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Publication Rate of Abstracts Presented at the Annual Meeting of the Society for Arthroscopy and Joint Surgery (AGA) (2010-2013)

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ABSTRACT

Purpose: *Quality of scientific society`s activity is reflected in the publication rate (PR) for congress presentations. The aim of this study was to evaluate the publication rates of the annual AGA congress, as the largest professional society for arthroscopy in Europe, and to compare it to other orthopedic conferences.*

Methods: *604 abstracts of podium and poster presentations presented from 2010 to 2013 were included. Using a PubMed search for corresponding articles in peer-reviewed journals for a follow-up (FU) period for each congress of 5 years was examined. Evaluation of abstracts and publications regarding hypothesis, method, number of cases, and outcome was made. Subgroup analysis of the publication data was performed according to the investigated body region and study type.*

Results: *The FU period of 5 years showed a publication rate of 49.7% with a mean publication period of 24.97 months (SD 16.74) and an average impact factor of 2.68 (SD 1.17). 60.5% of publications were in first-rate, 29.6% in second-rate, and 10.0% in third-rate journals. The following three journals had the most publications: Knee Surgery, Sports Traumatology, Arthroscopy (29.5%), Archives of Orthopaedic and Trauma Surgery (11.3%), and The American Journal of Sports Medicine (9.9%).*

Conclusion: *The overall publication rate (49.6%) was in the middle range of rates reported for other orthopedic conferences (25-71%). The high level of the journals in which they were published testified to the quality of the studies reported at the AGA meeting.*

INTRODUCTION

Evidence-based medicine is challenging[5] and requires constant verification of current practices through scientific analysis of results. Here, international congresses offer researchers the opportunity to present their results and discuss them with other experts. Presentation at the congress is the benchmark and usually the first step towards publication. However, publication in a journal indexed in the PubMed Medline database is of even greater scientific value [7]. The requirements are more stringent, with peer review and editorial guidelines specific to each journal. The different levels of peer review and the number and quality of reviewers contribute to the quality of the process. The AGA is Europe's largest professional society for arthroscopy with more than 5000 members. So the annual meeting is an important platform for research in arthroscopy, which has an international reach through partnerships with foreign societies and experts from all over the world and therefore the importanceof the AGA justifies a systematic study of its abstracts. The publication rate of studies presented at conferences is an indicator of the scientific quality and importance of the meeting. Many scientific societies have recorded the publication rates of panel presentations and e-posters presented at their congresses and assessed their quality [3, 11, 14, 19, 21], but this has not been done for the AGA. Only few investigations on this topic has been published in the growing field of arthroscopic surgery[1, 16].

Therefore, the aim of this study was to report the AGA publication rate in peer-reviewed journals, to analyze the characteristics of the abstracts and to compare the rate with other orthopedic meetings.

METHODS

A comprehensive literature search for all abstracts presented at the AGA annual meetings 2010-2013was performed. These years were selectedalong the established method

for investigating publication rates in fewer studies of our research group [19]. The meeting's abstractswere obtained from the website of AGA and then further analyzed. Abstracts were classified according to presentation type: podium vs posters and were subsequently subcategorized into specific body regions,and as well by study design (table x).

Table 1. Characteristics of abstracts (abs) and publications (pub)

	Abs	Abs	Pub	Pub	Publication rate
	n	% (100% = 604)	n	% (100% =300)	(relative to no. of abstracts) (%)
Type of study					
Experimental study	170	28,1	100	33,3	58,8
Clinical study	396	65,6	182	60,7	46
Epidemiologicalstudy	15	2,5	10	3,3	66,7
Review	12	2	7	2,3	58,3
Case Report	9	1,5	1	0,3	11,1
Clinical studies					
Therapeuticstudy	284	47	126	42	44,4
Prognosticstudy	43	11,4	17	5,7	39,5
Diagnosticstudy	69	7,1	39	13	56,5
Level of Evidence					
I	15	2,5	8	2,7	53,3
II	44	7,3	22	7,3	50
III	57	9,4	33	11	57,9
IV	87	14,4	66	22	75,9
V	0	0	0	0	0
VI	2	0,3	1	0,3	50
Randomizedstudy	32	5,3	21	7	65,6
Study with significant main result	380	62,9	228	76	60
Study with nonsignificant main result	56	9,3	27	9	48,2
Single-Center study	590	97,7	292	97,3	49,5
Multi-Center study	14	2,3	8	2,7	57,1
Biomechanicalstudy	75	12,4	51	17	68
Prospectivestudy	140	23,2	67	22,3	47,9
Retrospectivestudy	90	14,9	47	15,7	52,2
Category					
Shoulder	202	33,4	104	34,7	51,5
Knee	259	42,9	125	41,7	48,3
Hip	24	4	12	4	50
Foot	31	5,1	11	3,7	35,5
Elbowand Hand	18	3	8	2,7	44,4
Cartilage	45	7,5	24	8	53,3
Other	25	4,1	16	5,3	64

