



SAĞLIK TURİZMİNİN ÖNCÜ SEKTÖRÜ; SAÇ EKİMİ UYGULAMALARI: BİBLİYOMETRİK BİR ANALİZ

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ÖZET

Bu çalışma, saç ekimi literatürüne yönelik bir bibliyometrik analiz gerçekleştirmeyi amaçlamakta olup, alandaki akademik çalışmaların eğilimlerini, önde gelen araştırmacıları ve en çok atıf alan kaynakları belirlemeyi hedeflemektedir. Ayrıca, saç ekimi konusunda hangi bilimsel alanlarda daha fazla araştırmaya ihtiyaç duyulduğunu ortaya koyarak gelecekteki araştırmalara önemli bilgiler sunmayı amaçlamaktadır. Araştırma, Web of Science veri tabanından elde edilen verilerle yürütülmüştür. Analizler, VOSviewer yazılımı kullanılarak yapılmış ve anahtar kelime analizi, ortak yazarlık analizi, atıf analizi, dergi analizi ve ülke bazlı analizler gibi bibliyometrik analiz yöntemleri uygulanmıştır. Çalışma, 1980 ile 2025 yılları arasında yayımlanmış 2.409 akademik kaynaktan elde edilen verileri kapsamaktadır. Analizler sonucunda, saç ekimi alanındaki akademik çalışmaların özellikle dermatoloji ve cerrahi disiplinlerinde yoğunlaştığı belirlenmiştir. Bunun yanı sıra, hücre biyolojisi, deneysel tıp ve immünoloji gibi alanlarda da önemli bir artış gözlemlenmiştir. En çok atıf alan ülkeler arasında ABD, Japonya, Çin ve Birleşik Krallık yer almaktadır. En çok atıf alan dergiler arasında ise Dermatologic Surgery, Journal of Cosmetic Dermatology ve Journal of Dermatologic Surgery and Oncology bulunmaktadır. Ortak yazarlık analizinde, alana önemli katkılarda bulunan belirli araştırmacıların öne çıktığı tespit edilmiştir. Saç ekimi alanındaki akademik çalışmaların artan bir ivmeyle gelişmekte olduğu ve disiplinlerarası bir yaklaşımla ele alındığı görülmüştür. Gelecekteki araştırmaların daha spesifik ve disiplinlerarası yaklaşımlarla gerçekleştirilmesi gerektiği sonucuna varılmıştır. Ayrıca, daha fazla klinik çalışma yapılması ve yeni teknolojik gelişmelerin incelenmesi önerilmekte, böylece saç ekimi literatürünün zenginleştirilmesi hedeflenmektedir. Bu doğrultuda, saç ekimi turizminde hizmet kalitesi standartlarının bir üst seviyeye taşınmasına katkı sağlayacak bilgiler sunulmuştur.

Anahtar Kelimeler: Saç Ekimi, Sağlık Turizmi, Bibliyometrik Analiz, Vosviewer

LEADING SECTOR OF HEALTH TOURISM; HAIR TRANSPLANTATION APPLICATIONS: A BIBLIOMETRIC ANALYSIS

ABSTRACT

This study aims to perform a bibliometric analysis of the hair transplantation literature to identify the trends of academic studies in the field, the main researchers and the most cited sources. It also aims to provide important information for future research by revealing which scientific fields require more research in hair transplantation. The research was carried out with the data obtained from the Web of Science database. The analyses were performed using VOSviewer software and bibliometric analysis methods such as keyword analysis, co-authorship analysis, citation analysis, journal analysis and country-based analyses were applied. The study included data from 2,409 academic sources

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published between 1980 and 2025. As a result of the analyses, it was determined that academic studies in the field of hair transplantation are concentrated especially in dermatology and surgery disciplines. In addition, a significant increase was observed in fields such as cell biology, experimental medicine and immunology. The most cited countries are the USA, Japan, China and the UK. In addition, the most cited journals include 'Dermatologic Surgery', 'Journal of Cosmetic Dermatology' and 'Journal of Dermatologic Surgery and Oncology'. In the co-authorship analysis, it was determined that certain researchers who contributed to the development of the field came to the fore. It has been observed that academic studies in the field of hair transplantation are developing with increasing momentum and are handled with an interdisciplinary approach. It was concluded that future research should be conducted with more specific and interdisciplinary approaches. In addition, it is recommended that more clinical studies should be conducted and new technological developments should be examined to enrich the academic literature on hair transplantation. In this parallel, information has been provided to bring the standards of service quality in hair transplantation tourism to the next level.

Key Words: Hair Transplantation, Health Tourism, Bibliometric Analysis, Vosviewer.

