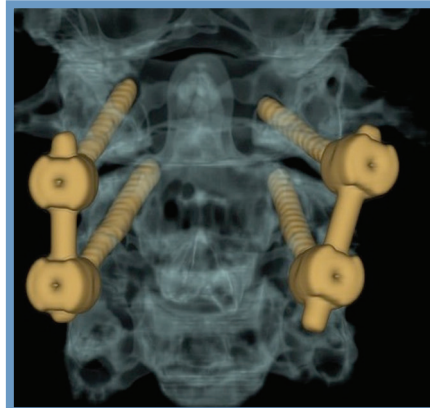
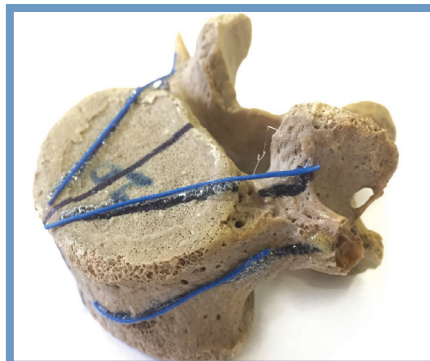
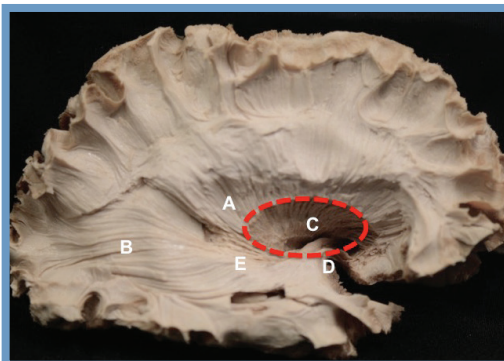




Turkish Neurosurgery

Official Journal of the Turkish Neurosurgical Society





Turkish Neurosurgery

Official Journal of the Turkish Neurosurgical Society

TURKISH NEUROSURGICAL SOCIETY

Volume: 28 Number: 6 Year: 2018

www.turkishneurosurgery.org.tr

PRESIDENTS

Nurhan Avman	1985-1986
Aykut Erbenği	1986-1987
Özdemir Gürçay	1988-1988
Tunçalp Özgen	1988-1989
Yücel Kanpolat	1989-1990
Osman E. Özcan	1990-1992
Ertekin Arasil	1992-1993
Yamaç Taşkın	1993-1995
Yücel Kanpolat	1995-1996
Nur Altınörs	1996-1997
M. Kemali Baykaner	1997-1998
Kaya Aksoy	1998-2000
Necmettin Pamir	2000-2002
Nurcan Özdamar	2002-2004
Selçuk Palaoğlu	2004-2006
Mehmet Zileli	2006-2008
Ethem Beşkonaklı	2008-2010
Murad Bavbek	2010-2012
Uğur Türe	2012-2014
Zeki Şekerci	2014-2016
Talat Kırış	2016-2017
Şükrü Çağlar	2017-2018
Savaş Ceylan	2018-

EDITORS

Tunçalp Özgen	1989-1989
Yücel Kanpolat	1989-1990
Osman E. Özcan	1990-1992
Selçuk Palaoğlu	1992-1994
Nur Altınörs	1994-1995
Selçuk Palaoğlu	1995-1996
Zafer Kars	1996-1998
Kaya Aksoy	1998-2000
Murad Bavbek	2000-2003
Erdener Timurkaynak	2003-2004
Kemal Benli	2004-2006
Hakan Caner	2007-2013
Deniz Belen	2014-2015
Talat Kırış	2015-2016
Selçuk Peker	2016-2018
Cem Yılmaz	2018-

Turkish Neurosurgery is indexing in:
SCIENCE CITATION INDEX EXPANDED
INDEX MEDICUS, MEDLINE, PubMed,
Scopus

Impact Factor : 0.775
5yr-Impact Factor : 0.846

ISI Web of KnowledgeSM, Journal Citation
Reports[®], 2016 JCR Science Edition

Editor-in-Chief:

Cem Yılmaz : cemerimiyilmaz@gmail.com

Editors of Sections:

