



"The tools used by the surgeon must be adapted to the task – and where the human brain is concerned, they cannot be too refined."

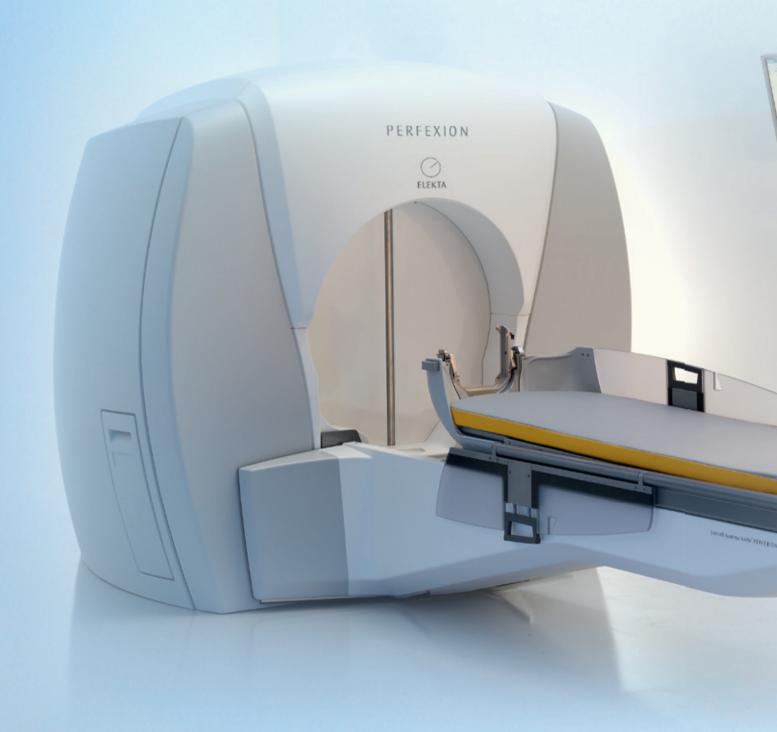
PROFESSOR LARS LEKSELL (1908 – 1986)

More than 70,000 patients undergo Gamma Knife® surgery every year.

Why do medical professionals and patients prefer Gamma Knife surgery?

Pioneering knowledge, insight from physicians, meticulous research and cutting-edge technology – this is Gamma Knife surgery. No matter how complex or intricate the clinical challenge, Gamma Knife surgery delivers the highest levels of physician and patient satisfaction.

This makes it the treatment of choice at leading hospitals and clinics around the world.



Leksell Gamma Knife, the gold standard in radiosurgery, has undergone an unprecedented transformation, retaining all the characteristics of earlier systems but with the additional ground-breaking capabilities of a revolutionary radiosurgery platform – Leksell Gamma Knife® Perfexion $^{\text{TM}}$.



Elekta perfects the art and science of stereotactic radiosurgery

Pioneered by Elekta, stereotactic radiosurgery involves delivering a single, high dose of radiation to a small and critically located target in the brain. This principle defines Gamma Knife surgery.

Gamma Knife surgery has replaced the scalpel in intracranial neurosurgery. And, by doing so, it has dramatically widened treatment possibilities for physicians and patients.

Exceeding expectations

Leksell Gamma Knife is specifically designed for non-invasive procedures. Gamma Knife surgery provides pinpoint accuracy, unmatched efficiency and outstanding results. Patients benefit from fast, painless treatment, often conducted in an outpatient surgical setting without the need for general anesthesia or even conva-

lescence. To date, about 700,000 patients have undergone Gamma Knife surgery.

New standard for radiosurgery

Elekta's latest achievement epitomizes ground-breaking innovation – Leksell Gamma Knife Perfexion.

This new integrated system, with its revolutionary design, provides full cranial reach. The system is built to deliver outstanding patient and staff comfort and better dosimetry performance than any other radiosurgical system.

Leksell Gamma Knife Perfexion – the system that fuses the skills of the physician with the science of radiosurgery.

The ultimate cranial radiosurgical tool – Leksell Gamma Knife® Perfexion™



Leksell Gamma Knife Perfexion is designed to irradiate targets in the brain.

Leksell Gamma Knife is consistently regarded as the best non-invasive treatment for brain disorders. So how did we make the best even better? By listening to experts in radiosurgery and then creating Leksell Gamma Knife Perfexion.

