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Implant Longevity in Total Hip and Knee Arthroplasty: A Bibliometric Analysis of the 100 Most-Cited Articles

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Background: Implant longevity is one of the primary outcomes of total hip and knee arthroplasty. The aim of this study is to identify the 100 most cited articles on implant longevity and analyze their characteristics.
Methods: A search was conducted in the Web of Science Core Collection on 31 October 2026 according to a pre-written protocol. The sensitivity of the query was tested with a broad reference search. Records were ranked by citation count and screened by consensus among four researchers. Study design, level of evidence, and research theme were recorded from the full text. Citation density (annual citations) was calculated, and groups were compared using non-parametric tests. The keyword network was analyzed with VOSviewer.
Results: Of 60,325 records, 691 were screened; the 100 most cited of 108 eligible articles were included. The median citation count was 349 (IQR 262–520). Among those articles, 52 articles originated from the USA and 19 from the United Kingdom; the most frequent journal was The Journal of Bone and Joint Surgery – American Volume (n = 36). The most common study design was case series (n = 44), followed by retrospective cohort (n = 21) and registry/database studies (n = 20). Eighty-eight articles provided Level III or IV evidence, and there were only three randomized controlled trial publications. The total citation count did not differ by level of evidence. USA articles had more citations but were older. Group differences in citation density paralleled differences in publication year ($\rho = 0.78$ between citation density and publication year). In keyword analysis, older articles focused on fixation and wear, while newer ones centered on registry-based outcomes, causes of revision, and risk factors; alignment has been a represented theme since the 1980s.
Conclusions: The most-cited literature on implant longevity predominantly comprises observational studies, with registry studies and meta-analyses more prominent among recent publications. In this sample, total citation count did not differ by level of evidence. These findings should be interpreted in light of publication year and the citation-based selection of articles.

Keywords: Bibliometrics; Citation analysis; Total hip arthroplasty; Total knee arthroplasty; Prosthesis failure; Implant survival; Level of evidence

1. Introduction

Total hip arthroplasty (THA) and total knee arthroplasty (TKA) are considered among the most successful surgical procedures within elective orthopedic surgeries in the past half century [1,2]. Thanks to these interventions, numerous studies have shown that in patients with late-stage degenerative joint diseases, pain is reduced, functional capacity is restored, and quality of life is improved [3,4]. The number of primary arthroplasties increases every year due to the aging global population, rising life expectancy, improved implant survival, and the expansion of surgical indications toward younger and more active patient groups; this number is expected to grow exponentially in the future [5-8]. This increase in the number of primary interventions is expected to be accompanied by a significant rise in the future need for revision arthroplasty [9,10]. Since revision surgery is technically more challenging, more costly, and yields more limited outcomes compared to primary surgery, prolonging implant longevity and reducing the need for revision have become key research priorities in arthroplasty surgery.

Implant longevity is a concept involving the interplay of numerous factors that together shape not only the long-term survival of the implant but also the biological, biomechanical, and material-driven processes determining this survival. Today, it is known that implant design, bearing surfaces, biomaterial properties, wear mechanisms, osteolysis, aseptic loosening, fixation methods, and clinical factors related to the patient all play a decisive role in the long-term success

of the implant [11-13]. In clinical practice, implant longevity is most often assessed in terms of implant survival and revision rate or risk. The evidence in this field ranges from long-term follow-up clinical series to comparative studies and large-scale analyses based on national joint registries. Especially national registries, as they can track thousands of implants over long periods and provide real-world data, have become one of the main sources of information on implant survival in recent years [14,15].

Bibliometric analyses are one of the important research methods that quantitatively assess the scientific publications in a specific research field and reveal the most influential studies, researchers, institutions, countries, as well as research trends in the field [16]. These analyses not only enable researchers to access key publications in the relevant field more easily, but also contribute to a more comprehensive evaluation of the historical development of the research area and its future research directions.

In the literature, numerous bibliometric analysis studies focusing on different subtopics of total hip and total knee arthroplasty have been published [17-20] However, these studies have addressed either the entirety of arthroplasty or specific subtopics, and the lists predominantly include subjects such as outcome measurement, complications, or perioperative care. To the best of our knowledge, there is no bibliometric analysis that directly focuses on implant longevity and evaluates the most influential publications in this field in terms of level of evidence and research theme together.

The aim of this study is to identify the 100 most-cited articles in the field of implant longevity in total hip and knee arthroplasty and to analyze these articles in terms of year of publication, journal, country, institution and author, study design, level of evidence, research theme, and keyword trends. Additionally, we aimed to examine whether the number of citations and annual citation density differ according to these characteristics.

2. Materials and Methods

Articles examining implant longevity in total hip and knee arthroplasty were obtained from the Web of Science Core Collection. The search strategy, eligibility criteria, screening process, and stopping rule were defined in a written protocol prior to the final search. Clarifications made for borderline cases during screening were recorded along with their justifications and re-applied to all previously screened records. The final search was conducted in the Web of Science Core Collection, across all indexes covered by institutional access, on October 31, 2026: Science Citation Index Expanded (1980–2026), Social Sciences Citation Index (1980–2026), Arts & Humanities Citation Index (1975–2026), Emerging Sources Citation Index (2005–2026), Conference Proceedings Citation Index – Science and Social Sciences & Humanities (1990–2026), and Book Citation Index – Science and Social Sciences & Humanities (2005–2026).

(TS=((hip OR knee) NEAR/5 (arthroplast* OR replacement* OR prosthe* OR implant*)) OR TS=("total joint arthroplast*" OR "total joint replacement*")) AND (TS=(surviv* OR longevity OR durabil* OR revision* OR revised OR reoperat* OR fail* OR loosen* OR regist* OR "follow-up" OR "follow up" OR followup OR "long-term" OR "long term") OR TI=(result* OR experience*)) NOT TI=(thromb* OR anticoag* OR heparin* OR warfarin OR rivaroxaban OR dabigatran OR apixaban OR enoxaparin OR analges* OR anesthe* OR anaesthe* OR opioid* OR pain OR tranexamic OR "blood loss" OR transfusion* OR satisfaction OR rehabilit* OR physiotherap* OR delirium OR cognitive)

Prior to assess to obtain of the optimum query, a broad reference search was first conducted (29 October 2026). In this search, as in the final search, no index or document type restrictions were applied. The following query was used in the "Topic" field: ((hip OR knee) NEAR/5 (arthroplast* OR replacement* OR prosthe* OR implant*)) OR "total joint arthroplast*" OR "total joint replacement*" OR THA OR THR OR TKA OR TKR. The search yielded 173,954 records. The top 3,000 records (≥202 citations), ranked by citation count, were pre-classified based on title and abstract; 111 records were marked as potentially eligible, 66 as uncertain. The final query was tested on this reference set. In this process, the concept of implant longevity was expanded beyond the narrow terms "longevity" and "survivorship" to also encompass concepts such as revision, failure, loosening, registry, and long-term follow-up. The abbreviations THA, THR, TKA, and TKR were not included in the final query, as these abbreviations especially "THR" retrieved records unrelated to arthroplasty (e.g., thyroid hormone receptor and genetic studies). Records with terms such as thromboprophylaxis, anesthesia, analgesia, blood loss, satisfaction, or rehabilitation in the title were excluded from the query; this title exclusion did not omit any potentially eligible records in the reference set. The final query captured

110 of the 111 potentially eligible records in the reference set. The 12 records (potentially eligible and uncertain) not retrieved by the final query were additionally assessed by researchers' consensus using the same eligibility criteria.

No restrictions were applied regarding document type, publication year, or language. The search resulted in 60,325 records. Records were listed in descending order of citation count in the Web of Science Core Collection, and the full records of the 1,000 most cited were exported on the same day. All citation counts were taken from this file. The citation counts of two additional articles (identified by researchers' consensus) were obtained from the reference search export dated October 29, 2026. The screening commenced from the beginning of the list. Due to coverage limitations, publications from before 1980 in the Science Citation Index Expanded could not be included in the search.

This study was designed as a bibliometric analysis and the article selection process was reported in accordance with the PRISMA 2020 guideline [21]. Since no patient data were used in the study and only published, publicly available data were analyzed, ethics committee approval was not required.

Clinical studies investigating implant longevity using patient data in primary or revision total hip arthroplasty (THA) or total knee arthroplasty (TKA), as well as systematic reviews or meta-analyses synthesizing such studies, were included in the study. Implant longevity was defined as implant survival, revision rate or risk, and causes of implant failure or revision. It was required that this outcome be stated in the aim of the article or reported as a main finding; mere mention in the introduction or discussion, or reporting it only as an incidental secondary result, was not considered sufficient. In this context, registry and database studies, comparative clinical studies, and case series were included. Studies examining alignment or component position were included if they presented survival or revision data. Studies comparing unicompartmental knee arthroplasty or hip resurfacing to TKA or THA were included if they provided survival data for the TKA or THA arm. Studies investigating periprosthetic infection or fracture were included only if they addressed these conditions as a cause for revision within the framework of implant survival.

