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Four Corner Fusion Vs. Proximal Row Carpectomy for The Treatment of Scapholunate Advanced Collapse

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Abstract

Background: One of the most typical wrist degenerative arthritis patterns is scapholunate advanced collapse (SLAC). Hyperextension or axial loading along with ulnar deviation or carpal supination is the mechanism causing scapholunate ligament injury. Additionally, a perilunate injury may leave behind scapholunate ligament insufficiency. Objective: to perform a systematic review and metanalysis comparing the outcomes of patients with SLAC managed by four corner fusion (4 corner fussij) and those treated with proximal row carpectomy regarding functional outcome, compliance, complications, union and patients' satisfaction in light of evidence-based medicine. Patients and Methods: the present study used two electronic medical databases: PubMed and Cochrane to identify relevant studies from January 2005 till December 2021 comparing 4CF and PRC for SLAC rresilt. Results: There were 158 individuals as an overall number in all the involved studies, 69 had done 4CF and 89 had done PRC. The average age of all studied was 50.23±15.9 and 56.89±14.36 between 4CF and PRC groups with no significant difference. The Distributionism of sex among included studies male percentage was 67.8% and 64.2% between 4CF and PRC groups. Conclusion: The comprehensive study has revealed that PRC and 4CF are both effective treatments for patients with symptomatic and staging SAC wrists. distribution 2 were PRC DASH s higher than 4CF. 4CF VAS distribution was lower than PRC. Grip strength was gighre in PRC than 4CF. extension flexion distribution was higher in 4CF than PRC.

Keywords: Corner Fusion, Proximal Row Carpectomy, Scapholunate.

1.Introduction

SLAC is one of the most typical wrist degenerative arthritis types. For those who have symptoms of SLAC and a degenerative condition that affects the radioscaphoid joint, surgery is necessary. The most common choices for motion-preserving restoration and therapy of this condition are PRC and 4-CA (1).

Following a scapholunate dissociation with rotatory subluxation of the scaphoid, SLAC naturally develops. The radioscaphoid joint is first affected by degenerative changes, then the midcarpal joints (capitolunate joint and scaphotrapeziotrapezoidal joint). When the capitate falls into the space between the lunate and scaphoid, the head in particular may disintegrate quickly. Due to the lunate's spherical shape and alignment with the lunate fossa, which make it very resistant to degenerative alterations, the radiolunate joint typically isn't affected. A SLAC wrist is likely to experience pain while being used and eventually while at rest, along with a decrease of ROM and grip strength [2].

Axial loading or hyperextension with carpal supination or ulnar deviation results in ligament damage. Additionally, a perilunate injury may leave behind scapholunate ligament weakness [4].

A complete scapholunate ligament rupture results in a static rise in the scapholunate interval (scapholunate dissociation), dorsiflexion of the lunate, and a tear of one or more extrinsic ligaments [5].

Additionally, the scaphoid experiences rotatory subluxation (volar flexion), and additional dorsal and proximal capitate translation, along with the distal carpal row, will lead to a deformity known as dorsal intercalated segment instability (DISI). The degenerative alterations termed as SLAC wrist are brought on by DISI, which results in aberrant articular loading [6].

Wrist osteoarthritis is a torturous illness progression that can impair upper extremity function and cause disability. After a serious injury to the scapholunate ligament, a common progressive form of wrist osteoarthritis known as SLAC typically develops [7].

Scapholunate diastasis, that is regarded as having a scapholunate interval twice as wide as a typical capitolunate joint interval or having a scapholunate distance greater than 4 mm as evaluated at scapholunate joint midpoint on the posteroanterior view are, scanning outecomes that can be seen with scapholunate disconnection [8].

When the scapholunate gap is between 2 and 4 mm, scapholunate dissociation may be suggested. The scapholunate interval widening on imaging has been referred to as the "Terry Thomas sign," after the well-known actor who had a noticeable gap between his front teeth [9].

The benefit of MRI is that it can immediately demonstrate a scapholunate ligament tear in addition to diastasis. For less money than MRI, ultrasound can be used to detect scapholunate ligament injuries. Because surgical stabilization devices might generate metal susceptibility artefact on MRI, reducing the capacity to examine the wrist ligaments, ultrasound is especially helpful for evaluating patients with past wrist fractures [10].

