

PUBLICATION TRENDS IN ENTROPION (2001-2020) : A SCIENTOMETRIC ANALYSIS

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The growth rate of literature on 'Entropion' during the period of 20 years i.e., (2001-2020) in which a total of 538 research papers were published in the field of Entropion is Analysed. A Scientometric study is the measurement method for identifying the publication trends in the field of Sciences. The study reveals different scientometric parameters like Document wise distribution of publication, Language wise distribution of publication, Year wise distribution of publication, Annual Growth Rate, Relative Growth Rate, Doubling Time, Degree of Collaboration, Most Prolific Authors, Most Productive Journals and Most Productive Institutions and found that the maximum 66 (12.26%) articles were published in 2011-12, 26.31% Annual Growth Rate was recorded in the year 2005-06. The Maximum RGR 0.76 and DT 5.77 were recorded in 2003-04 and 2019-20 respectively. The most prolific authors were Kakizaki H with 19 publications, followed by 09 publications by three authors Burton M J, Malhotra R and Takahashi Y each respectively. The maximum of 492 (91.45%) publications are done by multiple authors and Aichi Medical University of Japan published 13 articles with 229 citations in the Institution publication.

KEYWORDS: AGR; Degree of Collaboration; Doubling Time; Entropion Scientometrics; RGR

INTRODUCTION

The major sensory organ involved in vision is our eyes. It collects the light around us and converts it into nerve impulses. These signals are transmitted by optic nerve to the brain, which forms an image and it provides sight or vision. Our sight is one of the most complex systems in our bodies. Our eyes help us to learn about our surroundings than any other sense organs. 80% of all ideas are through our vision and yet most of us don't give importance until something goes wrong. There are several eye diseases and conditions which include Glaucoma, Cataracts, Retinal Detachment, Bacterial Conjunctivitis, Uveitis and some rare diseases which are Behcet's Disease, Colokoma, Retinitis Pigmentosa and Entropion and so on.

Entropion is a condition in which your eyelid turns inward, so that your eyelashes and skin rub against the eye surface and leads to irritation and discomfort to the eyes. Entropion is more common in older people and it usually affects the lower eyelid. When Entropion is not treated, it may cause damage to the front part of the eyes cornea, eye infection and vision loss. According to the American Academy of ophthalmology it affects up to 2.1 percent of people over the age of 60 years.

LITERATURE REVIEW

Gupta, Brij Mohan et al., (2013) conducted a quantitative analysis using the keyword 'Conjunctivitis' research during the period 2002-11 for which the research outputs are collected from the Scopus Citation Database which covers 8,550 publications. The analysis reveal that 604 papers published in the year 2002 which increased to 945 papers in the year 2011. The average growth rate is 5.44% and the average citation impact per paper is 5.72%. Harvard Medical School, Boston, USA ranks first among the top institutions with 100 papers, 889 total citation at an ACPP Of 8.89%. Allergy-European Journal of Allergy and Clinical Immunology comes first among the most productive journals with 146 papers for the study period.

Murugan, K (2019) examined the research output of Eye Disease collected from the PubMed Database for the period of 2009 to 2018. He analyzed 1,65,083 documents and found various factors like Year-wise Distribution, Gender Distribution, Article Types, Journal-wise Publications, Subject-wise Distribution etc in a detailed manner and concluded that majority of females are affected by on eye diseases with

42,466 records (61.23 %) and 9,717 records are found in the category of journals.

Ichhpujani, Parul et al., (2020) investigated the growth and development of Glaucoma from the Web of Science for the past 74 years. The documents published for the research period covers total of 32,551 items obtained from 1,906 sources. Geographic metrics reveals that USA produces more publication with 23% which collaborates with Brazil, China, Japan and Canada, whereas India collaborates mostly with the countries like Australia, UK, Singapore etc., Lotka's Law predicts that 60% of authors make a single author contribution and 15 % are done with two author contribution.