Dattatraya Muzumdar (Editor of Neurooncology Section)	: dmuzumdar@hotmail.com
Hidenori Kobayashi (Editor of Cerebrovascular Section)	: hidek-fchs@kbh.biglobe.ne.jp
Gianpiero Tamburrini (Editor of Pediatric Neurosurgery Section)	: gianpiero.tamburrini@rm.unicatt.it
R. Kemal Koç (Editor of Spinal Surgery Section)	: kocrk@erciyes.edu.tr
Ahmet Bekar (Editor of Functional Neurosurgery Section)	: dr_ahmet_bekar@hotmail.com
Andreas Unterberg (Editor of Neurotrauma Section)	: andreas.unterberg@med.uni-heidelberg.de
Hakan Karabağlı (Editor of General Neurosurgery Section)	: hakankarabağlı@yahoo.com

Associate Editors:

Selim Ayhan : selim_ayhan@yahoo.com	Bora Gürer : boragurer@gmail.com
Erdinç Civelek : civsurgeon@yahoo.com	Ender Köktekir : enderkoktekirns@hotmail.com
Emrah Çeltikçi : drceltikci@gmail.com	Emre Özkara : dremreozkara@gmail.com
Uygur Er : uygurer@gmail.com	Fikret Şahintürk : fikretsahinturk@gmail.com

Medical Ethics Advisor:

Dr. Nesrin Çobanoğlu

ADVISORY BOARD

Aviva Abosch, USA	Murat Günel, USA	Lukas Rasulic, Serbia
Feridun Acar, Turkey	Murat Hancı, Turkey	Guilherme Carvalhal Ribas, Brasil
Gökhan Akdemir, Turkey	Juha Hernesniemi, Finland	Concezio Di Rocco, Italy
Nejat Akalan, Turkey	Servet İnci, Turkey	James T. Rutka, Canada
Ossama Al-Mefty, USA	Juha E Jääskeläinen, Finland	Burak Sade, Turkey
Nur Altınörs, Turkey	Erkan Kaptanoğlu, Turkey	Madjid Samii, Germany
Nuri Arda, Turkey	Feyza Karagöz Güzey, Turkey	Ali Savaş, Turkey
Ali Arslantaş, Turkey	Takesi Kawase, Japan	Daniel Sciubba, USA
Emel Avci, Turkey	Andrew H. Kaye, Australia	Laligam Sekhar, USA
Şükrü Aykol, Turkey	Memduh Kaymaz, Turkey	Nathan Selden, USA
Mustafa K. Başkaya, USA	M. Yaşar Kaynar, Turkey	Franco Servadei, Italy
Murad Bavbek, Turkey	Evren Keleş, Turkey	Konstantin V. Slavin, USA
Ahmet Bekar, Turkey	Douglas Kondziolka, USA	İhsan Solaroğlu, Turkey
Ahmet Deniz Belen, Turkey	Kadir Kotil, Turkey	Robert F. Spetzler, USA
Edward C. Benzel, USA	Basant Kumar Misra, India	Alparslan Şenel, Turkey
Mustafa Berker, Turkey	Boris Krischek, Germany	Sait Şirin, Turkey
Ethem Beşkonaklı, Turkey	Ali Krisht, USA	Necmettin Tannöver, Turkey
Luis Borba, Brasil	Christer Lindquist, UK	Morcos Tatagiba, Germany
Kim Burchiel, USA	L. Dade Lunsford, USA	Yasin Temel, The Netherlands
Paolo Capabianca, Italy	Jacques Morcos, USA	Nicolas De Tribolet, Switzerland
Fady Charbel, USA	Melike Mut, Turkey	Uğur Türe, Turkey
Şükrü Çağlar, Turkey	Sait Naderi, Turkey	Tanju Uçar, Turkey
Mehmet Daneyemez, Turkey	Evandro de Oliveira, Brasil	Ağahan Ünlü, Turkey
Gilbert Deschambenoit, France	Kenji Ohata, Japan	Peter Vajkoczy, Germany
İlhan Elmacı, Turkey	Nezih Oktar, Turkey	M. Gazi Yaşargil, Turkey
Micheal Fehlings, Canada	Fahir Özer, Turkey	Selçuk Yılmazlar, Turkey
Atul Goel, India	Selçuk Palaoğlu, Turkey	Mehmet Zileli, Turkey
Ziya Gökaslan, USA	Necmettin Pamir, Turkey	İbrahim M. Ziyal, Turkey

Redaction: Dr. Aydın Yuluğ, Aytaç Yıldızeli

Secretary : Mukadder Karakaya Çerçi, Nurhan Şen

Plagiarism Report: Hüseyin Körpeoğlu

Web site design: Pleksus Information Technology

Turkish Neurosurgery

Volume: 28 Number: 6 Year: 2018

Official Journal of the Turkish Neurosurgical Society

Turkish Neurosurgery is published six times per year by the Turkish Neurosurgical Society (January, March, May, July, September, and November)

