

Project: 'Lebendige Kinderkardiologie'  
 Leitung: Prof. Dr. Jochen Weil (Hamburg)  
 Mitarbeit: Dr. Johanna Meyer-Lenz (Hamburg)

Contemporary witnesses of the honorary members of DGPK  
 Date of the Interview: November 5, 2012 Weimar

## Kurt Amplatz MD – Minneapolis

### I. Kurt Amplatz: Curriculum Vitae

#### 1. Childhood and education

1924 - 25. 2.	Born in Weistrach/ Lower Austria
1926	His sister Maria is born
1930 - 1934	Elementary school – Senftenberg Lower Austria
	Favorite subject: Chemistry / Physics; promotion by a family friend, a chemistry professor at Oberrealschule II Innsbruck Kurt Amplatz discovered his passion for scientific experimentation
1934 -1945	Oberrealschule II Innsbruck Main subjects: science, Latin
1942-1944	Interruption of school education to heal a tuberculosis in Schatzalp/ Davos
1945 vor Kriegsende	Matura (high school level)

#### 2. Medical school and residency training in Europe

1946-1947	Studies at the Faculty of Medicine Innsbruck
1948 -1949	Medical studies in Switzerland on a scholarship in Fribourg and Zurich;
1950	Academic year at Paris – Faculty of Medicine : Dermatology, gynecology (Hôpital St. Louis)
1950	Staatsexamen und Promotion in Innsbruck
1950-1952	Internship at St. Pölten / Lower Austria

#### 3. Stay in the United States since 1952

##### Internship / Residency - Specialist training - Radiology

1952	USA: exchange year in New York City
1952-53	Internship at Episcopal Hospital Brooklyn (NY)
1953	Applications for a residency in Rochester. He receives one at Detroit / Michigan (USA)
1953-1956	Residency at the Wayne State University Medical School Detroit / Michigan (Detroit Receiving Hospital) Clinic of Radiology
1957 Specialist examination (Resident)	He completed training in diagnostic radiology at Wayne State University School of Medicine Detroit / Michigan; His test subjects were isotope diagnostics, radiotherapy and x-ray diagnostics.

	His auditor, Dr. Leo Rigler, offered him a position at Medical School University of Minnesota / Minneapolis as an instructor - with tenure
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<b>4. Clinical and academic career (1957-1999)</b>	
<b>1957-1970 Medical School University of Minnesota (U of MN) / Minneapolis</b>	
<b>1957 - 1961</b>	<b>Instructor;</b> diagnostics in the (pediatric) cardiac catheterisation lab Division: Cardiac / pediatric / Radiology Variety Club Heart Hospital Minneapolis  (Head of Department: Harold A. Peterson / Neuroradiologist, successor of Leo Rigler MD)
<b>1961 - 1963</b>	<b>Assistant Professor</b> Faculty of Medicine – Department of Radiology – University of Minnesota (U of MN)
<b>1963 - 1970</b>	<b>Associate Professor</b> Faculty of Medicine Department of Radiology Head of Interventional Radiology ("I did everything")
<b>5. Full professor</b>	
<b>1970 -1999</b>	<b>Full Professor</b> <b>Head of Department of Interventional Radiology</b> <b>MS U Mn</b>
<b>Early years</b> <b>Key experience</b>	The death of a patient at the beginning of his activities in the cath lab is a dramatic experience: "And then I've built up a pretty good school. We have always had 4 assistants and have made thousands of angiographies without further incident. Never an infection! Everything went well. " <i>(Interview October 5, 2012, Weimar)</i>
<b>„I am not an administrator“</b>	He preferred to spend more time in his lab. "I would have made a lousy chairman," he says.
<b>1983-1993</b>	Research Professorship He was appointed as the <b>first Malcolm P. Hansen Professor</b> (*1927 prof. of radiology MS UMn) of diagnostic radiology endowed chair and held this position through 1993
<b>1993</b>	First results of the investigation to the Amplatz occluder will be presented at a conference
<b>1999</b>	Retirement; Professor emeritus of radiology at the University of Minnesota
<b>Sources:</b> <a href="http://radiologie.uki.at/page.cfm?vpath=radiologie/ueber-uns/kurt-amplatz-zentrum">http://radiologie.uki.at/page.cfm?vpath=radiologie/ueber-uns/kurt-amplatz-zentrum</a> (visited 7-06-2013)	

