Treatment of First Carpometacarpal Osteoarthritis with Arthroscopy: A Systematic Review

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Objectives:

- First carpometacarpal (CMC) osteoarthritis or trapeziometacarpal osteoarthritis is a common condition with a myriad of treatment options. This study aimed to perform a systematic review of the use of arthroscopic techniques for the treatment of first CMC arthritis to assess the effectiveness of different arthroscopic techniques.

Methods:

- A search of PubMed and Embase was performed using Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Grip strength, pinch strength, visual analog scale, Disability of Arm Shoulder and Hand (DASH) scale, range of motion (ROM), and complications were recorded. Mean values were calculated and compared.
- Two subgroup analyses were performed by comparing the outcomes of studies that implemented the following surgical techniques: 1) trapeziectomy of any type vs. debridement alone 2) trapeziectomy alone vs. interposition vs. suspension techniques.

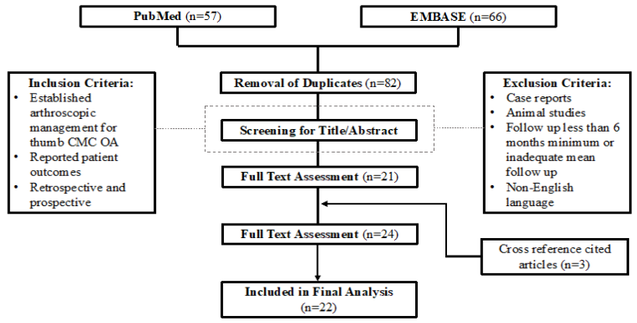

Fig 1. Study Selection Process

Results:

- Twenty-two studies were included (Fig 1.), with 733 operations performed across 708 patients. Preoperative and postoperative scores significantly improved for DASH scores, pain at rest and with activity, with variable improvements in ROM (Table 1).
- Complications occurred in 13% of cases in those publications that reported complications, with non-specific pain or irritation being the most common complication (58%).
- In one subgroup analysis comparing studies that utilized techniques with any type of trapeziectomy to debridement alone, only the trapeziectomy subgroup showed significant improvements in pain (Table 2).
- When comparing trapeziectomy alone to interposition and suspension techniques, mean DASH scores and pain levels significantly improved in the interposition and suspension subgroups (Table 3).

Conclusions:

- In a predominantly female population with Eaton-Littler stage II and III disease, arthroscopic techniques significantly improved pain scores, both resting and active, as well as DASH scores.
- All the arthroscopic techniques improved both pain and functional outcomes, with more predictable improvements in those who underwent trapeziectomy and either interposition or suspensionplasty.
- The results of this study can be used for the foundation of future large prospective studies assessing the most effective techniques in the arthroscopic management of CMC arthritis.

Outcome Measure	Value	Sample Size (% of all operations)	P Value
Grip Strength (kg)			
Preoperative	18.36	374 (51.0%)	0.098
Postoperative	22.58	264 (36.0%)	
Oppositional Pinch Strength (kg)			
Preoperative	4.25	351 (47.9%)	0.206
Postoperative	5.34	256 (34.9%)	
Appositional Pinch Strength			
Preoperative	2.76	100 (13.6%)	0.407
Postoperative	4.70	130 (17.7%)	
Pan Score at Rest			
Preoperative	6.64	327 (44.6%)	**<0.002**
Postoperative	1.28	219 (29.8%)	
Active Pain Score			
Preoperative	7.19	75 (10.2%)	**<0.002**
Postoperative	1.30	75 (10.2%)	
DASH			
Preoperative	42.73	195 (26.6%)	**<0.02**
Postoperative	23.12	289 (39.4%)	

Table 1. Combined Analysis Outcome Measures. Bold P values indicate significance. Alpha = 0.05.

Table 2. Subgroup 1 Analysis Outcome Measures comparing techniques involving trapeziectomy to those without trapeziectomy Bold P values indicate significance. Alpha = 0.05.

	Trapeziectomy (hemi or complete)			No Trapeziectomy (Debridement Alone)		
Outcome Measure	Value	Sample Size (% of all operations)	P Value	Value	Sample Size (% of all operations)	P Value
Grip Strength (kg)						
Preoperative	18.5	53.8%	0.225	17.2	38.3%	0.434
Postoperative	22.4	38.0%		24.0	27.1%	
Pinch Strength (kg)						
Preoperative	4.3	54.7%	0.257	-	-	-
Postoperative	5.3	38.8%		-	-	
Lat. Pinch Strength (kg)						
Preoperative	2.5	12.5%	0.611	*	*	-
Postoperative	4.3	61.1%		-	-	
Pan Score at Rest						
Preoperative	7.3	16.8%	**<0.005**	6.6	38.3%	0.819
Postoperative	1.1	16.8%		5.3	38.3%	
Active Pain Score						
Preoperative	7.1	7.2%	**<0.007**	7.3	24.1%	0.077
Postoperative	1.0	7.2%		1.7	24.1%	
DASH						
Preoperative	37.1	19.8%	0.059	51.3	57.1%	0.159
Postoperative	20.0	33.0%		26.0	68.4	

	Trapeziectomy Alone			Interposition			Suspension		
Outcome Measure	Value	Sample Size (% of all operations)	P Value	Value	Sample Size (% of all operations)	P Value	Value	Sample Size (% of all operations)	P Value
Grip Strength (kg)									
Preoperative	18.5	83.2%	0.325	19.9	52.5%	0.720	17.2	38.5%	0.271
Postoperative	20.3	32.2%		23.4	41.5%		22.5	38.5%	
Pinch Strength (kg)									
Preoperative	4.8	63.6%	0.854	3.8	69.0%	0.469	4.3	38.5%	0.479
Postoperative	5.9	63.6%		4.8	58.0%		5.8	38.5%	
Lat. Pinch Strength (kg)									
Preoperative	1.6	32.2%	0.405	-	-	-	-	-	-
Postoperative	2.5	32.2%		-	-		-	-	
Pan Score at Rest									
Preoperative	6.6	70.6%	0.210	6.3	62.5%	0.085	7.6	19.5%	**<0.03**
Postoperative	1.0	70.6%		0.8	45%		1.2	19.5%	
Active Pain Score									
Preoperative	-	-	-	6.3	21.5%	**<0.02**	-	-	-
Postoperative	-	-		1.0	21.5%		-	-	
DASH									
Preoperative	-	-	-	54.6	18%	**<0.004**	39.5	21.4%	0.220
Postoperative	-	-		16.2	33%		14.5	40.5%	

Table 3. Subgroup 2 Analysis Outcome Measures comparing techniques involving trapeziectomy alone to those with interposition or suspension techniques. Bold P values indicate significance. Alpha = 0.05.