**Списък публикации с резюмета**

1. *Ilchev B, Chervenkov V, Valchev N, Nakov V, Minchev T, Vassilev G, Tsvetanov T, Laleva L, Milev M, Spiriev T.[Interdisciplinary Successful Revascularization of Traumatic Occlusion of the Right Common Carotid Artery.](https://pubmed.ncbi.nlm.nih.gov/38562360/) Cureus. 2024 Mar 2;16(3):e55395. doi: 10.7759/cureus.55395. eCollection 2024 Mar.* ***6 точки***

***Abstract***

*Blunt carotid artery injury (BCI) poses a rare yet severe threat following vascular trauma, often leading to significant morbidity and mortality. We present a case of a 33-year-old male who suffered complete thrombotic occlusion of the right common carotid artery (CCA) following a workplace accident. Clinical evaluation revealed profound neurological deficits, prompting multidisciplinary surgical intervention guided by the Denver criteria (Grade I - disruption inside the vessel that results in a narrowing of the lumen by less than 25%; Grade II - dissection or intramural hematoma causing greater than 25% stenosis; Grade III - comprises pseudoaneurysm formation; Grade IV - causes total vessel occlusion; Grade V - describes vessel transection with extravasation). Surgical exploration unveiled extensive arterial damage, necessitating thrombectomy, primary repair, and double-layered patch angioplasty using an autologous saphenous vein. Postoperative recovery was uneventful, with the restoration of pulsatile blood flow confirmed by Doppler ultrasound. Three-month follow-up demonstrated patent arterial reconstruction and improved cerebral perfusion, despite the persistent neurological deficits. Our case underscores the challenges in diagnosing and managing BCI, advocating for a tailored approach based on injury severity and neurological status. While conservative management remains standard, surgical intervention offers a viable option in select cases, particularly those with complete vessel occlusion and neurological compromise. Long-term surveillance is imperative to assess the durability of arterial reconstruction and monitor for recurrent thromboembolic events. Further research is warranted to refine management algorithms and elucidate optimal treatment strategies in this rare but critical vascular pathology.*

1. *Trandzhiev M, Koundouras T, Milev M, Laleva L, Mitev A, Stoykov V, Dimitrov N, Maslarski I, Nakov V, Spiriev T.Cureus. [The Evaluation of Virtual Reality Neuroanatomical Training Utilizing Photorealistic 3D Models in Limited Body Donation Program Settings.](https://pubmed.ncbi.nlm.nih.gov/38562356/) 2024 Mar 2;16(3):e55377. doi: 10.7759/cureus.55377. eCollection 2024 Mar.* ***5,45 точки***

***Background***

*Neuroanatomy is one of the most complex areas of anatomy to teach to medical students. Traditional study methods such as atlases and textbooks are mandatory but require significant effort to conceptualize the three-dimensional (3D) aspects of the neuroanatomical regions of interest.*

***Objectives***

*To test the feasibility of human anatomy teaching medical students in a virtual reality (VR) immersive environment using photorealistic three-dimensional models (PR3DM) of human anatomy, in a limited anatomical body donation program.*

***Methods***

*We used surface scanning technology (photogrammetry) to create PR3DM of brain dissections. The
3D models were uploaded to VR headsets and used in immersive environment classes to teach second-year medical students. Twenty-eight medical students (mean age 20.11, SD 1.42), among which 19 females (n=28/67.9%) and nine males (n=28/32.1%), participated in the study. The students had either none or minimal experience with the use of VR devices. The duration of the study was three months. After completing the curriculum, a survey was done to examine the results.*

***Results***

*The average rating of the students for their overall experience with the method is 4.57/5 (SD=0.63). The “Possibility to study models from many points of view” and “Good Visualization of the models” were the most agreed upon advantages, with 24 students (n=28, 85.7%), and 95% confidence intervals (CI) [0.6643, 0.9532]. The limited availability of the VR headsets was the major disadvantage as perceived by the students, with 11 students (n=28, 39.3%), 95% CI [0.2213, 0.5927] having voted for the option. The majority of the students (25) (n=28, 89.2%, SD=0.31) agreed with the statement that the use of VR facilitated their neuroanatomy education.*

***Conclusion***

*This study shows the future potential of this model of training in limited cadaver dissection options to provide students with modern technological methods of training. Our first results indicate a prominent level of student satisfaction from VR training with minimum negative reactions to the nature of headsets. The proof of concept for the application of photorealistic models in VR neuroanatomy training combined with the initial results of appreciation among the students predisposes the application of the method on a larger scale, adding a nuance to the traditional anatomy training methods. The low number of headsets used in the study limits the generalization of the results but offers possibilities for future perspectives of research.*

1. *Corvino S, Kassam A, Piazza A, Corrivetti F, Spiriev T, Colamaria A, Cirrottola G, Cavaliere C, Esposito F, Cavallo LM, Iaconetta G, de Notaris M. [Open-door extended endoscopic transorbital technique to the paramedian anterior and middle cranial fossae: technical notes, anatomomorphometric quantitative analysis, and illustrative case.](https://pubmed.ncbi.nlm.nih.gov/38560942/) Neurosurg Focus. 2024 Apr;56(4):E7. doi: 10.3171/2024.1.FOCUS23838.* ***5 точки***

***OBJECTIVE*** *The superior eyelid endoscopic transorbital approach (SETOA) provides a direct and short minimally invasive route to the anterior and middle skull base. Nevertheless, it uses a narrow corridor that limits its angles of at- tack. The aim of this study was to evaluate the feasibility and potential benefits of an “extended” conservative variant of the “standard” endoscopic transorbital approach—termed “open-door”—to enhance the exposure of lesions affecting the paramedian aspect of the anterior and middle cranial fossae.*

***METHODS*** *First, the authors described the technical nuances of the open-door extended transorbital approach (ODETA). Next, they documented its morphometric advantages over standard SETOA. Finally, they provided a clinical- anatomical application to demonstrate enhanced exposure and better angles of attack to treat lesions occupying the paramedian anterior and middle cranial fossae. Five adult cadaveric specimens (10 sides) initially underwent standard SETOA and then extended open-door SETOA (ODETA to the paramedian anterior and middle fossae). The adjunct of hinge-orbitotomy, through three surgical steps and straddling the frontozygomatic suture, converted conventional SETOA to its extended open-door variant. CT scans were performed before dissection and uploaded to the neuronavigation system for quantitative analysis. The angles of attack on the axial plane that addressed four key landmarks, namely the tip of the anterior clinoid process (ACP), foramen rotundum (FR), foramen ovale (FO), and trigeminal impression (TI), were calculated for both operative techniques and compared.*

***RESULTS*** *Hinge-orbitotomy of the extended open-door SETOA resulted in several surgical, functional, and esthetic advantages: it provided wider axial angles of attack for each of the target points, with a gain angle of 26.68° ± 1.31° for addressing the ACP (p < 0.001), 29.50° ± 2.46° for addressing the FR (p < 0.001), 19.86° ± 1.98° for addressing the FO (p < 0.001), and 17.44° ± 2.21° for addressing the lateral aspect of the TI (p < 0.001), while hiding the skin scar, avoiding temporalis muscle dissection, preserving flap vascularization, and decreasing the rate of bone infection and degree of orbital content retraction.*