A rotational subluxation of the scaphoid results in a number of imaging abnormalities. The "signet ring" sign is caused by foreshortening of the scaphoid

and/or scapholunate interval widening (scapholunate diastasis), both of which can be detected on the PA radiograph (created when the waist is overlaid with the scaphoid tubercle). An elevated radioscaphoid angle >60° and/or a scapholunate angle >60–80° with a normal radiolunate angle might be noticed on the lateral radiograph. The usual scapholunate angle is between 30 and 60 ° [6].

The lateral radiograph can occasionally show the scaphoid subluxation onto the dorsal margin of the radius. The three SLAC arthropathy stages can be seen on imaging. Osteoarthritic alterations first appear in stage I SLAC in the radioscaphoid joint's most radial region. Sharp spurring and loss of the radial styloid process' typical rounded curve are the first alterations noticed at the articular/non-articular interface on the scaphoid radial side. The remaining radioscaphoid joint is then impacted in Stage II SLAC as the radioscaphoid joint narrows, and Stage III SLAC results in the narrowing of the capitolunate joint. In the end, the lunate moves ulnarward while the capitate migrates proximally [8].

For the management of SLAC wrist, there are numerous therapy options according to stages. Four corner fusion using hardware also in old age patient with technical skills team work. Proximal row carpectomy in young age patient. Recently, It has been suggested that capito-lunate arthrodesis in conjunction with scaphoid and triquetral excision is a reliable method of treating SLAC wrist [11, 12].

2. Aim of The Work

To conduct a systematic review and metanalysis comparing the results of patients with SLAC managed by 4CF and those treated with PRC regarding functional outcome, compliance, complications, union and patients' satisfaction in light of evidence-based medicine.

3. Patients and Methods

This meta-analysis and systemic review were performed to compare results of patients with SLAC managed by 4CF and those treated with PRC regarding functional outcome, compliance, complications, union and patients' satisfaction in light of evidence-based medicine, PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) standards are followed.

Inclusion Criteria: types of studies: Studies that were included are randomized controlled studies and comparative case series studies reporting post-operative results for 4CF vs. PRC in SLAC. **Types of participants:** studies on humans diagnosed with Scapholunate advanced collapse stage I and II according to Watson classification.

The radiolunate joint is spared, unlike other types of wrist arthritis, because there is still a concentric articulation between the lunate and the spheroid lunate fossa of the distal radius. Watson classification describes predictable development of degenerative alterations from the radial styloid to the entire scaphoid facet and finally to the unstable capitolunate joint as the capitate subluxates dorsally on the lunate.

Watson Classification: **[13]**: **Stage I:** arthritis between the radial styloid and the scaphoid **Stage II:** arthritis affecting the radius's whole scaphoid facet and the area between.

Stage III: between capitate and lunate arthritis **Stage IV:** Chronic arthritis (degenerative changes at capito- lunate and capito-scaphoid joints).

Types of interventions: 4CF or PRC. The scaphoid, lunate, and triquetrum can be surgically removed by a technique called a proximal row carpectomy. In a 4CF, the scaphoid is removed together with the arthrodesis of the lunate, capitate, triquetrum, and hamate.

Proximal row carpectomy: The lunotriquetral and scapholunate ligaments are removed. To access the cancellous bone, the lunate's dorsal cortex is first nibbled. Next, a 3 mm Schanz pin is inserted into the lunate. To protect the articular surface of the capitate, the pin should be aimed at the lunate's body. By manipulating the lunate and releasing all of its soft tissue connections, the Schanz pin enables the lunate to be removed as a single piece. The Schanz pin is simultaneously inserted in the triquetrum and scaphoid, and both bones are removed in one piece, making the procedure elegant, simple, and quick [14].

Four corner fusion: To adjust the position of the lunate, which is frequently in dorsal intercalated segment instability, to neutral or slightly volar intercalated segment destabilization, a dorsal midline incision is made and the retinaculum is exposed. Typically, this is accomplished with the help of the K-wires, which operate as joysticks and are put into the dorsal lunate and capitate [15].

