

# NEUROPATSKI BOL

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УНИВЕРЗИТЕТ У БАЊОЈ ЛУЦИ  
UNIVERSITY OF BANJA LUKA

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# NEUROPATSKI BOL

- Bol je poremećaj koji prolazi duž nervnih vlakana do mozga, a intenzitet bola je direktno povezan sa količinom povrijeđenog tkiva
- *Rene Descartes 1644* – francuski filozof i matematičar („*theory specificity*“)
- Ova tvrdnja je tačna kod akutnog bola povezanog sa povredom, ali je hronični bol često mnogo kompleksniji, naročito hronični neuropatski bol

## NEUROPATSKI BOL

Neuropatski bol (NeuB) nije jedna pojedinačna bolest već jedan sindrom koji se sastoji od specifičnih simptoma i znakova različite etiologije

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# NEUROPATSKI BOL

**Neuropatski bol (NeuB)** nastaje kao direktna posljedica lezije ili oboljenja somatosenzornog sistema

**“Patološki bol”** – nema zaštitnu ulogu, može trajati i više godina poslije vidljivog prolaska lezije/oboljenja.

Gotovo uvijek to je **hronični bol, ne prolazi spontano.**

**Ne može da se liječi „prema potrebi“**

Liječenje tvrdokornije i skuplje od liječenja nociceptivnog bola.

Ne reaguje na NSAIL lijekove već na antiepileptike i antidepresive.

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# NEUROPATSKI BOL



- Prevalencija NeuB je 8% i očekuje se njen dalji porast
- Neuropatski bol je jedan od najvećih zdravstvenih problema danas
- **ZAŠTO?**

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## NEUROPATSKI BOL

- Produženje životnog vijeka
- Povećana prevalencija gojaznosti i oboljelih od DM tip 2
- Povećana prevalencija malignih oboljenja, duže preživljavanje bolesnika i upotreba lijekova koji mogu dovesti do neuropatskog bola

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# NEUROPATSKI BOL

U Bosni i Hercegovini je u posleratnom periodu u naročitom porastu broj oboljelih sa neuropatskim bolom kod:

- **Diabetes mellitusa** (periferni NeuB kod DPN)
- **Malignih oboljenja** (nociceptivno-neuropatski bol ili čisti neuropatski bol)

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## SIMPTOMI NeuB

### Pozitivni simptomi

spontani bol  
hiperalgezija  
alodinija  
dizesteziija  
paresteziija

### Negativni simptomi

hipoesteziija/anesteziija  
hipoalgezija/analgezija

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## PERIFERNI NEUROPATSKI BOL

Dijabetična polineuropatija

Ostale polineuropatije

Kompresivne neuropatije,  
radikulopatije

Neuralgije (PHN, TN...)

Tumorska kompresija (više od  
40% tumora daje NB)

## CENTRALNI NEUROPATSKI BOL

„Central poststroke pain“ (8-12%  
oboljelih od moždanog udara)

Mijelopatije (kompresivna,  
postishemijska, postradijaciona)

Multipla skleroza

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# MJEŠOVITI NOCICEPTIVNO-NEUROPATSKI BOL

Hronični lumbalni bolni sindrom

Carpal tunnel syndroma

Tumorska kompresija

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# NEUROPATSKI BOL KOD MALIGNIH OBOLJENJA

- Bol usled direktne kompresije nerva tumorom
- Bol usled primjene citostatika (Chemotherapy Induces Polyneuropathy - CIP)
- Bol usled zračenja (postradijaciona fibroza pleksus brahijalisa i lumbosakralisa)
- Bol usled udaljenog efekta karcinoma (paraneoplastična neuropatija)

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# NEUROPATSKI BOL

Periferni neuropatski bol je značajno češći i značajno bolje proučen od centralnog neuropatskog bola

