



# Return to Golf After Shoulder Arthroplasty A Systematic Review

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## Background

- The number of golfers aged  $\geq 65$  years has increased in recent years and is predicted to rise.
- Guidelines for return to golf after shoulder arthroplasty have not been fully established.

## Methods

- A systematic review based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines was performed.
- Two independent reviewers searched PubMed, Embase, and the Cochrane Library using the terms “shoulder,” “arthroplasty,” “replacement,” and “golf.”
- Sought to include all studies investigating a return to golf after total shoulder arthroplasty (TSA), shoulder hemiarthroplasty (HA), and reverse shoulder arthroplasty (RSA).
- Studies reporting on return to sports after shoulder arthroplasty were included when data were stratified specifically for golf.
- Outcomes of interest included indications for shoulder arthroplasty, surgical technique, rehabilitation protocol, amount of time between surgery and resumption of golf activity, and patient-reported outcome measures.

## Results

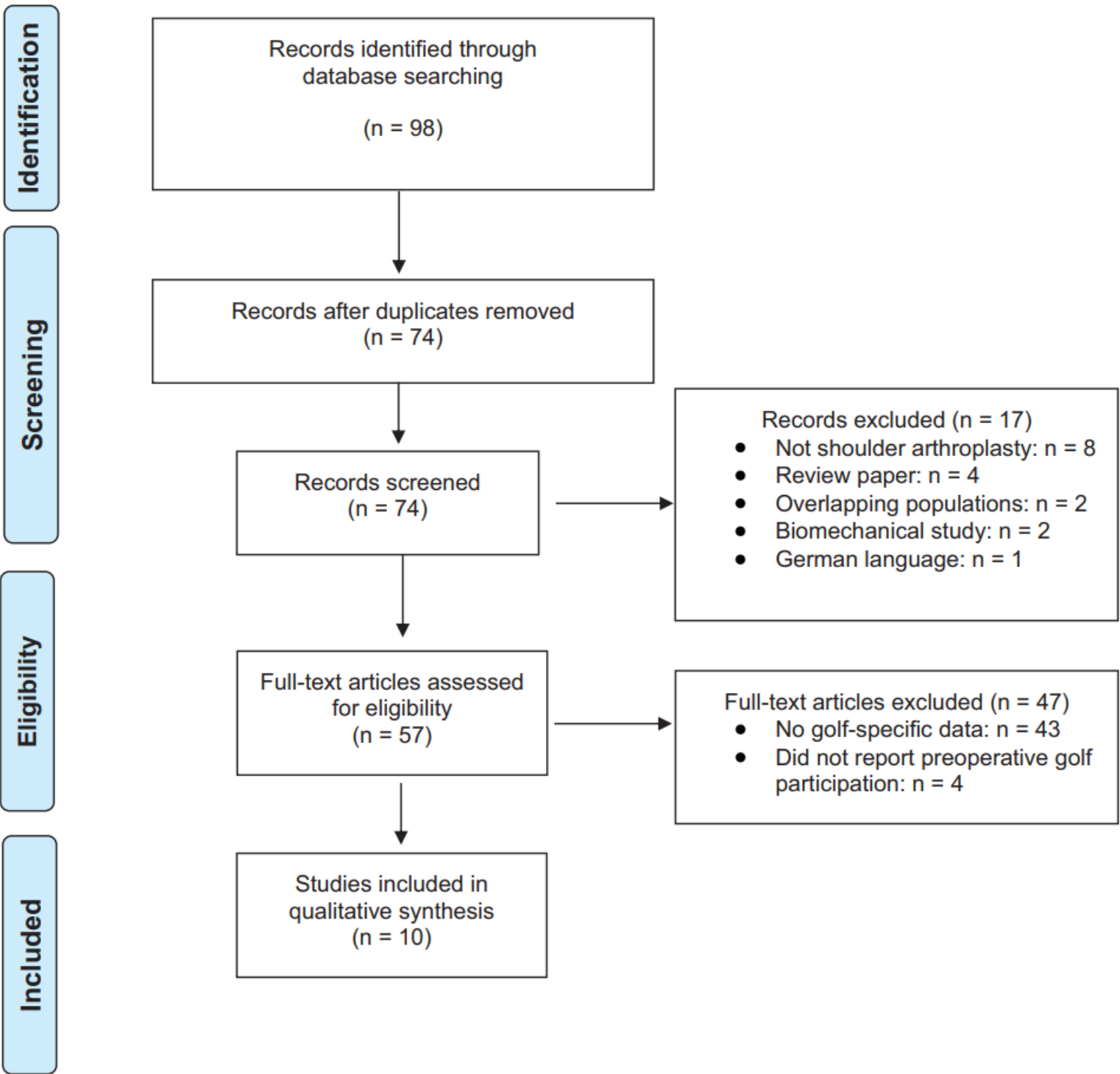


TABLE 1  
Study Details<sup>a</sup>

First Author	Study Design (LOE)	Arthroplasty Procedure, %	No. of Patients (Shoulders)	No. of Golfers in Cohort (%)	M:F	Age, y <sup>b</sup>	Follow-up <sup>b</sup>
Mannava (2018) <sup>22</sup>	Case series (4)	TSA	165 (186)	40 (24)	114:51	64 (18-82)	3.7 y (2-10 y)
Garcia (2017) <sup>7</sup>	Case series (4)	TSA	59 (61)	15 (25)	39:20	48.9 (25-55)	61 mo (25-103 mo)
Papaliodis (2015) <sup>27</sup>	Case series (4)	TSA	35 (36)	35 (100)	NR	67.2 (57.2-80.4)	38.8 mo (12-84 mo)
Schumann (2010) <sup>31</sup>	Case series (4)	TSA	100 (100)	8 (8)	39:61	68.9 $\pm$ 10.8	2.8 $\pm$ 1 y
McCarty (2008) <sup>23</sup>	Case series (4)	TSA, 71; HA, 29	75 (86)	75 (100)	48:27	65.5 (24-88)	3.7 y (2-9.4 y)
Jensen (1998) <sup>14</sup>	Cohort (3)	TSA, 77; HA, 23	23 (26)	23 (100)	21:3	52.4 (26.4-71.9)	53.4 mo (24.4-127.2 mo)
Garcia (2016) <sup>8</sup>	Case series (4)	HA	79 (82)	13 (16)	24:55	69 (27.6-97.1)	63.1 mo (24.6-90.2 mo)
Kolling (2018) <sup>17</sup>	Prospective (3)	RSA	166 (166)	14 (8)	67:99	76.5 (47-92)	2.8 y (1-5 y)
Garcia (2015) <sup>9</sup>	Cohort (3)	RSA	76 (NR)	20 (26)	26:50	74.8 (49.9-92.6)	31.6 y (12-65 y)
Kurowicki (2018) <sup>18</sup>	Cohort (3)	RSA, 41%; TSA, 59%	276 (NR)	32 (12)	NR	71.5 (32-89)	29 mo (12-91)

<sup>a</sup>F, female; HA, hemiarthroplasty; LOE, level of evidence; M, male; NR, not reported; RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty.  
<sup>b</sup>Data reported as mean (range) or mean  $\pm$  SD.

TABLE 2  
Surgical Details<sup>a</sup>

First Author	Arthroplasty Procedure, %	Indication, %	Dominant Shoulder, %	No. of Surgeons	Subscapularis Release	Implant