## II Kurt Amplatz: The clinician, diagnostician and inventor

### II.1. Early History of the Department of Radiology University of Minnesota (since 1923)

1927	Leo Rigler - pioneer of radiology, joins the Department;
1930	Growing importance of the specialist radiology in diagnosis and therapy
1930	Leo Rigler (1896-1979) full professor
1949/50	In the course of the stormy development particularly of open heart surgery at Medical School University of Minnesota ("which was doing pioneering work in open-heart surgery") cardiac radiology benefits enormously. It opens up completely new areas of diagnosis, specialising in diagnostic technologies for cardiac surgery.
Since 1945	Growing influx of young trainees radiologists after the second World War
1954	<p>The department of radiology is enlarged by the <b>department in the new Mayo Memorial Building in 1954.</b></p> <p>„Finally, in 1954, a new much larger department was opened on the second floor of the <b>new Mayo Memorial building.</b>“</p> <p>„Serial angiocardiology, employing rapid film changers to make as many as six exposers per second, enabled the delineation and classification of a large number of previously poorly understood congenital abnormalities of the heart.“</p> <p>Reference: Stephen A. Kieffer . Eugene Gedgàudas, Harold O. Peterson, MS Minneapolis (MS/ DM), 1967, 1-27. A Brief History of the Department of Radiology School of Medecine University Minnesota p.18s;</p>

## II.2. Diagnostic radiology in pediatric cardiology

Kurt Amplatz – since 1957 member of the department of radiology - developed numerous methods, tools, techniques and investigation - radiology technologies for various medical disciplines, not only Cardiology.

- Meticulous diagnosis before / after cardiac surgery
- diagnosis of congenital heart defects
- Introduction of new methods:
  - > 1958 Seldinger technique
  - > left heart catheter examinations
- Development / improvement of technical tools ("devices", etc.) for coronary angiography
- Contrast injector for liquid (dye-injector) for children
- Various types of catheters to study the coronaries, e.g. left / right Amplatz catheter, the modified Amplatz catheter,
- Amplatz Goose Neck snare
- Amplatz angiographic needle
- Amplatz heparin-coated guide wire etc.
- High resolution of image quality (during X)
- Research / Studies in experimental laboratory

➤ Textbook:

K. Amplatz, J.H. Moller, W. Castaneda-Zuniga, **Radiology of Congenital Heart Disease. Volume I**, Georg Thieme Verlag, Stuttgart, New York 1986, 542 p.

- K. Amplatz, J.H. Moller, **Radiology of Congenital Heart Disease. Volume I and II**, Mosby Yearbook, St Louis 1993 (2nd edition), 1207p.

## II.3. X-ray Diagnostic, neuroradiology etc.

Diagnostics for more specialized disciplines

- Pneumoencephalography (Neuroradiology)
- Process of disintegration of kidney stones: lithotripsy (Urology)

"Perhaps the most significant development of recent years has been the rapid growth in angiography. Dr. Kurt Amplatz, [...] Associate Professor of Radiology, joined the staff of the department in 1957 and has been **a pioneer in the development of techniques for accurate visualization of blood vessels**. It was he who **modified the original percutaneous vessel puncture technique of Seldinger** and developed a **simple safe technique for catheter replacement allowing opacification of nearly all the arteries of the body**. His techniques have been widely copied and his articles in the of renal physiology and arteriography, cardiac angiography, and peripheral vessel studies have won him high acclaim. A man of varied talents, Amplatz has also designed **the first effective light-weight portable injector for angiography**, an accurate **isotope inhalation method for detection of small intracardiac shunts**, and a **somersaulting chair for pneumoencephalography**."