One-button automation

The system offers physicians a fully automated, single pushbutton approach to operations that translates into dramatic time savings. The cutting-edge design radically expands treatment reach to cover a wider range of anatomical structures.

Full reproducibility

Leksell Gamma Knife Perfexion offers protocol reproducibility with full backward compatibility to existing Gamma Knife surgery protocols. That means building on the treatment experience of over 700,000 patients and 3,000 peer-reviewed papers.

Robotic efficiency

With Leksell Gamma Knife Perfexion, the multiple helmets have been replaced with a single robotic system with three collimator sizes. Because the collimator size automatically changes, according to the treatment plan, treatment times are radically reduced.

Improved workflow speeds radiosurgery

The system comes complete with Leksell GammaPlan®, the dedicated treatment planning system designed to take full advantage of the features and intelligence incorporated in Leksell Gamma Knife Perfexion.

Composite Shots enable sculpting the dose distribution, which is then delivered with the unmatched accuracy associated with Gamma Knife surgery.

Unrivalled radiation protection

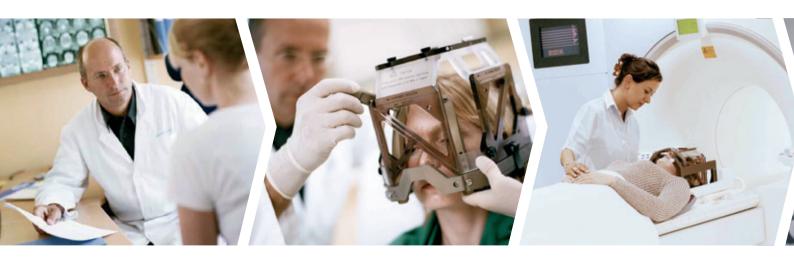
Every feature of Leksell Gamma Knife Perfexion reflects patient and staff safety and comfort. The system provides radiation shielding that is up to 100 times better than alternative technologies.

Room radiation levels are low enough to allow for a window into the treatment room and the system can be accommodated within a normal-sized room. "Leksell Gamma Knife Perfexion is a quantum leap in dosimetry and ease of use, as well as patient and staff comfort. By installing the new Gamma Knife at our center, we will be able to provide more conformal treatment options in less time, automate the record and verify procedure. It also dramatically improves patient throughput and can treat lesions which previously could not be reached."

CHRISTER LINDQUIST, MD, DIRECTOR OF THE GAMMA KNIFE CENTRE AT CROMWELL HOSPITAL, LONDON, UK. MEMBER OF THE EXPERT PANEL DURING THE DEVELOPMENT PROCESS OF LEKSELL GAMMA KNIFE PERFEXION.



Smooth and seamless treatment workflow



Diagnosis

Frame Attachment Leksell® Stereotactic Frame is secured to the patient's head throughout the entire treatment procedure to ensure maximum accuracy.

Imaging Images taken immediately before the treatment determine the precise shape, size and location of the target.

Improved workflow with Leksell Gamma Knife Perfexion

- 100% uptime.
- Single run, one push-button, for 99% of all cases.
- Two hours saving per patient compared to previous systems.
- Treatment planning done twice as fast.

Data based on a study of 99 patients, conducted at Hospital La Timone, Marseille, France (July-December 2006) and experience at Cromwell Hospital, London, UK. The ideal treatment procedure for physicians and patients is a single session that is swift, precise and elegant. This is where Gamma Knife surgery, together with the dedicated treatment planning system, excels. Each step in the process works to the highest possible standard of convenience and enables superior clinical efficiency.

Complete integration

The system digitally integrates diagnostic images, treatment planning and dose delivery into a seamless information flow. Finally, the procedure is implemented via a single push-button operation.

Highest comfort and safety

Patient comfort and well-being are priorities at every phase. The entire process is straightforward and the patient is usually ready to return to normal life the next day.

Workflow is so efficient that staff numbers are minimized while physicians' valuable time is optimized.



Treatment planning Images are used to create a tailor-made treatment plan to enable an optimal radiation dose to the target. The treatment plan is then transferred to the Gamma Knife system.



Treatment Targets are automatically irradiated according to the plan.

