

# Interventne procedure u lečenju bola

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**HEPMP**  
HIGHER EDUCATION PAIN MEDICINE PROJECT

# Lečenje hroničnog bola u Srbiji

- Nakon nepotpune rezolucije hroničnog bola (npr. spinalnog) izabrani lekar upućuje bolesnika neurohirurgu/neurologu/ortopedu
- Pacijenti takođe traže opcije: kiropraktičar, homeopatija..
- Hirurzi ne poznaju dijagnostičke i terapijske algoritme minimalno invazivnih procedura u lečenju bola, te izvode hirurški zahvat, čija je efikasnost kao Th krajnje kontroverzna

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# Ishodi lečenja

- Produžen oporavak nakon operacije, produženo bolovanje, neželjeni efekti lekova..
- Epiduralna fibroza nakon op uobičajena-bol i ishemija nervnih korenova
- Fasetni/disgogeni/sakroilijačni bol na susednim nivoima kičme nakon op skoro neizbežan, skoro nemoguće lečiti bilo kojom metodom

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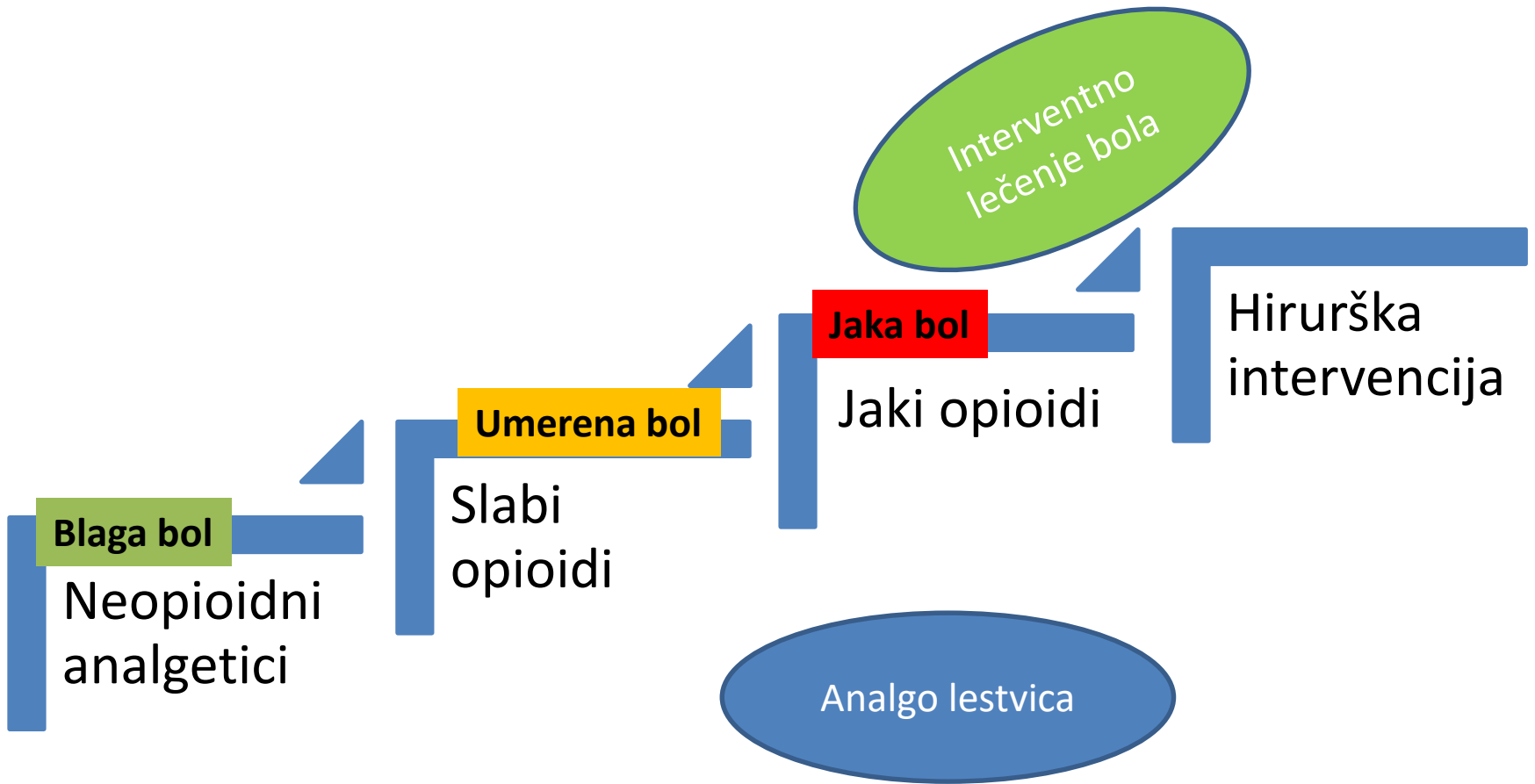
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# Šta je interventno lečenje bola?

