

# Analysis And Visualisation Of Research Trends In Maxillofacial Surgery: A General Review

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**Abstract:** *Maxillofacial surgery is a specialized surgery, focusing on face reconstructive surgery, facial trauma surgery, oral cavity, head, neck mouth, jaws, and facial cosmetic surgery. The bibliometric analysis had been conducted to understand the active authors, organizations, and countries involved in the research domain of “Maxillofacial Surgery” by using the published articles from “Scopus”. The resources were analyzed using the VOS viewer to develop analysis tables and visualization maps. The most active countries were Germany, France, and Italy. The leading organizations engaged in the research regarding “Maxillofacial Surgery” were Justus Liebig University Giessen of Germany. The most active authors who had made valuable contributions related to “Maxillofacial Surgery” were Ettorre G., Mommaerts M.Y., Lowry J.C., Howaldt H.P., Schaaf H., Sailer H.F, and Kolb E.*

**Keywords:** *Maxillofacial surgery, Bibliometric analysis, VOS viewer, Health*

## 1. INTRODUCTION

Maxillofacial surgery was defined by the American Dental Association as “Oral and Maxillofacial Surgery is the specialty of dentistry which includes the diagnosis, surgical and adjunctive treatment of diseases, injuries and defects involving both the functional and aesthetic aspects of the hard and soft tissues of the oral and maxillofacial region”<sup>1</sup>. Maxillofacial surgery is a specialized surgery, focusing on face reconstructive surgery, facial trauma surgery, oral cavity, head, neck mouth, jaws, and facial cosmetic surgery. Maxillofacial surgeons are specialists in surgery in the areas of the face, jaws, oral cavity e.t.c<sup>3</sup>. The specializations in this research domain include surgical treatments of cancer in the head, neck; surgery for facial deformity, surgery of teeth, salivary glands, facial skin, jaws, cosmetic surgery<sup>2</sup>, surgery-related with cleft lip, dental implants, bone grafts etc<sup>4</sup>. This study focuses on consolidating literature regarding “Maxillofacial Surgery” by identifying the leading authors, countries, and organizations engaged in research regarding “Maxillofacial Surgery”. The first section is the introduction, followed by the discussion of the methodology by which the research was conducted. The third section deals with results. The fourth section deals with the discussion and conclusion.

### 1.1 Research Objectives

- a) To consolidate the literature regarding the “Maxillofacial Surgery”
- b) To find out the trends related to research in the “Maxillofacial Surgery”

The following research questions are framed for conducting bibliometric analysis systematically.

### 1.2 Research Questions

- a) Who are the active researchers working on “Maxillofacial Surgery”?
- b) Which are the main organizations and countries working on “Maxillofacial Surgery”?

## 2. RESEARCH METHODOLOGY

This bibliometric analysis had drawn resources only from the Scopus. For the article selection, the Boolean used was TITLE (“Maxillofacial Surgery”) on 30/12/2020. All the tables in this paper were created by using Microsoft Excel and VOS Viewer. Grammarly was used for spelling and grammar checks. Mendeley was used for article review and citation. This paper had been inspired by bibliometric analysis in its presentation style, analysis, and methodology from the works.<sup>5-9</sup>

## 3. RESULTS

This first round of search produced an outcome of 288 documents, in nineteen languages, out of which 108 documents were in English. The classification of document categories is shown in Figure 1. For improving the quality of the analysis, we had selected only the peer-reviewed articles and all other documents had not been considered. Thus after using filters “Article” and “English” the second round search produced an outcome of 71 English articles (both open access and others) and had been used to conduct bibliometric analysis and visualization using VOS Viewer. The English research articles in this domain since 1946 had been shown in Figure 2.