Throughout the treatment procedure the patient is monitored via the intercom system.



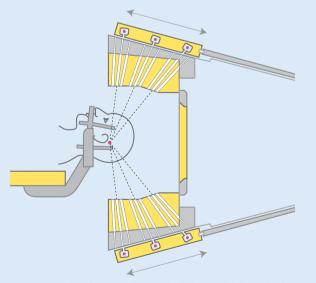
Follow-up The effect of radiosurgery takes place over time.

Gamma Knife surgery - preferred for a reason

With very few exceptions, Gamma Knife surgery is given on a single occasion and without general anesthesia. After Gamma Knife surgery the patient normally leaves the hospital on the same day or the day after, making it a very cost effective alternative to open surgery.

During the procedure, some 200 radiation beams from cobalt-60 sources converge with high accuracy on the target. Each individual beam has low intensity and therefore does not affect the tissue through which it passes on its way to the target. The beams converge in an isocenter where the cumulative radiation intensity becomes extremely high.

By moving the patient's head in relation to the beams' isocenter, the radiation dose can be optimized in relation to the shape and size of the target. The extreme precision of Leksell Gamma Knife, better than



0.5mm, makes it possible to administer a high radiation dose to the lesion with minimal risk of damaging healthy tissue.

Reaching new heights of excellence

1949 Introduction of Leksell Stereotactic System.

1968 First Leksell Gamma Knife prototype for clinical research.

1986 First commercially dedicated Leksell Gamma Knife.

1989 Leksell Gamma Knife Society formed.

1999 Introduction of Leksell Gamma Knife C with APS (Automatic Positioning System™).

2006 Launch of the fifth generation – Leksell Gamma Knife Perfexion.

Over 70 years ago, Professor Lars Leksell discovered that by minimizing surgical intervention in the skull, the mortality rate could be reduced along with the trauma to the patient.

This concept led to the birth of minimally and non-invasive neurosurgery and the inception of Elekta.

Setting the gold standard

It was Professor Leksell who invented the stereotactic frame so fundamental to Gamma Knife surgery. The stereotactic concept of directing beams of X-rays into the brain was used surgically for the first time in 1951. This marks the birth of stereotactic radiosurgery and, with it, Leksell Gamma Knife.

In the 1980s, the first commercial deliveries of Leksell Gamma Knife systems were made. The unsurpassed clinical effectiveness of the treatments conducted saw a dramatic increase in the number of publications. Leksell Gamma Knife soon became the worldwide gold standard for stereotactic brain surgery.

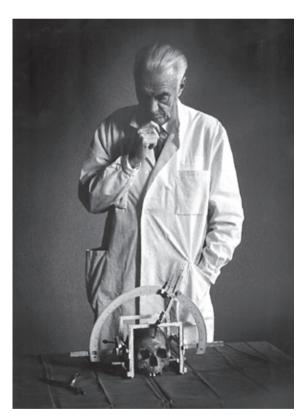
The number of patients to undergo Gamma Knife surgery has risen from about 7,000 patients in 1991 to over 700,000 by 2012. Correspondingly, the number of units installed globally over the last fifteen years has gone from 20 units in 1991, to over 300 units by 2012.

Solutions for tomorrow

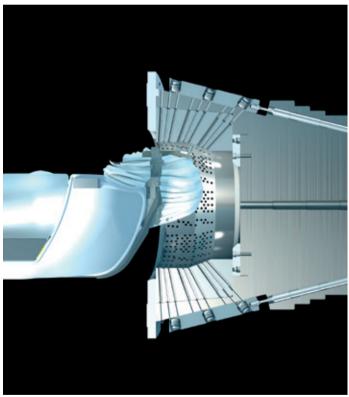
Elekta is continually evolving innovative solutions that redefine the neurological landscape.

Leksell Gamma Knife Perfexion is built with the technology to advance frontiers and deliver on the vision that guided Lars Leksell – to deliver highly effective and efficient treatment, at reasonable cost, with as little trauma to the patient as possible.

"Vision without action is a dream. Action without vision is simply passing the time. Action with vision is making a positive difference."



Professor Leksell with Leksell Stereotactic System® – a revolution in intercranial surgery



The collimator design of Leksell Gamma Knife Perfexion – the latest innovation within stereotactic neurosurgery.