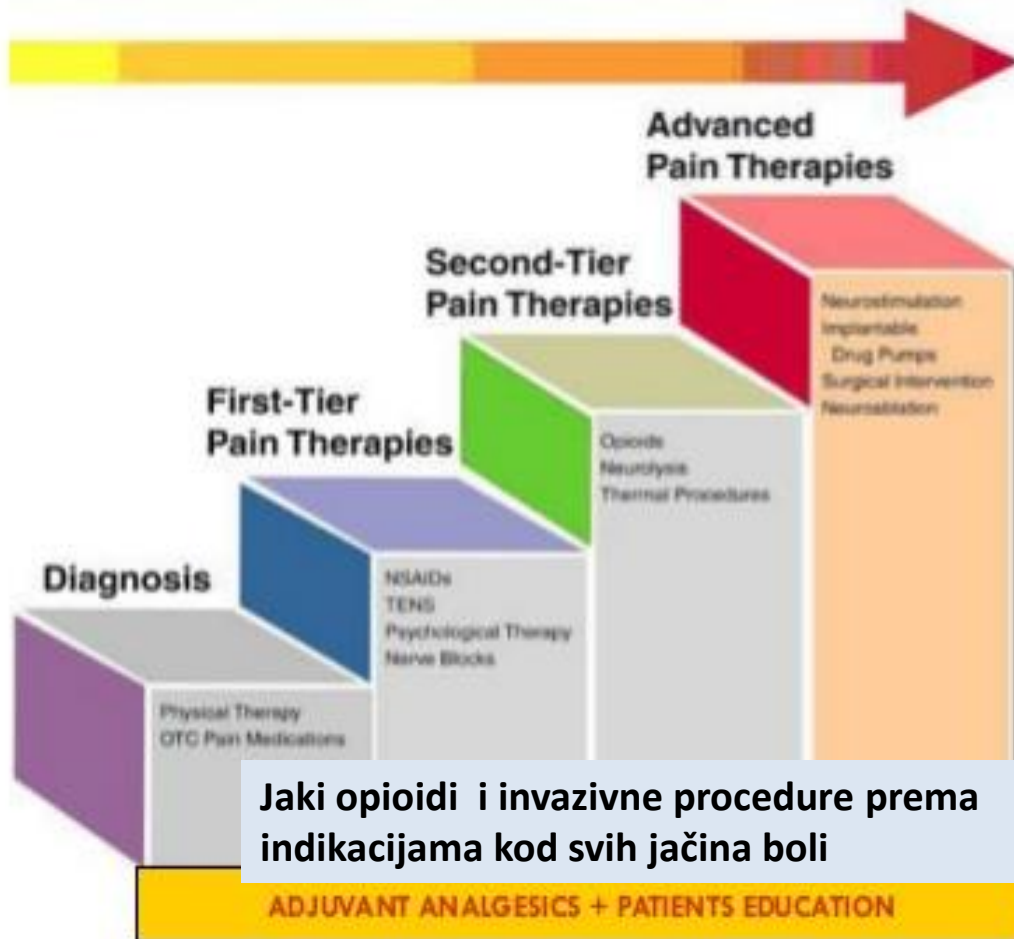
- Primena minimalno invazivnih tehnika u cilju smanjenja ili eliminisanja bola od strane specijalno obučениh subspecijalista medicine bola

# Mesto interventnih procedura, ranije

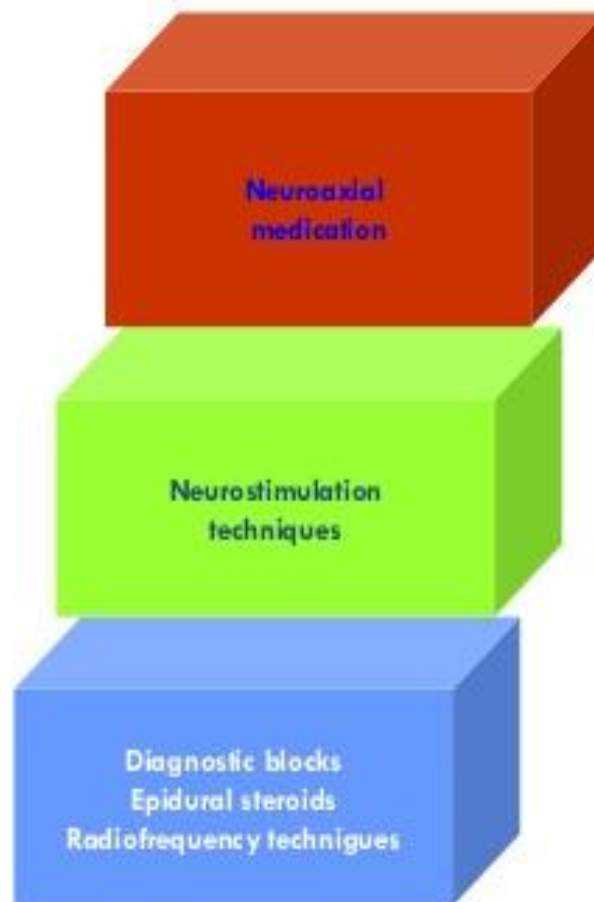


# Sada: Analgetski lift

## The Chronic Pain Treatment Continuum




## Interventional Therapies



# Interventno lečenje


Subspecijalista MB ili drugi specijalisti koji poznaju sve tehnike konzervativnog i minimalno invazivnog lečenja bola



Algoritmi dijagnostikovanja, personalizovan pristup, reakcija u slučaju promene simptoma



edukacija /modifikacija stila života (fizička aktivnost, nutricija) bolesnika radi maksimiziranja funkcije i sprečavanja recidiva



Bolji ishod lečenja, smanjenje troškova lečenja

# Interventno lečenje bola u Srbiji

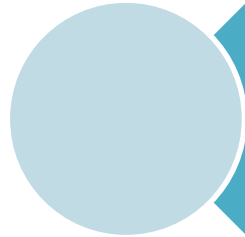
- **Nedostatak obučениh subspecijalista za ove procedure**
- Nedostatak obučениh radioloških tehničara (asistiraju prilikom fluoroskopije) i sestara koje prate oporavak bolesnika
- Nedostatak prostora, opreme i lekova
- Koncept Jednodnevne (ambulantne) “hirurgije” ?