Victoria, P and Gomathi, P (2021)The purpose of this study was to measure the number of contributions and highlight the contributions made by the researchers in the field of leprosy and published on the Web of Science database during 2010-2020 using scientometric analysis. Data were interpreted by using software such as Bibexcel, Vosviewer, and tabulated using MS Excel. The results indicated that 4544 papers were published during 2010 - 2020 and the highest number of publications 456 (10.03%) was produced in 2020. The trends in multi-authored papers have tremendously increased (89.28%) compared to (10.72%) single-authored papers. The relative growth rate (3.13) and degree of collaboration (0.89) is noted significantly and the highest no of papers (12.50%) was contributed by the collaboration of four authors and source wise most of the records were published an article 3063. It also noted that the value of the highest degree of collaboration was (0.92) in 2020. The Sarno EN author (114) contributed more numbers of papers in the domain of leprosy with Brazil

(1173) being the country producing more research papers followed by India, the USA, and the UK. More than 500 papers had been published in Leprosy, Mycobacterium-Leprae, and Diagnosis. The study inferred that the rate of growth is relation by the year wise publications of leprosy research.

OBJECTIVES OF THE STUDY

The objective of the study aims to perform the scientometric analysis of all Entropion publications during the period 2001 to 2020. The following parameters are analysed:

- Year wise Distribution of Publication and Annual Growth Rate
- Relative Growth Rate and Doubling Time
- Document wise Distribution of Publications
- Language wise Distribution of Entropion Research Output

- Degree of Collaboration
- Most Prolific Authors
- Most Productive Institution
- Most Productive Journal in the field Entropion

METHODOLOGY

The data for the following study were downloaded from the database Web of Science published by Thomson Reuters during the years 2001 – 2020, using the research term ‘Entropion’. A total of 538 documents were downloaded for the above period and analyzed as per the objectives of the study. The study is based on all the documents such as Articles, Letter, Review, Proceeding Paper, Meeting Abstract Editorial Material, and Early Access which are published in the Web of Science.

DATA ANALYSIS AND INTERPRETATION

Year wise Growth of Publication

Table - 1: Year wise Distribution of Publication

Year	No. of Publication	Cumulative No. of Publication	Percentage	Cumulative Percentage
2001 – 02	33	33	6.13	6.13
2003 – 04	38	71	7.06	13.19
2005 – 06	48	119	8.92	22.11
2007 – 08	50	169	9.30	31.41
2009 – 10	55	224	10.22	41.63
2011 – 12	66	290	12.26	53.89
2013 – 14	58	348	10.79	64.68
2015 – 16	60	408	11.15	75.83
2017 – 18	64	472	11.90	87.73
2019 – 20	65	537	12.08	99.81
Unknown	01	538	0.18	100
Total	538	538	100	100

Table-1 shows the year-wise distribution of publication on 'Entropion' from the marked period of study. The publication output in 'Entropion' research expanded from 33 in 2001 – 02 to 65 in the year 2019 – 20. Out of 538 publications, 66 (12.26%) were maximum

recorded during the year 2011 – 12, followed by 65 constituting (12.08%) of publications were published in the year 2019 – 20 and the minimum 33 (6.13%) of publications recorded in the year 2001 – 02.

Annual Growth Rate of Publication:

Table - 2: Annual Growth Rate of Publication:

Year	No. of Publication	AGR
2001 – 02	33	0
2003 – 04	38	15.15
2005 – 06	48	26.31
2007 – 08	50	4.17
2009 – 10	55	10.00
2011 – 12	66	20.00
2013 – 14	58	-12.12
2015 – 16	60	3.45
2017 – 18	64	6.67
2019 – 20	65	1.56
Unknown	01	-98.46

Figure - 1: Annual Growth Rate of Publication:

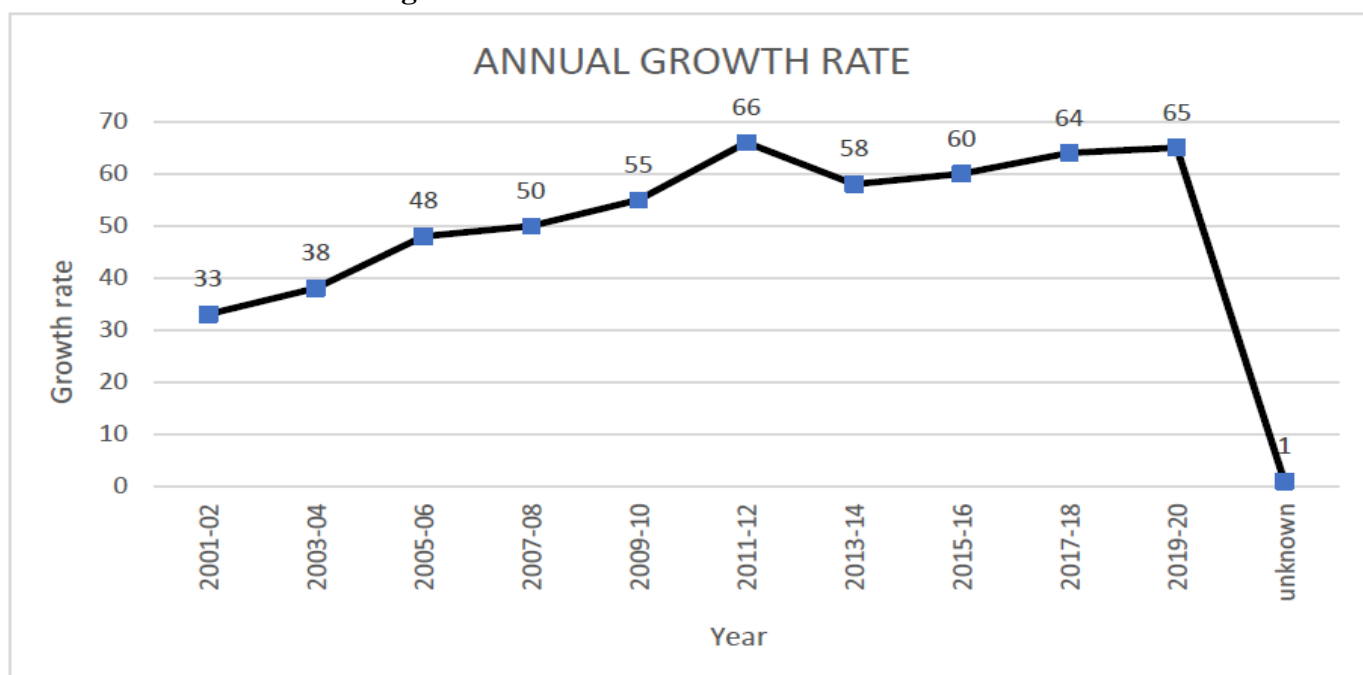


Table-2 and Figure-1 show that the Annual Growth Rate of publication on 'Entropion' during the period 2001 – 2020. It was found that the maximum of 26.31 AGR was recorded in the year 2005 – 06, followed by 20.00 AGR during the year 2011 – 12 and the minimum -12.12 AGR recorded in 2013 – 14 and -98.46 AGR which is

unknown. The overall AGR data is shown in Table-4. The annual growth rate (AGR) is calculated on the formula given by (Kumar and Kaliyaperumal, 2015) and mentioned as below:

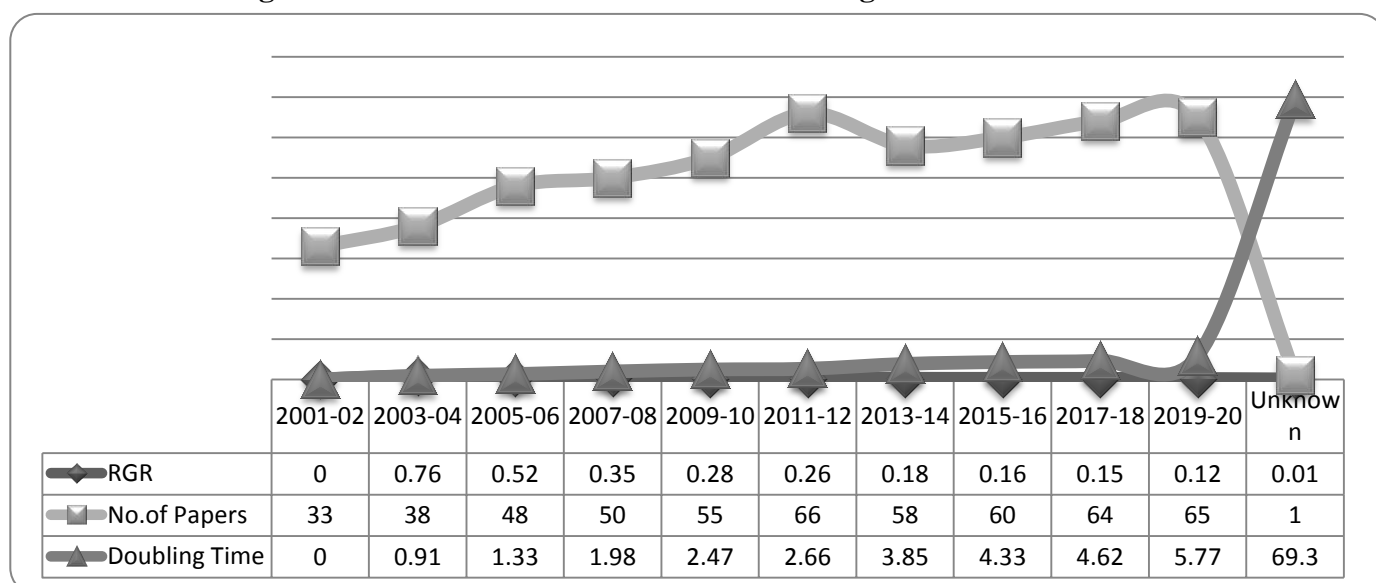
$$AGR = \frac{\text{End Value} - \text{First Value}}{\text{First Value}} \times 100$$