***CONCLUSIONS*** *Theextendedopen-doortechniquemaybespecificallysuitedforselectedpatientsaffectedbyparame- dian anterior and middle fossae lesions, with prevalent anteromedial extension toward the anterior clinoid, the foremost compartment of the cavernous sinus and FR and not completely controlled with the pure endoscopic transorbital approach.*

*https://thejns.org/doi/abs/10.3171/2024.1.FOCUS23838*

1. *Piazza A, Spiriev T, Corvino S, Corrivetti F, Laleva L, Iaconetta G, de Notaris M.[The Course of the Trochlear Nerve presented with 3-D Photorealistic Anatomical Model.](https://pubmed.ncbi.nlm.nih.gov/38548050/) World Neurosurg. 2024 Mar 26:S1878-8750(24)00483-2. doi: 10.1016/j.wneu.2024.03.099.* ***8, 57 точки***

*Objectives*

*Several factors contribute to the anatomical complexity of the trochlear nerve, including small diameter, complex and longest intracranial course, deep location, and numerous neurovascular relationships. A 3-dimensional (3D) photorealistic model of the cranial nerves provides a detailed and immersive representation of the anatomy, enabling one to improve surgical planning, advanced surgical research, and training. The purpose of this work is to present a 3D photogrammetric study for a more intuitive and interactive way to explore and describe the entire course of trochlear nerve.*

*Methods*

*Two injected-fixed head human specimens (4 sides) were examined. The dissection protocol was divided into the following steps: 1) brain hemisphere exposure; 2) hemispherectomy dissecting all cranial nerves and partial removal of the free edge of the tentorium; 3) middle fossa and lateral wall of cavernous sinus exposure; and 4) orbital exposure. A detailed 3D photogrammetric model was generated for each dissection step.*

*Results*

*Four main volumetric models were generated during a step-by-step layered dissection of the entire nerve pathway highlighting its different segments. Finally, a full and integrated model of the entire course of the nerve was created. The models are available for visualization on monoscopic display, virtual, and augmented reality environment.*

*Conclusions*

*The present photogrammetric model provides a more comprehensive understanding of the nerve’s anatomy in its different segments, allows for customizable views thus simulating different perspectives, and can be a valuable alternative to traditional dissections. It is an advanced tool for surgical planning and surgical simulation as well as virtual reality representation of the anatomy.*

1. *Krogager ME, Fugleholm K, Poulsgaard L, Springborg JB, Mathiesen TI, Cornelius JF, Nakov V, Laleva L, Milev M, Spiriev T [Intraoperative Videogrammetry and Photogrammetry for Photorealistic Neurosurgical 3-Dimensional Models Generated Using Operative Microscope: Technical Note.](https://pubmed.ncbi.nlm.nih.gov/38386966/) Oper Neurosurg (Hagerstown). 2024 Feb 21. doi: 10.1227/ons.0000000000001034. Online ahead of print.* ***6 точки***

*BACKGROUND AND OBJECTIVES: Intraoperative orientation during microsurgery has a prolonged learning curve among neurosurgical residents. Three-dimensional (3D) understanding of anatomy can be facilitated with realistic 3D anatomic models created from photogrammetry, where a series of 2-dimensional images is converted into a 3D model. This study implements an algorithm that can create photorealistic intraoperative 3D models to exemplify important steps of the operation, operative corridors, and surgical perspectives.*

*METHODS: Weimplementedphotograph-basedandvideo-basedscanningalgorithmsforuptakesusingtheoperating room (OR) microscope, targeted for superficial structures, after surgical exposure, and deep operative corridors, in cranial microsurgery. The algorithm required between 30–45 photographs (superficial scanning), 45–65 photographs (deep scanning), or approximately 1 minute of video recording of the entire operative field to create a 3D model. A multicenter approach in 3 neurosurgical departments was applied to test reproducibility and refine the method.*

*RESULTS: Twenty-five3Dmodelswerecreatedofsomeofthemostcommonneurosurgicalapproaches—frontolateral, pterional, retrosigmoid, frontal, and temporal craniotomy. The 3D models present important steps of the surgical approaches and allow rotation, zooming, and panning of the model, enabling visualization from different surgical perspectives. The superficial and medium depth structures were consistently presented through the 3D models, whereas scanning of the deepest structures presented some technical challenges, which were gradually overcome with re- finement of the image capturing process.*

*CONCLUSION: Intraoperative photogrammetry is an accessible method to create 3D educational material to show complex anatomy and demonstrate concepts of intraoperative orientation. Detailed interactive 3D models, displaying stepwise surgical case-based anatomy, can be used to help understand details of the operative corridor. Further de- velopment includes refining or automatization of image acquisition intraoperatively and evaluation of other applications of the resulting 3D models in training and surgical planning.*

1. *Corvino S, Piazza A, Spiriev T, Tafuto R, Corrivetti F, Solari D, Cavallo LM, Di Somma A, Enseñat J, de Notaris M, Iaconetta G. [The Sellar Region as Seen from Transcranial and Endonasal Perspectives: Exploring Bony Landmarks Through New Surface Photorealistic Three-Dimensional Model Reconstruction for Neurosurgical Anatomy Training.](https://pubmed.ncbi.nlm.nih.gov/38342178/) World Neurosurg. 2024 Feb 9:S1878-8750(24)00219-5. doi: 10.1016/j.wneu.2024.02.022.****5,45 точки***

*BACKGROUND: Virtual realityebased learning of neuroanatomy is a new feasible method to explore, visu- alize, and dissect interactively complex anatomic regions. We provide a new interactive photorealistic three- dimensional (3D) model of sellar region microsurgical anatomy that allows side-by-side views of exocranial and endocranial surfaces to be explored, with the aim of assisting young neurosurgery residents in learning micro- surgical anatomy of this complex region.*

*- METHODS: Four head specimens underwent an endo- scopic endonasal approach extended to the anterior and pos- terior skull base to expose the main bony anatomic landmarks of the sellar region. The same bony structures were exposed from a transcranial perspective. By using a photogrammetry method, multiple photographs from both endocranial and exocranial perspectives, different for angulations and depth, were captured, fused, and processed through dedicated software.*

*- RESULTS: All relevant bony structures were clearly distinguishable in the 3D model reconstruction, which pro- vides several benefits in neuroanatomy learning: first, it replicates bony structures with high degrees of realism, ac- curacy, and fidelity; in addition, it provides realistic spatial perception of the depth of the visualized structures and their anatomic relationships; again, the 3D model is interactive and allows a 360 self-guided tour of the reconstructed object, so that the learner can read the bones and their anatomic relationship from all desired points of view.*

*- CONCLUSIONS: Detailed knowledge of key surgical landmarks representing keyholes and/or anatomic struc- tures to not violate is mandatory for safer surgery, especially for a complex region such as the skull base. Highly accurate virtual and functional neurosurgical models, such as photogrammetry, can generate a realistic appearance to further improve surgical simulators and learn neuroanatomy.*