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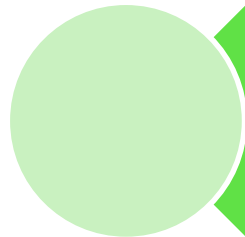
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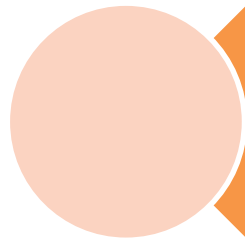
## Tri ključna koncepta ILB



Identifikacija/tretman uzroka bola,  
po algoritmu minimalno invazivnih  
procedura



Adekvatno tretiranje simptoma  
(medikamentozna, fizikalna Th)



Edukacija i promena stila života  
bolesnika, fizikalna Th u cilju maks  
funkcije i sprečavanja recidiva bola

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# Interventno lečenje bola

## Osnovne

- Blokada triger tačaka
- Periferni nervni blokovi
- Epiduralne injekcije i neuroaksijalni nervni blokovi
- Blok gangliona stelatuma
- Neuroloitički blokovi

## Napredne

- Procedure na disku
- Radiofrekventna ablacija
- Epiduroskopija
- Stimulacija kičmene moždine
- Implantacija sistema za isporuku lekova

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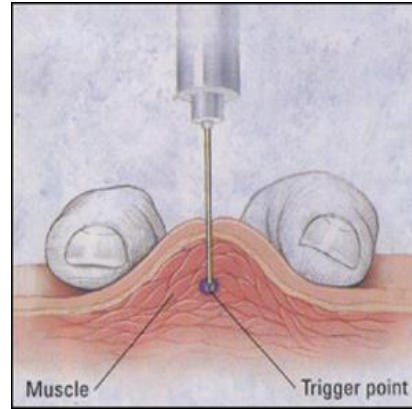
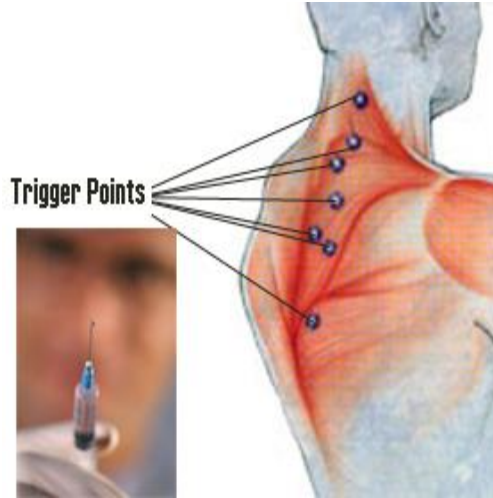
# Mehanizam dejstva ILB

- Aplikacija leka na mesto dejstva
- Korigovanje patološkog supstrata
- Prekid prenošenja bolnog signala

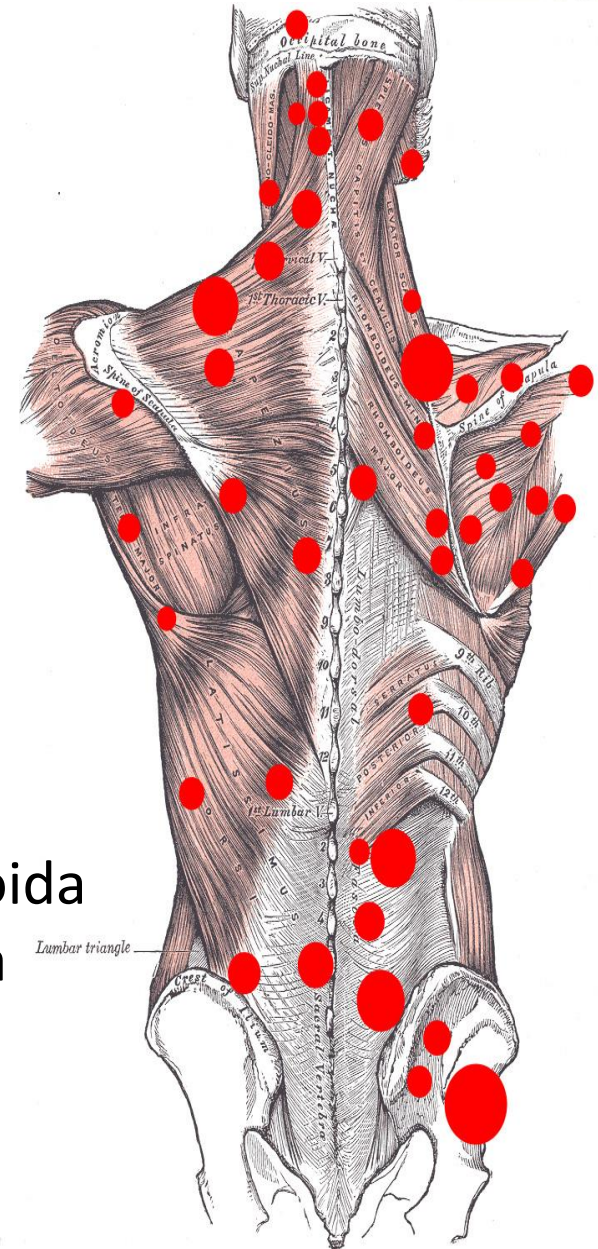
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# Blokada triger tačkaka



