

# CHARACTERISTIC PATTERNS AND PUBLICATION RATES OF SPINE SPECIALTY THESES FROM POSTGRADUATE ORTHOPEDIC RESIDENCY (2001-2020) PROGRAMMES IN TURKEY

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## ABSTRACT

**Objective:** Preparing specialization theses is mandatory for medical residents to complete their education. This study aimed to investigate the residency theses in the field of the spine and evaluate their publication rates in scientific journals.

**Materials and Methods:** A search of the Council of Higher Education Theses Center database was performed on May 3, 2021. Using a detailed search, the subject division was filtered as "orthopedics and traumatology," time limitation was set between 2001 and 2020. The Web of Science, PubMed, and Google scholar databases were searched to determine the publication status of theses. The index of journals that published theses were divided into three groups: SCI/SCI-E, ULAKBIM, and other peer-reviewed international indexes.

**Results:** One-hundred and ninety-two theses were included in this study. A total of 75 (39.1%) theses were published. Thirty-eight (19.8%) of theses were published in a journal with SCI/SCI-E index, 19 (9.8%) in the Ulakbim TR index, and 18 (9.4%) in the other peer-reviewed international indexes. Applied science methods had the highest rate of publications (60%). The topic of basic science had the highest rate of publication (52.6%).

**Conclusion:** The publication rates of spine specialty theses are apparently at an acceptable level compared to other studies. It was assessed that the topic of scoliosis was the most preferred subject and we suggest that original subjects who can contribute to the literature is important for the evolution of the spine. The basic research methods had higher publication rates than the clinical research methods.

**Keywords:** Orthopaedics, spine, publishing, theses

## INTRODUCTION

Preparing a specialization theses and being successful in theses presentation are mandatory for medical residents to complete their specialization<sup>(1)</sup>. There are different processes around the world. However, the common issue that everyone agrees on is that a specialization theses is necessary for an academic career in medicine<sup>(2)</sup>. These preparation educates the medical students and residences for the skill of developing scientific methods and a scientific vision. The publication of the theses provides significant contributions to personal, academic career and science. Researchers have suggested that the real value of scientific work lies in its publication in indexed literature<sup>(3)</sup>. The publication makes research results visible and easily accessible to scientists anywhere in the world<sup>(4)</sup>. However publication of the theses is a very challenging process, and according to the studies, it is seen that the many specialty theses in medicine remain unpublished<sup>(5-8)</sup>.

The discipline of orthopedic surgery has several subgroups including arthroplasty, trauma, sports medicine, oncology, spine, microsurgery. Koca et al.<sup>(9)</sup> analyzed the publication rate of all orthopaedic theses without subgrouping. No studies evaluating the publication status of the spine specialty theses published in our country on the scientific journals were found in the literature. The aim of this study was to investigate theses in the Council of Higher Education (YOK) Electronic Theses Archive, which have been made in the field of the spine and evaluate their publication status in scientific journals.

## MATERIALS AND METHODS

Ethics Committee approval was not required since data used in our study were obtained retrospectively from the internet which is available for open access. A search of the Council of Higher Education Theses Center database (<https://tez.yok.gov.tr/UlusalTezMerkezi/>) was performed on May 3, 2021. Using detailed search, the subject division was filtered in "orthopedics

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and traumatology”, time limitation was set between 2001 and 2020, and these study design was selected as “specialization in medicine”. Theses were excluded if they were not performed at the department of orthopedics and traumatology. Titles of all theses were reviewed and selected if relevant to or focused on spine disorders. Year, center, study design, and topic of theses were analyzed. Centers of theses were consisted of university or teaching and research hospitals. The study design of theses were categorized with an algorithm (Figure 1).

The topic of theses was divided into five subgroups; deformity, trauma, degenerative conditions, basic science (bone healing, bone turnover), and others (tumor, infection, metabolic disorder, practice management). Web of Science, PubMed, and Google Scholar databases were searched in order to determine the publication status of theses with the entry of author name, the title of theses and keywords. The index of journals that published theses were divided into 3 groups: SCI (Science Citation Index) or SCI-E (Science Citation Index Expanded), ULAKBIM, and other peer reviewed international indexes. We did not evaluate the index status of the journal at the time of publication of theses. All theses were screened independently regarding the title and abstract by 2 orthopedic surgeons and one expert spine surgeon.

