Recommendation on when to introduce radial access during fellowship training

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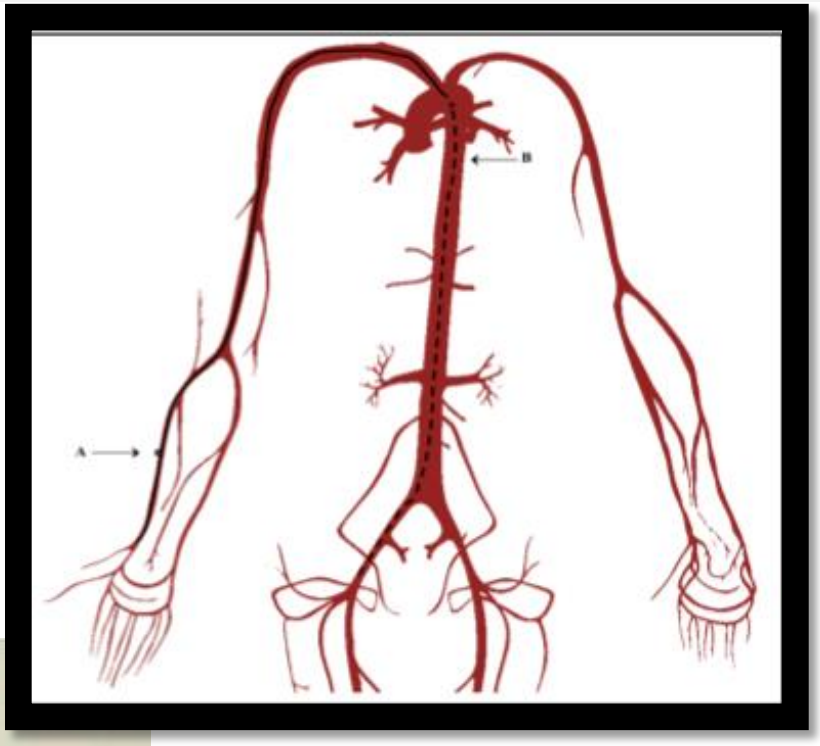
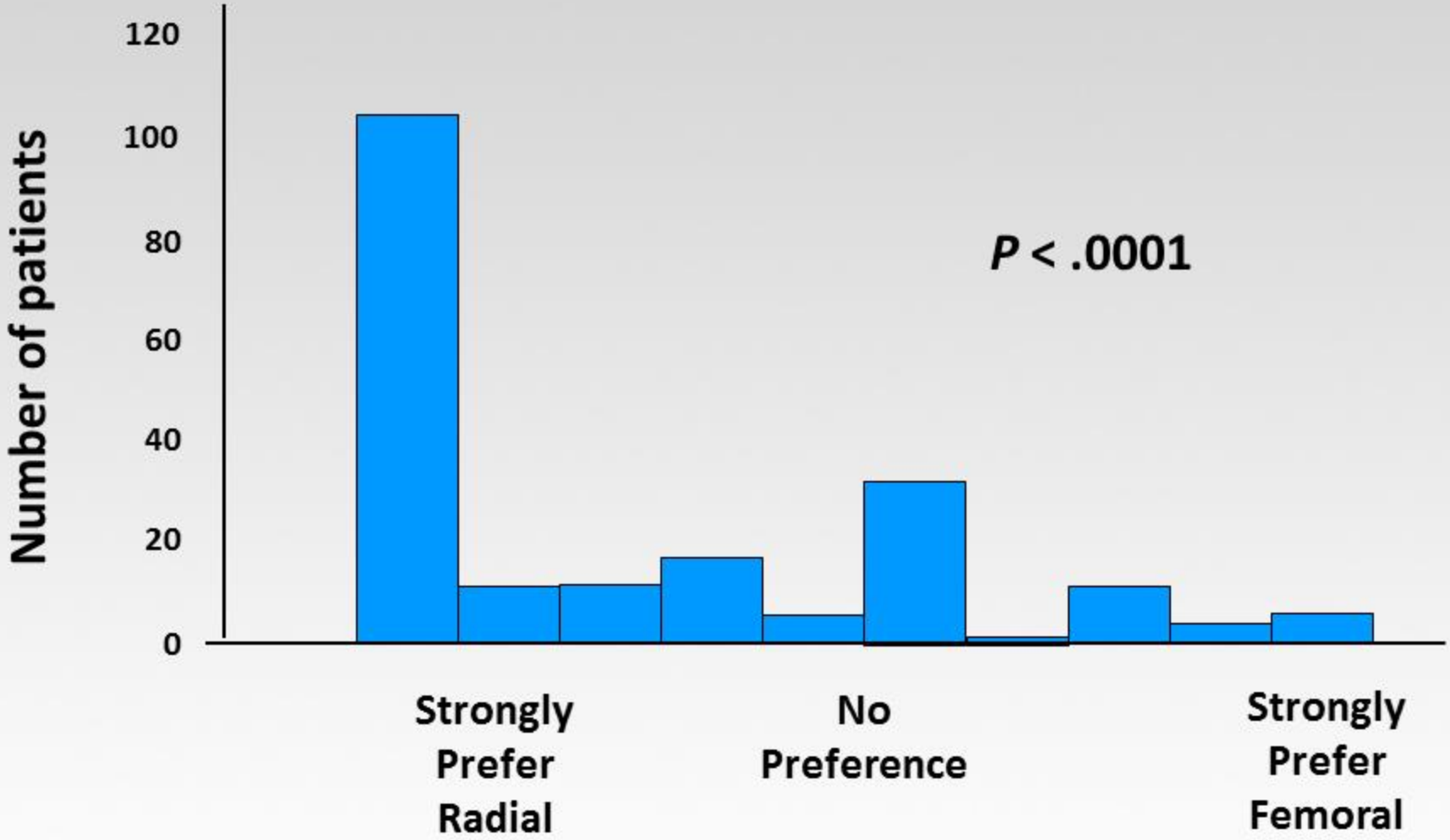
When to introduce radial access during fellowship training