Injeksija lokalnog anestetika i kortikosteroida u tačku okidača bola, ponavlja se 3-7 puta



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# Nervni blokovi

- **Dijagnostički**- samo lokalni anestetik da se potvrdi mehanizam, odnosno simulira efekat terapije
- **Terapijski**- anestezira se put prenosa bola, privremeno (lokalni anestetik) ili trajno (litički agens, krio, radifrekventna Th), ili se smanjuje inflamacija (kortikosteroidi)

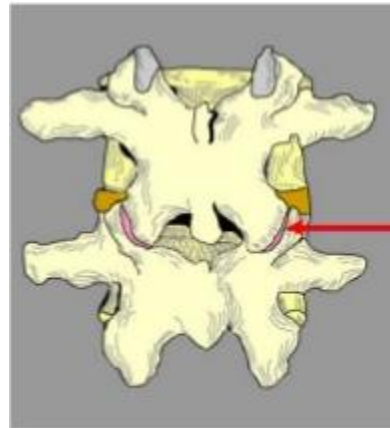
# Bol u vratnom i leđnom delu kičme

*Kod svih ljudi tokom vremena dolazi do degenerativnih oštećenja pokretnih segmenata kičmenog stuba*

Uzroci spinalnog bola su dobro poznati:

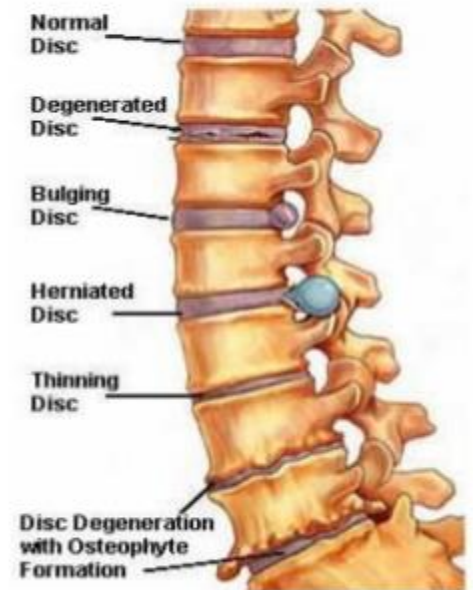
- **Fasetni zglob**
- **Inervertebralni disk**
- **Sakroilijačni zglob**
- **Inflamacija nerava**  
(radikularni bol)
- Postoje definisani protokoli postupanja zavisno od uzroka bola

Basic functional units of spine—motion segments—consist of two posterior zygapophyseal (facet) joints and an intervertebral disc, forming a tri-joint complex



Zygapophyseal joint

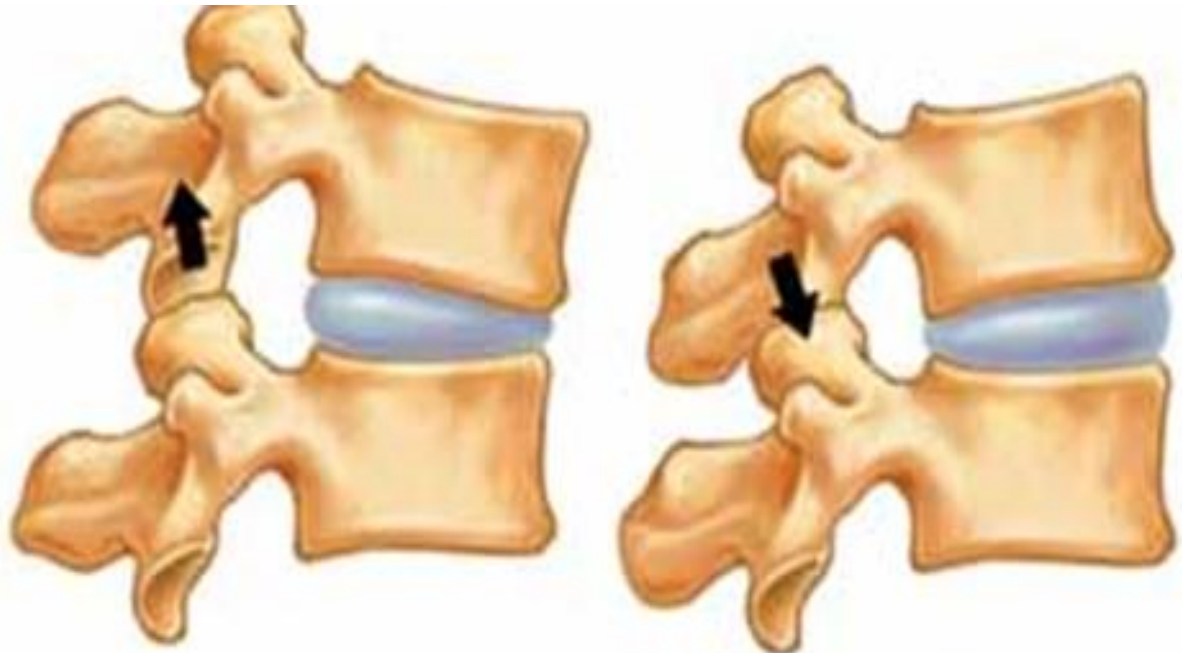
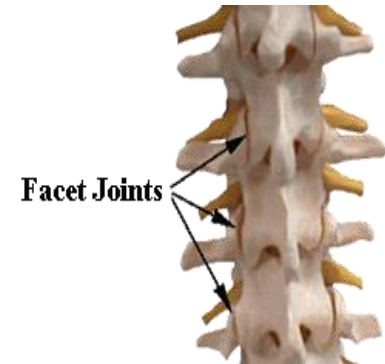
## Examples of Disc Problems