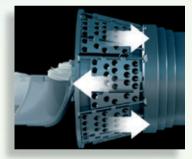


The sophisticated sector mechanism enables automatic collimator configuration within seconds and is designed to deliver high serviceability.

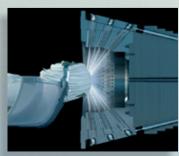


The couch can easily be adjusted for optimal patient comfort.

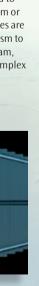
PERFEXION



The collimator system consists of 192 cobalt 60 sources, divided into 8 sectors that can be individually positioned to any of 4 states: 4 mm, 8 mm, 16 mm or off. During treatment, these sources are positioned via the sector mechanism to generate the desired radiation beam, and enable treatment of highly complex structures.



The unique collimator design offers full cranial reach, enabling treatment of a wide range of anatomical structures.

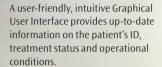




A series of interlocks are incorporated for a well-integrated system with enhanced safety features.



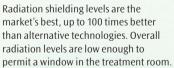
The single button approach enables fast and flexible surgical procedures, saving time and resources even as patients are effectively treated.





The system is developed with reliable, state-of-the-art industrial components for absolute stability, safety and precision.

The patient positioning system is built to be highly robust, accurate and dependable. It moves the patient into the correct position according to the beams' isocenter, thereby optimizing the radiation dose to the target.





The power of planning – Leksell GammaPlan®

Leksell GammaPlan

- Client-server architecture simultaneously supports multiple users to the online patient database.
- All patient data can be accessed remotely via a secured internet connection.
- Supports all imaging modalities (CT, MRI, angio, PET and MEG), also including nonstereotactic image studies.
- Real-time dose calculation.
- Optimized planning of multiple targets.
- Composite Shots enable dose scupting of complex structures.
- Dynamic Shaping protects critical anatomical structures.

The concept behind Leksell GammaPlan® is that it enables the physician to tailor a conformal treatment plan for a specific medical condition.

Leksell GammaPlan has been developed in collaboration with the professionals who actually use the system. This explains why so much attention has been devoted to ensuring true userfriendliness, speed and precision.

Software modules for easier planning

Using the latest technology, Gamma Knife software modules such as Inverse Planning, Re-Treatment and DICOM-RT bring more power to your planning. This opens the platform for future upgrades, while delivering on daily clinical needs for improved workflow, cost efficiency and treatment quality.

Rapid, precise planning

The system makes it possible to plan treatment of one or several lesions with as many isocenters as clinically deemed optimal. This is performed in a matter of minutes. Irradiation of the lesions is then delivered with superior conformity and selectivity.

Optimal tool for planning multiple targets

Based on a new algorithm, using automatic balancing of the radiation dose, the treatment planning of multiple brain metastases is now as easy as planning for a single target.

Composite Shots and Dynamic Shaping

The new collimator design featured in Leksell Gamma Knife
Perfexion enables the most complicated tumors to be treated with absolute precision. Composite
Shots enable dose sculpting of complex structures. And Dynamic Shaping protects critical anatomical structures in the vicinity of the target, thereby enabling a higher dose to the target.

Regardless of complexity

Leksell GammaPlan ensures that the most precise and effective treatment is delivered, regardless of the number and complexity of the targets – so physicians can achieve new heights of patient success.



Proven accuracy in every step

A common definition of accuracy is "the measure of the difference between the desired or planned outcome and a measurable outcome."

Sub-millimeter accuracy results in clinical benefits

Improved quality of life

- Less trauma
- Faster recovery
- Shorter hospital stays
- Fewer surgery-related complications

Improved clinical outcome

- Optimal dose to the target
- Minimum dose exposure to surrounding tissue

There is no other system capable of delivering the standards of accuracy achieved by Leksell Gamma Knife. This is a tested and proven fact.

Elekta guarantees 0.50 mm

In intracranial radiosurgery, clinical accuracy is the sum of the accuracy contributions that make up the entire treatment procedure – imaging, dose planning, patient positioning, radiological and mechanical accuracy.

Elekta guarantees that Leksell Gamma Knife systems will perform with a total radiological accuracy of 0.50 mm when having a valid service agreement. A study of 189 installed systems, based on 332 commissioning protocols, proved an average level of radiological accuracy of 0.15 mm.