The following studies were excluded: studies not involving arthroplasty; studies investigating other joints, osteotomy, or fracture fixation, as well as studies comparing internal fixation, hemiarthroplasty, and THA in hip fracture; studies exclusively examining unicompartmental knee arthroplasty, hip resurfacing, hemiarthroplasty, patellofemoral or tumor prostheses; studies whose did not examine implant longevity as a main outcome. As defined above (such as those focused on function, satisfaction, short-term complications, diagnosis or treatment of infection, or projections of arthroplasty numbers); studies examining only component position, alignment accuracy, or kinematics without reporting survival; biomechanical, retrieval, and biomaterial studies that did not contain clinical survival or revision data; broad reviews not focused on implant survival, as well as study protocols, letters, commentaries, and conference abstracts. Each excluded record was assigned a predefined exclusion code. The list ranked by citation count was jointly screened by four researchers, beginning with the most-cited record, based on title and abstract. Decisions were made by consensus; for records of uncertain eligibility, the full text was reviewed. According to the protocol, screening would continue until the 100th eligible article was reached, after which, as a safety margin, 20 additional records and all records at the cutoff with the same number of citations would also be screened. In the targeted search, the 100th eligible article was identified at the 667th record; the subsequent 20 records and those at the cutoff with equal citations (216 citations) were screened, and screening was completed at the 691st record. Twelve records (identified by researchers' consensus) were evaluated using the same criteria, and two of these were found to be eligible [22,23]. The eligible articles were ranked according to their number of citations in the Web of Science Core Collection, and the top 100 articles were included in the analysis. In cases of equal citation counts, it was predefined that the number of citations in Web of Science All Databases would be used first, followed by the annual citation count; there was no tie at the 100th rank. The selection process is shown in the PRISMA flow diagram (Figure 1).

For each included article, the following information was obtained from Web of Science records: title, first author, publication year, journal, Web of Science Core Collection citation count, Web of Science All Databases citation count, number of authors, authors' institutions and countries, open access status, and keywords. The country of the article was determined according to the country of the corresponding author, and countries were grouped into regions (North America, Europe, Asia, Oceania). Articles with authors from at least two different countries were considered international collaborations. For 16 older articles in the Web of Science record that listed only the corresponding author address, the country was determined based on this address; international collaboration could not be assessed for these articles. For the Charnley article indexed as a reprint, author, institution, and country information were taken from the original publication, while publication year and citation count were taken from the Web of Science record. Different historical names of the same journal were combined. was counted as a single journal (Acta Orthopaedica Scandinavica

and Acta Orthopaedica). For each article, the annual citation count (citation density) was calculated using the following formula: total citation count / (2026 − publication year + 1).

The following information was recorded by reviewing the full text of each article: joint examined (hip, knee, or both), study design (registry/database study, randomized controlled trial, prospective cohort, retrospective cohort, case series, systematic review/meta-analysis), level of evidence, type of research (clinical study or review), and main research theme. The main theme was determined as a category for each article: implant design, mechanisms of failure, alignment, fixation, registries and outcome measurement, patient factors, revision and bone loss, articulation surfaces and wear, surgical technology and technique, hospital/surgeon volume. For the level of evidence, the level reported in print in the article was used when available. In articles where no printed level was found, the level of evidence was determined based on the research question and design according to the Journal of Bone and Joint Surgery classification [24,25]. Two operational rules were predefined for consistency: registry/database studies without an explicitly reported level of evidence were considered Level III as a retrospective analysis of existing data; for systematic reviews, the lowest level of evidence among the included studies was assigned. All coding decisions, including study design, level of evidence, and primary research theme, were finalized by consensus among the four researchers.

Bibliometric mapping

The keyword co-occurrence network was generated using VOSviewer (version 1.6.20; Centre for Science and Technology Studies, Leiden University, Netherlands) [26]. Author keywords and Keywords Plus were used together, and the full counting method was applied. Twenty-five articles without keywords in their Web of Science records (mostly published before 1995) did not contribute to the analysis; the map is based on 75 articles. Synonymous terms (e.g., “UHMWPE” and “polyethylene”) were merged using a thesaurus file; closely related terms describing the same patient group (e.g., “body-mass index” and “obesity”) were also grouped under a single concept. General terms such as “arthroplasty” and “outcomes” were excluded from the analysis. General subject terms defining the search query (total hip arthroplasty, total knee arthroplasty, survivorship, and revision) were omitted from the analysis because they dominated the map and overshadowed more specific themes. Keywords that appeared in at least two articles were included in the map (27 out of 155 keywords); 26 terms in the largest interconnected cluster were shown. In the map, node size represents word frequency, link thickness indicates co-occurrence strength, and colors reflect the average publication year of the articles in which the word appears (overlay visualization). The distribution of articles by country was mapped using Datawrapper (Datawrapper GmbH, Berlin, Germany).

Statistical analysis

Normality of continuous variables was assessed using the Shapiro–Wilk test. Since citation count, citation density, publication year, and author count were not normally distributed (for all, $p < 0.001$), nonparametric tests were used. Continuous variables were presented as median (interquartile range, IQR), and categorical variables as number (percentage). The relationships among citation count, citation density, publication year, and author count were analyzed using Spearman’s rank correlation coefficient (ρ).

The Mann–Whitney U test was used for comparisons between two groups. Using this test, comparisons were made regarding joint (hip and knee), the corresponding author’s country (USA and other countries), open access status, and international collaboration. Articles examining both the hip and knee ($n = 8$) were not included in the joint comparison, and 16 articles in which international collaboration could not be assessed were not included in the collaboration comparison.

The Kruskal–Wallis test was used for comparisons among more than two groups. In this analysis, study design was divided into four groups: comparative clinical study (randomized controlled trial, prospective and retrospective cohort), registry/database study, case series, and systematic review/meta-analysis. Level of evidence was divided into three groups (Level I–II, III, and IV), and the corresponding author’s region into three groups (North America, Europe, and other [Asia and Oceania]). When the Kruskal–Wallis test was significant, pairwise comparisons were performed using the Mann–Whitney U test and Bonferroni correction was applied to p values (the raw p value was multiplied by the number of comparisons: 6 for design, and 3 for level of evidence and region).

Since citation density depends on publication year, all groups were also compared with respect to publication year using the same tests.

All tests were two-tailed, and $p < 0.05$ was considered statistically significant.

As the analyses were exploratory in nature, no multiple comparison correction was made between different analyses.

Analyses were performed using IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA).

3. Results

The search yielded 60,325 records. In the targeted search, the 100th eligible article was at record 667; due to the stopping rule, screening was completed at record 691. Of the 691 records screened, 585 were excluded and 106 articles were deemed eligible. The most common reasons for exclusion were that the outcome was not implant survival (n = 278), evaluation of a different joint or procedure or the treatment of hip fracture (n = 104), and lack of clinical survival or revision data (n = 82). Of the 12 records evaluated by other methods, two were found to be eligible [22,23]; thus, the number of eligible articles reached 108. In the combined ranking, the 100th article had 221 citations (the 660th record in the targeted search); there was no tie at this cutoff (the 101st eligible article had 220 citations). Eight eligible articles ranked 101st–108th in the citation ranking (217–220 citations) were excluded, and 100 articles were included in the analysis (Figure 1). The full text of all included articles was obtained.

The 100 articles included received a total of 41,112 citations in the Web of Science Core Collection (45,927 in Web of Science All Databases). The median number of citations per article was 349 (IQR 262–520; range 221–1,407), while the median citation density was 14.6 citations per year (IQR 8.9–24.9; range 5.2–78.2) (Table 1). The most highly cited article was the study by Bozic et al. examining the epidemiology of revision total hip arthroplasty in the USA (2009; 1,407 citations) [27]. This was followed by Charnley's study reporting the long-term results of low-friction arthroplasty (2005 reprint of the article published in 1972; 1,177 citations) [28] and the study by Bozic et al. investigating the epidemiology of revision total knee arthroplasty (2010; 1,014 citations) [29]. The highest citation density was in the 2009 study by Bozic et al. (78.2 citations per year). This was followed by the population-based cohort study by Bayliss et al., which examined patient age and revision risk (2017; 69.3 citations per year) [30] and two systematic reviews by Evans et al. on the longevity of hip and knee prostheses (2019; 62.5 and 61.0 citations per year, respectively) [14,15].

The articles were published between 1980 and 2020 (median 2000.5; IQR 1992–2012). The highest number of articles was published in the 2010s (n = 32) and the 1990s (n = 30); these were followed by the 2000s (n = 20), the 1980s (n = 17), and the 2020s (n = 1) (Figure 2). The number of citations was moderately correlated with citation density ($\rho = 0.553$, $p < 0.001$), but showed no correlation with publication year ($\rho = -0.045$, $p = 0.659$). Citation density, on the other hand, demonstrated a strong positive correlation with publication year ($\rho = 0.780$, $p < 0.001$) (Figure 3). The median number of authors per article was 4 (IQR 3–6). The number of authors was moderately correlated with publication year ($\rho = 0.476$) and citation density ($\rho = 0.484$) ($p < 0.001$ for both), and weakly correlated with the total number of citations ($\rho = 0.206$, $p = 0.040$).

Of the articles, 51 examined the hip, 41 the knee, and 8 investigated both joints (Table 2). The most common study design was case series (n = 44), followed by retrospective cohort studies (n = 21), registry/database studies (n = 20), systematic reviews or meta-analyses (n = 8), prospective cohort studies (n = 4), and randomized controlled trials (n = 3). The three randomized controlled trial publications belonged to two independent studies; one of these consisted of two publications reporting five- and fifteen-year outcomes of the same study (Table 1). The most frequent levels of evidence were Level IV (n = 48) and Level III (n = 40); there were 12 articles with Level I or II (Level I, n = 3; Level II, n = 9). Ninety-two articles were clinical studies, and 8 were systematic reviews or meta-analyses. The most common research themes were implant design (n = 20), failure mechanisms (n = 17), alignment (n = 14), fixation (n = 13), and registries and outcome measurement (n = 12). Thirty-five articles were open access.