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# Fasetni sindrom

- uzrok bola u 40% slučajeva
- Stalni bolovi pogoršani rotacijom i istežanjem
- Bol zrači u nogu ili glutealni deo, ne-dermatomska distribucija
- Osteljivost u predelu zglobova , Paravertebralni grč mišića

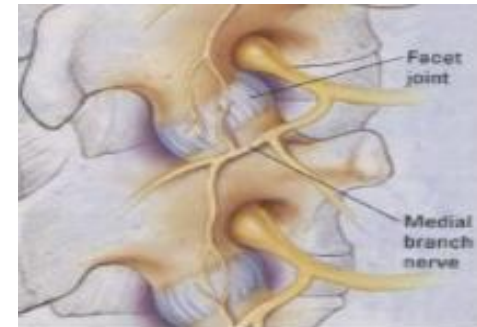


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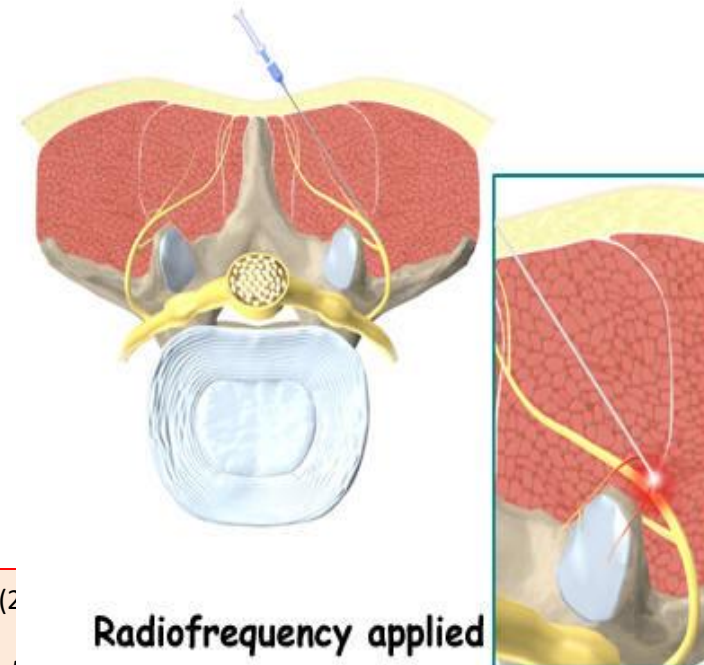
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# Radiofrekventna ablacija nerava (RFA)

- Primenom električnih impulsa Polutrajno se prekida kondukcija bolnog impulsa kroz nerv- lezija C vlakana
- Oporavak nerva nakon 6-18 meseci
- **blokiranje** (anestetik), ili **radiofrekventna neurotomija (destruktivna)** dve medijalne grane dorzalnog spinalnog nerva koje inervišu svaki fasetni zglob
- Selektivna **pulsna radifrekventna TH (nedestruktivna)** određenog nervnog korena



Microelectrode inserted

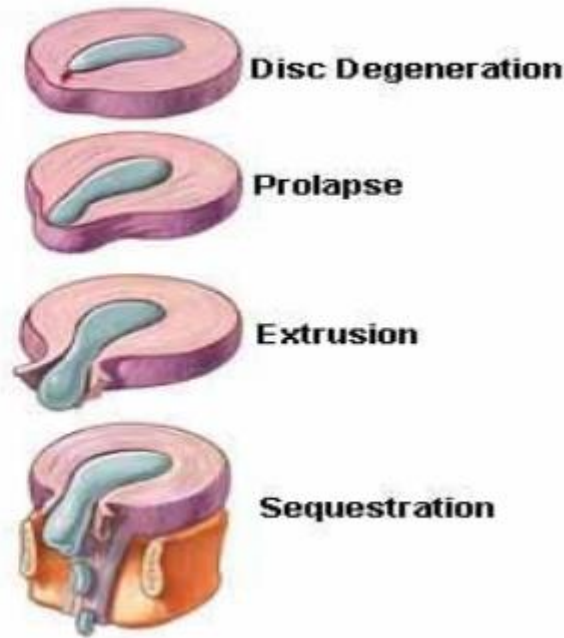


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# Diskopatija



- Uzrok bola u 20% slučajeva

Hernijacija- iritacija,  
inflamacija

Protruzija- pritisak na  
kičmenu moždinu , nervni  
koren

Pucanje fibroznog prstena-  
hemijska iritacija, edem

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# diskografija

- Ubrizgavanje kontrasta u disk uz rendgensko navođenje-morfologija diska, provokacija bola
- Pacijent referiše da li ubrizgavanje kontrasta izaziva bol sličan uobičajenom
- Postproceduralna RTG ili CT dokumentuje leziju diska
- Kandidat za intradiskalnu elektrotermalnu TH, anuloplastiku, nukleoplastiku, ozon nukleoliza, minimalno invazivna perkutana dekompresija diska (sitni se nuklus pulposus i isisava napolje),