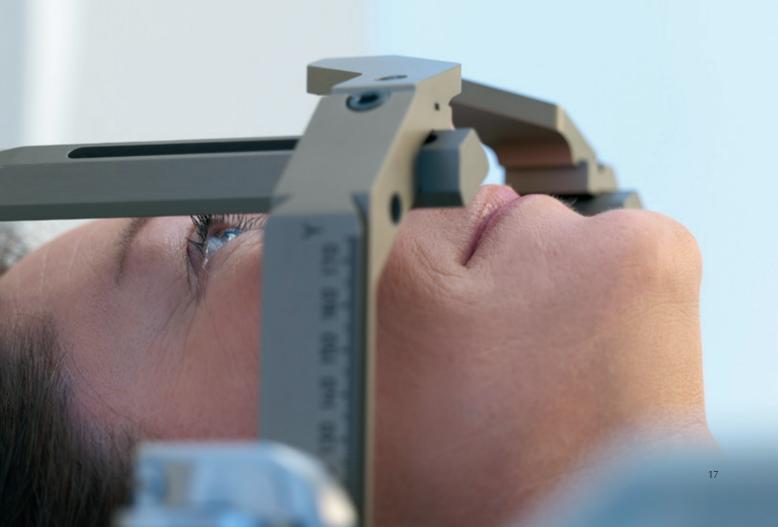
The only true stereotactic system

Only Leksell Gamma Knife offers a true stereotactic system, from the ground up, to facilitate precision with their sheer stability and robustness. Leksell® Coordinate Frame immobilizes the patient's head throughout the procedure.

The entire system comprises the least possible number of moveable components in order to deliver unsurpassed accuracy.

From the very beginning, Elekta has been uncompromising in the levels of accuracy defined and delivered by Leksell Gamma Knife. For the future, unmatched accuracy is assured by Leksell Gamma Knife Perfexion. "As an active user of both Leksell Gamma Knife and linear accelerator stereotactic radiosurgery, my experience has been that Leksell Gamma Knife allows me to achieve unsurpassed treatment accuracy and conformality. Combined with the most user-friendly treatment planning system available, Leksell Gamma Knife is rightfully referred to as the gold standard of radiosurgery."

VOLKER STIEBER, MD, WAKE FOREST UNIVERSITY BAPTIST MEDICAL CENTER
WINSTON-SALEM, NORTH CAROLINA, USA



Gamma Knife® surgery – based on clinical evidence

In today's cost-driven healthcare environment, it's crucial to evaluate expensive technology investments on the basis of hard facts and proven results. This is particularly true when choosing the best care for patients suffering from serious neurological diseases and cancer. In these cases, radiosurgery with Leksell Gamma Knife offers a range of benefits and efficacies fully supported by years of evidence-based medicine.

Proven and documented results

Clinical results for Gamma Knife treatment have been extensively published in peer-reviewed journals, which cite significant increases in successful outcomes. Only Leksell Gamma Knife can

show this long-term performance and how it combines cost-effectiveness with improved quality of life for patients in both curative and palliative care.

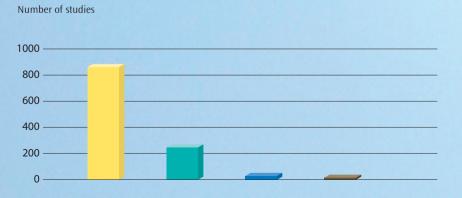
Constantly evolving practice

Gamma Knife surgery is constantly expanding, with ongoing research for new indications and the development of existing protocols. The design of Leksell Gamma Knife makes it especially suitable for treatment of multiple targets, which in most cases means brain metastases.

Nearly 20,000 patients with brain metastases have been documented in scientific papers. With extremely good tumor control rate, few side effects and the ability to treat multiple targets effectively, Gamma Knife surgery occupies a unique position in this field.

With all the clinical and management advantages of Gamma Knife surgery, it has become a preferred method in the care of metastatic disease. The unique ability to treat multiple brain metastases provides new opportunities for the patient to prolong life and gain better quality of life. And with the greater awareness among patients, Gamma Knife surgery is increasingly being requested when it comes to treatment of the brain.

