

Milestones in Catheterization

Journal Club Presentation

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History

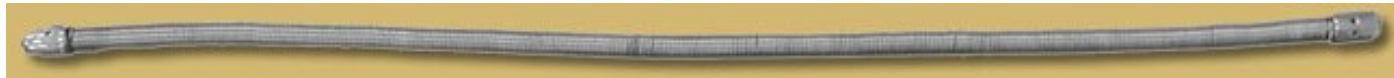
- Evidence for the practice of urinary catheterization by ancient Greeks, Syrians and Chinese as early as 3000 BCE¹
- καθίεμαι – to sit (as a plug)²
- Katheter (καθετήρ), originally referred to any inserted instrument

¹ <http://www.urotoday.com/Urologic-Catheters/a-brief-history-of-urinary-catheters.html>

² <http://en.wikipedia.org/wiki/Catheter>

History

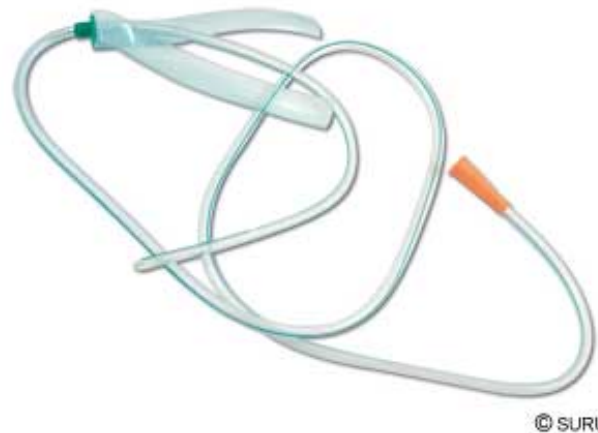
- Early catheters were made from onion stalks, wood or precious metals
- In 1752, Benjamin Franklin designed a flexible catheter made of silver for his brother John



- The first rubber catheters were produced by the end of the 18th century, but were weak at body temperature

History

- The invention of rubber vulcanization by Charles Goodyear in 1844 improved durability and allowed mass production
- In the early 20th century Gibbon and Walsh developed the standard urinary catheter used today

































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Sizes

- The size of a catheter is commonly measured with the **French scale** or **French gauge** system
- It was devised by Joseph-Frédéric-Benoît Charrière in the 19th century
- usually abbreviated FR or CH
- 1 FR equates to a diameter of $\frac{1}{3}$ mm

Sizes

in	.223	.21	.197	.184	.17	.158	.144	.131	.118	.105	.092	.079	.066	.053	.039
mm	5.7	5.3	5.0	4.7	4.3	4.0	3.7	3.3	3.0	2.7	2.3	2.0	1.67	1.35	1
Fr	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
															
															
Fr	18	19	20	22	24	26	28	30	32	34					
mm	6.0	6.3	6.7	7.3	8.0	8.7	9.3	10.0	10.7	11.3					
in	.236	.249	.263	.288	.315	.341	.367	.393	.419	.445					

CREGANNA
MEDICAL DEVICES

French Catheter Scale

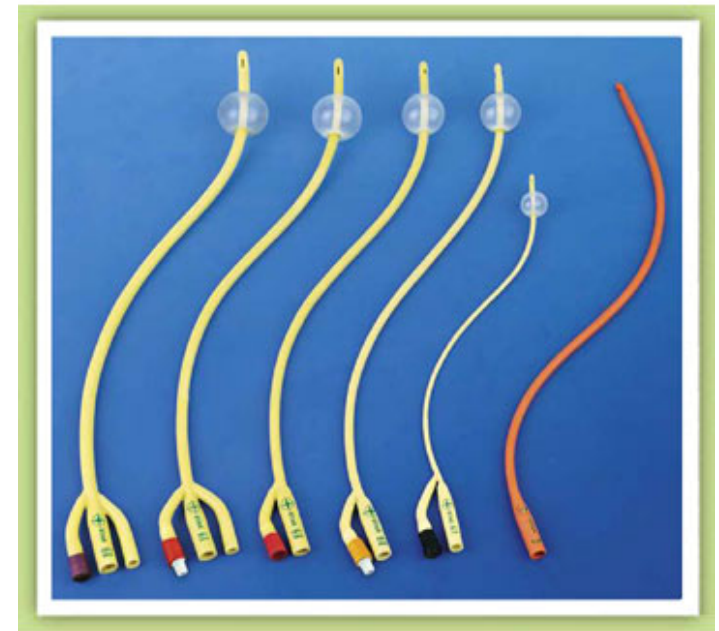
$$D \text{ (mm)} = Fr / 3$$

Frederic Foley

- Frederic Eugene Basil Foley
- born April 5, 1891 in Minnesota
- studied languages and then medicine at Johns Hopkins Medical School
- Surgeon and later urologist in Boston