INTRODUCTION

In today's conditions where healthcare services are globalised and rapidly developing, the medical tourism market has reached a capacity of \$24.14 billion in 2023, with an average of 14 million people receiving services annually (Fortune Business Insights, 2024). Türkiye has become an important destination in medical tourism thanks to its geographical location, advanced healthcare infrastructure, affordable and short waiting time healthcare services, and rich historical and cultural heritage; and it stands out especially in treatments such as in vitro fertilisation, cancer treatment, neurosurgery, ophthalmology, dental, cardiac and orthopedic disorders, aesthetic surgery, organ transplantation and hair transplantation (Büyük & Akkuş, 2024). With the development and medicalisation of modern medicine, surgery and pharmaceutical technologies; drugs and hair transplantation surgeries have started to be perceived as miraculous treatments (Szymczak & Conrad, 2006). Especially the advertisements of products and services for hair transplantation as a remedy for hair loss in media tools have emerged as a result of medicalisation (Sezgin, 2015). Türkiye, which stands out among health tourism destinations with its quality services and competitive prices, takes a significant share of the global market in the hair transplantation industry (İlhan & Özdoğan, 2022). Especially Istanbul as one of the leading destinations in this field is known as "Turkish Hairlines" in the world (Cengiz & Koç, 2024). Researches indicating that the first expression that comes to mind when it comes to health tourism in Türkiye is "hair transplantation" (Yıldız & Yazıcı Ayyıldız, 2024); is an indication of how popular the sector is and that it is integrated with the country's tourism. Visitors, especially from Gulf countries, also prefer Türkiye for non-essential medical operations such as hair transplantation and plastic surgery (Antalya Provincial Directorate of Culture and Tourism, 2021)

It was determined that the experiences of tourists travelling for hair transplantation consist of six main components: 'clinic and equipment quality', 'service quality', 'price-performance perception', 'transfer and accommodation services', 'meeting expectations' and 'follow-up processes' (Tanrıverdi et al., 2025). In another study conducted on a sample of tourism faculty academicians, in response to the question "What are the most preferred treatments in health tourism in Türkiye?", it was found that hair transplantation, aesthetic operations, organ transplants, surgical operations, dental and implant treatment, thermal treatments using thermal springs, especially in İçmeler, and eye treatment were the most preferred treatments; They stated that especially Arabs choose Türkiye for hair transplantation, that the country in general is good in organ transplants, especially the face transplant performed by Akdeniz University, and that Türkiye is preferred because dental treatments are cheaper compared to European countries (Gökmen et al., 2020). When the comments made by patients receiving hair transplantation services in Türkiye regarding the physician performing the procedure are analysed, it is seen that the physicians' characteristics such as being sincere, knowledgeable, competent, having time management skills, friendly, helpful, providing complete information, reducing anxiety and fear, reliable, empathising, experienced and proven, and being humble are emphasised (Güder & Yılmaz, 2023). In parallel with this, the fact that hair transplantation treatments have started to be offered at much more affordable prices and high service quality in our country compared to other countries has led to the interest in this field and the development of medical tourism (Cengiz & Koç, 2024)

Hair transplantation, which has become a very popular medical procedure for individuals suffering from hair loss, has become an important element for the tourism industry as individuals seek quality and competitive prices. Considering that hair transplantation is a rapidly growing sector that blends medical developments with travel opportunities; it can be stated as a serious possibility that the integration process into tourism with the right organisations will bring successful results. When the right policies are implemented, this field can continue to develop as a sustainable and beneficial industry for

both patients and service providers. At this point, analysing the trends of academic studies can contribute to the organisation and carrying the research on the subject to the next stage.

1. METHODOLOGY

In this part of the study, academic studies on "hair transplantation" were analysed using the Web of Science database. In this direction, the aim of the study, the analysis methods used and the details of the findings obtained are presented.

When the literature is examined, it is seen that different programmes are used in bibliometric analysis. In this study, VOSviewer software, which is considered to be more functional, was preferred and analyses were performed. VOSviewer is considered as a guiding tool for researchers who want to discover innovations and developments in the literature. In addition, thanks to its visualisation, multidimensional analysis and mapping features, it allows a more detailed examination of data sets. Choosing this database for studies such as bibliometric analysis is an important factor in increasing the reliability of the research. In addition, Web of Science contains many qualified and reliable studies from different disciplines by providing various control mechanisms that enable advanced data analyses. (Dirik et al., 2023, p. 173).

The data used in the study were taken from the Web of Science database. Within the scope of the study, on 19.02.2025, it was seen that there were 2,409 studies in the Web of Science database with the keyword "hair transplantation" by selecting "all fields". Between 1980 and 2025, 1825 articles, 289 review articles, 95 letters, 88 editorials, 76 meeting abstracts, 63 proceedings, 51 book chapters, 18 early access, 10 notes, 5 corrections, 2 reprints, 1 book review, 1 correction, addition and 1 withdrawn publication type study from different disciplines were reached. According to disciplines, most of the studies belong to the fields of dermatology (809), surgery (720), cell biology (193), experimental medicine research (166), oncology (157), transplantation (140), cell tissue engineering (134), immunology (127), hematology (96) and neuroscience (88). The data set used was analysed in terms of co-author, citation, journal, country, institution, source and citation analyses. As a result, the following research questions were reviewed in this study.

