National Imaging Associates, Inc.*	
Clinical guidelines: **SHOULDER ARTHROPLASTY**	**Original Date: August 2016**
CPT Codes:** - **Total/Reverse Shoulder Arthroplasty or Resurfacing: 23472** - **Partial Shoulder Arthroplasty/Hemiarthroplasty: 23470** - **Revision Shoulder Arthroplasty: 23473, 23474** ***See UM Matrix for allowable billed groupings and additional covered codes*	**Last Revised Date: ~~June~~ MayApril ~~April~~ 2021~~21~~**
Guideline Number: NIA_CG_317	**Implementation Date: January ~~January~~ 2023~~32~~**

General Requirements

Elective surgery of the shoulder may be considered if the following general criteria are met:

- There is clinical correlation of individual~~patient~~'s subjective complaints with objective exam findings and/or imaging (when applicable)
- ~~•~~ Individual~~Patient~~ has limited function (age-appropriate activities of daily living (ADLs), occupational, athletic)
- ~~Patient is medically stable with no uncontrolled comorbidities (such as diabetes)~~
- Individual~~Patient~~ does not have an active local or systemic infection
- Individual~~Patient~~ does not have active, untreated drug dependency (including but not limited to narcotics, opioids, muscle relaxants) unless engaged in treatment ~~program~~
- Individual~~Patient~~ has good oral hygiene and does not have major dental work scheduled or anticipated (ideally within one year of joint replacement), due to increased post-surgical infection risk
- Recommendations for elective total shoulder or reverse shoulder arthroplasty should only be considered after the individual~~patient~~ has been optimized for surgery and the individual~~patient~~'s overall medical condition demonstrates no uncontrolled co-morbidities.[1-5]

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Clinical notes should address:

- Symptom onset, duration, and severity
- Loss of function and/or limitations
- Type and duration of non-operative management modalities

Non-operative management, when required, will be specified within the clinical indications below and may include one or more of the following:

- Physical therapy or properly instructed home exercise program
- Rest or activity modification
- Application of heat or ice
- Pharmacologic treatment: oral/topical NSAIDS, acetaminophen, analgesics
- Corticosteroid injections

INDICATIONS

TOTAL SHOULDER ARTHROPLASTY (TSA)

Total Shoulder Arthroplasty may be necessary when **ALL** of the following criteria are met[6-8] ~~(Bhat, 2016; Izquierdo, 2010; Tashjian, 2016)~~:

- Evidence of painful osteoarthritis or inflammatory, non-infectious arthritis (e.g., rheumatoid) with functional limitations (such as activities of daily living or employment or simple recreation)
- Complete or near-complete loss of joint space on axillary or AP x-rays (internal rotation and/or external rotation)

  NOTE: MRI should not be the primary imaging study to determine the extent of disease
- Failure of **at least 12** weeks of non-operative treatment that includes **at least ONE** of the following:
  - Physical therapy or properly instructed home exercise program
  - Rest or activity modification
  - Application of heat or ice
  - Pharmacologic treatment: oral/topical NSAIDS, acetaminophen, analgesics
  - Corticosteroid injections
- Functional and intact rotator cuff and deltoid (adequate abduction strength); confirmed by physical examination, MRI, or CT ~~and/or MRI or CT~~ scan~~.~~
- No cortisone injection into the joint within 12 weeks of surgery[9] ~~(Werner, 2016).~~
- No prior arthroscopic surgery of the shoulder within 12 weeks of surgery[10,11]

Contraindications

- Neurological disease resulting in chronic regional pain syndrome (CRPS or its variants), Charcot arthropathy, or loss of deltoid or rotator cuff function.
- Active infection or any infection within ~~3 months~~12 weeks of surgery:
    - History of prior shoulder joint infection without proof that indolent infection has been eliminated (individual~~patient~~ has been off antibiotics for a minimum of 6 weeks). Evidence of resolved infection should include laboratory work (serologies, including CBC with differential, ESR (erythrocyte sedimentation rate), CRP (C-reactive protein), with or without blood cultures, soft tissue biopsy cultures, or synovial fluid aspiration (cultures, gram stain, cell count, differential, crystals). Cultures should be for aerobic and anaerobic bacteria (AFB, fungal), with special attention to the possibility of *Cutibacterium acnes* (*C. acnes*) formerly *P~~p~~roprionobacterium acnes* (*P. acnes*) ~~(Frangiomore, 2015; Holmes, 2017)~~.[12,13]
- Poor dental hygiene (e.g., tooth extraction should be performed prior to arthroplasty). Major dental work within 2 years after a joint replacement MAY lead to seeding of the implant and possible revision surgery. If possible, all dental work must be completed prior to shoulder arthroplasty as these procedures increase risk for infection.
- ~~Any injection~~Any cortisone injection into the joint within 12 weeks of surgery[9] ~~(Werner, 2016)~~
- Arthroscopic surgery of the shoulder within 12 weeks of surgery[10,11]