Types of outcome measures: range of motion: 73 degrees of flexion, 71 degrees of extension, 19 degrees of radial deviation, 33 degrees of ulnar deviation, 140 degrees of supination, and 60 degrees of pronation are considered normal wrist ROM values. **Grip strength:** 73 degrees of flexion, 71 degrees of extension, 19 degrees of radial deviation, 33 degrees of ulnar deviation, 140 degrees of supination, and 60 degrees of pronation are considered normal wrist ROM values. **Pain scores:** The Disabilities of the Arm, Shoulder, and Hand score is the dash. This survey inquiries about symptoms as well as the subject's capacity for particular tasks. The 30-item (DASH) questionnaire examines a patient's capacity for carrying out specific upper extremity activities. Patients can score the difficulties and interference with daily living on a 5-point Likert scale in this self-report questionnaire [16]. **Physical activity and Complications.**

Exclusion criteria: The dash represents the score for Arm, Shoulder, and Hand Disabilities. This survey inquiries about symptoms as well as the subject's capacity for particular tasks. The 30-item (DASH) questionnaire examines a patient's capacity for carrying out specific upper extremity activities.

Patients can score the difficulties and disruption with daily living on a 5-point Likert scale in this self-report questionnaire.

Studies in language other than English.

Search strategy for identification of studies: An initial search was performed utilizing two electronic medical databases: PubMed and Cochrane to identify relevant studies from January 2005 till December 2021.

The Keywords for these searches are SLAC, proximal row carpectomy, four corner arthrodesis, PRC and 4CF.

Moreover, a hand search of the reference lists of the studies that were included for further articles that qualified, was done.

Methods of the review: Finding and choosing studies. The titles and abstracts of the papers found using the aforementioned search method were examined, and complete articles that appeared to meet the inclusion requirements will be obtained. When in question, the piece was evaluated by a second reviewer, and a decision was made by consensus.

Data extraction: Two reviewers independently obtained data into spreadsheets and cross-checked them. The systematic review management software was used to upload the search results and manually check them for inclusion eligibility.

Data including: demographic data: number of subjects, age, sex, previous treatment time to follow-up, calculated in kilograms or as the other side motion range percentatge, pre-and postoperative measurements of grip strength (ROM) in the flexion/extension (F-E) and radial/ulnar (R-U) axes, pre-and postoperative scores, as well as the sort of measure employed for pain alleviation. The categories of "Good Pain Outcome" (e.g., reported as excellent, good, satisfied) and "Poor Pain Outcome" were used to categorize subjective ratings (e.g. reported as moderate, poor, severe), Physician and patient revealed results were used to classify postoperative complications such as nonunion, hardware failure, dorsal impingement, conversion to fusion, osteoarthritic changes, reflex sympathetic dystrophy, and sepsis. Subjective scores were divided into "Good Outcome" and "Poor Outcome" categories.

Each article's methodology was assessed by noting the type of study, the extent of the follow-up, and the assessor's surgical operation blindness. Two authors independently gathered primary information, which they then evaluated. Discussion was used to settle disagreements. In those articles reporting on both methodologies, a meta-analysis was anticipated for each outcome metric. Only publications reporting continuous data with a standard deviation or a sufficient number of studies reporting dichotomous data were allowed to be included in a meta-analysis.

PRISMA flowchart will be produced based on the search results and the inclusion/exclusion criteria.

Statistical considerations: Weighted averages based on the number of patients in each trial were produced to evaluate the results of the two surgical methods and draw some conclusions. A meta-analysis of all articles was used to compare the result of the two methods.

The causes of study heterogeneity were investigated, and if necessary, sensitive analysis was done based on the quality of the methodology and the use of random vs fixed effect models. In order to come to a satisfying conclusion, the relative risk of each of the planned quality indicators of interest was calculated after aggregating the data gathered from the required search investigations.

The use of the random-effects technique was predicated on the existence of sizable clinical and methodological variability. All statistical calculations were done with Review Manager (RevMan) 5.3 for Windows. every analysis using the Matel-Haenszel statistical technique. By visually inspecting the forest plots and using the chi-square and I-square tests, we evaluated heterogeneity. The Cochrane Handbook of Systematic Reviews and meta-analysis advises that significant heterogeneity is indicated by a chi-square p-value of less than 0.1, while I-square values indicate no significant heterogeneity between 0 and 40%, moderate heterogeneity from 30 to 60%, and substantial heterogeneity from 50 to 100%.