The number of citations differed according to the country of the corresponding author (median 372 [IQR 286–534] in the USA, 312 [242–475] in other countries; $p = 0.032$) and region ($p = 0.012$); no differences were found in other characteristics (Table 3). In pairwise comparisons with Bonferroni correction, articles from North America had higher numbers of citations than those from other regions (Asia and Oceania) (median 372 vs. 250; $p = 0.010$); however, there were only six articles in this group. Citation density was higher in knee articles than in hip articles (median 22.1 vs. 12.5; $p = 0.004$), and in open access articles than in subscription articles (17.5 vs. 13.4; $p = 0.039$). Citation density also differed according to study design ($p < 0.001$) and level of evidence ($p = 0.008$); no regional difference was found

(p = 0.465). In pairwise comparisons, citation density of case series (median 11.8) was lower than that of registry/database studies (19.2; p = 0.001) and systematic reviews/meta-analyses (27.3; p = 0.007). Citation density of Level III articles was higher than that of Level IV articles (18.2 vs. 12.1; p = 0.022).

Differences in citation density were accompanied by differences in publication year. Knee articles were more recent than hip articles (median 2009 vs. 1996; p = 0.003), and open-access articles were more recent than subscription-based articles (2010 vs. 1997; p = 0.005). Case series were older than registry studies (1993 vs. 2010; p <0.001) and systematic reviews (2012.5; p = 0.007). Level IV articles were older than both Level III articles (median publication year: 1993 vs. 2006.5; p = 0.006) and Level I–II articles (1993 vs. 2009; p = 0.028). Articles from the USA were older than those from other countries (1995 vs. 2005.5; p <0.001), and those from North America were older than those from Europe (1996.5 vs. 2002.5; p = 0.023).

The articles were published in 10 journals (Table 4). The highest number of articles was published in The Journal of Bone and Joint Surgery (American Volume) (n = 36; 14,736 citations). This was followed by The Journal of Bone and Joint Surgery (British Volume) (n = 21; 7,597 citations), Clinical Orthopaedics and Related Research (n = 17; 8,188 citations), and The Journal of Arthroplasty (n = 8; 3,524 citations). Seventy-four of the articles were published in these three journals (JBJS Am, JBJS Br, and CORR). The six articles published in The Lancet had the highest median number of citations per article (494).

The corresponding authors were from 16 different countries (Table 5, Figure 4). The highest number of articles originated from the USA (n = 52; 23,127 citations), followed by the United Kingdom (n = 19; 8,080 citations), Sweden (n = 8; 3,520 citations), Norway, and South Korea (each n = 3). Six articles involved international collaboration; collaboration could not be assessed in 16 articles where only the corresponding author's address was available. Considering the authors' institutions, the institutions contributing the most articles were Mayo Clinic (n = 11), Harvard University (n = 10), and Massachusetts General Hospital (n = 7). The most prolific authors were D.J. Berry and W.H. Harris (each n = 6), as well as M.A. Ritter and J.N. Insall (each n = 5).

Apart from 25 articles in the Web of Science index without keywords (the vast majority published before 1995), the keyword analysis is based on 75 articles. After merging synonyms and removing search terms, 27 of the 155 keywords appeared at least twice; 26 terms in the largest interconnected cluster were shown on the map (Figure 5). Keywords related to fixation, cement, wear, migration, osteolysis, tibial component, and Charnley low-friction arthroplasty were seen in older articles (average publication year 1994–2002), while keywords such as registry (2010), failure, infection, risk factors, and alignment (2013–2014), as well as epidemiology, National Inpatient Sample, and cost-effectiveness (2017), became prominent in more recent articles.

4. Discussion

In this study, the 100 most-cited articles examining implant longevity in total hip and knee arthroplasty were analyzed. The list was dominated by observational studies: 88 of the articles presented Level III or IV evidence, and there were only three randomized controlled trial publications (two independent studies). The most common study design was case series, followed by retrospective cohort and registry/database studies. Keyword analysis showed that, among these 100 articles, older publications focused on fixation, cement, wear, and osteolysis, while newer articles shifted toward registry-based outcomes, failure and infection, risk factors, alignment, and the epidemiology of revision. The total citation count differed only according to the corresponding author’s country and region; articles from the USA received more citations, but these articles were older. Differences in citation density between groups were accompanied by differences in publication year. More than half of the articles originated from the USA, about one-fifth from the United Kingdom, and three-quarters were published in three orthopedic journals.

As far as we know, this study is the first bibliometric analysis to focus exclusively on implant longevity in total hip and knee arthroplasty. Previous “top 100 most cited articles” analyses covered all topics related to hip or knee arthroplasty. In the hip arthroplasty list, most articles were from the USA, and only three articles originated from outside North America and Western Europe [31]. More than half of the articles on the knee arthroplasty list were also from the USA; the articles were published in 23 journals, the most frequent journal was The Journal of Bone and Joint Surgery – American Volume, and the most common study design was the case series [19]. Our compilation revealed a comparable pattern: over 50% of the articles originated from the USA, JBJS Am was the journal with the highest occurrence, and case series were the predominant study design. Furthermore, a worldwide examination of 8,631 knee

arthroplasty articles published from 2010 to 2019 recognized the USA as the leading country in terms of productivity [32]. In our compilation, articles from the USA garnered more citations compared to those from other nations, although their citation density remained similar and they were notably older. This citation advantage might partly be due to a longer timeframe for accumulating citations. The USA dominance was most evident in the 1980s, with 15 out of 17 articles, while from 2010 onwards, the contributions from the USA and the United Kingdom were comparable, with 12 and 9 articles, respectively. The six articles published in The Lancet, all originating from the United Kingdom, had the highest median citation count and were derived from national registries, extensive health databases, or meta-analyses that combined such data [14,15,30,33]. This primarily reflects the value of large-scale data, although the same article has been shown to receive more citations when published in a journal with a higher impact factor [34]; "Matthew effect" may also have contributed to their citation counts. The composition of the lists also differed in one important respect: most of the 27 Level I articles in the knee list were pharmacological randomized trials examining short-term outcomes such as anticoagulation and analgesia [19], whereas our implant-longevity-focused list included only three randomized controlled trial publications from randomized controlled trials. This disparity might indicate the challenges associated with tackling inquiries that necessitate extended follow-up on implant survival using randomized methodologies. Moreover, our research is distinct from earlier evaluations not just in subject matter: articles were evaluated based on established criteria, and the study design along with the evidence level was ascertained from the complete text of each article.

The scarcity of randomized studies and the recent impact of registry studies may be related to the nature of implant longevity. Assessing long-term implant durability requires 10–20 years of follow-up, and tracking patients in a randomized study over this period is challenging. National joint registries and large health databases fill this gap: by following large numbers of patients for many years, they enable the evaluation of implant survival under real-world conditions. Of the 20 registry/database studies in our list, nine were based on Scandinavian registries (Sweden, Norway, and the joint Scandinavian database NARA), three on the UK National Joint Registry, and eight on administrative or primary care health databases. Three of the ten most cited articles used such databases [27,29,30]; in addition, four systematic reviews were combining registry data.

However, the most common design on the list was case series (n = 44), most of which were reported from single centres, and these series were older than registry studies. The generalizability of the results from single-center series may be limited. In a comparison with national registry data, it was shown that for implants where the majority of published data originated from the center that developed the implant, the reported revision rates were markedly lower than those in the registry data, and that this effect was particularly prominent for implants developed in the USA [35]. Both of the meta-analyses by Evans and colleagues, which rank among the articles with the highest citation density in our list, demonstrate this difference: in hip prostheses, the 25-year survival rate was 77.6% in case series, while it was calculated as 57.9% in national registries (Australia and Finland); for knee prostheses, while there were no case series reporting 25-year survival, registry data showed a 25-year survival rate of 82.3% [14,15]. These findings suggest that a significant portion of the highest-cited evidence in the field is based on series whose generalizability may be limited, and that estimates of implant longevity can vary markedly depending on the data source. On the other hand, registry data also have limitations: in survival analyses, the endpoint is most often revision; thus, failures not revised, radiographic loosening, or cases in which the patient refused revision may not be represented, and the data are susceptible to coding errors. Therefore, the two data sources should be considered complementary rather than alternatives to one another.

In the keyword analysis, it was observed that the older articles in our list focused on fixation, cement, wear, osteolysis, and Charnley low-friction arthroplasty, whereas the newer articles shifted toward registry-based outcomes, failure and infection, risk factors, and revision epidemiology. This temporal shift suggests that implant longevity research has broadened from the implant itself toward patient- and system-level factors. A similar trend can be seen in the studies on causes of revision in the list: while the earliest studies in knee arthroplasty identified polyethylene wear and loosening as the primary reasons for revision [36], more recent studies have highlighted infection and instability, with wear becoming less prominent [37-40]. Registry studies examining patient-related factors [30][41], as well as the causes of revision, have also come to the forefront in recent times. Alignment, on the other hand, although it appears on the map as a theme of the new period, was a theme continuously represented from the 1980s [22,42] to the present day [43,44]. This theme appears to be one of the long-standing topics that have remained current in the implant longevity literature. Terms from the earlier period on the map may have been underrepresented due to the absence of keywords in a significant portion of the older articles. Furthermore, these findings reflect only the 100 most-cited articles and do not indicate publication trends across the entire field.

