# Research Trends versus Procedural Output for Common Upper Extremity Pathologies

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**INTRODUCTION:** Medical research output is not always proportional to the prevalence of specific pathologies, and discrepancies between research activity and treatment volume may indicate "over-researched" or "under-researched" pathologies. This descriptive study compares annual PubMed-indexed publication counts (PMC) with surgical treatment volumes for total hip arthroplasty (THA), total knee arthroplasty (TKA), carpal tunnel syndrome, (CTS) cubital tunnel syndrome, Wartenberg syndrome, Guyon canal syndrome, Lacertus syndrome, and distal radius fracture (DRF) from 2010-2022.

**METHODS:** Annual publications were quantified by using the Medical Subject Headings (MeSH) search terms feature in PubMed and only searching the "Title" field to avoid inclusion of studies merely mentioning the search term in the abstract. Annual treatment volume was estimated using Current Procedure Terminology (CPT)-coded procedures from the PearlDiver medical claims database.

**RESULTS:** Table 1 shows the annual treatment or research output for each pathology. This data was then indexed to show the percentage change displayed as changes from the baseline value from 2010 (Image 1). Due to values below 10 for PMC, Lacertus and Wartenberg syndromes could not be indexed.

**DISCUSSION:** This descriptive study compared PMC to CPT counts from 2010-2022, and data presented included both raw and indexed values. Visualizing the greatest separation between solid lines (CPT) and dashed lines (PMC) reveals the most "over-researched" pathology to be TKA, followed by DRF and CTS. The opposite trend was observed for THA, with procedural output increasingly exceeding research output. The charts for Cubital and Guyon syndromes have the least separation, indicating an appropriate research volume when compared to procedural output. The data used is on patients who have undergone procedures, rather than full number of procedures, due to limitations of PearlDiver. Future studies may perform regression modeling to determine cross-correlation between slopes and trends in research versus procedural acceleration and the temporal lag between the two.

**CLINICAL RELEVANCE:** The observed differences for TKA, DRF, CTS, and THA may be the result of over- or under-funding certain areas of research or a temporal separation between when a pathology presents versus when a topic gains research interest. Evaluating these mismatches may inform more balanced research prioritization and funding strategies.

| | THA | | TKA | | CTS | | Cubital Tunnel | | Guyon Canal | | DRF | | Lacertus | | Wartenberg | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **CPT** | **PMC** | **CPT** | **PMC** | **CPT** | **PMC** | **CPT** | **PMC** | **CPT** | **PMC** | **CPT** | **PMC** | **CPT** | **PMC** | **CPT** | **PMC** |
| **2010** | 60,892 | 87 | 133,377 | 368 | 97,740 | 148 | 13,561 | 23 | 1,870 | 12 | 18,521 | 47 | 386 | 1 | 448 | 3 |
| **2011** | 59,290 | 97 | 126,101 | 426 | 107,459 | 183 | 15,408 | 17 | 1,900 | 7 | 19,510 | 45 | 485 | 1 | 544 | 0 |
| **2012** | 62,298 | 73 | 128,558 | 502 | 109,103 | 225 | 15,763 | 22 | 1,817 | 10 | 18,613 | 47 | 489 | 2 | 581 | 2 |
| **2013** | 68,024 | 89 | 138,684 | 555 | 116,956 | 217 | 17,182 | 15 | 1,991 | 8 | 21,300 | 66 | 503 | 5 | 637 | 2 |
| **2014** | 72,038 | 100 | 137,174 | 544 | 118,854 | 224 | 18,306 | 15 | 1,919 | 16 | 23,714 | 69 | 561 | 4 | 632 | 3 |
| **2015** | 69,344 | 101 | 129,201 | 717 | 115,855 | 211 | 18,446 | 21 | 1,860 | 11 | 23,418 | 79 | 553 | 2 | 622 | 2 |
| **2016** | 70,129 | 124 | 129,829 | 794 | 112,724 | 226 | 18,505 | 25 | 1,781 | 13 | 21,881 | 81 | 510 | 3 | 597 | 1 |
| **2017** | 68,844 | 117 | 126,592 | 864 | 105,554 | 269 | 17,986 | 32 | 1,602 | 10 | 21,415 | 98 | 425 | 4 | 521 | 3 |
| **2018** | 72,453 | 121 | 142,004 | 913 | 104,518 | 236 | 18,034 | 30 | 1,644 | 7 | 21,601 | 98 | 443 | 1 | 543 | 2 |
| **2019** | 82,583 | 126 | 173,117 | 970 | 114,582 | 242 | 20,770 | 34 | 1,874 | 8 | 25,482 | 102 | 535 | 2 | 594 | 1 |
| **2020** | 92,999 | 171 | 157,771 | 1116 | 99,358 | 274 | 19,334 | 38 | 1,731 | 6 | 25,018 | 131 | 535 | 6 | 613 | 2 |
| **2021** | 111,904 | 157 | 187,717 | 1246 | 109,415 | 296 | 21,992 | 29 | 1,884 | 9 | 25,965 | 145 | 594 | 4 | 653 | 0 |
| **2022** | 114,124 | 162 | 195,054 | 1270 | 96,282 | 333 | 19,896 | 44 | 1,728 | 9 | 23,658 | 125 | 553 | 10 | 636 | 0 |