Sensitivity Analysis: By removing one study at a time, we conducted sensitivity analysis to determine the cause of any discovered heterogeneity.

Publication Bias: we evaluated publication bias using Egger test and funnel plot methods **[17].**

Statistical analysis: A quantitative, formal, epidemiological study method known as a "meta-analysis" is used to systematically evaluate earlier research studies in order to draw conclusions about that body of knowledge.

A meta-results analysis's may be more accurate estimates of the outcomes than those of any individual study that contributed to the pooled analysis. Another crucial consequence is the analysis of study results' variability or heterogeneity.

A comprehensive and quantitative evaluation of a significant, frequently complex, and occasionally seemingly contradictory body of literature is one of the advantages of meta-analysis. A sensitive literature search and the result specification and tested hypotheses are essential to meta-analyses execution.

Data entered and structured in Microsoft Excel 2010 is sent to version 3 of the comprehensive meta-analysis program.

Pooled: for the analysis of numerous investigations, and discovered a modified cumulative result.

Z score method: to test difference in mean.

Test for heterogeneity: Cochran's Q test and I^2: Under the null hypothesis, the distribution of the test for heterogeneity and homogeneity of study outcomes and findings is roughly a chi-square with k-1 freedom degrees.

4. Results

Table (1) Distribution of age among included studies.

Study	N	4CF		PRC	Z	P
Wolff et al. [18]	10	62.0±17.0	10	60.0±13.0	1.135	0.279
Gaston et al. [19]	18	48.0±14.85	18	57.0±17.63	2.541	0.032*
Vanhove et al. [2]	15	38.0±8.53	15	45.0±13.21	1.874	0.062
Andreas et al. [20]	17	39.5±9.67	30	44.0±12.89	1.698	0.089
Van Nuffel et al. [21]	9	66.0±10.36	16	61.85±8.63	0.985	0.354
Pooled		50.23±15.9		56.89±14.36	1.321	0.185

Mean age from all studied was 50.23±15.9 and 56.89±14.36 between 4CF and PRC groups with no significant difference.

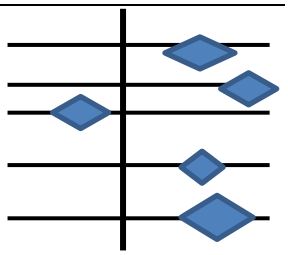
Table (2) Distribution of sex among included studies.

Study	N	4CF Male/ female		PRC Male/ female	Z	P
Wolff et al. [18]	10	100.0/0	10	100.0/0	1.135	0.279
Gaston et al. [19]	18	81.0/19.0	18	88.0/12.0	2.541	0.032*
Vanhove et al. [2]	15	67.7/33.3	15	53.4/46.6	1.874	0.062
Andreas et al. [20]	17	94.1/5.9	30	93.3/6.7	1.698	0.089
Van Nuffel et al, [21]	9	22.2/77.8	16	25.0/75.0	0.985	0.354
Pooled		67.8/22.2		64.2/25.8	1.321	0.185

Pooled male percentage was 67.8% and 64.2% between studied groups.

Table (3) DASH distribution among included studies

Study	N	4CF Dash		PRC Dash	Z	P
Wolff et al. [18]	10	NA	10	NA	-----	------
Gaston et al. [19]	18	22.0±4.6	18	17.0±3.5	3.589	0.008*
Vanhove et al. [2]	15	27.1±6.3	15	6.3±1.85	10.58	0.00**
Andreas et al. [20]	17	21.4±7.6	30	25.7±6.9	1.898	0.057
Van Nuffel et al, [21]	9	19.0±4.1	16	15.0±3.71	1.915	0.052
Pooled		23.1±5.62		14.36±3.12	3.858	0.003*



Pooled Dash post-operative was distributed as 23.1±5.62 and 14.36±3.12 respectively between 4CF and PRC groups and PRC group was significantly lower.