Owned and controlled by the Turkish Neurosurgical Society

Copyright owner on behalf of the Turkish Neurosurgical Society:

Savaş CEYLAN

Publishing Manager:

Ünal ÖZÜM

Key title: Turkish Neurosurgery

Abbreviated key title: Turk Neurosurg

www.turkishneurosurgery.org.tr

ISSN: 1019-5149

NLM ID: 9423821

Subscription: Sent free to the Turkish Neurosurgical Society members.

Non-members should contact: editor@turkishneurosurgery.org.tr

2018 Non-member Subscription Rates:

Within Turkey 300 TL, Outside Turkey 100 Euro

Publishing Services

BULUŞ DESIGN AND PRINTING SERVICES COMPANY

Bahriye Üçok Caddesi 9/1 Beşevler, 06500 Ankara, Turkey

Phone: +90 312 222 44 06 Fax: +90 312 222 44 07

www.bulustasarim.com.tr

Advertisement: editor@turkishneurosurgery.org.tr

Printed at

Sonsöz Gazetecilik ve Matbaacılık Tic. Ltd. Şti.

Matbaacılar Sanayi Sitesi 35. Cadde, No: 56 İvedik, Ankara, Turkey

Phone: +90 312 394 57 71

This issue is published as: 1550 copies.

Printing Date: 20.11.2018

Cover picture: Comert, p. 869; da Costa, p. 938; Bozkurt, p. 973; Schleicher, p. 998

Turkish Neurosurgical Society

Taşkent Caddesi 13/4 06500 Bahçelievler, Ankara/TURKEY

Phone: +90 312 212 64 08 Fax : +90 312 215 46 26 E-mail: info@turknorosirurji.org.tr

www.turknorosirurji.org.tr www.turkishneurosurgery.org.tr

Review of the articles in the journal to make sure they conform to publishing standards, typesetting, the review of English abstract and sources, getting the journal ready for publication and finally the publishing process has been the responsibility of Buluş Design and Printing Services Company.

The paper used to print this journal conforms to ISO 9706: 1994 standard (Requirements for Permanence).

The National Library of Medicine suggests that biomedical publications be printed on acid-free paper (alkaline paper).



ENVIRONMENTAL INFORMATION

The company that manufactures the paper used in this journal has an ISO 14001 environmental management certificate. The company obtains all wood fiber in a sustainable manner. The forests and plantations of the company are certified. The water used in production is purified and used after recovery.

Heavy metals or film are not used for the publication of this journal. The fluids used for developing the aluminum printing templates are purified. The templates are recycled. The inks used for printing do not contain toxic heavy metals.

This journal can be recycled. Please dispose of it in recycling containers.

INSTRUCTION TO THE AUTHORS

Turkish Neurosurgery is a peer-reviewed, multidisciplinary journal directed at an audience of neurosurgery physicians and scientists. The official language of the journal is *English*. The journal publishes original articles in the form of clinical and basic research. *Turkish Neurosurgery* will only publish studies that have institutional review board (IRB) approval and have strictly observed a sufficient follow-up period. With the exception of reference presentation, *Turkish Neurosurgery* requires that all manuscripts be prepared in accordance with the *Uniform Requirements for Manuscripts Submitted to Biomedical Journals*.

Turkish Neurosurgery periodically publishes the following papers: Turkish Neuro-Excursion, Original Investigation (Clinical and Experimental Studies), Review Article, Case Report, Case Illustration, Technical Note, Historical Perspective and Letter to the Editor.

Manuscript Submission

Authors are to submit their manuscripts through the web-based tracking system at <http://www.turkishneurosurgery.org.tr>. The site contains instructions and advice on how to submit manuscripts, guidance on the creation/scanning and saving of electronic art, and supporting documentation. **ORCID** identifier (ID) is required for all authors during the submission process. **ORCID ID** can be obtained free of charge at <http://orcid.org>. **E-mail address of all authors** should also be provided during the submission process. In addition to allowing authors to submit manuscripts on the web, the site allows authors to follow the progression of their manuscript through the peer review process. Authors who submit their manuscripts through the web-based tracking system are asked not to send hard copies of the manuscript to the editorial office. Please address all inquiries regarding manuscripts not yet accepted or published to the Journal's editorial office. The editorial office will acknowledge receipt of your manuscript and will send you a manuscript number for reference.

