Surgical Treatment of Thumb CMC Joint Arthritis Literature Review

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Non-Arthroplasty Treatments
- Denervation
- Arthrodesis
- Arthroscopy
- Trapeziectomy
  - Alone
  - LRTI
  - Suspensionplasty
Denervation

Prospective case series of 31 thumbs

Kapandji score, key pinch, and pain improved in all patients

Grip improved in 10 patients

6 pts dissatisfied, of those 4 had grade IV disease

2017 – UK

Prospective case series of 31 thumbs

2 incision + PIN

Thumb carpometacarpal joint denervation for primary osteoarthritis: A prospective study of 31 thumbs.

Giesen T, Klein Hu, Franchi A, Medina JA, Elliot D.
Denervation

- 2019 - Johns Hopkins
- Retrospective case series of 12 patients
- Wagner approach
- 11 of 12 reported complete or near complete pain relief at 15 months
- Grip strength improved by 4.1 kg and key pinch by 1.7 kg from baseline at final follow-up
Denervation

- 2019 J Surgical Research - UK
- Initially designed as RCT, but converted to non randomized
- 35 denervation and 10 trapeziectomy
- No significant difference in Michigan Hand Q, VAS, cost, quality of life scores, or time to return to work at 5 year f/u
- 9 of 35 in denervation group converted to trapeziectomy due to pain within 12 months post op
- Conclusion:
  - No significant difference (Except for those converted to trapeziectomy)
  - Denervation group had quicker rehab, but higher reoperation rate
Denervation

- Germany 2016
- 42 patients with stage II or III disease
- Denervation, open joint lavage, capsular imbrication
- 41.2 month follow up
- Numerical Pain Rating from 7.5 to 1.1
- DASH, Cooney-Wrist, and Krimmer-Wrist score improved
- No neuroma or sensory loss
- Conclusion
  - Effective for pain relieve as an alternative to arthroplasty
Arthrodesis

- Netherlands
- 25 thumbs
- Patient related outcomes followed to 10.8 years
- DASH - 52.1 to 29.2
- PRWHE 25 at final f/u
- Mean satisfaction was 10 / 10 – excellent
- 8 plate removals

- Netherlands
- RCT comparing arthrodesis and LRTI in women >40
- 43 patients enrolled
- PRWHE and DASH scores improved in both groups, but were not statistically sig.
- Early termination of data collection before adequate sample obtained
- Increased complication rate in arthrodesis group 71% vs 29% in LRTI
  - 2 non-union, 3 delayed union, 3 scar TTP, 3 sensory nerve

Arthrodesis of the Carpometacarpal Thumb Joint for Osteoarthritis; Long-Term Results Using Patient-Reported Outcome Measurements.

van Laaenhoven CMCA, Schrier VJA M, van Heijl M, Schuurman AH.

Trapeziometacarpal arthrodesis or trapeziectomy with ligament reconstruction in primary trapeziometacarpal osteoarthritis: a randomized controlled trial.

Vermeulen GM, Brink SM, Slijper H, Falter J, Moojen TM, Hovius SE, Selles RW.
Arthrodesis

China - 2019

39 patients - 22 arthrodeses and 17 LRTI with FCR followed for 2.5 years

No significant difference in DASH, grip strength, or VAS pain score

Pinch significantly better in arthrodesis group

Palmar and radial abduction and Kapandji opposition better in LRTI group

100% union rate
Arthroscopic Hemitrapeziectomy for First Carpometacarpal Arthritis: Results at 7-year Follow-up

Eric P. Hofmeister • Robert S. Leak • Randall W. Culp • A. Lee Osterman

2009 – HAND

- 18 thumbs treated with arthroscopic HT, thermal capsular plication, and temporary K-wire fixation
- 7.6 year f/u
- Subjective improvement in pain, pinch activities, strength, and ROM
- Return to work at 5.2 weeks
- Key pinch improved from 8 to 11 lbs
- Tip pinch improved from 4 to 5 lbs
- No revision surgery, 20% loss of composite thumb ROM
Arthroscopy

Prospective series of 144 thumbs
73 arthroscopic trapeziectomy without interposition
71 in interposition group (52 Graftjacket, 19 OrthoADAPT and Artelon)
Mean f/u 7.4 and 5.6 years
Improved pain, pinch, and grip for both groups at final f/u (minimum of 1 year)
No significant difference
Artelon group had worse results than GJ group
6 / 13 OrthoADAPT pts required revision surgery for pain (4 extrusions)
Interposition did not improve results
Worse results and higher failure rates with Artelon and OrthoADAPT
Arthroscopy

2018 – HAND

Retrospective cohort comparing 11 thumbs that had AAA to 15 that had LRTI with Eaton II or III CMC OA

