## How Have Total Shoulder Arthroplasty Implant Prices Changed Compared to Overall Costs and Reimbursements?

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INTRODUCTION: Total shoulder arthroplasty (TSA) volumes are projected to rise in the US with an increasingly aging US population. Previous studies have documented trends in costs, reimbursements, and volume for TSA. However, there is limited information regarding recent trends in TSA implant prices. As TSA volumes continue to increase and cost control pressure continues to mount, understanding these financial trends will be increasingly important for surgeons. Thus, the purpose of this study was to investigate how implant prices have changed compared to overall costs and reimbursements for TSA. This is the first study to evaluate trends in TSA implant costs and their relative impact on total costs.

METHODS: A commercial insurance claims database was queried from 2010-2022 for overall costs, hospital reimbursements, physician reimbursements, and patient out-of-pocket (OOP) costs for TSA. Average implant prices between 2010-2022 were extracted from Orthopedic Network News (ONN), the largest publicly available implant registry. Implant prices were broken down into anatomic TSA and reverse TSA. However, due to CPT coding, costs and reimbursements could not be broken down into anatomic versus reverse TSA. All costs, reimbursements, and prices were inflation-adjusted to 2022 dollars. Trends were analyzed using linear regressions. RESULTS:

There were 59,442 total TSA procedures. Between 2010 and 2022, the average price for an anatomic TSA implant was \$5,928. The average price for a reverse TSA implant was \$8,720.

For total shoulder arthroplasty, there were significant decreases in physician reimbursement (-46.4% change, b=-155.5, p=<0.001), anatomic TSA implant price (-45.3% change, b=-277.3, p=<0.001) and reverse TSA implant price (-42.9% change, b=-423.9, p=<0.001). There were no significant changes in overall costs (-32.3% change, b=978.2, p=0.06), hospital reimbursement (--29.8% change, b=-745.8, p=0.09), or OOP patient costs (-13.9% change, b=-4.9, p=0.25). DISCUSSION AND CONCLUSION:

Between 2010 and 2022, inflation-adjusted implant prices decreased significantly for both anatomic and reverse TSA implants. Physician reimbursement also fell significantly. In contrast, overall costs, hospital reimbursements, and OOP patient costs did not change significantly. Amidst an aging US population and mounting cost control pressures, these trends are important to consider in implementing future changes to clinical practice, payment, and policies.

Total Shoulder Arthroplasty	
	Overall Cost Develal Cost Depth Reinbursement Orlphain Cost Assaurie TSA Implant Price Reverse TSA Implant Price
Year	

	Total Shoulder Athroplasty	
Total number of procedures	59,442	
Age, mean (SD)	66.9 (10.0)	
Female (%)	30,941 (52.1%)	
Length of stay, mean (SD)	1.9 (2.4)	
Total cost for procedure, \$	\$37,027	
Total hospital charge, \$	\$31,878	
Total physician payment, \$	\$3,016	
Total OOP cost for procedure, \$	\$979	
Average selling price for anatomic TSA implant from ONN, \$	\$5,982	
Average selling price for reverse TSA implant from ONN, \$	\$8,720	

Procedure	Category	Percent Change from 2012 to 2022	Slope (95% CI)	p-value
Total Shoulder Arthrophoty	Overall Cost	-32.3%	-978.2 (-2006 to 50.04)	0.06
	Hospital Reimbursement	-29.8%	-745.8 (-1637 to 144.9)	0.09
	Physician Reimbursoment	-46.4%	-155.5 (-217.5 to -93.39)	<0.001
	OOP Patient Cest	-13.9%	-4.9 (-13.79 to 3.936)	0.25
	Anatomic TSA Implant Price	-45.3%	-277.3 (-352.9 to -201.7)	<0.001
	Reverse TSA Instant Price	-42.9%	-423.9 (-526.5 to -321.3)	-0.001