HEMIARTHROPLASTY

Hemiarthroplasty may be necessary when **the** ~~**ALL** of the~~ following criteria are met ~~(Lervick, 2016)~~:

- Acute 3 or 4-part fracture of the proximal humerus[14]

  OR
- Individual~~Patient~~ meets all of the criteria for a Total Shoulder Arthroplasty, as detailed above, or has ~~**OR** patient with~~ a vascular necrosis or osteonecrosis of the humeral head without advanced glenoid disease

~~- Acute 3 or 4-part fracture of the proximal humerus[14] (Shukla, 2016)~~

- No cortisone injection into the joint within 12 weeks of surgery[9,15] ~~(Somerson, 2016; Werner, 2016)~~
- No prior arthroscopic surgery of the shoulder within 12 weeks of surgery[10,11]

Contraindications

- Any cortisone injection ~~Any injection~~ into the joint within 12 weeks of surgery[9] ~~(Werner, 2016)~~
- Arthroscopic surgery of the shoulder within 12 weeks of surgery[10,11]
- Neurologic disease resulting in CRPS or Charcot shoulder
- Active infection within ~~3 months~~12 weeks of surgery

REVERSE TOTAL SHOULDER ARTHROPLASTY (RTSA) for the treatment of arthritis, irreparable rotator cuff tears or proximal humeral fractures:

Arthritis

RTSA may be indicated for the **treatment of arthritis** when **ALL** of the following criteria are met[15] ~~(Somerson, 2016)~~:

- Evidence of painful osteoarthritis or inflammatory, non-infectious arthritis (e.g., rheumatoid) with functional limitations (such as activities of daily living or employment or simple recreation)
- Complete or near-complete loss of joint space on axillary or AP x-rays (internal rotation and/or external rotation) OR radiographic evidence of advanced glenoid bone loss or excessive retroversion[16] ~~(Hyun, 2013)~~

  NOTE: MRI should not be the primary imaging study to determine the extent of disease
- Non-repairable massive tears involving at least two tendons,~~(> 2 tendons) rotator cuff tear,~~ substantial partial, OR focal full thickness rotator cuff tear with significant rotator cuff dysfunction (weakness, impingement signs on exam) AND intact deltoid
- Requests for reverse TSA for advanced glenohumeral arthritis with an intact rotator cuff will be reviewed on a case-by-case basis[17-20]
- Failure of **at least 12** weeks of non-operative treatment that includes **at least ONE** of the following:
  - Physical therapy or properly instructed home exercise program
  - Rest or activity modification
  - Application of heat or ice
  - Pharmacologic treatment: oral/topical NSAIDS, acetaminophen, analgesics
  - Corticosteroid injections
- Age > 60 ~~60~~; requests for RTSA in individual~~patient~~s < 60 ~~60~~ will be reviewed on a case-by-case basis*
- No cortisone injection into the joint within 12 weeks of surgery[9] ~~(Werner, 2016)~~
- No prior arthroscopic surgery of the shoulder within 12 weeks of surgery[10,11]

***NOTE**: RTSA has been found to be a reliable operation in younger individual~~patient~~s with improvement in pain, range of motion and strength, without a large number of early failures ~~(Otto, 2017; Samuelsen, 2017)~~.[21-24]

Contraindications

- ~~Any injection~~Any cortisone injection into the joint within 12 weeks of surgery[9] ~~(Werner, 2016)~~
- Active infection within 12 weeks ~~3 months~~ of surgery
- Neurologic disease resulting in CRPS or Charcot shoulder
- Arthroscopic surgery of the shoulder within 12 weeks of surgery[10,11]

Proximal Humeral Fractures

RTSA may be indicated for the **treatment of fractures** when **ALL** of the following criteria are met:

- Acute 2, 3, or 4-part fractures of proximal humerus with or without concomitant tuberosity as evidence by radiographic findings OR painful malunion of proximal humerus fracture with rotator cuff dysfunction (weakness, impingement signs on exam)[16]~~; (Hyun, 2013).~~
- Age > 60; requests for RTSA in individual~~patient~~s < 60 will be reviewed on a case-by-case basis.