A PubMed search (MEDLINE) for matching peer-reviewed publications was made, including a follow-up period of 5 years after each congress. In addition, publications of abstracts published before the congress were included. First, the names of the authors of each abstract were searchedincluding the keywords of the abstract. At least one author of the abstract and the author of the publication had to be identical for a positive match to be registered. The content of the congress abstract was directly compared with the content of the publication. If the hypothesis of the study, methods, sample size and results were identical, abstract was classified as *published*. If the publication had larger or smaller sample size, the corresponding abstract was classified as *published* only if the hypothesis and methods were identical. In the case of several publications per abstract, the publication whose publication date was closest to that of the congress was

choosen. If a publication was found before the congress, the abstract was classified as *published* if the sample size and the time period were identical and it receives a negative value. The month of print publication was defined as the publication date. Differences between congress and publication dates were assessed in full months. For each publication, the name and impact factor of the journal in the year of publication were documented.Furthermore, the publications were ranked specifically for the year of publication according to the Journal Citation Reports (JCR) database of Clarivate Analytics (formerly Thomson Reuters).

All abstracts were classified according to several features characteristics to determine which abstracts were more likely to be published in the likelihood of full publication compared to others. Therefore, the type of study was assessed (experimental studies, clinical trials, epidemiological studies, reviews and case reports). The clinical studies were further divided into the following categories: therapeutic, prognostic and diagnostic. The level of evidence (LoE) was calculated for clinical trials [23]. It was investigated whether the following characteristics of congress abstracts have an influence on publication rates: randomised vs. non-randomised studies (only applies to clinical and epidemiological studies); prospective versus retrospective studies (only applies to clinical and epidemiological studies); single-centre studies versus multi-centre studies.

Studies with significant main results were compared with those without significant main results. A result was graded as *significant* if data were presented with $p<0.05$ or with significance explicitly stated. Results were graded*not significant* with $p>0.05$ or if a lack of statistical significance was explicitly stated. Statistical analysis was performed using SPSS 28.0.1 (SPSS Inc., Chicago, Illinois, USA). In addition to descriptive analysis, the Chi-squared test was used to compare categorical variables. Odds ratios (OR) were calculated with 95% confidence intervals (CI).

RESULTS

A total of 604 abstracts were studied, with an overall publication rate of 49.7% (n=300). The mean time to publication was 24.97 months (0-60 months, 16.74 SD)