Alignment was one of the most prominent topics of discussion regarding implant longevity in knee arthroplasty on our list: the main theme of fourteen articles was alignment; eleven of these were related to the knee, and three were among the top ten most cited articles [44-46]. When these articles are examined chronologically, it can be seen that the neutral mechanical axis was accepted as a fundamental principle for many years, followed by a period during which it became a subject of debate. Early studies reported that failure was more frequent in knees with varus alignment; for example, in a 5.5–9 year follow-up, the failure rate was found to be 91% in varus-aligned knees and 11% in valgus-aligned ones [22]. Subsequent studies have also reported that well-aligned knees demonstrate better survival [42,45,46]. In a number of later long-term studies, no significant difference was found in 15-year implant survival between knees aligned within $0° \pm 3°$ of the mechanical axis and those outside this range [44,47]. However, other studies have continued to report that malalignment, especially deviations in the varus direction, increases the risk of failure [48-50]. These contradictory findings have increased interest in alternative approaches such as kinematic alignment. In the kinematic alignment series in our list, 10-year survival was reported as 97.5%, and similar survival was observed even in knees considered outliers by conventional criteria [43]. Technologies aimed at more accurate alignment were represented in the list by only a single study: in a randomized study comparing robotic and conventional total knee arthroplasty, no difference was found in terms of survival and clinical outcomes at a mean follow-up of 13 years [51]. Registry data from outside our list, however, present a different picture: in a study based on the Australian national registry, computer navigation did not change the overall revision rate but was found to be associated with a lower nine-year revision rate in patients under 65 years of age (6.3% vs. 7.8%) [52].

More recent and comprehensive registry data outside of our list also present a similar picture. In two studies based on the UK National Joint Registry, no difference was found in five-year implant survival between robotic and conventional surgery (98.8% vs. 98.8% in the hip, 98.6% vs. 98.5% in total knee arthroplasty); only in the hip was there a lower rate of revisions due to malposition in the robotic group [53,54]. However, in these studies, the mean follow-up period was 2.5 years. Longer follow-up is required to assess the effect of robotic surgery on implant longevity. It should also be considered that long-term studies on this technology can only be included in such lists after accumulating sufficient citations.

In this selected sample, the total number of citations did not differ by level of evidence ($p = 0.952$), study design, or joint type; this finding suggests that citation count alone may not reflect level of evidence or methodological quality. Differences in citation density across groups were also accompanied by differences in publication year. One reason for this may be the way the list was constructed: while an article published in 1980 could exceed the threshold of 221 citations with approximately 4.7 citations per year, an article published in 2020 would need to receive around 32 citations per year. Therefore, when interpreting citation density comparisons in lists of the most cited articles, publication year should be taken into account.

For the same reason, newly published studies that have not yet accumulated sufficient citations may not be represented in such lists. For example, a meta-analysis published in 2026 that examined approximately 1.9 million hip prostheses from eight national registries reported a 20-year survival rate of 93.6% for modern total hip prostheses, and, based on registry data modeling, predicted a 30-year survival rate of 92.1% [55]. This study was captured by our search strategy but was not included in the list because its citation count was below the list entry threshold. This example demonstrates that lists of the most cited articles may reflect new developments in the field with a delay.

When considered as a whole, this study provides a reference list that brings together the impactful literature in the field of implant longevity in hip and knee arthroplasty. The search strategy, eligibility criteria, and stopping rule were defined in a written protocol prior to the final search; clarifications made during screening were recorded with their justifications, and each exclusion decision was documented with a justification code. The sensitivity of the search query was tested with a broad reference search, and potentially eligible records not captured by the query were also evaluated. Study design and level of evidence were determined from the full text of each article, rather than from abstracts. Assessing citation density alongside publication year offered a perspective for interpreting such lists. We believe this list may serve as a starting point for researchers and clinicians who wish to become familiar with the core literature of the field.

6.Limitations

This study has several limitations. First, the search was limited to the Web of Science Core Collection; citation counts, and consequently rankings, may vary in different databases such as Scopus or Google Scholar. Furthermore, since institutional access to the Science Citation Index Expanded begins in 1980, key publications from before 1980 could not be included in the search; for example, Charnley's low-friction arthroplasty study could only enter the list through its 2005 reprint. This may have led to the underrepresentation of the field's early classic literature. Second, the citation counts are specific to certain dates (31 October 2026; 29 October 2026 for two articles found through other methods) and change over time; self-citations were also not excluded. Third, while citation count reflects an article's impact, it does not directly indicate its methodological quality or clinical significance. Fourth, citation-based ranking disadvantages recently published articles; as a result, current studies may be underrepresented in the list. Fifth, eligibility decisions inherently involve a degree of judgment. To mitigate this limitation, borderline cases were resolved using predefined rules; however, because the screening was conducted jointly and by consensus among four researchers, inter-rater agreement (kappa) could not be calculated. Sixth, restricting the scope to clinical studies directly examining implant longevity also influenced the content of the list: for example, randomized trials comparing internal fixation, hemiarthroplasty, and total hip arthroplasty in hip fracture and reporting revision rates [56], as well as basic science studies lacking clinical survival data, were excluded from the scope. A different definition of scope could have resulted in a different list. Seventh, in some articles the level of evidence was taken from the level printed in the article, while in others it was taken from the classification we made based on predefined rules. In particular, in older articles published before the widespread reporting of evidence levels, these two sources may not be fully comparable. The operational rules applied to registry studies without a printed level and to reviews including mixed evidence may also have influenced the distribution of levels of evidence. Eighth, some subgroups were small (for example, there were 12 articles at Level I–II and a total of six articles from Asia and Oceania), and multiple comparisons were performed; therefore, group comparisons should be considered exploratory. Finally, 25 articles without keywords in Web of Science most of which were older did not contribute to the keyword analysis, which may have led to early-period themes being underrepresented on the map. In addition, in 16 older records that had only the corresponding author's address, international collaboration could not be assessed; this limits the scope of the collaboration analysis.

7.Conclusions

Observational studies predominated among the 100 most-cited articles examining implant longevity in total hip and knee arthroplasty: the most common design was the case series, and randomized controlled trials were limited in number. While older articles in the list focused on fixation, cement, and wear, newer articles shifted toward registry-based outcomes, causes of revision, and risk factors; alignment stood out as a recurring theme represented across four decades. In this selected sample, total citation count did not differ by level of evidence; differences between groups in citation count and citation density largely coincided with differences in publication year. This list offers a starting point for researchers and clinicians seeking to familiarize themselves with the core literature in the field of implant longevity; however, it should be interpreted in light of publication year, bearing in mind that citation count alone does not reflect the level of evidence.

Abbreviations

CORR: Clinical Orthopaedics and Related Research
IQR: Interquartile range
JBJS Am: The Journal of Bone and Joint Surgery, American Volume
JBJS Br: The Journal of Bone and Joint Surgery, British Volume
LoE: Level of evidence
NARA: Nordic Arthroplasty Register Association
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT: Randomized controlled trial
THA: Total hip arthroplasty
THR: Total hip replacement
TKA: Total knee arthroplasty
TKR: Total knee replacement
UHMWPE: Ultra-high-molecular-weight polyethylene
UK: United Kingdom
USA: United States of America

Declarations

Consent to Participate Not Applicable

Ethics Approval: Not applicable. This study evaluated publicly available No patient data or human participants were involved; therefore, ethics committee approval and informed consent were not required.

Consent to Publish The authors have read and approved the manuscript and consent to its publication.

Data Availability: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Table 1. The 100 most-cited articles on implant longevity in total hip and total knee arthroplasty