Rotator Cuff Tears

RTSA may be indicated for the **treatment of irreparable rotator cuff tears in the absence of arthritis** when **ALL** of the following criteria are met:

- Non-repairable massive rotator cuff tear AND intact deltoid AND inability to actively elevate the arm above the level of the shoulder (90 degrees) (i.e., pseudoparalysis); **OR** history of previous failed rotator cuff repair with severe pain and functional disability[25,26] ~~(Virk, 2016; Weber, 2019)~~
- Failure of **at least 12** weeks of attempted physical therapy or properly instructed home exercise program unless there is worsening of symptoms
- Age > 60; requests for RTSA in individual~~patient~~s < 60 will be reviewed on a case-by-case basis~~s~~
- No arthroscopic surgery of the shoulder within 12 weeks of surgery[10,11]
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- No cortisone injection into the joint within 12 weeks of surgery[9]

Contraindications

- Any cortisone injection into the joint within 12 weeks of surgery[9]
- Active infection within 12-weeks~~3 months~~ of surgery
- Neurologic disease resulting in CRPS or Charcot shoulder
- Arthroscopic surgery of the shoulder within 12 weeks of- surgery[10,11]

NOTE: RTSA is a reasonable surgical option for irreparable rotator cuff repair without arthritis. However, caution should be exercised when offering RTSA to individual~~patient~~s without pseudoparalysis because they can have a higher complication and dissatisfaction rate ~~(Virk, 2016)~~.[25]

REVISION ARTHROPLASTY

Conversion of a **Hemiarthroplasty to a Total Shoulder Arthroplasty** may be necessary when **ALL** of the following criteria are met:

- Evidence of a prior hemiarthroplasty
- Persistent pain and functional loss
- Negative infection evaluation (including CRP, ESR, CBC, with or without negative aspiration)[27-30] ~~(Green, 2019, Hecker, 2020; Paxton, 2019; Simha, 2018)~~ OR documentation of mechanical failure, or component failure/malposition
- Clinical and radiographic evidence of intact rotator cuff (or repairable rotator cuff tear), including **ONE** of the following two options:
    - Radiographic evidence of failed humeral component, including aseptic loosening or periprosthetic fracture. Documentation should include radiolucencies around cemented or uncemented components ~~;~~ **OR**
    - Clinical and radiographic evidence of glenoid articular cartilage disease (including progressive arthritis).

Conversion of a **Hemiarthroplasty to a Reverse Shoulder Arthroplasty** may be necessary when **ALL** of the following criteria are met:

- Evidence of a prior hemiarthroplasty
- Persistent pain and functional loss
- Negative infection evaluation (including CRP, ESR, CBC, with or without negative aspiration)[27-30] ~~(Green, 2019, Hecker, 2020; Paxton, 2019; Simha, 2018)~~ **OR** documentation of mechanical failure, or component failure/malposition
- Intact deltoid and intact axillary nerve

- Age > 60 ~~65~~; requests for individual~~patient~~s < 60 will be reviewed on a case-by-case basis
- Evidence of pseudoparalysis (inability to elevate arm) OR severe pain with elevation

Revision of a **Total Shoulder Arthroplasty to Another Total Shoulder Arthroplasty** may be necessary when **ALL** of the following criteria are met[7] ~~(Izquierdo, 2010)~~:

- Evidence of prior total shoulder arthroplasty
- Persistent pain and functional loss
- Negative infection evaluation (including CRP, ESR, CBC, with or without negative aspiration)[27-30] ~~(Green, 2019, Hecker, 2020; Paxton, 2019; Simha, 2018)~~ **OR** documentation of mechanical failure, or component failure/malposition
- Clinical and radiographic evidence of intact rotator cuff (or repairable rotator cuff tear)
- Radiographic evidence of failed humeral and/or glenoid component, including aseptic loosening or periprosthetic fracture[31] ~~(Mallo, 2015).~~

Revision of a **Total Shoulder Arthroplasty to a Reverse Shoulder Arthroplasty** may be necessary when **ALL** of the following criteria are met:

- Evidence of prior total shoulder arthroplasty
- Persistent pain and functional loss
- Negative infection evaluation (including CRP, ESR, CBC, with or without negative aspiration)[27-30] ~~(Green, 2019, Hecker, 2020; Paxton, 2019; Simha, 2018)~~ **OR** documentation of mechanical failure, or component failure/malposition
- Intact deltoid function
- Age > 60 ~~65~~; requests in individual~~patient~~s <~~age less than~~ 60 ~~65~~ will be reviewed on a case-by-case basis
- Evidence of pseudoparalysis (inability to elevate arm) OR severe pain with elevation