Najčešći uzrok neuropatskog bola je dijabetična neuropatija

**DPN i drugi uzroci perifernog NeuB:**

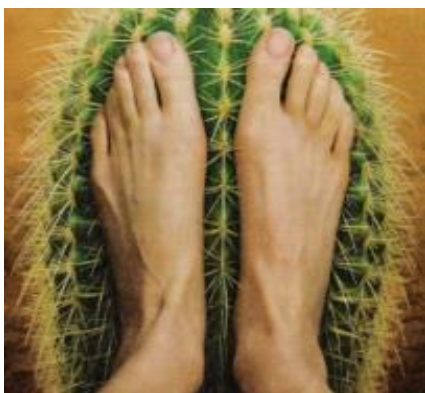
**uzrok bola** - promjene u **PNS-u**

**održavanje bola** - promjene u **CNS-u**

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## NEUROPATSKI BOL



Dijabetična  
polineuropatija



Moždani udar



Hronični lumbalni  
bolni sindrom

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## NEUROPATSKI BOL



Herpes zoster

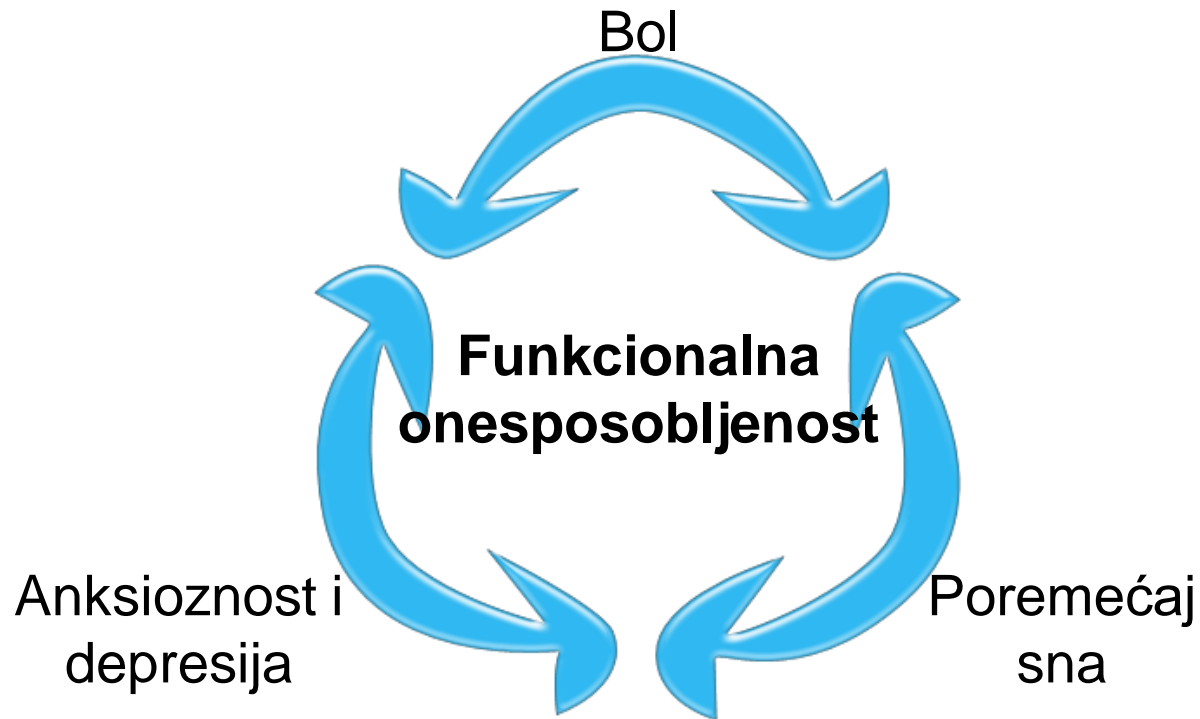


Trigeminalna  
neuralgija

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# NEUROPATSKI BOL



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## DIJAGNOZA NEUROPATSKOG BOLA



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# DIJAGNOZA NEUROPATSKOG BOLA

Klinički pregled

EMNG ili NMR



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# UPITNICI U DIJAGNOSTICI NEUROPATSKOG BOLA

**DN4**

**PainDETECT**

**the LANSS Pain Scale**

**Senzitivnost i specifičnost upitnika je 80-90%**

Upitnici za dijastikovanje NeuB ne mogu zamijeniti klinički pregled jer  
10-20% bolesnika ima lažno negativan nalaz!