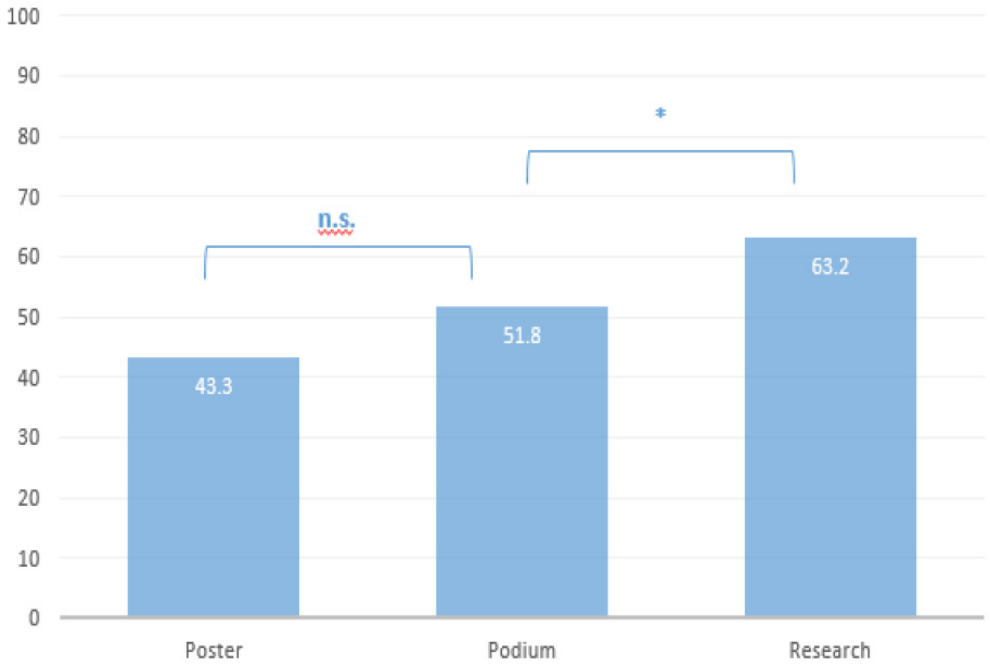

Figure 1. Publication rates of the congress abstracts for the different presentation types (n.s.: non significant; *: significant)

Figure 1 shows publication rates of the congress abstracts for the different presentation types. Within the five-year follow-up, 129 of the 249 podium abstracts were published in a peer-reviewed journal (51.8%). Out of the 268 poster abstracts, 116 abstracts were published in the period under review (43.3%). For 55 of the 87 research abstracts presented, publication was found in the FU of the respective congress (63.2%). Publication rate of the research abstracts is significantly higher than of the poster contributions. (p=0.001, OR: 2.23, CI: 1.37-3.71). There are no statistically significant differences between the publication rates of podium and poster abstracts (p=0.053, OR: 1.4 CI: 1 - 1.99) and between the publication rates of podium and research abstracts (p=0.067, OR: 1.6, CI: 0.97-2.64).

Out of the 604 congress abstracts presented, 396 abstracts are clinical studies (65.5%). Clinical studies are thus the most frequently presented study type, followed by experimental studies with a number of 170 abstracts (28.1%). Epidemiological studies (n=15/2.5%), reviews (n=12/2%) and case reports (n=9/1.5%) are less frequent. Two congress abstracts could not be assigned to any study type. (Table 1)

The publication rates of the different study types range from 11.1% to 66.7% (Figure 2). Epidemiological studies show the highest publication rate with 66.7%. The publication rate of experimental studies is 58.8% and the publication rate of reviews is 58.3%. The clinical studies examined have a publication rate of 46%. The lowest publication rate was found in the analysis of case reports with 11.1%. The statistical analysis shows that the publication rate of experimental studies is significantly higher than the publication rate of clinical studies (p=0.005, OR: 1.68, CI 1.17-2.42).

