# Peripheral Neuropathy after Shoulder Arthroplasty: Incidence of Surgical Intervention

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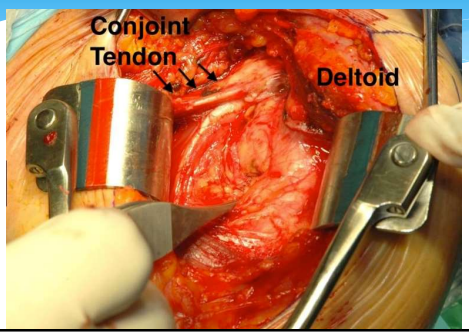
## Background

* Paucity of literature exists regarding the incidence of peripheral neuropathy (PN) status post shoulder arthroplasty (SA).
* Investigated correlation between SA and need for subsequent surgical intervention for peripheral neuropathy due to CTS and CubT

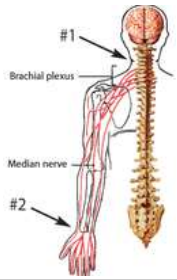
## Arm Lengthening?

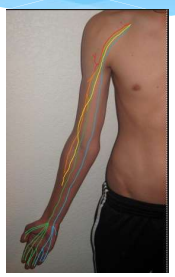
## Immobilization?

## Intraoperative Manipulation and/or retraction?



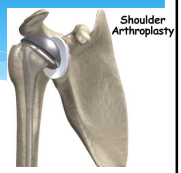

## Double crush exacerbated?
## Subclinical PN made worse after SA?
## Traction on brachial plexus + subclinical pre op PN = post op PN?

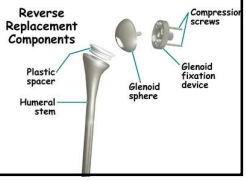


## Methods

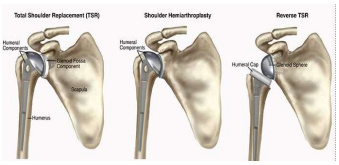
- Retrospective chart review
- Single large orthopedic center, performed by 10 board-certified, fellowship trained orthopedic surgeons.
- 5,701 SA's performed from 2007 to 2017 (ten-year period)
- NEW ONSET CubT and/or CTS requiring neuroplasty, within a 2 years post-operative period from SA
  - Identified via…
    - CPT code search…….Confirmed with Medical record and Operative report review




## Results

- 32 received surgery in the ipsilateral upper extremity having undergone SA
- 25 in the contralateral upper extremity having not undergone SA
- SA performed on the ipsilateral extremity included
  - rTSA (n=24)
  - aTSA (n=7)
  - HA (n=1)
- Indications for SA included
  - rotator cuff arthropathy (n=12)
  - primary osteoarthritis (n=8)
  - massive rotator cuff tear (n=3)
  - avascular necrosis (n=3)
  - failed aTSA (n=2), failed rTSA (n=2)
  - failed ORIF (n=2)
  - fracture (n=1)




## Results

- **No statistically significant difference** between incidence of new onset PN post SA requiring surgery in **ipsilateral verse contralateral upper extremity** (P=0.353)

- **OVERAL INCIDENCE** of surgery for PN post SA = 0.90%
  - 0.30% CubTR
  - 0.79% CTR
- **INCIDENCE** of surgery for **IPSI-LATERAL UE** for PN post SA =0.56%
  - 0.19% CubTR
  - 0.42% CTR
- **INCIDENCE** of surgery for **CONTRA-LATERAL UE** for PN post SA = 0.44%
  - 0.09% CubTR
  - 0.38% CTR

## Results

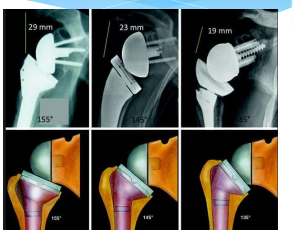
- **No statistically significant difference** between incidence of new onset PN post SA requiring surgery in **ipsilateral verse contralateral upper extremity** (P=0.353)
- **Statistically significant difference** exists between **aTSA or rTSA (P= 1.86x10$^{-5}$)**

## What does existing literature say?


- **Ball et al.**
  - retrospective review 211 SA's during a 5-year period
  - "nerve complications after shoulder joint replacement is common, but almost all will fully recover".
- **Miller and Bigliani**
  - nerve injuries s/p SA most often represent a neuropraxia and are transient in nature
- **Wirth and Rockwood**
  - 14 nerve injuries s/p SA
  - majority represented a neuropraxia, treated successfully via non-operative means
- **Lynch et al.**
  - 1975 to 1989, 417 aTSA
  - 4.3% rate of neurological deficit after surgery
    - all attributed to intra-operative traction
    - all patients recovered with non-operative treatment, most within a 12 month post op

## What does existing literature say?

- **Ladermann et al.**
  - neurologic lesions after rTSA and aTSA, and correlation to postoperative lengthening of the arm
  - 42 SA: rTSA (n=19) and primary aTSA (n=23)
  - "significantly more frequent in the reverse shoulder arthroplasty group (p = 0.002), with a 10.9 times higher risk . . ."
  - "…… Arm lengthening with a reverse shoulder arthroplasty may be responsible for these nerve injuries ."



## What does existing literature say?

- Thomasson et al
  - retrospective review 895 patients over 2 years
    - 34 post op PN found
  - PN after aTSA, rTSA, and arthroscopic rotator cuff repair (RCRx)
  - "PN is a relatively common complication after shoulder surgery. ……..will often resolve with non-operative management."


## What does existing literature say?

- Nagda et al.
  - intraoperative nerve monitoring during SA
  - patients at higher risk for nerve injury
    - decreased motion (<10 degrees passive external rotation with the arm at the side)
    - Hx prior open shoulder surgery
- Aleem et al.
  - intra-operatively monitored transcranial electrical motor evoked potentials (MEPs) and their association with peripheral nerve injury
  - electromonitoring could potentially alert a surgeon to the possibility of nerve injury

## What does existing literature say?

- Yian et al.
  - 1-year post-operative incidence of new onset compressive PN (CTS and CubT) in a SA cohort
  - compared to a 1:1 age and gender-matched non-operative control group
  - Retrospective study
  - 606 SA's in regional registry
  - Incidence of PN (CTS and CubT) in surgical and control groups was not statistically significant, inferring no significant relationship between SA and PN

## Discussion

- surgical intervention for new onset PN post SA of the 5,701 post SA patients in this study was
  - similar rates for CubTR and CTR performed in the general population
  - no statistically significant difference between the incidence of PN in the ipsilateral and contralateral upper extremity was seen
  - statistically significant difference did exist in the incidence of new onset PN post SA requiring an aTSA or rTSA
    - More common in rTSA
    - Statistically significant, but from a Statistically insignificant pool of data? Therefore really significant?

## Discussion

- STRENGTHS of the study
  - large population of SA patients attributed to this study, approx. 6-10x larger than largest studies
  - comparison of surgical decompression in the contralateral unaffected (non-SA) upper extremity
    - previous studies ….
      - do not use this as a control group
      - just report incidence or devise other controls

## Discussion

- WEAKNESSES of the study
  - retrospective analysis
  - not evaluating incidence of PN successfully treated with non-operatively
  - inability to evaluate intraoperative electrodiagnostic monitoring to track patients with PN as it correlates to the need for surgery for CTS and CubT post-operatively

## Conclusion

- SA not a risk factor for need for post op CTR and CubTS
  - This does not mean the patient is not at increased risk for PN due to SA, **but the severity of the neuropathy is likely not so great as to necessitate surgical intervention any more than the unaffected upper extremity in the patient**