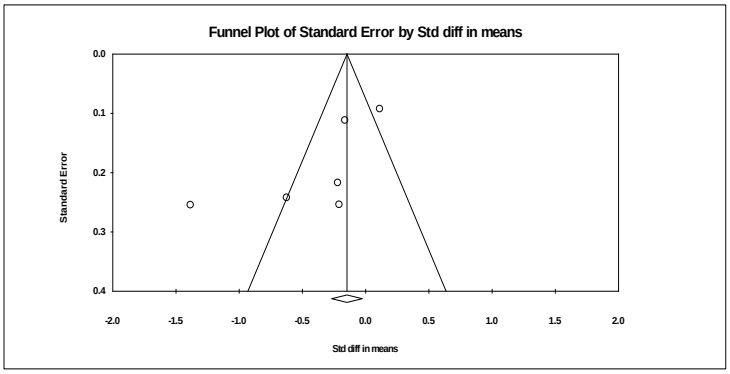


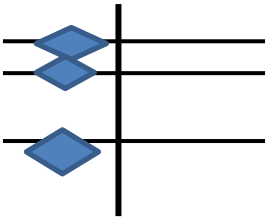
Fig. (1) Heterogenisity and asymmetry founded and illustrated in funnel plot.

Test for heterogenicity	
Cochran Q	4.56
P	0.314
I^2 (Inconsistency)	2.63
95% CI for I^2	0.66-9.85

There was established homogeneity among investigations. Following measuring every element, there is no bias to account for variations in outcomes between studies that are not the result of chance. There was no discernible heterogeneity, and the investigations were in accord.

Table (4) VAS distribution among included studies**.**

Study	N	4CF Dash		PRC Dash	Z	P
Wolff et al. [18]	10	NA	10	NA	-----	------
Gaston et al. [19]	18	1.1±0.38	18	1.4±0.47	1.774	0.069
Vanhove et al. [2]	15	NA	15	NA	-----	------
Andreas et al. [20]	17	NA	30	NA	-----	------
Van Nuffel et al, [21]	9	0.9±0.35	16	1.4±0.43	1.912	0.053
Pooled		1.0±0.39		1.4±0.46	1.888	0.057



Pooled VAS post-operative was distributed as 1.0±0.39 and 1.4±0.46 respectively between 4CF and PRC groups and 4CF group was lower but not significantly.

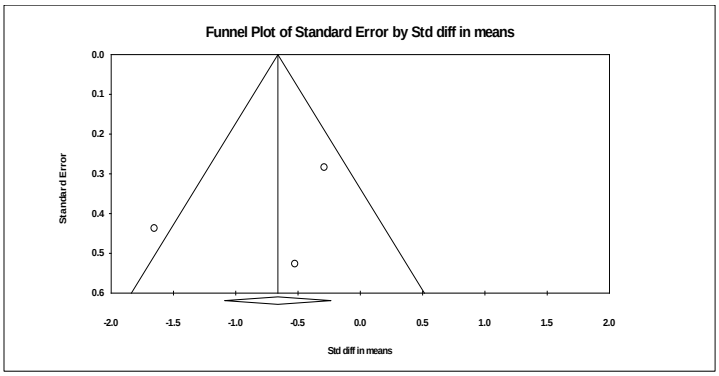


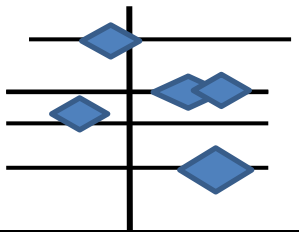
Fig. (2) Heterogenisity and asymmetry founded and illustrated in funnel plot.

Test for heterogenicity	
Cochran Q	11.63
P	0.098
I^2 (Inconsistency)	8.36
95% CI for I^2	0.87-13.65

Studies had established homogeneity. After measuring all the variables, no bias is used to account for changes in outcomes between studies that are not the result of chance. We discovered no appreciable heterogeneity and consensus among the investigations.