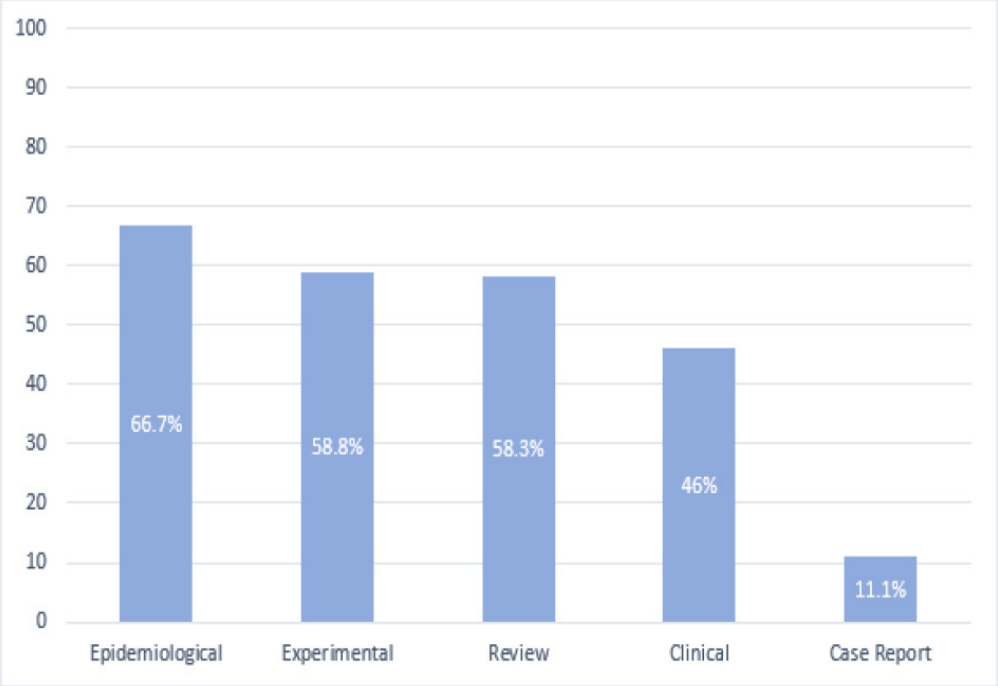

Figure 2. Publication rates of the different study types

The articles were published in different journals. The five most frequent journals were, in descending order: Knee Surgery, Sports Traumatology, Arthroscopy (ISSN 0942-2056)(n=87/29%), Archives of Orthopaedic and Trauma Surgery (ISSN 09368051)(n=36/12%), Arthroscopy (ISSN 0749-8063) (n=28/9.3), The American Journal of Sports Medicine (ISSN 0363-5465) (n=27/9%) and Journal of shoulder and elbow surgery (ISSN 1058-2746) (n=12/4%).

Figure 3shows an overview of all journals in which at least five publications were published.

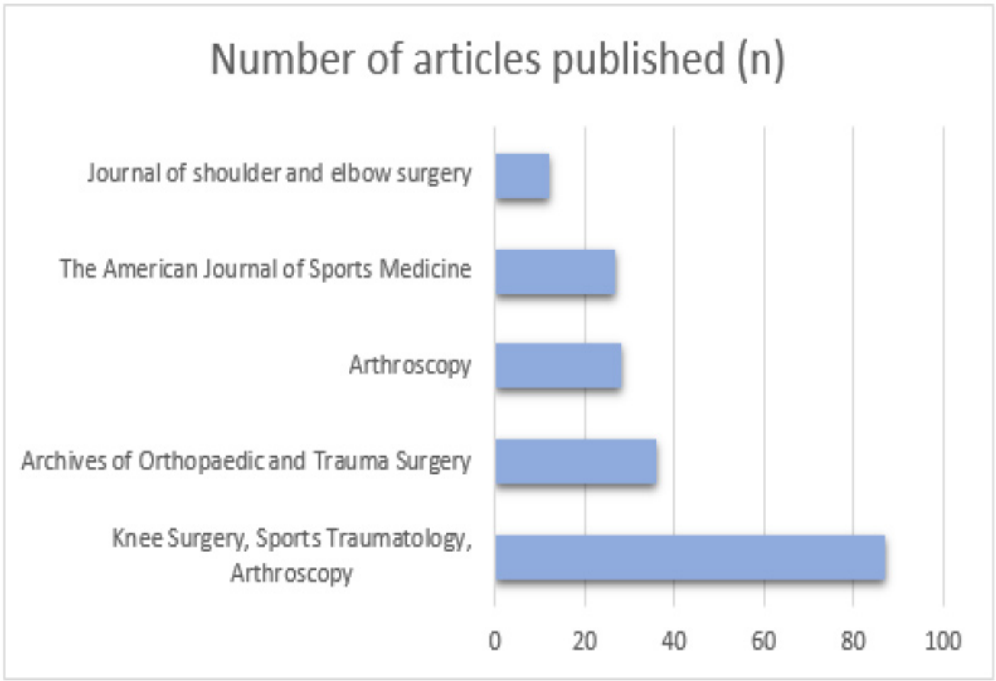

Figure 3. Most recent journals in which at least five publications appeared

Of the 300 publications, the impact factors of 291 publications were available. The remaining nine publications wereassigned to "missing value". The journals in which the 291 publications were published have an average IF of 2.68 (+/- 1.1; 0.359 - 7.404) in the year of publication.