Reference: Stephen A. Kieffer . Eugene Gedgãudas, Harold O. Peterson, MS Minneapolis (MS/ DM), 1967, 1-27. *A Brief History of the Department of Radiology School of Medicine University Minnesota, ibid. p. 2)*

### III Kurt Amplatz: The Inventor (1958-1993)

1958	In 1958, he performed one of the first percutaneous catheterizations of the heart.
1959	In a neighbor's garage in 1959, he built a machine to inject dye through catheters into children's hearts for angiograms
1960er Jahre	Development of specially shaped Amplatz catheter, a mainstay for coronary Angiography: The Amplatz right, left-heart catheterization The specially shaped Amplatz catheter, invented in the 1960s, is "still a mainstay for coronary angiography," says Dr. Donald Hagler, a professor of pediatrics at the Mayo College of Medicine in Rochester."
1979	K. Amplatz' Goose-Neck Snare, created in 1979, are used to retrieve broken catheters and other items from the cardiovascular system.
	K. Amplatz fed many of his inventions to Minnesota start-up companies, helping to launch several in which he had no ownership stake. They include <i>AngioMedics</i> , acquired by Pfizer in the 1980s; <i>SciMed Life Systems</i> , acquired by Boston Scientific in 1995; and <i>Microvena</i> , maker of the Goose-Neck Snare, which became part of vascular device manufacturer <i>ev3</i> a few years ago.
Since 1993	He is best known for the invention of the Amplatzer Septal Occluder (1996) as well as the Amplatzer Cribriform Occluder, which is used for closing atrial septal defect, common congenital heart defect found in infants. These devices are inserted by percutaneous catheter placement, thus avoiding open heart surgery.
During the process 2003	K. Amplatz enrolled at Century College, a technical school in White Bear Lake, to learn to do his own machining.
<p><b>Reference: Susan Jeffrey, theheart.org , 12 june, 2013</b></p> <p><b>  <a href="mailto:sjeffrey@theheart.org">sjeffrey@theheart.org</a>(2001) Transcatheter pioneer Kurt Amplatz looks to the future: „You ain't seen nothin' yet“Jack Gordon, Business leaders. The return of Kurt Amplatz, May 2001</b></p> <p><b><a href="http://www.tcbmag.com/peoplecompanies/businessleaders/71076p6.aspx">http://www.tcbmag.com/peoplecompanies/businessleaders/71076p6.aspx</a> 07-11-2012</b></p>	

## IV Kurt Amplatz : Research

<b>Publications</b>	<b>Extensive publication record since 1958 (PubMed: about 900 posts)</b> Numerous contributions as first author, second author and coauthor by research teams of MS U of MN, whose members at the Department of Radiology spent their stays to accommodate <ul style="list-style-type: none"><li>• themselves as heads of their departments,</li><li>• the suggestions in their scientific research and</li><li>• develop in their "schools".</li></ul>
	<i>„Die Radiologie habe ich [...] in den 80er Jahren aufgegeben und dann habe mich nur auf die Forschung und diese Schirme spezialisiert.“</i> "I've abandoned Radiology [...] in the 80s and then I've only specialized in the research and these 'umbrellas'." (Interview Weimar 2012)
<b>Teaching</b>	<b>Training of future radiologists (residents)</b>
<b>Conferences</b>	<b>Countless contributions to conferences / lectures</b>

Excerpt from the interview with Kurt Amplatz (A), led by Jochen Weil (W) on October 5, 2012 in Weimar:

### **Moonlight research: „...wenn man jung ist, kann man das machen“**

*W: „Jetzt, Sie waren ja die ganze Zeit in der Radiologie und trotzdem haben Sie ja dauernd Erfindungen gemacht, ob das jetzt die Schlinge ist für die Urologie oder ob das jetzt die Katheter waren..*

*Wieviel Zeit haben Sie jeden Tag für Ihre Entwicklungen (verbracht)? [...]*

*A: Das habe ich nur nach meiner Dienstszeit gemacht. Nach dem Dienst habe ich schnell gegessen und dann bin ich ins Labor und (habe) gearbeitet. Das haben wir dann genannt: **Moonlight-Research** [...] Da habe ich selber die Hunde anästhesiert. [...]*

*W: Wieviel Stunden haben Sie da gearbeitet als Radiologe, haben Sie da 8 Stunden..?*

*A: Jaja, (als) Radiologe, (von) 8 bis 5.*

*W: Als Radiologe haben Sie von morgens 8 bis nachmittag 5 haben Sie im Krankenhaus gearbeitet und anschließend sind Sie?*