Frederic Foley

- Developed the Foley catheter in 1937
- easy to apply
- inflatable balloon at the tips retains the catheter inside the bladder
- no external fixation needed



Foley Catheter

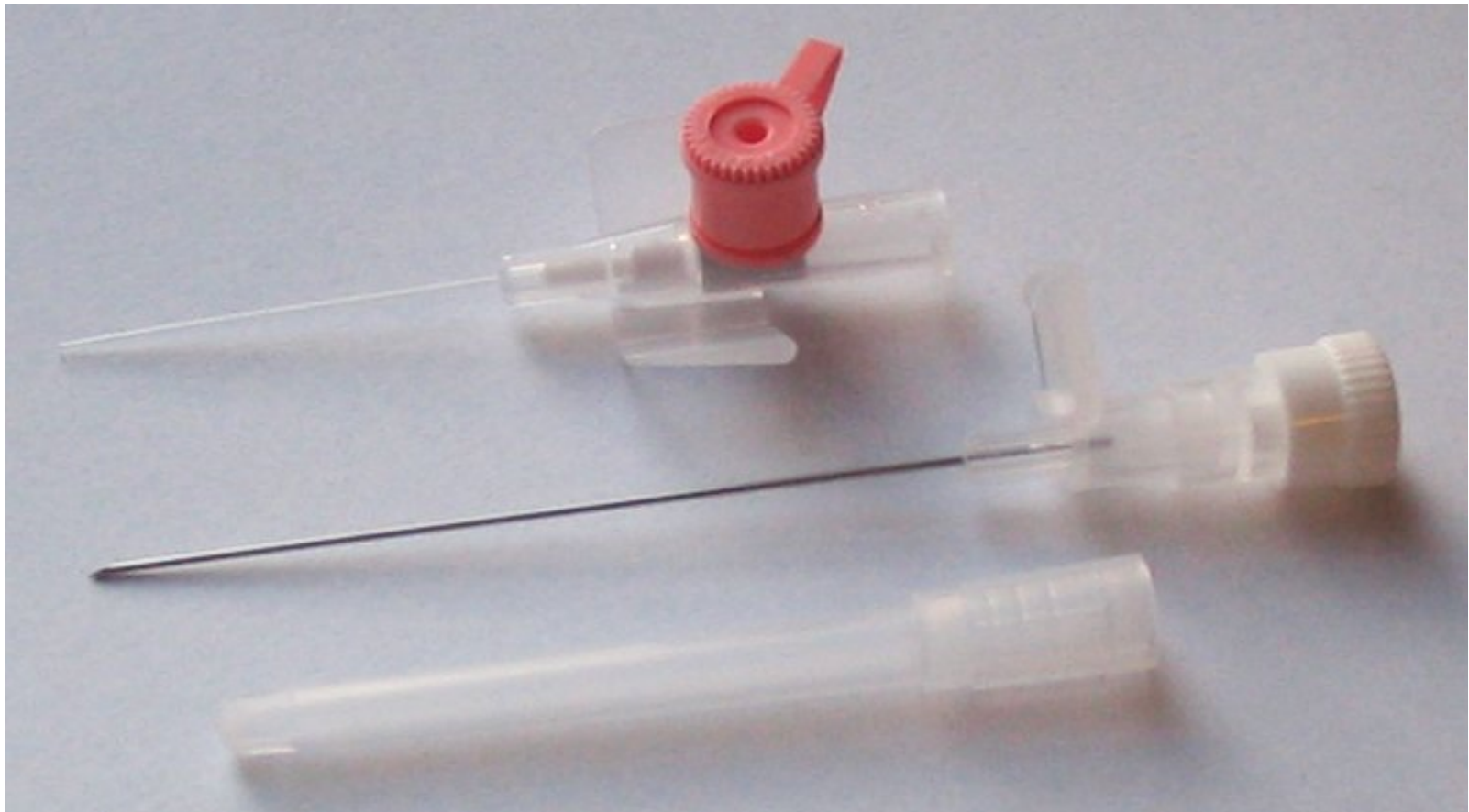
- replaced Malecot and Pezzer catheters



- Frederic Foley did not receive the patent rights for his invention

Vascular Catheterization

Peripheral Intravenous Catheters



Peripheral Intravenous Catheters

Farbkodierung von Venenkathetern							
Größe in Gauge	24	22	20	18	17	16	14
Farbe	Gelb	Blau	Rosa	Grün-Weiß/ Grün	Weiß	Grau	Orange-braun
Außendurchmesser (mm)	0,7	0,9	1,1	1,3	1,5	1,7	2,2
Innendurchmesser (mm)	0,4	0,6	0,8	1,0	1,1	1,3	1,7
Kanülenlänge (mm)	19	25	33	33/45	45	50	50
Durchfluss (ml/min)	13	36	61	103/96	128	196	343
Durchfluss (l/h)	0,78	2,16	3,66	6,18/5,76	7,68	11,76	20,58

