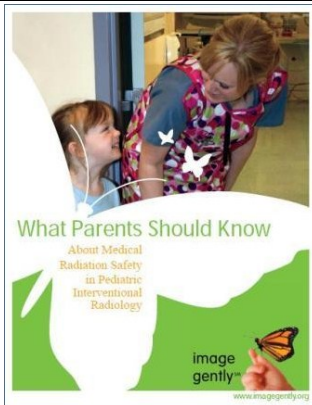


# 10 Bisera: Zaštita od zračenja u *pedijatrijskoj interventnoj radiologiji*

**1. Zapamtite: Određena tkiva kod dece u periodu rasta su osetljivija na zračenje u odnosu tkiva odraslih osoba.**

**Duži očekivani životni vek kod dece omogućava više vremena za manifestaciju radijacionih efekata.**



**2. Razgovarajte sa roditeljima pre procedure:**

- Postavite pitanje o prethodnim pregledima
- Odgovorite na njihova pitanja iz domena zaštite od zračenja.

image gently

Patient's Name \_\_\_\_\_ MR# \_\_\_\_\_ Date of exam \_\_\_\_\_

**Step Lightly Checklist**

Review steps below before starting the procedure.

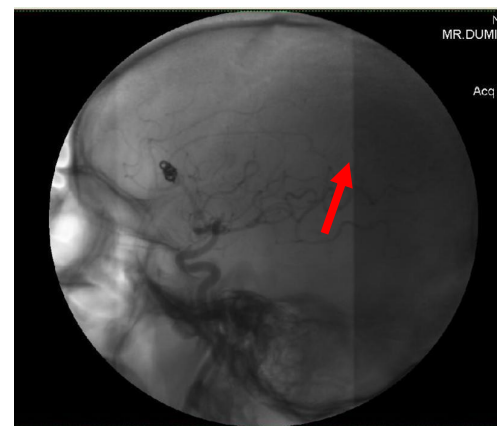
Safety is a team effort: don't be afraid to ask the necessary questions to ensure you are working as a team to keep radiation dose to patients and staff as low as possible.

Reducing radiation dose must be balanced with safe, accurate and effective completion of the procedure. Not all the steps below may be possible in each case, depending on patient size, technical challenge and critical nature of the procedure. Overall patient safety is most important. The goal is to minimize the dose to the patient while providing important and necessary medical care.

- Ask patient or family about previous radiation ([record card downloadable at this link](#)). Answer questions about radiation safety ([parent patient brochure downloadable here](#))
- Use ultrasound when possible
- Position hanging table shields and overhead lead shields prior to procedure with remainder during the case as needed
- Operators and personnel wear well fitted lead aprons, thyroid shield and leaded eye wear
- Use pulse rather than continuous fluoroscopy when possible, and with as low a pulse as possible
- Position and collimate with fluoroscopy off, tapping on the pedal to check position
- Collimate tightly. Exclude eyes, thyroid, breast, gonads when possible
- Operator and personnel hands out of beam
- Step lightly: tap on pedal and review anatomy on last image hold rather than with live fluoroscopy when possible; minimize live fluoroscopy time
- Minimize use of electronic magnification, use digital zoom whenever possible
- Acknowledge fluoroscopy timing alerts during procedure
- Use last image hold whenever possible instead of exposures
- Adjust acquisition parameters to achieve lowest dose necessary to accomplish procedure: use lowest dose protocol possible for patient size, lower frame rate, minimize magnification, reduce length of run
- Plan and communicate number and timing of acquisitions, contrast parameters, patient positioning and suspension of respiration with radiology and sedation team in advance to minimize improper or unintended runs
- Move table away from X-ray tube in both planes. Move patient as close to detector in both planes
- Use a power injector, or extension tubing if injected by hand
- Move personnel away from table or behind protective shields during acquisitions
- Minimize overlap of fields on subsequent acquisitions
- After procedure: record and review dose

**3. Utičite na svest mlađih saradnika analizirajući radijacionu sigurnost svake procedure i pre njenog početka. Koristite ček-listu.**

**4. Detaljno, unapred planirajte procedure kako biste izbegli neprimerene ili nepotrebne akvizicione serije i ponovljene ekspozicije.**



[http://www.pedrad.org/associations/5364/files/ImGen\\_StpLight\\_Chcklst.pdf](http://www.pedrad.org/associations/5364/files/ImGen_StpLight_Chcklst.pdf)



**5. Koristite zaštitne sredstva za štitastu žlezdu, dojke, oči i gonade uvek kada je to moguće.**



**RPOP Posters webpage!**

<https://rpop.iaea.org/RPOP/RPoP/Content/AdditionalResources/Posters/index.htm>

# 10 Bisera: Zaštita od zračenja u *pedijatrijskoj interventnoj radiologiji*

## 6. Koristite optimalnu tehniku:

- Manji broj frejmova u jedinici vremena. Smanjenje broj impulsa u sekundi sa 7.5 na 3 uvek kada je to moguće
- Kod dece lakše od 20 kg, uklonite rešetku ukoliko je to moguće . Umesto rešetke koristiti vazdušni procep.
- Skratite vreme pregleda
- Izbegavajte preklapanje polja tokom ponovljenih akvizicija
- Koristite kolimaciju
- Izbegavajte magnifikaciju (zoom)