58.7%(n=176) of all publicationswere published in a first-class journal. 29%(n=78) were published in a second-class journal. 9.3% (n=28) were distributed in a third-class journal. It was not possible to classify the journal of publication in nine cases (3%). Most publications were in English(93%), only 7% published articles in Journals with German language.

Only 205 of 604 abstractswere assigned to a LoE (33.9%). Most abstracts were assigned LoE IV (n= 87, 14.4%), 57 belonged to LoE III (9.4%), 44 to LoE II (7.3%), 15 to LoE I (2.5%) and 2 to LoE VI (0.3%).

The highest publication rate was shown by contributions of LoE IV with 75.9%. This is followed by 57.9% for LoE III, 53.3% for LoE I and 50% each for LoE II and VI. The Chi-Square-Test showed significant differences for the publication rates in depending on LoE (p=0.029). Therefore, an analysis of the subgroups among each other followed. It was found that the publication rate of publications with LoE IV was significantly higher than the publication rate of publications with LoE II (p=0.0035) and significantly higher than the publication rate of publications with LoE III (p=0.0243). Otherwise, no significant differences were found between the individual LoE subgroups.

PR for randomized studies was 65.6%. Prospective studies 47.9%, retrospective studies 52.2% without significant difference (p=0.518, no OR, no CI).

The publication rate of the multi-centre studies is 57.1%, which is higher than the publication rate of the single-centre studies (49.5%). However this difference is not statistically significant (p=0.57, no OR, no CI).

The evaluation of the author composition shows that in 79.7% of the publications (n=239) the first author of the congress abstract is also the first or the last author of the publication. Most often the publication has a new secondary author to the original authors of the congress abstract. In 65.7% of the publications (n=197) at least one new secondary author was added.

Figure 4 gives an overview of the occurrences of topics of the different anatomical regions. 259 (42.9%) abstracts were submitted to the topic knee, shoulder 202 (33.4%), foot 31(5.1%), Hip 24(4%), Elbow and Hand 18 (3%), cartilage 45 (7.5%) and 25 to other topics (4.1%). There was no statistically significant difference between the individual categories with regard to the publication rate (p=0.517).