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# LIJEČENJE NEUROPATSKOG BOLA

1. Liječenje osnovne bolesti
2. **Farmakološka terapija** – osnova liječenja, specifična u odnosu na nociceptivni bol
3. Nefarmakološka terapija (psihosocijalna podrška, fizikalna terapija...)
4. Interventne metode

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## NEUROPATSKI BOL

<b>Prva linija terapije</b>	<b>gabapentin, pregabalin, duloksetin, TCA, venlafaksin</b>
<b>Druga linija terapije</b>	kapsaicin flaster i lidokain flaster (za liječenje lokalizovanog perifernog NeuB) tramadol
<b>Treća linija terapije</b>	jaki opioidi, botulinski toksin A

NeuPSIG - Specijalna interesna grupa za neuropatski bol  
(International Assotiation for the Study of Pain - IASP)

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# LIJEČENJE NEUROPATSKOG BOLA

**Antiepileptici i antidepresivi su ključni lijekovi u liječenju NeuB**

**„Ne treba biti posljednji ljekar koji prestaje propisivati neki lijek“**

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# LIJEČENJE NEUROPATSKOG BOLA

Procijeniti jačinu NeuB i pratiti je tokom liječenja

Utvrđiti prisustvo komorbiditeta

Procijeniti psihički status (depresivnost, anksioznost)

Upoznati bolesnika sa prirodom oboljenja i sa realnim očekivanjima

Kod velikog procenta bolesnika cilj je smanjiti jačinu bola za 30-50%

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# LIJEČENJE NEUROPATSKOG BOLA

## Neke vrste NeuB imaju specifično liječenje:

- Trigeminalna neuralgija
- Akutni neuropatski bol
- Egzacerbacija akutnog neuropatskog bola
- NeuB u dječijoj dobi

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## Antidepresivi u liječenju NeuB

Među prvim lijekovima korištenim u terapiji NeuB, a analgetski učinak je primijećen sekundarno

Analgetski efekat je nezavisan od antidepresivnog, postiže se brže i manjim dozama nego antidepresivni/anksiolitički učinak

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## Antidepresivi u liječenju NeuB

Amitriptilin – najbolji efekat, ali je i najtoksičniji.

Stariji bolesnici - prije uvođenja amitriptilina uraditi EKG i internistički pregled.

Duloxetin – najbolje proučen

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## Amitriptilin u liječenju NeuB

**Doziranje:** 10-25 mg uveče, svakih 3-7 dana može se povećavati doza

**Maksimalna dnevna doza:** 150 mg na dan, jedna do dvije dnevne doze

### **Prednosti:**

- doziranje u jednoj dozi (do dvije doze)
- poboljšanje depresivnosti i nesanice ako su prisutni
- niska cijena

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# Neželjeni efekti Amitriptilina u liječenju NeuB

## Sedacija

**Antiholinergički efekti** (suhoća usta, smetnje sa akomodacijom, retencija urina, opstipacija, ortostatska hipotenzija, konfuzija)

**KV sistem** (aritmije, srčani blok, hipotenzija, tahikardija).

**Centralni neželjeni efekti** (hipomanija, sklonost ka konvulzijama)

Ne davati bolesnicima sa rizikom od iznenadne srčane smrti, KVB, bolesnicima sa suicidalnim idejama, bolesnicima sklonim kolapsima i padovima

# Gabapentin i Pregabalin u liječenju NeuB

## **Prednosti u odnosu na ostale lijekove u liječenju NeuB:**

Ne stupaju u interakcije sa drugim lijekovima što ih čini idealnim za primjenu kod bolesnika sa komorbiditetima.