Medical publications with patient data (September 2012)



With more than 3,000 peer-reviewed papers, Gamma Knife surgery has more published data, including more patients than any other SRS/SRT technology.

These graphs include scientific findings from groups of more than 30 patients, covering the most important pathologies for intracranial radiosurgery.

Leksell Gamma Knife

Adapted Linacs

CyberKnife

Novalis

"Our increasing ability to control primary cancers creates increased urgency to detect and treat metastatic lesions. Naturally, we want to do so non-invasively when possible and with a resulting positive impact on quality of life. Leksell Gamma Knife Perfexion, a remarkably sophisticated instrument, can safely and efficiently radiate multiple targets in a single session, and will surely benefit many patients."





The treatment of choice

Today, Gamma Knife surgery is performed in hundreds of leading hospitals and clinics around the world. Around 70,000 patients undergo Gamma Knife surgery every year, and this unique procedure has an impressive scientific track record with more than 70,000 patients documented in peer-reviewed articles. No other method in this field has gained greater clinical acceptance.

Playing a vital role in modern healthcare

With the increasing number of cancer incidence rates and an aging population, Gamma Knife surgery plays an important role in modern healthcare. Hospital management and medical staff choose Leksell Gamma Knife for its extreme accuracy, streamlined workflow and outstanding therapeutic response. It frees resources in the clinic, provides evidence-based medicine, and gives the clinic confidence and reliability.

Gamma Knife surgery helps reduce waiting lists for both

radiation therapy clinics, as well as neurosurgery clinics. And it offers society high quality care for disorders of the brain. Additionally, the short treatment times and rapid recoveries of the patients mean lower costs for the healthcare system and society. Patients get back to work and normal life faster compared to convalescence with open surgery.

Several published studies demonstrate savings of more than 50% of direct costs associated with microsurgery¹. These gains are primarily due to the minimal need for hospitalization and intensive care, as well as the reduction of complications related to open surgery.

Another study shows that one Gamma Knife system can free up to 700 ICU beds per year².

Clinical need for more capacity

Taking the most common Gamma Knife surgery indications into account, approximately 375 people per million are candidates for this treatment.

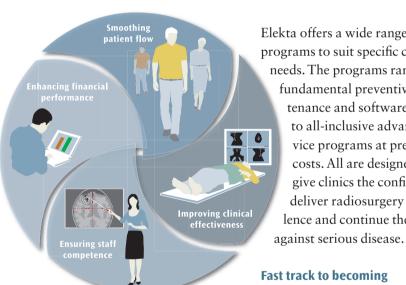
This number will most certainly grow in the future. The number of cancer cases is predicted to increase by 50 percent, to 16 million new cases, by the year 2020³. As 20-40% of all cancer patients develop brain metastases⁴, Leksell Gamma Knife will definitely play an important role in future healthcare.

- van Roijen L, et al. Costs and effects of open surgery versus SRS in treating vestibular schwannoma. Acta Neurochir, 1997.
 - Rutigliano MJ, et al. The cost effectiveness of SRS versus surgical resection in the treatment of solitary metastatic brain tumours. Open Surgery, 1995.
- 2) Netten, et al, Unit at Health & Social Care 1999. University of Kent Canterbury, Hospital and Community Health Service.
- 3) World Cancer Report, World Health Organization.
- 4) American Cancer Society.

More effective treatment of cancer means fewer treatment sessions, shorter hospital stays and less physical, mental and emotional strain for the patient. Additionally, it reduces the overall burden on the healthcare system.



Elekta Lifecycle Services providing the power of excellence



Leksell Gamma Knife Service & Support Programs optimize clinical performance by enhancing safety, minimizing disturbances and enabling a higher patient throughput. Advanced technology and comprehensive expert support ensure the best customer experience and guarantee maximum uptime throughout the lifetime of the equipment.

Elekta offers a wide range of programs to suit specific clinical needs. The programs range from fundamental preventive maintenance and software support to all-inclusive advanced service programs at predictable costs. All are designed to give clinics the confidence to deliver radiosurgery excellence and continue the fight

Fast track to becoming center of excellence

During the first warranty year, Leksell Gamma Knife customers receive a full parts warranty and access to incomparable support and education.

Elekta Warranty, Education & Support Packages allow clinics to boost performance and excel in everyday practice. Start-up is fast, patient-flow smooth and staff confidence enhanced, ensuring maximum uptime and the best customer experience from the very first day.

