

# From Patents to Publications: The Evolution of Knowledge and Funding for Hip and Knee Arthroplasty from 1978-Present

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## INTRODUCTION:

The Dimensions database is a modern linked research data infrastructure which uses machine learning and cloud computing to aggregate grants, publications, citations, clinical trials, patents in one place. Using Dimensions data, this study sought to examine the evolution of knowledge and funding for the study of hip and knee arthroplasty over the last century.

## METHODS:

The Dimensions database was queried for publications, grants, patents, and clinical trials without geographic or date-range restriction. The search resulted in 82,019 publications, 1,005 grants, 2,680 patents, and 5,243 clinical trials. Parameters of interest were extracted including number of citations, country of origin, year patent/grant was filed and/or awarded, and clinical trial start year. Monetary values were calculated in 2023 inflation-adjusted US Dollars (USD). Descriptive statistics and temporal analyses were performed. Significance was considered at  $p < 0.05$ .

## RESULTS:

Starting in 1978 the mean inflation-adjusted funding per grant was \$553,131 USD  $\pm$  1,832,495 overall. The countries with the highest total grant funding were the US, Japan, Canada, United Kingdom, and China. The largest individual funders overall are the International Cancer Research Partnership (ICRP) followed by the National Institutes of Health (NIH) and The Professional Coalition for Research Progress (Coalition). Of the 82,019 total publications, 63% were published closed access. Since 2000 (after the Dotcom era), there have been a mean of 3,166 publications per year, which has been rising dramatically each year and recently peaked in 2020 at 6,870. Since 2020, 39 grants and 107 patents have been awarded per year.

## DISCUSSION AND CONCLUSION:

The US, Japan, and Canada are responsible for the largest proportion of total grant funding for hip and knee arthroplasty when examining data over the last century. Worldwide, grant funding for hip and knee arthroplasty research is estimated to be \$965 million USD per year in inflation-adjusted USD since 2000. Publication volume in recent years is approximately 3,166 publications per year, with an increasing proportion of open access publications in recent years.

FIGURE 1. Total Funding by Country for Grants Related to Hip and Knee Arthroplasty

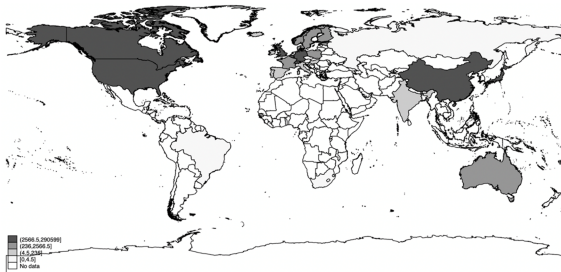


FIGURE 2. Number of Publications per Year