1. What is the trend in the number of publications of academic studies on hair transplantation according to years?
2. What are the most commonly used keywords in hair transplantation literature?
3. Which are the most cited sources in studies on hair transplantation?
4. According to the co-citation analyses in the hair transplantation literature, which authors are most frequently cited?
5. Who are the publishers with the most publications in hair transplantation literature?

The classification of the results obtained as a result of the bibliometric analysis in terms of the most common types of studies, the most published authors, the top 5 categories of Web of Science, the most published languages and the most published publishers and their total numbers are given in Table 1.

Table 1: Bibliometric Analysis Summary Information

Range of Publication Years	Most Common	Most Published Authors	Web Of Science Top 5 Categories	Most Published Languages	Most Broadcasting Publishers
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Types of Work					
1980	Article (1826)	Hu, Zhiqi (35)	Dermatology (810)	English (2,323)	Elsevier (536)
	Review Article (288)	Park, Jae Hyun (32)	Surgery (719)	German (49)	Wiley (459)
	Letter (96)	Miao, Yong (31)	Cell Biology (193)	French (14)	Springer Nature (296)
	Editorial Material (88)	Hoffman, Rober M. (28)	Experimental Medicine Research (166)	Spanish (10)	Lippincott Williams&Wilkins (252)
	Abstracts (76)	Fan, Zhexiang (20)	Oncology (157)	Korean (4)	Taylor & Francis (62)
Total Work: 2.525		Total Number of Authors: 200	Total number of Categories: 114	Total Number of Languages: 10	Total Publishers: 202

2. FINDINGS

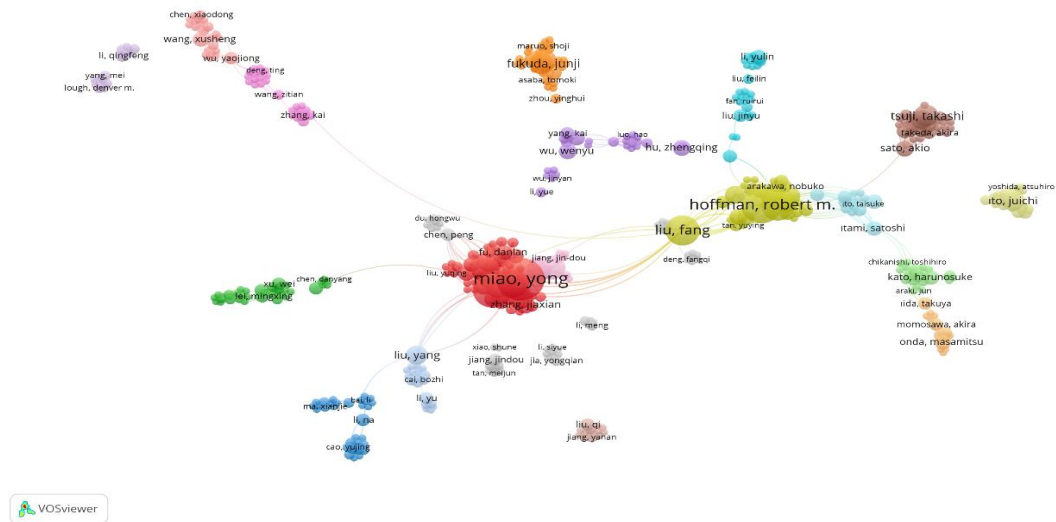
In this section, bibliometric information on the concept of hair transplantation is explained with visuals.

2.1. CO-AUTHORSHIP OF AUTHORS

Using co-authorship analysis, based on the criteria of at least one publication and at least one citation, the authors who collaborate the most and have the strongest connections with each other were identified and a network map was created. As a result of the analysis, 9681 authors and 2987 connections were identified in a single cluster among the authors with the highest number of connections. The authors with the highest number of studies were Maiao Yong (35), Park Jae Hyun (30) and Hoffman Robert M. (24). The most cited authors were Hoffman, Robert M. with 781 citations, Clevers Hans, Barker, Nick, Van Es and Johan H, Jacks Viljar, Kasper Maria, Snippert Hugo J. and Toftgard Rune with 765 citations and Amoh Yasuyuki and Katsuoka Kensei with 699 citations. It is seen that the author

with the highest number of studies is also in the first place among the most connected authors (Miao Yong).