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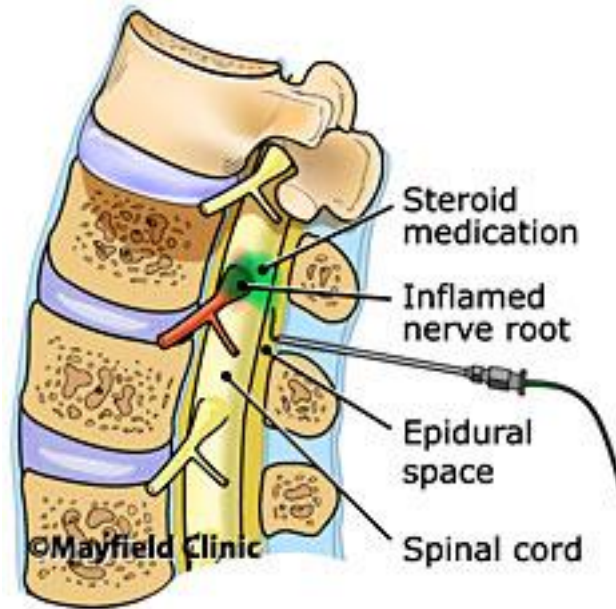
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# Bol u leđima

## Epiduralna injekcija steroida

- Smanjuje inflamaciju
- Translaminarni ili transforamenski pristup uz fluoroskopsko navođenje – precizna aplikacija na mesto patološkog procesa

## Epiduralna injekcija steroida

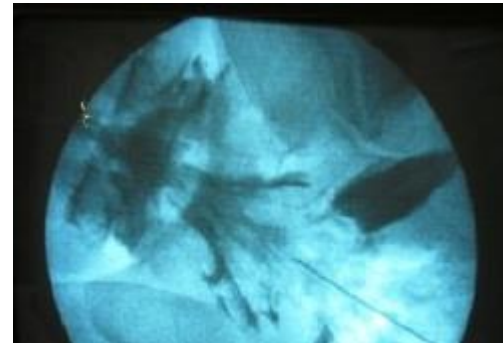


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# Epiduroлиза

- Epiduralna edhezioliza nakon potvrde fibroze epidurogramom ili tokom epiduralne endoskopije. Aplicira se fiziološki ili hipertoni NaCl rastvor, sa ili bez hijaluronidaze



Normalni epidurogram-obrnuto božično drvo  
Kontrast ulazi u duralne ekstenzije oko svakog  
nervnog korena. Defekt- fibroza

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## Blok sakroilijačnog zgloba

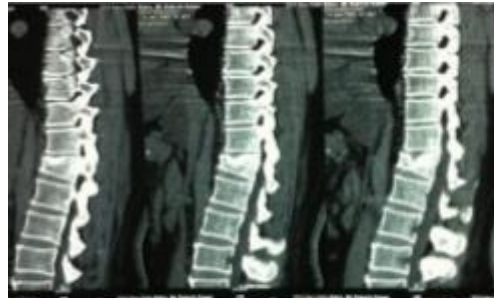
- Uzrok bola u donjem delu leđa u 13-20% slučajeva
- Perkutana radifrekventna neurotomija SI zgloba
- Injekcija kortikosteroida u sakroilijačni zglob obezbeđuje dugotrajno oslobađanje od bola



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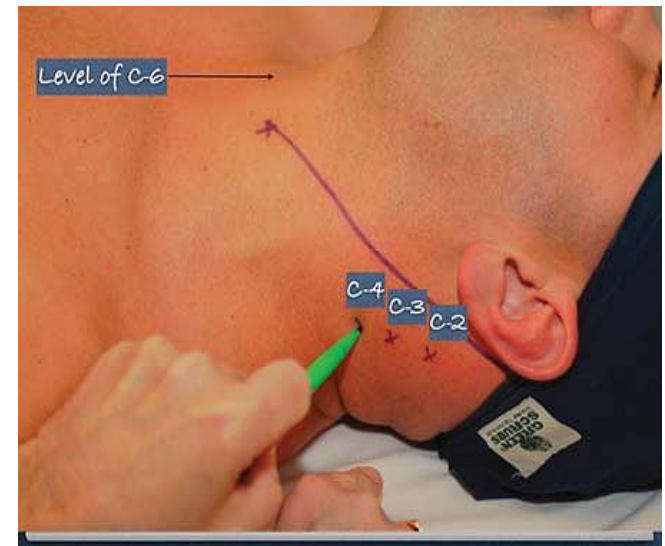
# Perkutana vertebroplastika

- Kod kompresivne frakture pršljena usled osteoporoze, karcinomskih metastaza, hemangioma
- Igla se pod rendgenom uvodi u pršljen i ubrizgava se viskoznan koštani cement
- Cement ne sme da dođe u kontakt sa nervima
- Stabilizacija i oslobađanje od bola



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# Blokovi za glavobolju: okcipitalni i blok C2 nervnog korena