Revised Submission

Author's comments to the reviewers are required for revised submissions. Authors must address the reviewer's concerns/suggestions and whether the change was made or not. Authors must also highlight the changes made within the text. Do not track the additions or deletions to the manuscript. If the authors do not want to revise the manuscript within a period of *two months*, the manuscript will automatically be declined.

Patient anonymity and informed consent: It is the author's responsibility to ensure that a patient's anonymity is carefully protected and to verify that any experimental investigation with human subjects reported in the manuscript was performed with informed consent and followed all the guidelines for experimental studies with human subjects required by the institution(s) with which all the authors are affiliated. Authors should mask patients' eyes, private parts and remove patients' names from all figures.

Copyright: Corresponding author must sign a copy of the Journal's "**Copyright Transfer/Conflict of Interest and Device Status Form**" on behalf of all authors and submit it to the Editorial Office. The authors of all published material must sign this form at the time of manuscript acceptance.

Permissions: Authors must submit written permission from the copyright owner (usually the publisher) to use direct quotations, tables, or illustrations that have appeared in copyrighted form elsewhere, along with complete details about the source. Any permissions fees that might be required by the copyright owner are the responsibility of the authors requesting use of the borrowed material and not the Turkish Neurosurgical Society.

Preparation of Manuscript

Manuscripts that do not adhere to the following instructions **WILL BE RETURNED** to the corresponding author for technical revision before undergoing peer review.

General format: All manuscripts should be submitted in English, and formatted for standard 8 1/2 x 11-inch (21 x 28-cm) paper with at least a 1-inch (2.5 cm) margin on all sides and double-spaced.

Style: *Pattern manuscript style after the American Medical Association Manual of Style (9th edition). Stedman's Medical Dictionary (27th edition) and Merriam Webster's Collegiate Dictionary (10th edition) should be used as standard references. Refer to drugs and therapeutic agents by their accepted generic or chemical names, and do not abbreviate them. Use code numbers only when a generic name is not yet available. In that case, supply the chemical name and a figure giving the chemical structure of the drug. Capitalize the trade names of drugs and place them in parentheses after the generic names. To comply with trademark law, include the name and location (city and state in USA; city and country outside USA) of the manufacturer of any drug, supply, or equipment mentioned in the manuscript. Use the metric system to express the units of measure and degrees Celsius to express temperatures, and SI units rather than conventional units.*

Submit the manuscript electronically via:

<http://www.turkishneurosurgery.org.tr> in the following order:

1) Title page:

The title page should include:

- (a) complete manuscript title (brief, definite and didactic),
- (b) authors' full names, highest academic degrees, and affiliations,
- (c) name and address for correspondence, including fax number, telephone number, and e-mail address,

- (d) address for reprints if different from that of corresponding author,
- (e) sources of support that require acknowledgement,
- (f) any other acknowledgement the authors wish to include. Please verify that the spelling, order, and affiliation of each author are correct.
- (g) the title page must be uploaded as a separate file

The Journal is not responsible for published misspelled names due to author error.

A Running Head should also appear in the title page. The running head should be no more than three to five words from the title, and should NOT include the authors' names.

2) Structured Abstract and Key Words:

The following subheads must be included in the Structured Abstract *only for clinical and experimental research papers*: **Aim, Material and Methods, Results, Conclusion**. Do not cite references in the abstract, and limit the use of abbreviations and acronyms. The structured abstract must be **no more than 250 words**.

List **three to five Key Words** after the *abstract*.

Abbreviations should be written after the keywords in the abstract. Abbreviations should be written within parentheses after writing the abbreviated phrase in full in the first instance in the text. They should be written without parentheses afterwards. For a list of standard abbreviations, consult the Council of Biology Editors Style Guide (available from the Council of Science Editors, 9650 Rockville Pike, Bethesda, MD 20814) or other standard sources.

It is not necessary to provide a structured abstract for submissions to the Turkish Neuro-Excursion, Review Article, Case Report, Case Illustration, Technical Note, Historical Perspective and Letter to the Editor sections.

3) Text:

Organize the manuscript into five main headings:

Introduction, Material and Methods, Results, Discussion, and Conclusion.

For Clinical Trials, Experimental and Anatomic Studies as well as similar study designs, *please attach the Ethical Committee Approval Form to the manuscript submission*.

