

# Trauma Research in Europe\*

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## Abstract

**Background:** Publishing in journals with the highest possible Impact Factor and Citation Index is of paramount importance for a researcher and his research group. In this respect, European trauma researchers may be in a disadvantaged position, as the citation index of European trauma journals is relatively low, as compared to Anglo-American trauma journals.

**Material and Method:** This article analyses relative differences observed in original studies published in a continental European and several Anglo-American trauma journals. Aspects analysed include the number, (source of) funding, country of origin, type and topic of study of the publications.

**Conclusion:** It is concluded that the quality of original trauma publications from Europe is high, that the larger subsidized studies are published outside continental Europe, while relatively few European studies have received (substantial) funding. Obtaining substantial financial support for trauma research, i.e. to appoint and train dedicated trauma researcher, is of capital importance to promote the cause of trauma research in Europe.

## Key Words

Trauma research · Manuscripts · Medical journals · Citation index · Impact Factor

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## Introduction

European authors, who are not “native English speakers”, regularly complain that their manuscripts are not easily accepted by English and American journals. Various reasons may underlie this observation, such as the quality of the work submitted, the command of the English language within the manuscript, or a negative selection of scientific work coming from continental Europe.

The Impact Factor and Citation Index of Anglo-American Journals, especially in trauma, is substantially higher than their European counterparts (Table 1). Publishing in a journal with a high Citation Index and Impact Factor is of paramount importance for an author and his/her scientific group, as these factors regularly are used to assess the quality of their scientific work.

In this situation, continental European researchers have a problem. Submitting their best work to a European journal is counterproductive, as the Impact Factor is low, while submission to an Anglo-American journal may lead to a high rate of refusal, with the subsequent substantial delay due to having the work reviewed and published in another journal. Also in the highest ranked European trauma journal, publications mostly are in the German language, which severely limits international access to excellent trauma research, and negatively affects its Citation Index.

A negative spiral is thus generated for European journals, as the best European work is published in non-European journals, improving their Impact Factor, and the remaining work tends to be published in European journals, which is not helpful in raising their Impact Factor.

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The present manuscript is an effort to document differences in quantity and quality of original scientific works from continental Europe, as found in a European trauma journal and in three leading American and English trauma journals.

### Material and Method

Four trauma journals were selected, one continental European of long standing (Unfallchirurg), and three Anglo-American: the Bone and Joint Surgery American (JBJS-A) and British (JBJS-B), and the Journal of Trauma. In each journal, only original contributions were selected, excluding review articles, didactic articles, case reports, meta-analyses, and non-trauma related contributions such as tumor or degenerative disease related articles. In the JBJS, only a minority of manuscripts were trauma related (JBJS-B 66 out of 389 original articles [17%]; JBJS-A 42 out of 157 [26%]).

To obtain a comparable number of original trauma-related manuscripts as in the Journal of Trauma, 5 years of the European journal had to be reviewed (Table 1).

Subsequently, the original contributions were classified according to the topic, country of origin, the funding obtained and the source of the funding, and whether the research performed was experimental, biomechanical, or a randomized clinical study.

Admittedly, this brief inventarization of trauma publications is incomplete, as not all trauma research –

especially fundamental and in vitro research – is published in the journals analysed. Also for the European journal 5 full years had to be analysed to meet the numbers of 1 year of the Journal of Trauma. Also funding of the research is probably not always mentioned in all journals. In this respect, the JBJS-B consequently mentions funding as well as its source.

Finally, as to the allocation to topics, no strict criteria could be formulated. Papers were allocated to only one category, while they might have fitted into more than one.

### Results

Within the years analysed, a total of 614 original papers were analysed (Table 1). The number and percentage of non-European and European papers analysed is shown in Table 2. In the JBJS-B the percentage of European articles is high, as many of these papers originated from the United Kingdom.

Table 3 shows the number and percentage of European papers having received financial support.

Table 4 shows that the percentage of subsidized papers is significantly lower in the continental European journal versus in the Anglo-American journals. The only non-European article published in the continental European journal was subsidised. There seems to be a strong correlation between the Impact Factor of the journal and the number of subsidized studies pub-

**Table 1.** Impact Factor and number of trauma-related papers per journal.

Journal	Year(s)	Impact Factor	Number of trauma papers
JBJS American	2000	2.47	42
J Trauma	2000	1.75	255
JBJS British	2000	1.55	66
Unfallchirurg	1996–2000	0.60	251
Total			614

**Table 2.** Number and percentage of European and non-European papers.

Journal	Number of trauma papers	Non-European	European
JBJS American	42	32	10 (24%)
J Trauma	255	226	29 (11%)
JBJS British	66	20	46 (70%)
Unfallchirurg	251	1	250 (100%)
Total	614	279	335

**Table 3.** Number and percentage of European papers having received financial support.

Journal	Number of trauma papers	European	Number (%) subsidized
JBJS American	42	10	2 (20%)
J Trauma	255	29	14 (48%)
JBJS British	66	46	13 (28%)
Unfallchirurg	251	250	14 (5,6%)
Total	614	335	43

**Table 4.** Percentage of papers subsidized; non-European versus European.

Journal	Number of trauma papers	Non-European	European
JBJS American	42	28%	20%
J Trauma	255	33%	48%
JBJS British	66	15%	28%
Unfallchirurg	251	1/1	5,6%

lished (Table 4). Also, it seems that – except for the JBJS-A with only a small number of European publications – a higher percentage of the European papers were subsidized relatively to the non-European papers (Table 4).