1. *Spiriev T, Laleva L, Milev M, Nakov V. [How I do it: cervical hemangioblastoma resection. Surgical technique and complication avoidance.](https://pubmed.ncbi.nlm.nih.gov/38285198/) Acta Neurochir (Wien). 2024 Jan 29;166(1):46. doi: 10.1007/s00701-024-05949-8.* ***15 точки***

***Abstract***

***Background*** *Spinal cord hemangioblastomas are benign, highly vascular neoplasms that affect the brain and, rarely, the spinal cord. They can be solitary or as part of von Hippel-Lindau syndrome. Radiosurgery is not a suitable treatment option. Endovascular embolization can only be adjunct to surgery.****Method*** *We present a detailed approach to resection of a spinal cord hemangioblastoma. A video demonstrates the microsurgical technique and discusses complication avoidance.*

***Conclusion*** *The pitfalls to consider are preservation of normal spinal cord vessels, protection of the pia-arachnoid cleavage plane, and avoidance of tumor piecemeal removal. Careful microsurgical resection and detailed preoperative planning are key.*

1. *Nikolova E, Laleva L, Milev M, Spiriev T, Stoyanov S, Ferdinandov D, Mitev V, Todorova A.[miRNAs and related genetic biomarkers according to the WHO glioma classification: From diagnosis to future therapeutic targets.](https://pubmed.ncbi.nlm.nih.gov/38035044/) Noncoding RNA Res. 2023 Oct 7;9(1):141-152. doi: 10.1016/j.ncrna.2023.10.003. eCollection 2024 Mar.* ***7,5 точки***

*Abstract In the 2021 WHO classification of Tumors of the Central Nervous System, additional molecular characteristics have been included, defining the following adult-type diffuse glioma entities: Astrocytoma IDH-mutant, Oligodendroglioma IDH-mutant and 1p/19q-codeleted, and Glioblastoma IDH-wildtype. Despite advances in genetic analysis, precision oncology, and targeted therapy, malignant adult-type diffuse gliomas remain "hard-to-treat tumors", indicating an urgent need for better diagnostic and therapeutic strategies.*

*In the last decades, miRNA analysis has been a hotspot for researching and developing diagnostic, prognostic, and predictive biomarkers for various disorders, including brain cancer. Scientific interest has recently been directed towards therapeutic applications of miRNAs, with encouraging results*

*Databases such as NCBI, PubMed, and Medline were searched for a selection of articles reporting the relationship between deregulated miRNAs and genetic aberrations used in the latest WHO CNS classification.
The current review discussed the recommended molecular biomarkers and genetic aberrations based on the 2021 WHO classification in adult-type diffuse gliomas, along with associated deregulated miRNAs. Additionally, the study highlights miRNA-based treatment advancements in adults with gliomas.*

1. *Trandzhiev M, Vezirska DI, Maslarski I, Milev MD, Laleva L, Nakov V, Cornelius JF, Spiriev T* [*Photogrammetry Applied to Neurosurgery: A Literature Review.*](https://pubmed.ncbi.nlm.nih.gov/37908958/) *Cureus. 2023 Sep 30;15(9):e46251. doi: 10.7759/cureus.46251. eCollection 2023 Sep.****7,5 точки***

***Abstract***

*Photogrammetry refers to the process of creating 3D models and taking measurements through the use of photographs. Photogrammetry has many applications in neurosurgery, such as creating 3D anatomical models and diagnosing and evaluating head shape and posture deformities. This review aims to summarize the uses of the technique in the neurosurgical practice and showcase the systems and software required for its implementation. A literature review was done in the online database PubMed. Papers were searched using the keywords “photogrammetry”, “neurosurgery”, “neuroanatomy”, “craniosynostosis” and “scoliosis”. The identified articles were later put through primary (abstracts and titles) and secondary (full text) screening for eligibility for inclusion. In total, 86 articles were included in the review from 315 papers identified. The review showed that the main uses of photogrammetry in the field of neurosurgery are related to the creation of 3D models of complex neuroanatomical structures and surgical approaches, accompanied by the uses for diagnosis and evaluation of patients with structural deformities of the head and trunk, such as craniosynostosis and scoliosis. Additionally, three instances of photogrammetry applied for more specific aims, namely, cervical spine surgery, skull-base surgery, and radiosurgery, were identified. Information was extracted on the software and systems used to execute the method. With the development of the photogrammetric method, it has become possible to create accurate 3D models of physical objects and analyze images with dedicated software. In the neurosurgical setting, this has translated into the creation of anatomical teaching models and surgical 3D models as well as the evaluation of head and spine deformities. Through those applications, the method has the potential to facilitate the education of residents and medical students and the diagnosis of patient pathologies.*

1. [*Krogager ME, Fugleholm K, Mathiesen TI, Spiriev T. Simplified Easy-Accessible Smartphone-Based Photogrammetry for 3-Dimensional Anatomy Presentation Exemplified With a Photorealistic Cadaver-Based Model of the Intracranial and Extracranial Course of the Facial Nerve.*](https://pubmed.ncbi.nlm.nih.gov/37321193/) *Oper Neurosurg (Hagerstown). 2023 Aug 1;25(2):e71-e77. doi: 10.1227/ons.0000000000000748. Epub 2023 Jun 15.* ***15 точки***

*BACKGROUND AND OBJECTIVES: Smartphone-based photogrammetry (SMPhP) was recently presented as a practical and simple algorithm to create photorealistic 3-dimensional (3D) models that benefit from volumetric presentation of real anatomic dissections. Subsequently, there is a need to adapt the techniques for realistic depiction of layered anatomic structures, such as the course of cranial nerves and deep intracranial structures; the feasibility must be tested empirically. This study sought to adapt and test the technique for visualization of the combined intracranial and ex- tracranial course of the facial nerve’s complex anatomy and analyze feasibility and limitations.*

*METHODS: We dissected 1 latex-injected cadaver head to depict the facial nerve from the meatal to the extracranial portion. A smartphone camera alone was used to photograph the specimen, and dynamic lighting was applied to improve presentation of deep anatomic structures. Three-dimensional models were created with a cloud-based photogrammetry application.*

*RESULTS: Four 3D models were generated. Two models showed the extracranial portions of the facial nerve before and after removal of the parotid gland; 1 model showed the facial nerve in the fallopian canal after mastoidectomy, and 1 model showed the intratemporal segments. Relevant anatomic structures were annotated through a web-viewer platform. The photographic quality of the 3D models provided sufficient resolution for imaging of the extracranial and mastoid portions of the facial nerve, whereas imaging of the meatal segment only lacked sufficient precision and resolution. CONCLUSION: A simple and accessible SMPhP algorithm allows 3D visualization of complex intracranial and extra- cranial neuroanatomy with sufficient detail to realistically depict superficial and deeper anatomic structures.*

