



Veleučilište „Lavoslav Ružička” u Vukovaru
Odjel za zdravstvene studije

PROCJENA MIŠIĆNO – KOŠTANOG SUSTAVA U TRUDNOĆI

PREDAVANJE

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Vukovar, 2025.

UVOD

1. Što su SOAP zabilješke i zašto ih vodimo?
2. Kako prikupiti subjektivne informacije?
3. Koji su objektivni podatci potrebni?
 - 3.1. Obrazac za objektivan pregled
 - 3.2. Mjerenja i testovi
 - 3.3. Upitnici i skale
4. Zaključak
5. Pitanja?

S O A P

Subjektivno
Objektivno
Assesment
Plan

SOAP Note

- **S**ubjective:
 - Detailed information about the history of injury and athlete; chief complaints, sign, and symptoms
- **O**bjective:
 - Information that is record of test measurements; data gained from inspection
- **A**ssessment:
 - Identification of problem; determine injury; severity of injury
- **P**lan of Action:
 - Treatment; Rehabilitation; Referrals

Slika 1. SOAP bilješke

(Izvor: <https://slideplayer.com/slide/4232568/>)

Zašto ih vodimo (trebamo voditi)?

- Odgovornost
- Komunikacija – s drugim članovima tima
- Osiguranje
- Evaluacija promjena
- Istraživanje
- Unaprjeđenje kvalitete fizioterapije

Kako prikupiti subjektivne informacije?

- Razgovor, pripremljen upitnik s pitanjima, prethodni nalazi i sl.

OBRAZAC PROCJENE MIŠIĆNO-KOŠTANOG SUSTAVA TRUDNICE

IME I PREZIME:

GODINA ROĐENJA:

ZANIMANJE:

GESTACIJSKA DOB:

BROJ PORODA:

OP ZAHVATI:

TT/kg:

RR/mmHg:

HR:

BOL:

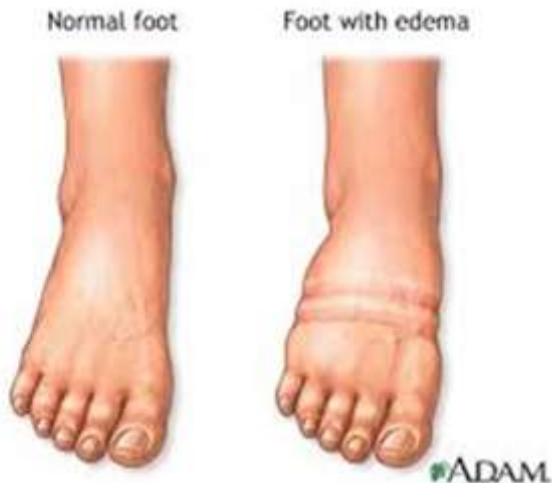
Slika 2. Primjer informacija iz upitnika (Izvor: vlastita izrada)

Pitanja:

1. Živate li sami?
2. Stojite dugo ili hodate puno na radnom mjestu? Podižete li teške predmete?
3. Jeste li pušač? Ako je dogovor potvrđan navesti broj cigareta koje konzumirate tijekom dana:
4. Konzumirate li alkohol?
5. Bolujete li od neke kronične bolesti? Ako je odgovor potvrđan navedite od koje:
6. Uzimate li redovno neke lijekove? Ako je odgovor potvrđan navedite koje i u kojoj dozi:

Koji su objektivni podatci potrebni?

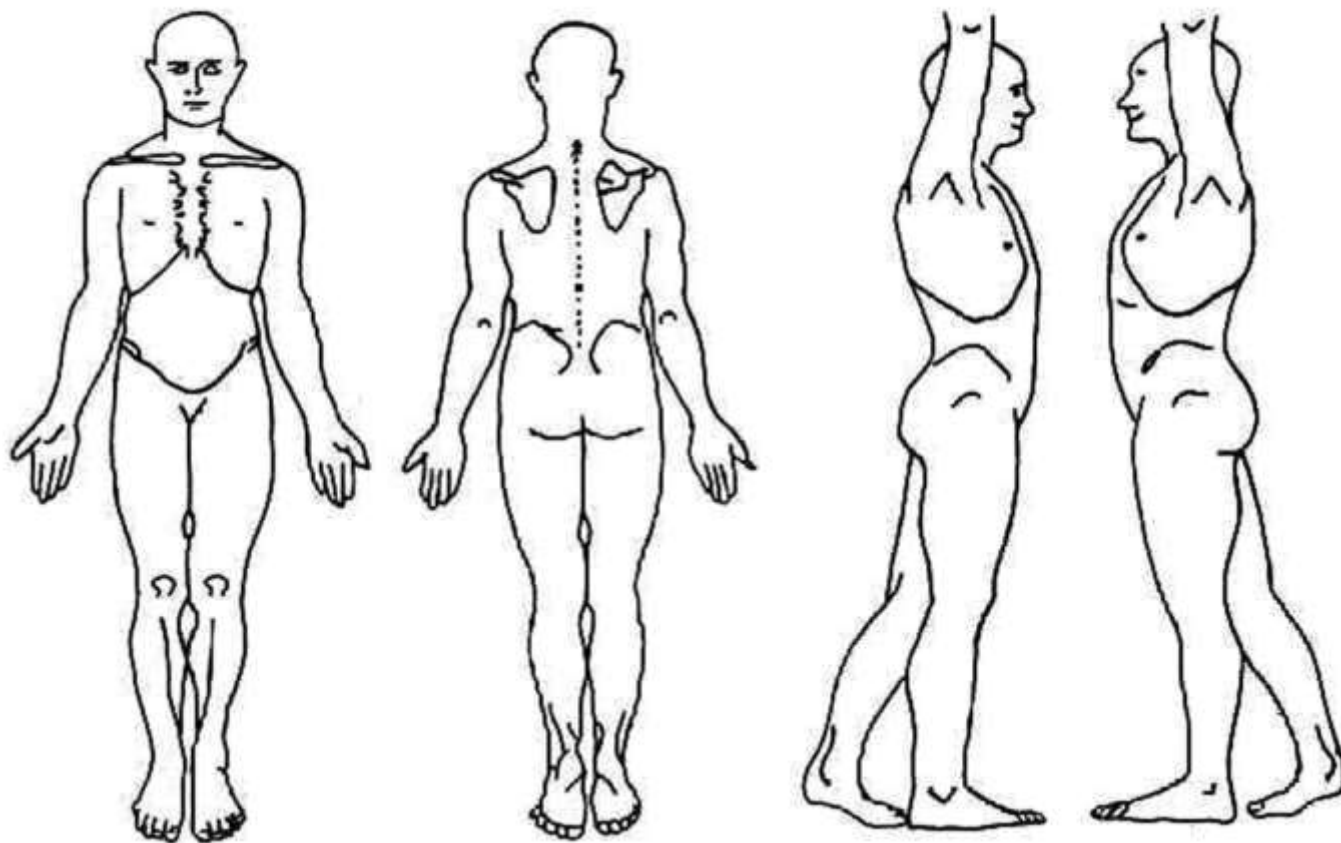
1. Inspekcija (što fizioterapeut primjećuje?)
2. Palpacija (napetost, krutost, mlohavost mišića, pojava boli na dodir, provjera edema, temperatura, vlažnost ili suhoća kože i sl.)
3. Mjerenja



Slika 3. Prikaz edema

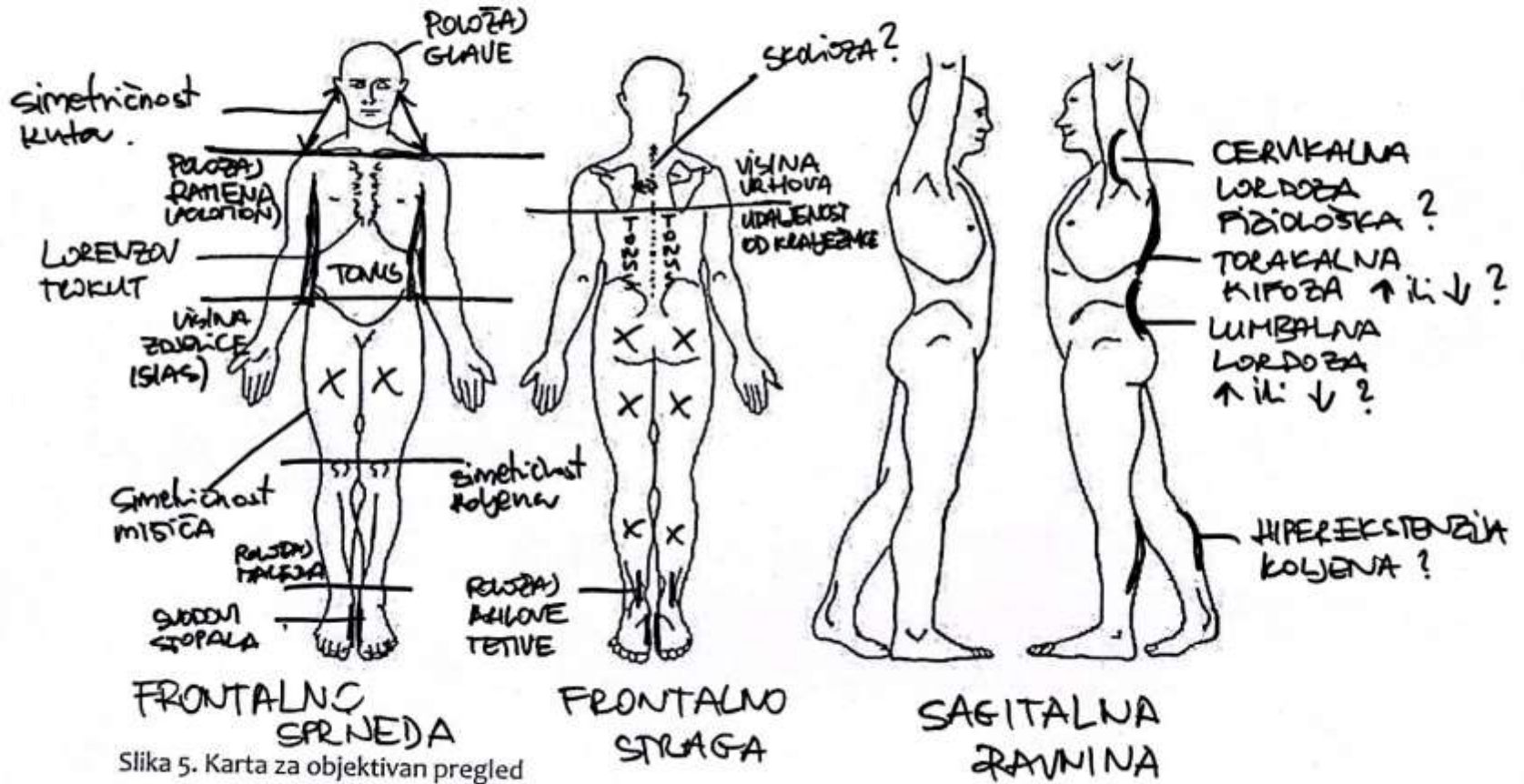


Slika 4. „Pitting” edem



Slika 5. Karta za objektivni pregled (Izvor: vlastita izrada)

D L L D



Slika 5. Karta za objektivni pregled

- Orijentacijske točke

- *Frontalno sprijeda (simetrične)*: uši, acromion, art. sternoclaviculare, SIAS, gornji rub patellae, medijalni malleol
- *Frontalno straga (simetrične)*: angulus inferior scapulae, SIPS, tuber osis ishii
- *Vertikalne točke (sprijeda)*: nos, brada, manubrium sternii, xyphoideus, symphysis pubica
- *Vertikalne točke (straga)*: occipitalna kvrga, C7, Th1, Th12, L4, L5

BOLNA PODRUČJA

- Th kralješnica: povećanje grudi; bol kao rezultat kompenzacije promjena u držanju tijela
- L kralješnica: hiperlordoza; povećana inklinacija zdjelice; slabost mišića prednje trbušne stjenke
- SI zglobovi (posteriorna pelvična bol)
- Simfiza (anteriorna pelvična bol)

PROMJENE DRŽANJA TIJELA

GLAVA: hiperlordoza, glava pomaknuta prema naprijed

RAMENA I PRSNI KOŠ: kifotično držanje zatvara thorax, otežano je disanje, ramena u protrakciji, skraćeni prsni mišići

TRBUH I ZDJELICA: oslabljeni trbušni mišići, pojačana L lordoza, zdjelica u većoj inklinaciji

KOLJENA I STOPALA: hiperekstenzija, oslonac na pete

Slika 6. a) Postura u II tromjesječu



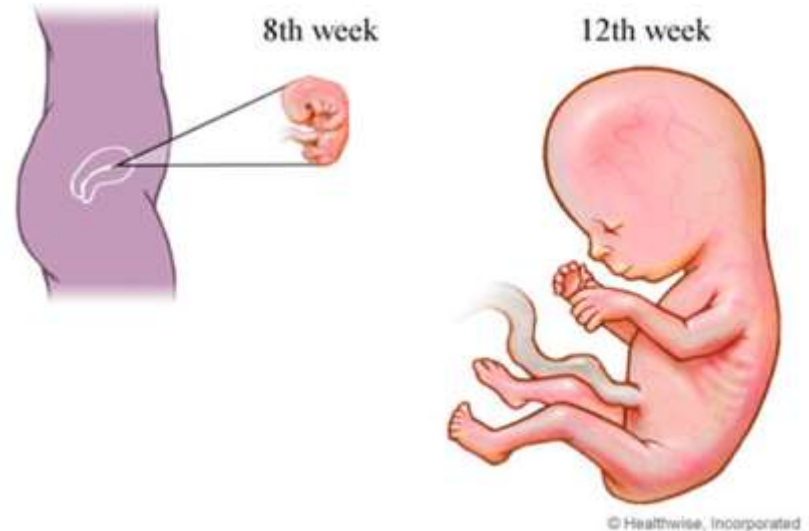
b) korigirano držanje (Izvor: vlastita izrada)



Slika 7. Postura frontalno (izvor: vlastita izrada)



I TRIMESTAR



- Od začeća do kraja 12-og tjedna
- Do 12-og tjedna **nema značajnijih promjena**
- Optimalno vrijeme za procjenu mišićno – koštanog sustava (sva mjerenja i testovi)

II TRIMESTAR



- Od 13.-og do 28.-og tjedna
- Izražena **Th kifoza i zdjelična inklinacija**

Utvrđiti (obvezno):

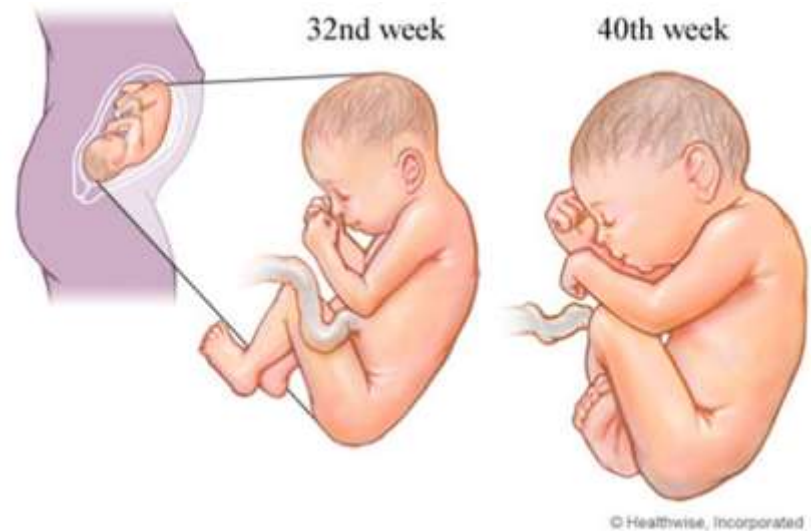
- patološku dijastazu m. rectus abd.
- pokretljivost L sgm.
- respiratorni indeks

III TRIMESTAR

- Od 29.-og tjedna do poroda

Izraženi još više:

- C lordoza,
- protrakcija ramena,
- nagib zdjelice,
- promjene u nivou SIAS,
- jača separacija m. rectus abd.,
- hiperekstenzija u zgl. koljena,
- pritisak na mišiće zdjeličnog dna





Mjerenja i testovi



Mjerenja: kako, koja i zašto?