AAA = arthroscopic synovectomy, debridement, and pinning

Less improvement in VAS and DASH AAA

8 pts in arthroscopy group went on to LRTI

Conclusion: Higher revision rate, more post operative pain, lower patient-rated outcomes in AAA compared to LRTI
Trapeziectomy

Hematoma and Distraction Arthroplasty for Thumb Basal Joint Osteoarthritis: A Prospective, Single-Surgeon Study Including Outcomes Measures

Craig A. Kuhns, MD, Los Angeles, CA, Eric T. Emerson, MD, Gastonia, NC, Roy A. Meats, MD, Los Angeles, CA

- 2003 - JHS
- 26 pts followed for 24 months
- 92% had complete pain relief at 24 months
- 24/26 had full adduction
- 47% increase grip, 33% and 23% increase in key and tip pinch

Conclusion
- Hematoma and distraction restores a stable pain free thumb in most patients
Trapeziectomy vs Interpose vs LRTI

- 2012 – UK
- 153 thumbs randomized into 3 groups
  - Trapeziectomy
  - Trapeziectomy + PL interposition
  - LRTI w/ half FCR
- K-wire placed in all 3 groups
- No difference in pain relief, grip strength, key and tip pinch strength
- No difference in complications
- Conclusion
  - No significant difference between groups
Trapeziectomy vs LRTI

- JHS – E 2007
- 65 patients randomized, 12 month f/u
- Trapeziectomy or Trapeziectomy with FCR LRTI
- ROM
  - Both groups had improved ROM
  - No significant difference in palmar abduction
  - Significantly greater radial abduction in Trapeziectomy only group
- Pain and Function
  - No difference in Pain, Grip, Key, and Tip pinch
- Scaphometacarpal distance better maintained in LRTI group
- Conclusion
  - No clinical benefit to LRTI compared to Trapeziectomy alone
Retrospective study of 12 LRTI and 9 HDA

Excellent pain relief in both groups

No significant difference in QuickDASH, VAS, grip, tip or lateral pinch

Amount of proximal migration was similar

LRTI took 54 minutes longer

Conclusion

Both groups satisfied and had comparable objective and subjective outcomes
APL Suspensionplasty vs LRTI

- 2020 HAND U of Florida
- Retrospective review of 139 patients
- 51 suspensionplasties and 151 LRTIs
- APL and LRTI
  - Pain relief - 92.5% and 94%
  - Grip and pinch were 41.2 and 10.4 vs 42.1 and 9.7
  - Mean f/u of 3.3 and 8.4
- Conclusion
  - APL suspension provides similar pain relief and functional outcomes to LRTI
Suspensionplasty vs LRTI

Trapeziectomy With Suspension-Interposition Arthroplasty for Thumb Carpometacarpal Osteoarthritis: A Randomized Controlled Trial Comparing the Use of Allograft Versus Flexor Carpi Radialis Tendon.

Marks M\textsuperscript{1}, Hensler S\textsuperscript{2}, Wehrli M\textsuperscript{2}, Scheibler AG\textsuperscript{3}, Schindele S\textsuperscript{3}, Herren DB\textsuperscript{3}.

- 2017 JHS – Switzerland
- 60 pts randomized to FCR Suspensionplasty (Weilby) or Trapeziectomy with Allograft Suspensionplasty
- 12 month f/u
- MHQ scores increased in both groups. No statistically significant difference
  - 51 to 83 in FCR group and 53 to 76 in allograft group
- Similar trend in MHQ Pain scores, DASH, SF-12, and grip strength
- More complications in allograft group including higher incidence of FCR tendonitis
- No Benefit of Allograft with higher complications
Suture Suspensionplasty

2019 JHS
- Retrospective review of 320 thumbs
- Trapeziectomy with suture suspensionplasty of APL and FCR
- Average trapezial height on final f/u 0.8 cm
- VAS 0.6
  - No pain in 269, minimal in 49, unchanged in 2
- Operative time 23.4 minutes

Conclusion
- Suture suspension provides comparable clinical results to other techniques without implants, tendon harvest, k-wires, and shorter operative time
Suture Suspensionplasty

- 2020 Ann Plastic Surgery – Korea
- 36 thumbs
- Mean f/u 26 months
- Patient reported outcome improvements
  - VAS 5.9 to 0.4
  - DASH 51.6 to 27.0
- ROM
  - Opposition improved 49.1 to 54.1
  - Kapandji score improved from 7.8 to 9.3
- Grip and key pinch did not significantly improve
- Conclusion:
  - Suture suspension provides comparable clinical results to other techniques without implants, tendon harvest, k-wires, and shorter operative time
Mean 5-Year Follow-up for Suture Button Suspensionplasty in the Treatment of Thumb Carpometacarpal Joint Osteoarthritis