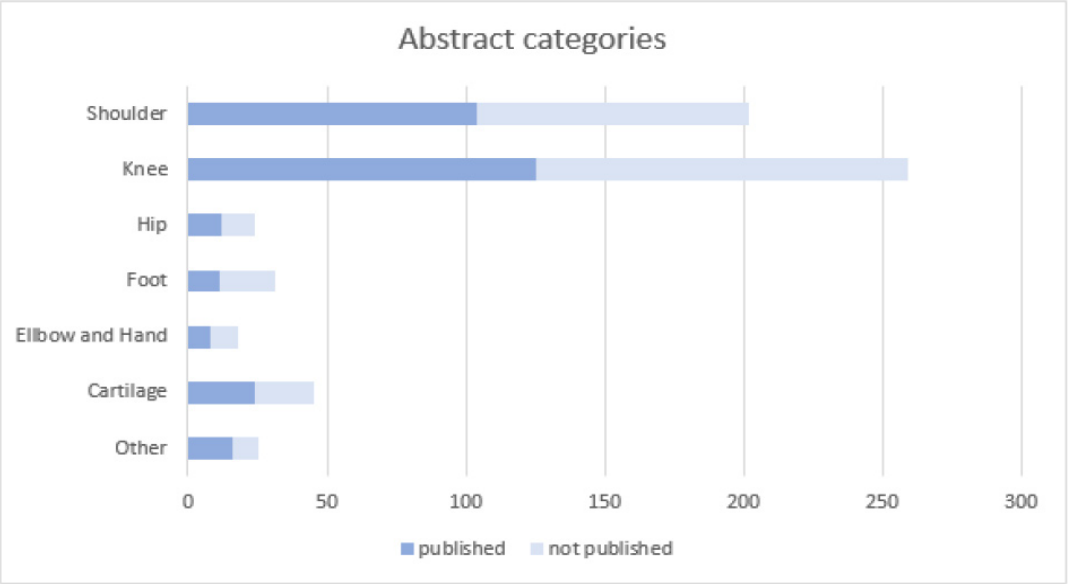

Figure 4. Anatomical regions of published abstarcts

DISCUSSION

604 abstracts were studied, including 249 podium abstracts, 268 poster abstracts and 87 research abstracts from the annual meeting of AGA between 2010-2013 and we found an overall PR of 49.7%. PR of podium abstracts were 51.8%, poster abstracts had a lower PR with 43.3%. The highest PR was documented for research abstracts with63.2%.The overall publication rate is above the average (45%) of the congresses studied in the literature (see table 1). There you can find an overall PR at orthopaedic scientific meetings ranging from 21 to 71% [3]. The PR of podium presentations ranges from 20 to 90%, and the PR of poster presentations from 15 to 63%. Numerous studies show that podium presentations are more likely to be published as full-length manuscripts compared to poster presentations [6, 11, 13, 15] yet many presentations are not ultimately published in peer-reviewed journals. Previously reported publication

rates for orthopaedic specialties have varied from 34% to 52%. In addition, the publication rate of accepted abstracts is a strong indicator of meeting quality, and it has a potential effect on clinical practice. To date, no studies have investigated publication rates in the field of sports medicine, and specifically for abstracts presented at American Orthopaedic Society for Sports Medicine (AOSSM). Different publication rates of podium and poster presentations could be explained by the fact that poster presentations are commonly thought to be published at a lower rate than podium presentations, as podium presentations are typically believed to consist of studies with greater scientific value[18].

The average time to publication of 24.97 months (0-60 months, 16.74 SD) in our study is similar to that in other studies (see Table 2). A faster publication process would be required, but it must be taken into account that most authors work mainly in the clinical sector and have little time for research. Additionally, the review process for peer-reviewed journals, including one or two revisions, frequently takes several months.

Table 2. Publication rates of orthopedic scientific meetings

Scientific meeting	Year	Author	Total number of abstracts (n)	Overall PR* (%)	Podium PR* (%)	Poster PR* (%)	Minimal follow-up (months)	Mean Time to Publication (months)
AAHKS	2012-2014	Bowers et al.	610	71	90	63	-	14,5
AANA	1991-1993	Yoo et al.	-	51	-	-	-	-
	2008-2012	Frank et al.	976	49	59	44	36	14,4
AAOS	2011-2015	Naziri et al.	2129	56	61	51	12	-
AAOS-SES	1999-2004	DeMola et al.	558	58	66	51	36	18
AOFAS	2008-2012	Williams et al.	1262	62	74	56	48	17,3
AOSSM	2006-2010	Kinsella et al.	444	67	73	57	36	-
	2011-2015	Gowd et al.	628	51	54	46	24	11,2
APTACSM	2000-2004	Warden et al.	823	25	-	-	60	22,7
ASES	2005-2010	Kay et al.	266	49	-	-	60	18,2
BASK	2002-2009	Mihok et al.	602	33	-	-	48	23
	2007,2009,2010,2011	Collier et al.	394	26	-	-	60	-
BOA	1997-1998	Guryel et al.	300	35	-	-	-	16,2
	2001	Ul Haq et al.	179	36	-	-	97	18,6
EPOS	2006-2008	Kleine-Konig et al.[38]	646	37	46	30	60	13,9
ESSKA	2008-2010	Kay et al.	390	55	-	-	60	16
GOTS	2003	Schulte et al.	1100	36	37	32	48	15
IOA	2002-2005	O'Neill et al.	203	33	-	-	60	30,1
ISAKOS	1997-1999	Edk et al.	358	37	-	-	51	-
ISSLS	1991-1993	Wang et al.	335	45	-	-	48	-
	2010-2012	Ohtori et al.	1126	50	62	47	60	-
JAO	2006-2007	Ohtori et al.	1676	26	27	25	-	-
JAOR	2006-2008	Ohtori et al.	1529	50	53	49	-	-
MSTSM	1991,1992,1995,1997-1999	Jasko et al.	336	-	41	-	36	21,8
NASS	1990-1992	Wang et al.	545	40	-	-	60	-
	2010-2012	Narain et al.	1045	44	47	38	36	8,4
OTA	2005-2010	Lee et al.	392	66	-	-	18	28,3
	2008-2012	Williams et al.	357	-	73	-	48	23,4
SOA	2005-2011	Tait et al.	568	41	-	-	-	19,2
SOMOS	1998-2006	Schoenfeld et al.	770	46	-	-	36	32,4
	1999-2003	Fuller et al.	435	44	-	-	-	-
	2009-2013	Orr et al.	592	-	59	-	24	18,1
SRS	1991-1993	Wang et al.	308	47	-	-	48	-
	2009-2011	Frost et al.	345	-	48	-	-	-
SSE	2000-2003	Schulte et al.	839	38	48	31	48	17,7
TNOTC	2007	Yalçınkaya et al.	770	30	44	22	-	14,9
SA			444,98	12,12	15,15	12,47	17,23	5,81
MEAN			681	45	56	43	47	19