- Potvrditi sve uočeno inspekcijom ili palpacijom
 1. Utvrđivanje C i L hiperlordoze (viskom)
 2. Provjera laterofleksije u L kralježnici (cm vrpcom)
 3. Utvrđivanje duljine DE (cm vrpcom)
 4. Provjera obujma GE i DE (cm vrpcom)
 5. Provjera respiratornog indeksa (cm vrpcom)

PATRICKOV TEST

- Test probira kod patologije zgl. kuka ili boli u SI zglobu

IZVODI SE:

1. Trudnica je u **ležećem položaju na leđima**.
2. **Nogu koju testiramo** flektirati u kuku i stopalo osloniti na koljeno suprotne noge (fleksija, abdukcija, vanjska rotacija testirane noge).
3. Polagano vršiti **pritisak na koljeno noge koja se testira** u smjeru daljnje abdukcije.

POZITIVAN TEST: ako se javi bol u kuku, u SI zglobu testirane strane, preponi; ako osoba ne može nogu koja se testira spustiti toliko da je gotovo paralelna sa podlogom.

PATRICKOV TEST = FABERE ZNAK



Slika 8. Patrickov test - položaj za izvođenje (Izvor: vlastita izrada)

SI DISFUNKCIJA

- Osjećaj “plesanja” zdjelice i nestabilnosti zdjelice

POTVRDA SI DISFUNKCIJE:

1. Palpatorni test - “sacral apex pressure test”
2. SI fiksacijski test

PALPATORNI TEST

SACRAL APEX PRESSURE TEST:

1. Ležeći potrbuške (kod trudnica na boku)
2. Izvršiti pritisak na vrhove sacruma uzrokujući razdvajanje sacruma od os ilium

POZITIVAN TEST: pojava boli ili laksiteta



Slika 9. Položaj na boku za izvođenje testa



Slika 10. Mjesto pritiska na sacrum

(Izvor: vlastita izrada)

SI FIKSACIJSKI TEST

- procjenjuje mobilnost SI zglobova
- pokretljivost veća od normalne korelira s pojavom boli
- **promatra se SIPS** prilikom fleksije prema naprijed iz stojećeg položaja

POZITIVAN TEST: ako je SIPS na bolnoj strani u stojećem položaju niža nego na suprotnoj, a postaje obratno pri fleksiji trupa

TEST PALPACIJE SIMFIZE

- test se izvodi u ležećem položaju na leđima, koljena ekstendirana
- patološko razdvajanje mišića, ili os pubis
- palpiraju se lateralno **ramusi na os pubis i prati njihova udaljenost**



Slika 11. Test palpacije simfize



Slika 12. Položaj ruku pri testiranju

(Izvor: vlastita izrada)

RAZDVAJANJE SIMFIZE

- bol uslijed promjena mišićno-koštanog sustava
- najčešće prilikom hodanja uz stube
- pogoršava se vježbanjem
- fiziološka separacija 3-9mm (opuštanje ligg.)
- ***problem kada je razdvajanje 10mm i više***

TEST NA DIJASTAZU

- ležeći položaj na leđima, *noge savijene u kukovima i koljenima*
- ispitivač traži fleksiju glave, te palpira razdvajanje m. rectus abd. u području lineae albae, *2 cm proksimalno od umbilicusa*



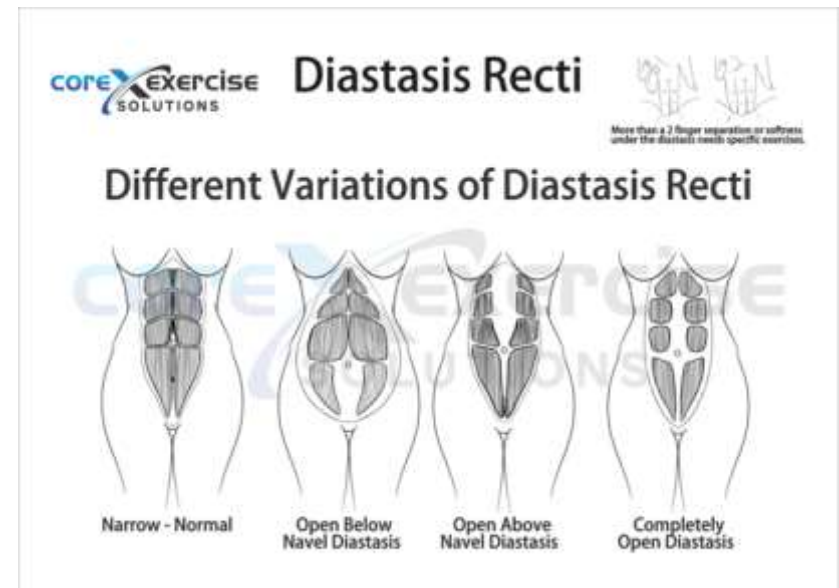
Slika 13. Test na dijastazu – 2 cm proksimalno od pupka



Slika 14. Mjesto pritiska okomito na lineu albu

PATOLOŠKA DIJASTAZA m. rectus abdominis

- Istegnuti i oslabljeni trbušni mišići utječu na položaj zdjelice
 - mehanički stres na lineu albu
 - **dijastaza veća od 2cm = patološka.**
 - češće kod višerotki, prvorotki s višeploidnom trudnoćom, tjelesno neaktivnih žena



Slika 15. Tipovi dijastaze (izvor: <https://www.coreexercisesolutions.com/>)

DERBOLOWSKI TEST

- Test probira kod asimetričnih pokreta SI zglobova
 - promatra se ***položaj med. malleola dok trudnica sjedi i leži na leđima***
- POZITIVAN TEST:*** ako se položaj med. malleola mijenja jedan u odnosu na drugi kako trudnica mijenja položaj sjedeći i ležeći na leđima.



Slika 16. Derbolowski test - sjedeći



Slika 17. Položaj ležeći

(Izvor: vlastita izrada)

Upitnici i skale

PAR-Q & YOU

The original PAR-Q was developed by the British Columbia Ministry of Health. It has been revised by an Expert Advisory Committee of the Canadian Society for Exercise Physiology chaired by Dr. N. Gledhill (2002).

YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Has your doctor ever said that you have a heart condition <u>and</u> that you should only do physical activity recommended by a doctor?
<input type="checkbox"/>	<input type="checkbox"/>	2. Do you feel pain in your chest when you do physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	3. In the past month, have you had chest pain when you were not doing physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	4. Do you lose your balance because of dizziness or do you ever lose consciousness?
<input type="checkbox"/>	<input type="checkbox"/>	5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
<input type="checkbox"/>	<input type="checkbox"/>	7. Do you know of <u>any other reason</u> why you should not do physical activity?

Tumačenje odgovora

If you answered:	YES to one or more questions
	<p>Talk to your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.</p> <ul style="list-style-type: none">• You may be able to do any activity you want – as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.• Find out which community programs are safe and helpful for you.

NO to all questions	Delay becoming much more active: <ul style="list-style-type: none">• If you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or• If you are or may be pregnant – talk to your doctor before you start becoming more active.
<p>If you answered NO honestly to <u>all</u> PAR-Q questions, you can be reasonably sure that you can:</p> <ul style="list-style-type: none">• Start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.• Take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.	<p>Please note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.</p>

PARmed-X for PREGNANCY **PHYSICAL ACTIVITY READINESS MEDICAL EXAMINATION**

<https://ywcavan.org/sites/default/files/assets/media/file/2021-01%20/parmed-xpreg.pdf>

The original PARmed-X for PREGNANCY was developed by L.A. Wolfe, Ph.D., Queen's University. The muscular conditioning component was developed by M.F. Mottola, Ph.D., University of Western Ontario. The document has been revised based on advice from an Expert Advisory Committee of the Canadian Society for Exercise Physiology chaired by Dr. N. Gledhill, with additional input from Drs. Wolfe and Mottola, and Gregory A.L. Davies, M.D.,FRCS(C) Department of Obstetrics and Gynaecology, Queen's University, 2002.

No changes permitted. Translation and reproduction in its entirety is encouraged.

Disponible en français sous le titre «Examination médicale sur l'aptitude à l'activité physique pour les femmes enceintes (X-AAP pour les femmes enceintes)»

Additional copies of the PARmed-X for PREGNANCY, the PARmed-X and/or the PAR-Q can be downloaded from: <http://www.csep.ca/forms.asp>.
For more information contact the:

Canadian Society for Exercise Physiology
185 Somerset St. West, Suite 202, Ottawa, Ontario CANADA K2P 0J2
tel.: 1-877-651-3755 FAX (613) 234-3565 www.csep.ca

PARmed-X for PREGNANCY **PHYSICAL ACTIVITY READINESS MEDICAL EXAMINATION**

PARmed-X for PREGNANCY is a guideline for health screening prior to participation in a prenatal fitness class or other exercise.

Healthy women with uncomplicated pregnancies can integrate physical activity into their daily living and can participate without significant risks either to themselves or to their unborn child. Postulated benefits of such programs include improved aerobic and muscular fitness, promotion of appropriate weight gain, and facilitation of labour. Regular exercise may also help to prevent gestational glucose intolerance and pregnancy-induced hypertension.

The safety of prenatal exercise programs depends on an adequate level of maternal-fetal physiological reserve. PARmed-X for PREGNANCY is a convenient checklist and prescription for use by health care providers to evaluate pregnant patients who want to enter a prenatal fitness program and for ongoing medical surveillance of exercising pregnant patients.

Instructions for use of the 4-page PARmed-X for PREGNANCY are the following:

1. The patient should fill out the section on PATIENT INFORMATION and the PRE-EXERCISE HEALTH CHECKLIST (PART 1, 2, 3, and 4 on p. 1) and give the form to the health care provider monitoring her pregnancy.
2. The health care provider should check the information provided by the patient for accuracy and fill out SECTION C on CONTRAINDICATIONS (p. 2) based on current medical information.
3. If no exercise contraindications exist, the HEALTH EVALUATION FORM (p. 3) should be completed, signed by the health care provider, and given by the patient to her prenatal fitness professional.

In addition to prudent medical care, participation in appropriate types, intensities and amounts of exercise is recommended to increase the likelihood of a beneficial pregnancy outcome. PARmed-X for PREGNANCY provides recommendations for individualized exercise prescription (p. 3) and program safety (p. 4).

NOTE: Sections A and B should be completed by the patient before the appointment with the health care provider.

A PATIENT INFORMATION

NAME _____

ADDRESS _____

TELEPHONE _____ BIRTHDATE _____ HEALTH INSURANCE No. _____

NAME OF _____ PRENATAL FITNESS

PRENATAL FITNESS PROFESSIONAL _____ PROFESSIONAL'S PHONE NUMBER _____

B PRE-EXERCISE HEALTH CHECKLIST

PART 1: GENERAL HEALTH STATUS

In the past, have you experienced (check YES or NO):

- | | YES | NO |
|--|--------------------------|--------------------------|
| 1. Miscarriage in an earlier pregnancy? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Other pregnancy complications? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. I have completed a PAR-Q within the last 30 days. | <input type="checkbox"/> | <input type="checkbox"/> |

If you answered YES to question 1 or 2, please explain:

Number of previous pregnancies? _____

PART 2: STATUS OF CURRENT PREGNANCY

Due Date: _____

During this pregnancy, have you experienced:

- | | YES | NO |
|---|--------------------------|--------------------------|
| 1. Marked fatigue? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Bleeding from the vagina ("spotting")? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Unexplained faintness or dizziness? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Unexplained abdominal pain? | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Sudden swelling of ankles, hands or face? | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Persistent headaches or problems with headaches? | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Swelling, pain or redness in the calf of one leg? | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Absence of fetal movement after 6 th month? | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Failure to gain weight after 5 th month? | <input type="checkbox"/> | <input type="checkbox"/> |

If you answered YES to any of the above questions, please explain:

PART 3: ACTIVITY HABITS DURING THE PAST MONTH

1. List only regular fitness/recreational activities:

INTENSITY	FREQUENCY (times/week)			TIME (minutes/day)		
	1-2	2-4	4+	<20	20-40	40+
Heavy	___	___	___	___	___	___
Medium	___	___	___	___	___	___
Light	___	___	___	___	___	___

2. Does your regular occupation (job/home) activity involve:

- | | YES | NO |
|-------------------------------------|--------------------------|--------------------------|
| Heavy Lifting? | <input type="checkbox"/> | <input type="checkbox"/> |
| Frequent walking/stair climbing? | <input type="checkbox"/> | <input type="checkbox"/> |
| Occasional walking (>once/hr)? | <input type="checkbox"/> | <input type="checkbox"/> |
| Prolonged standing? | <input type="checkbox"/> | <input type="checkbox"/> |
| Mainly sitting? | <input type="checkbox"/> | <input type="checkbox"/> |
| Normal daily activity? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Do you currently smoke tobacco?* | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Do you consume alcohol?* | <input type="checkbox"/> | <input type="checkbox"/> |

PART 4: PHYSICAL ACTIVITY INTENTIONS

What physical activity do you intend to do?

Is this a change from what you currently do? YES NO

***NOTE: PREGNANT WOMEN ARE STRONGLY ADVISED NOT TO SMOKE OR CONSUME ALCOHOL DURING PREGNANCY AND DURING LACTATION.**

Popunjiva zdravstveni djelatnik!

C CONTRAINDICATIONS TO EXERCISE: to be completed by your health care provider					
Absolute Contraindications			Relative Contraindications		
<i>Does the patient have:</i>			<i>Does the patient have:</i>		
	YES	NO		YES	NO
1. Ruptured membranes, premature labour?	<input type="checkbox"/>	<input type="checkbox"/>	1. History of spontaneous abortion or premature labour in previous pregnancies?	<input type="checkbox"/>	<input type="checkbox"/>
2. Persistent second or third trimester bleeding/placenta previa?	<input type="checkbox"/>	<input type="checkbox"/>	2. Mild/moderate cardiovascular or respiratory disease (e.g., chronic hypertension, asthma)?	<input type="checkbox"/>	<input type="checkbox"/>
3. Pregnancy-induced hypertension or pre-eclampsia?	<input type="checkbox"/>	<input type="checkbox"/>	3. Anemia or iron deficiency? (Hb < 100 g/L)?	<input type="checkbox"/>	<input type="checkbox"/>
4. Incompetent cervix?	<input type="checkbox"/>	<input type="checkbox"/>	4. Malnutrition or eating disorder (anorexia, bulimia)?	<input type="checkbox"/>	<input type="checkbox"/>
5. Evidence of intrauterine growth restriction?	<input type="checkbox"/>	<input type="checkbox"/>	5. Twin pregnancy after 28th week?	<input type="checkbox"/>	<input type="checkbox"/>
6. High-order pregnancy (e.g., triplets)?	<input type="checkbox"/>	<input type="checkbox"/>	6. Other significant medical condition?	<input type="checkbox"/>	<input type="checkbox"/>
7. Uncontrolled Type I diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder?	<input type="checkbox"/>	<input type="checkbox"/>	Please specify: _____		
			NOTE: Risk may exceed benefits of regular physical activity. The decision to be physically active or not should be made with qualified medical advice.		
PHYSICAL ACTIVITY RECOMMENDATION:			<input type="checkbox"/> Recommended/Approved		<input type="checkbox"/> Contraindicated

Izračunavanje srčanog opterećenja trudnice:

220 – broj godina = n (max. HR)

$n \times 0,75$ = gornja granica ili 75% max. HR

$n \times 0,60$ = donja granica ili 60% max. HR

Prescription for Aerobic Activity

RATE OF PROGRESSION: The best time to progress is during the second trimester since risks and discomforts of pregnancy are lowest at that time. Aerobic exercise should be increased gradually during the second trimester from a minimum of 15 minutes per session, 3 times per week (at the appropriate target heart rate or RPE) to a maximum of approximately 30 minutes per session, 4 times per week (at the appropriate target heart rate or RPE).