Jeffrey Yao, MD,* Andre Eu-Jin Cheah, MD, MBA†

- 2015 JHS
- Retrospective review of 16 thumbs in 14 pts
- Mean f/u 64 months
- Quick-DASH improved by 58.2
- ROM
  - Palmar and radial abduction were 105% and 97% compared to non-op hand
  - Kapandji scores were 9 or 10 in all
- Strength
  - Pinch and grip were 107% and 102% of non-op hand
- Conclusion
  - Improvement in pain, ROM, and strength with SB
Suture Button

- 2019 Wrist Turkey
- 21 patients
- Mean f/u 50.1 months
- ROM
  - Kapandji score improved from 7.6 to 9.2
- VAS improved from 8.2 to 1.9
- DASH 23.4 to 5.5
- Grip and pinch
  - 66.2 to 75.1 and 14.8 to 20.2

Arthroscopic Hemitrapeziectomy and Suture Button Suspensionplasty in the Treatment of First Carpometacarpal Joint Eaton–Littler Stage 2–3 Arthritis

İsmail Bülent Özçelik, Meriç Uğurlar, Abdulkadir San
Suture Button versus Trapeziectomy

2015 J of Orthopedics – UK

Retrospective study of 26 trapeziectomies and with 30 SB

Mean f/u 13.8 months and 26.4 for trapeziectomy

QuickDASH, PRWE, and Nelson scores improved in all, but no difference between groups

2 complications in SB group

1 suture reaction and 1 need for revision after TR failure

Conclusion

SB did not improve functional outcomes

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Patient functional outcomes with trapeziectomy alone versus trapeziectomy with TightRope®

Arvind Mohan, Michael Shenouda, Hiba Ismail, Ankit Desai, Joshua Jacob, Tanaya Sarkhel

Department of Trauma and Orthopaedic Surgery, St Peter’s Hospital, Chertsey KT16 0PZ, Surrey, UK
Suture Button versus APL Suspension

- 2015 HAND
- Retrospective study
- 33 patients in APL group and 27 in suture button group
- Mean f/u of 17.6 months for APL and 9.5 for SB
- DASH, VAS, ROM, Grip, and Pinch improved in both
- No statistical difference between the two
- Motion with therapy initiated at 2 weeks in button group versus 4 weeks in APL group

Conclusion
- Similar short term clinical outcomes
- Suture button has potential of earlier ROM
LRTI versus Ligament Reconstruction Only

2004 JBJS

52 thumbs

Better palmar and radial abduction, cosmeses, and desire to have procedure again with LR

No difference in pinch strength, pain, daily function, dexterity, overall satisfaction, or return to work

No difference in proximal migration of metacarpal

Conclusion

- Interposition did not improve outcomes compared with LR alone
- Proximal migration of the metacarpal didn’t affect functional outcome
FCR LRTI with bone tunnels versus FCR/APL Suspension

- 2014 JHS – Netherlands
- 79 women over 40 randomized to FCR LRTI or Weilby Suspensionplasty
- At 3 months PRWHE and pain were significantly better in the bone tunnel / LRTI group
- At 12 months no significant difference in PRWHE, DASH, pain, ROM, strength, return to work time, satisfaction, or complications

Conclusion
- Bone tunnel / LRTI had better function and less pain at 3 months than non bone tunnel technique, but no difference at 12 months
- Authors prefer bone tunnel
Systematic Review

- JHS 2019 - Australia
- Failure rates calculated per 100 procedure years
- 125 implant and 33 non implant articles
- Implant arthroplasty failure rates per 100 procedure years
  - Total joint arthroplasty – 2.4
  - Hemi-arthroplasty – 2.5
  - Interposition w/ no, partial, or complete trapezial resection – 4.5, 4.5, and 1.7
- Non implant Failure Rates per 100 procedure years
  - Trapeziectomy – 0.49, Arthrodesis – 0.52, LRTI – 0.23
- Conclusion
  - Non implant group had significantly lower failure rates than implant group
  - Certain implants had particularly high failure rates
Online survey to active ASSH members

LRTI with entire FCR preferred technique - 37.44%

Personal Experience

24.17% of surgeons with >5 years experience have changed techniques in last 5 years

Conclusion

- Suture suspension use increasing, especially among the young
- US surgeons rely less on current evidence
- More opiates prescribed in US compared to international surgeons
Conclusion

- Many techniques that work
- Large amount of level IV evidence
- Trapeziectomy supported by level I evidence
Thank You
References


References