1. [*Toma Spiriev*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Spiriev+T&cauthor_id=37235851)[*1*](https://pubmed.ncbi.nlm.nih.gov/37235851/#full-view-affiliation-1)[*2*](https://pubmed.ncbi.nlm.nih.gov/37235851/#full-view-affiliation-2)*,*[*Vladimir Nakov*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Nakov+V&cauthor_id=37235851)[*2*](https://pubmed.ncbi.nlm.nih.gov/37235851/#full-view-affiliation-2)*,*[*Jan F Cornelius*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Cornelius+JF&cauthor_id=37235851)[*1*](https://pubmed.ncbi.nlm.nih.gov/37235851/#full-view-affiliation-1) *Photorealistic 3-Dimensional Models of the Anatomy and Neurosurgical Approaches to the V2, V3, and V4 Segments of the Vertebral Artery Oper Neurosurg (Hagerstown) 2023 May 24. doi: 10.1227/ons.0000000000000701.* ***20 точки***

 *BACKGROUND: Thevertebralartery(VA)hasatortuouscoursesubdividedinto4segments(V1-V4).Forneurosurgeons, a thorough knowledge of the 3-dimensional (3D) anatomy at different segments is a prerequisite for safe surgery. New technologies allowing creation of photorealistic 3D models may enhance the anatomic understanding of this complex region.*

*OBJECTIVE: To create photorealistic 3D models illustrating the anatomy and surgical steps needed for safe neuro- surgical exposure of the VA.
METHODS: We dissected 2 latex injected cadaver heads. Anatomic layered dissections were performed on the first specimen. On the second specimen, the two classical approaches to the VA (far lateral and anterolateral) were realized. Every step of dissection was scanned using photogrammetry technology that allowed processing of 3D data from 2-dimensional photographs by a simplified algorithm mainly based on a dedicated mobile phone application and open- source 3D modeling software. For selected microscopic 3D anatomy, we used an operating microscope to generate 3D models.*

*RESULTS: Classic anatomic (n=17) and microsurgical (n=12) 3D photorealistic models based on cadaver dissections were created. The models allow observation of the spatial relations of each anatomic structure of interest and have an immersive view of the approaches to the V2-V4 segments of the VA. Once generated, these models may easily be shared on any digital device or web-based platforms for 3D visualization.*

*CONCLUSIONS: Photorealistic 3D scanning technology is a promising tool to present complex anatomy in a more comprehensive way. These 3D models can be used for education, training, and potentially preoperative planning.*

1. [*Donika Vezirska*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Vezirska+D&cauthor_id=36733788)[*1*](https://pubmed.ncbi.nlm.nih.gov/36733788/#full-view-affiliation-1)*,*[*Milko Milev*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Milev+M&cauthor_id=36733788)[*1*](https://pubmed.ncbi.nlm.nih.gov/36733788/#full-view-affiliation-1)*,*[*Lili Laleva*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Laleva+L&cauthor_id=36733788)[*1*](https://pubmed.ncbi.nlm.nih.gov/36733788/#full-view-affiliation-1)*,*[*Vladimir Nakov*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Nakov+V&cauthor_id=36733788)[*1*](https://pubmed.ncbi.nlm.nih.gov/36733788/#full-view-affiliation-1)*,*[*Toma Spiriev*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Spiriev+T&cauthor_id=36733788)[*1*](https://pubmed.ncbi.nlm.nih.gov/36733788/#full-view-affiliation-1)*Three-Dimensional Printing in Neurosurgery: A Review of Current Indications and Applications and a Basic Methodology for Creating a Three-Dimensional Printed Model for the Neurosurgical Practice Cureus 2022 Dec 30;14(12):e33153. doi:* ***5 точки***

***Introduction***

*Three-dimensional (3D) printing is an affordable aid that is useful in neurosurgery. It allows for better visualization and tactile appreciation of the individual anatomy and regions of interest and therefore potentially lowers the risk of complications. There are various applications of this technology in the field of neurosurgery.*

***Materials and methods***

*In this paper, we present a basic methodology for the creation of a 3D printed model using only open-source software for medical image editing, model generation, pre-printing preparation, and analysis of
the literature concerning the practical use of this methodology.*

***Results***

*The literature review on the current applications of 3D printed models in neurosurgery shows that they are mostly used for preoperative planning, surgical training, and simulation, closely followed by their use in*

*patient-specific implants and instrumentation and medical education. MaterialiseTM Mimics is the most frequently used commercial software for a 3D modeling for preoperative planning and surgical simulation, while the most popular open-source software for the same applications is 3D Slicer. In this paper, we present*

*the algorithm that we employ for 3D printing using HorosTM, Blender, and Cura software packages which are all free and open-source.*

***Conclusion***

*Three-dimensional printing is becoming widely available and of significance to neurosurgical practice. Currently, there are various applications of this technology that are less demanding in terms of technical knowledge and required fluency in medical imaging software. These predispositions open the field for further research on the possible use of 3D printing in neurosurgery.*

1. [*Toma Spiriev*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Spiriev+T&cauthor_id=35967185)[*1*](https://pubmed.ncbi.nlm.nih.gov/35967185/#affiliation-1)*,*[*Atanas Mitev*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Mitev+A&cauthor_id=35967185)[*2*](https://pubmed.ncbi.nlm.nih.gov/35967185/#affiliation-2)*,*[*Viktor Stoykov*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Stoykov+V&cauthor_id=35967185)[*2*](https://pubmed.ncbi.nlm.nih.gov/35967185/#affiliation-2)*,*[*Nikolay Dimitrov*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Dimitrov+N&cauthor_id=35967185)[*2*](https://pubmed.ncbi.nlm.nih.gov/35967185/#affiliation-2)*,*[*Ivan Maslarski*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Maslarski+I&cauthor_id=35967185)[*2*](https://pubmed.ncbi.nlm.nih.gov/35967185/#affiliation-2)*,*[*Vladimir Nakov*](https://pubmed.ncbi.nlm.nih.gov/?sort=date&term=Nakov+V&cauthor_id=35967185)[*3*](https://pubmed.ncbi.nlm.nih.gov/35967185/#affiliation-3) *Three-Dimensional Immersive Photorealistic Layered Dissection of Superficial and Deep Back Muscles: Anatomical Study. Cureus 2022 Jul 11;14(7):e26727. doi: 10.7759/cureus.26727. eCollection 2022 Jul.* ***10 точки***

***Introduction***

*The distinct anatomy of the superficial and deep back muscles is characterized by complex layered courses, fascial planes, specific vascularization, and innervation. Knowledge of these anatomical parameters is important for some surgical approaches, including lumbar disc herniation, cerebrospinal fluid fistula repair, vascularized muscle pedicle flaps, and posterior fossa extra-intracranial bypass. In the present study, we use modern techniques of three-dimensional (3D) surface scanning to help better illustrate the layered anatomy of the back muscles.*

***Material and methods***

*We dissected in layers the back muscles of one cadaver . Every step of the dissection was 3D scanned using a technique called photogrammetry, which allows the extraction of 3D data from 2D photographs. The 3D data were processed using Blender software, and the 3D photorealistic models were uploaded to a dedicated website for 3D visualization. This allows users to see the 3D models from every desktop or mobile device, as well as augmented (AR) and virtual reality (VR) formats.*