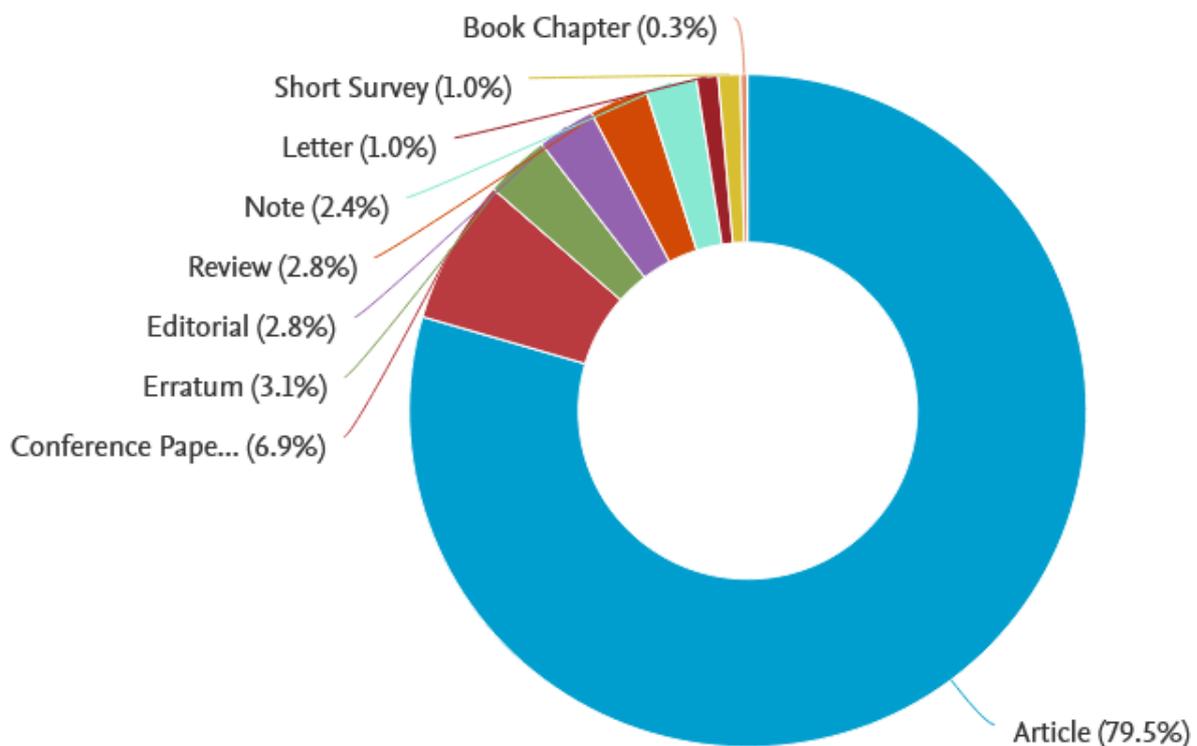


Figure 1: Classification of the documents on “Maxillofacial Surgery”, Source: [www.scopus.com](http://www.scopus.com)