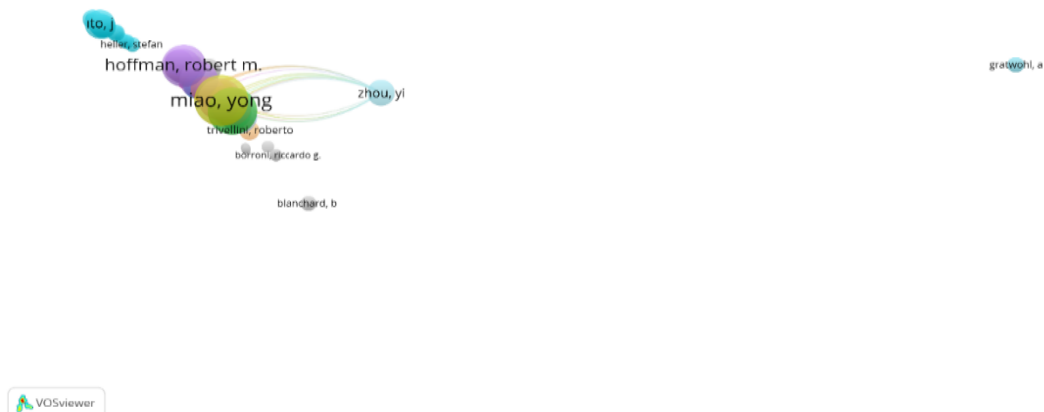
Figure 1: Author Links Indicating Author Collaborations



2. 2. CITATION ANALYSIS BY AUTHORS (CITATION OF AUTHORS)

In order to perform the author citation analysis, a network map including authors who have published at least one publication and received at least one citation was created. As a result of the analysis, a total of 31 clusters, 35,843 links and 45,206 total link strengths were identified in the analysis of 2,285 linked units. Among the most cited authors, Robert M. Hoffman ranked first with 781 citations, while Hans Clevers, Johan H. Van Es, Nick Barker, Rune Toftgard, Hugo J. Snippert, Maria Kasper and Viljar Jaks shared the second place with 765 citations. Kensei Katsuoko and Yasuyuki Amoh ranked third with 699 citations. The most cited author also topped the list in terms of total link strength.

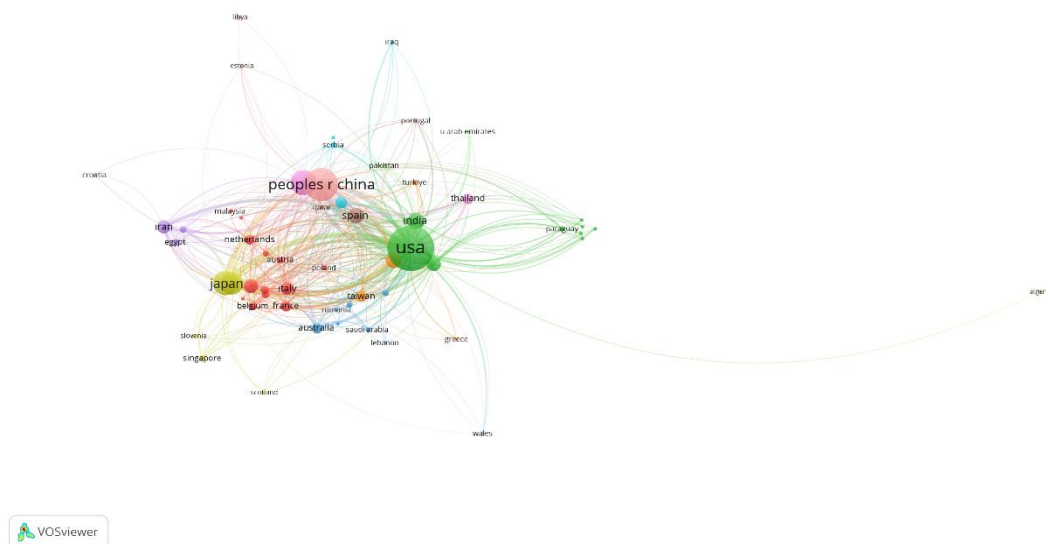
Figure 2: Authors' Citation Links



2. 3. CITATION ANALYSIS BY COUNTRIES

In order to analyse the citations of publications according to their country of origin, a network map was created by taking into account the criterion that a country publishes at least one work and receives citations. In this framework, 59 interrelated elements were analysed. 13 clusters, 435 links and 2914 total link strength were identified. The countries with the highest number of citations were USA (7056 citations) and Japan (2617 citations) China (1815 citations) and England (1483 citations) the ranking of the total linking power for these countries is USA (1479), China (698), Japan (439) and South Korea (356). The ranking of the number of publications is as follows: USA (288 publications), China (153 publications), South Korea (87 publications) and Japan (85 publications).