Define abbreviations at first mention in text and in each table and figure. If a brand name is cited, supply the manufacturer's name and address (city and state/country).

The number of words varies for different types of manuscripts:

Turkish Neuro-Excursion: The editor will invite connoisseurs for these special type of papers which may cover a broad spectrum in various fields of medicine, science, art, history, law as well as any important theme on actuality other than

core neurosurgery. The number of words, figures, tables and references are not restricted.

Original Investigation, Review, and Historical Perspective:

The main text should not exceed 3500 words excluding the abstract, references, tables, and figure legends for original articles, including randomized controlled trials, observational (cohort, case-control or cross-sectional) studies, diagnostic accuracy studies, systematic reviews and meta-analyses, nonrandomized behavioral and public health intervention trials, experimental animal trials, or any other retrospective or prospective clinical or experimental studies and invited articles. The number of figures, tables, videos and references are not restricted. The specifications for video files are given at part 6.

Case Report: Word count must not exceed 1000 (excluding references, tables, and figure legends). Case reports cannot have more than 15 references, and 4 figures or tables.

Case Illustration: The number of words must not exceed 500 (excluding references, tables, and figure legends). There is a restriction for only 2 figures and 10 references.

Technical Note: The number of words must not exceed 1000, and there should not be more than 15 references. The number of figures and tables are not restricted.

Letter to the Editor: These can also be submitted through Editorial Manager. Letters should refer to the title and authors of a recent *Turkish Neurosurgery* article. The letter should be no longer than 300 words with no more than 3 references. Unpublished data should not be used. Letters to the Editor are sent to the article authors for response. The Editor-in-Chief makes the final decision on whether letters to the editor and the responses are published.

Terms: Do not use the term hardware. Acceptable substitutions include implants and instrumentation. Constructs or montage may be used if the reference is to a particular pattern of fixation points for the instrumentation.

4) References:

The authors are responsible for the accuracy of the references. Key the references (double-spaced) at the end of the manuscript. Cite references in text in *alphabetical order within parentheses*. Do not link the references to the text. Cite unpublished data, such as papers submitted but not yet accepted for publication or personal communications, in parentheses in the text. Do not use "et al" in the references. List all the authors of the reference. Refer to the List of Journals Indexed in Index Medicus for abbreviations of journal names, or access the list at "<http://www.nlm.nih.gov/tsd/serials/lji.html>"

Sample references are given below:

A. *Journal article*

Guiot BH, Khoo LT, Fessler RG: A minimally invasive technique for decompression of the lumbar spine. *Turk Neurosurg* 27: 432-438, 2002

B. Additional example

Altınörs N, Kars Z, Arda N, Şenveli E, Türker A, Çınar N: Spinal extradural metastasis of medulloblastoma. *Turk Neurosurg Suppl* 1: 144, 1989

C. Book chapter

Sweitzer S, Arruda J, DeLeo J: The cytokine challenge: Methods for the detection of central cytokines in rodent models of persistent pain. In: Kruger L (ed), *Methods in Pain Research*. Boca Raton, FL: CRC Press, 2001: 109-132

D. Entire book

Atlas SW: *Magnetic Resonance Imaging of the Brain and Spine*. Philadelphia: Lippincott Williams & Wilkins, 2001

E. Example of thesis

Kanpolat Y: Experimental percutaneous access to the trigeminal ganglion and the histopathological evaluation of radiofrequency thermic lesion (Unpublished dissertation), Ankara: Ankara University, 1978:1- 52

F. Software

Epi Info [computer program]. Version 6. Atlanta: Centers for Disease Control and Prevention, 1994

G. Online journals

Friedman SA. Preeclampsia: A review of the role of prostaglandins. *Obstet Gynecol* [serial online]. January 1988;71:22-37. Available from: BRS Information Technologies, McLean, VA. Accessed December 15, 1990

H. Database

CANCERNET-PDQ [database online]. Bethesda, MD: National Cancer Institute, 1996. Updated March 29, 1996

I. World Wide Web

Gostin LO. Drug use and HIV/AIDS [JAMA HIV/AIDS web site]. June 1, 1996. Available at: <http://www.ama-assn.org/special/hiv/ethics>. Accessed June 26, 1997

5) Tables and Figures:

Tables: Create tables in **word format** using the table creating and editing feature of your word processing software. Do not use Excel or comparable spreadsheet programs. **Tables should not exceed page width of 41 picas or 17.5 cm.** Supply tables together in a separate file. Cite tables consecutively in the text, and number them in that order. Key each on a separate sheet, include the table title, appropriate column heads, and explanatory legends (including definitions of any abbreviations used). **Do not embed tables within the body of the manuscript.** They should be self-explanatory and should supplement, rather than duplicate, the material in the text.

