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## The open access video collection project" Hernesniemi's 1001 and more microsurgical videos of Neurosurgery"

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## Original Article

# The open access video collection project “Hernesniemi’s 1001 and more microsurgical videos of Neurosurgery”: A legacy for educational purposes

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## Abstract

**Background:** Neurosurgical educational programs and courses are helpful to improve the quality of training. Moreover, nowadays, online activities may represent a very useful tool to globally enhance neurosurgical education. The “Hernesniemi’s 1001 and more microneurosurgical videos” project aims to show the microsurgical style developed by the senior author and his TEAMS in more than 40 years of experience.

**Methods:** More than 1100 high-definition videos of microneurosurgical operations performed by the senior author were carefully edited. These videos illustrate the philosophy of “simple, clean, fast and preserving the normal anatomy” while offering a step by step guide of different neurosurgical procedures.

**Results:** All the aforementioned material is well organized in an electronic videobook, freely available in Surgical Neurology International. The book also includes comments of great current neurosurgeons and writings of the authors and editors.

**Conclusion:** We are sure that our project will be able to instill in and spread across the neurosurgical community the microneurosurgical style of the senior author, thus representing an efficient educational tool for surgeons all around the world.

**Key Words:** Educational tool, microsurgical video, Neurosurgery, neurosurgical training, video-book

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## INTRODUCTION

Neurosurgical educational programs and courses aim to improve the quality of training and preparation for the care of neurosurgical patients. The continuous development and improvement of these programs is paramount, in particular, in low- and middle-income countries.<sup>[2]</sup>

Even though exchange programs with more developed neurosurgical centers and/or donations of equipment

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are classic ways to improve the quality of neurosurgical services, nowadays online educational activities such as practical workshops, surgical videos, topic-specific lectures, and online case discussions represent very useful educational tools to enhance surgical decision-making.<sup>[20]</sup>

In this regard, we believe that in future, videobooks will replace, at least partially, the classic written handbooks, thus helping accelerate the training and shortening the learning curve of the new generation of doctors. Edited surgical videos may offer a step by step illustration of different surgical operations, thus representing a helpful guide for surgeons all around the world.

“Hernesniemi’s 1001 and more microneurosurgical videos – videobook of Neurosurgery” is a great open access project that was born from an idea of the senior author (J.H.) while looking for a way to transmit us his legacy, which comes from more than 40 years of neurosurgical experience. This project is about the microneurosurgical style developed by the senior author and his TEAMs in Kuopio and later since 1997 in Helsinki.<sup>[7,10,23]</sup>

Our effort is to show openly, through the open access journal Surgical Neurology International, our neurosurgical principles and operations to the neurosurgical community, in particular to those who, for economic or other reasons, may not travel and visit highly specialized neurosurgical centers for educational purposes.

## MATERIALS AND METHODS

More than 1100 microsurgical videos of neurosurgery (1190 videos to be more precise) were edited by skillful video editors, mainly neurosurgical fellows of Helsinki Neurosurgery. The project includes mostly high-definition videos recorded between 2010 and 2015.

The edited videos are divided into five groups: (1) Short and (2) long version videos, up to 5 and 20 minutes, respectively; (3) Surgical approaches, which clearly illustrate the philosophy “simple, clean, fast, and preserving the normal anatomy;” (4) Tricks and pearls, showing some special and useful tricks and pearls which represent important techniques of Professor Hernesniemi’s neurosurgical armamentarium; and (5) Bypass procedures, indispensable techniques for a neurosurgeon who wants to get a high level of skill. The first two groups are classified according to the frequency of the treated pathologies, thereby the subgroups inside each folder are: (1) brain aneurysms; (2) arteriovenous malformations; (3) cavernous malformations; (4) tumors and intracranial expansive lesions; (5) and spinal diseases.

The videos, 1130 up to now, were uploaded to Vimeo, a video sharing site that supports high-definition videos,

by an account of the open access neurosurgical journal Surgical Neurology International.