Rank	First author	Year	Title	Journal	Citations	Citations/ year	Study design	LoE
1	Bozic et al.	2009	The epidemiology of revision total hip arthroplasty in the United States	J Bone Joint Surg Am	1407	78.2	Registry/database study	II[b]
2	Charnley[a]	2005	The long-term results of low-friction arthroplasty of the hip performed as a primary intervention	Clin Orthop Relat Res	1177	53.5	Case series	IV
3	Bozic et al.	2010	The epidemiology of revision total knee arthroplasty in the United States	Clin Orthop Relat Res	1014	59.6	Registry/database study	II[b]
4	Sharkey et al.	2002	Why are total knee arthroplasties failing today?	Clin Orthop Relat Res	992	39.7	Case series	IV
5	Jeffery et al.	1991	Coronal alignment after total knee replacement	J Bone Joint Surg Br	796	22.1	Retrospective cohort	III
6	Ritter et al.	1994	Postoperative alignment of total knee replacement: its effect on survival	Clin Orthop Relat Res	749	22.7	Retrospective cohort	III
7	Bayliss et al.	2017	The effect of patient age at intervention on risk of implant revision after total replacement of the hip or knee: a population-based cohort study	Lancet	693	69.3	Registry/database study	III
8	Sharkey et al.	2014	Why are total knee arthroplasties failing today—has anything changed after 10 years?	J Arthroplasty	682	52.5	Case series	IV
9	Parratte et al.	2010	Effect of postoperative mechanical axis alignment on the fifteen-year survival of modern, cemented total knee replacements	J Bone Joint Surg Am	651	38.3	Retrospective cohort	III[b]
10	Stauffer	1982	10-year follow-up study of total hip replacement: with particular reference to roentgenographic loosening of the components	J Bone Joint Surg Am	638	14.2	Case series	IV
11	Barrack et al.	1992	Improved cementing techniques and femoral component loosening in young patients with hip arthroplasty: a 12-year radiographic review	J Bone Joint Surg Br	632	18.1	Case series	IV
12	Malchau et al.	2002	The Swedish Total Hip Replacement Register	J Bone Joint Surg Am	619	24.8	Registry/database study	III
13	Harris et al.	1982	Femoral component loosening using contemporary techniques of femoral cement fixation	J Bone Joint Surg Am	603	13.4	Case series	IV
14	Amstutz et al.	1984	Treatment of primary osteoarthritis of the hip: a comparison of total joint and surface replacement arthroplasty	J Bone Joint Surg Am	593	13.8	Retrospective cohort	III
15	Chandler et al.	1981	Total hip replacement in patients younger than thirty years old: a five-year follow-up study	J Bone Joint Surg Am	588	12.8	Case series	IV
16	Sutherland et al.	1982	A ten-year follow-up of one hundred consecutive Müller curved-stem total hip-replacement arthroplasties	J Bone Joint Surg Am	581	12.9	Case series	IV
17	Kärrholm et al.	1994	Does early micromotion of femoral stem prostheses matter? 4-7-year stereoradiographic follow-up of 84 cemented prostheses	J Bone Joint Surg Br	561	17.0	Prospective cohort	II
18	Liddle et al.	2014	Adverse outcomes after total and unicompartmental knee replacement in 101 330 matched patients: a study of data from the National Joint Registry for England and Wales	Lancet	545	41.9	Registry/database study	III
19	Gie et al.	1993	Impacted cancellous allografts and cement for revision total hip arthroplasty	J Bone Joint Surg Br	538	15.8	Case series	IV
19	Malchau et al.	1993	Prognosis of total hip replacement in Sweden: follow-up of 92,675 operations performed 1978-1990	Acta Orthop Scand	538	15.8	Registry/database study	III
21	Fang et al.	2009	Coronal alignment in total knee arthroplasty: just how important is it?	J Arthroplasty	534	29.7	Retrospective cohort	III
22	Berry et al.	2002	Twenty-five-year survivorship of two thousand consecutive primary Charnley total hip replacements: factors affecting survivorship of acetabular and femoral components	J Bone Joint Surg Am	532	21.3	Retrospective cohort	III
22	Berend et al.	2004	Tibial component failure mechanisms in total knee arthroplasty	Clin Orthop Relat Res	532	23.1	Retrospective cohort	III
24	Ryd et al.	1995	Roentgen stereophotogrammetric analysis as a predictor of mechanical loosening of knee prostheses	J Bone Joint Surg Br	531	16.6	Prospective cohort	II
25	Ritter et al.	2011	The effect of alignment and BMI on failure of total knee replacement	J Bone Joint Surg Am	522	32.6	Retrospective cohort	II[b]

26	Callaghan et al.	1985	Results of revision for mechanical failure after cemented total hip replacement, 1979 to 1982: a two to five-year follow-up	J Bone Joint Surg Am	514	12.2	Case series	IV
27	Evans et al.	2019	How long does a hip replacement last? A systematic review and meta-analysis of case series and national registry reports with more than 15 years of follow-up	Lancet	500	62.5	Systematic review/meta-analysis	IV
28	Kennedy et al.	1998	Effect of acetabular component orientation on recurrent dislocation, pelvic osteolysis, polyethylene wear, and component migration	J Arthroplasty	491	16.9	Retrospective cohort	III
29	Evans et al.	2019	How long does a knee replacement last? A systematic review and meta-analysis of case series and national registry reports with more than 15 years of follow-up	Lancet	488	61.0	Systematic review/meta-analysis	IV
30	Fehring et al.	2001	Early failures in total knee arthroplasty	Clin Orthop Relat Res	462	17.8	Case series	IV
31	Delanois et al.	2017	Current epidemiology of revision total knee arthroplasty in the United States	J Arthroplasty	454	45.4	Registry/database study	III
32	Labek et al.	2011	Revision rates after total joint replacement: cumulative results from worldwide joint register datasets	J Bone Joint Surg Br	436	27.2	Systematic review/meta-analysis	IV
32	Smith et al.	2012	Failure rates of stemmed metal-on-metal hip replacements: analysis of data from the National Joint Registry of England and Wales	Lancet	436	29.1	Registry/database study	III
34	Gwam et al.	2017	Current epidemiology of revision total hip arthroplasty in the United States: National Inpatient Sample 2009 to 2013	J Arthroplasty	427	42.7	Registry/database study	III
35	Howell et al.	2013	Does a kinematically aligned total knee arthroplasty restore function without failure regardless of alignment category?	Clin Orthop Relat Res	412	29.4	Prospective cohort	IV[b]
36	Kerkhoffs et al.	2012	The influence of obesity on the complication rate and outcome of total knee arthroplasty: a meta-analysis and systematic literature review	J Bone Joint Surg Am	410	27.3	Systematic review/meta-analysis	II[b]
37	Schulte et al.	1993	The outcome of Charnley total hip arthroplasty with cement after a minimum 20-year follow-up	J Bone Joint Surg Am	406	11.9	Case series	IV
38	Mulroy et al.	1990	The effect of improved cementing techniques on component loosening in total hip replacement: an 11-year radiographic review	J Bone Joint Surg Br	404	10.9	Case series	IV
39	Santaguida et al.	2008	Patient characteristics affecting the prognosis of total hip and knee joint arthroplasty: a systematic review	Can J Surg	396	20.8	Systematic review/meta-analysis	IV
40	Herberts et al.	2000	Long-term registration has improved the quality of hip replacement: a review of the Swedish THR Register comparing 160,000 cases	Acta Orthop Scand	395	14.6	Registry/database study	III
41	Havelin et al.	2000	The Norwegian Arthroplasty Register: 11 years and 73,000 arthroplasties	Acta Orthop Scand	388	14.4	Registry/database study	III
42	Bozic et al.	2015	Comparative epidemiology of revision arthroplasty: failed THA poses greater clinical and economic burdens than failed TKA	Clin Orthop Relat Res	384	32.0	Registry/database study	III
43	Kavanagh et al.	1985	Revision total hip arthroplasty	J Bone Joint Surg Am	379	9.0	Case series	IV
44	Diduch et al.	1997	Total knee replacement in young, active patients: long-term follow-up and functional outcome	J Bone Joint Surg Am	374	12.5	Case series	IV
45	Font-Rodriguez et al.	1997	Survivorship of cemented total knee arthroplasty	Clin Orthop Relat Res	371	12.4	Case series	IV
46	Ulrich et al.	2008	Total hip arthroplasties: what are the reasons for revision?	Int Orthop	364	19.2	Case series	IV
47	Hailer et al.	2010	Uncemented and cemented primary total hip arthroplasty in the Swedish Hip Arthroplasty Register: evaluation of 170,413 operations	Acta Orthop	356	20.9	Registry/database study	III
48	Harris et al.	1986	Loosening of the femoral component after use of the medullary-plug cementing technique: follow-up note with a minimum five-year follow-up	J Bone Joint Surg Am	355	8.7	Case series	IV
48	Insall et al.	1983	The total condylar knee prosthesis in gonarthrosis: a five to nine-year follow-up of the first one hundred consecutive replacements	J Bone Joint Surg Am	355	8.1	Case series	IV
50	Schroer et al.	2013	Why are total knees failing today? Etiology of total knee revision in 2010 and 2011	J Arthroplasty	349	24.9	Case series	IV
50	Dorr et al.	1983	Total hip arthroplasties in patients less than forty-five years old	J Bone Joint Surg Am	349	7.9	Case series	IV
52	Bargren et al.	1983	Alignment in total knee arthroplasty: correlated biomechanical and clinical observations	Clin Orthop Relat Res	346	7.9	Retrospective cohort	III