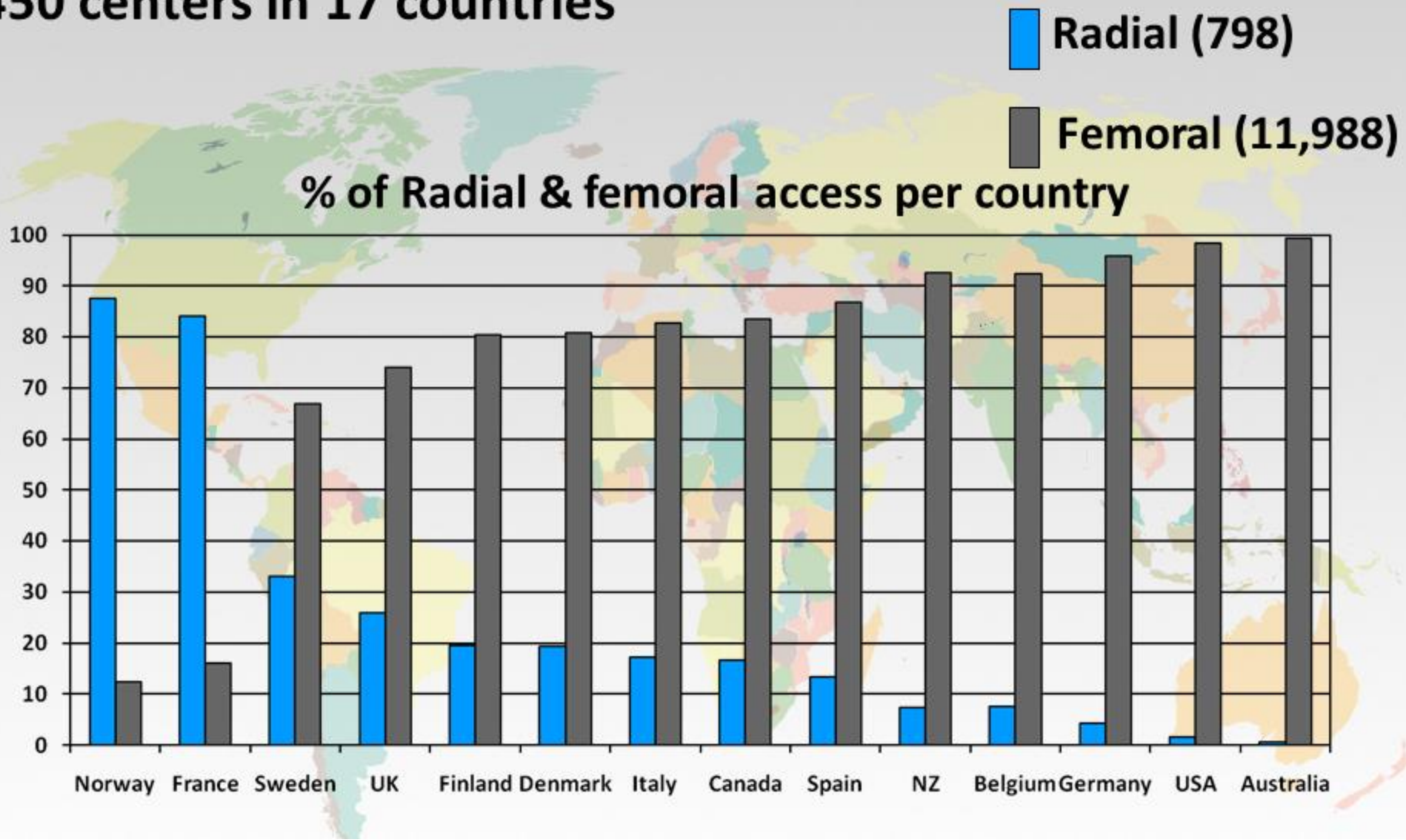
Patient Preferences



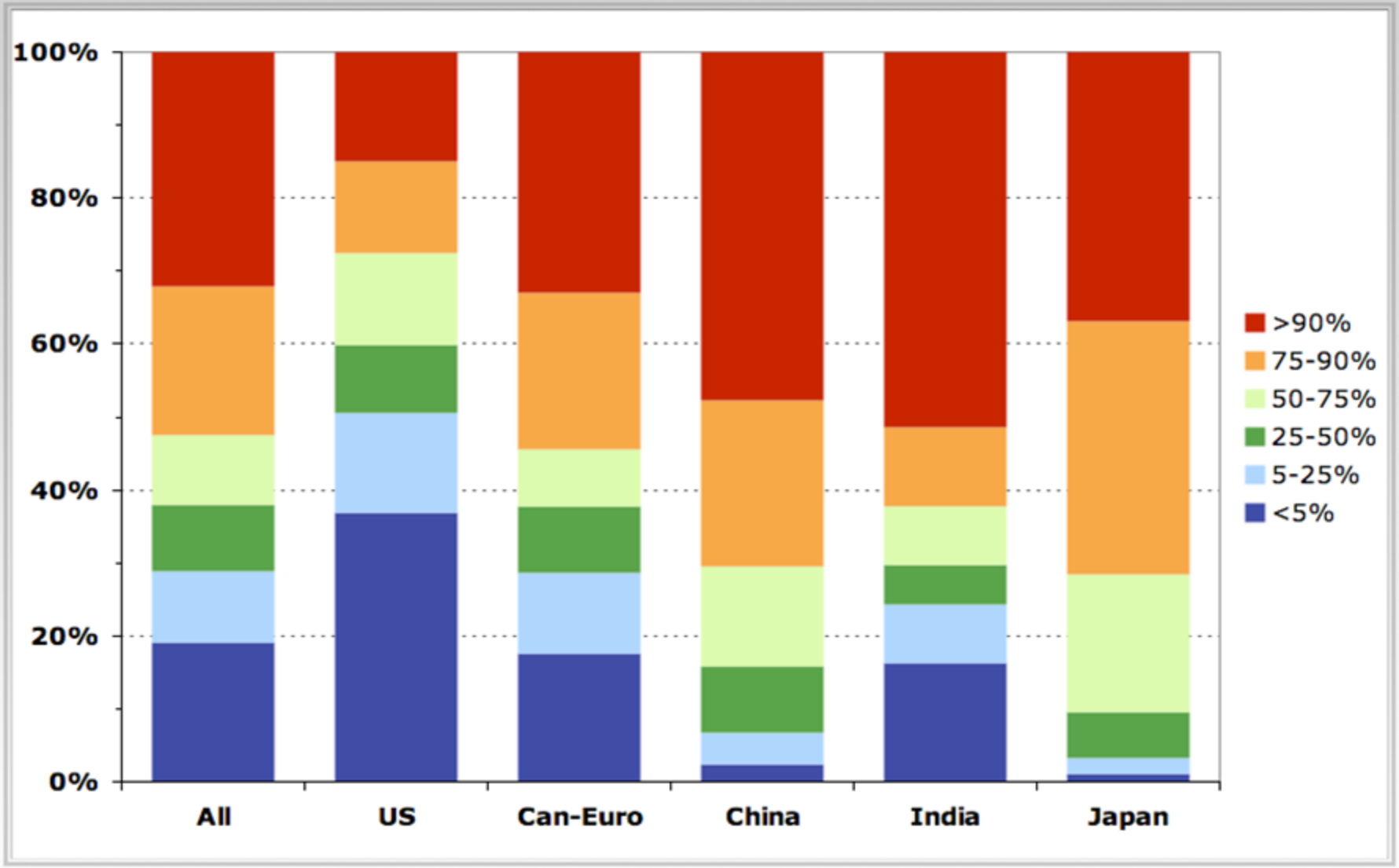
Am Heart J 1999; 138: 430-436

ACUITY Access

450 centers in 17 countries



1st International Radial Survey



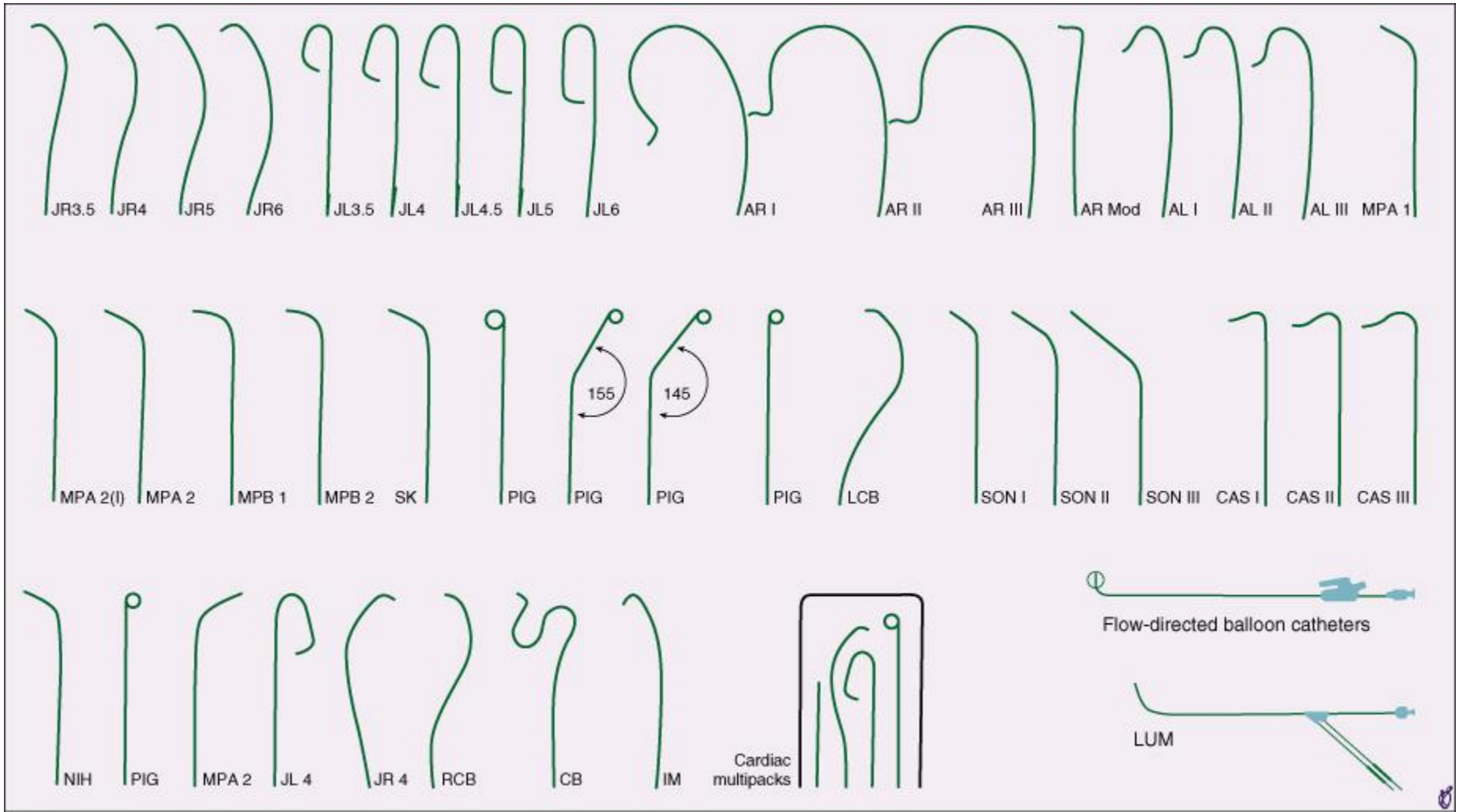
Interventional & Surgery

Bertrand OF, et al. *JACC Interventions* 2010;3:1022-1031.

theheart.org from WebMD

Medscape EDUCATION

Fellows should first recognize the catheters and its characteristics



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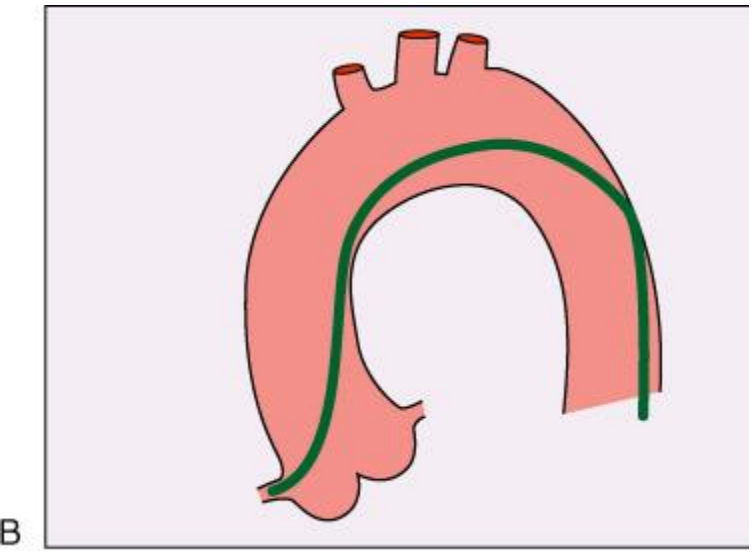
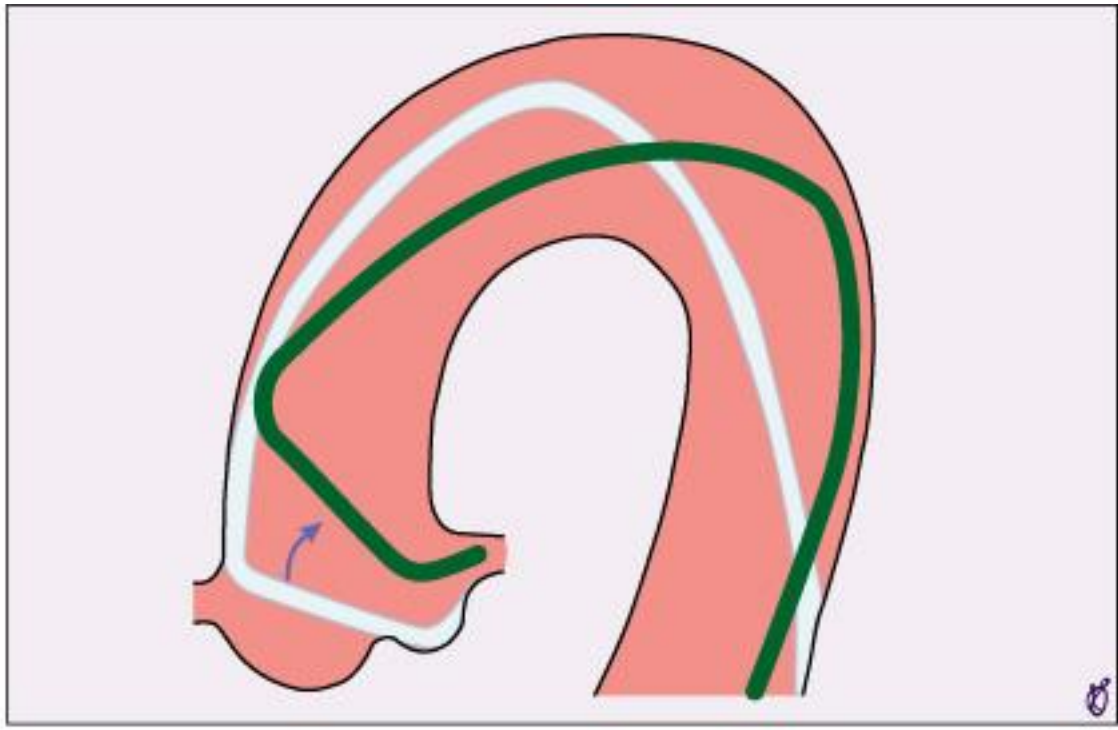