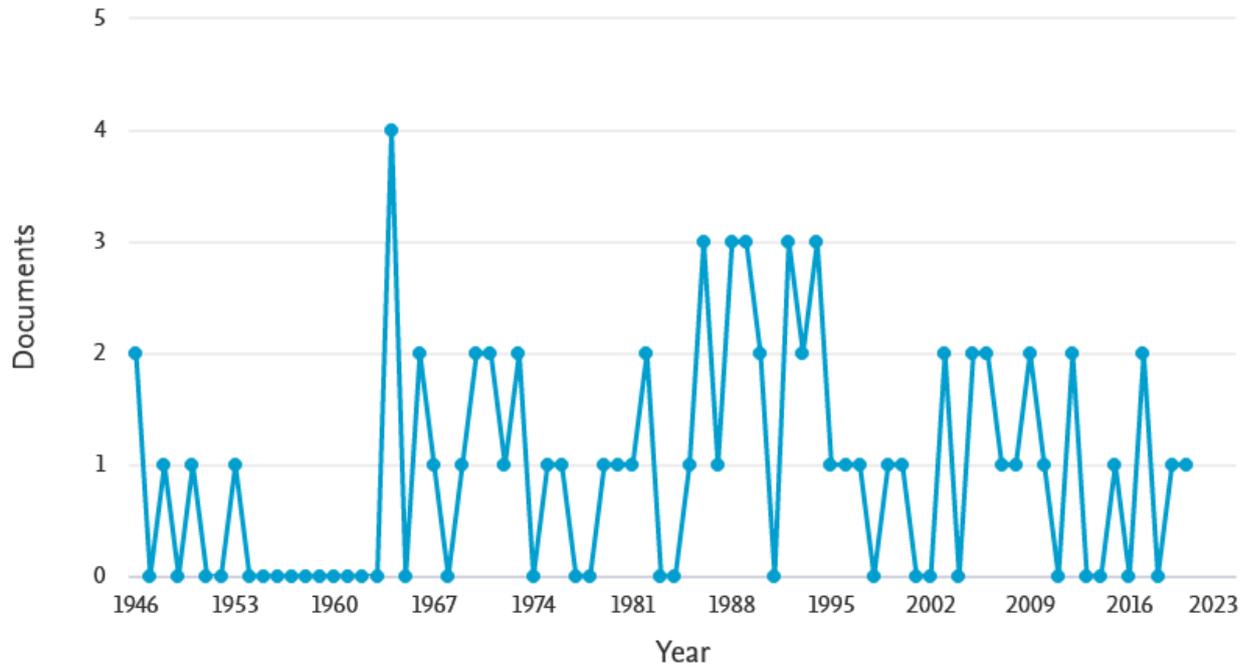


Figure 2: Period wise publication of English articles, Source: WWW.scopus.com

### 3.1 Who are the leading authors on “Maxillofacial Surgery”?

Co-authorship analysis, publication volume, and citation analysis had been used to spot out the leading authors on Maxillofacial Surgery. The results of co-authorship analysis, publication, and citation analysis using VoS viewer are shown in figure 3 For a better presentation of the analysis, the parameters used were the minimum number of documents of an author as two and the minimum number of citations of authors as one. This combination plotted the map of seven authors, in two clusters.