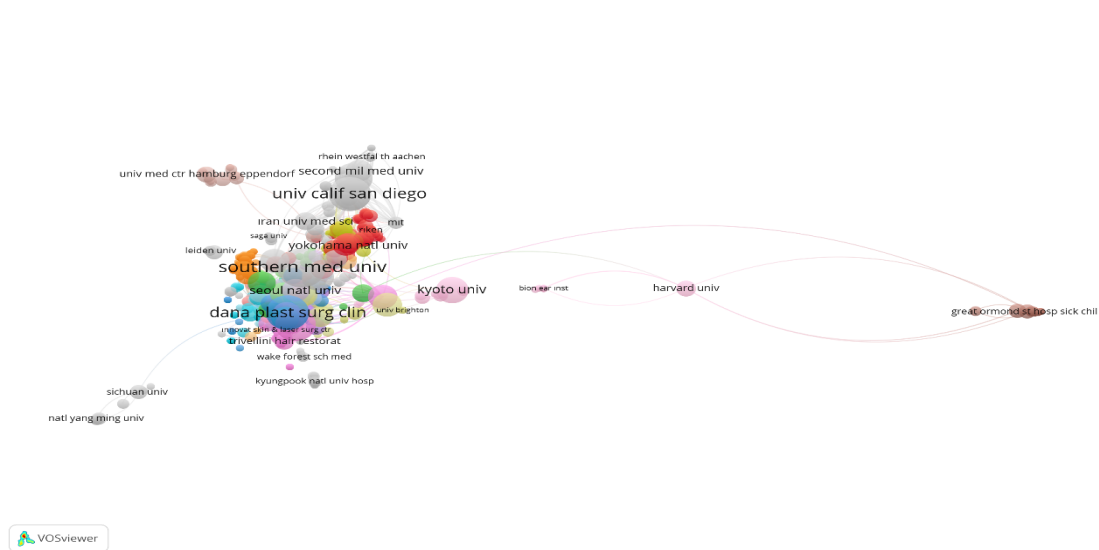
Figure 3: Citation Links by Country



2. 4. CITATION ANALYSIS BY CITATION OF ORGANISATIONS

In order to visualise the citation relationships between institutions, a network map was created including institutions that have published and cited at least one work. In this context, 26 clusters, 8,058 links and a total of 10,801 link strength were identified as a result of the analysis of 921 interconnected items. Among the institutions that produced the most publications, Southern Medical University (29 works), Dana Plastic Surgery Clinic (23 works), University of California San Diego (22 works) and University of Miami (21 works) stand out. The institutions to which the studies with the highest impact in terms of the number of citations are affiliated are Kitasato University (1,301 citations), University of California San Diego (1,114 citations) and University of Tartu, Novum, Hubrecht Institute and Estonian Biocenter (765 citations). One of the three institutions producing the most works is also in the top three of the most cited institutions.

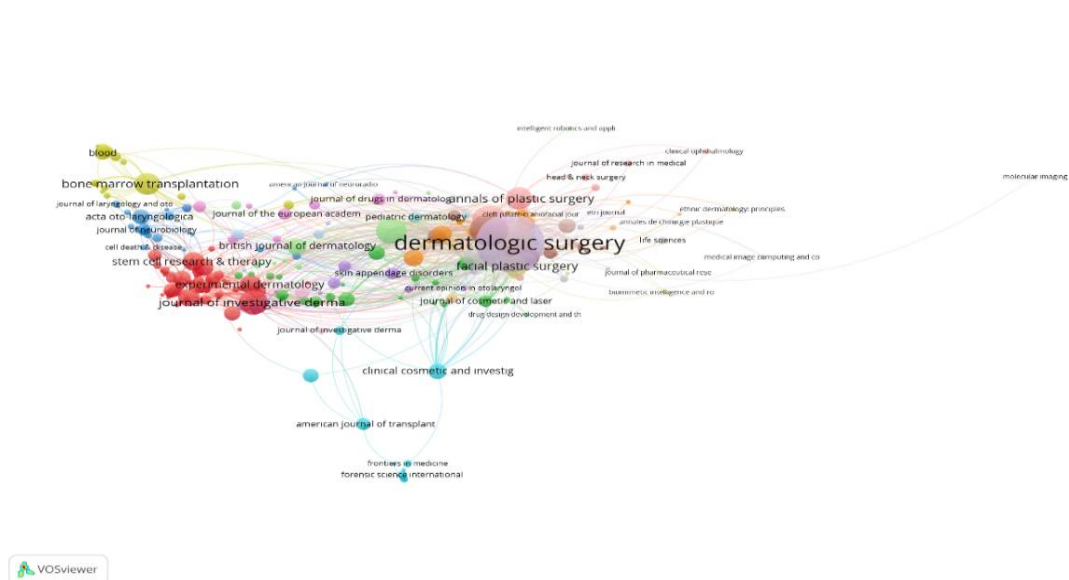
Figure 4: Citation Links by Institutions



2. 5. CITATION OF SOURCES ANALYSIS

In order to create a network map according to the citation of the sources, the analysis was carried out with 262 items under the restriction that at least 1 work was published and 1 citation was received. In the analysis, it was determined that there were 22 clusters, 1211 links and 2667 total link strength. The most cited sources were Dermatologic Surgery (199 citations), Journal of Cosmetic Dermatology (63 citations) and Journal of Dermatologic Surgery and Oncology (59 citations).