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# Simpatički blok

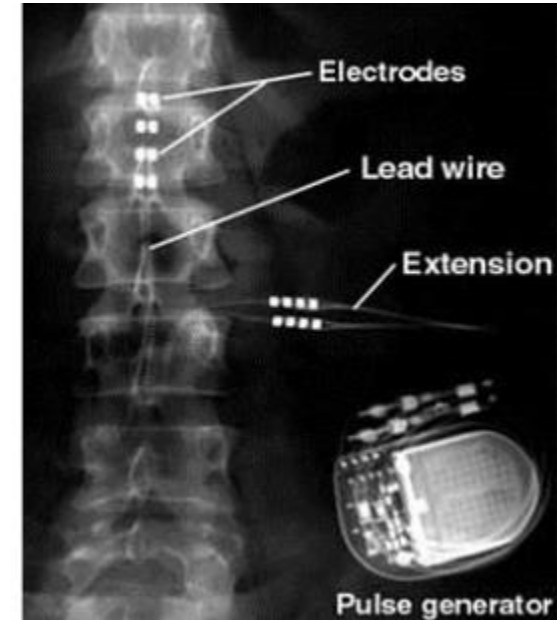
- ❑ Blokada simpatikusa u predelu vrata - Stellate ganglion ili u lumbalnoj regiji
- ❑ Uglavnom dijagnostički za potvrdu kompleksnog regionalnog bolnog sindroma
- ❑ Terapijski: KRBS gornjih i donjih ekstremiteta, vaskularna insuficijencija, refrakтерна angina; Lokalni anestetik ili neuroлиза





# Stimulacione (neuromodulacija) tehnike

- Stimulacija kičmene moždine
- Periferna nervna stimulacija



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# Interventno lečenje akutnog bola postoperativni, posttraumatski

- Kontinuirana epiduralna analgezija (PCEA)
- Spinalna analgezija
- Periferni nervni blokovi (jednokratni, kontinuirani)

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# Prednosti

- Bolja analgezija
- Manje doze lekova, manje neželjenih efekata
- Manja incidenca duboke venske tromboze i plućne embolije
- Manji gubitci krvi intraoperativno
- Ranija peristaltika
- Brže pokretanje bolesnika
- Bolja supresija neuro-endokrinog stres odgovora

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# Interventne procedure u lečenju karcinomskog bola

- Često najbolji a nekada i jedini način tretiranja karcinomskog bola
- Nakon procedure bolesnici su često mesecima bez bola
- Omogućava se značajno smanjenje doze opioida, i veoma povećava odgovor na opioide i druge analgetike

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# Interventne procedure u lečenju karcinomskog bola

## Nervni blokovi

- Visceralni bol kod karcinoma, se prenosi simpatičkim nervnim sistemom
- Visceralni organi su obično inervisani sa više nervnih struktura tako neuroлиза često ne dovodi do potpunog oslobađanja od bola

## Spinalna primena lekova

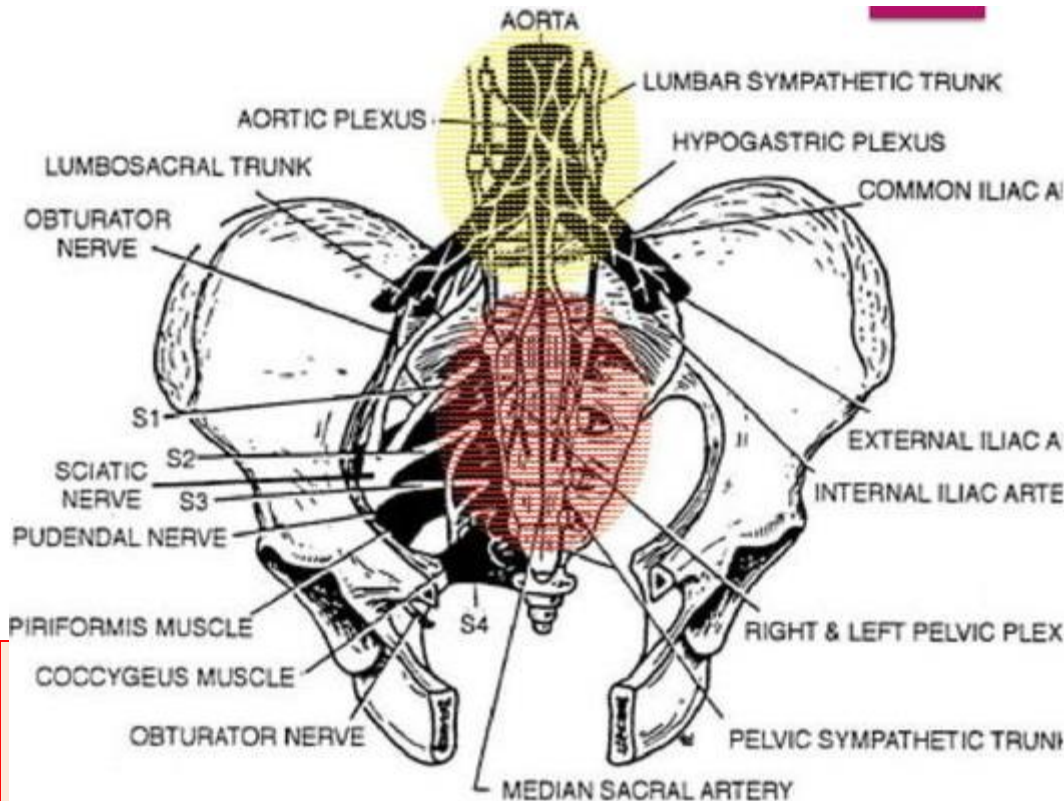
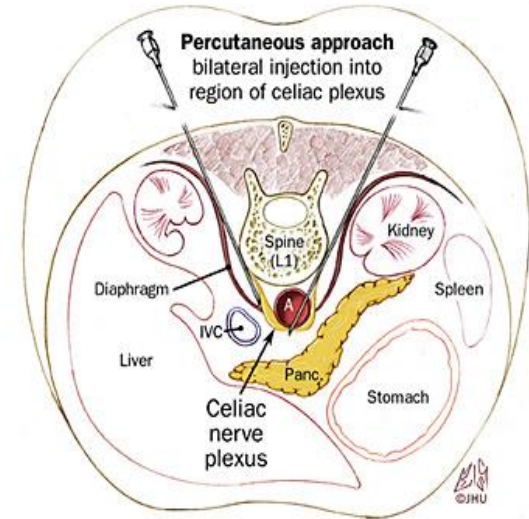
- Izraženi neželjeni efekti medikamentozne terapije