***Results***

*The photorealistic 3D models present the back muscles' anatomy in a volumetric manner, which can be visualized on any computer device. The web 3D features, including AR and VR, allow users to zoom, pan, and rotate the models, which may facilitate learning.*

***Conclusion***

*The technology of photorealistic surface scanning, modern 3D visualization possibilities of web-dedicated formats, as well as advances in AR and VR, have the potential to help with a better understanding of complex anatomy. We believe that this opens the field for further research in the field of medical education.*

1. Nikolova E, Georgiev C, Laleva L, Milev M, Spiriev T, Stoyanov S, Taseva-Mineva T, Mitev V, Todorova A. [Diagnostic, grading and prognostic role of a restricted miRNAs signature in primary and metastatic brain tumours. Discussion on their therapeutic perspectives.](https://pubmed.ncbi.nlm.nih.gov/35064290/) Mol Genet Genomics. 2022 Mar;297(2):357-371. doi: 10.1007/s00438-021-01851-5. Epub 2022 Jan 21.PMID: 35064290 **6,66 *точки***

 *At present, brain tumours remain one of the “hard-to-treat” malignancies with minimal improvement in patients’ survival. Recently, miRNAs have been shown to correlate with oncogenesis and metastasis and have been investigated as potential biomarkers for diagnosis, prognosis and therapy prediction in different brain malignancies. The aim of the current study was to select an accurate and affordable brain tumour detection and grading approach. In the present study, we analysed the applicability of a restricted miRNA signature that could differentiate among patients with primary as well as metastatic brain tumours. Fresh tumour tissues were collected from Bulgarian patients (n = 38), including high-grade gliomas (n = 23), low-grade gliomas (n = 10) and brain metastases (n = 5) from lung cancer. Total RNAs enriched with microRNAs were isolated and differentially expressed miRNAs were analyzed by RT-qPCR using TaqMan Advanced miRNA assay. We selected a signature of miR-21, miR-10b, miR-7, miR-491 that showed good diagnostic potential in high-grade gliomas, low-grade gliomas and brain metastases compared with normal brain tissues. Our results showed that miR-10b could reliably differentiate brain metastases from high-grade gliomas, while miR-491 could distinguish low-grade from high-grade gliomas and brain metastases from low-grade gliomas. We observed that miR-21 and miR-7 correlated with disease recurrence, survival status and the Karnofsky Performance Status. The selected signature of miR-7, miR-21, miR-10b and miR-491 could be used as a highly accurate diagnostic, grading and prognostic biomarker in differentiating various types of brain tumours. Our data suggest that the 4-miRNAs signature could be further analysed for predicting treatment response and for future miRs-based targeted therapy. The ongoing studies on miRs-based targeted therapy related to our selected miRNA signature are also reviewed.*

1. Spiriev T, LalevaL, AlioskiN, DobrikovR, Gelev V, MilevM, Nakov V. Contrast induced neurotoxicity presented as transient cortical blindness after stent assisted coiling of a medium sized incidental basilar artery aneurysm. Case report and review of the literature. Surg Neurol Int 2022 (in press) **8,57 *точки***

**Background:** Contrast-induced neurotoxicity is a rare event after endovascular diagnostic procedures or interventions and presents as transient neurological deficit. Herewith, we present a case of reversible complete cortical blindness after uneventful stent-assisted coiling of a medium-sized unruptured basilar artery aneurysm.

**Case Description:** A 70-year-old woman with a medium-sized 10 mm/6 mm wide neck basilar tip aneurysm was planned for endovascular obliteration of the lesion. e procedure was done under general anesthesia. e contrast agent was iso-osmolar, nonionic. e aneurysm was coiled, and a stent was placed in the left posterior cerebral artery achieving sufficient aneurysm packing. No signs of vessel obliteration were observed during the procedure. On awakening of anesthesia, the patient reported complete visual loss. Ophthalmological examination was normal. e patient was brought back to the angio-suite but there were no signs of parent vessel compromise from the endovascular implants or distal vessel occlusion. An MRI of the brain was done showing no signs of brain ischemia, just mild brain edema in both occipital lobes. Given the results of the radiological studies and clinical presentation, the diagnosis of contrast-induced neurotoxicity was accepted. In 72 h, the patient had complete resolution of the visual loss and was discharged home with no additional neurological worsening.

**Conclusion:** Contrast-induced neurotoxicity is a rare event that can occur after uneventful endovascular interventions of the brain vessels. Knowledge of this rare complication, after exclusion of all other possible reversible causes, is important for the treatment and prognosis of the patient.

1. Spiriev T, MilevM, StoyanovS, Laleva L, PlachkovI, Staneva M, Nakov V. A rare case of carotid body tumor associated with near complete cerebral sinus thrombosis and idiopathic intracranial hypertension. Management strategy and review of the literature. Surg Neurol Int 2021 Jun 7;12:262. doi: 10.25259/SNI\_170\_2021.**8,57 *точки***

 *Background: Carotid body tumors (CBTs) are rare hypervascular lesions with critical location which makes them very challenging to treat. In rare occasions, compression of the jugular vein from the tumor mass could predispose to progressive thrombosis of intracranial venous sinuses. e latter consequently leads to intracranial hypertension (pseudotumor cerebri) with the accompanying danger to the vision. Herewith, we present our management strategy for this rare presentation of CBTs.*

*Case Description: A 38-year-old woman, with no medical history, was admitted in the emergency unit with acute onset of headache, dizziness, and vomiting. On the diagnostic imaging studies (CT venography and MRI) a near total occlusion of all cerebral venous sinuses and a large CBT (Shambin Type II) were diagnosed. Initially, the patient was treated with anticoagulants for the thrombosis and with lumbo-peritoneal (LP) shunt for the management of pseudotumor cerebri. At a second stage, after resolution of the cerebral sinus thrombosis, the CBT was completely resected under electrophysiological monitoring, without preoperative embolization. At 1-year follow-up, the patient is neurologically intact with functioning LP shunt, patent cerebral venous sinuses, without tumor recurrence.*

*Conclusion: We present a rare case of CBT with intracranial complications, which was managed successfully by staged treatment. Careful study of the preoperative radiological and laboratory data, thorough preoperative planning of the tridimensional lesion anatomy, as well as meticulous microsurgical technique under intraoperative electrophysiological monitoring was essential for the successful outcome of the case.*

1. Laleva L, **Spiriev** T, Dallan I, Prats-Galino A, Catapano G, Nakov V, de Notaris M. [Pure Endoscopic Lateral Orbitotomy Approach to the Cavernous Sinus, Posterior, and Infratemporal Fossae: Anatomic Study.](https://www.ncbi.nlm.nih.gov/pubmed/31143574) J Neurol Surg B Skull Base. 2019 Jun;80(3):295-305. doi: 10.1055/s-0038-1669937. Epub 2018 Sep 6. **8,57 *точки***

Objective The aim of this anatomic study is to describe a fully endoscopic lateral orbitotomy extradural approach to the cavernous sinus, posterior, and infratemporal fossae.
Material and Methods Three prefixed latex-injected head specimens (six orbital exposures) were used in the study. Before and after dissection, a computed tomo- graphy scan was performed on each cadaver head and a neuronavigation system was used to guide the approach. The extent of bone removal and the area of exposure of the targeted corridor were evaluated with the aid of OsiriX software (Pixmeo, Bernex, Switzerland).

