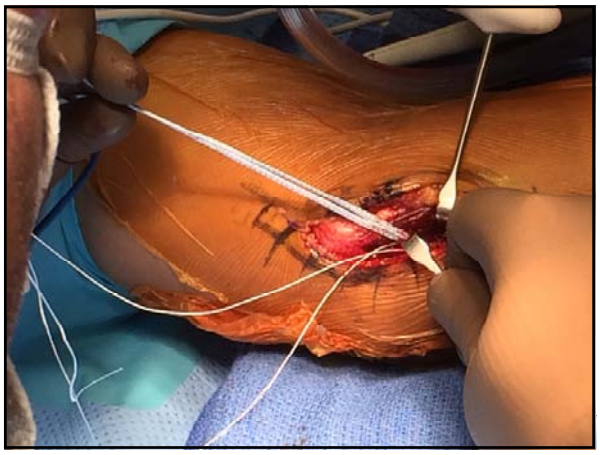


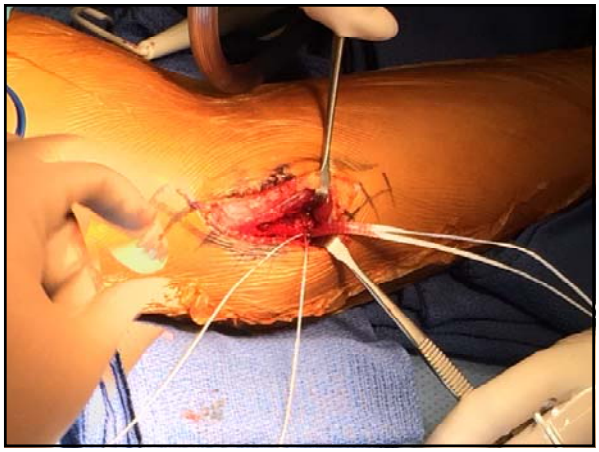


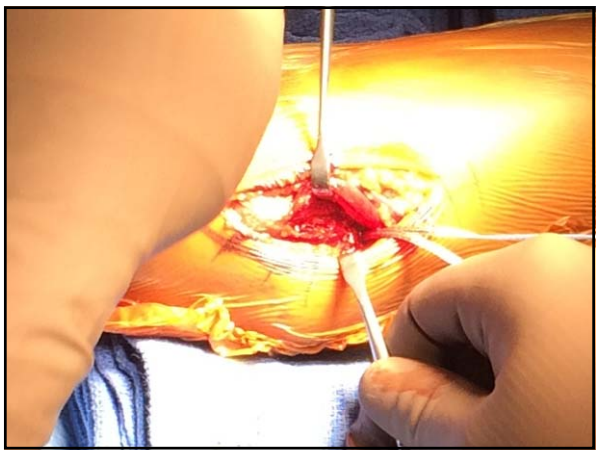


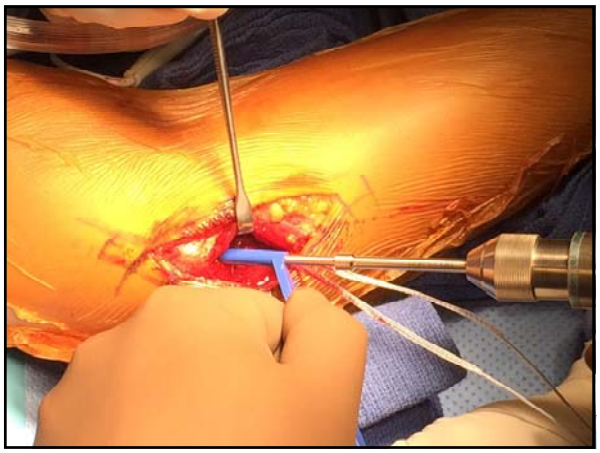


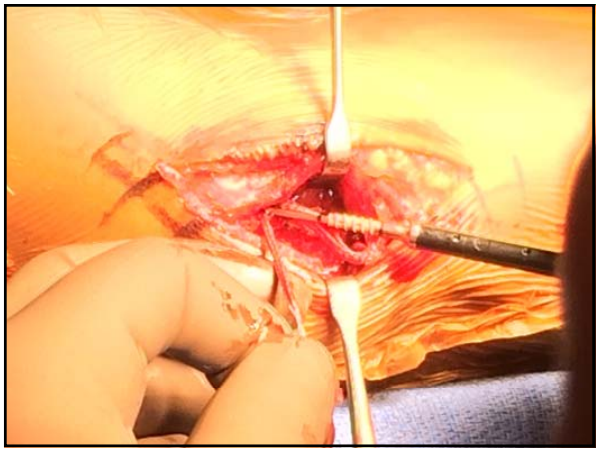

UCLR: Technical Variations

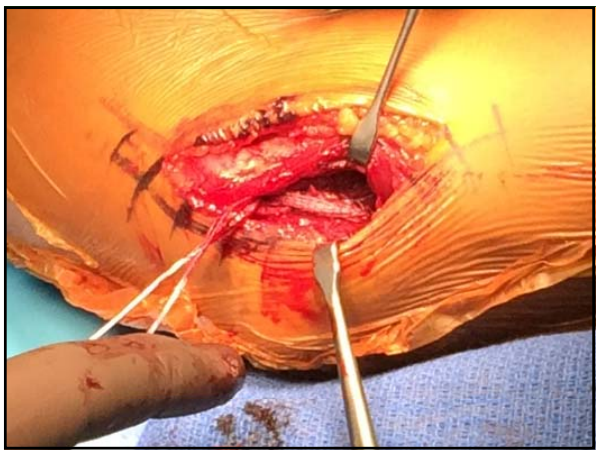


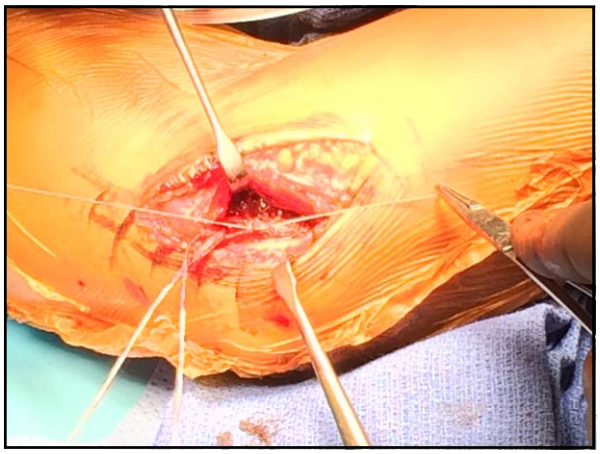


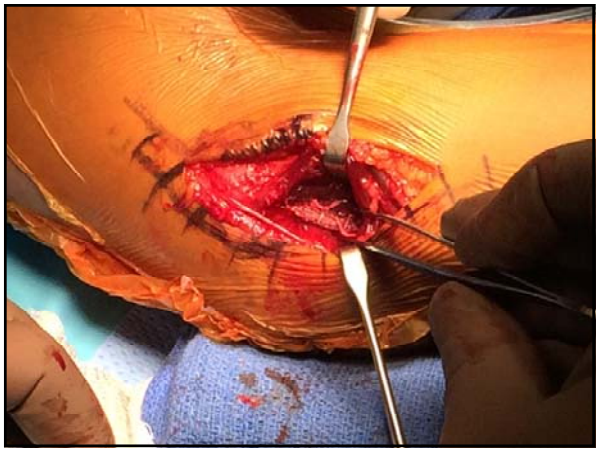












Outcomes with Internal Splint

UCLR: Technical Variations

- Preliminary results are encouraging
- Only used in a select group of patients
- Avoid over constraining the UCL
- Likely faster RTS

"A clear, concise surgical algorithm for UCL reconstruction is lacking"

UCLR: Technical Variations

J Am Acad Orthop Surg. 2016 Mar;24(3):135-49. doi: 10.5435/JAAOS-D-14-00323.
Comparison of Surgical Techniques for Ulnar Collateral Ligament Reconstruction in Overhead Athletes.
Chang ES[1], Dodson CC, Ciccotti MG.
Author information
Abstract
Several surgical techniques and modifications for ulnar collateral ligament (UCL) reconstruction have been proposed since this procedure was first performed in 1974. The goal of these techniques has been restoration of stability to the medial elbow with minimal alteration to the surrounding anatomy. Outcome studies and systematic reviews on modified techniques for UCL reconstruction have shown a trend toward increased return to play in patients, particularly overhead athletes. Abandonment of flexor pronator mass detachment in favor of a muscle-splitting or muscle-elevating approach, minimal handling of the ulnar nerve, and the docking technique may result in improved outcomes and decreased complications without diminished performance. Several biomechanical studies have compared the structural properties of these techniques with those of the native UCL. However, a clear, concise surgical algorithm for UCL reconstruction is lacking. Additional studies that use sport-specific outcome measures and performance metrics may better demonstrate the true return to preinjury performance after UCL reconstruction in overhead athletes.
PMID: 26890035 DOI: 10.5435/JAAOS-D-14-00323

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