WARM-UP/COOL-DOWN: Aerobic activity should be preceded by a brief (10-15 min.) warm-up and followed by a short (10-15 min.) cool-down. Low intensity calisthenics, stretching and relaxation exercises should be included in the warm-up/cool-down.

PRESCRIPTION/MONITORING OF INTENSITY: The best way to prescribe and monitor exercise is by combining the heart rate and rating of perceived exertion (RPE) methods.

F	I	T	T
FREQUENCY	INTENSITY	TIME	TYPE
Begin at 3 times per week and progress to four times per week	Exercise within an appropriate RPE range and/or target heart rate zone	Attempt 15 minutes, even if it means reducing the intensity. Rest intervals may be helpful	Non weight-bearing or low-impact endurance exercise using large muscle groups (e.g., walking, stationary cycling, swimming, aquatic exercises, low impact aerobics)

"TALK TEST" - A final check to avoid overexertion is to use the "talk test". The exercise intensity is excessive if you cannot carry on a verbal conversation while exercising.

TARGET HEART RATE ZONES

The heart rate zones shown below are appropriate for most pregnant women. Work during the lower end of the HR range at the start of a new exercise program and in late pregnancy.

Age	Heart Rate Range
< 20	140-155
20-29	135-150
30-39	130-145

RATING OF PERCEIVED EXERTION (RPE)

Check the accuracy of your heart rate target zone by comparing it to the scale below. A range of about 12-14 (somewhat hard) is appropriate for most pregnant women.

6	
7	Very, very light
8	
9	Somewhat light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard
20	

Vježbe snage u trudnoći i mjere opreza

Prescription for Muscular Conditioning

It is important to condition all major muscle groups during both prenatal and postnatal periods.

WARM-UPS & COOL DOWN:
Range of Motion: neck, shoulder girdle, back, arms, hips, knees, ankles, etc.

Static Stretching: all major muscle groups

(DO NOT OVER STRETCH!)

EXAMPLES OF MUSCULAR STRENGTHENING EXERCISES

CATEGORY	PURPOSE	EXAMPLE
Upper back	Promotion of good posture	Shoulder shrugs, shoulder blade pinch
Lower back	Promotion of good posture	Modified standing opposite leg & arm lifts
Abdomen	Promotion of good posture, prevent low-back pain, prevent diastasis recti, strengthen muscles of labour	Abdominal tightening, abdominal curl-ups, head raises lying on side or standing position
Pelvic floor ("Kegels")	Promotion of good bladder control, prevention of urinary incontinence	"Wave", "elevator"
Upper body	Improve muscular support for breasts	Shoulder rotations, modified push-ups against a wall
Buttocks, lower limbs	Facilitation of weight-bearing, prevention of varicose veins	Buttocks squeeze, standing leg lifts, heel raises

PRECAUTIONS FOR MUSCULAR CONDITIONING DURING PREGNANCY

VARIABLE	EFFECTS OF PREGNANCY	EXERCISE MODIFICATIONS
Body Position	<ul style="list-style-type: none"> • in the supine position (lying on the back), the enlarged uterus may either decrease the flow of blood returning from the lower half of the body as it presses on a major vein (inferior vena cava) or it may decrease flow to a major artery (abdominal aorta) 	<ul style="list-style-type: none"> • past 4 months of gestation, exercises normally done in the supine position should be altered • such exercises should be done side lying or standing
Joint Laxity	<ul style="list-style-type: none"> • ligaments become relaxed due to increasing hormone levels • joints may be prone to injury 	<ul style="list-style-type: none"> • avoid rapid changes in direction and bouncing during exercises • stretching should be performed with controlled movements
Abdominal Muscles	<ul style="list-style-type: none"> • presence of a rippling (bulging) of connective tissue along the midline of the pregnant abdomen (diastasis recti) may be seen during abdominal exercise 	<ul style="list-style-type: none"> • abdominal exercises are not recommended if diastasis recti develops
Posture	<ul style="list-style-type: none"> • increasing weight of enlarged breasts and uterus may cause a forward shift in the centre of gravity and may increase the arch in the lower back • this may also cause shoulders to slump forward 	<ul style="list-style-type: none"> • emphasis on correct posture and neutral pelvic alignment. Neutral pelvic alignment is found by bending the knees, feet shoulder width apart, and aligning the pelvis between accentuated lordosis and the posterior pelvic tilt position.
Precautions for Resistance Exercise	<ul style="list-style-type: none"> • emphasis must be placed on continuous breathing throughout exercise • exhale on exertion, inhale on relaxation using high repetitions and low weights • Valsalva Manoeuvre (holding breath while working against a resistance) causes a change in blood pressure and therefore should be avoided • avoid exercise in supine position past 4 months gestation 	

Oswestry Low Back Pain Disability Questionnaire

Sources: Fairbank JCT & Pynsent, PB (2000) The Oswestry Disability Index. *Spine*, 25(22):2940-2953.

Davidson M & Keating J (2001) A comparison of five low back disability questionnaires: reliability and responsiveness. *Physical Therapy* 2002;82:8-24.

- 10 područja (bol, osobna higijena, podizanje tereta, hodanje, sjedenje, stajanje, spavanje, spolni život, društveni život, putovanja)
- Likertova skala (0,1,2,3,4,5)
- Oswestry Disability Index – stupanj funkcionalnog onesposobljenja; zlatni standard kod boli u L kralježnici

Primjer

Section 1 – Pain intensity

- I have no pain at the moment
- The pain is very mild at the moment
- The pain is moderate at the moment
- The pain is fairly severe at the moment
- The pain is very severe at the moment
- The pain is the worst imaginable at the moment

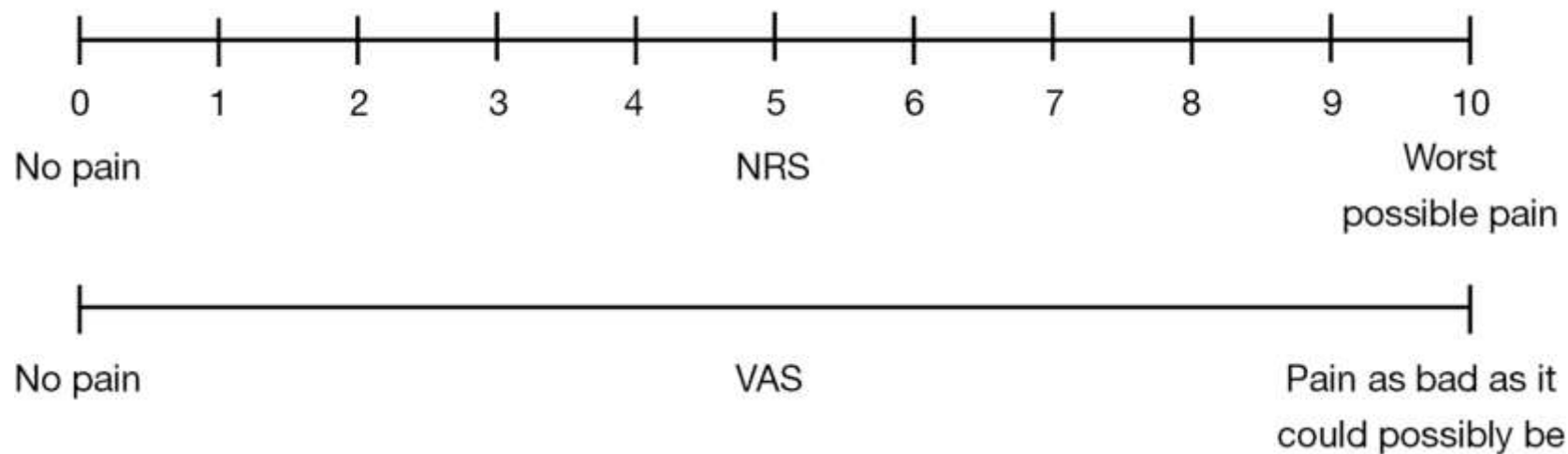
Izračunavanje i tumačenje rezultata

Interpretation of scores

0% to 20%: minimal disability:	The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
21%-40%: moderate disability:	The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
41%-60%: severe disability:	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61%-80%: crippled:	Back pain impinges on all aspects of the patient's life. Positive intervention is required.
81%-100%:	These patients are either bed-bound or exaggerating their symptoms.

$$\frac{BROJ\ BODOVA\ ISPITANIKA}{50} \times 100$$

VAS, NRS



Slika 18. Primjer NRS i VAS (Izvor: <https://rebelem.com/rebel-cast-episode-49-pediatric-pain-management-pearls-with-sebrina-perkins/visual-analog-scale/>)

Tumačenje za VAS:

0 – 4mm bez boli

5 – 44mm bol blaga

45 – 74mm umjerena bol

75 – 100mm jaka bol

Zaključak?

- Zašto je procjena važna?
- Što sve uključuje procjena?
- Kako nam procjena pomaže u izradi plana terapije?
- Kako sve možemo koristiti objektivne podatke dobivene tijekom procjene?
- Kada je najbolje raditi procjenu mišićno-koštanog sustava u trudnoći?



**FOR TODAY
ANYWAY...**

VELEUČILIŠTE „LAVOSLAV RUŽIČKA” U VUKOVARU
ODJEL ZA ZDRAVSTVENE STUDIJE

PROBLEMATIKA ŽENA KOD ANATOMSKIH I FIZIOLOŠKIH PROMJENA U TRUDNOĆI



PREDAVANJE

Vesna Šeper, Ph.D. in Physical Education and Sport, prof. struč. stud.

Vukovar, 2025.

NESIGURNI POKAZATELJI TRUDNOĆE

Amenoreja

Mučnina i povraćanje

Osjetljivost dojki

Učestalo mokrenje i zatvor

Zamor



SIMPTOMI

ZNAKOVI

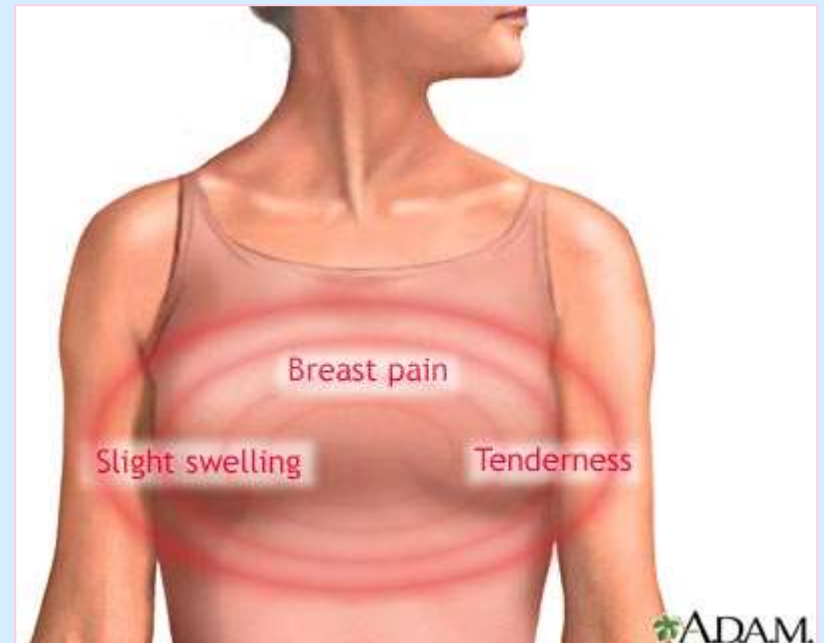
CHLOASMA - pjege na licu

“MASKA TRUDNOĆE”

LEUCORRHEA - povećana
količina cervikalne
sluzi

PROMJENE NA DOJKAMA

UVEĆANJE ABDOMENA



Slika 1. Mogući znakovi trudnoće



Slika 2. Maska trudnoće

(Izvor: Kuljak, Ž; Habek, D. (2023) Primaljska njega trudnice, roditelje i babinjače. Škola za primalje, Zagreb)



Slika 3. Hiperpigmentacija linee albae

(Izvor: Kuljak, Ž; Habek, D. (2023) Primaljska njega trudnice, roditelje i babinjače. Škola za primalje, Zagreb)

PROMJENE NA ZDJELIČNIM ORGANIMA

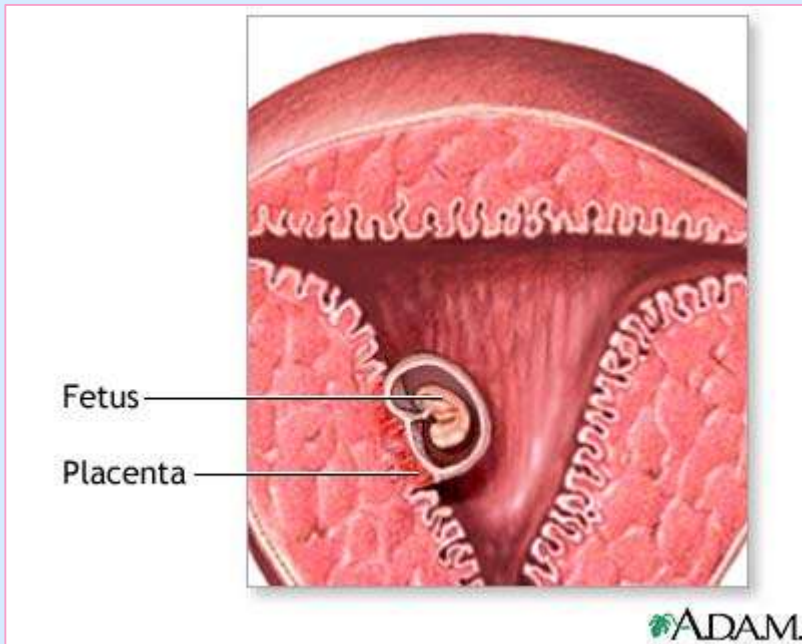
VANJSKO SPOLOVILO I RODNICA

- Hiperemija sluznica
- CHADWICKOV ZNAK - lividitet rodnice

JAJNICI I JAJOVODI

- Hiperemija jajnika
- **CORPUS LUTEUM GRAVIDITATE** - produkcija beta-HCG, do 10-og tjedna trudnoće

MATERNICA



Slika 4. Nidacija

- Povećanje i omekšavanje maternice
- Promjene mišića i ligg.
- Piskačkov znak
- Omekšavanje vrata maternice

DOJKE

- Toplina
- Povećana napetost
- Proliferacija tkiva - žljezdano
- Receptori za prolaktin

PROMJENE EKSTRAGENITALNIH ORGANA U TRUDNOĆI

KRVOTOK: pada vrijednost Hgb i Fe, raste volumen plazme, raste broj L, raste minutni volumen i udarni volumen, ubrzava se puls