Peripheral Intravenous Catheters

- First experiments in Britain by Christopher Wren and his colleagues in 1658
- early catheters were made from quill, improved with silver tips with infusion sets made from animal vessels and bladders
- due to misguided blood-transfusions, catheter development came to a halt for more than a century

Peripheral Intravenous Catheters

- Successful intravenous therapy of patients during cholera epidemics in London and Paris in 1831 and 1832
- Peripheral intravenous catheters were made of steel until the 1950s, when the first through-the-needle devices were developed

Werner Forßmann

- born August 29, 1904 in Berlin
- died June 1, 1979 in Schopfheim
- 1956 Nobel Prize in Medicine
- studied medicine at the Friedrich-Wilhelm-University
- Physician at the Auguste-Victoria-Clinic in Eberswalde

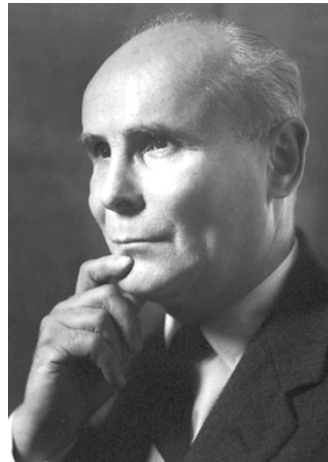


Werner Forßmann

- Performed first documented cardiac catheterisation on himself (after ignoring his department chief and persuading an OR nurse)
- Following his experiment he got an unpaid position at the Charité Hospital
- He was expelled after a dispute with his superior and Prof. Unger and Bleichröder, who did a similar experiment in 1912

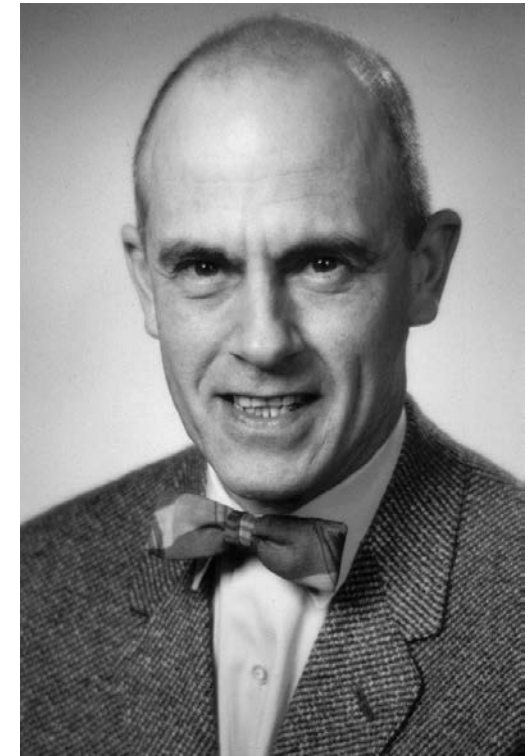
Werner Forßmann

- In 1956 he won the Nobel Prize in Medicine, together with André Cournand and Dickinson Richards *for their discoveries concerning heart catheterization and pathological changes in the circulatory system.*



Charles Dotter

- born June 14, 1920 in Boston
- died in 1985
- studied medicine at the Cornell University, New York
- At the age of 32 he became professor and chairman of the Department of Radiology at the University of Oregon



Charles Dotter

- January 16, 1964: Dotter and his trainee Melvin Judkins performed the first percutaneous transluminal angioplasty



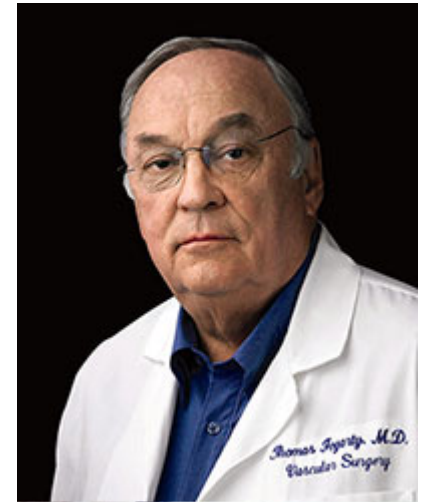
Andreas Grüntzig

- Born June 25, 1939 in Dresden
- Died October 27, 1985 in Forsyth, Georgia
- Performed the first percutaneous transluminal coronary angioplasty on an awake patient on September 16, 1977 in Zürich



Thomas J. Fogarty

- Born February 25, 1934 in Cincinnati, Ohio
- He invented the Fogarty catheter in the late 1950s, before even finishing his medical education
- He became Professor of Surgery at Stanford University in the 1990s, has founded a number of companies and has earned 63 patents





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Thank you for your attention!