Table (7) Grip strength distribution among included studies

Study	N	4CF Dash		PRC Dash	Z	P
Wolff et al. [18]	10	27.0±8.0	10	32.0±6.0	1.112	0.235
Gaston et al. [19]	18	27.0±8.6	18	23.0±6.8	1.363	0.131
Vanhove et al. [2]	15	NA	15	NA	10.58	0.00**
Andreas et al. [20]	17	32.0±10.6	30	24.0±6.9	2.21	0.035*
Van Nuffel et al, [21]	9	28.0±8.9	16	32.0±9.74	1.442	0.112
Pooled		29.1±7.96		26.5±7.63	1.512	0.108



Pooled Grip strength was distributed as 29.1±7.96 and 26.5±7.63 respectively between 4CF and PRC groups and PRC group was lower but not significantly.

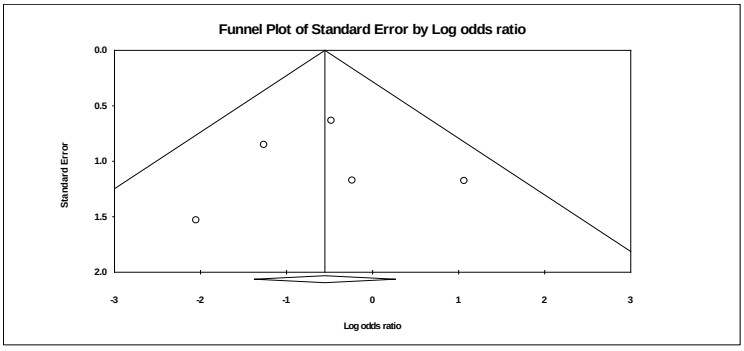


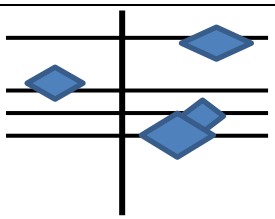
Fig. (3) Heterogenisity and asymmetry founded and illustrated in funnel plot.

Test for heterogenicity	
Cochran Q	10.22
P	0.062
I^2 (Inconsistency)	11.32
95% CI for I^2	0.71-20.36

There is evidence for study homogeneity. When all factors have been quantified, there is no bias to explain for variations in outcomes between studies that are not the result of chance. Between trials, there was agreement and no discernible heterogeneity.

Table 8:

Study	**N**	**4CF Dash**		**PRC Dash**	**Z**	**P**
Wolff et al. [18]	10	NA	10	NA	-----	------
Gaston et al. [19]	18	73.0±8.5	18	63.0±3.5	3.815	0.002*
Vanhove et al. [2]	15	69.0±22.6	15	79.0±26.3	1.882	0.059
Andreas et al. [20]	17	NA	30	NA	-----	------
Van Nuffel et al, [21]	9	80.5±19.85	16	70.2±14.6	2.954	0.039*
Pooled		74.3±13.2		69.56±18.6	1.874	0.058



Pooled Dash post-operative was distributed as 74.3±13.2 and 69.56±18.6 respectively between 4CF and PRC groups and PRC group was lower.

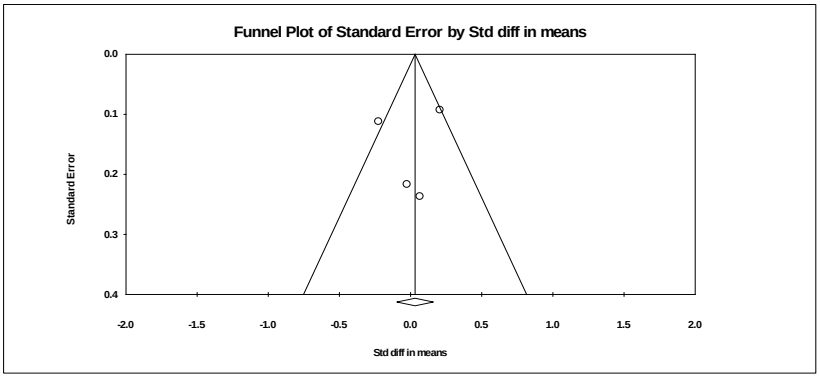


Fig. (4) Heterogenisity and asymmetry founded and illustrated in funnel plot.

Test for heterogenicity	
Cochran Q	7.23
P	0.121
I^2 (Inconsistency)	3.11
95% CI for I^2	0.76-8.54

There was established homogeneity among investigations. After measuring all parameters, no bias is taken into consideration for variations in outcomes between studies that are not the product of chance. We found no substantial heterogeneity and we found agreement between studies.