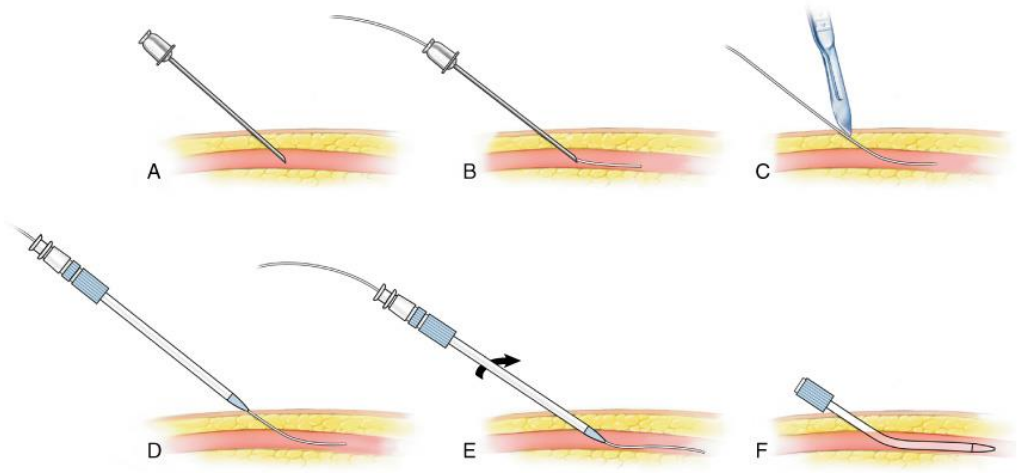
B

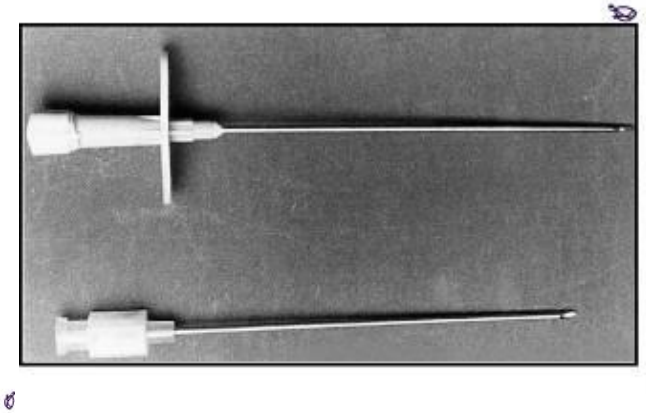


B

The case of micro-puncture of the femoral artery

- The moment a center starts with micro-puncture and each fellows uses the new technique
- The classic Seldinger technique is lost
- The expertise of femoral artery puncture are lost





What happens when a center starts with the Radial Approach?

What happens when a center starts with the Radial Approach?

- The moment a center starts with radial approach – it will reach 70-90% in 3-4 years.
- The fellows will be exposed mainly to TRI.
- The expertise of femoral artery puncture and hemostasis will be lost.

What happens when a center starts with the Radial Approach?

- The moment a center starts with radial approach – it will reach 70-90% in 4 years.
- The fellows will be exposed mainly to TRI.
- The expertise of femoral artery puncture and hemostasis will be lost.
- [similar to physical examination in modern era]
- Fellow after femoral approach - *"wow this is so easy…"*

A center with both approaches:

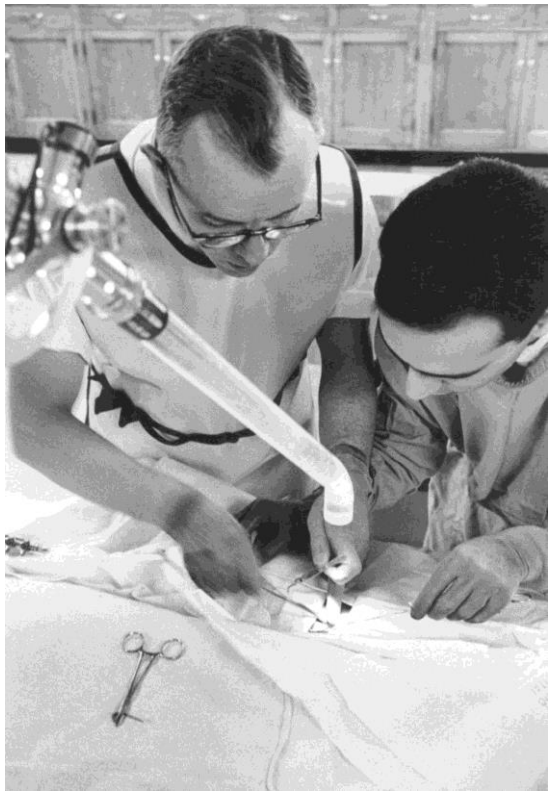
If possible:

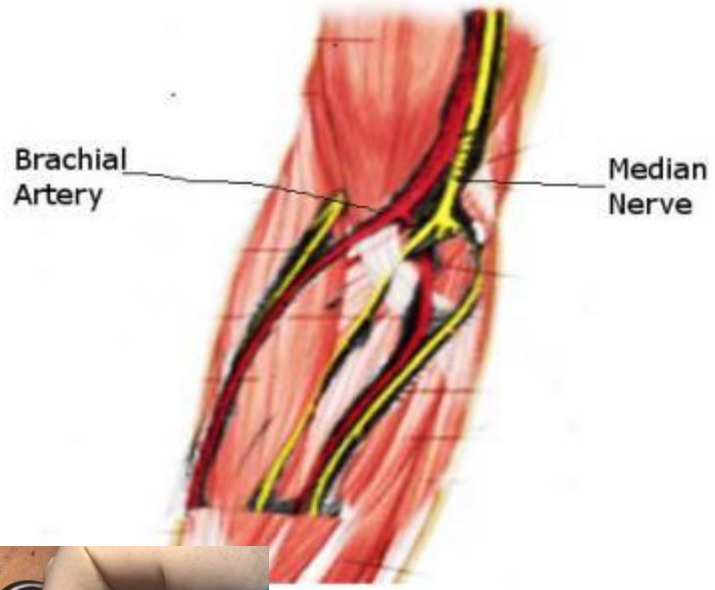
- First 100 cases Femoral approach!
- Only then move to radial

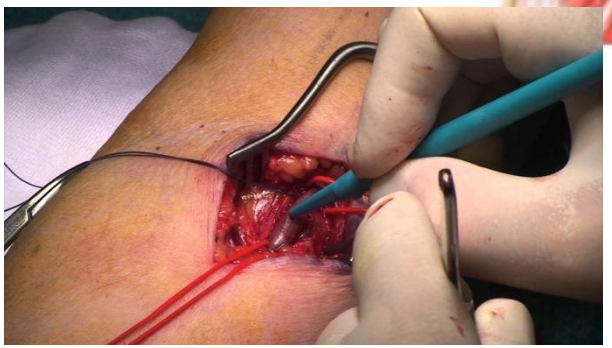
- Some basic manual expertise is needed,
- The basics come from the Femoral approach

What is the future of femoral approach:

Where is now the Sones approach?







When to introduce radial access during fellowship training

European Heart Journal Advance Access published September 11, 2015

European Heart Journal
doi:10.1093/eurheartj/ehv320

ESC GUIDELINES

2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC)

"Radial access, performed by experienced operators, is recommended over the transfemoral access in ACS."

2015 ESC guidelines on ACS

European Heart Journal
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- Radial access, performed by experienced operators, is recommended over the transfemoral access in ACS.
- It is recommended that centres treating ACS patients implement a transition from transfemoral to transradial access.

2015 ESC guidelines on ACS

European Heart Journal
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- Radial access, performed by experienced operators, is recommended over the transfemoral access in ACS.
- It is recommended that centres treating ACS patients implement a transition from transfemoral to transradial access.
- However, proficiency in the femoral approach should be maintained, as this access is indispensable in a variety of procedures, including intra-aortic balloon counterpulsation implantation, structural heart disease interventions and peripheral revascularization procedures.
- A consensus document has proposed a stepwise approach to favour the transition from a femoral to a radial approach.