53	Rand et al.	2003	Factors affecting the durability of primary total knee prostheses	J Bone Joint Surg Am	342	14.2	Retrospective cohort	II[b]
54	Sadoghi et al.	2013	Revision surgery after total joint arthroplasty: a complication-based analysis using worldwide arthroplasty registers	J Arthroplasty	340	24.3	Systematic review/meta-analysis	III[b]
55	Murray et al.	1993	Survival analysis of joint replacements	J Bone Joint Surg Br	335	9.9	Systematic review/meta-analysis	IV
56	Wilson et al.	2019	Patient relevant outcomes of unicompartmental versus total knee replacement: systematic review and meta-analysis	BMJ	332	41.5	Systematic review/meta-analysis	III
57	Ranawat et al.	1993	Long-term results of the total condylar knee arthroplasty: a 15-year survivorship study	Clin Orthop Relat Res	323	9.5	Case series	IV
58	Langton et al.	2011	Accelerating failure rate of the ASR total hip replacement	J Bone Joint Surg Br	321	20.1	Case series	IV
59	Rand et al.	1991	Survivorship analysis of total knee arthroplasty: cumulative rates of survival of 9200 total knee arthroplasties	J Bone Joint Surg Am	320	8.9	Retrospective cohort	III
60	Postler et al.	2018	Analysis of total knee arthroplasty revision causes	BMC Musculoskelet Disord	316	35.1	Case series	IV
61	Furnes et al.	2001	Hip disease and the prognosis of total hip replacements: a review of 53 698 primary total hip replacements reported to the Norwegian Arthroplasty Register 1987-99	J Bone Joint Surg Br	309	11.9	Registry/database study	III
62	Pagnano et al.	1996	The effect of superior placement of the acetabular component on the rate of loosening after total hip arthroplasty: long-term results in patients who have Crowe type-II congenital dysplasia of the hip	J Bone Joint Surg Am	301	9.7	Retrospective cohort	III
63	Peters et al.	1992	Osteolysis after total knee arthroplasty without cement	J Bone Joint Surg Am	296	8.5	Case series	IV
64	Robertsson et al.	2001	The Swedish Knee Arthroplasty Register 1975-1997: an update with special emphasis on 41,223 knees operated on in 1988-1997	Acta Orthop Scand	293	11.3	Registry/database study	III
65	Kim et al.	2014	The relationship between the survival of total knee arthroplasty and postoperative coronal, sagittal and rotational alignment of knee prosthesis	Int Orthop	291	22.4	Retrospective cohort	III
65	Russotti et al.	1991	Proximal placement of the acetabular component in total hip arthroplasty: a long-term follow-up study	J Bone Joint Surg Am	291	8.1	Case series	IV
67	Hamadouche et al.	2002	Alumina-on-alumina total hip arthroplasty: a minimum 18.5-year follow-up study	J Bone Joint Surg Am	289	11.6	Case series	IV
68	Engesæter et al.	2003	Antibiotic prophylaxis in total hip arthroplasty: effects of antibiotic prophylaxis systemically and in bone cement on the revision rate of 22,170 primary hip replacements followed 0-14 years in the Norwegian Arthroplasty Register	Acta Orthop Scand	284	11.8	Registry/database study	III
68	Ranawat et al.	1980	Total hip arthroplasty in protrusio acetabuli of rheumatoid arthritis	J Bone Joint Surg Am	284	6.0	Case series	IV
70	Scuderi et al.	1989	Survivorship of cemented knee replacements	J Bone Joint Surg Br	283	7.4	Case series	IV
71	Boyd et al.	1993	Long-term complications after total knee arthroplasty with or without resurfacing of the patella	J Bone Joint Surg Am	279	8.2	Retrospective cohort	III
72	Koh et al.	2017	Periprosthetic joint infection is the main cause of failure for modern knee arthroplasty: an analysis of 11,134 knees	Clin Orthop Relat Res	273	27.3	Retrospective cohort	III
73	Pellicci et al.	1985	Long-term results of revision total hip replacement: a follow-up report	J Bone Joint Surg Am	271	6.5	Case series	IV
74	Dobbs	1980	Survivorship of total hip replacements	J Bone Joint Surg Br	265	5.6	Retrospective cohort	III
75	Korovessis et al.	2006	Metallosis after contemporary metal-on-metal total hip arthroplasty: five to nine-year follow-up	J Bone Joint Surg Am	263	12.5	Case series	IV
76	Newman et al.	1998	Unicompartmental or total knee replacement? Five-year results of a prospective, randomised trial of 102 osteoarthritic knees with unicompartmental arthritis	J Bone Joint Surg Br	262	9.0	RCT	I
76	Geesink et al.	1995	6-year results of hydroxyapatite-coated total hip replacement	J Bone Joint Surg Br	262	8.2	Case series	IV
78	Stern et al.	1992	Posterior stabilized prosthesis: results after follow-up of 9 to 12 years	J Bone Joint Surg Am	261	7.5	Case series	IV
79	Newman et al.	2009	Unicompartmental or total knee replacement? The 15-year results of a prospective randomised controlled trial	J Bone Joint Surg Br	260	14.4	RCT	I

80	Martell et al.	1993	Primary total hip reconstruction with a titanium fiber-coated prosthesis inserted without cement	J Bone Joint Surg Am	256	7.5	Case series	IV
81	Murray et al.	1997	Loss to follow-up matters	J Bone Joint Surg Br	252	8.4	Prospective cohort	II
82	Ong et al.	2010	Risk of subsequent revision after primary and revision total joint arthroplasty	Clin Orthop Relat Res	248	14.6	Registry/database study	II[b]
83	Howell et al.	2018	Implant survival and function ten years after kinematically aligned total knee arthroplasty	J Arthroplasty	247	27.4	Case series	III[b]
84	Engh et al.	1997	Long-term results of use of the anatomic medullary locking prosthesis in total hip arthroplasty	J Bone Joint Surg Am	243	8.1	Case series	IV
85	Kim et al.	1993	Uncemented porous-coated anatomic total hip replacement: results at six years in a consecutive series	J Bone Joint Surg Br	238	7.0	Case series	IV
86	Thiele et al.	2015	Current failure mechanisms after knee arthroplasty have changed: polyethylene wear is less common in revision surgery	J Bone Joint Surg Am	237	19.8	Case series	IV[b]
86	Salvati et al.	1981	A ten-year follow-up study of our first one hundred consecutive Charnley total hip replacements	J Bone Joint Surg Am	237	5.2	Case series	IV
88	Shinar et al.	1997	Bulk structural autogenous grafts and allografts for reconstruction of the acetabulum in total hip arthroplasty: sixteen-year-average follow-up	J Bone Joint Surg Am	236	7.9	Case series	IV
89	Bonner et al.	2011	The effect of post-operative mechanical axis alignment on the survival of primary total knee replacements after a follow-up of 15 years	J Bone Joint Surg Br	233	14.6	Retrospective cohort	III
90	Tew et al.	1985	Tibiofemoral alignment and the results of knee replacement	J Bone Joint Surg Br	229	5.5	Retrospective cohort	III
90	Freeman et al.	1994	Early migration and late aseptic failure of proximal femoral prostheses	J Bone Joint Surg Br	229	6.9	Retrospective cohort	III
92	de Steiger et al.	2015	What is the learning curve for the anterior approach for total hip arthroplasty?	Clin Orthop Relat Res	228	19.0	Retrospective cohort	III
93	Callaghan et al.	2000	Charnley total hip arthroplasty with cement: minimum twenty-five-year follow-up	J Bone Joint Surg Am	227	8.4	Case series	IV
93	Le et al.	2014	Current modes of failure in TKA: infection, instability, and stiffness predominate	Clin Orthop Relat Res	227	17.5	Case series	III[b]
93	Ravi et al.	2014	Relation between surgeon volume and risk of complications after total hip arthroplasty: propensity score matched cohort study	BMJ	227	17.5	Registry/database study	III
93	Thien et al.	2014	Periprosthetic femoral fracture within two years after total hip replacement: analysis of 437,629 operations in the Nordic Arthroplasty Register Association database	J Bone Joint Surg Am	227	17.5	Registry/database study	III
97	Sochart	1999	Relationship of acetabular wear to osteolysis and loosening in total hip arthroplasty	Clin Orthop Relat Res	226	8.1	Case series	IV
98	Smith et al.	2012	Failure rates of metal-on-metal hip resurfacings: analysis of data from the National Joint Registry for England and Wales	Lancet	225	15.0	Registry/database study	III
99	Kim et al.	2020	Does robotic-assisted TKA result in better outcome scores or long-term survivorship than conventional TKA? A randomized, controlled trial	Clin Orthop Relat Res	224	32.0	RCT	I[b]
100	Berry et al.	1992	Revision arthroplasty using an anti-protrusio cage for massive acetabular bone deficiency	J Bone Joint Surg Br	221	6.3	Case series	IV

Citations: Web of Science Core Collection, 31 October 2026 (Dorr et al. and Bargren et al., identified through other methods: 29 October 2026). Citations/year = citations / (2026 − publication year + 1). LoE, level of evidence (journal-printed level when available; otherwise assigned according to the Journal of Bone and Joint Surgery classification). RCT, randomized controlled trial. Journals are listed as published; in Table 4, renamed journals are combined. Ties share the same rank. [a] Reprint (Clin Orthop Relat Res 2005, The Classic) of Charnley J. J Bone Joint Surg Br. 1972;54:61–66; year and citations from the Web of Science record. [b] Level of evidence as printed in the article.

Table 2. Characteristics of the 100 most-cited articles

Characteristic	n (%)	Citations, median (IQR)
Publication decade		
1980s	17 (17.0)	355 (277–584)
1990s	30 (30.0)	310 (255–501)
2000s	20 (20.0)	392 (290–534)
2010s	32 (32.0)	352 (247–480)
2020s	1 (1.0)	224
Joint		
Hip	51 (51.0)	349 (252–532)
Knee	41 (41.0)	346 (276–526)
Hip and knee	8 (8.0)	386 (336–426)
Study design		
Case series	44 (44.0)	322 (257–448)
Retrospective cohort	21 (21.0)	342 (269–533)
Registry/database study	20 (20.0)	392 (286–543)
Systematic review/meta-analysis	8 (8.0)	403 (336–475)
Prospective cohort	4 (4.0)	472 (292–554)
Randomized controlled trial	3 (3.0)	260
Level of evidence		
Level I	3 (3.0)	260
Level II	9 (9.0)	522 (297–788)
Level III	40 (40.0)	343 (267–532)
Level IV	48 (48.0)	352 (265–482)
Type of research		
Clinical study	92 (92.0)	348 (261–532)
Systematic review/meta-analysis	8 (8.0)	403 (336–475)
Main research theme		
Implant design	20 (20.0)	322 (260–500)
Failure mechanisms	17 (17.0)	384 (306–607)
Alignment	14 (14.0)	379 (280–563)
Fixation	13 (13.0)	356 (247–582)
Registries & outcome measurement	12 (12.0)	392 (286–497)
Patient factors	8 (8.0)	385 (344–544)
Revision & bone loss	8 (8.0)	278 (239–480)
Bearing surfaces & wear	5 (5.0)	289 (244–378)
Surgical technology & technique	2 (2.0)	226
Hospital/surgeon volume	1 (1.0)	227
Region of corresponding author		
North America	54 (54.0)	372 (284–532)
Europe	40 (40.0)	334 (260–498)
Asia	4 (4.0)	250 (228–284)
Oceania	2 (2.0)	250
Open access		
Open access	35 (35.0)	335 (262–500)
Subscription	65 (65.0)	349 (262–532)
International collaboration		
Yes	6 (6.0)	442 (272–594)
No	78 (78.0)	352 (263–493)
Not assessable (corresponding address only)	16 (16.0)	342 (254–576)

IQR, interquartile range. Region refers to the corresponding author address.