Table 5 shows the source of funding of European trauma publications (more than one source possible). Only the Journal of Trauma was used as a comparison for this table. The – mainly United States generated – non-European studies in the Journal of Trauma were frequently sponsored from sources where the big money is: by governmental/national or regional funds, the Medical Faculty or Hospital, or the army. Relatively, sponsorship in Europe was mainly obtained from small-

**Table 5.** Source of funding of European trauma publications (more than one source possible).

	J Trauma	Unfallchirurg
National	57	13
Hospital/faculty	9	2
Foundation	16	14
Industry	10	8
Profession	5	6
Army	11	2
Total publications	74 (33%)	43 (13%)

**Table 6.** Number of original trauma publications according to the country of origin, and the number of subsidized papers.

Country	J Trauma, JBJS-A, JBJS-B	Unfallchirurg	Total	Number subsidized
Austria	7	28	35	2 (6%)
Belgium		1	1	
Denmark	2		2	2
France	6	1	7	3
Germany	17	201	218	14 (6%)
Greece	1		1	
Hungary		1	1	
Israel	4		4	2
Italy	2		2	
Kroatia		3	3	
Netherlands	4	2	6	1
Slovenia		1	1	
Spain	2		2	
Sweden	8		8	7
Switzerland	12	13	25	7 (28%)
Turkey	3		3	
United Kingdom	17		17	4 (23%)

er sources, such as various private funds, the industry, or even from the profession itself.

Table 6 shows the number of original trauma publications, according to the country of origin, and the number of subsidized papers. Only the Scandinavian countries, Israel and Switzerland seem to be able to obtain funding for the trauma research published in the journals analysed.

Table 7 shows the type of study published in the continental European trauma journal, versus in the Journal of Trauma. Surprisingly. Surprisingly, more randomised clinical trials come from Europe, while also 2 out of 6 papers on biomechanics published in the Journal of Trauma come from Europe.

**Table 7.** Type of study in Journal of Trauma versus in continental European journal.

	J Trauma	Unfallchirurg
Biomechanics	6 (2')	9
Experimental	22	12
Randomized clinical trials	4	7
Total	255	251

\*2 manuscripts from Europe

**Table 8.** Topics addressed in continental European journal versus in Journal of Trauma.

	J Trauma	Unfallchirurg
Wound healing	13	33
Infection, antibiotics	13	9
Nutrition, metabolism	5	
Shock, SIRS	63	5
Intensive care	5	5
Fracture treatment	29	72
Joint injuries		31
Ligaments	2	28
Diagnostic procedures	45	30
Polytrauma	4	7
Outcome	28	16
Thromboembolism	7	5
Quality control	3	6
Brain injury	17	5
Neck	3	
Thorax	18	5
Abdomen	26	2
Young age	11	20
Old age	8	3
Total	255	251

Table 8 gives an overview of the topics addressed in a continental European journal versus in the Journal of Trauma. Qualitatively and/or quantitatively strong areas in Europe are wound healing, bone healing, implants for fracture treatment, biomechanics, methods of imaging and navigation, treatment of the polytrauma patient, and brain injury.

### **Discussion and Conclusion**

The present overview of trauma publications in and outside Europe has a number of limitations, as stated in the introduction. Despite these flaws, it can be concluded that overall the output from Europe is of high quality, and brings lots of renovating ideas especially in fundamental areas such as wound and bone healing. Also a relatively large number of prospective studies is performed in trauma patients, though in this area absolute numbers are very low.

Important is the observation that there seems to be a substantial lack of funding for trauma research in Europe, especially from the more wealthy areas such as governmental funds.

On the other hand, the subsidized studies from Europe seem to be published mainly in Anglo-American trauma journals, confirming the idea of a “brain-drain”, to the detriment of the Impact Factor of European trauma journals.

Finally, in the Anglo-American journals, a higher percentage of the European papers were subsidized relatively to the non-European papers.

It is concluded that a substantial concerted effort is required to boost the quality, and subsequently the Impact Factor of European trauma journals, as there are many good studies from Europe, which still are submitted to Anglo-American journals, where they seem to have more difficulties to be accepted.

Introducing a “European Citation Index”, as was suggested recently, does not solve the problem. Only improving the quality of the European trauma journals will get us out of the negative spiral. This requires the possibility to attract the better studies, which often are the more expensive ones. Therefore it is of paramount importance to attract substantial funding, and in the mean time find and train the researchers that can perform, and give continuity to, the better work.

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