### 10 Bisera: Zaštita *pacijenta* u fluoroskopiji

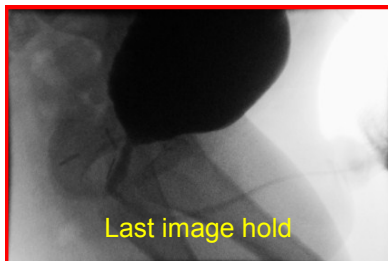
1. Udaljenost između rendgenske cevi i pacijenta mora biti što veća.
2. Rastojanje između elektronskog pojačavača i pacijenta mora biti što manje.
3. Fluoroskopiju koristiti u što kraćem vremenu.
4. Koristiti impulsnu fluoroskopiju s najmanjim mogućim brojem slika u sekundi, kako bi se zadržao prihvatljiv kvalitet slike.
5. Izbegavati ozračivanje istog dela kože tokom različitih projekcija.

IAEA RPOP <http://rpop.iaea.org>

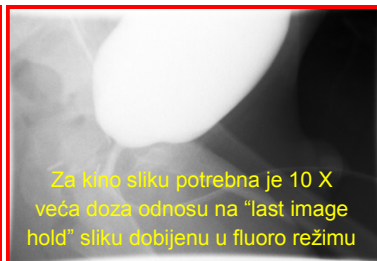
### 10 Bisera: Zaštita *pacijenta* u fluoroskopiji

6. Deblji pacijenti ili delovi tela uzrokuju povećanje doze na površini kože pacijenta (ESD).
7. Kose projekcije takođe povećavaju ulaznu kožnu dozu.
8. Izbegavajte upotrebu uvećanja. Smanjenje polja (field of view FOV) za faktor 2, povećava jačinu doze za faktor 4.
9. Smanjiti broj frejmova i broj akvizicija na klinički prihvatljivo nivo. Izbegavati upotrebu akvizicije (čine) umesto fluoroskopije.
10. Koristite kolimaciju! Svesti snop x zračenja na interesnu zonu.

IAEA RPOP <http://rpop.iaea.org>



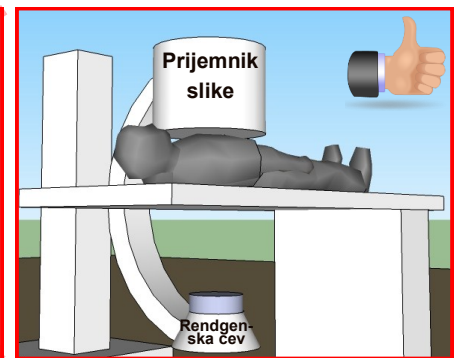
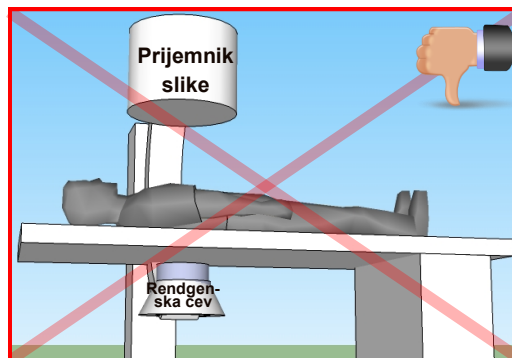
Last image hold



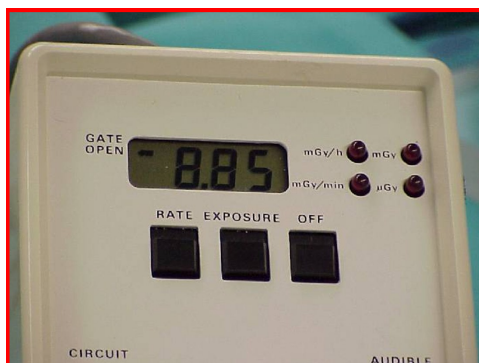
Za kina sliku potrebna je 10 X veća doza odnosi na "last image hold" sliku dobijenu u fluoro režimu

## 7. Koristiti "last image hold" umesto dodatnih ekspozicija, uvek kada je to moguće.

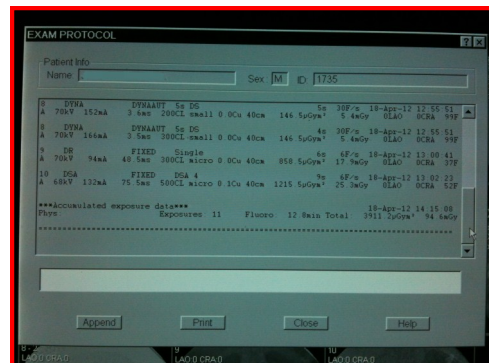
- ### 8. Povećati rastojanje između pacijenta i rendgenske cevi. Smanjiti rastojanje između pacijenta i prijemnika slike.



- ### 9. Koristiti sistem za evidentiranje doze i postojeće tehnike za smanjenje doze.



- ### 10. Analizirati i evidentirati dozu nakon procedure



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