Table 3. Citation count and citation density according to article characteristics

Characteristic	n	Citations, median (IQR)	p	Citations/year, median (IQR)	p
Joint[a]					
Hip	51	349 (252–532)	0.548	12.5 (8.1–17.5)	0.004
Knee	41	346 (276–526)		22.1 (10.4–32.3)	
Country of corresponding author[a]					
USA	52	372 (286–534)	0.032	12.8 (8.3–24.5)	0.160
Other countries	48	312 (242–475)		17.0 (11.6–26.6)	
Access[a]					
Open access	35	335 (262–500)	0.680	17.5 (12.2–32.0)	0.039
Subscription	65	349 (262–532)		13.4 (8.2–22.9)	
International collaboration[a]					
Yes	6	442 (272–594)	0.520	13.7 (7.5–30.1)	0.339
No	78	352 (263–493)		17.5 (11.7–27.8)	
Study design[b]					
Comparative clinical study	28	331 (260–532)	0.470	16.8 (8.9–23.0)	<0.001
Registry/database study	20	392 (286–543)		19.2 (14.6–42.5)	
Case series	44	322 (257–448)		11.8 (8.1–17.7)	
Systematic review/meta-analysis	8	403 (336–475)		27.3 (21.7–56.1)	
Level of evidence[b]					
Level I–II	12	376 (254–554)	0.952	16.8 (14.3–32.5)	0.008
Level III	40	343 (267–532)		18.2 (12.4–27.4)	
Level IV	48	352 (265–482)		12.1 (8.1–19.6)	
Region[b]					
North America	54	372 (284–532)	0.012	13.2 (8.4–23.6)	0.465
Europe	40	334 (260–498)		16.2 (11.6–26.6)	
Other	6	250 (227–278)		20.7 (8.5–28.5)	

[a] Mann–Whitney U test. [b] Kruskal–Wallis test. IQR, interquartile range. Comparative clinical study: randomized controlled trials and prospective and retrospective cohort studies. Other regions: Asia (n = 4) and Oceania (n = 2). International collaboration could not be assessed in 16 articles whose Web of Science record lists only the corresponding address; these were excluded from that comparison. Groups with a higher citation density were also more recent (median publication year: hip 1996 vs. knee 2009, p = 0.003; open access 2010 vs. subscription 1997, p = 0.005; study design p < 0.001; level of evidence p = 0.002). Post hoc pairwise comparisons (Mann–Whitney U test with Bonferroni correction): citations/year, registry/database study vs. case series, p = 0.001; case series vs. systematic review/meta-analysis, p = 0.007; Level III vs. Level IV, p = 0.022; citations, North America vs. other, p = 0.010; all other pairs, p > 0.05.

Table 4. Journals publishing the 100 most-cited articles

Journal	Articles, n	Total citations	Median citations
J Bone Joint Surg Am	36	14,736	346
J Bone Joint Surg Br	21	7,597	283
Clin Orthop Relat Res	17	8,188	371
J Arthroplasty	8	3,524	440
Lancet	6	2,887	494
Acta Orthop	6	2,254	372
Int Orthop	2	655	328
BMJ	2	559	280
Other journals with one article (n = 2)	2	712	356

Articles were published in 10 journals. Acta Orthopaedica includes articles published as Acta Orthopaedica Scandinavica (n = 5).

Table 5. Most productive countries, institutions and authors

	Articles, n	Total citations
Countries (corresponding author)		
USA	52	23,127
United Kingdom	19	8,080
Sweden	8	3,520
Norway	3	981
South Korea	3	753
Austria	2	776
Netherlands	2	672
Canada	2	623
Germany	2	553
Institutions (≥ 4 articles)		
Mayo Clinic	11	5,840
Harvard University	10	4,580
Massachusetts General Hospital	7	3,564
University of California System	6	4,057
Harvard Medical School	5	2,201
Exponent	4	3,053
University of Bristol	4	1,649
University of Exeter	4	1,649
Southmead Hospital	4	1,510
Authors (≥ 4 articles)		
Berry, DJ	6	4,209
Harris, WH	6	2,521
Ritter, MA	5	2,686
Insall, JN	5	1,644
Lau, E	4	3,053
Herberts, P	4	2,083
Blom, AW	4	1,649
Callaghan, JJ	4	1,418
Ranawat, CS	4	1,392
Furnes, O	4	1,208
Havelin, LI	4	1,208

Countries are based on the corresponding author address. Institutions are based on the organisation names standardised by Web of Science and counted once per article (all author affiliations); institutions and authors are credited with every article to which they contributed.

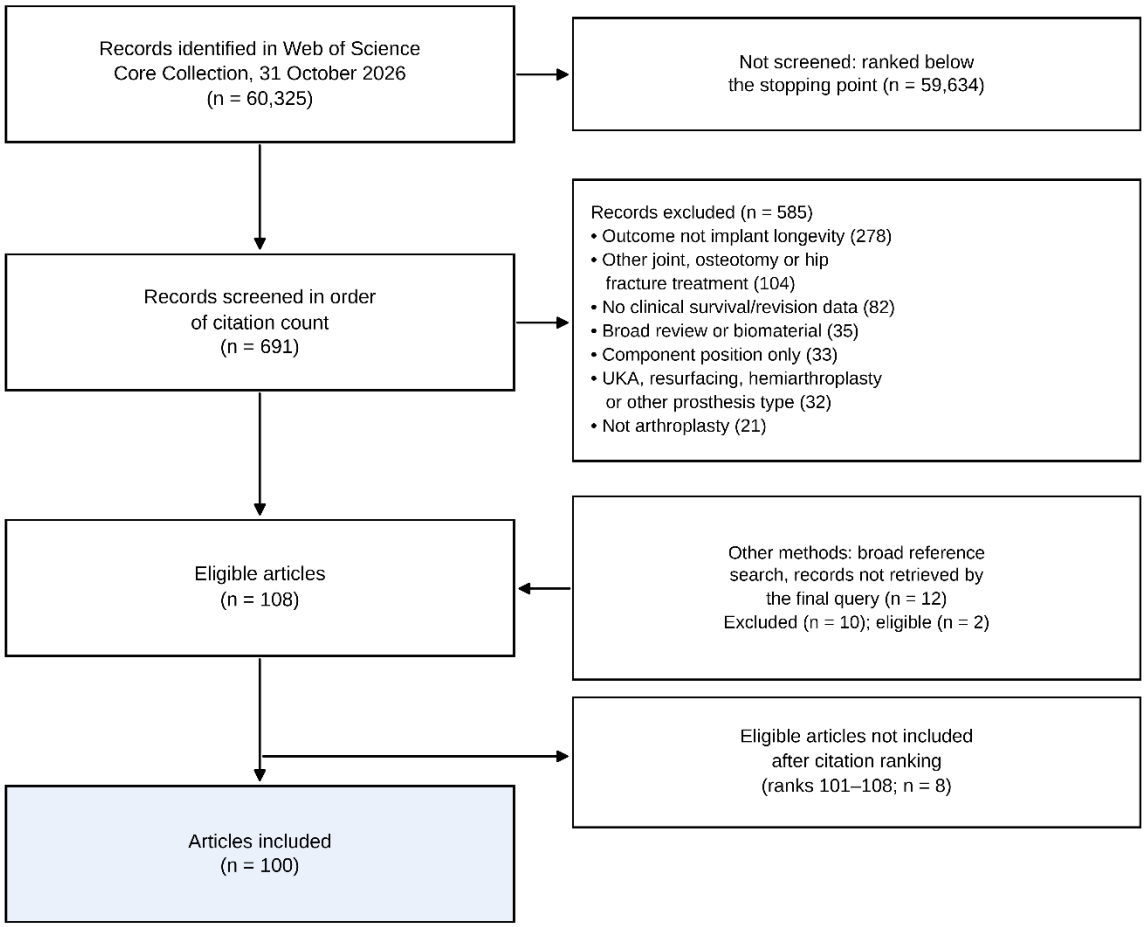


Figure 1: PRISMA 2020 flow diagram of article selection. Records were screened in descending order of citation count until the 100th eligible article, the following 20 records and all records tied at the cut-off citation count had been assessed; the broad reference search (29 October 2026; 173,954 records) is described in the Methods.