Results The lateral orbital approach offers four main endoscopic extradural routes: the anteromedial, posteromedial, posterior, and inferior. The anteromedial route allows a direct route to the optic canal by removal of the anterior clinoid process, whereas the posteromedial route allows for exposure of the lateral wall of the cavernous sinus. The posterior route is targeted to Meckel’s cave and provides access to the posterior cranial fossa by exposure and drilling of the petrous apex, whereas the inferior route gives access to the pterygopalatine and infratemporal fossae by drilling the floor of the middle cranial fossa and the bone between the second and third branches of the trigeminal nerve.

Conclusion The lateral orbitotomy endoscopic approach provides direct access to the cavernous sinus, posterior, and infratemporal fossae. Advantages of the approach include a favorable angle of attack, minimal brain retraction, and the possibility of dissection within the two dural layers of the cavernous sinus without entering its neurovascular compartment.

1. Kehayov I, Nakov V, Kitov B, Zhelyazkov H, Spiriev T (2019) Interhemispheric Transcallosal Transforaminal Approach and Microscopic Third Ventriculostomy for Intraventricular Craniopharyngioma Associated with Asymmetric Hydrocephalus: Case Report and Literature Review. Folia Medica 61(1): 133-137. **12 *точки***

We report on a case of a solid adamantinomatous variant of craniopharyngioma located entirely within the third ventricle causing asymmetric obstructive hydrocephalus in a 43-year-old male patient. The patient complaints included intermittent severe headache and progressive bilateral visual field loss. Initially, the lesion was accessed via the bifrontal interhemispheric translamina terminalis ap- proach but total removal was not possible due to short anterior communicating artery which limited the exposure. In the second stage, we used the right interhemispheric transcallosal transforaminal approach and achieved total tumor removal followed by microscopic third ventriculostomy. The present article discusses the selection of appropriate surgical approach based on concise literature review that provides favorable surgical management of these rare lesions.

1. Nakov V, **Spiriev** T, Stavrev E [How I do it: surgical clipping of vertebrobasilar junction aneurysms through a far-lateral transcondylar approach.](https://www.ncbi.nlm.nih.gov/pubmed/29541887). Acta Neurochir (Wien). 2018 Jun;160(6):1149-1153. doi: 10.1007/s00701-018-3512-1. Epub 2018 Mar 14. **20 *точки***

Abstract

Background Vertebrobasilar junction aneurysms occur rarely, but have a higher rupture rate than supratentoral aneurysms, and higher morbidity and mortality. Their location ventral to the neuroaxis makes them a challenging surgical lesion.
Methods In this paper, we share our experience with the surgical technique for the management of these complex aneurysms. Conclusion An in-depth understanding of the anatomy of these aneurysms, careful preoperative planning, and a meticulous surgical technique, including knowledge of every detail of the procedure—positioning, an advanced skull base technique, and careful aneurysm dissection and clipping—is essential for a successful outcome of the surgery.

1. de Notaris M, Laleva L, **Spiriev** T, Dallan I, Di Nuzzo G, Pineda J, Prats-Galino A, Catapano G. [Frontolateral Approach Combined with Endoscopic Endonasal Extradural Posterior Clinoidectomy to the Upper Clival Region: Anatomic and Feasibility Study.](https://www.ncbi.nlm.nih.gov/pubmed/29269065) World Neurosurg. 2018 Mar;111:86-93. doi: 10.1016/j.wneu.2017.12.047. Epub 2017 Dec 19. **7,5 *точки***

- BACKGROUND: Surgical management of lesions located in the upper clival region is challenging. Complex open transcranial approaches have been used to reach surgical targets in these areas. The frontotemporozygomatic approach combined with an intradural posterior clinoidectomy has been proposed as the most reliable route to manage such lesions. We investigated combining a minimally invasive endoscopic endonasal extradural posterior clinoidectomy (EPC) with a standard frontolateral approach to expand the working area within the upper clival region.

- METHODS: Investigators dissected 10 human cadaveric heads at the Laboratory of Surgical NeuroAnatomy of the University of Barcelona. The heads were positioned to simulate a supine position, enabling the simultaneous use of both endonasal and frontolateral routes. The dissections were divided into 3 steps—standard frontolateral approach, EPC, and re-evaluation of the frontolateral route—aiming to compare the surgical exposure before and after EPC.

- RESULTS: After EPC, through the frontolateral pathway it was possible to improve visualization and working angles to the interpeduncular fossa and retrosellar and upper clival regions. Increase in extension of the carotid-oculomotor window was 7 mm and 10 mm before and after the poste- rior clinoidectomy, respectively.

- CONCLUSIONS: EPC provided extra working space for the frontolateral approach to the upper clival area with 42.8% expansion of the carotid-oculomotor triangle. Surgical series

are needed to demonstrate clinical advantages and disad- vantages of this novel combined approach.

1. Spiriev T, Ebner F, Hirt B, Shiozawa T, Gleiser C, Tatagiba M, Herlan S.Fronto-temporal branch of facial nerve within the interfascial fat pad: is the interfascial dissection really safe? Acta Neurochir (Wien). 2016 Mar;158(3):527-32. doi: 10.1007/s00701-016-2711-x. Epub 2016 Jan 23. **8,57 *точки***

*Abstract*

*Background The study was conducted to clarify the presence or absence of fronto-temporal branches (FTB) of the facial nerve within the interfascial (between the superficial and deep leaflet of the temporalis fascia) fat pad.*

*Methods Eight formalin-fixed cadaveric heads (16 sides) were used in the study. The course of the facial nerve and the FTB was dissected in its individual tissue planes and followed from the stylomastoid foramen to the frontal region. Results In the fronto-temporal region, above the zygomatic arch, FTB gives several small twigs running anteriorly in the fat pad above the superficial temporalis fascia and a branch within the temporo-parietal fascia (TPF) to the muscles of the forehead. There were no twigs of the FTB within the interfascial fat pad.*

*Conclusions No branches of the FTB are found in the interfascial (between the superficial and deep leaflet of the temporalis fascia) fat pad. The interfascial dissection can be safely performed without risk of injury to the FTB and poten- tial subsequent frontalis palsy.*

1. Spiriev T, Poulsgaard L, Fugleholm K. One Piece Orbitozygomatic Approach Based on the Sphenoid Keyhole: Anatomical Study J Neurol Surg B Skull Base. J Neurol Surg B Skull Base. 2016 Jun;77(3):199-206. doi: 10.1055/s-0035-1564590. Epub 2015 Oct 8. **20 *точки***

The one-piece orbitozygomatic (OZ) approach is traditionally based on the McCarty keyhole. Here, we present the use of the sphenoid ridge keyhole and its possible advantages as a keyhole for the one-piece OZ approach. Using transillumination technique the osteology of the sphenoid ridge was examined on 20 anatomical dry skull specimens. The results were applied to one-piece OZ approaches performed on freshly frozen cadaver heads. We defined the center of the sphenoid ridge keyhole as a superficial projection on the lateral skull surface of the most anterior and thickest part of the sphenoid ridge. It was located 22 mm (standard deviation [SD], 0.22 mm) from the superior temporal line; 10.7 mm (SD, 0.08 mm) posterior and 7.1 mm (SD, 0.22 mm) inferior to the frontozygomatic suture. The sphenoid ridge burr hole provides exposure of frontal, temporal dura as well as periorbita, which is essential for the later bone cuts. There is direct access to removal of the thickest (sphenoidal) part of the orbital roof, after which the paper-thin (frontal) part of the orbital roof is easily fractured. The sphenoid ridge is an easily identifiable landmark on the lateral skull surface, located below the usual placement of the McCarty keyhole, with comparative exposure.