DISANJE: hiperventilacija, raste potrošnja kisika i VC

PROBAVNI SUSTAV: usporavanje motiliteta crijeva zbog djelovanje progesterona, dilatacija žučnih vodova

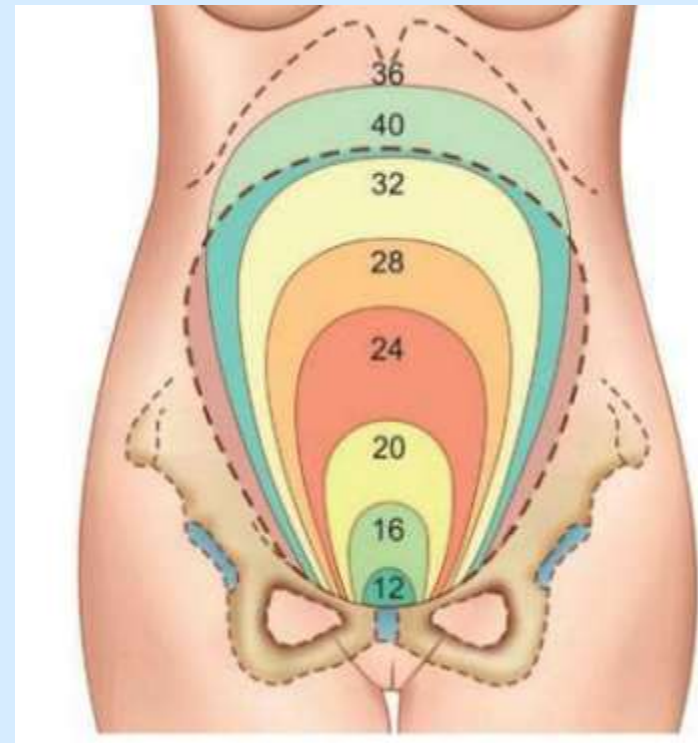
METABOLOZAM: smanjuje se razina albumina i ukupnih proteina, opasnost od dijabetesa - raste GUK, raste razina lipida u plazmi

ŽIVČANI SUSTAV: promjenjivo raspoloženje

VJEROVATNI POKAZATELJI TRUDNOĆE

ZNAKOVI

- Značajno povećanje maternice
- MATERIČNI ŠUM - zbog povećanog protoka kroz maternicu
- BRAXTON - HICKS kontrakcije



Slika 5. Visina fundusa maternice
(Izvor: Kuljak, Ž; Habek, D. (2023) Primaljska njega trudnice, roditelje i babinjače. Škola za primalje, Zagreb)

SIGURNI POKAZATELJI TRUDNOĆE

SIMPTOMI

- ne postoje

ZNAKOVI

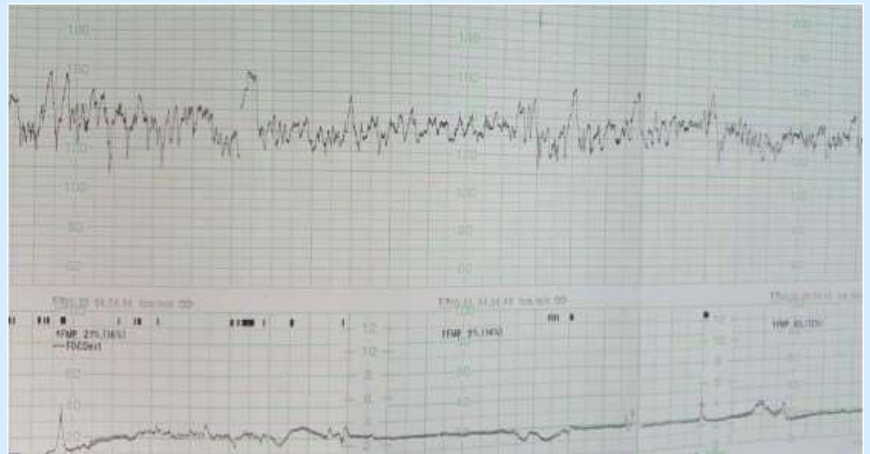
- Auskultacija otkucaja fetusa
- Palpacija obrisa
- Pokreti ploda
- UZV ploda
- Fetalni EKG

KARDIOTOKOGRAFIJA



Slika 6. Kardiotokograf

(Izvor: Kuljak, Ž; Habek, D. (2023) Primaljska njega trudnice, roditelje i babinjače. Škola za primalje, Zagreb)



Slika 7. Temeljna srčana frekvencija
(Izvor: Kuljak, Ž; Habek, D. (2023) Primaljska njega trudnice, roditelje i babinjače. Škola za primalje, Zagreb)



Slika 8. Pokreti ploda



Slika 9. UZV ploda



Slika 10. UZV blizanačke trudnoće



Slika 11. i 12. UZV u različitim tjednima gestacije



Slika 13. 3D UZV



Slika 14. Usporedba 3D UZV i novorođenče




Slika 15. UZV detektira i anomalije u razvoju



Slika 16. Kongenitalne srčane greške

HORMONSKE PROMJENE TIJEKOM TRUDNOĆE

- Količina hormona se mijenja
- LH i HCG se značajno povećavaju - 10ak dn od koncepcije
- FSH 

PROMJENE U TIPIČNOJ TRUDNOĆI

GUBITAK DAHA

- Oko 12og tj.
- Zaduha, ali ne dispnea
- Hiperventilacija - adaptacija

SINKOPA, NESVJESTICA

- U početku
- Prevenirica hipoglikemije
- Lagana tjelesna aktivnost

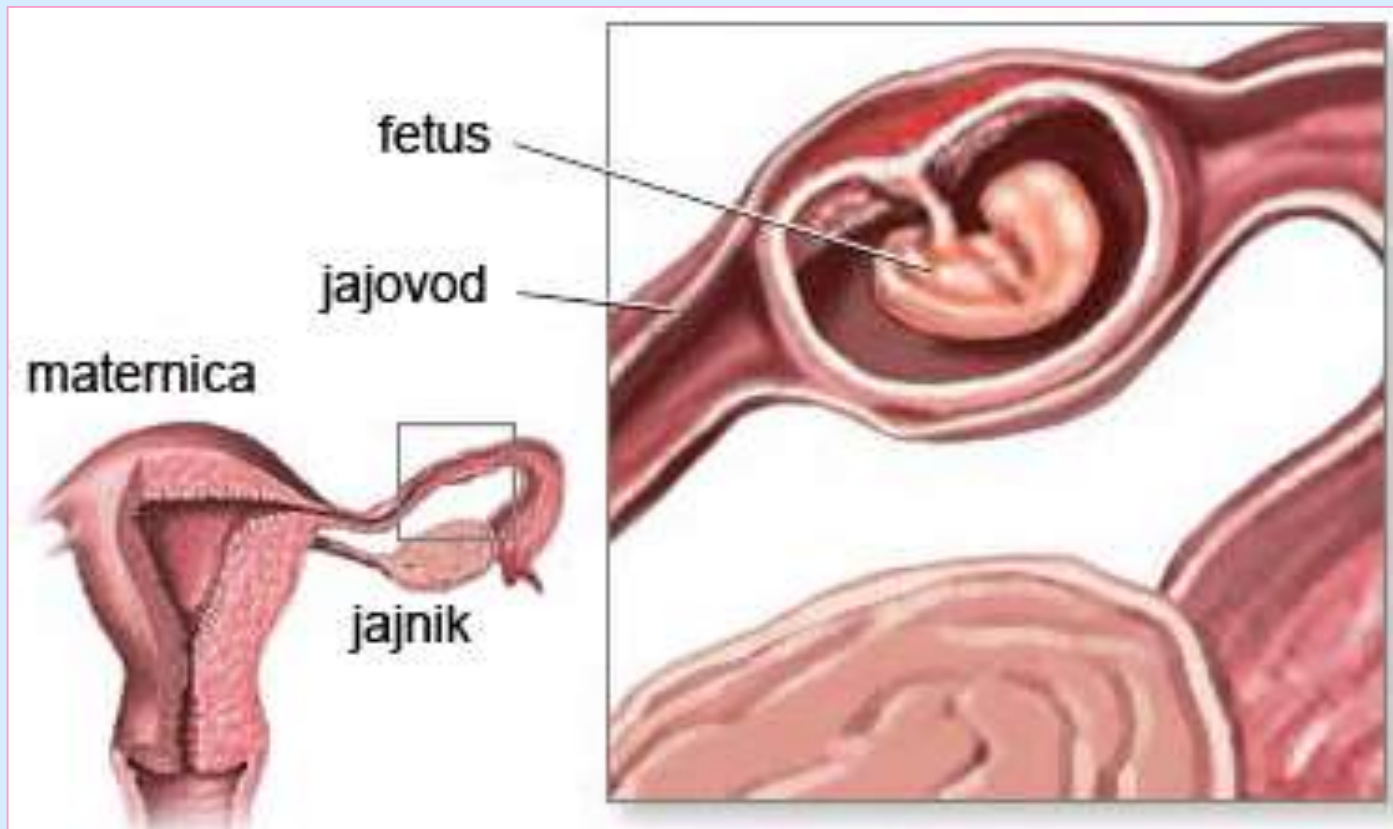
BOLOVI U LEĐIMA

- Mišićno-koštane promjene
- II, najviše III trimestar

VAŽNO: poboljšati držanje, potpetice srednje visine, tvrd ležaj, lagana masaža, trudnički steznik (?)

ABDOMINALNI BOLOVI

- Osjećaj težine
- Zategnutost sveza maternice
- Nadutost, grčevi, probavne smetnje
- Kontrakcije maternice
- Patološka trudnoća, bolest jajnika i jajovoda



Slika 17. Ektopična trudnoća

JUTARNJA MUČNINA

- 10 tjedana
- Odbojnost (hrana, piće)
- *HYPEREMESIS GRAVIDARUM*
- Nekad češće u večernjim satima

PREPORUČA SE...

- Manji obroci, češće NEKOLIKO MANJIH OBROKA DNEVNO
- Izbjegavati masnu, začinjenu hranu; ugljikohidrati
- Hidracija

KOD JAČEG POVRAĆANJA LIJEKOVI PO
UPUTI LIJEČNIKA

PYTIALISAM

- Pretjerana salivacija (nekad 1500ml)
- Udruženo s mučninom
- Dehidracija

GUBI SE KRAJEM
TRUDNOĆE

PYROISIS

- Gorušica
- GERB, regurgitacija
- Zbog pritiska maternice i pomicanja želuca proksimalno

PIJENJE TOPLOG ČAJA i
PROMJENA POLOŽAJA

GLAVOBOLJA

- I i III trimestar
- Emocionalna napetost

POSUMNJATI: preeklamsija,
eklamsija!



LEUKOREJA

- Zbog hormona (progesteron)
- Mliječne boje, ne iritira sluzokožu
- Opasnost od infekcije

URINARNI SIMPTOMI

- Učestalo mokrenje, povećan nagon
- SUI

ZBOG: povišenog intraabdominalnog tlaka, smanjenog kapaciteta mokraćnog mjehura i pritiska maternice

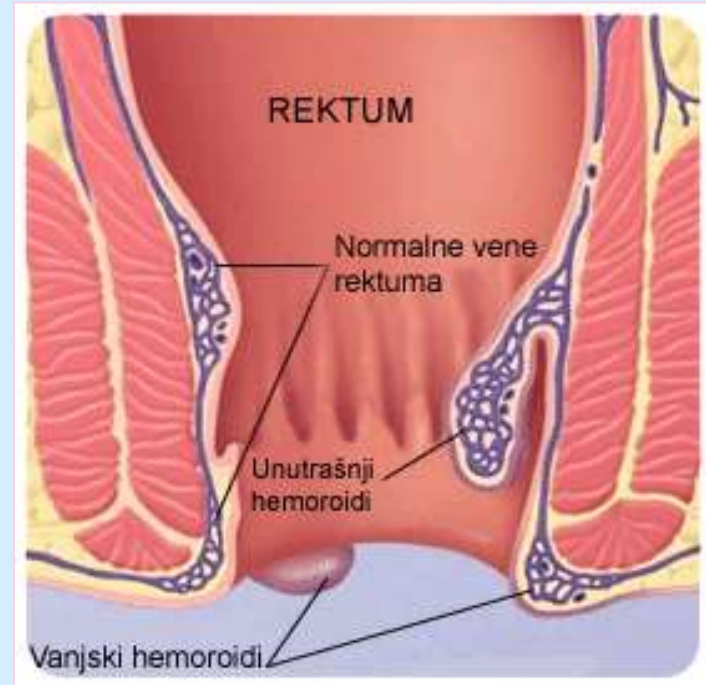
- Dizurija + hematurija - INFEKCIJA!

OGRANIČITI: kofein, začine

HEMOROIDI

- Postoje varikoziteti
- Prevencija opstipacije

KORISNE: tople kupke,
lokalno masti



Slika 18. Vanjski hemoroidi

ZATVOR - OPSTIPACIJA

- Tromost crijeva

ZBOG: povišenih spolnih hormona koji usporavaju motilitet crijeva te pritiska gravidne maternice na rectum

POTREBNO: jedenje voluminozne hrane, pijeње dosta tekućine, dosta voća u prehrani, izbjegavati dugotrajno sjedenje

OTICANJE D. EXTR.

- III trimestar

ZBOG: retencije Na i H₂O, dugotrajnog sjedenja ili stajanja, povećanog venskog pritiska u nogama, uslijed djelovanja ovarijalnih i placentarnih hormona

- Elevacija
- Umjeren Trendelenburlov položaj
- Izbjegavati odjeću koja steže

GRČEVI U NOGAMA

- Nakon I trimestra
- Rijetko pred porod
- Potkoljenice

POSLJEDICA POVIŠENOG
P, ILI SMANJENOG Ca

- Kratko stajati na pločicama - vazokonstrikcija
- Masaža
- Topli oblozi - mišići
- Odnos meso - mliječni proizvodi

VARIKOZNE VENE

- Kod višerotki

ZBOG: slabosti krvnih žila, venske staze uslijed trudnoće, neaktivnosti, slabog tonusa mišića i pretilosti



Slika 19. Varikozne vene potkoljenice

PREPORUČA SE...

- Umjereni tjelesna aktivnost (hodanje)
- U LEŽEĆEM POLOŽAJU - elevacija nogu iznad razine srca
- Nošenje prozračne odjeće (pamuk)
- Kontrola TT/kg (12-15kg!)

IZBJEGAVATI MASAŽU I PRITISAK NA NOGAMA!

Dijete	3500 g
Plodova voda	1000 g
Posteljica	500 g
Maternica	1000 g
Povećanje dojki	800 g
Povećanje volumena krvi	1500 g
Ukupno zadržavanje vode u tijelu	4700 g
Ukupno	13.000 g

Slika 20. Prirast na težini tijekom trudnoće

(Izvor: Kuljak, Ž; Habek, D. (2023) Primaljska njega trudnice, roditelje i babinjače. Škola za primalje, Zagreb)

Veleučilište „Lavoslav Ružička” u Vukovaru
Odjel za zdravstvene studije

VRSTE PORODA, POROĐAJNA DOBA, PUERPERIJ

PREDAVANJE

Vesna Šeper, Ph.D. in Physical Education and Sport, prof. struč. stud.

Vukovar, 2026.



Vrsta poroda

- Vaginalnim putem
- Vaginalnim putem uz pomagala
- Carskim rezom (elektivan, hitan)

3 POROĐAJNA DOBA

PRVO POROĐAJNO DOBA – kompletna dilatacija vrata maternice

- 13h kod prvorotki i do 8h kod višerotki
- porođaj koji traje 18h i dulje = PRODULJEN POROĐAJ



Stanjivanje i širenje vrata maternice

Burke-Aaronson, A. (2017). Mode of Birth and Infant Outcomes: A Review of Literature. *International Journal of Pediatrics & Child Care: Open Access*, 1(1): 4.