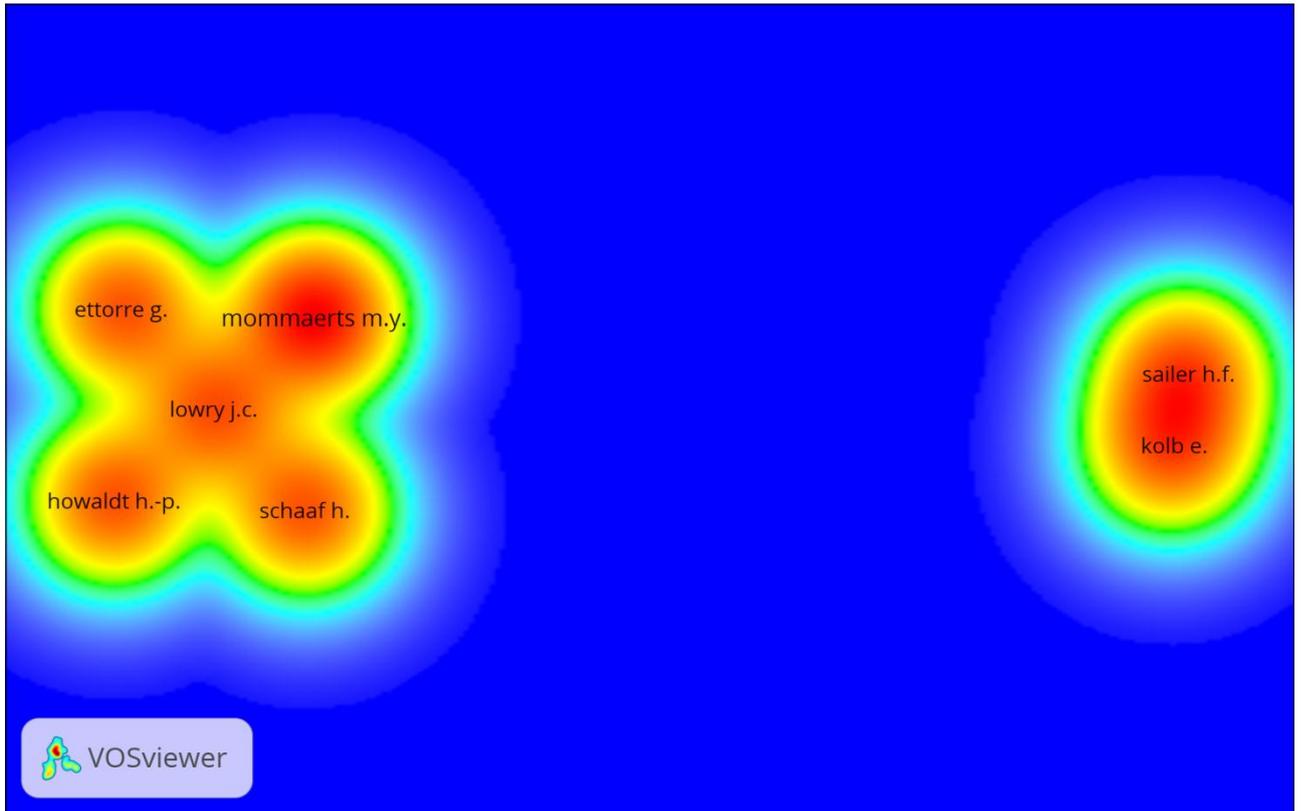


Figure 3: Co-authorship analysis, citation, and volume of publication analysis on basis of authors

In Co-occurrence analysis, we had used all keyword analyses, by keeping the minimum number of occurrences of a keyword as 5. This combination plotted the map of 31 thresholds, in five clusters. The overlay visualization of co-occurrence analysis of keywords has been shown in Figure 4.

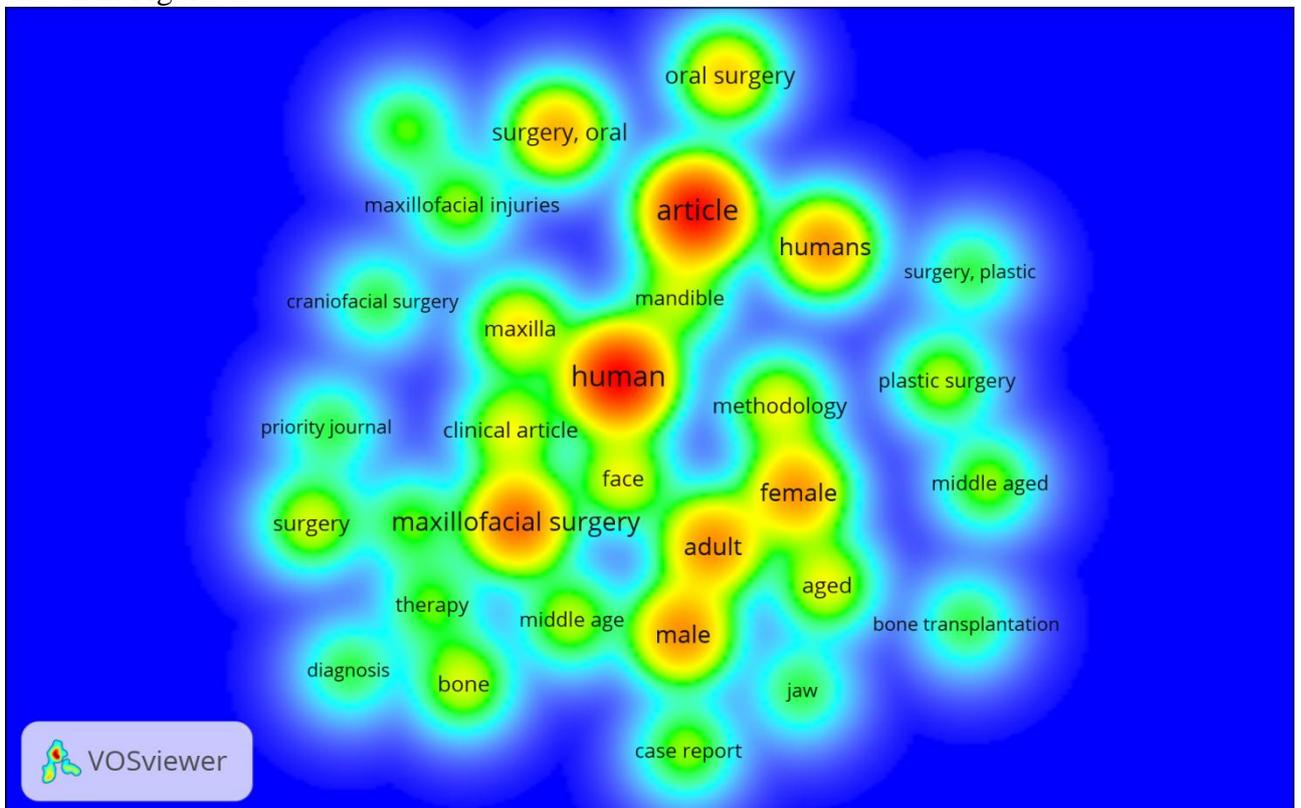


Figure 4: Co-occurrence analysis on basis of all keywords

3.2 Which are the top organizations and countries researching “Maxillofacial Surgery”?

The most leading organizations engaged in research on “Maxillofacial Surgery” had been found out by the citation analysis and basis of publication. The result of the above analysis is shown in table 1.