1. Spiriev T, Poulsgaard L, Fugleholm K. Techniques for Preservation of the Frontotemporal Branch of Facial Nerve during Orbitozygomatic Approaches. J Neurol Surg B Skull Base. 2015 Jun;76 (3):189-94. doi: 10.1055/s-0034-1396599. Epub 2014 Dec 24. **20 *точки***

Background During orbitozygomatic (OZ) approaches, the frontotemporal branch (FTB) of the facial nerve is exposed to injury if proper measures are not taken. This article describes in detail the nuances of the two most common techniques (interfascial and subfascial dissection).

Design The FTB of the facial nerve was dissected and followed in its tissue planes on fresh-frozen cadaver heads. The interfascial and subfascial dissections were performed, and every step was photographed and examined.
Results The interfascial dissection is safe to be started from the most anterior part of the superior temporal line and followed to the root of the zygoma. The dissection is continued on the deep temporalis fascia (DTF), and the interfascial fat pad is elevated. With the subfascial dissection, both the superficial temporalis fascia and the DTF are elevated. The interfascial dissection exposes the zygomatic arch directly, whereas the subfascial dissection requires an additional cut on the DTF to expose the zygomatic arch. Proper subperiosteal dissection on the zygomatic arch is another important step in FTB preservation.

Conclusion Detailed understanding of the complex relationship of the tissue planes in the frontotemporal region is needed to perform OZ exposures safely.

1. Romano A, Chibbaro S, Marsella M, Oretti G, Spiriev T, Iaccarino C, Servadei F. *Combined Endoscopic Transsphenoidal-Transventricular approach to excise a Giant Pituitary Macroadenoma.* World Neurosurg. Jul. 2010; 74(1). 161-4 **8,57 *точки***

OBJECTIVES: Sellar lesions, such as pituitary adenomas, even when extended to the suprasellar space may be usually removed through a trans-sphenoidal approach. Larger lesions extending well beyond the edges of the sellar diaphragm such as giant adenomas are best controlled with craniotomy and/or a combined approach that implies both, transphenoidal and transcranial route. Currently, the availability of more sophisticated endoscopes in this type of surgery has provided optimal angles of view and rendered the trans-sphenoidal route less invasive yet, more effective.

 CASE DESCRIPTION: The authors report a case of a giant pituitary adenoma successfully managed by a simultaneous, combined endoscopic trans-sphenoi- dal-transventricular approach.

 CONCLUSION: In selected case of giant pituitary adenoma with ventricular extension, this technique may help to achieve a gross total removal avoiding the need of staged procedures allowing also a direct visualization of the extent of removal. Finally this approach can potentially improve gross total resection rate of different types of tumor involving this region such as cranipharyngiomas while reducing morbidity and mortality.

1. Shamov T, Spiriev T, Tzvetanov P, Petkov A. The combination of neuronavigation with transcranial magnetic stimulation for treatment of opercular gliomas of the dominant brain hemisphere. Clin Neurol Neurosurg. 2010 Oct;112(8):672-7. Epub 2010 Jun 9. **15 *точки***

Objective: The objective of this study is to investigate the application of transcranial magnetic stimu- lation combined with neuronavigation for preoperative mapping of the language area in neurosurgical interventions on the opercular area of the dominant hemisphere.
Methods: Five patients were operated upon gliomas in the opercular area. For localization of the speech area a transcranial magnetic stimulator MEDTRONIC-MagPro was used. BrainLAB-VectorVision Neuron- avigation system was utilized for precise planning of the operative approach.

Results: Gross total resection was achieved in all patients. Three-month postoperative follow-up was done. Three of the patients had a transient postoperative motor aphasia which resolved within 1 month. Conclusion: This method is useful for preoperative localization of the speech area, as well as preoperative planning of the operative approach and intra-operative planning of the direction of brain retraction and operative corridor.

1. Enchev Y, Tzekov C, Ferdinandov D, Cekov A, Spiriev T Neuronavigation in cranioorbital neurosurgery - do we really need it? Turk Neurosurg. 2011;21(2):119-26 **12 точки**

ABSTRACT

AIm: The value of neuronavigation in cranioorbital neurosurgery is controversial and relatively unstudied. The aim of this study was to evaluate the application, the usefulness and the reliability of neuronavigation in the neurosurgical treatment of orbital tumours.

mAterIAl and methOds: A frameless armless infrared-based neuronavigation system was applied in the microsurgical removal of 7 orbital tumors. Image guidance was CT-based in 3 cases, MRI-based in another 3 cases and based on image fusion between CT and MRI image sets in one patient. The extradural fronto-orbital approach was performed in 3 cases, lateral orbitotomy in 2 cases, trans-supraciliar approach in 1 case and inferomedial orbitotomy in 1 case.

results: The surgical procedures were successful in all cases. The procedure-related morbidity and mortality rate in the series was zero. The registration accuracy of the neuronavigation ranged between 1.0 and 1.7 mm, with an average of 1.3 mm. Neuronavigated image guidance was evaluated as useful in all patients. Total tumour removal was achieved in 5 patients and partial tumour excision in 1 case. One patient was only biopsied.

COnClusIOn: Neuronavigation is not a substitute for surgical knowledge and experience, but it is a valuable complement with significant intraoperative potential in cranioorbital surgery.

KeywOrds: Orbital tumours, Neurosurgery, Image-guided neurosurgery, Neuronavigation

1. Spiriev T, Tzekov C, Laleva L, Kostadinova C, Kondoff S, Sandu N, Schaller B; Trigeminocardiac Reflex Examination Group (TCREG). Central trigeminocardiac reflex in pediatric neurosurgery: a case report and review of the literature. J Med Case Rep. 2012 Oct 30;6:372. doi: 10.1186/1752-1947-6-372. **8,57 *точки***

Abstract

Introduction: Trigeminocardiac reflex is a well-known phenomenon in neurosurgery, craniofacial surgery, ophthalmology and interventional neuroradiology. Even though the trigeminocardiac reflex has become an important factor in skull base surgery and neurosurgery, the central form of trigeminocardiac reflex has only been described in adult subpopulations until now.

Case presentation: We present a clear form of repetitive trigeminocardiac reflex expressed during revision surgery of a giant (110×61mm) right temporoparietal meningioma in an 18-month-old male Caucasian patient. After cessation of the surgical stimulus, his heart rate and mean arterial blood pressure returned to normal physiological levels. The further follow-up was uneventful.