Relative Growth Rate and Doubling Time of Publication:

Table - 3: Relative Growth Rate and Doubling Time of Publication:

Year	No. of Publication	Cumulative No. of Publication	W1	W2	RGR (W2-W1)	Mean	DT (0.693/RGR)	Mean
2001 – 02	33	33	0	3.50	0	0.434	0	1.56
2003 – 04	38	71	3.50	4.26	0.76		0.91	
2005 – 06	48	119	4.26	4.78	0.52		1.33	
2007 – 08	50	169	4.78	5.13	0.35		1.98	
2009 – 10	55	224	5.13	5.41	0.28		2.47	
2011 – 12	66	290	5.41	5.67	0.26		2.66	
2013 – 14	58	348	5.67	5.85	0.18	0.124	3.85	17.57
2015 – 16	60	408	5.85	6.01	0.16		4.33	
2017 – 18	64	472	6.01	6.16	0.15		4.62	
2019 – 20	65	537	6.16	6.28	0.12		5.77	
Unknown	01	538	6.28	6.29	0.01		69.3	

Figure - 2: Relative Growth Rate and Doubling Time of Publication



output of the last twenty years reveals that the Relative Growth Rate (RGR) mean and mean Doubling Time (DT) of the publications in the research area of Entropion during the research period. It was found that the relative growth rate (RGR) from 0.76 in the year 2003-04 is decreased to 0.01 in the year 2019-20. At the same time, the doubling time of the publications gradually increased from 0.91 in the year 2003-04 to 5.77 in the year 2019-20 and the mean doubling time of the publication was found to be 1.56 and 17.57. From the above discussion, it is found that the relative growth rate of the publication is gradually decreased while the doubling time of the publication is gradually increased.

The Relative Growth Rate and the Doubling Time for publications are calculated by

5.4. Document wise Distribution of Publication:

Table - 4: Document wise Distribution of Publication:

Document Types	No. of Records	Cumulative No. of Records	Percentage	Cumulative Percentage
Article	412	412	76.58	76.58
Letter	38	450	7.06	83.64
Review	38	488	7.06	90.70
Article; Proceeding Paper	29	517	5.40	96.10
Meeting Abstract	15	532	2.79	98.89
Editorial Material	05	537	0.93	99.82
Article; Early Access	01	538	0.18	100
Total	538	538	100	100

Figure – 3: Document wise Distribution of Publication:

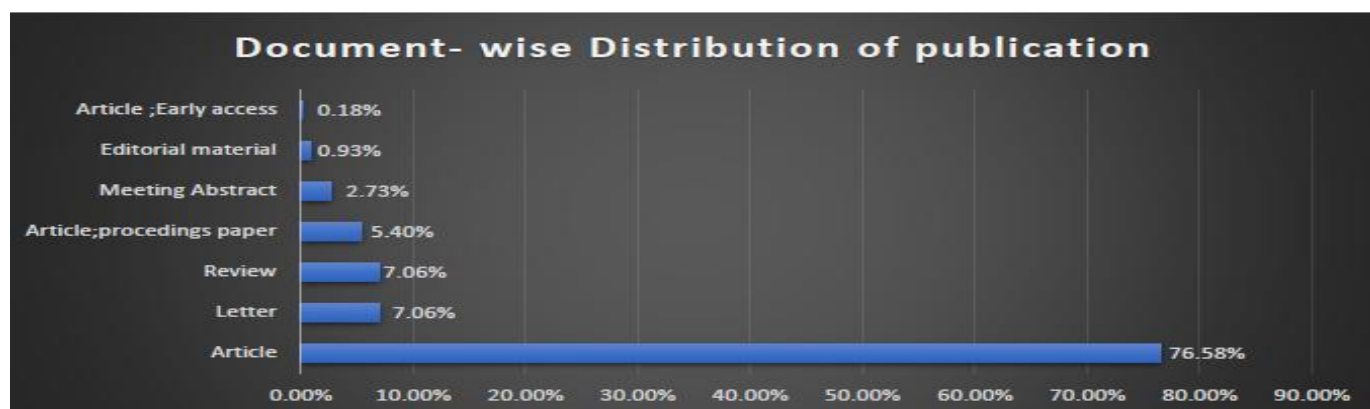


Table-4 & Figure-3 illustrate the document-wise distribution of publications on 'Entropion' during the period of 20 years i.e, from 2001 – 2020. The maximum 412 (76.58%) of publications were 'Article' type of documents, which is followed by 'Letter' and 'Review' type of documents with 38 (7.06%) of publications

each and 29 (5.40%) of publications was 'Proceedings' type of documents. The remaining data like Meeting Abstract, Editorial Material, and Early Access which comes next of document-wise distribution of publications as shown in the table-4.

Language wise Distribution of Publication:

Table - 5: Language wise Distribution of Publication:

Languages	No. of Records	Cumulative No. of Records	Percentage	Cumulative Percentage
English	494	494	91.82	91.82
German	25	519	4.65	96.47
French	09	528	1.67	98.14
Portuguese	03	531	0.56	98.70
Spanish	02	533	0.37	99.07
Italian	02	535	0.37	99.44
Turkish	01	536	0.18	99.62
Hungarian	01	537	0.18	99.80
Slovenian	01	538	0.18	99.98
Total	538	538	100	100

From the above Table-5, it can be found that among the various published documents, most of the publications are in the Language English 494 (91.82%) then it is followed by German 25 (4.65%), French 09 (1.67%) and then continued by Portuguese, Spanish, Italian, Turkish, Hungarian and Slovenian. It is visible that the language English is Predominantly used and published in Entropion Research.

Degree of Collaboration (DC)

The Degree of Collaboration for the research term 'Entropion' has been calculated by the equation suggested by K. Subramanian which shows the degree of collaboration of authors yearwise as shown in Table - 6

$$DC = Nm / Nm$$

Table - 6: Degree of Collaboration

Year	Single	Two	Three	Four	More than Four	Total	More than One Author (Nm)	Degree of Collaboration DC = (Nm / Nm + Ns)
2001 – 02	02	12	07	05	07	33	31	0.94
2003 – 04	06	11	06	08	07	38	32	0.84
2005 – 06	06	12	09	08	13	48	42	0.88
2007 – 08	08	11	08	10	13	50	42	0.84
2009 – 10	09	09	14	09	14	55	46	0.84
2011 – 12	03	12	14	16	21	66	63	0.95
2013 – 14	02	08	11	11	26	58	56	0.96
2015 – 16	03	09	11	14	23	60	57	0.95
2017 – 18	03	11	12	13	25	64	61	0.95
2019 – 20	04	06	17	04	35	66	62	0.94
Total	46	101	109	98	184	538	492	0.91

Table-6 show that the Collaboration of Research of Authorship Pattern from 538 Articles published during the period 2001-20 shows, out of that the least 8.55% (i.e., 46) of articles have been contributed by a single author. A more number of articles are published by more than four authors with 34.2% (i.e., 184). Therefore, the study reveals that out of 538 articles multiple authors contributed to the maximum i.e., 492 (91.45%) and the single authors contributed to the minimum i.e., 46 (8.55%).

5.7. Most Prolific Authors Contribution:

Table -7 below reveals the topmost 15 prolific authors for their contributions in the field

of Entropion. It is found that Kakizaki H contributed the maximum number of articles with 19 (3.53%) publications with a total citation of 257 having an ACPP of 13.53 citations for his research done. The next highest number of publications was published by three persons namely Burton M.J, Malhotra R, and Takahashi Y with 09 articles each (1.67%) with a total citation of 315, 119, and 62 respectively. The top three authors with their h-index conclude that Kakizaki H (h-index=9) in first, Burton M.J (h-index=8) in second, and Malhotra R (h-index=6) in third respectively.