*A: Und anschließend bin ich im Labor W:(ja toll)*

*W: Wie lange haben Sie gearbeitet, wenn Sie im Labor waren?*

*A: Im Labor? Das war vielleicht bis Mitternacht oder sowas.*

*W: Und am nächsten Tag wieder normal weiter*

*A: Ja wenn man jung ist, kann man das machen. Heute könnte ich das nicht mehr machen.*

*W: Aber ich meine, die Zahl der Erfindungen, die Sie gemacht haben, auch bahnbrechende Sachen, spricht für sich und Hut ab vor dieser Leistung, die Sie da erbracht haben vor allen Dingen in der Freizeit.“*

Excerpt from an interview, Jochen Weil (W) interviewing Kurt Amplatz (A) in Weimar, October 5, 2012

**Kurt Amplatz: Moonlight research: "... when you're young, you can do it "**

W : "Now, you were a radiologist all the time and yet you continuously invented new devices, like the sling for urology or catheters ..

How much time did you spend each day on this work? /developing these devices? [...]

A: , I could not do it during working hours[...]I only worked on this after working hours . I quickly ate dinner and then I went to the lab to work. That's what we called moonlight-research [...] I even anesthetized the dogs myself

W : On your own?

A: Yes, yes, on my own.

W : How many hours did you have to work there as a radiologist , was it 8 hours a day?

A: Yes, yes, ( as a ) radiologist (from) 8 am to 5 pm.

W : You worked as a radiologist from 8 am to 5 pm in the hospital and then in the evenings you worked in the lab?

A: And then in the lab (W: fantastic / amazing)

W : How long did you work in the lab?

A: In the lab? Perhaps round about until midnight.

W : And again the next day work as normal.

A: Yes, when you're young, you can do it. Today I could not do this any longer .

W : But I mean, the number of inventions that you have made, even groundbreaking stuff, speaks for itself and hats off to this performance that you have achieved - especially in your free time.“

## V Inventions since 1993 and entrepreneurship:

### Amplatzer® - Occluders for pediatric cardiology

<b>AMPLATZER® Occluder</b>	Company	European CE Mark approval	Countries (incomplete)	FDA Approval	Diverse Chiffres
<b>ASO Septal Occluder</b>	AGA	1998	Approved in 2012 in 53 countries	2001 P000039	Total sales In 2012: 223.965,
<b>ASD Multi-Fenestrated Septal Occluder</b>	AGA	1998	See above	2001 2006	
<b>PFO Patent Foramen Ovale</b>	AGA	1998	Italy, Switzerland, Germany Slovak Republic	2002 H000007 2006 withdrawn	2003: about 30.000 various Amplatz occluders implanted Worldwide
<b>ADOO Duct Occluder</b>	AGA	1998	2009 Japanese approval	2003 P020024	Dec. 31, 2007: <b>(more than) 51.0000 sales in U.S., Europe, other countries</b>
<b>VSD Muscular Occluder</b>	AGA	1998	See above ( as ASO)	2007 P040040	
<b>ADO II</b>	AGA St Jude	2008		2008	
<b>Amplatz Vascular Plug-3</b>	AGA St Jude	2008			
<b>Amplatz Vascular Plug-4</b>	St.Jude			2012	

„We sell our devices in 112 countries (...) International markets represented 59.2% of our net sales in 2008 and 61.1% of our net sales in the six months ended June 30, 2009, and we anticipate continued growth internationally as we expand our presence in (...) countries such as China (and) expand our direct sales presence into additional European countries (...).”  
AGA Medical Holdings Inc. (last: April 13, 2013)“

**References:** [http://www.uni-kiel.de/aepc/aepcHandouts/Handout\\_512.pdf](http://www.uni-kiel.de/aepc/aepcHandouts/Handout_512.pdf)

AEPC 47th Annual Meeting of the Association for European Paediatric and Congenital Surgery 22nd-25th May 2013 London



## VI Kurt Amplatz: The entrepreneur

The economic success of the enterprise is based on the inventions of the Amplatz occluders® and cardiovascular plugs.