Consensus document on the radial approach in percutaneous cardiovascular interventions: position paper by the European Association of Percutaneous Cardiovascular Interventions and Working Groups on Acute Cardiac Care** and Thrombosis of the European Society of Cardiology

Martial Hamon[1*#], MD; Christian Pristipino[2#], MD; Carlo Di Mario[3], MD, PhD; James Nolan[4], MD; Josef Ludwig[5], MD, PhD; Marco Tubaro[6], MD; Manel Sabate[7], MD, PhD; Josepa Mauri-Ferré[8], MD; Kurt Huber[9], MD; Kari Niemelä[10], MD; Michael Haude[11], MD; William Wijns[12], MD, PhD; Dariusz Dudek[13], MD; Jean Fajadet[14], MD; Ferdinand Kiemeneij[15#], MD, PhD

EuroIntervention. 2013 Mar;8(11):1242-51

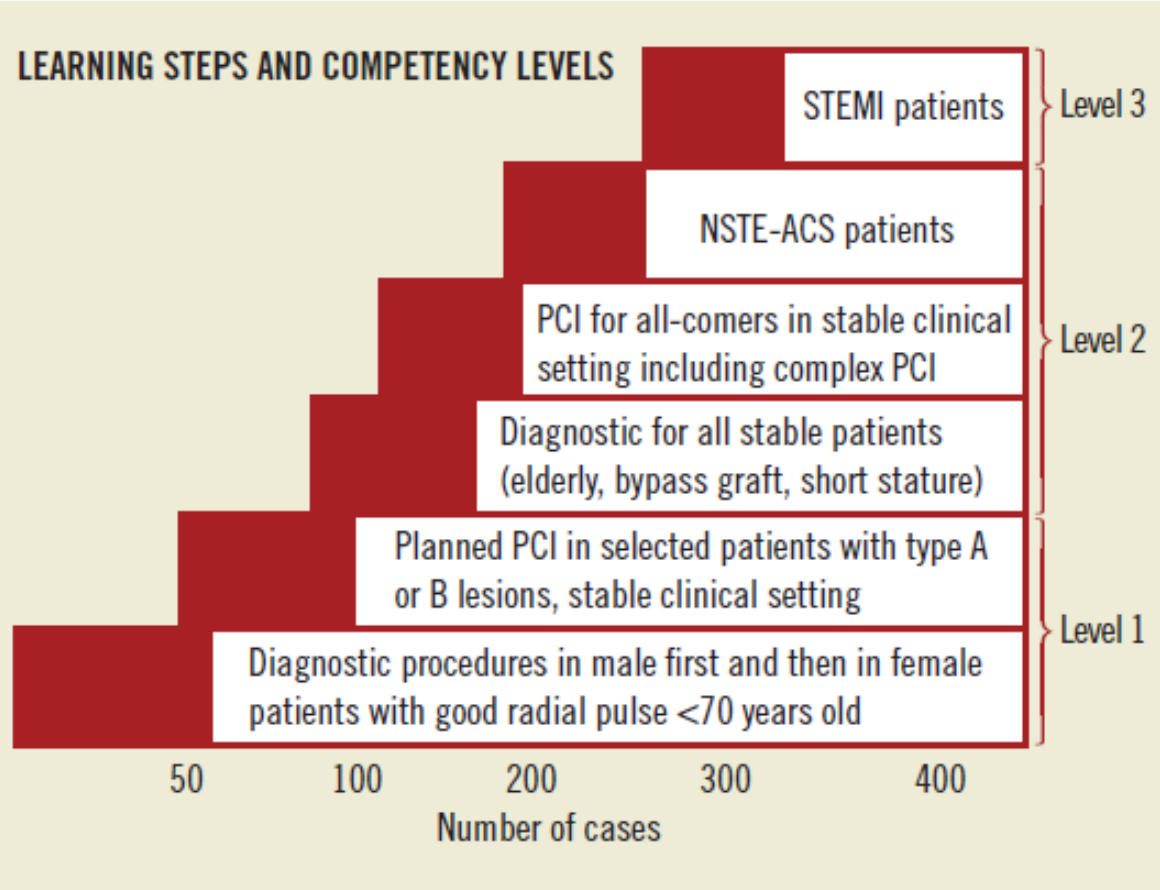

Figure 4. *Proposed framework for learning steps and competency levels for TRI. ACS-PCI is proposed as the last step (NSTEMI and STEMI patients), due to expected anatomical variations and to less suitable clinical settings, where time constraints and/or complex pharmacological and clinical management are often required during the procedure.*

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- Nothing regarding fellowship

EuroIntervention. 2013 Mar;8(11):1242-51

Consensus document on the radial approach in percutaneous cardiovascular interventions: position paper by the European Association of Percutaneous Cardiovascular Interventions and Working Groups on Acute Cardiac Care** and Thrombosis of the European Society of Cardiology

- All radial-proficient teams should aim to maintain optimal proficiency in femoral procedures as well.
- Some low-risk patients for femoral access site complications and procedures requiring femoral access (IABP, radial access failure or if guiding catheters ≥8 Fr are required) should provide a volume of cases to maintain adequate training in femoral artery puncture.

EuroIntervention. 2013 Mar;8(11):1242-51

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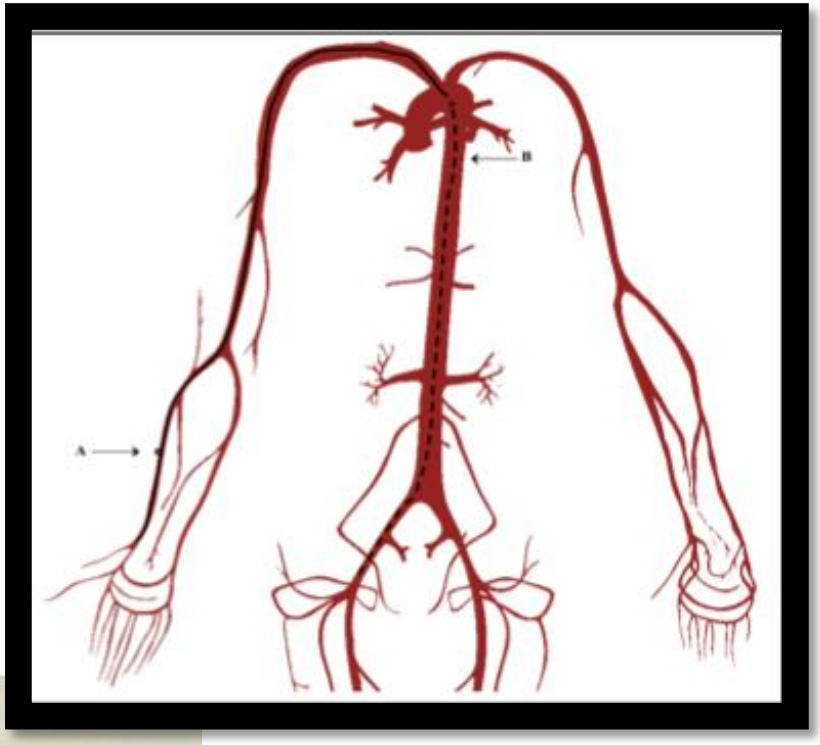
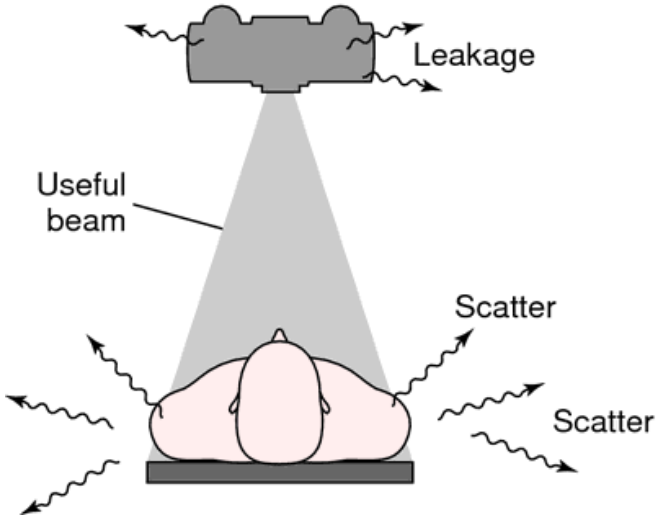

A
B

Scatter radiation

- Most of the radiation is scatter radiation



Improvements in radiation protection are needed.

Radial approach is associated with greater radiation compared to femoral approach

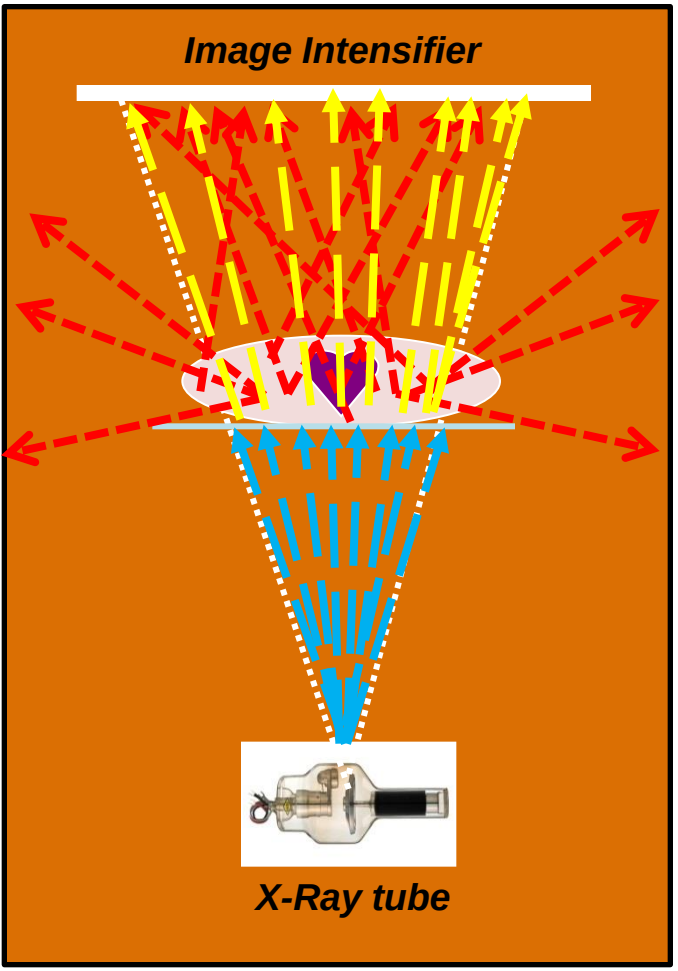
Left Versus Right Transradial Approach for Percutaneous Coronary Procedures: TALENT

Procedure	Right	Left	*P*
Diagnostic			
Fluoroscopy time (sec)	168	149	.0025
Dose area product (Gy/cm^2)	12.1	10.7	.004
Interventional			
Fluoroscopy time (sec)	696	614	.087
Dose area product (Gy/cm^2)	63.1	53.7	.17

Interventional & Surgery

Data presented by: Sciahbasi A. EuroPCR 2010; May 25-28, 2010; Paris, France.