Table – 7: Top 15 Most Prolific Authors in the Field of Entropion:

S.No.	Author	No. of Publications	Percentage	Total Citations	ACPP*	h-index
1.	Kakizaki H	19	3.53	257	13.53	09
2.	Burton M.J	09	1.67	315	35.00	08
3.	Malhotra R	09	1.67	119	13.22	06
4.	Takahashi Y	09	1.67	62	6.89	05
5.	Woo Ki	07	1.30	60	8.57	05
6.	Kim Y.D	07	1.30	60	8.57	05
7.	Meyer D.R	08	1.49	33	4.12	03
8.	Rajak S.N	06	1.11	122	20.33	06
9.	West S.K	06	1.11	79	13.17	05
10.	Selva D	06	1.11	104	17.33	05
11.	Khwarg S.I	06	1.11	50	8.33	05
12.	Habtamu E	05	0.93	72	14.4	05
13.	Zako M	05	0.93	115	23.00	05
14.	Iwaki M	05	0.93	115	23.00	05
15.	Allen R.C	05	0.93	24	4.80	04

ACPP* - Average Citations per Paper

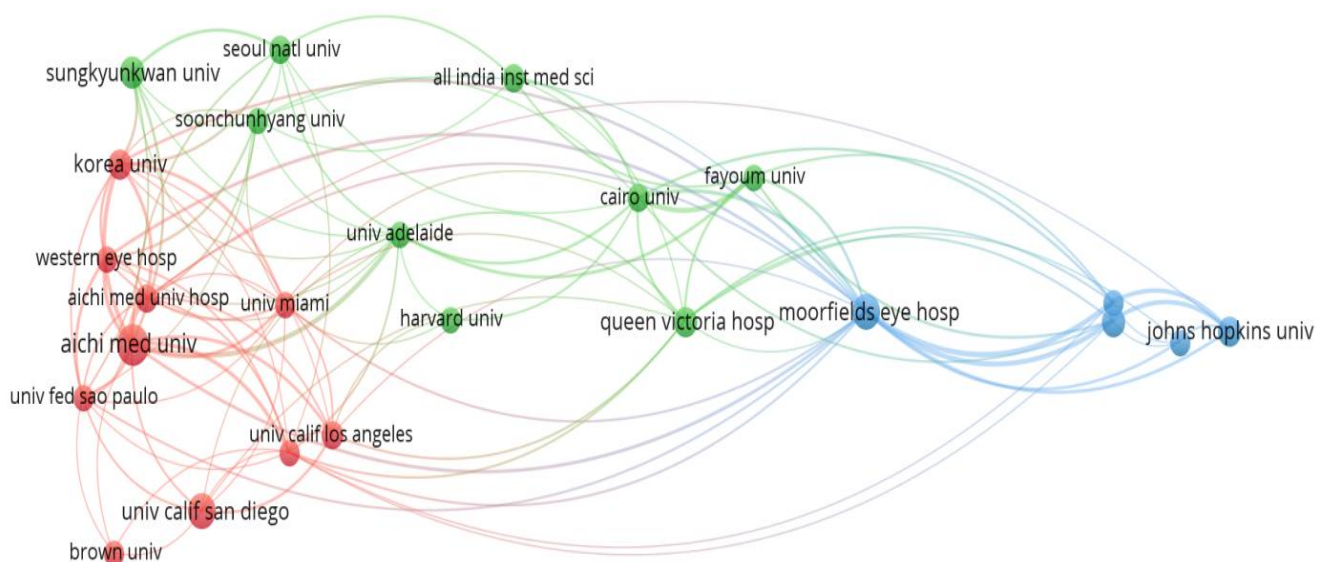
5.8. Top 10 Institution Contributions:

Table-8 and Figure-4 below show the top 10 Institution Contributions and collaboration of networks in the field of Entropion which depicts that out of the top ten institutions which are ranked based on total articles published, four countries namely the USA, Japan, South Korea, and the UK have two institutions each and also one from India and one from UAE. The maximum number of articles with 13 publications (2.4%) come from Aichi Medical University followed by Moorefields Eye Hospital and University of California San Diego with 09 publications (1.7%) each. As a third institution,