5. Discussion

PRC and 4CF are the two main motion-sparing treatments for SLAC wrist. **[22]**.

In PRC, the scaphoid, lunate, and triquetrum are removed surgically, and the wrist is supposed to be able to move with less pain thanks to the new joint between the radius and distal carpal row **[23]**.

Conversely, the 4CF procedure entails fusing the lunate, triquetrum, capitate, and hamate, and it is dependent on maintaining the radiolunate articulation after which the midcarpal interval is stabilized **[2]**.

It has been reported that four-corner fusion provides better post-operative grip strength and a reduced progression risk of radio-carpal arthritis. But it has also been linked to a higher risk of problems including nonunion, painful hardware, or implant failure **[24].** In contrast, PRC is believed to be simpler to perform and to have less postoperative problems **[25].**

This systematic review aims to compare the results of patients with Scapholunate advanced collapse managed by four corner fusion and those treated with proximal row carpectomy regarding functional outcome, compliance, complications, union and patients' satisfaction in light of evidence-based medicine.

Thus, we conducted the present study in order to systematically review published studies about post-operative results for four corner fusion vs. proximal row carpectomy in SLAC.

In the present study, we searched two electronic medical databases: PubMed and Cochrane to identify relevant studies from January 2005 till December

2021 comparing 4CV and PRC for Scapholunate Advanced Collapse treatment.

Descriptive analysis of all studies included: we observed that the involved studies published between January 2005 till December 2021. The overall patients number in all the included studies was 158 patients, 69 of them had done Four Corner Fusion and 89 had done PRC.

The Mean age from all studied was **50.23±15.9** and **56.89±14.36** between 4CF and PRC groups with no significant difference.; with youngest mean age in **Vanhove et al. [2] study**; and oldest mean age in **Van Nuffel et al. [21] study**.

The Distribution of sex among included studies male percentage was 67.8% and 64.2% between 4CF and PRC groups.

In the study of **Mulford et al. [26]** reported that **s**imilar numbers of patients are present in each surgical group, according to the comparison studies' demographic data. In both groups, the average age, sex distribution, and follow-up are similar. All of the involved studies' patient demographics were similar.

Comparative analysis of studies: by analysis of the results of DASH distribution among included studies we found that Dash post-operative was distributed as **23.1±5.62** and **14.36±3.12** respectively between 4CF and PRC groups and PRC group was significantly lower.

In the study of **Mulford et al. [26]** reported that the subjective outcomes were similar. Both patients and doctors used a variety of subjective measurement techniques. Collation and comparison were made challenging because to the inconsistent reporting. Because they were rarely employed in studies, it was, for instance, impossible to compare DASH and Mayo Wrist scores among the two groups.

In the study of **Saltzman et al. [27]** The difference between the DASH scores before and after surgery was not statistically significant, and neither was the comparative proportional change between the pre-operative and postoperative DASH scores. Only two of the seven studies included in the study employed the DASH as an end measure, therefore there may not have been enough patients to identify a statistical difference.

The analysis of VAS distribution among included studies showed that VAS post-operative was distributed as **1.0±0.39** and **1.4±0.46** respectively between 4CF and PRC groups and 4CF group was lower but not significantly.

By analysis of Loss of rotation of the study we found that five studies with a total sample of 189 patients, there was no significant difference between the two groups regarding, and the data was homogenous.

The analysis of Grip strength distribution among included studies showed that Grip strength was distributed as 29.1±7.96 and 26.5±7.63 respectively between 4CF and PRC groups and PRC group was lower but not significantly.

This was in agreement with the study of **Saltzman et al. [27]** which reported that following 4-CA, post-operative grip strength as a proportion of the contralateral side was significantly higher. However, because the pre-operative grip strength of those who received PRC was several percentage points lower than that of those who had 4-CA treatment, the proportional change from pre-operative to post-operative was not statistically different.

According to conventional wisdom, 4CF will produce a firmer grip than PRC. In the study of **Mulford et al.** [26] reported that nevertheless, the results of both methods are comparable in terms of grip strength. These papers did not include other strength measurements, such as wrist torque strength.