Digital Figures: All electronic art can be submitted through the Web-based tracking system

“<http://www.turkishneurosurgery.org.tr>”

A. Format: Electronic art should be created/scanned and saved and submitted either as a **JPEG file**.

B. Sizing and Resolution:

Line art must have a resolution of at least 1200 dpi (dots per inch).

Electronic photographs, radiographs, CT scans, and scanned images must have a resolution of at least 300 dpi.

Figures should be sized to fit either 1 column (20 picas/8.4 cm), 1 1/2 columns (30 picas/12.65 cm OR 2 columns (41 picas/17.5 cm) on a page.

Sizing and Resolution can be checked through the related web-based programs or softwares.

C. Fonts: If fonts are used in the artwork, they must be converted to paths or outlines or they must be embedded in the files. Fonts must be 8 pt and be sized consistently throughout the artwork. The best font to use is Helvetica.

Figure legends: Legends must be submitted for all figures. They should be brief and specific and less than 150 characters or approximately 50 words. List figure legends on a separate page at the end of the manuscript text.

Color figures: The journal accepts color figures with free of charge which will enhance the quality of an article.

6) Videos:

Videos will be published as a part of manuscripts. Videoclips must be the property of author(s). The copyright issues are similar to the other parts of the Turkish Neurosurgery Journal that was aforementioned. These videoclips may replace of a figure or figures of an article. They must include an embedded audio narration and subtitles in English. The proper formats are .avi, .mpeg and .mp4. The file size is restricted to a maximum of 40 MB. The runtime should not be longer than 10 minutes. To upload a video more than mentioned size, please contact with the editorial office.

7) Research Reporting Guidelines:

The authors should consult the following guidelines* in accordance with the type of research.

A. Consolidated Standards of Reporting Trials (CONSORT) for randomized trials.

B. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) for systematic reviews and meta-analyses.

C. Meta-Analysis of Observational Studies in Epidemiology (MOOSE) for observational studies of systematic reviews and meta-analyses.

D. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) for observational articles.

E. Standards for the Reporting of Diagnostic Accuracy Studies (STARD) for the studies of diagnostic accuracy.

**It is possible for the authors to reach these guidelines through internet.*

8) Plagiarism:

Manuscripts are investigated for possible plagiarism once they are accepted for possible publication. If an author receives a plagiarism notice regarding his/her manuscript, the corrections should be made within one month. If the Editorial Board detects any plagiarism on the second check after correction of the manuscript by the authors, the chief editor can reject the manuscript.

After Acceptance

Page proofs and corrections: Corresponding authors will receive electronic page proofs to check the copyedited and typeset article before publication. Portable document format (PDF) files of the typeset pages and support documents (e.g., reprint order form) will be sent to the corresponding author via e-mail. Complete instructions for downloading and printing the files and for faxing the corrected pages to the publisher will be provided with the e-mail. Authors without an e-mail address will receive traditional page proofs. It is the author's responsibility to ensure that there are no errors in the proofs. Changes that have been made to conform to journal style will stand if they do not alter the author's meaning. Only the most critical changes of the accuracy of the content will be made. Changes that are stylistic or are a reworking of previously

accepted material will not be allowed. The publisher reserves the right to deny any changes that do not affect the accuracy of the content. Authors may be charged for alterations to the proofs beyond those required to correct errors or to answer queries. Proofs must be checked carefully and corrections faxed within 24 to 72 hours of receipt, as requested in the cover letter accompanying the page proofs.

Publisher's contact details: Fax or e-mail corrected page proofs, and any other related materials to Journal Production Editor, Türk Nöroşirürji Derneği, Taşkent Caddesi 13/4, Bahçelievler-06500 Ankara, TURKEY.

Phone: +90 312 212 64 08 Fax: +90 312 215 46 26

Reprints: Reprint requests should be faxed or e-mailed with the corrected proofs by the corresponding author, if needed. Reprints are normally shipped 6 to 8 weeks after publication of the issue in which the item appears. Contact with the Publisher: Bulus Tasarım, Bahriye Üçok Caddesi 9/1, Beşevler, Ankara, TURKEY.