DRUGO POROĐAJNO DOBA – završava rađanjem djeteta

TREĆE POROĐAJNO DOBA – izbacivanje posteljice, do 1h od rođenja djeteta (krvarenje, infekcija, šok)

ČETVRTO POROĐAJNO DOBA – 2h nakon poroda, u prostoru pred-rađaoone – nadzor roditelje

POSTUPAK U PRVOM POROĐAJNOM DOBU (nije zadaća fizioterapeuta)

Primanje trudnice u bolnicu:

- Anamneza
- Mjerenje vitalnih znakova (puls, RR)
- Uzimanje uzoraka urina (**proteinurija!**, poticanje na mokrenje)
- Opći pregled
- Promatranje učestalosti kontrakcija (CTG – kardiotokografija) i nadzor djeteta
- Provjera krvarenja, otjecanje plodne vode
- Vaginalni pregled

Maternity Pre-Admission Questionnaire

TO ENSURE AN EXPEDIENT ADMISSION AND AN ACCURATE BIRTH CERTIFICATE PLEASE RETURN QUESTIONNAIRE WITHIN 10 DAYS OF RECEIPT.
 UPON RECEIPT OF THIS FORM, WE WILL SEND YOU AN INFORMATION PACKET.

Estimated Date of Admission _____ Referred By: Mount Sinai Hospital Physician E-Level
 Obstetrician _____ Settlement Boriken Other _____

Please indicate the last name which will be used to identify you and your baby throughout hospitalization.

PATIENT'S NAME LAST FIRST MIDDLE MAIDEN

HOME ADDRESS STREET APT NO. AREA CODE/ TEL NO.

CITY/TOWN COUNTY STATE ZIP CODE SOCIAL SECURITY

MAILING ADDRESS (If different from home) AREA CODE/ TEL NO.

MATERNITY PATIENT INFORMATION
 AGE BIRTH DATE BIRTH PLACE RELIGION RACE ANCESTRY
 MARITAL STATUS Single Married Divorced Widowed Separated MOTHER'S FULL NAME
 FATHER'S FULL NAME

NEXT OF KIN NAME RELATIONSHIP ADDRESS AREA CODE / TEL NO. BIRTH DATE

NOTIFY IN EMERGENCY NAME RELATIONSHIP ADDRESS AREA CODE / TEL NO. BIRTH DATE

MOST RECENT CARE
 WERE YOU EVER HOSPITALIZED AT MOUNT SINAI? Yes If Yes: Medical Record No. _____
 No E-Level ER Hospital Other
 UNDER WHAT LAST NAME WERE YOU REGISTERED IF DIFFERENT FROM ABOVE? _____

PATIENT'S OCCUPATION EMPLOYER ADDRESS
 OCCUPATION AREA CODE / TEL NO.
 ARE YOU A CURRENT MOUNT SINAI HOSPITAL EMPLOYEE? Yes No

SPOUSE OR PARENT'S OCCUPATION
 EMPLOYER ADDRESS
 OCCUPATION HOW LONG ADDRESS
 SOCIAL SECURITY NO. AREA CODE / TEL NO.
 ARE YOU A CURRENT MOUNT SINAI HOSPITAL EMPLOYEE? Yes No

INSURANCE: INSURANCE CO. NAME TEL NO. TO VERIFY ELIGIBILITY
 EFFECTIVE DATE ADDRESS CITY STATE ZIP
 PRIMARY INSURANCE FC: POLICY HOLDER'S NAME BIRTH DATE
 PATIENT RELATIONSHIP TO INSURED: SELF CERTIFICATE / GROUP ID #
 Spouse Other Child

SECONDARY INSURANCE FC: INSURANCE CO. NAME TEL NO. TO VERIFY ELIGIBILITY
 EFFECTIVE DATE ADDRESS CITY STATE ZIP
 POLICY HOLDER'S NAME BIRTH DATE
 PATIENT RELATIONSHIP TO INSURED: SELF CERTIFICATE / GROUP ID #
 Spouse Other Child

OTHER INFORMATION TO BE COMPLETED BY FATHER OF CHILD:
 FULL NAME BIRTH DATE

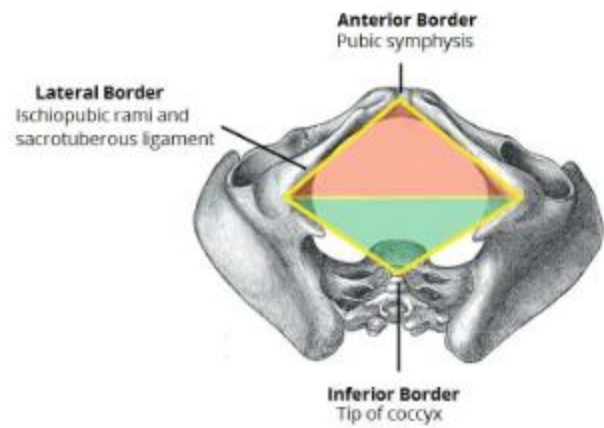
Obrazac pri primitku
 u bolnicu
 (Izvor: <https://www.dochub.com/fillable-form/182065-maternity-pre-admission-questionnaire>)

PRIPREMA TRUDNICE ZA POROD

(nije zadaća fizioterapeuta)

- priprema perineuma
- primjena laksativnog sredstva
- mirovanje u postelji – posebno ako je pukao vodenjak
- uzimanje dosta tekućine
- P.P. primjena analgetika

Anatomical Borders:



Surface Borders:

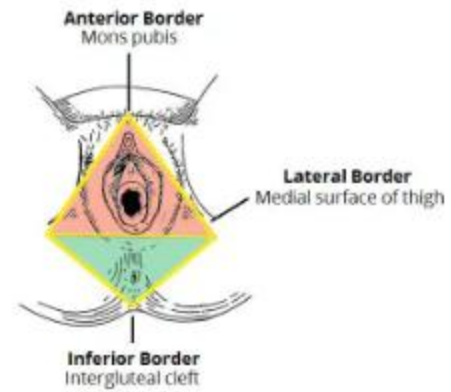


Fig 2

Anatomical and surface borders of the perineum.

Perineum

(Izvor: <https://teachmeanatomy.info/pelvis/areas/perineum/>)

ULOGA FIZIOTERAPEUTA

- aktivnosti na lopti - 1. porođajno doba
- tehnike disanja i opuštanja (naučene u trudnoći) - 1. i 2. porođajno doba
- masaža leđa, pritisak na sacrum, ležanje na boku - 1. porođajno doba

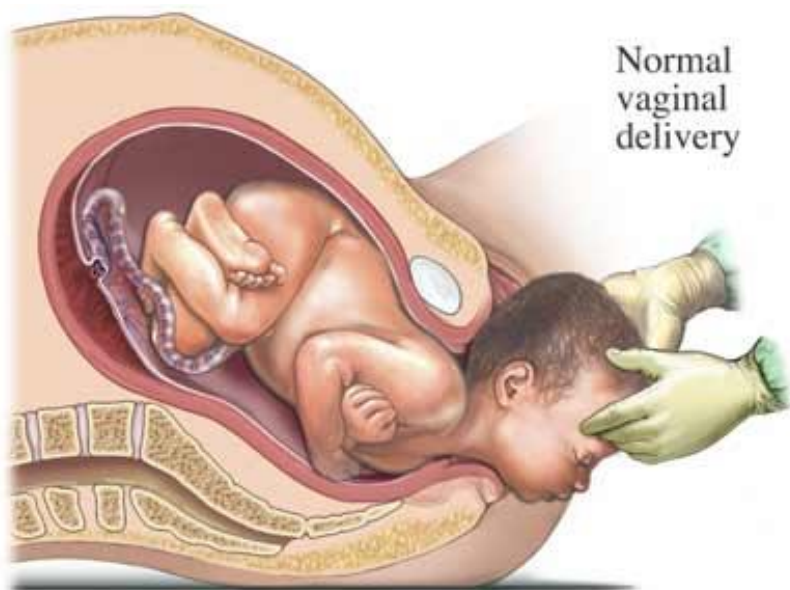
*Pravilna tehnika izгона i disanje = manje komplikacija,
aktivno učešće u porodu*



Primjer aktivnosti na lopti



DRUGO POROĐAJNO DOBA



Drugo porođajno doba

(Izvor: <https://magazine.fvhospital.com/en/vaginal-birth-labour-delivery/>)

Vernix caseosa

(Izvor: <https://www.magnoliabirthhouse.com/magnolia-blog/2020/6/2/water-birth-in-miami-what-you-need-to-know-about-hydrotherapy-during-labor-and-delivery>)



Plavičasta boja kože (Izvor:

<https://www.kentmidwiferypractice.com/waterbirth>)



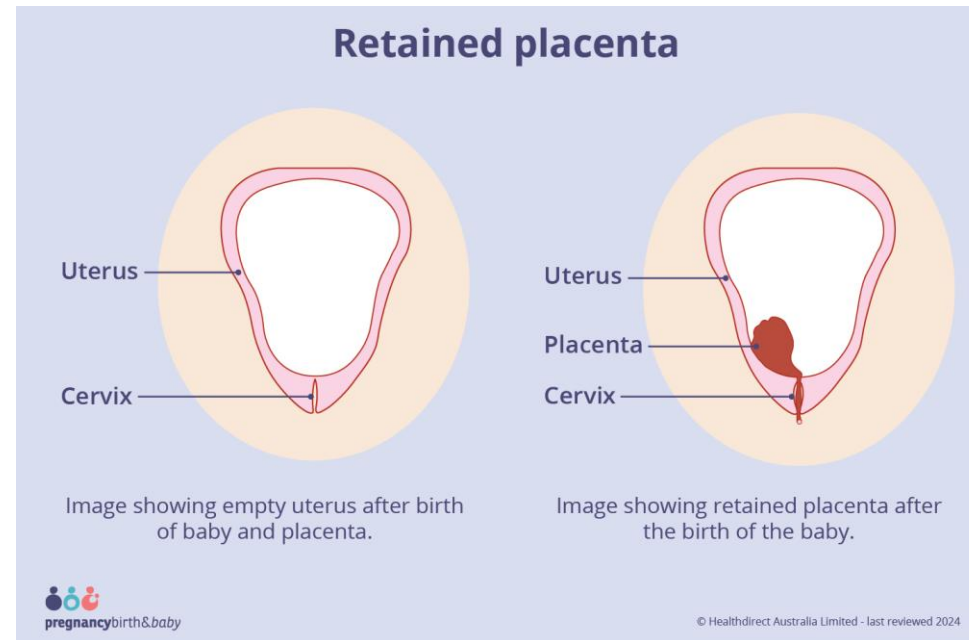


Radaonica (Izvor: <https://www.fvhospital.com/news/fv-introduces-water-labour-a-faster-gentler-childbirth-option-for-expectant-mothers/>)

TREĆE i ČETVRTO POROĐAJNO DOBA

nadzor roditelje

- Porod posteljice (45')
- Krvarenje, infekcija, šok
- Kontrola vitalnih znakova
- 2h, nakon toga odlazak na odjel



Komplikacije

(Izvor: <https://www.pregnancybirthbaby.org.au/retained-placenta>)

TYPES OF PLACENTA PREVIA



Normal
Placenta



Marginal
Placenta Previa



Partial
Placenta Previa



Complete
Placenta Previa

Pozicioniranje posteljice u maternici

(Izvor: <https://birthbootcamp.com/placenta-previa-is-vaginal-birth-still-an-option/>)

Vaginalni porod

1. Post-porođajni dan:

- 24h od poroda
- što ranije ustajanje - poptuna sloboda pokreta u postelji
- ustajanje (već nakon 2 sata) i odlazak do toaleta uz pomoć
- prvo tuširanje
- ležanje na trbuhu do max. 15 min. (brža involucija maternice)

Post-porođajne vježbe

1.dan: dijafragmalno disanje s usnom preprekom

2.dan: vježbe disanja uz pokrete g. extr

3.dan: savijati noge u koljenima i podizati zdjelicu

} bolnica

4. dan: savijati noge u koljenima i kukovima

5 – 8. dan: vježbe za jačanje trbušnih mišića - UMJERENO

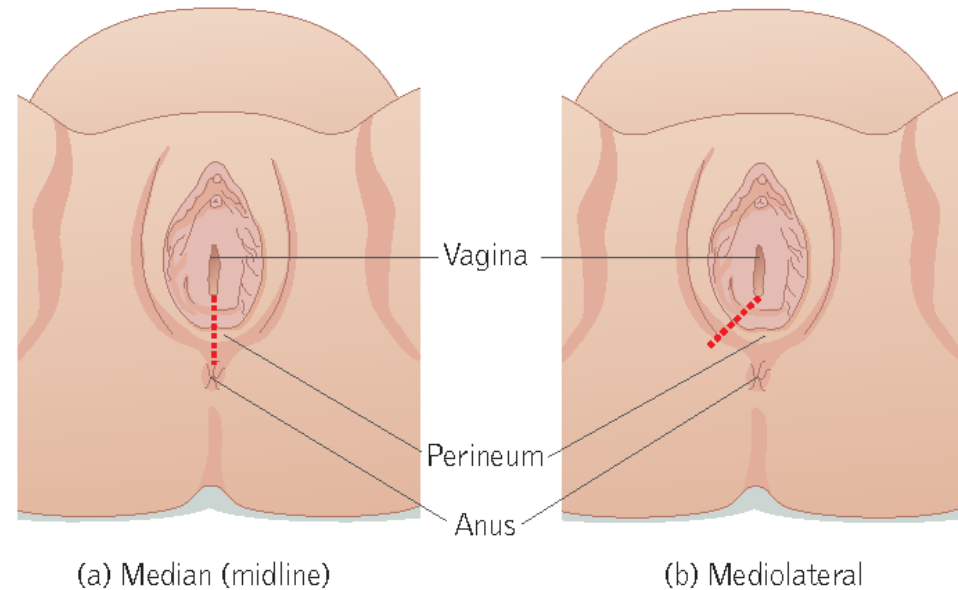
Kombinacija pokreta nogu, glave i trupa

EPIZIOTOMIJA

Kod urađene epiziotomije:

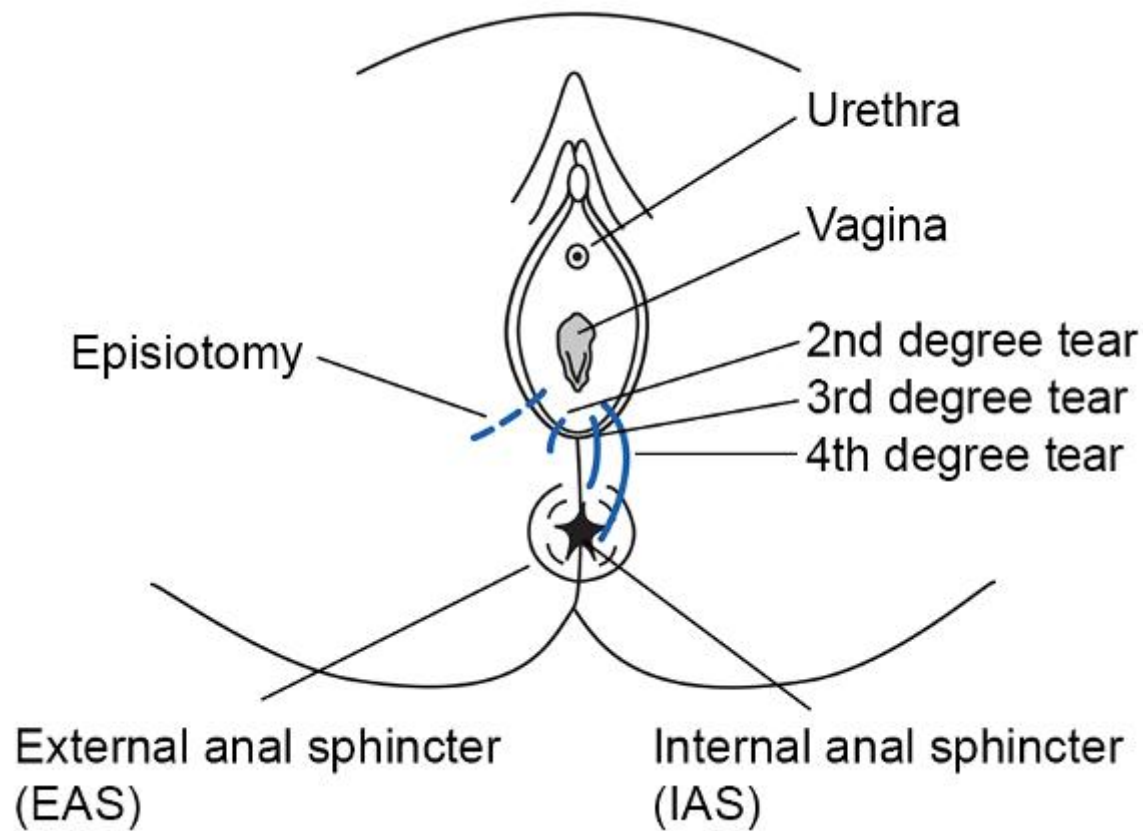
- izbjegavati sjedenje
- ne križati nogu preko noge
- ne izvoditi vježbe fleksije i abdukcije na strani epiziotomije
- pri dojenju na boku – između nogu jastuk

Locations commonly used for episiotomy wounds



Epiziotomija

(Izvor: <https://www.semanticscholar.org/paper/Perineal-tears-and-episiotomy.-Gould/92bfa9b12761a7dbb245577871870480b5121ad>)



Stupnjevi trganja perineuma

(Izvor: <https://pelvicare.uk/blog/how-to-heal-your-scars-after-an-episiotomy-or-tear-during-childbirth>)

LEBOYEROVA TEHNIKA

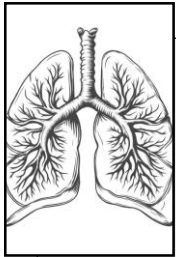


- nenasilan porođaj
- smanjivanje intenziteta svjetlosti i zvuka
- stavljanje novorođenčeta u vodu (37st.) 10-15 min. nakon poroda
- stavljanje novorođenčeta majci na grudi (reakcija sisanja)

Nelle, M., Zilow, E. P., Kraus, M., Bastert, G., Linderkamp, O. (1993). The effect of Leboyer delivery on blood viscosity and other hemorheologic parameters in term neonates. *American journal of obstetrics and gynecology*, 169(1), 189-193. [https://doi.org/10.1016/0002-9378\(93\)90161-B](https://doi.org/10.1016/0002-9378(93)90161-B)

Gzmbel, J., Nocon, J. J. (1977). The physiological basis for the Leboyer approach to childbirth. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 6(1), 11-15. <https://doi.org/10.1111/j.1552-6909.1977.tb01280.x>

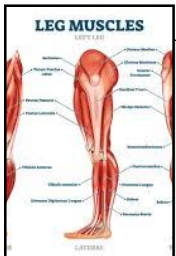
CARSKI REZ - PREDOPERATIVNA PRIPREMA



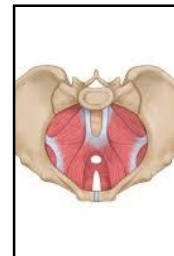
Vježbe disanja (sgm., torakalno, abdominalno, dijafragmalno)



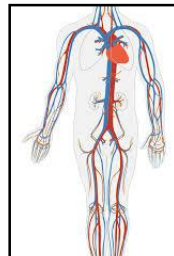
Tehnika učinkovitog kašljanja (edukacija o provođenju)



Statičke kontrakcije (mm. gluteus, quadriceps)



Aktivacija i relaksacija mišića zdjeličnog dna



Vježbe cirkulacije

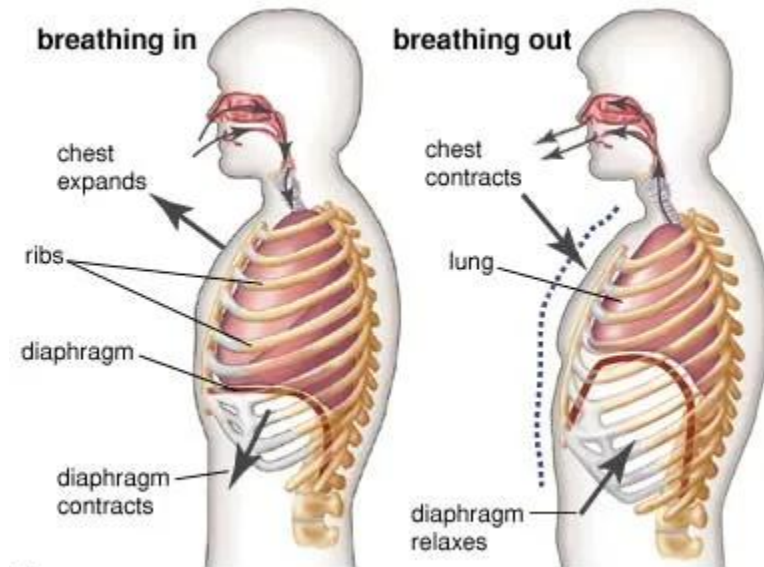
Vježbe za cirkulaciju



- **Vježbe periferne cirkulacije:** pokreti stopala i potkoljenica, 3-2-1 vježbe
- **Vježbe abdominalne cirkulacije:** vježbe u četveronožnom položaju, npr. vježba Mačka

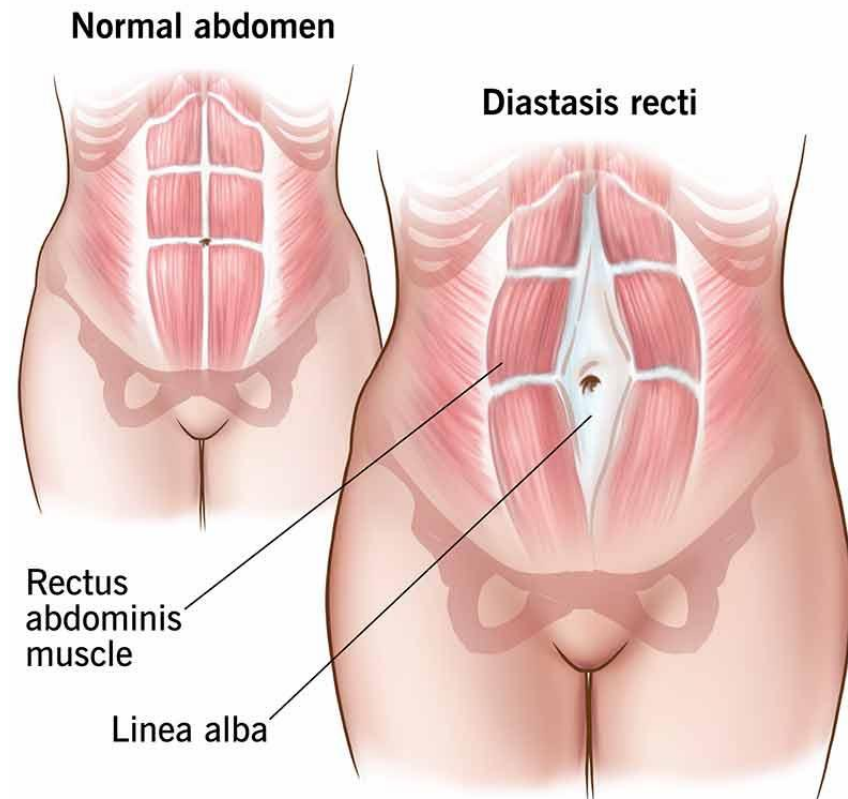
RANA POSTOPERATIVNA FIZIOTERAPIJA

- Vježbe disanja (segmentalno ili torakalno)
- Vježbe za cirkulaciju
- Što ranije ustajanje



KASNA POSTOPERATIVNA FIZIOTERAPIJA

- Dijafragmalno disanje s usnom preprekom
- Vježbe za cirkulaciju
- Statičke kontrakcije – gluteus, quadriceps
- Oko 12. post op. dana aktivan pokret
- Vježbe jačanja trbušne muskulature – test na dijastazu!





CAREFUL!

MJERE OPREZA I OSOBNA HIGIJENA

- Rano ustajanje, ali ne i povratak normalnim aktivnostima

- Prevencija pojave komplikacija dugotrajnog ležanja

- Izbjegavati podizanje, naprezanje i napinjanje



- Tuširanje

- Kupanje u kadi, u toploj vodi?

YES

NO

ŠTO KOD KUĆE?

PRVI TJEDAN: pomoć obitelji, odmaranje, izbjegavanje penjanja uz stepenice, umjereno vježbanje

DRUGI TJEDAN: odmor 1-2h dnevno, lakši kućanski poslovi, priprema objeda, raniji odlazak na počinak

TREĆI TJEDAN: odlazak u kupovinu, odmor 1h dnevno, šetnje, povećanje aktivnosti

ČETVRTI TJEDAN: neznatno ograničenje svakodnevnih aktivnosti

PETI TJEDAN: postpartalni ginekološki pregled

PUERPERIJ



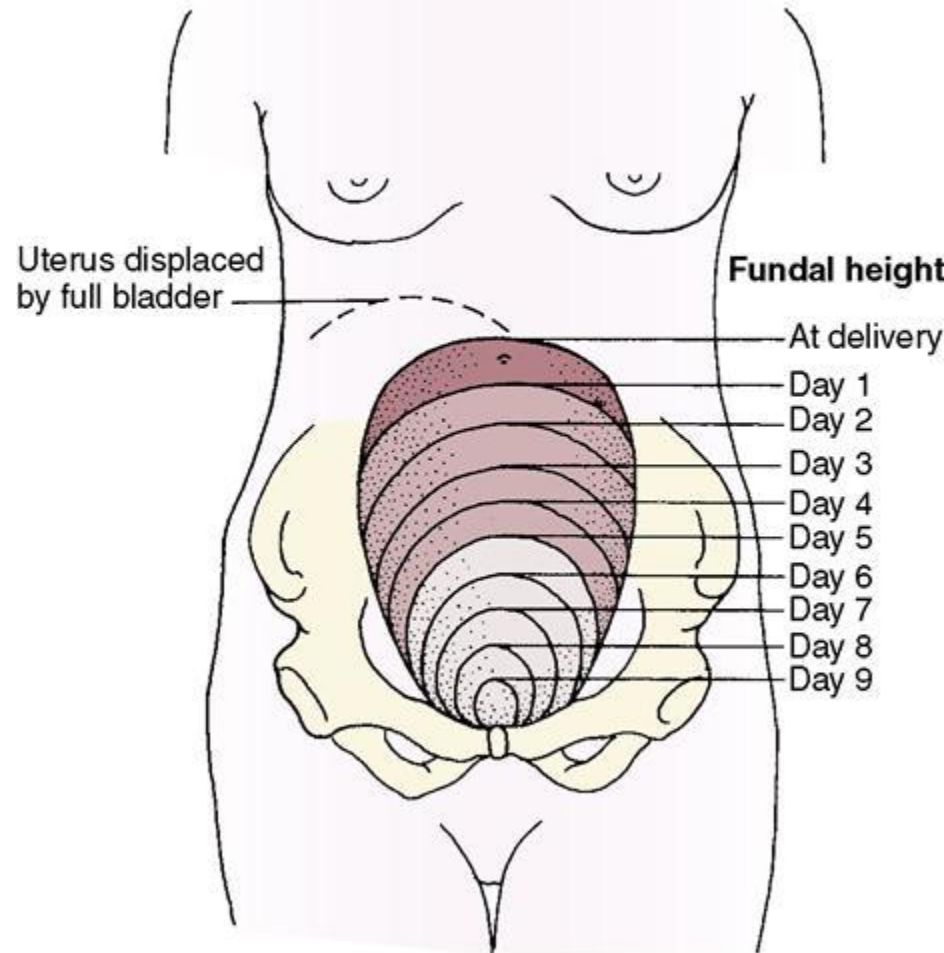
FIZIOLOŠKA ZBIVANJA U PUERPERIJU

- Period od 6 tjedana nakon poroda
- Organizam se vraća u pre-gravidno stanje
- Izmjene u veličini maternice počinju odmah nakon porođaja



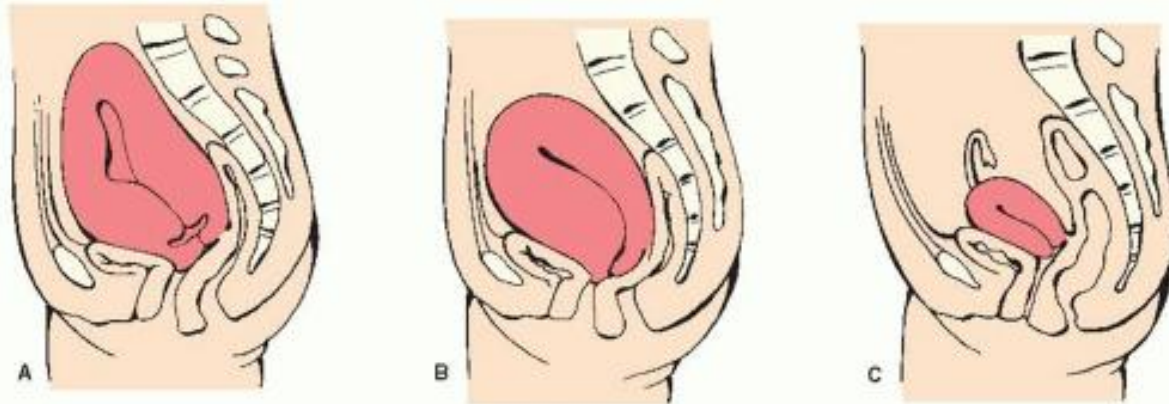
- Regeneracija endometrija
završava 3 tjedna od poroda
- Regeneracija mjesta placente
završava tek 5-og tjedna

LOCHIAE – krvav sekret postaje serozniji; prestaje negdje oko 4-og tjedna



Involucija maternice

(Izvor: <https://nursekey.com/12-postpartum-assessment-and-nursing-care/>)



- A. Maternica odmah nakon poroda
- B. nakon 6 dana
- C. Negravidna maternica

(izvor: <https://nursekey.com/care-of-mother-and-neonate-during-the-postpartum-period/>)



CERVIX – vanjsko materično ušće oko 3. tjedna postaje
poprečni prorez

RODNICA – oko 3. tjedna nakon vaginalnog porođaja; izrazito
proširena rodnica se vraća u prenatalno stanje

- Mišići dna zdjelice postupno vraćaju tonus



- Normalna funkcija bubrega nakon 3 mjeseca
- Žena nakon poroda izgubi 4,5kg (eliminacija nakupljene tekućine i elektrolita)
- Tijekom 3-4 tjedna nakon poroda – normalizacija vrijednosti udarnog i minutnog volumena te pulsa
- Opasnost od tromboze
- Funkcija pluća nakon do 6 mjeseci



USPOSTAVLJANJE OVULACIJE I MJESEČNICE

- Majke koje doje nemaju mjesečnicu
- Prednji režanj hipofize luči *prolaktin*
- Kod žena koje ne doje: do ovulacije može doći 25 – 30 dana od poroda, a najkasnije do 3 mjeseca

Kontracepcijski učinak dojenja: nepouzđano; ovisi o prehrani majke, intenzitetu sisanja, dohrani



PSIHIČKI POREMEĆAJI U PUERPERIJU

- Baby blues (blaži depresivni poremećaj)
- Uslijed naglog pada hormona trudnoće
- Puerperalne psihoze!