ALARA Principle: Reduce Scattered Radiation!



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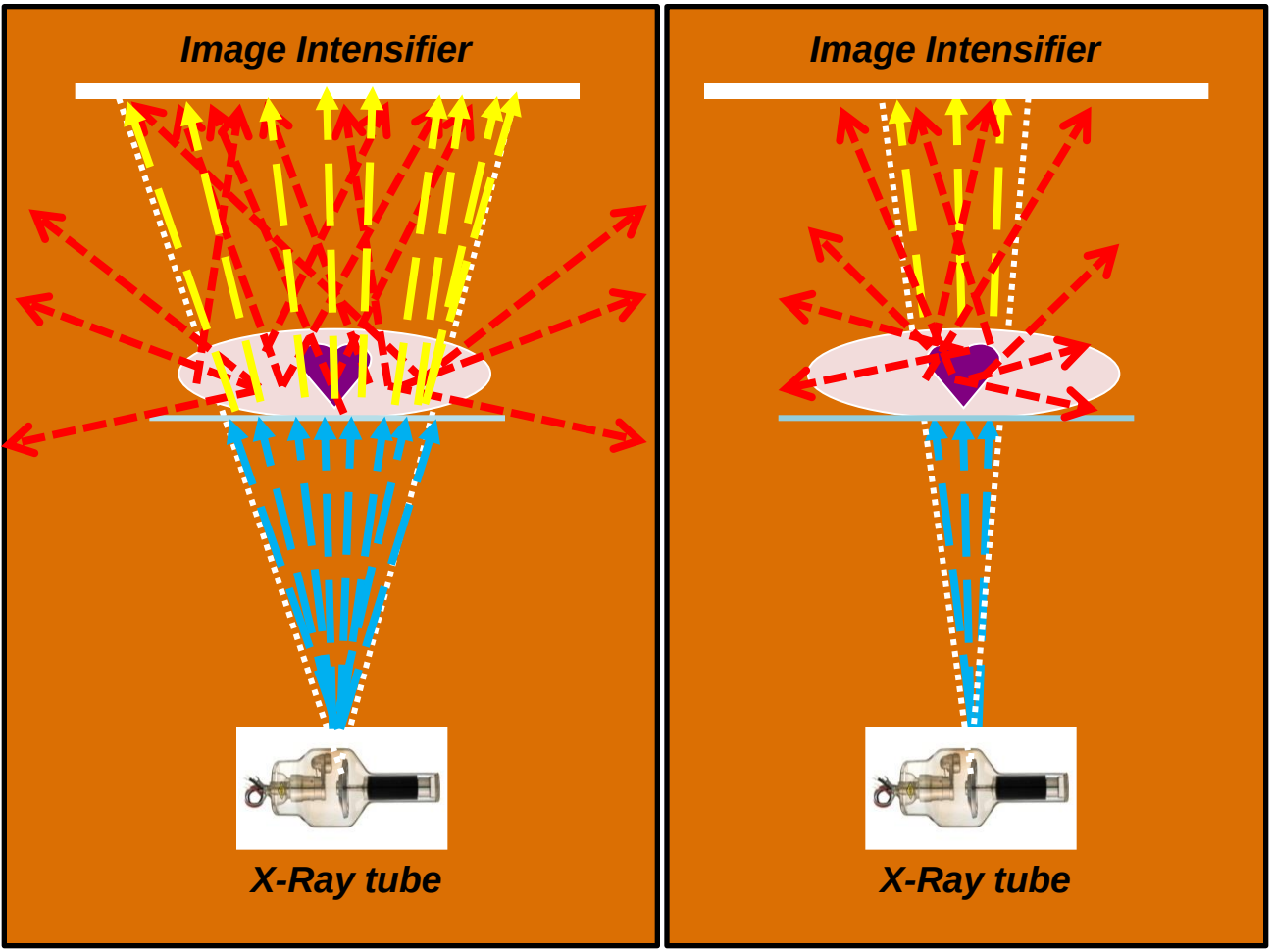

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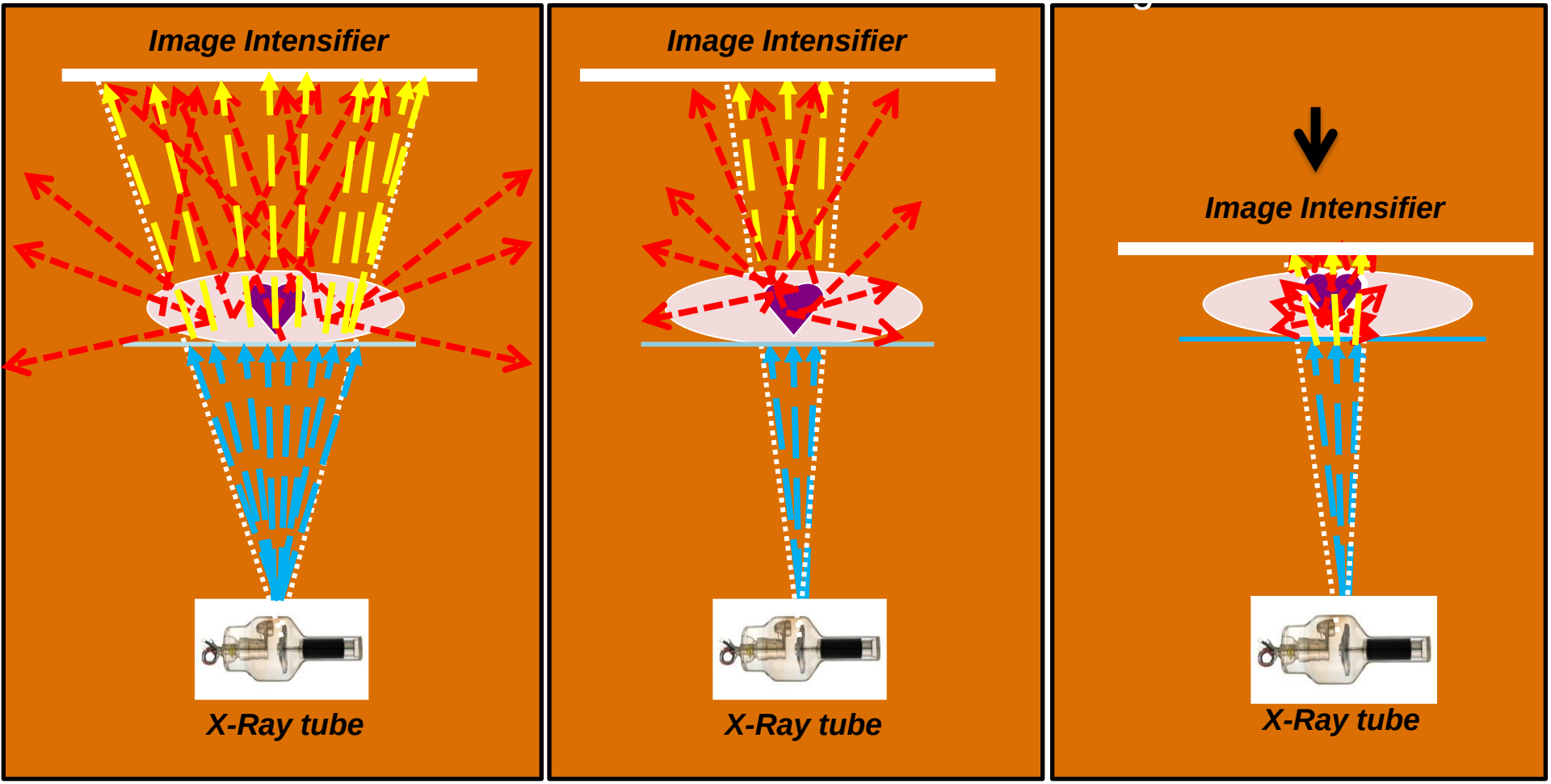
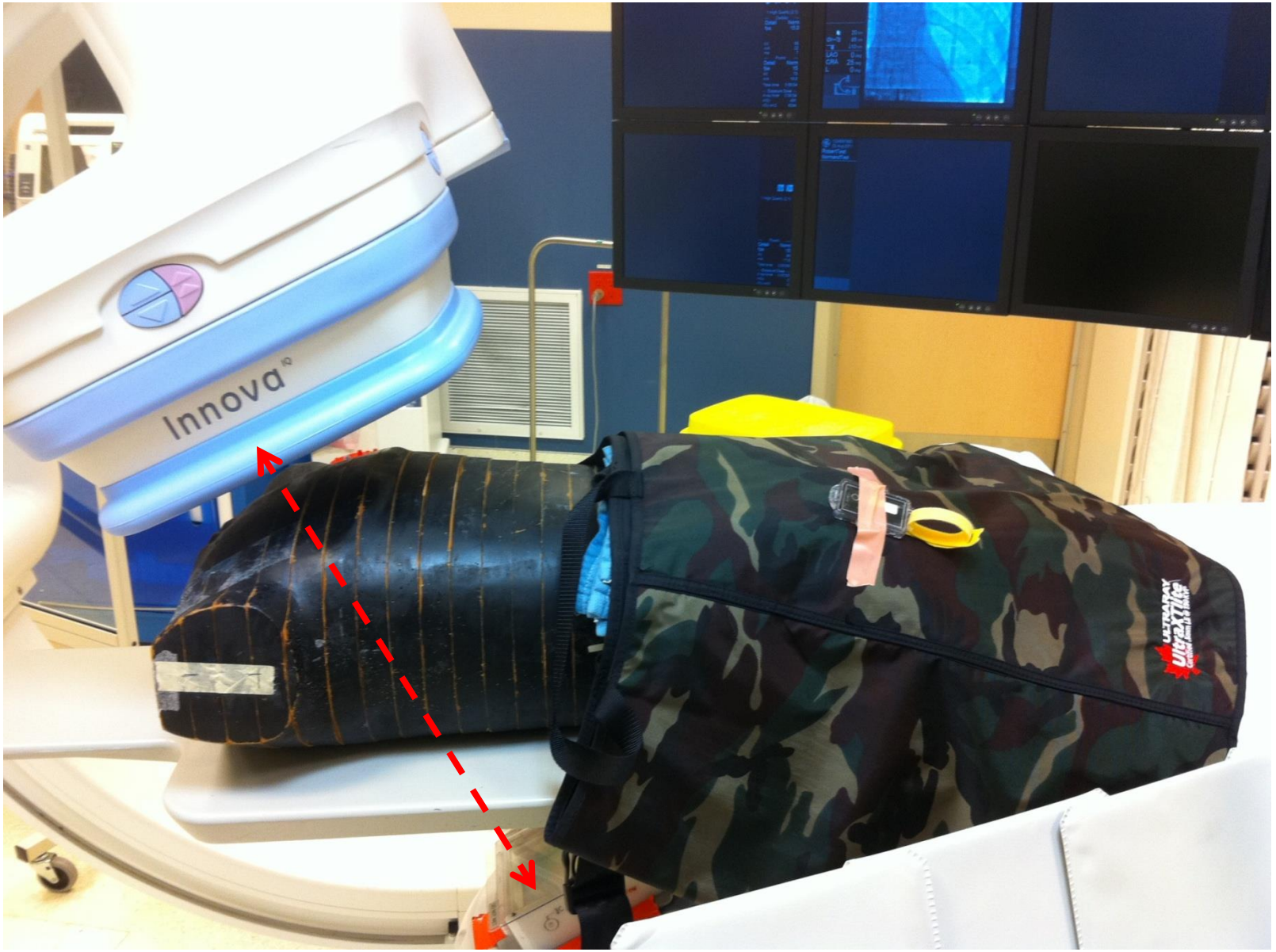