Table 1: Highlights of the most active organization

Organizations	Country	Documents	Citations	Average Citations per document
Justus Liebig University Giessen	Germany	2	106	58

Co-authorship analysis and citation analysis of the countries engaged in the research on “Maxillofacial Surgery” had been shown in Figure 5 and Figure 6. Volume analysis is shown in figure 7. For a better presentation of the analysis, the parameters used were the minimum number of documents of an author as two and the minimum number of citations of authors as one. This combination plotted the map of 43 countries, 13 clusters.

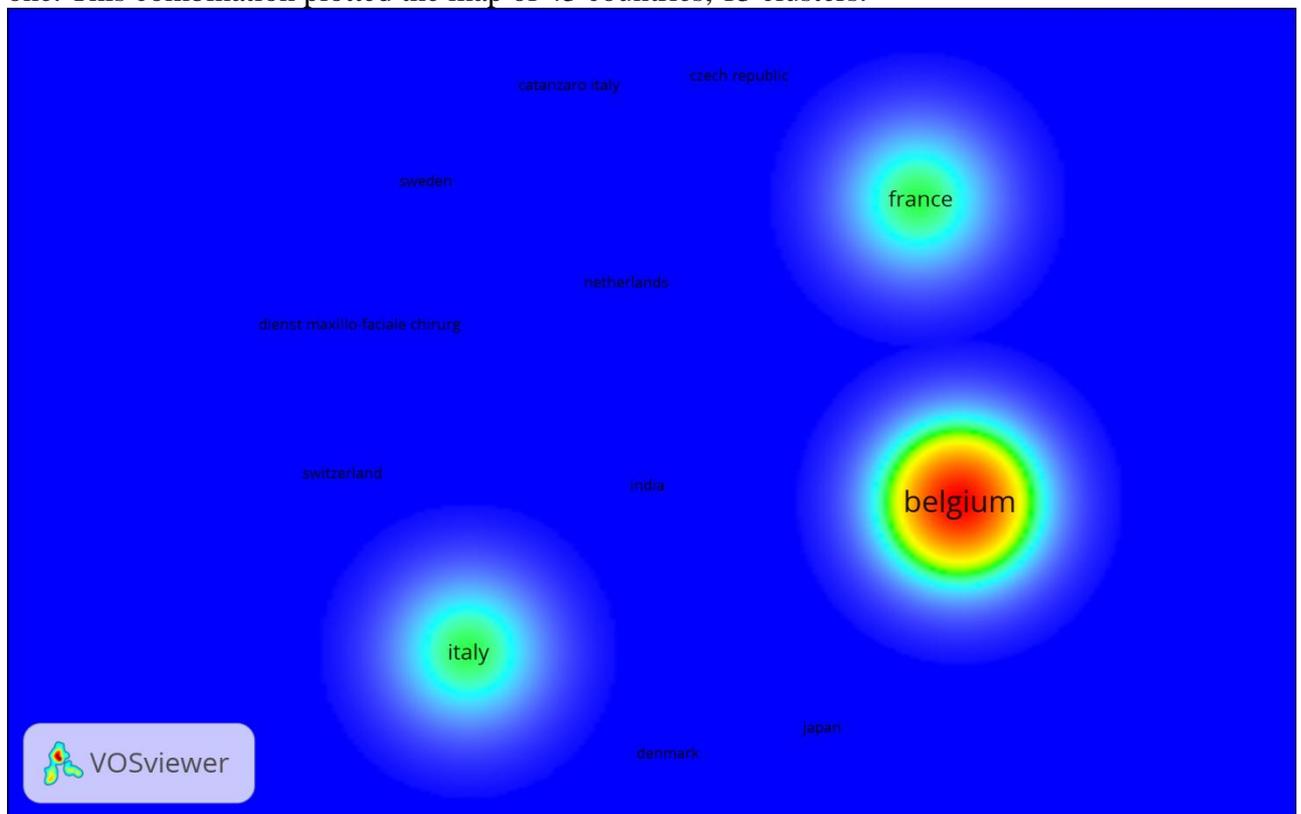


Figure 5: Co-authorship analysis on basis of countries