### Statistical Analysis

Statistical analysis was performed with SPSS 22.0 (SPSS Inc., Chicago, IL). Categorical variables were analyzed with Fisher’s exact test and the chi-square test was used to detect differences.  $P < 0.05$  considered to be statistically significant results.

## RESULTS

One thousand nine hundred and thirty-three theses were identified and screened. Sixty-seven theses were excluded

because they did not meet the eligibility criteria. Three orthopedic surgeons screened the titles and abstracts of theses and a total of 195 theses were found to be related to spine surgery. Three of them did not contain any abstracts, then they were also excluded. One hundred and ninety-two theses were included in this study. A total of 75 (39.1%) theses were published. Thirty-eight (19.8%) of theses were published in a journal with SCI/SCI-E index, 19 (9.8%) in Ulakbim TR index, and 18 (9.4%) in the other international indexes. It took  $4.4 \pm 3.1$  years (minimum-maximum, 1-18) to publish the theses after writing.

The distribution of the number and center of theses by years was demonstrated in Figure 2. 86.5% (n=116) of theses were written at university hospitals and 13.5% (n=26) of theses were written at teaching and research hospital. The highest number of theses was seen in 2010. On the other hand, there were no theses related to the spine from teaching hospitals for a total of 8 years. Publication rates of university and teaching hospitals were 38.6% (n=64) and 42.3% (n=11), respectively with no statistical difference ( $p=0.44$ ). Dokuz Eylül University Hospital, Department of Orthopedics and Traumatology had the highest number of theses (n=26, 13.5%), followed by Ankara University (n=15, 7.8%) and Hacettepe University (n=14, 7.3%).

The most preferred study design was clinical research (61.5%). The distribution of publication rates according to the study design was shown in Table 1. There was a statistical difference in study design of theses and their publication rates [basic research 48.6% (n=36) and clinical research 33.1% (n=39),  $p=0.03$ ]. Besides, applied science methods had the highest rate of publication.

Publication rates based on the subject were given in Table 2. The most common subject was deformity followed by basic science and trauma. The number of theses that contain the topic of scoliosis was 73 (38%). The topic of basic science (bone