Conclusion: Our case demonstrates that the central trigeminocardiac reflex also exists in pediatric patients, especially if manipulating trigeminal innervated structures or around the nerve itself. Whether the incidence and the behavior of the trigeminocardiac reflex is similar in pediatric neurosurgery compared with adult patients has to be shown in further studies.

1. Spiriev T, Sandu N, Kondoff S, Tzekov C, Schaller B. Tic and autonomic symptoms. J Neurosurg. 2012 Jun;116(6):1397-8; **12 *точки***

*Letter to the editor, no abstract available*

1. Spiriev T, Prabhakar H, Sandu N, Tzekov C, Kondoff S, Laleva L, Schaller B. Use of hydrogen peroxide in neurosurgery: case series of cardiovascular complications. JRSM Short Rep. 2012 Jan;3(1):6. doi: 10.1258/shorts.2011.011094. Epub 2012 Jan 24. **8,57 *точки***

Summary

Objectives Postoperative complications induced by hydrogen peroxide (H2O2) are described in the neurosurgical literature and mainly involve oxygen venous emboli, postoperative pneumocephalus; some of them even fatal. However, recently there are more and more published case reports for significant cardiac dysrhythmia related to the use of this chemical agent during routine neurosurgical interventions.

Retrospective, two-centre study.

Retrospective review of clinical/radiological documentation (including preoperative medical history, operation report and intraoperative anesthesiology data charts).

Patients scheduled for cranial neurosurgical

Main outcome measures Intraoperative occurrence of trigeminocardiac reflex (TCR), according the earlier defined by our group criteria, or other severe cardiovascular complications related to the intraoperative use of H2O2.

Results Five cases were included in the study fulfilling the strict inclusion/exclusion criteria. Two of the cases were recognized as intraoperative TCR, in the other three cases the cardiovascular effects were possibly due to TCR in one, mechanical stimulation of vital centre in anterior hypothalamus, brainstem, or either mechanical or thermal action of H2O2.

Conclusions According to this two-centre study, we can give, for the first time, evidence that cardiovascular complications according to the intraoperative use of H2O2 in neurosurgery are not rare with an incidence of 3%. Special reference is given to the occurrence of the TCR in this context

1. J.F. Cornelius, B. George, D. N’dri, T. Spiriev, H.J. Steiger, D. Hänggi. Bow-hunter’s syndrome caused by dynamic vertebral artery stenosis at the cranio-cervical junction – A management algorithm based on a systematic review and a clinical series Neurosurg Rev. 2011 July 26 **10 *точки***

Abstract Bow hunter's syndrome (BHS) is defined as symptomatic, vertebro-basilar insufficiency caused by mechanical occlusion of the vertebral artery (VA) at the atlanto-axial level during head rotation. In the literature, about 40 cases have been reported. However, due to the rarity of this pathology, there are no guidelines for diagnosis and treatment. Conservative, surgical, and endovascular concepts have been proposed. In order to work out an algorithm, we performed a systematic review of the literature and a retrospective analysis of patients, which have been treated in our institutions over the last decade. The clinical series was comprised of five patients. The symptoms ranged from transient vertigo to posterior circulation stroke. Diagnosis was established by dynamic angiography. In all patients, the VA was decompressed; one patient required additional fusion. The clinical and

radiological results were good, and the treatment-related morbidity was low. The literature review demonstrated that Bow hunter's syndrome is a rare pathology but associated with a pathognomonic and serious clinical presentation. The gold standard of diagnosis is dynamic angiography, and patients were well managed with tailored vertebral artery decompression. By this management, clinical and radiological results were excellent and the treatment- related morbidity was low.

1. Spiriev T, Laleva L. Evidence Based Indications For The Use Of Corticosteroids In The Treatment Of Brain Edema In Neurosurgery.Review Of The Literature. Bulg Neurosurg, 2014, 19(1-2) **15 *точки***

**Резюме**

*Въведение:* Кортикостероидите, особено дексаметазон, поради своето слабо минералокортикоидно действие, традиционно са едни от най-често използваните медикаменти в неврохирургията в лечението на мозъчен оток от различна генеза: общомозъчен едем след тежка черепно-мозъчна травма, лечение на мозъчен оток след нетравматичен интрапаренхимен мозъчен кръвоизлив, общомозъчен едем след субарахноиден кръвоизлив, мозъчен едем при интра/екстрааксиални тумори и метастази. Настоящата статия цели да представи литературен обзор по темата.

*Материал и методи:* Систематичен преглед на литературата в PUBMED за значението на кортикостероиди при посочените по-горе заболявания. Селектирани са проучвания с висока степен на доказателствени резултати (Клас I, II; Категория I, II).
*Резултати:* Кортикостероидите повлияват само състояния характеризиращи се с вазогенен тип мозъчен оток. Приложението им във високи дози, продължително време е свързано със значителни странични действия, които имат пряк негативен ефект върху изхода от заболяването.

*Заключение:* Употребата на кортикостероиди (в частност дексаметазон) е ограничена само при мозъчен оток породен от интрапаренхимни първични мозъчни тумори и метастази, и в много по-малка степен при големи менингиоми със значителен колатерален едем. Оптималната доза е 10 мг и.в. последвана от 4 мг на всеки 6 часа (4х4мг).

**Ключови думи:** Кортикостероиди, дексаметазон, мозъчен оток, черепно-мозъчна травма, интрапаренхимен мозъчен кръвоизлив, субарахноиден кръвоизлив, мозъчни тумори.

1. Spiriev T, Lili Laleva L, The Role Of Corticosteroids In The Treatment Of Traumatic Spinal Cord Injury – Real Effect Or Real Damage? Review Of The Literature Bulg Neurosurg, 2012, 17(1-2) **15 *точки***

*Цел:* През деветдесетте години на миналия век приложението на метилпреднизолон в лечението на остра гръбначно мозъчна травма (до 3-ти час след инцидента: 30 мг/кг болусно приложение за 15 мин, последвана от 5.4 мг/кг/час инфузия за 23 часа; между 3-ти до 8-ми час след травмата приложението на метилпреднизолон трябва да продължи за 48 часа; след 8-ми час от травмата метилпреднизолон не се прилага) се превръща в стандарт след публикуваните резултати от Националните Проучвания за Остра Увреда на Гръбначния Мозък II и III (National Acute Spinal Cord Injury Study- NASCIS II & III). Настоящата статия цели да представи литературен обзор по темата. *Материал и методи:* Преглед на литературата в PUBMED.
*Резултати:* Въпреки положителни данни за изхода от заболяването представени в проучванията NASCIS II и III, тези резултати не са повторени от други сходни публикации използвали тези протоколи. От друга страна има данни за сериозни странични ефекти и усложнения от приложението на високи дози метилпреднизолон при болни с гръбначно-мозъчна травма.
*Заключение:* Няма убедителни доказателства, че приложението на кортикостероиди според NASCIS II и III протокола има положителен ефект върху неврологичния изход след гръбначно-мозъчна травма.