World-class Education & Training – the best possible start

Elekta offers superior education and training programs for Leksell Gamma Knife users. Courses are based on over 40 years of leading clinical experience, including more than 700,000 treatments at over 300 sites worldwide. Leksell Gamma Knife courses provide confidence and proficiency in use - to maximize return and benefits to patients and clinicians alike.

Elekta Lifecycle Services

- Uptime guaranteed (98%)
- Guaranteed accuracy services
- On-line expert support
- Consultation services
- Program premiums



Flexibility and freedom of choice – a complete product family

Elekta is the world's only radiosurgery solutions provider with a comprehensive range comprising systems, software and services.

These are the components necessary to build and support a stereotactic center of excellence with dedicated solutions for head and body. The breadth of Elekta's portfolio allows a neurosurgery or radiation oncology center to develop a strong reputation based

on exceptional patient care and profitable collaborations.

Leksell Gamma Knife
Perfexion expands the Gamma
Knife range of solutions and offers
endless possibilities within the
field of stereotactic radiosurgery.
Now, healthcare professionals
can choose a solution relevant to
individual price and performance
requirements.



Leksell Gamma Knife® Perfexion™

Leksell Gamma Knife Perfexion represents innovation in the future of stereotactic radiosurgery. The system radically broadens the techniques and the scope of treatments employed. Leksell Gamma Knife Perfexion offers swifter, more flexible surgical procedures, enabling substantially more patients to be treated than ever before.



Leksell Gamma Knife® 4C

Leksell Gamma Knife® 4C meets the needs of hospitals and clinics with a strong patient caseload and offers all the benefits of Gamma Knife surgery to their patients. The built-in robotic APS (Automatic Positioning System™) enables an efficient treatment procedure. Leksell Gamma Knife 4C meets the highest demands of performance, efficiency and economy.



Leksell Gamma Knife® 4

Leksell Gamma Knife 4 has been developed to meet the exacting demands of hospitals and clinics with a small register of patients and an overriding objective of delivering the highest levels of efficiency and security. The system offers all the benefits of Gamma Knife surgery at a very reasonable price.

Leksell Gamma Knife® Society – a collaboration of scientific minds

Each Gamma Knife user receives automatic membership to the prestigious Leksell Gamma Knife Society. Today, this society is an esteemed global network for sharing clinical experience, scientific research and knowledge.

Close collaboration

The Society has over 2,000 active members around the world, who meet at various locations every second year. The proceedings from these meetings are regularly published in The Journal of Neurosurgery. Gamma Knife surgery has an impressive scientific track record with over 3,000 peer-reviewed articles on treatment efficacy, improved quality of life for patients and cost efficiency.

Elekta works very closely with all users, to understand their needs

and learn from their findings. These insights are invaluable for the development of new products.

The successful evolution of Elekta's solution developments over the years is a direct result of close collaboration with the members of the Leksell Gamma Knife Society.



Leksell Gamma Knife Society Meetings

- **1989** 1st International Meeting, Charlottesville, Virginia, USA
- **1990** 2nd International Meeting, Bath, England
- **1991** 3rd International Meeting, Pittsburgh, PA, USA
- 1992 4th International Meeting, Buenos Aires, Argentina
- **1993** 5th International Meeting, Aronsborg, Sweden
- **1994** 6th International Meeting, Kyoto, Japan
- **1995** 7th International Meeting, Lana'i, Hawaii, USA
- 1997 8th International Meeting, Marseille, France
- **1998** 9th International Meeting, Hong Kong
- **2000** 10th International Meeting, Lake Tahoe, California, USA
- **2002** 11th International Meeting, Prague, Czech Republic
- **2004** 12th International Meeting, Vienna, Austria
- **2006** 13th International Meeting, Seoul, Republic of Korea
- 2008 14th International Meeting, Quebec, Canada
- **2010** 15th International Meeting, Athens, Greece
- **2012** 16th International Meeting, Sydney, Australia

The Society was established in 1989 to encourage Leksell Gamma Knife users to share information, ideas, clinical techniques and advance scientific research for the application of Leksell Gamma Knife. Today it is a worldwide network made up of hundreds of leading clinics and hospitals, and experts in radiosurgery.



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