Sungkyunkwan University published 08 publications with 1.5%. London School of Hygiene and Tropical Medicine, United Kingdom has a maximum number of citations (274 citations) with an ACPP of 39.14 citations followed by Aichi Medical University, Japan (229 citations) with an ACPP of 17.62 citations and Moorefields Eye Hospital, UAE (186 Citations) with an ACPP 20.67 citations. Among the top ten institutions, All India Institute of Medical Science, India comes in the fifth rank with 103 citations at an ACPP of 17.17 citations

Table – 8: Top 10 Institution Contribution in the Field of Entropion:

S.No.	Institution Name	No. of Publications	%	Rank	TC	ACPP	Country
1	Aichi Medical University	13	2.4	1	229	17.62	Japan
2	Moorefields Eye Hospital	09	1.7	2	186	20.67	UAE
3	University of California San Diego	09	1.7	2	49	5.44	USA
4	Sungkyunkwan University	08	1.5	3	62	7.75	South Korea
5	Johns Hopkins University	07	1.3	4	90	12.86	USA
6	Korea University	07	1.3	4	57	8.14	South Korea
7	London School of Hygiene and Tropical Medicine	07	1.3	4	274	39.14	UK
8	Queen Victoria Hospital	07	1.3	4	73	10.43	UK
9	Aichi Medical University Hospital	06	1.1	5	26	4.33	Japan
10	All India Institute of Medical Science	06	1.1	5	103	17.17	India

Figure – 4: Network Collaboration of Institutions in the Field of Entropion:

5.9. Authors Most Preferred Journal for Publication:

Table-9 and Figure-5 below show that the research output of the term Entropion is published in 538 articles in 150 different Journals. Among the top ten preferred journals for publications, the journals Ophthalmic Plastic and Reconstructive Surgery with Impact Factor 1.331 (2019) and 82 Publications (15.24%) ranked first, which is followed by the journal Ophthalmology with Impact Factor 5.04 (2020) and 29 Publications

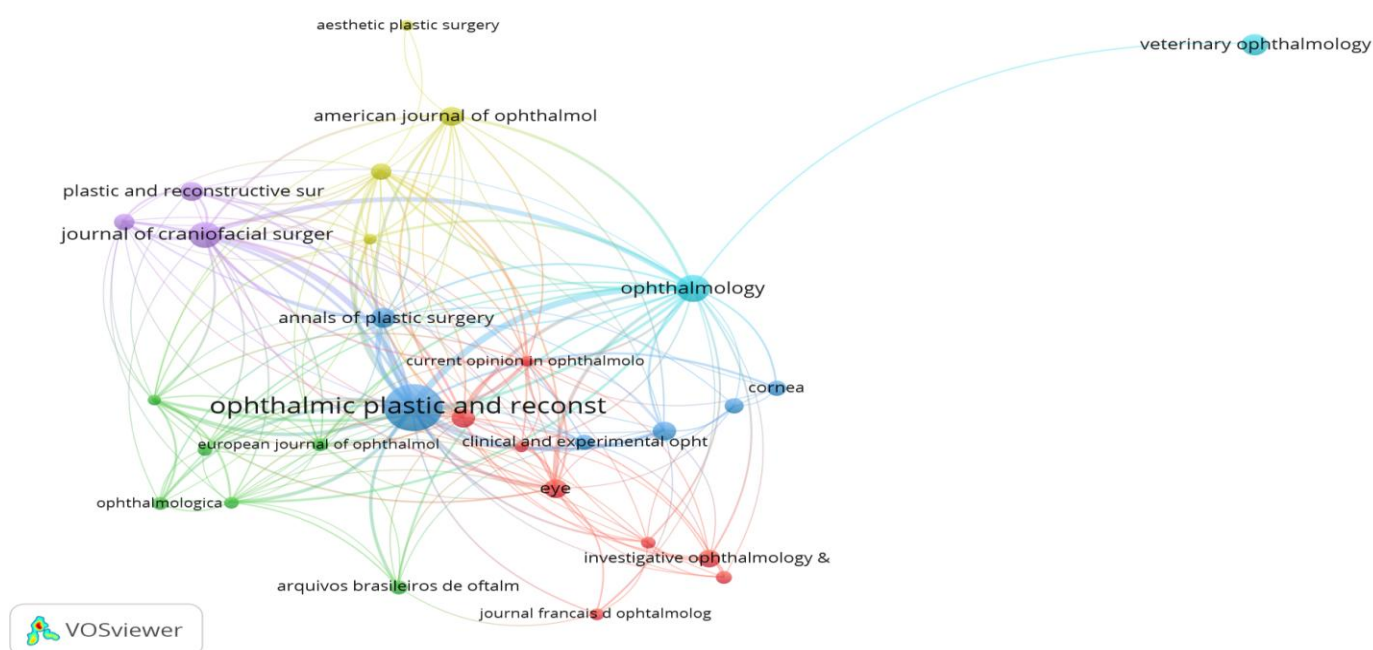
(5.39%) in Second Rank and Journal of Craniofacial Surgery with Impact Factor 0.953 (2019) and 25 Publications (4.65%) in the Third Rank. Moreover, the Journals Plastic and Reconstructive Surgery with Impact Factor 1.57 (2020), American Journal of Ophthalmology with Impact Factor 4.013 (2019), British Journal of Ophthalmology with Impact Factor 4.19 (2020), and Klinische Monatsblätter Für Augenheilkunde with Impact Factor 0.605 (2019) share the 7th Rank respectively.