Revision of a **Reverse Shoulder Arthroplasty to Another Reverse Shoulder Arthroplasty** may be necessary when **ALL** of the following criteria are met[32] ~~(Cheung, 2011)~~:

- All cases should be reviewed on a case-by-case basis and include the following:
  - Evidence of prior reverse shoulder arthroplasty
  - Persistent pain and functional loss

- Negative infection evaluation (including CRP, ESR, CBC, with or without negative aspiration)[27-30] ~~(Green, 2019, Hecker, 2020; Paxton, 2019; Simha, 2018)~~ **OR** documentation of mechanical failure, or component failure/malposition
- Radiographic evidence of failed humeral and/or glenoid component, including aseptic loosening or periprosthetic fracture
- Intact deltoid

Revision of a Total Shoulder or **Reverse Shoulder Arthroplasty to a Hemiarthroplasty** may be necessary when **ALL** of the following criteria are met[33] ~~(Gamradt, 2012)~~:

- All cases should be reviewed on a case-by-case basis and include the following:
  - Evidence of prior total shoulder or reverse shoulder arthroplasty
  - Persistent pain and functional loss
  - Negative infection evaluation (including CRP, ESR, CBC, with or without negative aspiration),[27-30]~~;~~ ~~(Green, 2019, Hecker, 2020; Paxton, 2019; Simha, 2018)~~ **OR** documentation of mechanical failure (anterior or superior migration), or component failure
  - Radiographic evidence of failed humeral and/or glenoid component, including aseptic loosening or periprosthetic fracture
  - Intact deltoid and intact axillary nerve
  - Insufficient glenoid bone to support a revision glenoid component

Contraindications for revision arthroplasty

- Active or recent history of infection
- Neurogenic pain syndrome
- Acromial fracture OR overly thin acromion from prior subacromial decompression
- Severe osteoporosis as evidenced by radiographic osteopenia, osteomalacia or severe osteoporosis on DXA~~exa~~ scan
- Non-functioning deltoid or axillary nerve injury~~-~~/~~-~~palsy

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BACKGROUND

SHOULDER ARTHROPLASTY - Total, Partial & Revision Shoulder Replacement

This guideline addresses elective, non-emergent shoulder arthroplasty (shoulder replacement) procedures, including total shoulder arthroplasty, reverse shoulder arthroplasty, resurfacing

arthroplasty, partial shoulder replacement or hemiarthroplasty, and revision arthroplasty procedures.

Arthroplasty describes the surgical replacement and reconstruction of a joint with implanted devices when the joint has been damaged by an arthritic or traumatic process.

In both a total shoulder replacement and a reverse shoulder replacement, the damaged joint surfaces (humeral head and glenoid) are removed and replaced with prosthetic components, with the goal of reducing pain and improving joint function. In a reverse shoulder procedure, the ball and socket feature of the joint is reversed, allowing for added rotator cuff support.

In the event the shoulder joint cannot support a glenoid prosthesis, a hemiarthroplasty, or partial joint replacement may be performed to replace the humeral head with a prosthesis.

In some cases, the shoulder prosthesis may wear out or loosen. If loosening is painful, a second surgery, such as a revision may be necessary. In this procedure, some or all of the components of the original replacement prosthesis are removed and replaced with new ones.

OVERVIEW

Total Shoulder Arthroplasty (TSA)

The replacement of the glenohumeral joint is called a shoulder arthroplasty. It can be either a total shoulder arthroplasty (TSA), where both the glenoid and humerus are replaced, a partial arthroplasty of the humerus only (hemiarthroplasty [~~,~~ HA]), or a partial resurfacing of the humerus (humeral head resurfacing ~~,~~ [HHR, HR]). In general, these arthroplasty procedures are reserved for end stage arthritis of the shoulder joint, including functional loss of motion, pain, and disability. The choice of arthroplasty is dependent upon surgeon philosophy, experience, and skill. Successful outcome, regardless of procedure, is more likely with high volume (> 20 per year) shoulder specialists. Revision shoulder arthroplasty is most commonly required because of technical problems encountered at the time of surgery, such as insertion of the wrong size components, improper technique, and poor surgical exposure.

Reverse Total Shoulder Arthroplasty (RTSA)

This shoulder surgery involves placing the ball on the glenoid side (glenosphere and baseplate) of the joint and the socket on the humeral side. It works by moving the center of joint rotation medial and downward and increasing deltoid tension to facilitate active abduction and elevation of the arm ~~(Lorenzetti, 2016)~~.[34]

The original purpose of a RTSA was to allow basic function of a pseudoparalytic shoulder from a non-repairable chronic rotator cuff tear with arthropathy (or arthritis) in an inactive person over age 65. Complication rates have steadily decreased as surgeons become more familiar with this procedure and technical advances have been made. Indications have expanded to

include younger individualspatients, malunions, nonunions, failed arthroplasty, and irreparable cuff tears.