Mogu se bezbjedno koristiti u kombinaciji sa drugim analgeticima u liječenju NeuB

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## Gabapentin i Pregabalin u liječenju NeuB

- Dobra efikasnost
- Izlučuju se nepromijenjeni preko bubrega
- Kod HBI se doza lijeka smanjuje
- **Ne stupaju u interakcije sa drugim lijekovima**
- Gabapentin se daje u dvije dnevne doze
- Pregabalin se daje u dvije dnevne doze

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## Neželjeni efekti Gabapentina i Pregabalina

**Nisu česti, obično kod uvođenja lijeka, najčešće ne iziskuju prekid terapije**

**Dozno ovisni i reverzibilni nakon isključenja lijeka**

- pospanost
- ošamućenost
- vrtoglavica
- smanjena koordinacija pokreta
- zamućen vid, duple slike...

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## Gabapentin u liječenju NeuB

- **1994. god.** odobren je u liječenju epilepsije kao dodatna terapija
- **2001. god.** odobren u liječenju postherpetične neuralgije.
- Kasnije je odobren i za druge indikacije (neuropatski bol...).

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## Gabapentin u liječenju NeuB

### BRZA TITRACIJA

300 mg uveče 1 dan  
2x300 mg 1 dan  
3x300 mg do kontrole

### SPORA TITRACIJA

300 mg uveče 7 dana  
2x300 mg 7 dana  
3x300 mg do kontrole

Po potrebi povećavati dozu svaka 3 dana za po 300 mg

Najčešća doza 3x300-600 mg

Maksimalna dnevna doza 3600

## Pregabalin u liječenju NeuB

**2004. god.** pregabalin je odobren od strane FDA, a

**2007. god.** od strane EMA za liječenje perifernog NeuB kod postherpetične neuralgije i bolne DPN

Kasnije je odobren i za druge indikacije

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## Pregabalin u liječenju NeuB

**Početna doza: 2x75 mg**

Po potrebi povećavati za po 75 mg svakih 3-7 dana (prvo povećati večernju, pa jutarnju dozu)

**Najčešća doza: 300 mg na dan**

**Maksimalna dnevna doza: 600 mg (podijeljeno u 2-3 dnevne doze)**

Može i sporije da se uvodi:  
75 mg uveče 3 dana, 2x75 m.

## Spora titracija Gabapentina i Pregabalina

- Loše opšte stanje bolesnika
- Stariji bolesnici
- Istovremena primjena sedativa, antidepresiva, opioida
- Sporom titracijom se postižu optimalni terapijski efekti, smanjuje rizik za pojavu neželjenih efekata te značajno poboljšava kvalitet sna

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# LIJEČENJE NEUROPATSKOG BOLA

## Koji lijek izabrati na početku liječenja?

Ako su prisutni anksioznost i/ili nesanica – antiepileptik

Ako je izražena depresija – antidepresiv

Ako su prisutni važni komorbiditeti - antiepileptik

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## ZAKLJUČAK

NeuB je „patološki bol“ - liječenje je značajno teže i skuplje od liječenja nociceptivnog bola

Liječenje mora biti energično, kontinuirano, jer ukoliko bol dugo traje, liječenje je sve teže

Lijekovi ne mogu da se daju “prema potrebi”