As written in previous papers, except for bypass procedures, the main tools to adequately perform microneurosurgical operations are: (1) a basic microsurgical set of 11 instruments [four bipolar forceps (longer and short, sharp and blunt tipped), microdissector, straight microscissors, aneurysm clip applicator, straight blunt steel needle for irrigation, and three suction tubes (long, medium size, and short)] plus some ring tip forceps for tumor surgery; (2) a highly mobile operating microscope with good magnification and illumination, equipped with a mouth switch and allowing intra operative indocyanine green video-angiography; (3) high speed drill with a trephine and a craniotomy blade, a cutting ball tips, and a diamond ball tips; (4) a Sugita Head Frame, and a Mayfield Head Frame; (5) an intraoperative microvascular Doppler ultrasound; (6) Tachosil, fibrin glue sealant and fibrillar surgical, needed to maintain a clean surgical field; and (7) Neuronavigation, an important tool for subcortical lesions with not defined anatomic landmarks, as well as for distal middle cerebral artery and distal anterior cerebral artery aneurysms.<sup>[3-6,10,21,23]</sup>

In experienced hands, a minimal retraction may be carried out using the suction tube and/or the bipolar forceps.

## RESULTS

All the aforementioned educational material is well organized in an electronic video collection book of Microneurosurgery (Supplementary material, which is also available for free in SNI: <http://surgicalneurologyint.com/wp-content/uploads/2017/04/1001-e-book-1.pdf> and <https://helda.helsinki.fi/handle/10138/195920>), which includes every link of published videos in a well-structured table of contents from where you can directly access each microsurgical video. This book also includes comments of many great current neurosurgeons and writings of the authors and editors [Table 1].

A small but relevant amount of supplementary contents is added to the project. A video describing the department of Neurosurgery in Helsinki University Hospital Inside-Outside is attached. Music by a Peruvian artist designed specially for this project is also linked. We also have videos of prestigious visitors in Helsinki University Hospital; pictures of the development of the Neurosurgical Unit in Trujillo-Peru, 2016; the last surgical case operated by professor Hernesniemi in Helsinki, as well as his farewell party video.

## DISCUSSION

By this educational source, we aim to show to neurosurgeons, neurosurgical fellows, and residents

**Table 1: Sections of the microneurosurgical video collection project**

Video Collection Book sections	
Forewords: Professors: James Ausman; Giuseppe Lanzino; Juha E. Jääskeläinen; Mika Niemelä	
Preface: Juha Hernesniemi	
Letters from neurosurgeons around the world: Robert F. Spetzler, Alexander Kononov, Vinko V. Dolenc, Evandro De Oliveira, Atul Goel, Michael Morgan, Ali F. Krisht, Peter Vajkoczy, Ying Mao & Liang Chen, Rokuya Tanikawa, Luis M. Alvarez Simonetti, Renato Scienza & Giancarlo Perra, Jouke S. Van Popta	
Video editors: Danil A. Kozyrev, Peeraphong Thiarawat, Jane Lau, Roberto Colasanti, Isaac Aguirre Carreno, Kléber Eduardo González Echeverría, Hidetsugu Maekawa	
Founding and supporters for fellowships: Fondation de Luxembourg, Aesculap academy fellowships	
How to become to be a good neurosurgeon: Juha Hernesniemi	
1001 and more microsurgical videos of neurosurgery - process of video edition: Joham Choque-Velasquez	
Microsurgical video-book content	Number of videos
Video introduction	06
1001 and more microsurgical videos of neurosurgery – video advertisement	
Department of Neurosurgery - Helsinki University Hospital, inside-outside	
Some prestigious visitors in Helsinki University Hospital	
Last surgical case of Professor Hernesniemi	
Juha Hernesniemi's farewell party, Helsinki University Hospital	
Developing the Neurosurgical unit "Juha Hernesniemi", Trujillo Peru, 2016	
Short version videos	565
Aneurysms	292
Arteriovenous malformations	33
Cavernous malformations	25
Tumors of the central nervous system	203
Spinal degenerative lesions	12
Long version videos	445
Aneurysms	200
Arteriovenous malformations	39
Cavernous malformations	19
Tumors of the central nervous system	172
Spinal degenerative lesions	15
Surgical approaches	53
Tricks and pearls	55
Bypass procedures (Credit to Professor Rokuya Tanikawa)	19
Supplementary content	
Enrique Galdos Rivas	
Martha Galdos	
Music for 1001 videos project by Martha Galdos, album "Respirare"	

surgical principles based on more than 40 years of experience in the field coming from one of the greatest microneurosurgeons. This video collection project is designed especially for people who work in places where

the development of neurosurgery as a specialization is still at its beginning due to the lack of appropriate resources.