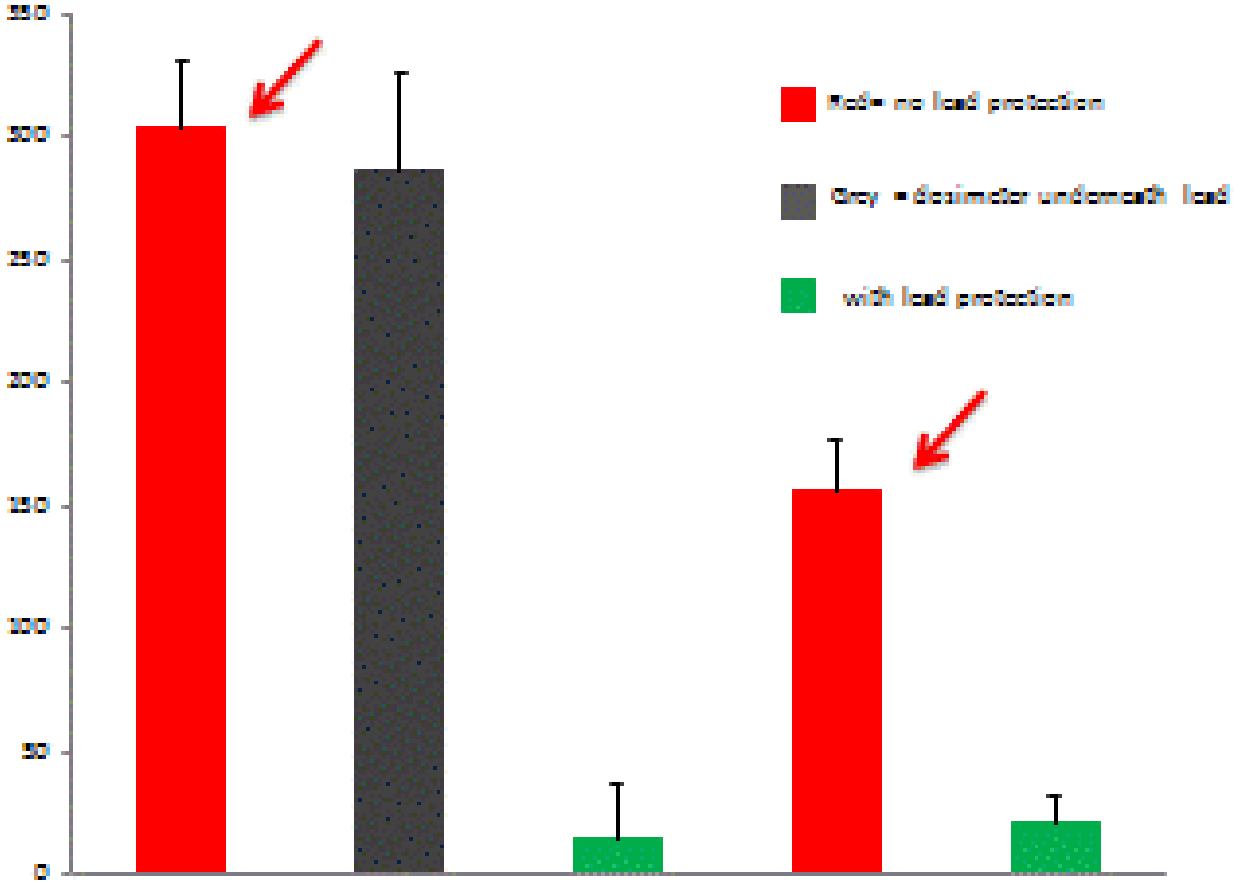
A randomized study comparing the use of a pelvic lead shield during trans-radial interventions: Threefold decrease in radiation to the operator but double exposure to the patient.