## Stimulacija kičmene moždine

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# Nervni blokovi

- Pankreas, gornji abdomen (želudac, jetra, dist. ezofagus)
  - Blok pleksusa celijakusa



- Donji abdomen (pelvični bol)
  - Blok gornjeg hipogastričnog pleksusa
- Interkostalni nervni blokovi
- Periferni nervni blokovi

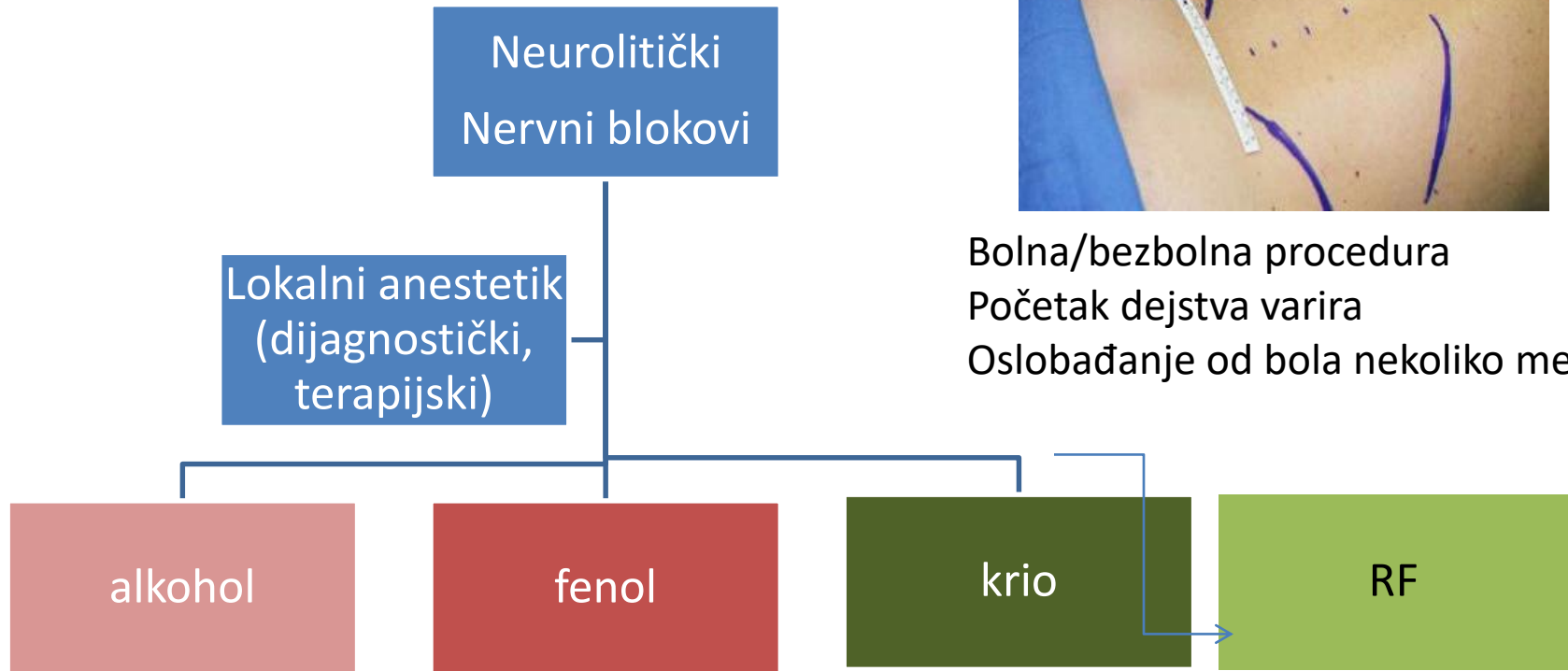
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# Nervni blokovi



Bolna/bezbolna procedura  
Početak dejstva varira  
Oslobađanje od bola nekoliko meseci



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# Spinalna primena lekova

- Očekivano trajnje života < 3 meseca
- Epiduralno, intratekalno (tunelirani kateter)
- Morfin:

**3mg PO = 1mg IV = 0,1mg epidural = 0,01mg spinal**

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# Intratekalna isporuka lekova- pumpa

- Očekivano trajanje života > 3 meseca
- Kontinuirana isporuka leka
- Znatno manje doze i neželjeni efekti
- Produžava život
- Konfornije za bolesnika
- skupo



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# zaključak

- Deo multimodalnog pristupa
- Ciljani tretman uzroka (mehanizma) bola
- Poštovati indikacije i kontraindikacije, obučeno osoblje, pažljiv monitoring-bezbednost pre svega
- Može olakšati rehabilitaciju kod hroničnog bola
- Manje rizika u odnosu na hirurgiju

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