Phone: +90 312 222 44 06 Fax: +90 312 222 44 07

e-mail: bulus@bulustasarim.com.tr.

The price for 2 sets of Hardcopy journal + shipping is approximately* 200 TL (~35 EUR).

**Depend on shipping cost. Please contact Bulus Tasarım.*

Manuscript Checklist (before submission. For author reference only)

1. ORCID identifier (ID) is required for all authors during the submission process.
ORCID ID can be obtained free of charge at <http://orcid.org>
2. E-mail address of all authors should be provided during the submission process.
3. Title page
 - Title (brief, definite, didactic)
 - Corresponding author designated, and full mailing address included on title page
 - E-mail address of corresponding author included on title page
 - Running head
 - Permission to reproduce copyrighted materials or signed patient consent forms
 - Acknowledgements listed for grants, technical support, and corporate support on title page
4. Structured abstract with key words (250 words)
5. Manuscript text with page numbers (without author names and affiliations)
6. Figure legends
7. Tables (Word, Wordperfect)
8. Figures (jpeg)
9. Videos (avi, mpeg, mp4) with narration
10. References double-spaced and cited in alphabetical order

ORIGINAL INVESTIGATIONS

- 853** **The Effect of Rosmarinus Officinalis and Chemotherapeutic Etoposide on Glioblastoma (U87 MG) Cell Culture**
Meryem Damla OZDEMIR, Dilek GOKTURK
- 858** **Neuroprotective Effects of Oleocanthal, a Compound in Virgin Olive Oil, in a Rat Model of Traumatic Brain Injury**
Mesut METE, Isil AYDEMIR, Ulkun Unlu UNSAL, Fatih COLLU, Gokhan VATANDAS, Beyhan GURCU, Yusuf Kurtulus DURANSOY, Fatma TANELI, Mehmet Ibrahim TUGLU, Mehmet SELCUKI
- 866** **Usefulness and Radiological Evaluation of Accuracy of the Innovative “Smart” Hand Technique for Pedicle Screw Placement: An Anatomical Study**
Ayhan COMERT, Ihsan DOGAN, Y. Sukru CAGLAR 
- 877** **Computed Tomographic Localization of the Central Sulcus: A Morphometric Study in Adult Patients**
Dan ZIMELEWICZ OBERMAN, Jorge RASMUSSEN, Maximiliano TOSCANO, Ezequiel GOLDSCHMIDT, Pablo AJLER
- 882** **Analysis of the Factors Affecting Surgical Site Infection and Bone Flap Resorption after Cranioplasty with Autologous Cryopreserved Bone: The Importance of Temporalis Muscle Preservation**
Sung-Won JIN, Sang-Dae KIM, Sung-Kon HA, Dong-Jun LIM, Hwa LEE, Hi-Jin YOU
- 889** **Effects of Resveratrol on Inflammation and Apoptosis After Experimental Spinal Cord Injury**
Salim SENTURK, Mesut Emre YAMAN, Hasan Emre AYDIN, Guven GUNEY, Ismail BOZKURT, Kemal PAKSOY, Ahmet Atilla ABDIOGLU
- 897** **Modified Frailty Index and Body Mass Index as Predictors of Adverse Surgical Outcomes in Degenerative Spinal Disease**
Wei XU, Xu-Ming ZHANG, Tie KE, Hong-Ru CAI, Xiang GAO
- 904** **Is Implant Washing and Wound Irrigation with Rifampicin Effective for Preventing Surgical Site Infections in Lumbar Instrumentation?**
Numan KARAARSLAN, Ibrahim YILMAZ, Hanefi OZBEK, Kadir OZNAM, Ozkan ATES, Ilknur ERDEM 
- 910** **Expression of Nestin, CD133 and Sox2 in Meningiomas**
Zong-Yu XIAO, Xiao-Juan CHEN, Qi PAN, Qing-Zhi YANG, Kun-Zheng LI

915 Comparison of Sinonasal Complications of Microscopic and Endoscopic Approaches for Transsphenoidal Hypophyseal Surgery: Prospective Study

Murat KIRAZ, Omur GUNALDI, Osman TANRIVERDI, Ibrahim ERDIM, Lutfi Sinasi POSTALCI, Bekir TUGCU, Mine Zahide YAZICI