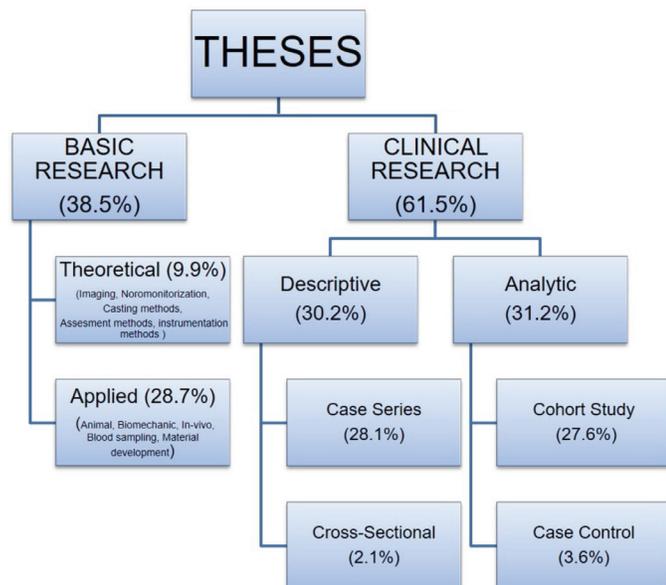


Figure 1. Methodology of published theses

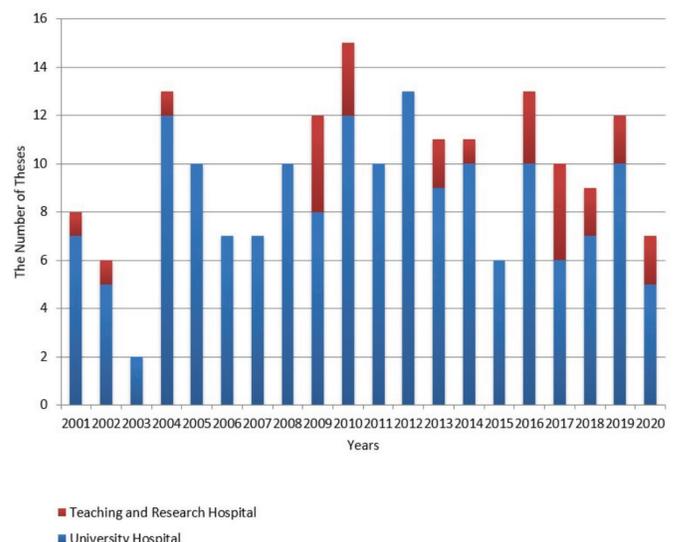


Figure 2. The distribution of the number and center of theses by years

healing, bone turnover) had the highest rate of publication. On the other hand, the publication rates of the theses in SCI/SCI-E journals were 33.3% (n=1) for others (tumor, infection, metabolic disorder, practice management) followed by 31.6% (n=12) for basic science (bone healing, bone turnover).

The distribution of the number of theses related articles by year of publication was demonstrated in Figure 3. Half of all articles were detected between 2009 and 2013. After 2009, a downward trend in the number of publications was seen.

Journals that published theses were listed in Table 3. Seventy-five of 192 theses were published in 37 journals. Fourteen articles were published in the Journal of Turkish Spinal Surgery followed by Acta Orthopaedica et Traumatologica Turcica (n=11), Asian Spine journal (n=4) and The Spine (n=4).

## DISCUSSION

In our effort to evaluate the publication of spine specialty theses in our country, we found that the rate of publication of spine theses conducted between 2001 and 2020 in scientific journals was found to be 39.1%. Half of theses were published in scientific journals indexed in SCI/SCI-E. To our knowledge, in literature, this is the first study that analyzes the publication pattern of spine specialty theses in indexed journals.

In our country many studies have investigated publication rates of theses prepared for both basic and clinical science of medicine including public health, emergency medicine, pharmacology, physiology, otorhinolaryngology, microbiology, family medicine and sport science with a range of 1.7-35.6% publication rate<sup>(10-17)</sup>. There was a wide range of publication rates reported in the current literature (17-60.5%). Ozgen et al.<sup>(18)</sup> analyzed the publication pattern of Turkish medical theses and found that 6.2% of theses were published in SCI-E indexed journals. Besides, in the same study, the publication rate of orthopaedic theses was found 3.4%. Öğrenci et al.<sup>(19)</sup> reported that 18% of neurosurgery theses were published in SCI/SCI-E indexed journals.

Lack of publication of thesis-derived papers has also been reported from other countries including, England, France, Croatia, Peru and India<sup>(6,20-23)</sup>.

In a study that included the analysis of orthopedic theses from Turkey, it was seen that the spine was the 6<sup>th</sup> common in all orthopedic sub-branches, yet the publication rate of spine specialty theses in the SCI/SCI-E indexed journals was higher than the rate of all orthopaedic theses (12.3%) with a statistical difference (p=0.007). When all the results were taken into consideration, spine specialty theses had a higher rate for turning into publication. Gürbüz et al.<sup>(24)</sup> conducted a study that the bibliometric analysis of orthopedic publications from Turkey and they listed the distribution of the number of articles according to authors and the first five articles in number, belonged to three spine surgeons. In our opinion, these results suggested that a higher publication rate of spine specialty theses were also related to the motivation of the supervisor.

Besides the student, if the mentor is also not interested in publishing, the main roles for turning theses to publication, residence and supervisor, become reluctant.

The delay in publication is a window of missed opportunity for postgraduate medical education. Postgraduate medical education is considered to be an initiation to research; the study is missing until the publication of theses. Unpublished researches have potential to get outdated quickly; similar work from other centers may be conducted the same topics. Even though this is common knowledge, very little is being done to promote residences to publish their theses<sup>(5,25)</sup>. Therefore we recommended residences to prepare the theses including spine topics earlier. In this study, similar to some studies in the literature that have been conducted so far, a 10-year period was analyzed in our study. We found that 4.4 years was needed for the theses to be published after writing. When all times interval for theses turning into publication were taken into consideration, the mean time interval ranged from 3.15 to 5 years. Although our meantime was longer, yet still in the range of the current literature interval.