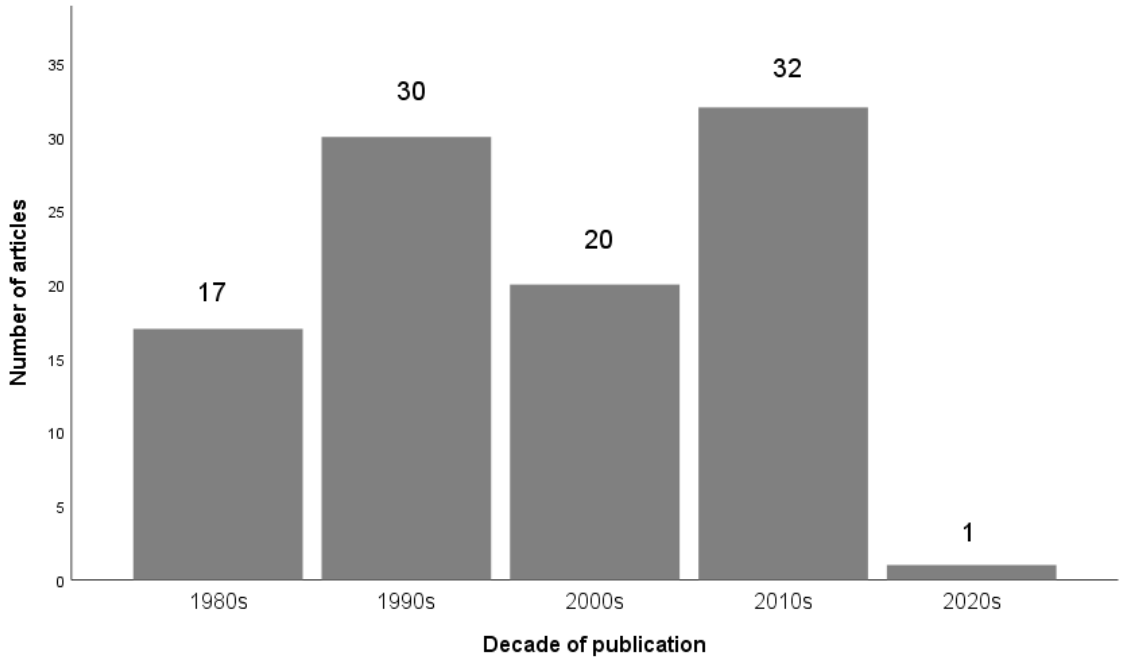


Figure 2. Distribution of the 100 most-cited articles on implant longevity in total hip and total knee arthroplasty by decade of publication. Numbers on the bars indicate the number of articles per decade.

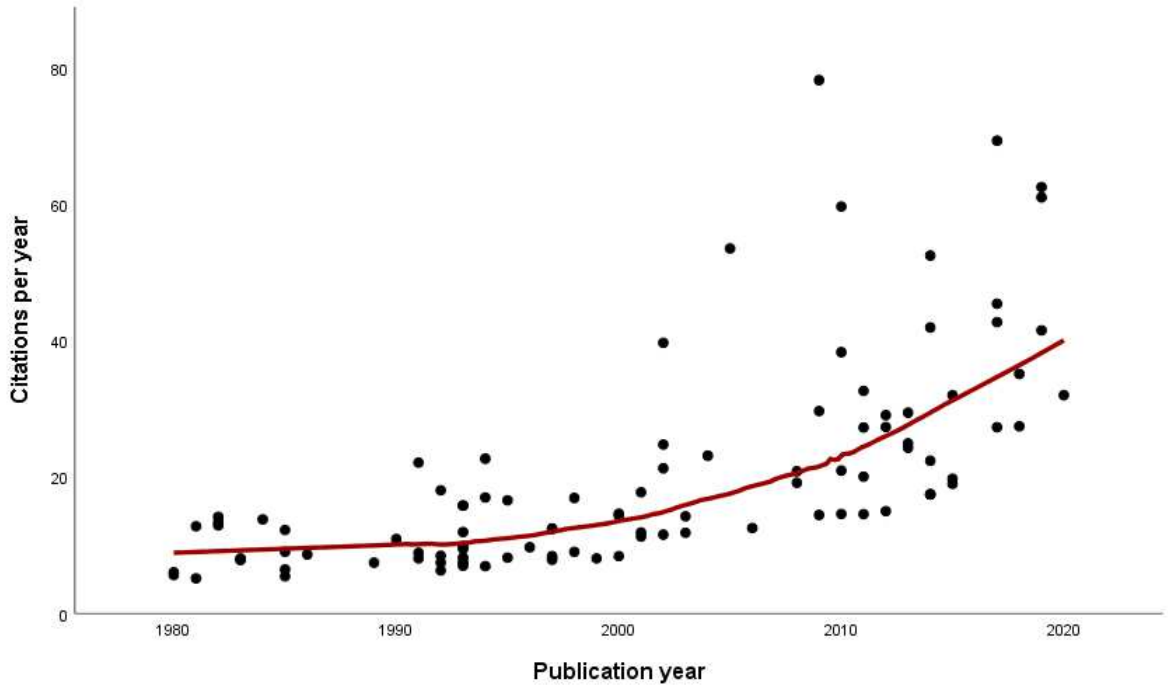


Figure 3. Citation density (citations per year) according to publication year (n = 100). The line represents a Loess fit (Epanechnikov kernel, 50% of points). Spearman's ρ = 0.780, $p < 0.001$. The Charnley article is plotted at the year of its 2005 reprint.

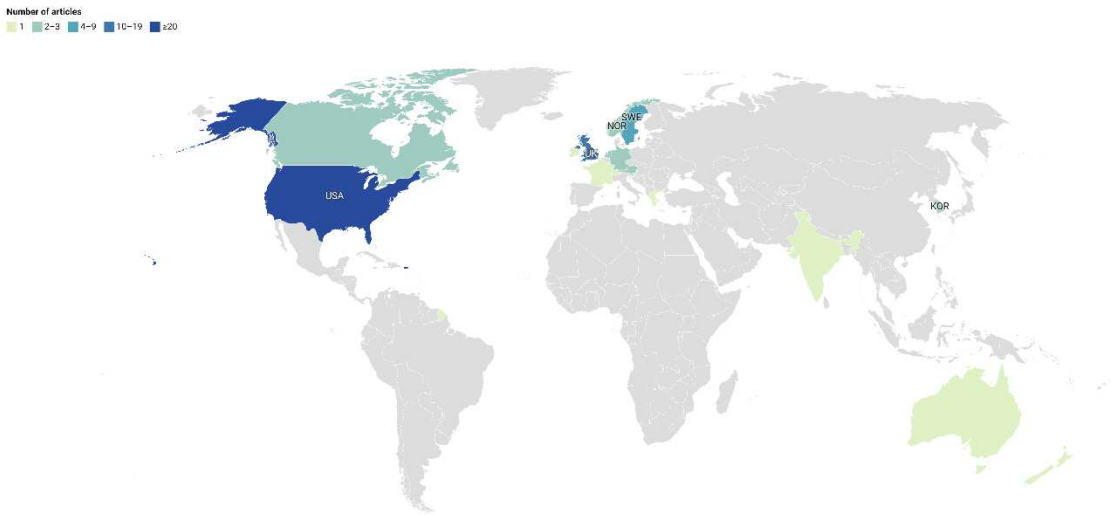


Figure 4. Geographical distribution of the 100 most-cited articles by country of the corresponding author (16 countries; labelled countries contributed ≥3 articles). French Guiana is shaded as part of France.

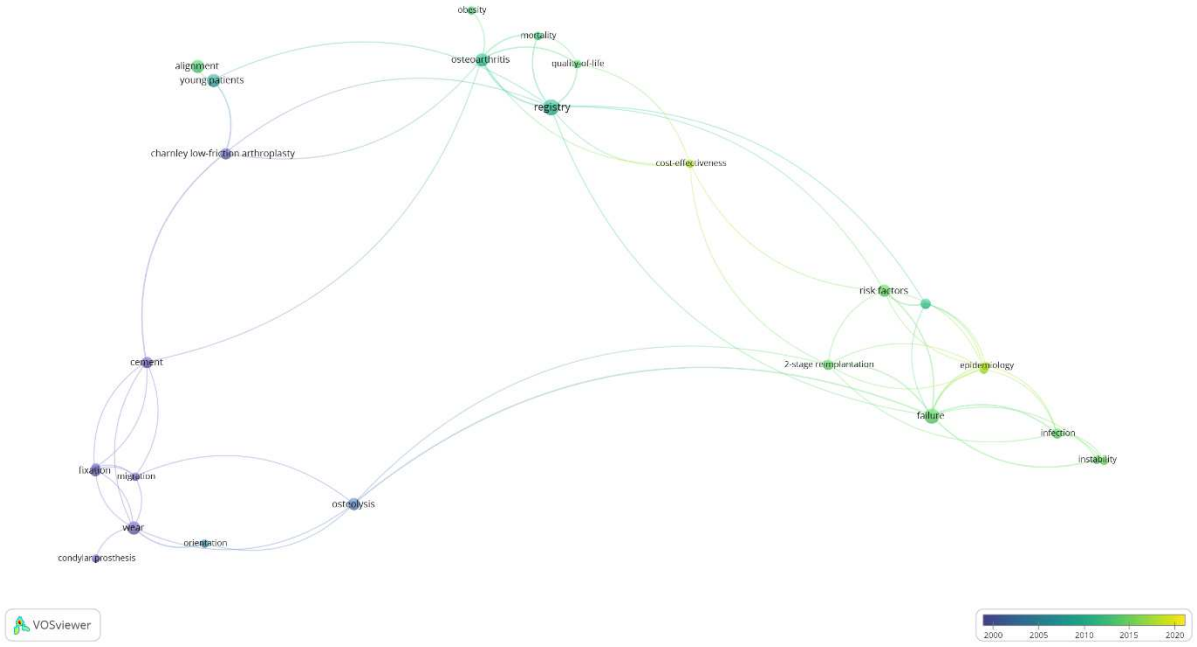


Figure 5. Co-occurrence overlay map of author keywords and Keywords Plus (minimum two occurrences; 26 of 155 keywords shown after thesaurus merging). Node size reflects occurrence, links reflect co-occurrence, and colour indicates the average publication year of articles containing the keyword.