By analysis of extension flexion distribution among included studies we found that extension flexion post-operative was distributed as 74.3±13.2 and 69.56±18.6 respectively between 4CF and PRC groups and PRC group was lower.

This was in disagreement with the study of **Mulford et al. [26]** which reported that Every treatment results in a modest reduction in postoperative range of motion. No significant differences between the two techniques were found in the comparison studies. When comparing the motion range in all articles, it was found that 4CF had a flexion-extension arc that was lower than PRC by 10 ° postoperatively.

This was in disagreement with the study of **Saltzman et al. [27]** which reported that Although PRC resulted in more post-operative wrist flexion, extension and total flexion-extension motion arc, In the two distinct treatments, the proportional change in flexion-extension arc values from pre- to post-operative was comparable. This is due to PRC's overall pre-operative flexion-extension movement arc being longer. There was no pre-operative change in wrist extension between the two groups.

In systematic review done by **Mulford et al. [26]** showed that for patients with symptomatic and correctly staged SLAC or SNAC wrists, both treatments enhance pain and subjective outcome assessments. PRC lacks the possible problems unique to 4CF and may offer a superior postoperative range of motion (nonunion, hardware issues and dorsal impingement). Even if the majority of PRC patients were asymptomatic at the time of evaluation, the chance of developing osteoarthritis later on is noticeably increased in these people. In both therapy groups, grip strength, pain alleviation, and subjective outcomes are comparable.

In systematic review **Saltzman et al. [27]** revealed clinical results following PRC or 4-CA for SLAC arthritis or scaphoid non-union advanced collapse showed that the four-corner arthrodesis significantly increased post-operative radial deviation and grip strength as a percentage of the contralateral side. Following PRC, wrist flexion, extension, and the flexion-extension arc improved. The procedure also had a decreased overall complication rate.

In systematic review done by **Amer et al. [1]** showed that in comparison trials, PRC was statistically superior than 4-CA for the management of SLAC. Although statistically significant, these variations are nonetheless very tiny and have little clinical significance. This study provides more evidence that both of these therapy approaches are equally effective in curing this condition. Patients who had PRC compared to 4-CA reported more range of motion, stronger grips, and less pain, however these differences were not clinically significant.

In the study done by **Dacho et al. [20]** in which PRC is preferable for individuals who need less grip strength at work, according to a comparison of PRC and midcarpal arthrodesis for stage II (SNAC-wrist) management and (SLAC-wrist). We advise MCA for patients who perform strenuous manual labour because to the greatly improved grip strength that results afterwards.

In the study done by **Daar et al.** [28] in which compare PRC versus 4-CA for management of SLAC/SNAC Wrist: A Cost-Utility Analysis and concluded that 4-CA with screw stabilization and PRC are both cost-effective treatment methods for SLAC/SNAC wrist because of their lower complication profile and high efficacy, with 4-CA with screw as the most cost-effective therapy. 4-CA with plate and Kirschner-wire stabilization should be avoided from a cost-effectiveness standpoint.

Caution is required when interpreting the data as none of the research use a randomization approach to minimize bias. Studies' heterogeneity, quality, bias, and publication bias are likely to have an impact on the results measured and, consequently, any summary result. The magnitude or orientation of connections in the results examined are likely to be distorted in observational studies, particularly case series (which comprise the majority of the papers included). 95 percent confidence intervals (CI) and standard deviations were rarely reported in the literature that was available [29].

The best way to verify any differences in results between the two groups would be through a randomized controlled trial, but large sample sizes would be needed to demonstrate these differences based on the weighted averages from this systematic review, and long-term patient monitoring would be necessary to determine whether the rate of osteoarthritis is significant and/or disabling. Understanding the natural history of a wrist following motion salvage surgery would benefit from long-term case series reporting on the results of PRC and 4CF. It would be helpful to give standard deviations, confidence intervals, and results that were reported by patients (DASH) and physicians (MAYO wrist score) [26].

6.Conclusion

Both 4CF and PRC are effective treatments for individuals with symptomatic and adequately staged Scapholunate advanced collapse wrists, according to the systematic review. PRC DASH distribution was lower than 4CF. 4CF VAS distribution was lower than PRC. Grip strength was lower in PRC than 4CF. extension flexion distribution was lower in PRC than 4CF.

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