Table - 9: Top 10 Ranked Most Preferred Journal for Publication by Authors:

S.No.	Source Title	No. of Publication	%	Rank	Citations	Impact Factor
1.	Ophthalmic Plastic and Reconstructive Surgery	82	15.24	1	740	1.331 (2019)
2.	Ophthalmology	29	5.39	2	591	5.04 (2020)
3.	Journal of Craniofacial Surgery	25	4.65	3	114	0.953 (2019)
4.	Veterinary Ophthalmology	18	3.35	4	107	1.105 (2019)
5.	Annals of Plastic Surgery	16	2.98	5	132	1.354 (2019)
6.	Eye	14	2.60	6	108	2.55 (2020)
7.	Plastic and Reconstructive Surgery	13	2.41	7	277	1.57 (2020)
8.	American Journal of Ophthalmology	13	2.41	7	224	4.013 (2019)
9.	British Journal of Ophthalmology	13	2.41	7	130	4.19 (2020)

10.	Klinische Monatsblätter Fur Augenheilkunde	13	2.41	7	25	0.605 (2019)
11.	Investigative Ophthalmology and Visual Science	12	2.23	8	109	4.05 (2020)
12.	Journal of Plastic Reconstructive and Aesthetic Surgery	11	2.04	9	38	2.390 (2019)
13.	Journal of Cranio-Maxillofacial Surgery	10	1.86	10	163	1.94 (2020)

Figure – 5: Network Collaboration of Journals in the Field of Entropion:



5.10 Findings and Conclusion

A total of 538 contributions on Entropion during the period of 20 years from 2001-2020 have been identified and analyzed the various factors such as Document wise Distribution, Language wise Distribution, Yearwise Growth, Relative Growth Rate, Doubling Time, Degree of Collaboration, Most Prolific Authors, Institution Contribution of Publication and Most Preferred

Journals for Publication which has been found in the field of Entropion output for the above period.

The results of the scientometric analysis show that among 538 publications, Articles come first with 76.58% (412 Records), where the Language English was dominant with 91.82% (494 Records). The maximum number of articles were published during the year 2011-12 with 66 publications (12.26%) and the minimum number

of publications in the year 2001-02 with 33 publications (6.13%). Also, the Annual Growth Rate shows that a maximum of 26.31 AGR was recorded in the year 2005-06.

It is found that the Relative Growth Rate of publications decreased gradually while the doubling time of the publication is increased which ranges from 0.91 during the year 2003-04 to 5.77 during the year 2019-20. Also, Degree of Collaboration shows that out of 538 articles published, the maximum 492 (91.45%) are published by multiple authors while the single-author publication has the least 46 (8.55%).

Among the most prolific authors, Kakizaki H with 19 publications and 257 citations ranked first and Aichi Medical University, Japan comes in first among the top ten institutions with 13 publications and 229 citations.

According to the analysis and evaluation of the research output of Entropion, it is concluded that for the past 20 years only 538 articles have been published which is too little compared to other publication outputs. So in the future more research to be needed to explore the publication of Entropion.

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