Osherov et la EuroIntervention. 2013;9:757-60

Distance is important

LAO 39 Cranial 26
AP Cranial 25
Caudal 44

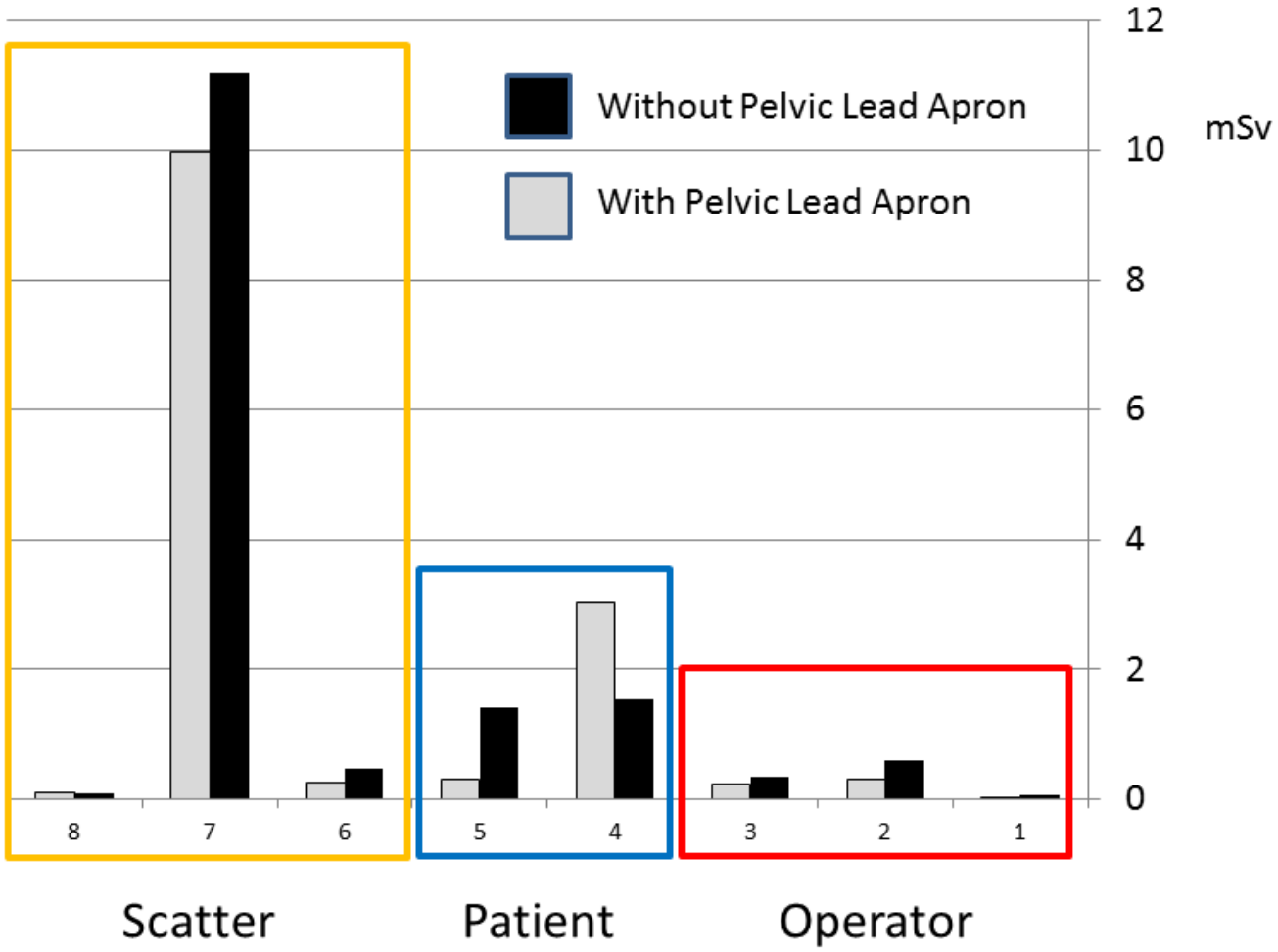


50 cm away from radiation beam 100cm

Osherov et la EuroIntervention. 2013;9:757-60

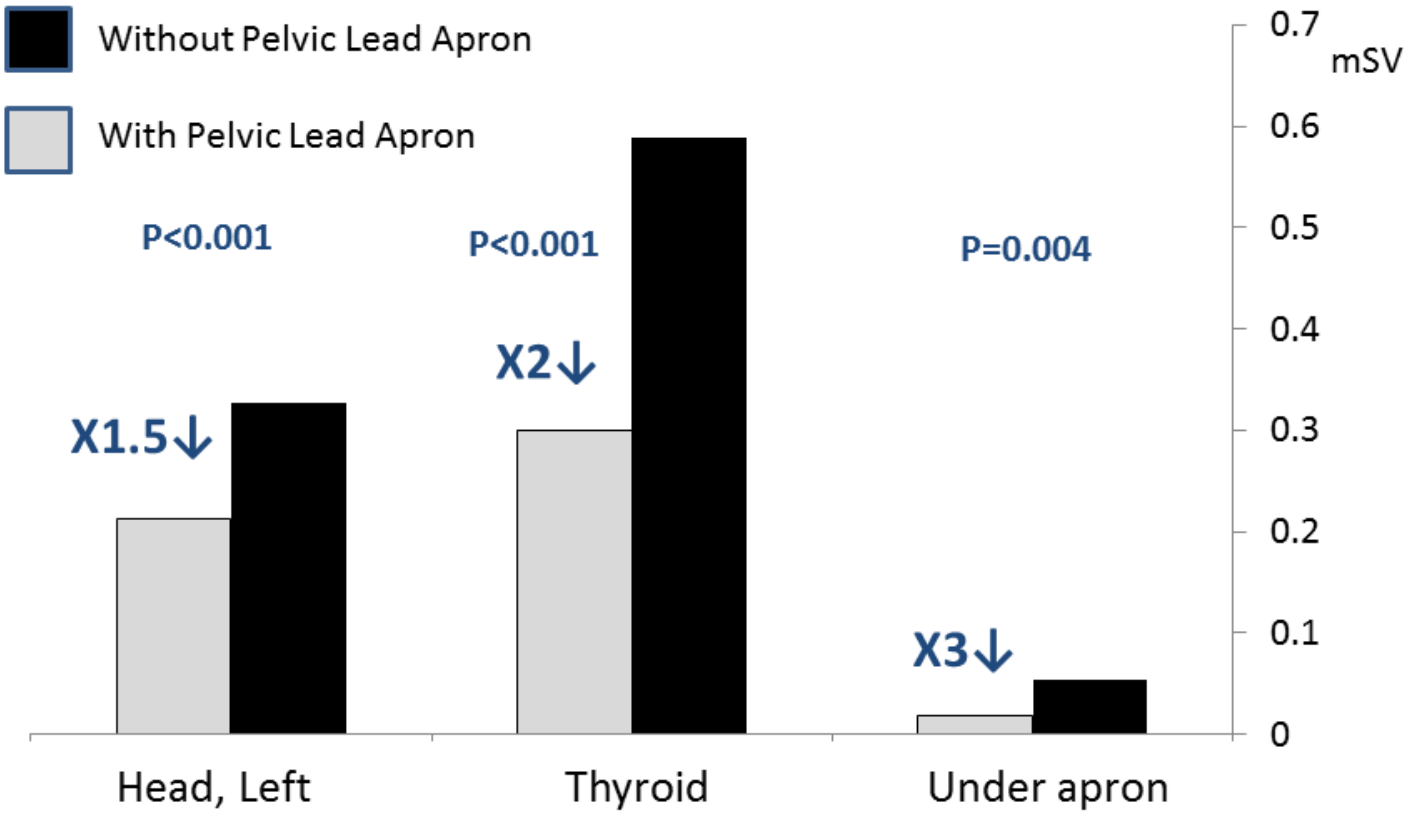
Catheter Cardiovasc Interv. 2015;85:1164-70

Radiation exposure



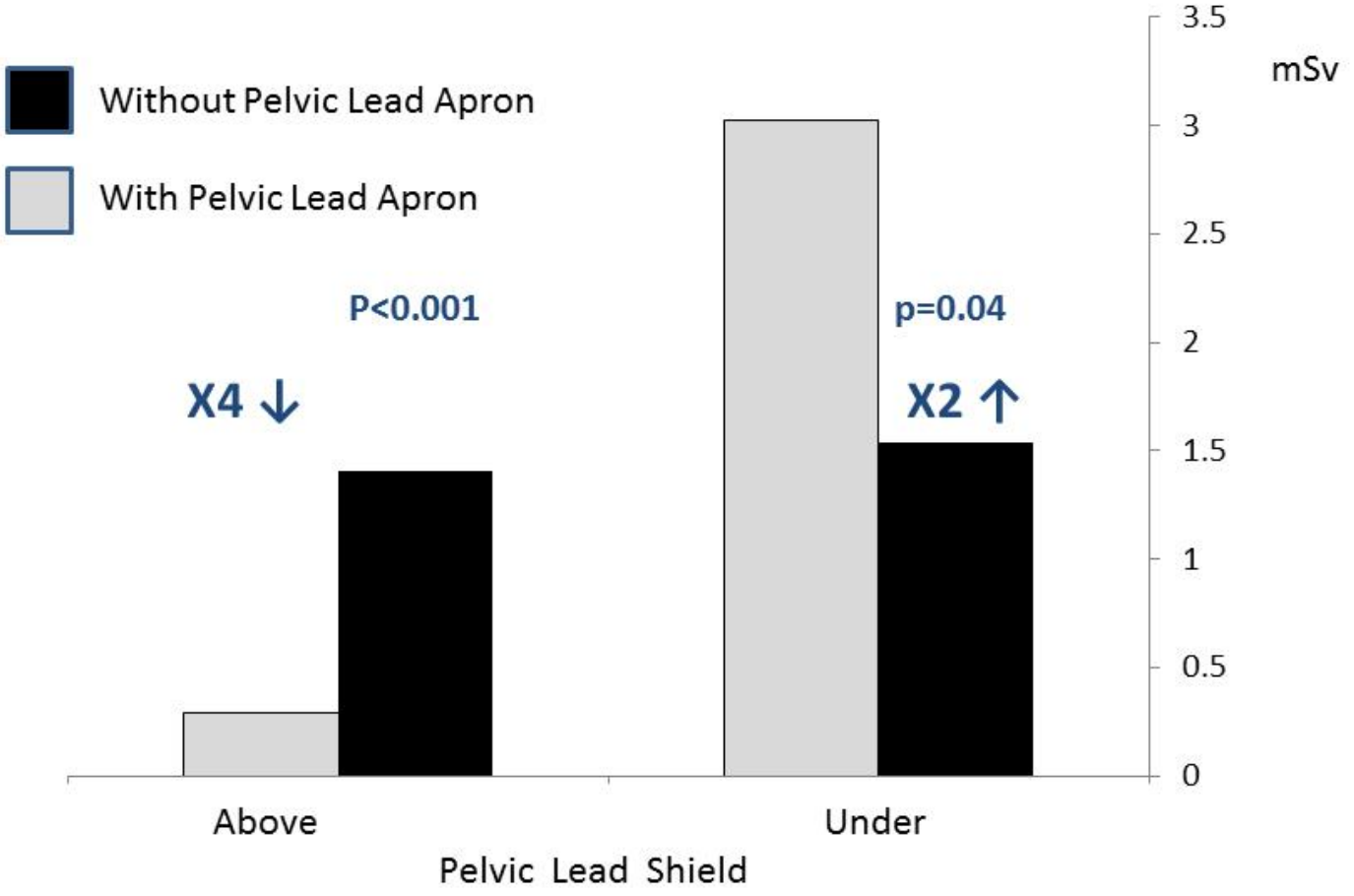
Catheter Cardiovasc Interv. 2015;85:1164-70

Radiation to operator



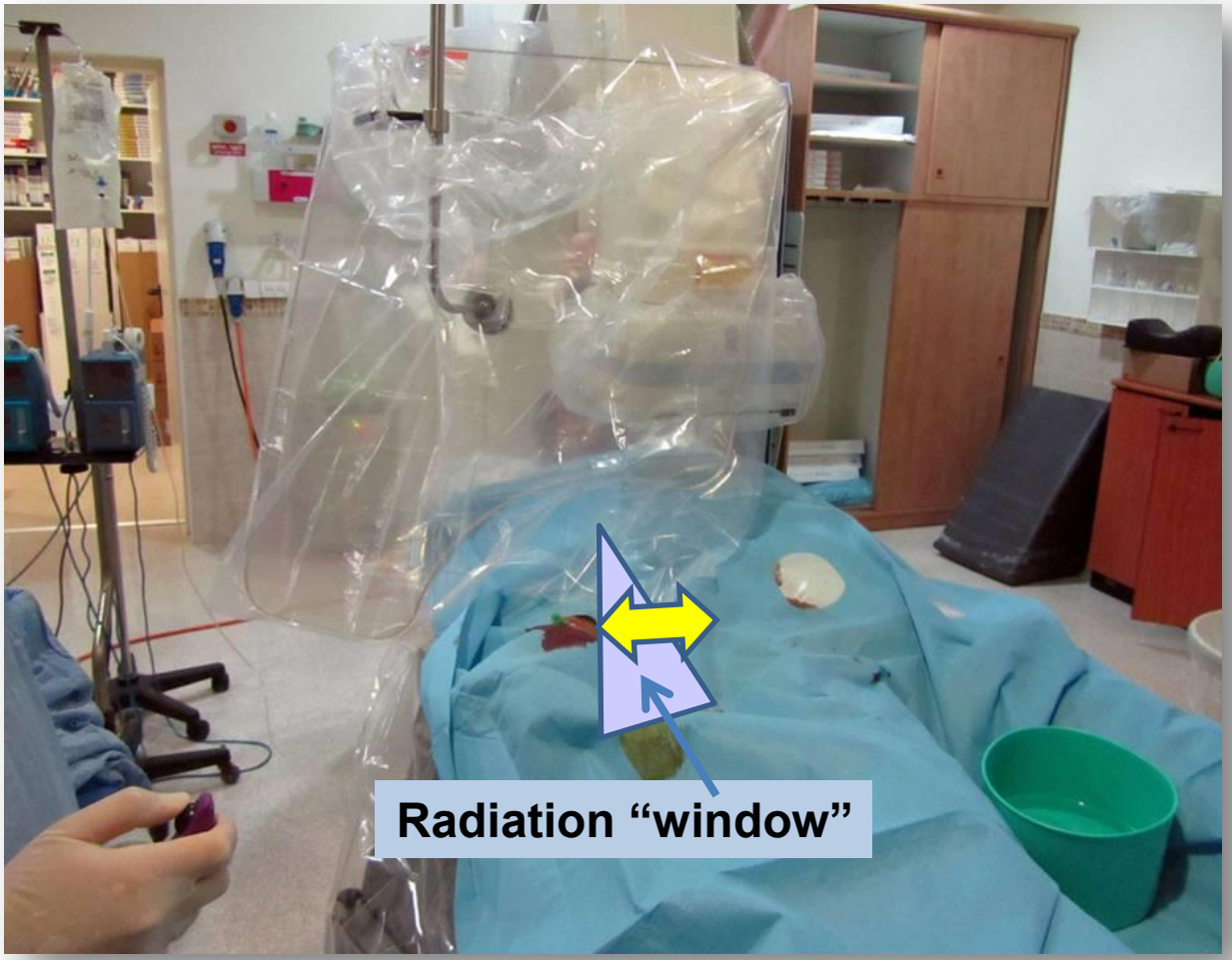
Catheter Cardiovasc Interv. 2015;85:1164-70