Mannava (2018) <sup>22</sup>	TSA	NR	NR	1	LTO	Apex or Univers II (Arthrex Inc)
Garcia (2017) <sup>7</sup>	TSA	OA, 100	52	6	NR	Biomet Comprehensive
Papaliodis (2015) <sup>27</sup>	TSA	OA, 100	60	4	NR	Third-generation TSA implant with press-fit stems
Schumann (2010) <sup>31</sup>	TSA	1° OA, 60; 2° OA, 34; RA, 6	50	NR	ST	PROMOS (Smith & Nephew)
McCarty (2008) <sup>23</sup>	TSA, 71; HA, 29	1° OA, 79; 2° OA, 7; AVN, 5; PHF, 6; RA, 3	57	2	LTO	Biomet Bio-Modular
Jensen (1998) <sup>14</sup>	TSA, 77; HA, 23	1° OA, 46; 2° OA, 50; AVN, 4	54	1	ST	Neer Prostheses or Global (DePuy Synthes)
Garcia (2016) <sup>8</sup>	HA	OA, 50.6; PHF, 21.5; AVN, 13.9; RCA, 10.1; RA, 3.8	78	5	ST	Biomet Comprehensive
Kurowicki (2018) <sup>18</sup>	TSA, 58.7; RSA, 41.3	NR	NR	1	NR	NR
Kolling (2018) <sup>17</sup>	RSA	RCTA, 100	74	NR	ST	PROMOS REVERSE (Smith & Nephew), Univers Revers (Arthrex)
Garcia (2015) <sup>9</sup>	RSA	RCTA, 55.2; OA, 22.3; PHF, 17.1; RA, 5.2	61	NR	NR	Biomet Comprehensive

<sup>a</sup>AVN, avascular necrosis; HA, hemiarthroplasty; LTO, lesser tuberosity osteotomy; NR, not reported; OA, osteoarthritis; PHF, proximal humerus fracture; RA, rheumatoid arthritis; RCTA, rotator cuff tear arthropathy; RSA, reverse shoulder arthroplasty; ST, subscapularis tenotomy; TSA, total shoulder arthroplasty.

TABLE 3  
Return to Golf<sup>a</sup>

First Author	Arthroplasty	Golf Participation, No.		Return-to-Golf Rate, %	Mean Time to Return, mo
		Preoperative	Postoperative		
Mannava (2018) <sup>22</sup>	TSA	40	33	83	NR
Garcia (2017) <sup>7</sup>	TSA	15	14	93	6.7
Papaliodis (2015) <sup>27</sup>	TSA	35	31	89	8.4
Schumann (2010) <sup>31</sup>	TSA	8	8	100	5.1
McCarty (2008) <sup>23</sup>	TSA, HA	35	27	77	5.8
Jensen (1998) <sup>14</sup>	TSA, HA	23	23	100	4.5
Garcia (2016) <sup>8</sup>	HA	13	7	54	6.5
Kolling (2018) <sup>17</sup>	RSA	14	11	79	6
Garcia (2015) <sup>9</sup>	RSA	20	10	50	5.3

<sup>a</sup>HA, hemiarthroplasty; NR, not reported; RSA, reverse shoulder arthroplasty; TSA, total shoulder arthroplasty.

## Conclusions

- Most patients who undergo a shoulder arthroplasty procedure can expect to resume playing golf approximately 6 months after the index procedure.
- The rate of return may be lower after RSA and HA as compared with anatomic TSA.

## Implications

- The data presented can help physicians counsel patients who wish to continue golf participation after a shoulder arthroplasty procedure.

## Limitations

- A relatively small number of studies were included.
- Among studies included, 3 surgical procedures were performed, but a direct comparison among the individual procedures was not possible.
- Heterogeneity among studies in methodology, patient population, protocols, interventions, and outcome assessments did not allow for meta-analysis.