Figure 5: Most Frequently Cited Source Links

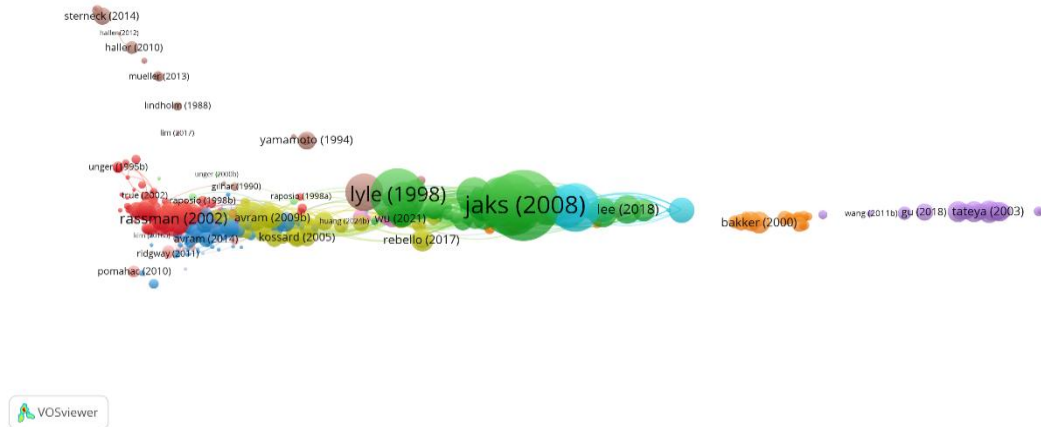


2. 6. BIBLIOGRAPHIC COUPLING OF DOCUMENTS

Bibliographic matching refers to the situation where two independent sources refer to a common work. As a result of the analysis performed on 734 items that were selected with the criterion of being cited at least once and linked to each other, 12 clusters, 24,604 links and 43,323 link strength in total were determined. The most similar studies in terms of bibliographic matching were Jaks (2008) with 765 citations, Plikus (2008) with 571 citations and Lyle (1998) with 436 citations. On the other hand,

Jimenez (2021a), Vogel (2013) and Zheng (2023) stand out among the studies with the highest total link strength.

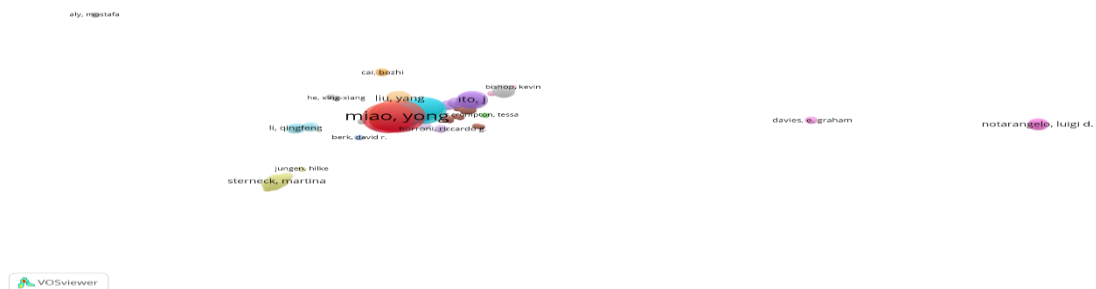
Figure 6: Bibliographic Matching Links of the Works