Short version videos were designed for experienced neurosurgeons that will benefit from analyzing how their own surgical style differs from that of Professor Hernesniemi. Most of these videos include only microneurosurgery.

Long version videos were designed especially for young neurosurgeons, and include a more detailed step by step guide to the different phases of the operations from the selected approach to the various microsurgical stages.

With a minimalistic point of view, the approaches are performed with the sufficient and necessary steps. Along his career, Professor Hernesniemi could progressively reduce and simplify every procedure at its maximum expression: almost all the different surgical approaches are performed in less than 25 minutes, except some lateral approach to the foramen magnum for low located vertebrobasilar aneurysms or tumors. Special attention was paid for the presigmoid approach, which has been so far the longest lasting approach used by Juha Hernesniemi in cases of aneurysms located extremely low below the posterior clinoid process, as well as for lesions extending to both middle and posterior fossae, petroclival tumors or Bypass procedures from P2. Currently, this approach is performed in less than one hour and requires just a burr hole at the most cranial part of the temporal bone.<sup>[22]</sup>

The many "tricks and pearls" may be of great help for solving tedious problems whereas operating on, making the surgical procedures simpler and faster. They will surely be an important training tool for many neurosurgeons.<sup>[5,6,8,9,11,12,14-16,22]</sup>

A big project about microvascular Neurosurgery cannot miss bypass techniques. The big amount of them were edited from the master surgeries that Professor Rokuya Tanikawa performed in Helsinki Hospital during his many visits. These videos include the main steps of the bypass procedures.<sup>[19]</sup>

The general philosophy of Helsinki Neurosurgery is summarized in the principle "Simple, clean, fast and safe". To make high quality procedures in short surgical times, "Simple" implies achieving the goal by the minimal effort, doing only what is really necessary. "Clean" involves preventing the bleedings, as well as a good hemostasis and the use of saline irrigation. "Fast and safe" are the result of the aforementioned factors, together with precise and fluent movements, respecting natural tissue boundaries and cleavage planes, under high magnification.<sup>[10,23]</sup>

Certainly, any video material could not replace a real-time surgery and all the instances and circumstances involved performing a procedure. On the other hand, it

is certainly not possible for every neurosurgeon to visit high-specialized neurosurgical center to improve his/her skills.

Professor MG Yasargil was the first neurosurgeon who recorded and collected his microsurgical cases. Currently, similar projects are published in the literature, such as the “Video Atlas of Neurosurgery: Contemporary Tumor and Skull Base Surgery” published by Quiñones-Hinojosa, which is a resource with 40 procedural videos and a concise companion book to reinforce the understanding of the material.<sup>[1]</sup> The Neurosurgical Atlas by Aaron Cohen-Gadol, with its 210 videos, represents another interesting website designed for educational purposes.<sup>[18]</sup>

Moreover, nowadays, important journals of neurosurgery have collections in video sharing sites such as Youtube. Journal of Neurosurgery: Neurosurgical Focus with 162 videos,<sup>[13]</sup> and NEUROSURGERY Journal with 361 videos<sup>[17]</sup> are examples of projects with the same aim.

All these projects required enormous efforts and strong perseverance to collect, and edit the surgical material. Our work is based on a systematic structure, and aims to illustrate more than 40 years of experience of the same surgeon, which performed almost all the cases. 1100 microsurgical videos carried out per the same principles represent an incomparable opportunity to learn a style of microneurosurgery.

## CONCLUSION

We are sure that our video-collection book of Neurosurgery “Hernesniemi’s 1001 and more microneurosurgical videos” is an extremely useful educational material, which will be able to instill in and spread across the neurosurgical community the microneurosurgical principles of the senior author.

## Financial support and sponsorship

Aesculap Academy supported the printing of the books, Ehnrooth foundation supported the fellowships, and Surgical Neurology International uploaded the videos in the video share site VIMEO.

## Conflicts of interest

There are no conflicts of interest.

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