Table 1: Raw values comparing procedural and research output.

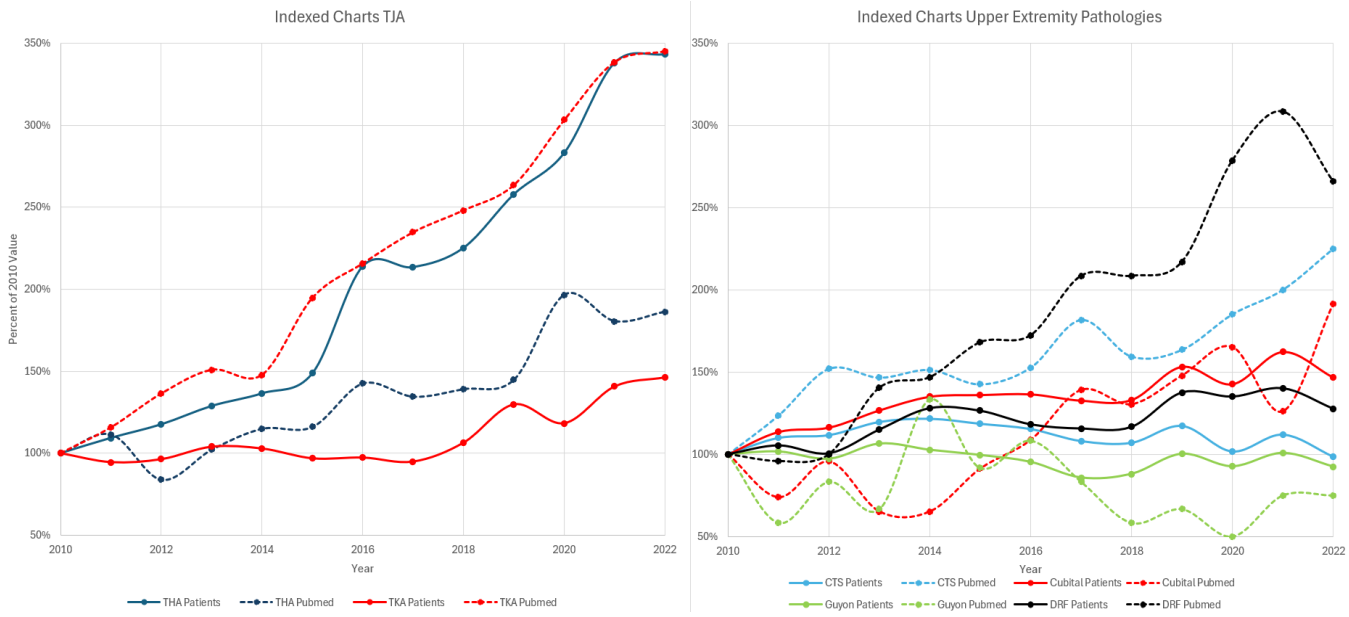


Image 1: Indexed charts comparing TJA (left) with upper extremity pathologies (right), with the reference point being the 2010 value