Age and Shoulder Arthroplasty

In general, the more severe the disease, the more loss of motion and glenoid erosion will exist and the more likely a TSA will be required, regardless of age. However, if surgery is delayed too long, it can be exceedingly difficult to insert the glenoid component for a TSA due to posterior glenoid erosion. For optimal TSA success, only one replacement should be attempted during an individual patient's lifetime.

Additional research is necessary to support an accurate age range for each type of shoulder arthroplasty. At this time, an individual'spatient age is a **relative indication** for surgery and ultimately relies on surgeon's judgment and patient presentation (Bhat, 2016).[6]

TSA can be done at any age, but in general, to minimize complications, consideration should be given to the following[35] (Roberson, 2017):

- Age < 55: Hemiarthroplasty can be considered due to the likelihood that these individualpatients will need the joint converted to a total shoulder arthroplasty. However, primary TSA outperforms HA for implant survival and patient satisfaction at short term follow up for individualpatients younger than 50[36] (Eichinger, 2016)
- Age 55-65: Depending on an individual'spatient anatomy and desired activity level, TSA, resurfacing (HHR), or reverse total shoulder arthroplasty (RTSA) may be indicated. Overall low revision rates and high implant survivorship are reported in the current literature in individualpatients under age 65 undergoing TSA. Results of HA have been shown to be inferior to TSA, and conversion of HA to TSA yields less optimal result than a primary TSA[35] (Roberson, 2017)
- Age > 65: TSA or RTSA is typically the best surgical option for individualpatients over the age of 65

Revision Arthroplasty

There are six primary indications for revision shoulder arthroplasty: (1) conversion of a hemiarthroplasty to a total shoulder arthroplasty, (2) conversion of a hemiarthroplasty to a reverse shoulder arthroplasty, (3) revision of a total shoulder arthroplasty to another total shoulder arthroplasty, (4) revision of a total shoulder arthroplasty to a reverse shoulder arthroplasty, (5) revision of a reverse total shoulder arthroplasty to another reverse shoulder arthroplasty (6) revision of a total shoulder or reverse shoulder arthroplasty to a hemiarthroplasty.

NOTE: Historically, this procedure was coded as the removal of hardware and total shoulder arthroplasty. CPT introduced shoulder revision procedure codes in January 2013.

POLICY HISTORY SUMMARIES

Date	Summary
May 2022	Updated references **Added:** • Arthroscopic surgery within 12 weeks of an arthroplasty as a contraindication for surgery. • RTSA request with intact rotator cuff to be reviewed on a case-by-case basis • Replaced patient is medically stable statement (general requirements) with individual is optimized with no uncontrolled co-morbidities statement • Added "or" after, "acute 3 or 4-part fracture of the proximal humerus" (Hemiarthroplasty) **Revised:** • Criterion with ages 65 to 60 for consistency (case-by-case review) • "no injection" statements to "no cortisone injection", and "any injection statements" to "any cortisone injection" • Infection contraindication from 3 months to 12 weeks • Non-repairable massive *tears involving at least two tendons* (RTSA arthritis) **Clarified:** • Clarification of contraindications for RSTA performed for rotator cuff tears • functional and intact rotator cuff and deltoid is confirmed by physical examination, MRI, *or* CT scan. • Chronic *regional* pain syndrome Replaced "patient" with "individual" where appropriate
~~April 2022~~	•
June 2021	• Added heat and ice as acceptable non-operative treatment modalities.
October 2020	• Added requirement for attempted physical therapy for reverse TSA for rotator cuff tears: **"**Failure of at least 12 weeks of attempted physical therapy or properly instructed home exercise program unless there is worsening of symptoms." • Updated references. •
October 2019	• Updated references

	• Deleted requirement for documentation of adequate glenoid bone stock for TSA • Deleted requirement for a cortisone injection and deltoid retraining for reverse TSA • Expanded indications for RSTA (reverse total shoulder arthroplasty) • Added new indication for revision surgery: Revision of a Total Shoulder or Reverse Shoulder Arthroplasty to a Hemiarthroplasty
November 2018	• Added and updated references

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Reviewed / Approved by NIA Clinical Guideline Committee

~~**GENERAL INFORMATION**~~

~~It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.~~

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Reviewed / Approved by NIA Clinical Guideline Committee

GENERAL INFORMATION

It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.