Excision of the Trapezium

Krishna Mohan Iyer*
Orthopaedic Surgeon, India

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*Corresponding author: K Mohan Iyer, K Mohan Iyer, Senior Consultant, Orthopaedic Surgeon, Flat No: 120/H-2K, First Floor, Kailash Apartments, 8th Main Road, Malleswaram, Bangalore, 560005, Karnataka State, India, Tel: +91 9632683264; Email: kmihyer28@hotmail.com

Original Work


The Trapezium Surfaces

a. Palmar Surface-Groove and a Tubercle.
b. Dorsal Surface-Related to Radial Artery.

Normal Wrist Joint Compartments

a. Radiocarpal Joint.
b. Inferior Radioulnar Joint.
c. Midcarpal Joint.d. Isolated Carpometacarpal Joint the Thumb (Figure 1)

Intercarpal Joints

a. Joints between bones of the proximal row.
b. Joints between bones of the distal row.
c. Midcarpal Joint
i. Between these two rows of bones.
ii. S shaped cavity lined by synovial membrane.
iii. Has 2 projections proximally and 3 projections distally.

Pathology

Stage I:

a. Pain
b. Synovitis
c. Local Swelling
d. Effusion into the joint (Figure 2)

Stage II:

a. Severe pain
b. Joint space narrowing
c. Medial osteophyte (Figures 3 & 4).
Carpometacarpal Arthritis of the Thumb

a. Age: 60 Years
b. Sex: Women (Post Menopausal)
c. Side: Right side; Both sides frequent
d. Predisposing Factors:
i. Trauma (30%)
ii. Developmental Anomalies
iii. Occupational
iv. Anatomical

Symptoms

a. Severe pain-Base of the thumb
b. Aggravated by movements
c. Swelling over the base of the thumb
d. Stiffness of the Thumb
e. Weak Grip

(A) Conservative Treatment

a. Physiotherapy
b. Radiotherapy
c. Splint
d. Intra-articular Steroids

(B) Surgical Treatment

a. Forage
b. Intra-articular Tenodesis
c. Excision of the Trapezium
d. Arthrodesis
e. Silicone rubber interpositional arthroplasty
f. Prosthetic Replacement
i. Charcot and Leri (1926)
ii. Robert (1936)
iii. Forestier (1937)
iv. Lasserre, Pauzat and Derennes (1949)
v. Muller (1949) and Brittain (1952) - Arthrodesis of the carpometacarpal joint of the thumb. Stressed the difficulty of obtaining a successful fusion of this small joint.
vi. Dickson (1976):
a. Silicone rubber sponge interposition arthroplasty.

Stage III:

a. Severe pain
b. Marked decrease of joint space Subluxation of the metacarpal (Figure 5).

Stage IV:

a. Subluxated metacarpal fixed by fibrosis & contracture
b. Marked hyperextension deformity of the MCP joint Flexion deformity of the IP joint
c. Pain minimal or nil Fixed adducted thumb (Figure 6).
b. Excellent results in 15 of the 16 wrists.
c. Silicone promotes development of repair fibrous tissue.

vii. Swanson (1972) - Heat molded, intramedullary stemmed silicone rubber implant. Early results not encouraging due to advancement of insertion of abductor pollicis longus with reinforcement of capsule with a slip from flexor carpi radialis.

viii. Gervis (1949) 18 wrists with 16 good results. (1973) 12 wrists followed up for 6 to 22 years.


xi. Sims & Bentley (1970) 27 Trapeziectomies with excellent results in 15, Good in 6, Fair in 5 & Poor in one. Incidence of 54% of patients with associated Trapezio-Scaphoid Arthritis.

xii. Gervis (1949) 18 wrists with 16 good results.

xiii. Gervis (1973) 12 wrists followed up for 6 to 22 years


xvi. Marmor and Peter (1969) 7 wrists with 5 good results.

xvii. Sims and Bentley (1970) 27 Trapeziectomies with excellent results in 15, good in 6, fair in 5 and poor in one. Incidence of 54% of patients with associated Trapezio-Scaphoid arthritis.


Clinical Evaluation

a) Name
b) Age
c) Sex
d) Dominant Hand
e) Occupation
f) Time off work: Pre-op, Post-op & Total.
g) Return to original occupation.
h) History of Injury.
i) Duration of complaints pre-op.
j) Time since surgery.

Associated Conditions

a) Cervical Spondylosis.
b) Periarthritis Shoulders.
c) Stenosing Tenovaginitis.
d) Median nerve compression.
i. Surgical - Incision.
ii. Post operative management (Table 1) (Figures 7-17).

Table 1: Clinical Evaluation.

<table>
<thead>
<tr>
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<th>Number of patients</th>
<th>Number of operations</th>
<th>Age (Years)</th>
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<tr>
<td></td>
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<td></td>
<td>Average</td>
</tr>
<tr>
<td>Males</td>
<td>9</td>
<td>13</td>
<td>67.66</td>
</tr>
<tr>
<td>Females</td>
<td>9</td>
<td>13</td>
<td>58.11</td>
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Figure 7: Thumb Movements.

Figure 8: Thumb Movements.

Figure 9: Thumb Movements.