## ZAKLJUČAK

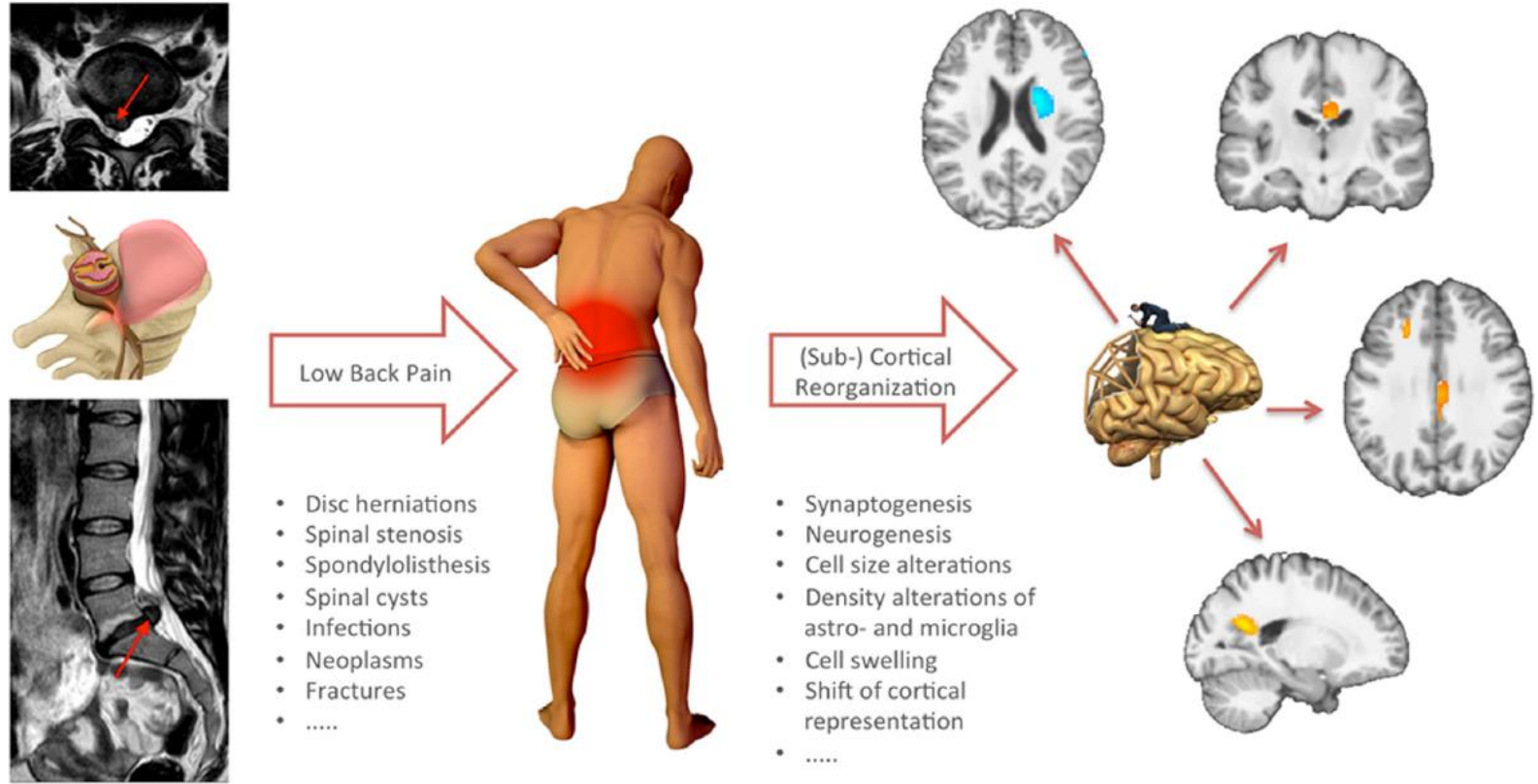
### Antiepileptici i antidepresivi su ključni lijekovi u liječenju NeuB

Pri odabiru lijeka voditi računa o komorbiditetima:

- bol udružen sa nesanicom: pregabalin ili gabapentin
- bol udružen sa depresijom: antidepresiv
- Prisustvo komorbiditeta: pregabalin ili gabapentin

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**NMR i fNMR mozga:** hronični NeuB dovodi do remodelisanja, reorganizacije i hiperekscitabilnosti u somatosenzornom korteksu.

Smanjenje bola može dovesti do reverznih promjena.





# Hvala na pažnji!

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