<b>1995</b>	<i>Kurt Amplatz founded <b>AGA Corp.</b> the capital stock to total \$ 300 belonged originally in equal shares to him, to his son-in-law Franck Gougeon and to Michael Afremov.</i>
<b>1998</b>	<i>The enterprise in Plymouth Mn, grew up rapidly. It already valued at \$25 million in 1999 based on healthy overseas sales of AGA's occluders (90% placed in children); 1998 AGA got the EC MARK approval and was success-full on the Euro-pean market; the enterprise increased. (medcitynews.com/20107 10 (april 21, 2013))</i>
<b>2001-2009</b>	<i>Diverse FDA Approvals for the line of AMPLATZER occlusion devices ASO®, ASD®, PFO®, ADO® since 2001. In 2002 AGA's sales rose to \$62 million.</i>
<b>2004</b>	<i>A litigation about nearly two years (2004-2006) led to new management and investment structures of AGA. Afremov was sold out with approximately \$300 million</i>
<b>2009</b>	<i>In February 2009 Caroline Amplatz pledged \$50 million for the <b>university's new children's hospital</b>, which the Medical School named for Dr. Amplatz. " The Hospital opened on April 30, 2011 in Minneapolis.</i>
<b>2010</b>	<i>„St. Jude Medical Inc. Completes ist \$1.3 billion acquisition of AGA Medical Holdings Inc. “</i>
<b>2012</b>	<i>About 30.000 various Amplatz occluders were implanted world-wide in 2003 Total sales in 2012 (53 countries): 223.965. <b>The vision of Kurt Amplatz:</b> Inventing motors fitting for the ecological ere (saving fuel) and going on inventing new techniques and devices)</i>

### References:

AGA Medical Holdings Inc. WWW

NASDAQ. com/markets/ ipos/company/aga-medical-holdings-inc (April 13, 20

**Brody, JA**, Scientist at work: Kurt Amplatz; at 79, a Pioneer of Heart Devices ist not about to quit tinkering. NYTimes, September 09, 2003; <http://www.nytimes.com/2003/09/09/> (last: March 11, 2013)

**FDA** accesdata www: fda / gov / (last: April 13, 2013)

**MEDCITY** News November 19, 2010 <http://medcitynews.com/2010/1> last: May 1, 2013)

**Wilson** LG, Medical Revolution in Minnesota, A History of the University of Minnesota Medical School. St. Paul, Minnesota 1989

## VII Appreciation "Gold Medal Winners" durch Wilfrido E. Castaneda Zuniga

### Wilfrido E. Castaneda Zuniga):

W.E. Castaneda-Zuniga: "Over the past 40 years, Dr. Amplatz has been one of the most prolific and inventive individuals in academic radiology, and there are to his credit innumerable inventions. Many of these inventions became part of the past and current armamentarium utilized in the radiologic diagnosis and treatment of diseases. In the diagnostic field, some of his most notable inventions include vascular injectors for angiography, a chair for pneumoencephalography and autotomography, and the slot cardiovascular device to limit scattered radiation. In the interventional procedures field, his inventions include many tools that are currently in use, including the Amplatz access needle; catheters for selective coronary arteriography; the Amplatz guidewires; the Amplatz thrombectomy device; the nephrostomy dilatation set for the creation of percutaneous access to the kidney, which revolutionized the management of renal stones; an atrial septal defect closure device; and many other devices that have been mass-produced and used all over the world for the performance of diagnostic angiography and interventional radiologically guided procedures." (l.c.)

(Reference: AJR September 2000 vol. 175 no. 3 910 Gold Medal Winners - Wilfrido E. Castaneda Zuniga)

### Awards / „innumerable for his scientific work“ (List incomplete)

Many other first prize awards „cum laude and certificate of merit awards from several scientific societies“

1980 Nov	The magna cum laude award from the Radiological Society of North America
1981 Apr	The first prize award of the Canadian Association of Radiologists
1988	He received a gold medal from the American College of Radiology
1988	The Memorial Award from the Chicago Radiological Society
1989	the 29th C. Valentine Award of the New York Academy of Medicine
1999	The Outstanding Research Award of the Radiological Society of North America
2000	Gold Medal – American Roentgen Ray Society

„All of these awards were based on his academic achievements and contributions to the advancement of diagnostic and interventional radiology.“ (W. E. Castaneda – Zuniga (2000))