Figure 10: Thumb Movements.
Results

Thumb Movements:

I. Abduction
   a) Normal range + Power - 18 wrists
   b) Less than 50% - 8 wrists

II. Opposition
   a) Normal range + Power - 14 wrists
   b) Normal range + 50% Power - 9 wrists
   c) Less than 50% R+P - 3 wrists

III. Adduction
   a) Normal Power - 25 wrists
   b) Poor - 1 wrist

IV. Circumduction
   a) Normal - 25 wrists
   b) Poor - 1 wrist

Associated Features:

a) Cervical Spondylosis - 13/18 patients.
b) Periarthritis Shoulders - 9/18 patients.
c) Stenosing Tenovaginitis - 3/18 patients.
d) Median nerve compression - 4/18 patients (Surgical Decompression in 2 patients)
i. Follow up - 2 months to 14 years
ii. Duration of complaints pre-operative - 1 year to 10 years
iii. Total time off work - 3 months
iv. Return to original occupation - 11 patients
v. History of injury - 7/26 wrists
vi. Dominant hand - 13/18 patients
vii. Hand span
   a) Bilateral cases (8 patients) - equal
   b) Rest (10 patients) - 1.25 cms (average)
viii. Shortening of the thumb
   a) Bilateral cases (8 patients) - equal
   b) Rest (10 patients) - 1 cm (average)
ix. Intermetacarpal angle
   a) Normal - 23/26 wrists
   b) Less than normal - 3/26 wrists
e) Functioning tendons of Flexor carpi radialis and Flexor pollicis longus = 26/26 wrists.
f) Decreased sensations over the dorsum of the base of the thumb = 3/26 wrists.
g) Keloid formation = 5/26 wrists.
h) Palpable Neuroma = None.
i) Opposition Grip:
   a) Normal Power = 6 wrists, Decreased power = 20 wrists
j) Pinch Grip: (Figures 18-23).

Radiographic Assessment
i. Level of first metacarpal base.
ii. Accessory Ossicles.
iii. Radiologic gap.
iv. Telescoping.
v. Stress views.
vi. Degenerative changes:
   a) Base of first metacarpal
   b) Distal Scaphoid
c) Elsewhere in the carpus

Radiographic Features
a) Telescoping = 14 wrists (55%)
b) Accessory Ossicles = 9 wrists (40%)
c) Radiological Gap = 1 mm to 6 mm
d) Degenerative changes:
   i. Base of first metacarpal = 14 wrists
   ii. Distal Scaphoid = 8 wrists
   iii. No changes = 11 wrists (Figure 24).
e) Residual Cartilage:
i. Base of first MC - Nil in 3 wrists
ii. Present in 22 wrists Distal Scaphoid - Nil in 2 wrists
iii. Present in 23 wrists 6.Lateral subluxation of 1st MC on Abduction
iv. Marked subluxation in 3 wrists Moderate subluxation in 22 wrists (Figure 25).

Figure 25: Radiographic Features.

f) Maintenance of joint space despite subluxation of the 1st MC on the Scaphoid on radial deviation of the wrist.
g) Stress views of the wrist:
i. No changes = 9 wrists
ii. Widening of the Sc-Trap.Jt =12 wrists
iii. Widening of the Sc-Cap.Jt = 6 wrists
iv. Widening of gap between the bases of 1st & 2nd MC’s = 6 wrists (Figures 26-28).

Figure 26: Radiographic Features.

Figure 27: Radiographic Features.

Figure 28: Radiographic Features.

Arthrography of the Metacarpo-Scaphoid joint

Technique (Figures 29 & 30)

Figure 29: Arthrography of the Metacarpo-Scaphoid joint.

Figure 30: Arthrography of the Metacarpo-Scaphoid joint – Technique.

Arthrographic assessment

a) Amount of dye injected.
b) Ease of location of the joint & injection.
c) Residual articular cartilage over:
i. Base of the first metacarpal.
ii. Distal Scaphoid.

Arthrographic Assessment
d) Joint Features
(A) Isolated.
(B) Communications-
(C) Midcarpal
(D) Radiocarpal
(E) Radioulnar
(F) Tendon Sheaths
(G) Pouch between 1st & 2nd metacarpal bases
e) Stress Views (Figures 31 & 32).

Figure 31: Arthrographic Assessment.
Arthrographic Features

a) Distinct Joint Space - 25 wrists
b) Comm. with midcarpal joint - 10 wrists
c) Comm. with radiocarpal joint - 2 wrists
d) Comm. with distal RU joint - 1 wrist
e) Comm. with tendon sheaths - 4 wrists
f) Contour-Irregular & small - 16 wrists
i. Regular & larger - 9 wrists (Figures 33-36).

Figure 32: Arthrographic Assessment.

Figure 33: Arthrographic Features.

Figure 34: Arthrographic Features.

Figure 35: Arthrographic Features.

Figure 36: Arthrographic Features.

Conclusion

i. Excision of the Trapezium gives good results with respect to relief of pain.
ii. Good hand function despite some reduction in the power of Opposition grip and Pinch grip.
iii. Carpal Instability or Laxity may account for decreased Opposition grip & Pinch grip.
iv. Distinct joint space
   a) Small & Irregular within 6 months of Surgery
   b) Large & Regular thereafter
   c) Marked subluxation indicates weak grip
v. Late deterioration of pseudoarthrosis in one patient

References


35. (1989) Arthritis of the basal joint of the thumb. From Department of Orthopaedic Surgery, the Johns Hopkins University School of Medicine, Baltimore, Maryland. The Journal of arthroplasty 4(1): 65-78.


37. Thumb Basilar Joint Arthritis.


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