The most frequent study types were clinical and experimental studies, with therapeutic studies being the most frequent type of clinical research, as in other reports[17, 20]. We could not document a significant difference in PR regarding study types. A comparable investigation also did not observedifferent PRs for the two types[4].

The fact that more than the half(58.7%) of the publications appeared in first-class journals and the average impact factor of 2.68 for all publications demonstrates the high quality of the congress presentations. However considering, that the members of the program committee reviewing the congress abstracts are also responsible for the most important Arthroscopy journals, in this case KSSTA in particular, probably influences the publication rate.

Conflicting results have been reported with regard to a relationship between the level of evidence (LoE) and the PR of presentations at orthopaedic congresses. Several studies showed that a higher LoE was positively associated with the PR of studies presented at meetings such as the German Society for Orthopaedic and Trauma Surgery (DGOU) [21], the American Association of Orthopaedic Surgeons (AAOS) annual meetings [22] and the European Society for Paediatric Orthopaedics (EPOS) [12]. However, other studies report no association between LoE and publication rate[1, 9, 10, 15]. In our study we found an inverse relationship with significantly higher publication rate of publications with LoE IV than the publication rate of publications with LoE II (p=0.0035) and LoE III (p=0.0243). Overall, however, the results of the LoE should be interpreted with caution due to the small number of cases in the subgroups.

One possible explanation for the lower publication rate for level I and II studies could be that many level I and II studies are RCTs that have a substantial methodological bias. The methodological deficiencies responsible for the downgrading of the level of evidence may also have prevented publication in a peer-reviewed journal, leading to the lower publication rate for level I and II studies. These results suggest that the methodological quality of presentations at AGA meetings is not entirely predictive of future publication status.

Presentations that had a significant result had higher publication rates than those with nonsignificant results. Thought it should be notedthat studies with non-significant results are of equal importance as comparable studies with significant results.

The analysis of the consistency of congress abstracts and publications showed that in 79.7% of the publications the first author or senior author was the same as the first author of the congress presentation. This can be seen as a clear sign of reliabilityand value. The fact that authors were added to the publications could be due to the work involved in writing the manuscript or finishingthe study.

The abstract category regarding to anatomical regions had no influence on the journal peer-review process at the AGA Congress. This finding seems to be in line with the literature were statistical analysis did not identify any significant differences in PRs relative to anatomic locations [2, 8, 20]. The lowest PR was for the foot (35.5%), while the highest (53.3%) was for the cartilage. Only at SECEC the abstract topic plays a role in the probability of publication in a journal [4].

Limitations of the present study include the fact that reasons for nonpublication were not investigated. Furthermore, the search for full-text publications of the presented abstracts was limited to PubMed (Medline) databases, so we may have missed journal publications indexed in other databases.

CONCLUSION

The overall publication rate (49.6%) is above the average rates reported for other orthopedic conferences (45%). This fact and the high level of the journals in which they were published testified to the quality of the studies reported at the AGA meeting.

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