Proximal Hamate Graft for Proximal Scaphoid Reconstruction Restores Native Carpal Kinematics

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No conflict of interest
Arthrex® provided compression screw
Proximal Scaphoid Pole Reconstruction Utilizing Ipsilateral Proximal Hamate Autograft

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No difference in Carpal kinematics
Does a proximal hamate graft to reconstruct the proximal pole of the scaphoid restore native carpal kinematics?
Methods

8 fresh-frozen mid-forearm cadaver specimens

Only Lunate Viegas Type I
No evidence of arthritis
No SL abnormalities under stress X-rays
Methods

- Moiré Phase Tracking 3D motion
- Tracking sensor hardware and motion capture software
- Optoelectronic sensors
Scaphoid proximal pole reconstruction with proximal hamate graft

Volar Capito
Hamate Ligament

Medial
Proximal
Scaphoid proximal pole reconstruction with proximal hamate graft

Volar Capito Hamate Ligament

Medial Proximal

180°

Hamate Scaphoid
After Screw Fixation

Volar Capito Hamate ligament
After Screw Fixation

After SLIL Repair

Volar Capito Hamate ligament
Methods

1) intact
2) scaphoid proximal pole fracture
3) proximal hamate autograft
Kinematics Measurements

- Scapho Lunate Joint Motion
- Luno Capitate Joint Motion

In Wrist Flexion / Extension
Radial / Ulnar Deviation
Statistical analysis

Multivariate repeated-measures Anova test

To compare the SL and LC angles at each 5° interval of flexion/extension and radial/ulnar deviation

Power analysis

A power analysis set at 80% power (1 - β) and α = 0.05 indicated that an effect size of 2.5 degrees of inter-carpal motion could be attained with a sample size of \( n=8 \)
Results
Wrist Flexion Extension

Scaphoid and Lunate Flexion - Extension

Lunate and Capitate Flexion - Extension

Scaphoid and Lunate Radial - Ulnar deviation

Lunate and Capitate Radial - Ulnar deviation

No Difference
Wrist Radial Ulnar Deviation

Lunate and Capitate Radial-Ulnar deviation

Fracture
Intact
Graft

Lunate and Capitate Flexion-Extension

Significant Difference
Wrist Radial Ulnar Deviation

Scaphoid and Lunate Flexion – Extension

Significant Difference
Discussion

Limits

• Non vascularized graft
Discussion

Limits
• Non vascularized graft

Advantages
• Same donor site
Discussion
Discussion

An Anthropometric Assessment of the Proximal Hamate Autograft for Scaphoid Proximal Pole Reconstruction

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Proximal Hamate Graft fit the Proximal Pole of the Scaphoid in 69% cases
Discussion

Limits

• Non vascularized graft
Discussion

Limits

• Non vascularized graft

Advantages

• Same donor site
Discussion

Limits

• Non vascularized graft

Advantages

• Same donor site
• Reconstruction of the SL Ligament
Conclusion

• Proximal Hamate Graft of proximal pole of the scaphoid restore carpal kinematics

• Proximal Hamate Graft can be an alternative for Non Salvageable Proximal Pole Scaphoid Nonunion
Merci

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