Radiation to Patient



Catheter Cardiovasc Interv. 2015;85:1164-70

MORE RADIATION IN RADIAL APPROACH

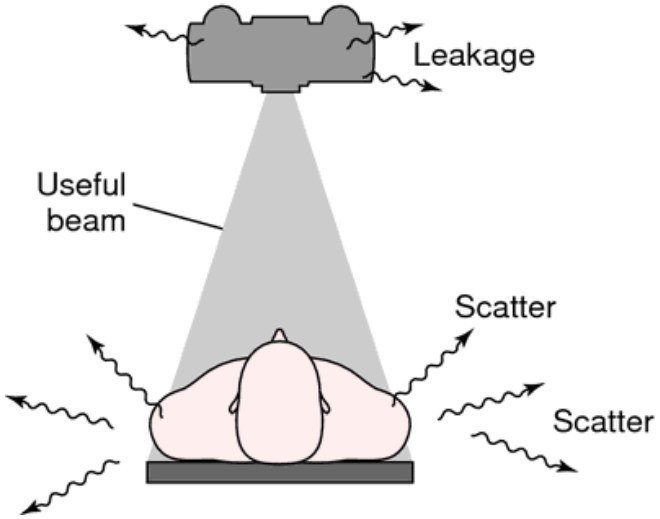


Form a “protection wall”

Personal protection equipment

Scatter radiation

- Most of the radiation is scatter radiation



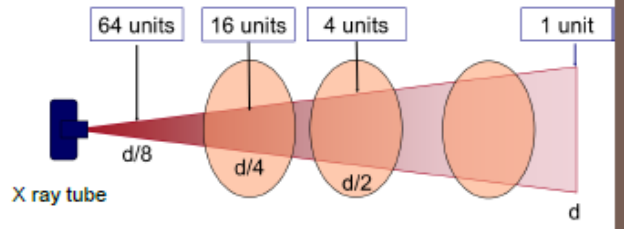
Improvements in radiation protection are needed.

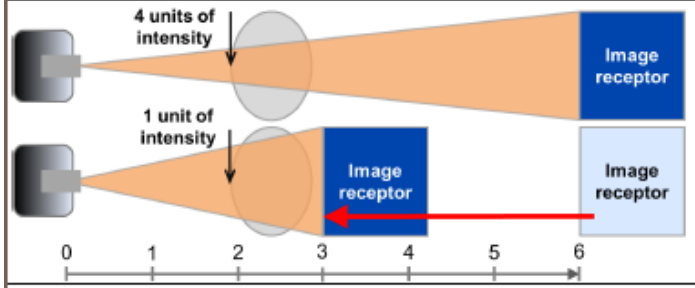
Pelvic lead shielding has the potential to reduce operator radiation dose.

Take home message

Radiation *protection of patients in fluoroscopy*

1. Maximize distance between the X ray tube and the patient to the extent possible

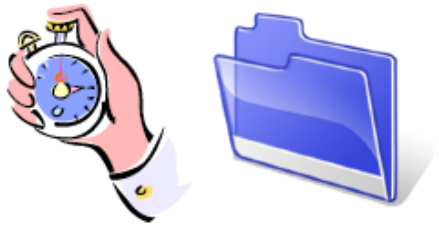


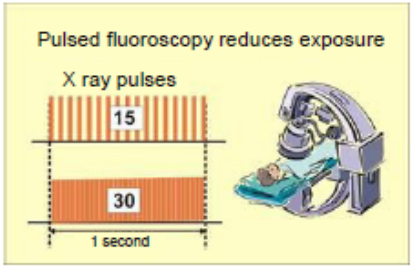


2. Minimize distance between the patient and the image receptor

3. Minimize fluoroscopy time

Keep records of fluoroscopy time and DAP/KAP (if available) for every patient





4. Use pulsed fluoroscopy with the lowest frame rate possible to obtain images of acceptable quality

5. Avoid exposing the same area of the skin in different projections

Vary the beam entrance port by rotating the tube around the patient

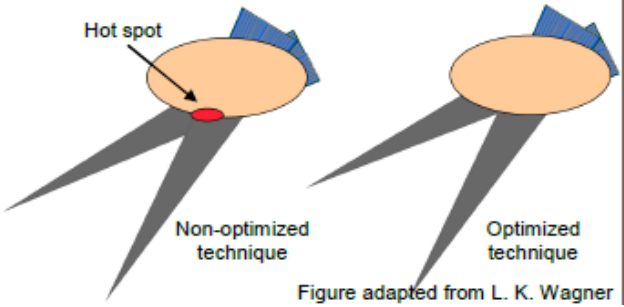
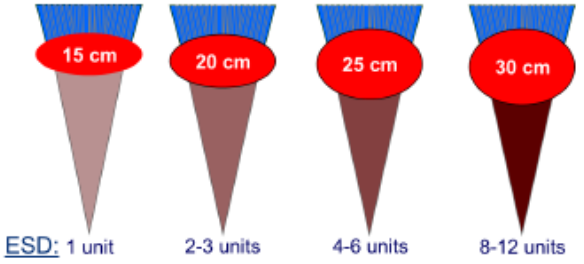


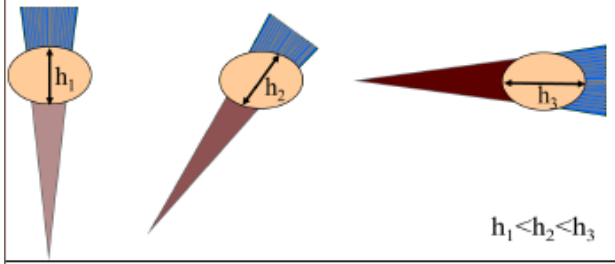
Figure adapted from L. K. Wagner

Take home message

Radiation *protection of patients in fluoroscopy*

6. Larger patients or thicker body parts trigger an increase in entrance surface dose (ESD)





$h_1 < h_2 < h_3$

7. Oblique projections also increase ESD

Be aware that increased ESD increases the probability of skin injury

INTENSIFIER Field-of-view (FOV)	RELATIVE PATIENT ENTRANCE DOSE RATE FOR SOME UNITS
12" (32 cm)	100
9" (22 cm)	177
6" (16 cm)	400
4.5" (11 cm)	711

8. Avoid the use of magnification

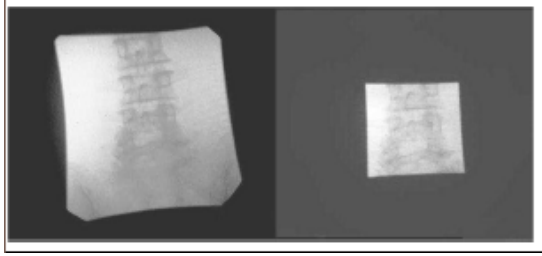
Decreasing the field of view by a factor of two increases dose rate by a factor of four

9. Minimize number of frames and cine runs to clinically acceptable level

Avoid using the acquisition mode for fluoroscopy

Cine dose rate ≈ (10-60) × normal fluoroscopy dose rate

Documentation should be performed with last image hold whenever possible and not with cine images



10. Use collimation

Collimate the X ray beam to the area of interest

protection of staff in fluoroscopy

10 Pearls: Radiation protection of *staff* in fluoroscopy

Reducing patient dose always results in staff dose reduction

1. Use protective devices!

Advisable skirt type lead apron to distribute weight

0.25 mm lead equivalence but with overlap on front to make it 0.5 mm on the front and 0.25 mm on the back (Provides >90% protection)

Lead glass eyewear with side protection

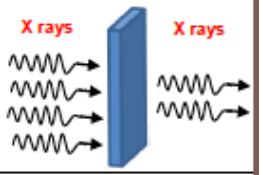
Thyroid protection

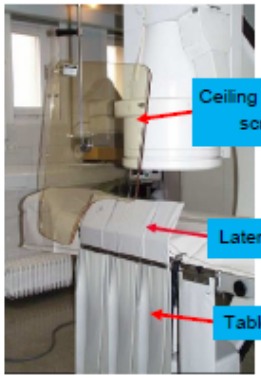
2. Make good use of time-distance-shielding (TDS) principle

Minimize time

Maximize distance as much as clinically possible

Use shielding

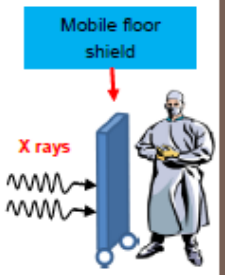




3. Use ceiling suspended screens, lateral shields and table curtains

They provide more than 90% protection from scattered radiation in fluoroscopy

Mobile floor shielding is advisable when using cine acquisition



4. Keep hands outside the primary beam unless totally unavoidable

Hands inside the central area of the primary beam will increase exposure factors (kV, mA) and doses to patient and staff