2.7. BIBLIOGRAPHIC COUPLING OF AUTHORS

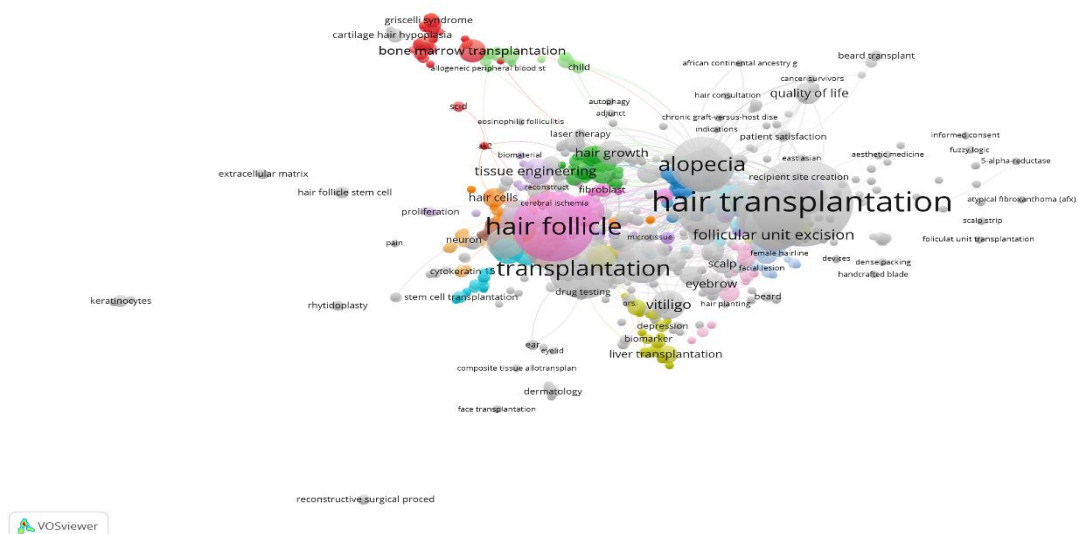
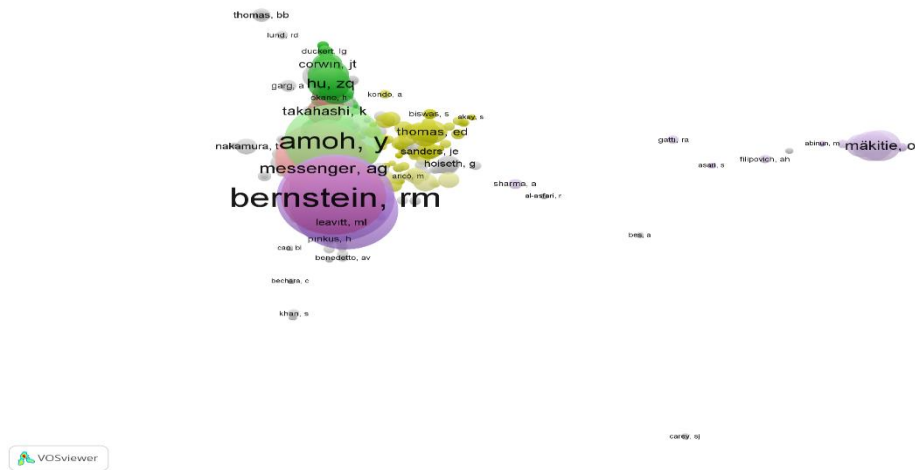
As a result of the analysis carried out on 2,837 items that were selected according to the criteria of having published at least one work and having received at least one citation, 26 clusters, 401,659 links and a total of 1,480,706 link strength were identified. The most similar authors in terms of bibliographic matching were Miao Young (20,294 link strength) with 35 citations, Park Jae Hyun (7,422 link strength) with 30 citations and Robert M. Hoffman (22,658 link strength) with 24 citations.

Figure 7: Authors' Bibliographic Matching Links



2.8. CO-CITATION OF CO-AUTHORS

Different sources cited together in a publication are called co-citation. As a result of the analysis performed on 341 items selected with a minimum of 10 citations, a total of 6 clusters, 17,985 links and 67,173 link strengths were determined. The authors with the highest number of co-citations were Bernstein RM with 212 citations, Rassman WR with 168 citations and Unger WP with 168 citations.



3. DISCUSSION AND CONCLUSION

This study presents a bibliometric analysis of the hair transplantation literature, aiming to identify the general trends, main actors and most cited sources of academic studies in this field. The analyses conducted using the Web of Science database have shown that academic studies on hair transplantation are increasing with a growing momentum and are addressed in different fields of science with an interdisciplinary approach.

As a result of the analyses, it was determined that academic studies in the field of hair transplantation are concentrated especially in dermatology and surgery disciplines. In addition to these disciplines, it has been determined that studies in areas such as cell biology, experimental medicine and immunology have also increased. Patwardhan and Mysore (2008) also described hair transplantation as a surgical method used in hair restoration. They stated that the doctor who will perform this application should be a specialist who has completed postgraduate education in the field of dermatology and has sufficient theoretical knowledge about dermo-surgery in a center providing dermatosurgery training. The findings obtained reveal that academic studies on hair transplantation have increased over the years and that there has been a great accumulation in the literature from the 1980s to the present day. Avram and Rogers (2009) also stated that the hair transplantation field has evolved and developed gradually in the last quarter century and that hair loss has started to be prevented in patients. Rassman (2015), in his study discussing the future of hair transplantation, emphasised the continuous development of the field. He also stated that the 1990s witnessed great changes in hair transplantation; moreover, the use of a large number of small grafts and the acceptance of follicular unit transplantation as the new "gold standard" in this period were among the important developments in the field of hair transplantation.