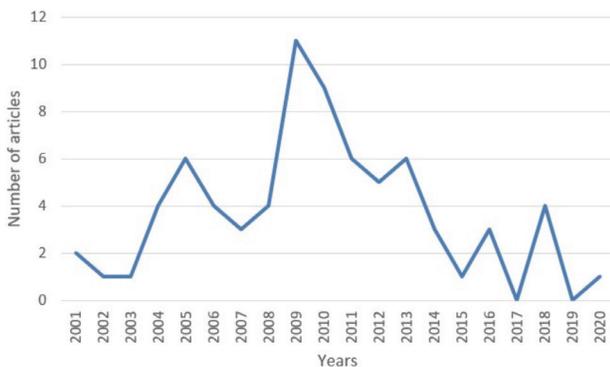
Choosing the right journal for submitting the article is one of the main steps for publication. We detected that most papers resulting from the spine specialty theses were published in domestic journals. In addition that the Turkish Journal of Spine Surgery was the most favored journal for publication. This might be due to the journal being well known than the others and possibly because that journal is tolerant to and pays more attention to publishing the spine specialty theses from Turkey. 86.5% of spine theses were written at the university hospitals. However there was no statistical difference between the university and teaching - research hospitals regarding spine specialty theses published as articles in foreign and Turkish journals. On the other hand, we found that theses that prepared at teaching and research hospitals had a higher rate than the university hospitals. Since the lack of theses written in training and research hospitals in the database of the Council of Higher Education was not taken into account in this analysis, a more comprehensive evaluation of the results may be needed as there may be inconsistencies.

Medical and surgical management of idiopathic scoliosis has developed rapidly together with the learning of the pathophysiology of scoliosis and inventing the new spinal segmental instrumentation in the last decade<sup>(26)</sup>. Studies have shown that the scoliosis prevalence in children under age 16 changes between 0.35% and 5.2%, and it is commonly accepted to have an average of 2-3%<sup>(27-30)</sup>. There has been a wide-scope study based on school screening conducted in multiple centers in Turkey that found the prevalence of adolescent idiopathic scoliosis was 2.3% in Turkey<sup>(31)</sup>. As a result of the high prevalence of scoliosis in Turkey, the most preferred topic for writing a spine specialty theses being scoliosis (38%), was not surprising. In addition, it has been anecdotally reported from clinical experience that the surgical treatment of scoliosis is mostly performed in orthopedic clinics, yet the treatment of

other spinal conditions is mostly performed in neurosurgery clinics.

Research methods are one of the factors that directly affect the quality and data of the study. As a research method, the researcher may adopt an observational-clinical or experimental-basic science approach. Considering our study results on this subject, it is seen that most clinical studies (61.5%) are preferred. This situation presents a parallel situation in terms of international publications. In this regard, the rate of observational studies was found to be 68.1% in a study conducted by Ersel et al.<sup>(32)</sup>.

Similarly, independent of the field of specialization, Salmi et al.<sup>(6)</sup> found that, the rate of observational study as a research method was reported as 69.3% in medical faculties. Koca et al.<sup>(9)</sup> conducted a study of analysis of orthopedic theses and showed that the most preferred study-design was clinical (71.7%) and followed by non-clinical experimental studies (25.6%). In



**Figure 3.** Distribution the number of theses related articles by year of publication

another study from India, Dhaliwal et al.<sup>(22)</sup> reported the rate of observational studies was 44.4%. The fact that observational studies are preferred more than experimental studies is due to the convenience in their design and applicability. Laboratory and prospective studies are considered to have higher scientific value when compared with retrospective studies. Accordingly, spine theses prepared using basic research including applied and theoretical methods had higher publication rates than clinical research.

In this study, most published theses were related to basic science (bone healing, bone turnover) which includes animal experimental studies. Eser<sup>(15)</sup> showed that the rate of publication of experimental studies was higher (78.7%) than other study types [Prospective clinical studies (9.8%), retrospective and survey studies (6.6%), cell culture studies (4.9%)]. In a study published in 2019, the high rate of studies with experiments determined (73.2%) shows that the results are in parallel with our study<sup>(16)</sup>.

Most of the articles were published between 2009 and 2013. After 2009, an obvious decrease in the publication rate of theses was detected. These results were similar to other studies: Koca et al.<sup>(9)</sup> showed rapidly increase up to 2005 and decreased thereafter. Another study from Turkey that analyze the publication pattern of orthopedic articles showed a significant rise up to 2005 and a mild undulation till 2008, with a rapid decrease thereafter<sup>(24)</sup>. In our opinion, the main reason for upwards and downwards trends in publication rates of theses is the consequences of regulations for Turkish academician criteria that could not motivate the publication of theses.