POSTPARTALNI PREGLED

- 5-og tjedna nakon poroda
- kontrole TT/kg, pregled dojki, ginekološki pregleda i pregled zdjelice
- povratak svim aktivnostima nakon 6-og tjedna



**VELEUČILIŠTE „LAVOSLAV RUŽIČKA“ U VUKOVARU
ODJEL ZA ZDRAVSTVENE STUDIJE**



**MENOPAUAZA I KLIMAKTERIJ
mogućnosti primjene fizioterapije**

predavanje

VESNA ŠEPER, Ph.D. in Physical Education and Sport, prof. struč.
stud.

Vukovar, 2025.

MENOPAUAZA (fiziološka, inducirana)

- Prekretnica u zdravlju
- U kontekstu mase masti, dislipidemije i neurodegeneracije
- Premenopauza, postmenopauza
- KLIMAKTERIJ – fiziološke promjene; prijelaz iz reproduktivnog u ne-reproduktivno razdoblje

OSOBNI I SOCIJALNI UTJECAJ MENOPAUZE

- Ovisno o socijalnim i kulturološkim uvjerenjima
- ~20% žena smatra kako se radi o bolesti
- Promjena slika o vlastitom tijelu; gubitak sposobnosti reprodukcije
- Čimbenici koji negativno utječu: sindrom praznog gnijezda, umirovljenje, krhki, bolesni roditelji, gubitak roditelja, partnera
- 30-40% žena prijavljuje smanjenu radnu sposobnost

Incidencija, prevalencija, etničke razlike

- Prosječna dob – 48.78 god, (ranije kod Afro-Amerikanki, Latino Amerikanki, Azijatkinja i u zemljama srednjeg Istoka, kasnije u Europi, Australiji i SAD)
- Vazomotorni simptomi – Europljanke i Latino Amerikanke; rjeđe Indija i srednje Istočne zemlje.
- CVD rizik veći kod pretilih crnkinja nego pretilih bjelkinja?
- Rizik od osteoporozе – zemlje smještene sjevernije; osteoporotične frakture - Kina

INDUCIRANA (UMJETNO IZAZVANA) MENOPAUAZA

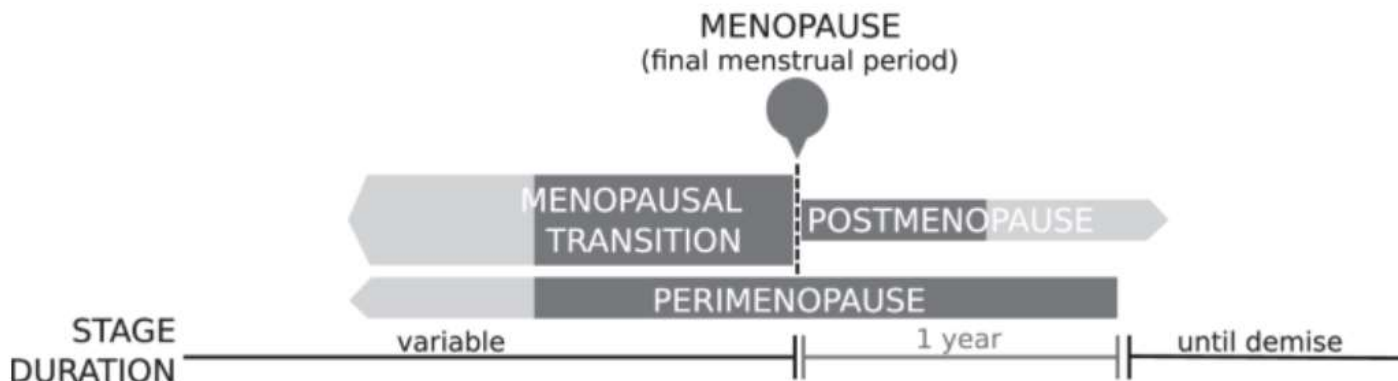
- Kod op. jajnika, radioth. zdjelice
- Nastupa naglo, th. estrogenom
- Oprez kod ca. dojke. i endometrioze
- Češće kognitivno oštećenje i demencija kasnije u životu

FIZIOLOŠKA MENOPAUAZA

- Trajni prestanak mjesečnice (unazad 12 mj.)
- Promjene FSH i hormona jajnika
- Bez patoloških uzroka

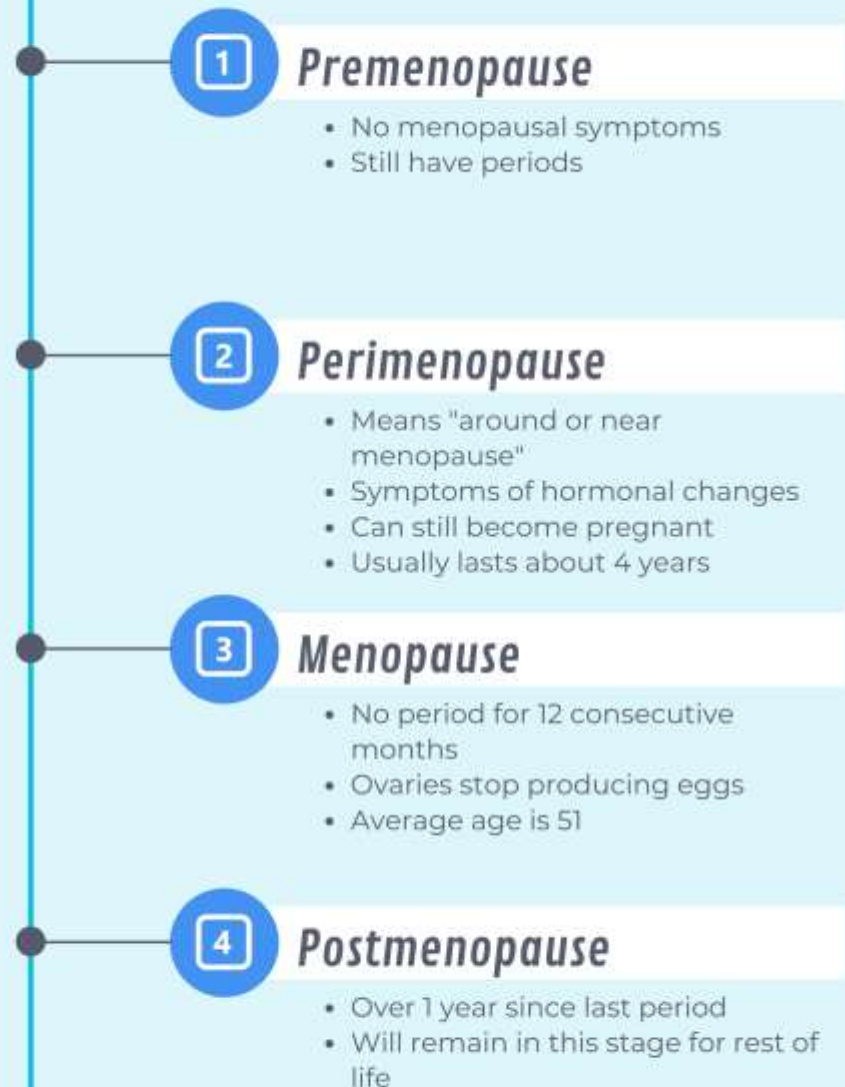
Slika 1. Menopauza (Izvor: Ambikairajah, A., Walsh, E., & Cherbuin, N. (2022). A review of menopause nomenclature. *Reproductive health*, 19(1), 29.)

Fig. 1



Visual representation of the relationship between different time periods surrounding menopause as established by a World Health Organization Scientific Group on Research in the Menopause. Figure is a modification of work found in World Health Organization [9]

STAGES OF MENOPAUSE




Slika 2. Razdoblja menopauze (Izvor: <https://www.genesisperformancechiro.com/blog/2020/10/5/understanding-the-stages-and-challenges-of-menopause>)

CILJ: utvrditi promjene u kvaliteti zdravlja žena uzrokovane starenjem i smanjenom funkcijom jajnika

- The 2001 Stages of Reproductive Aging Workshop (STRAW) proposed nomenclature and a staging system for ovarian aging...The STRAW staging system is widely considered the gold standard for characterizing reproductive aging through menopause

► Menopause. Author manuscript; available in PMC: 2013 Apr 1.

Published in final edited form as: Menopause. 2012 Apr;19(4):387–395. doi: [10.1097/gme.0b013e31824d8f40](https://doi.org/10.1097/gme.0b013e31824d8f40) 

Executive summary of the Stages of Reproductive Aging Workshop + 10: addressing the unfinished agenda of staging reproductive aging

[Siobán D Harlow](#)¹, [Margery Gass](#)², [Janet E Hall](#)³, [Roger Lobo](#)⁴, [Pauline Maki](#)⁵, [Robert W Rebar](#)⁶, [Sherry Sherman](#)⁷, [Patrick M Sluss](#)⁸, [Tobie J de Villiers](#)⁹, For the STRAW + 10 Collaborative Group

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PMCID: PMC3340903 NIHMSID: NIHMS361103 PMID: [22343510](https://pubmed.ncbi.nlm.nih.gov/22343510/)




Slika 3. Faze u odrasloj dobi u životu žene (Izvor: Harlow, S. D., Gass, M., Hall, J. E., Lobo, R., Maki, P., Rebar, R. W., Sherman, S., Sluss, P. M., de Villiers, T. J., & STRAW 10 Collaborative Group (2012). Executive summary of the Stages of Reproductive Aging Workshop + 10: addressing the unfinished agenda of staging reproductive aging. *Menopause* (New York, N.Y.), 19(4), 387–395. <https://doi.org/10.1097/gme.0b013e31824d8f40>)

	Menarche										FMP (0)	
Stage	-5	-4	-3b	-3a	-2	-1	+1 a	+1b	+1c	+2		
Terminology	REPRODUCTIVE				MENOPAUSAL TRANSITION			POSTMENOPAUSE				
	Early	Peak	Late		Early	Late	Early			Late		
					<i>Perimenopause</i>							
Duration	variable				variable	1-3 years	2 years (1+1)	3-6 years	<i>Remaining lifespan</i>			
PRINCIPAL CRITERIA												
Menstrual Cycle	Variable to regular	Regular	Regular	Subtle changes in Flow/Length	Variable Length Persistent ≥7- day difference in length of consecutive cycles	Interval of amenorrhea of >=60 days						
SUPPORTIVE CRITERIA												
Endocrine			Low	Variable*	↑ Variable*	↑ >25 IU/L**	↑ Variable	Stabilizes				
FSH			Low	Low	Low	Low	Low	Very Low				
AMH				Low	Low	Low	Low	Very Low				
Inhibin B				Low	Low	Low	Low	Very Low				
Antral Follicle Count			Low	Low	Low	Low	Very Low	Very Low				
DESCRIPTIVE CHARACTERISTICS												
Symptoms						Vasomotor symptoms <i>Likely</i>	Vasomotor symptoms <i>Most Likely</i>				<i>Increasing symptoms of urogenital atrophy</i>	

* Blood draw on cycle days 2-5 ↑ = elevated

**Approximate expected level based on assays using current international pituitary standard⁶⁷⁻⁶⁹

Kasna reproduktivna faza (Stage -3)

- opada plodnost, mijenja se razina hormona (FSH, estradiol i dr. markeri)
- podfaze -3b i -3a  fine promjene mjesečnog ciklusa, vrijednosti FSH promjenjive, ostali markeri funkcije jajnika 

mjesečni ciklus redovit, nema promjena u duljini ili nivou FSH; broj folikula smanjen i ostalih folikularnih hormona

Značajke ostalih faza u odrasloj dobi žene



Rani prijelaz u menopauzu

Stage -2

Povećana promjenjivost duljine m. ciklusa ≥ 7 dn (unazad 10 ciklusa)

Varijabilnost folikularnih hormona



Kasni prijelaz u menopauzu

Stage -1

Pojava amenoreje 60 i više dana, značajna promjenjivost m. ciklusa, značajne fluktuacije hormona, anovulacija, 1-3 godine



Rana postmenopauza (5-8 god.)

Stage +1a, +1b, +1c

FSH raste, estradiol pada

svaki period traje 1 god. (+1a retrospektivno daje podatak o FMP) – kraj perimenopauze +1c traje 3-6 god.



Kasna postmenopauza

Stage +2

Promjene vezane uz somatsko starenje najvažnije
Izraženi suhoća rodnice i urogenitalna atrofija

Čimbenici koji utječu na klasifikaciju

- pušenje, BMI>30kg/m², histerektomija
- izrazito naporna aerobna aktivnost, kronični problemi s mjesečnim ciklusom, nepravilnosti maternice i jajnika, ozbiljne bolesti, rak
- socioekonomski status

STRAW klasifikacija NA

Tablica 1. Odstupanja od STRAW klasifikacije (Izvor: Harlow, S. D., Gass, M., Hall, J. E., Lobo, R., Maki, P., Rebar, R. W., Sherman, S., Sluss, P. M., de Villiers, T. J., & STRAW 10 Collaborative Group (2012). Executive summary of the Stages of Reproductive Aging Workshop + 10: addressing the unfinished agenda of staging reproductive aging. *Menopause (New York, N.Y.)*, 19(4), 387–395. <https://doi.org/10.1097/gme.0b013e31824d8f40>)

Histerektomija i ablacija endometrija	Sindrom policističnih jajnika	Kronične bolesti i kemoterapija
endokrini markeri starenja jajnika; najranije 3 mj. od zahvata; ponoviti mjerenje bar 2x; informacija o premenopauzi ili postmenopauzi	česta oligomenoreja; moguća pojava menopauze u kasnijoj dobi; „hipotalamička” amenoreja; nedovoljno informacija	amenoreja uslijed primjene lijekova i gubitak BF; važna starost u trenutku primjene th., vrsta tretmana raka, terapija tamoxifenom; žene s HIV-AIDS

➤ Fiziološke i emocionalne promjene

➤ Pad E, 70% žena

Simptomi: navale vrućine, nesanica+noćno znojenje, palpitacije, glavobolja i vrtoglavice, iritabilnost, pad pažnje, teže pamćenje, smanjen libido

➤ Emocionalne promjene – nedovoljno istražene, literatura oskudna

PROMJENE NA SPOLNIM ORGANIMA

➤ 6mj. od zadnje
mjesečnice

➤ Ostale promjene

Kontraktura predvorja
rodnice, suhoća rodnice i
gubitak elastičnosti,
stanjivanje
vulvovaginalnog tkiva

Involucija cervixa,
smanjivanje uterusa i
adnexa, ginatrezija

VAŽNOST IDENTIFIKACIJE SIMPTOMA

- Narušavaju kvalitetu života (uznemirujući; privatno, na radnom mjestu)
- Stručno vodstvo
- Intervencije za poboljšanje kvalitete života