Co-authorship analysis showed that there is an intensive collaboration network among academics publishing in the field of hair transplantation. When the most published and cited authors were analysed, it was determined that certain researchers made significant contributions to the academic development of the field. Citation analyses revealed that the main researchers who have an impact in this field have a significant impact on other studies.

Analyses on the basis of countries showed that the countries with the highest number of publications and citations are "USA, Japan, China and UK". This finding reveals that academic studies on hair transplantation are largely carried out by developed countries and that research centers and academic institutions in these countries are effective in this field. Inter-institutional citation analyses showed that institutions such as "Southern Medical University", "Dana Plastic Surgery Clinic", "University of California San Diego" and "University of Miami" have significant number of publications and citations in the field of hair transplantation.

When the source citation analyses were examined, it was seen that journals such as "Dermatologic Surgery", "Journal of Cosmetic Dermatology" and "Journal of Dermatologic Surgery and Oncology" were among the most cited sources in this field. This shows that academic publications on hair transplantation are concentrated around certain journals and that these journals provide important sources of information for the literature.

Keyword analyses revealed that academic studies on hair transplantation are mostly shaped around concepts such as "hair transplantation", "hair follicle", "alopecia" and "transplantation". This finding is important for understanding the basic conceptual framework of the studies published in the hair transplantation literature.

In general, bibliometric analyses in the field of hair transplantation have systematically examined the publication distribution of academic studies in this field, citation rates, academic collaborations between countries and institutions, and the main sources in the literature. These findings serve as a guide

for academics who want to conduct studies on hair transplantation and provide important reference points for future research. At the same time, these analyses provide important information for researchers who will work in this field by revealing in which directions the academic development in the field of hair transplantation is progressing and which areas and topics in the literature require further research.

In conclusion, the bibliometric analysis of hair transplantation literature reveals that this field has become a growing academic research area that is integrated with different disciplines. This study also provides important information for the development of future academic studies in a way that will allow them to be carried out with more specific and interdisciplinary approaches.

4. THEORETICAL AND PRACTICAL IMPLICATIONS

This study provides comprehensive insights into the existing literature on hair transplantation through a comprehensive bibliometric analysis. Theoretically, the findings aim to contribute to academic discourse by mapping the intellectual structure, influential authors and key research topics in the field. The identification of the most cited authors, journals and institutions improves the understanding of the process of knowledge production and dissemination in hair transplant research. Furthermore, the analysis of co-authorship networks and bibliographic links reveals collaborative patterns, highlighting the interdisciplinary nature of this field, encompassing dermatology, surgery, cell biology and immunology. The current findings may guide future researchers to identify gaps in the literature and explore less explored areas for more comprehensive research.

From a practical perspective, the results of the study have important implications for medical practitioners, health policy makers and organisations interested in hair transplantation. Understanding the most productive countries, institutions and authors in the field can facilitate international collaborations and strengthen global research networks. In addition, current results can also improve the quality of clinical practice. The identification of leading journals and important publications is also expected to provide practitioners with reliable sources for evidence-based practice and the latest advances in hair transplantation techniques. In addition, the recognition of the most frequently cited topics and keywords may also help practitioners to be informed about emerging trends and innovative approaches in this field.

Overall, the current research not only enriches the theoretical foundations of hair transplantation studies, but also offers practical implications for academics, clinicians and healthcare industry professionals seeking to improve knowledge, collaborations and clinical practice in the evolving field.

5. ASSUMPTIONS AND LIMITATIONS

Certain assumptions were taken into consideration while conducting bibliometric analysis of the academic literature in the field of hair transplantation. Firstly, Web of Science database was used as the main data source of the study. Although this choice was made in order to provide access to high quality and peer-reviewed publications in the literature, it led to the exclusion of relevant studies in other databases. Therefore, the current situation constitutes a limitation in terms of generalising the results of the analysis.

The VOSviewer software used in the study is widely accepted as a preferred and reliable tool in bibliometric analyses (Van Eck & Waltman, 2009). However, the limited visualisation capabilities of the software and the limitations in the application of certain analysis techniques caused limitations in performing more in-depth analyses. In addition, the data analysed in this study only focused on publications published in English. This may cause studies in other languages to be ignored and may limit the universality of the literature analysed. In addition, only publications in a certain date range

(1980-2025) were considered in the study and studies outside this date range were excluded from the scope of the analysis. The date limitation may lead to deficiencies in providing a comprehensive overview of the historical development of hair transplantation literature.

Finally, the research was based on citation analyses only. Although the number of citations is an important indicator in measuring the academic impact of studies, it may not always be considered as an absolute measure of scientific quality (Ioannidis et al., 2016). In particular, low citation rates of new publications do not mean that these studies are worthless.

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