923 Percutaneous Endoscopic Interlaminar Discectomy for L5-S1 Adolescent Lumbar Disc Herniation

Zheng XU, Yi LIU, Jinchuan CHEN

929 Management of Hardware Related Infections after DBS Surgery: A Cost Analysis

Pim WETZELAER, Tim Bouwens van der VLIS, Mehmet TONGE, Linda ACKERMANS, Pieter KUBBEN, Silvia EVERS, Ersoy KOCABICAK, Yasin TEMEL

934 A Technical Guide for Fiber Tract Dissection of the Internal Capsule

Marcos Devanir Silva DA COSTA, Vinícius Lopes BRAGA, Kaan YAGMURLU, Ricardo Silva CENTENO, Sérgio CAVALHEIRO, Feres CHADDAD-NETO



940 New Entity of Skull Lesions due to Birth Trauma: Kanat (Wing) Fractures

Ali GEMICI, Aysegul ALKILIC, Pinar GULERYUZ, Selcuk TUNALI, Betul ORHAN KILIC, Pinar OZISIK

949 Co-Innervation of Triceps Brachii Muscle with Variant Branch of Ulnar Nerve

Sedat DEVELI

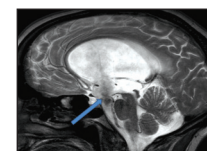


954 Evaluation of Bevacizumab for the Treatment of Epidural Fibrosis by Immunohistochemical Staining for CD105 and Osteopontin

Ilhan YILMAZ, Uzay ERDOGAN, Osman TANRIVERDI, Omur GUNALDI, Utku ADILAY, Muhammed OMEROGLU, Canan TANIK, Bekir TUGCU

963 The Predictor Role of the Aqueduct Cerebrospinal Fluid Flow on Endoscopic Third Ventriculostomy: Explication on Assumption Physical Model

Ihsan ANIK, Yonca ANIK, Burak CABUK, Aykutlu DANA, Aykut GOKBEL, Dilek OZDAMAR, Musa CIRAK, Savas CEYLAN



970 Assessing Aneurysm Obliteration and Neck Remnants in 225 Clipped Aneurysms Using Indocyanine Green Video Angiography, Micro-Doppler Ultrasonography and Postoperative Digital Subtraction Angiography

Melih BOZKURT, Onur OZGURAL, Gokmen KAHILOGULLARI, Umit EROGLU, Ihsan DOGAN, Haydar SEKMEN, Nihat EGEMEN

979 Simpson Grade 2 Resection and Tumor Recurrence in Ventrally Located Spinal Meningiomas

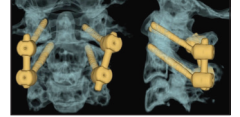
Necati UCLER, Batu HERGUNSEL, Sait OZTURK, Serpil KOZAN, Metin KAPLAN

983 Benign-appearing Intraspinal Malignant Peripheral Nerve Sheath Tumors: Treatments and Outcomes of 14 Consecutive Patients

Haiyi GONG, Dan ZHANG, Da WANG, Shaohui HE, Xinghai YANG, Haifeng WEI, Jianru XIAO

- 989** **A Novel Candidate Molecule in the Pathological Grading of Gliomas: ELABELA**
Gokhan ARTAS, Sait OZTURK, Tuncay KULOGLU, Adile Ferda DAGLI, Murat GONEN, Hakan ARTAS, Suleyman AYDIN, Fatih Serhat EROL

- 995** **The C2-Pars interarticularis Screw as an Alternative in Atlanto-Axial Stabilization. A Biomechanical Comparison of Established Techniques**
Philipp SCHLEICHER, Mehmet Bulent ONAL, Frank HEMBERGER, Matti SCHOLZ, Frank KANDZIORA



CASE REPORTS

- 1005** **Lumbosacral Epidural Primitive Neuroectodermal Tumor (PNET): Case Report and Literature Review**
Keyvan EGHBAL, Amir Reza DEGHANIAN, Fariborz GHAFARPASAND



- 1009** **Active Rebleeding of a Ruptured Middle Cerebral Artery Aneurysm During Diagnostic Catheter Angiography**
Pinar CELTIKCI, Onder ERASLAN, Onur ERGUN, Esra SOYER GULDOGAN, Mehmet Erhan TURKOGLU

LETTER TO EDITOR

- 1013** **How Can Mesenchymal Stem Cells Penetrate the Blood Brain Barrier?**
Hua-Jiang DONG, Gang LI, Hui-Peng MENG, Chong-Zhi SHANG, Yuechen LUO, Gong WEN, Ming-Liang ZHAO