**Table 1.** The relationship between the study design of theses and publications

Study design of theses	Total number n	Publication of theses n (%)	Publication in SCI/SCI-E indexed journals n (%)
Basic Research			
- Theoretical	19	3 (15.8)	2 (10.5)
- Applied	55	33 (60)	20 (36.4)
Clinical Research			
- Descriptive			
• Case Series	54	18 (33.4)	5 (9.3)
• Cross-Sectional	4	2 (50)	2 (50)
- Analytic			
- Cohort Study	53	19 (35.8)	9 (17)
- Case Control	7	0 (0.0)	0 (0.0)

**Table 2.** The relationship between the subject of theses and publications

Subject of theses	Total number n	Publication of theses n (%)	Publication in SCI/SCI-E indexed journals n (%)
Deformity	93	31 (33.3)	16 (17.2)
Trauma	33	14 (42.4)	5 (15.2)
Degenerative	25	9 (36)	4 (16)
Basic science (bone healing, bone turnover)	38	20 (52.6)	12 (31.6)
Others (tumor, infection, metabolic disorder, practice management)	3	1 (33.3)	1 (33.3)

### Study Limitations

The main limitation of the study is that we only the theses at the National Thesis Center database in Turkey. Therefore, we could have missed other theses and it might be incorrect to generalize results to all theses. In addition, we are unable to detect the change of the title of the thesis transforming to the article and determine that some other theses might have reached publication or are currently under peer-reviewed process or in press. Another limitation is that we intended on published articles and we did not research oral or poster presentations in medical congress.

### CONCLUSION

We concluded that the publication rates of spine specialty theses are apparently at an acceptable level compared to other studies. It was assessed that the topic of scoliosis was the most preferred subject and we suggest that original subjects that can contribute to the literature may be important for the evolution of the spine. Basic research methods including applied and theoretical methods had higher publication rates than clinical research.

**Table 3.** The list of journals where the spine theses were published

Name of journals	Number of publications
Journal of Turkish Spinal Surgery	14
Acta Orthopaedica et Traumatologica Turcica	11
Asian Spine Journal	4
The Spine	4
Spine 1976	3
Joint Diseases and Related Surgery	3
Acta Orthopaedica Belgica	2
Cureus	2
Euroasian Journal of Emergency Medicine	2
European Spine Journal	2
Journal of Pediatric Orthopaedic	2
Journal of Spinal Disorders and Techniques	2
Acta Ortopédica Brasileira	1
Advances in Orthopedics	1
African Journal of Pharmacy and Pharmacology	1
Annals of Medical Research	1
Archives of Clinical and Experimental Surgery	1
BioMed Research International	1
Bosphorus Medical Journal	1
Cumhuriyet Medical Journal	1
Current Therapeutic Research	1
Folio Morphologica	1
Global Spine Journal	1
International Journal of Medical Robotics and Computer Assisted Surgery	1
Journal of International Medical Research	1
Journal of neurosciences in rural practice	1
Korean Journal of Spine	1
Medicine (Baltimore)	1
Medicine Science	1
Neurosurgery Quarterly	1
Spine Deformity	1
Spine Surgery and Related Research	1
The European Journal of Orthopaedic Surgery and Traumatology	1
The Journal of Bone and Joint Surgery - American Volume	1
The Journal of Bone and Joint Surgery - British Volume	1
The Medical Journal of Göztepe Training and Research Hospital	1
Turkish Neurosurgery	1

## Ethics

**Ethics Committee Approval:** Ethics Committee approval was not required since data used in our study were obtained retrospectively from the internet which is available for open access.

**Informed Consent:** Retrospective data-analysis study.

**Peer-review:** Internally peer-reviewed.

## Authorship Contributions

Concept: E.Ş., Design: E.Ş., Ö.A., Data Collection or Processing: E.Ş., A.İ.K., Ö.A., Analysis or Interpretation: E.Ş., A.İ.K., Ö.A., Literature Search: E.Ş., A.İ.K., Ö.A., Writing: E.Ş., A.İ.K., Ö.A.

**Conflict of Interest:** There are no conflicts of interest in connection with this paper, and the material described is not under publication or consideration for publication elsewhere.

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