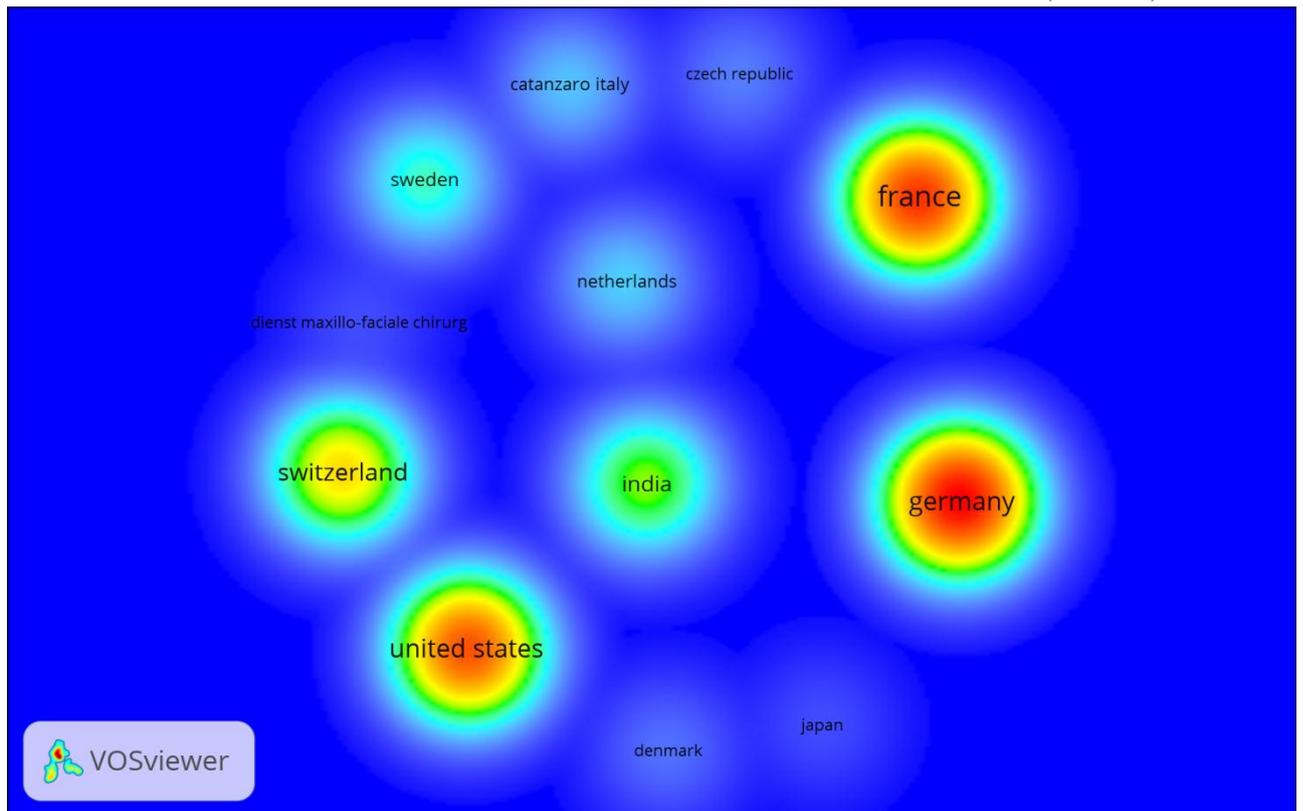


Figure 6: Citation analysis on basis of countries

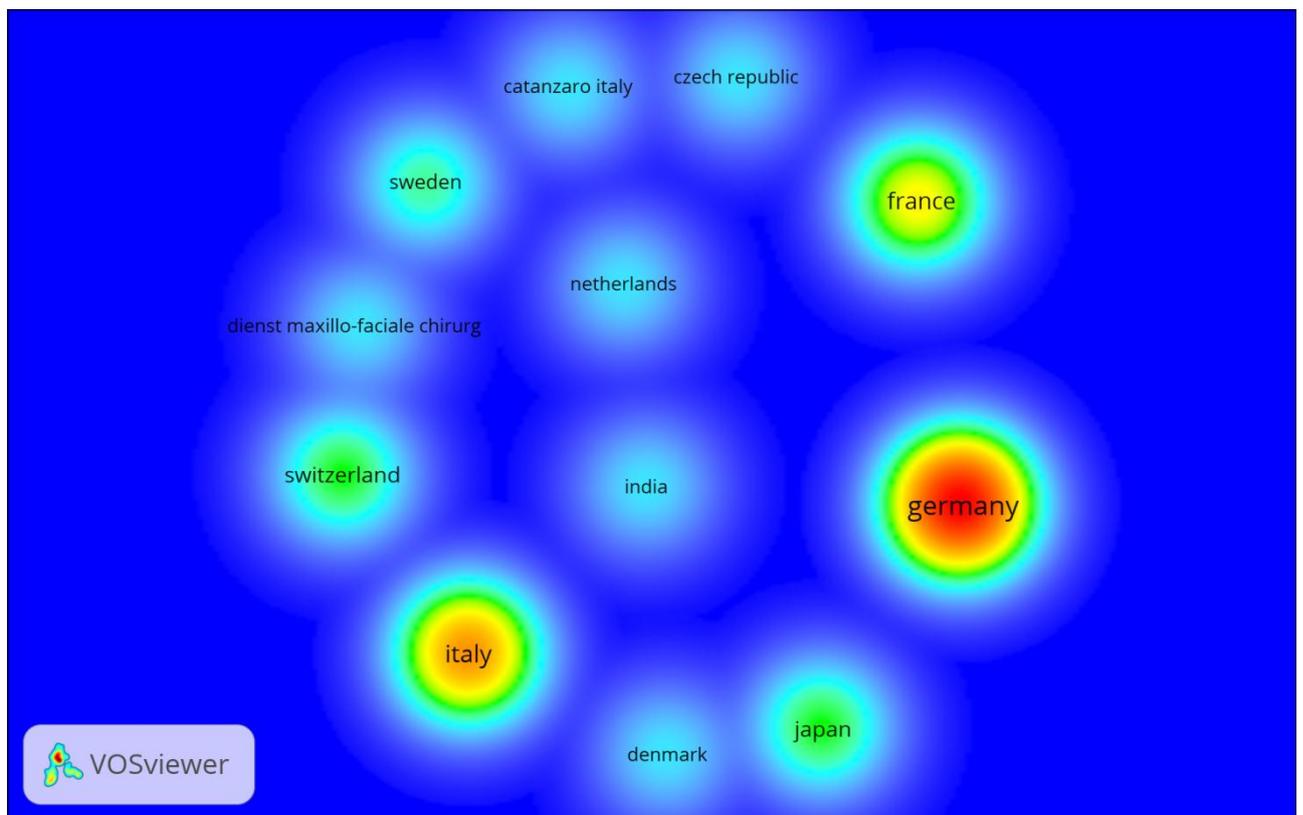


Figure 7: Leading countries in the publication of documents

#### 4. DISCUSSION AND CONCLUSION

Maxillofacial Surgery is an interesting research domain and the most active country of the research domain was Germany, France, and Italy with the leading position in the citation, publication volume, and co-authorship links. The leading organizations engaged in the research regarding “Maxillofacial Surgery” were Justus Liebig University Giessen of Germany. The most active authors who had made valuable contributions related to “Maxillofacial Surgery” were Ettore G., Mommaerts M.Y., Lowry J.C., Howaldt H.P., Schaaf H., Sailer H.F and Kolb E. with the leadership in publications, citations, and co-authorship links. This research domain offers a new avenue for researchers regarding future research. From the above discussion regarding the bibliometric patterns in the research regarding the “Maxillofacial Surgery”, this research had observed a gradual increase in research interest regarding the “Maxillofacial Surgery” from the starting of the millennium and the momentum is going on positively. This points out the relevance and potential of this research domain (Refer to Figure 2).

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