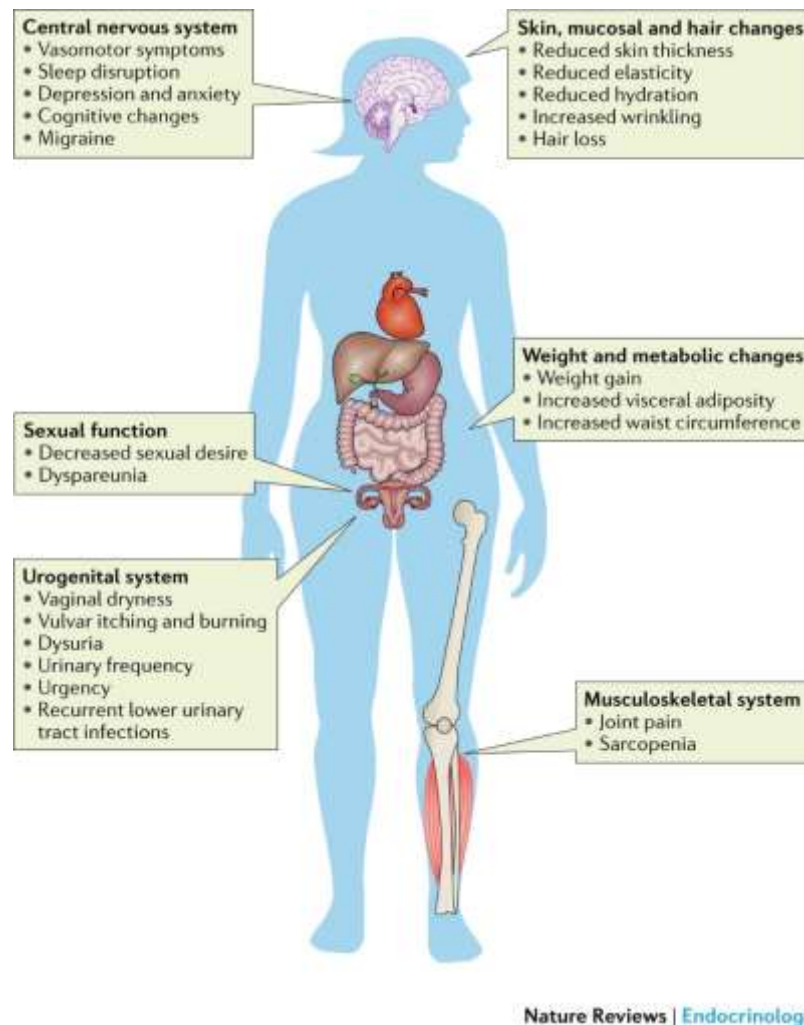
Longitudinalne studije – etničko i zemljopisno porijeklo, individualne značajke – utjecaj na pojavu i ozbiljnost simptoma

(Izvor: Monteleone, P., Mascagni, G., Giannini, A. *et al.* Symptoms of menopause — global prevalence, physiology and implications. *Nat Rev Endocrinol* 14, 199–215 (2018). <https://doi.org/10.1038/nrendo.2017.180>)



Patrizia Monteleone, Giulia Mascagni, Andrea Giannini, Andrea R. Genazzani & Tommaso Simoncini

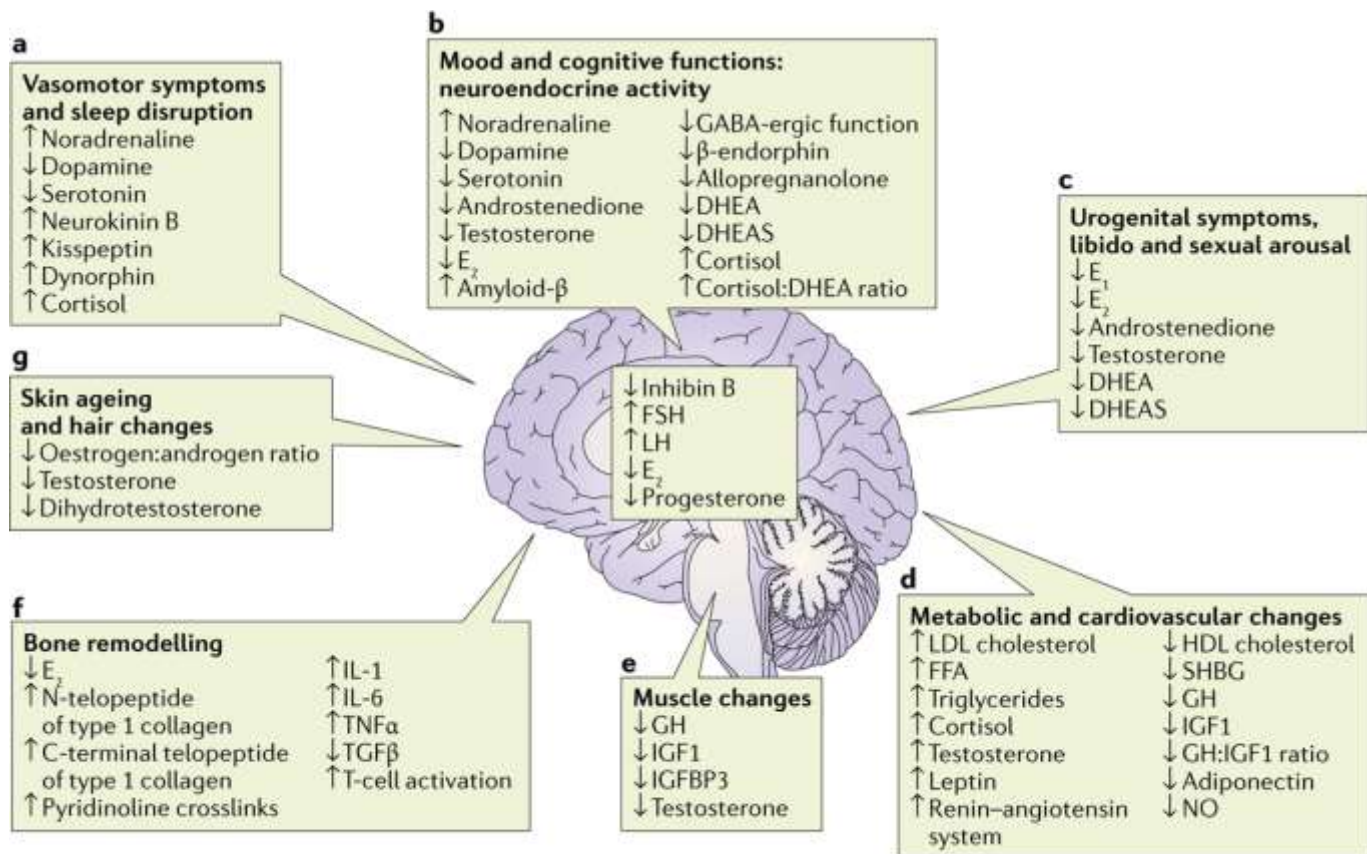
17k Accesses 251 Altmetric 30 Mentions [Explore all metrics](#)



Slika 4. Pregled simptoma menopauze

(Izvor: Monteleone, P., Mascagni, G., Giannini, A. *et al.* Symptoms of menopause — global prevalence, physiology and implications. *Nat Rev Endocrinol* 14, 199–215 (2018). <https://doi.org/10.1038/nrendo.2017.180>)

Symptoms of menopause include central nervous system (CNS)-related disorders, bodily alterations related to cardio-metabolic changes, musculoskeletal alterations, urogenital and skin atrophy and sexual dysfunction. Perimenopause is associated with the worst menopausal symptom burden, arising from neurochemical changes within the CNS leading to severe vasomotor symptoms, sleep disorders and depression, which might affect cognitive function. Long-term manifestations of definite oestrogen decline result in urogenital atrophy and ageing of the skin, whereas osteoporosis and sarcopenia might develop during the postmenopausal period.



Slika 5. Endokrinološke implikacije simptoma i promjena tijekom menopauze (Izvor:Monteleone, P., Mascagni, G., Giannini, A. *et al.* Symptoms of menopause — global prevalence, physiology and implications. *Nat Rev Endocrinol* 14, 199–215 (2018). <https://doi.org/10.1038/nrendo.2017.180>)

CNS i povezani simptomi MENOPAUZE

- Nastaju nakon „otkazivanja“ funkcije jajnika
- Posljedica neurobiokemijskih promjena



Vazomotorni simptomi; znojenje, navale vrućine, drhtavica, zimica; 75% žena; 2 godine prije FMP, najjači 1god. nakon FMP i traju do 4 god.; što se ranije pojave dulje traju



Poremećaji spavanja; 40-60% žena; češće u perimenopauzi i postmenopauzi; buđenje noću, noćno znojenje; simptomi izraženi više kod opstruktivne apneje



Depresija i anksioznost; rana perimenopauza i postmenopauza; > 20%; češće u žena koje su imale depresivne epizode; tuga, gubitak interesa, apetita, sna, koncentracije, osjećaji krivice, umora, uznemirenost i suicidalne ideje; anksioznost češća u prijelaznom razdoblju;



Kognitivne promjene; češće nakon inducirane menopauze prije 45. god.; problemi s učenjem, verbalnom memorijom



Migrena; u 10-29% žena; češće u žena koje su je imale tijekom reproduktivnog razdoblja; opada u postmenopauzi

MENOPAUAZA I METABOLIČKI SINDROM

(kriteriji: centralna pretilost – WHR, hipertenzija, inzulinska rezistencija, dislipidemija;
simptomi: bolovi, poremećaji sna, seksualna disfunkcija, promjenjivo raspoloženje)

Women's Health

Impact Factor: 2.7 / 5-Year Impact Factor: 3.6

Journal Homepage

Submission Guidelines

Open access | Review article | First published online March 10, 2022

Are there differences in symptoms experienced by midlife climacteric women with and without metabolic syndrome? A scoping review

Se Hee Min, Qing Yang, and Sharron Rushton

<https://doi.org/10.1177/17455057221083817>

Contents | PDF/EPUB | Cite article | Share options | Information, rights and permissions | Metrics and citations | Figures and tables

- Veći rizik od pojave velikog broja simptoma u odnosu na žene bez MtS-a
- Velika razlika među ženama s MtS-om
- Urogenitalni, vazomotorni, psihološki simptomi, problemi sa spavanjem, tjelesni simptomi
- Najčešći pojedinačni simptom – mentalna iscrpljenost (84,4%); urogenitalni simptomi najveća prevalencija u grupi (81,3%).
- Žene dobi 40-65 god.

SRČANOŽILNE PROMJENE



- Porast TT/kg (2,1 kg/kroz 3 god.) – više povezano sa starenjem
- Raspodjela – više povezana s menopauzom (visceralna mast) – neovisan uzrok CVD-a
- Histerektomija + ooforektomija – porast TT brži

- Ateroskeloza – više proupalnih citokina i adipokina
- Akumulacija masti u srčanom mišiću
- Lipidni profil – stvaranje plakova u arterijama
- Porast RR, neosjetljivost na sol (2x)
- Pad estrogena – promjene u elastičnosti krvnih žila
- Mlađe od 45. god – rizik raste



MIŠIĆNO-KOŠTANI PROBLEMI

- *Postmenopauzalna osteoporoza* (smanjena gustoća kostiju, stanjivanje i povećana poroznost srži i smanjena povezanost trabekula)
- Češći prijelomi (ručni zglob, kralješci, kuk) – trajna onesposobljenost
- Promjene značajno napreduju u kasnoj perimenopauzi
- Nakon FMP gubitak koštane mase – kuk 1,0-1,4%; kralježnica 1,8-2,3% (godišnje)
- Promjene u sastavu mase tijela – LMM, FM, pojava *sarkopenije*
- *Osteoartritis* – bol; DIP zgl. šake i baza palca, koljeno; perimenopauza do 5 god. od FMP

UROGENITALNI SIMPTOMI I SEKSUALNA DISFUNKCIJA

- Često se simptomi ne prijavljuju; češći u postmenopauzi, nakon 4-5 god.
- *Suhoća rodnice (83%), dispareunija (42%), svrbež (26%) i osjećaj pečenja rodnice (14%), dizurija, češće i hitno mokrenje (30%), češće infekcije*
- Ozbiljnost simptoma – 62% žena navodi umjereno do izrazito ozbiljne
- prema REVIVE studiji – vulvo-vaginalna atrofija; ozbiljan problem
- Urinarna inkontinencija – posljedica ulaska u menopauzu ili
↑TT/kg (SUI – paritet i TT; UUI – dob; MUI - ↑BMI, histerektomija)

EVIDENCE BASED PHYSIOTHERAPY

Lialy, H. E., Mohamed, M. A., AbdAllatif, L. A., Khalid, M., & Elhelbawy, A. (2023). Effects of different physiotherapy modalities on insomnia and depression in perimenopausal, menopausal, and post-menopausal women: a systematic review. *BMC women's health*, 23(1), 363.

Reflexology, yoga, walking and aromatherapy massage showed an overall significant impact on decreasing insomnia and depression in menopausal women. Most of exercise and stretching interventions also showed improvement in sleep quality but inconsistent findings regarding depression. However, insufficient evidence was found regarding the effect of craniofacial massage, footbath, and acupressure on improving sleep quality and depression in menopausal women.

Munjal, J., Zutshi, K., Aman, I., & Khan, M. R. (2021). Effect of Physiotherapy on Postmenopausal Women: **A Review of Literature**. *Int. J. Adv. Res. Gynaecol. Obstet*, 2(1), 1.

Study	Participants	Exercise Intervention	Result
Karandikar-Agashe et al. ¹³	60 patients with menopause and insomnia. Controlled Group (n = 30), Experimental Group (n = 30)	Group A underwent general strengthening exercises. The frequency was three times for the first two weeks sessions lasted for 20 min and 30 min for 3rd and 4th week. Group B received aerobic exercises for 20 min in 1st and 2nd week, and 30 min in 3rd and 4th week	Reduction in insomnia in postmenopausal women
Llanas et al. ¹⁴	2 patients aged 56 and 62 years (case study)	One and a half hours physiotherapy session twice a week for six months Treatment includes active and passive stretching and active strengthening of a major group of muscles.	Reduction in REM latency Improvement in sleep efficiency
Oliveira et al. ¹⁵	44 participants were categorise into 3 groups, TM(n = 15), CTL (n = 15), PM(n = 14)	The duration of treatment was 4 months PM and TM group participants were seen twice a week in 1-h sessions, i.e. the 16th session of massage and passive movement	Improvement in ISI Decrease in the BDI Decrease in insomnia symptoms
Emara et al. ¹⁶	20 postmenopausal women with BMI less than 30 kg/m ²	The duration of the treatment lasted for 40 minutes. Each treatment sessions were 3 times/week for 2 months.	Improvement in sleep quality

Study	Participants	Exercise Intervention	Result
Schröder et al. ¹⁷	50 participants were enrolled into two groups (controlled and experimental). Control group (n = 25) Experimental group (n = 25)	30-minute intensive exercise, twice weekly for 3 months	Decrease in pain Improvement in quality of life
Bergstrom et al. ¹⁸	36 postmenopausal women with kyphosis attending the osteoporosis split into two groups. Control group (n=16) Experiment group (n=20)	60-min group training programme twice a week for 4 months	Increased thoracic extension Increased back extensor strength Improvement in physical mobility

Angin et al. ¹⁹	16 osteoporotic and 17 osteopenic postmenopausal women were enrolled in the study.	Participants received exercise sessions for 1 hour for 3 weeks for 21 weeks.	Decrease in pain Increase in BMD Improvement in quality of life
Angin et al. ²⁰	Forty-one women were divided into 2 groups, Pilates group (n = 22) Control group (n = 19)	One-hour session, three times a week for 24 weeks	Increase in pain Increase in BMD Improvement in quality of life
Aveiro et al. ²¹	36 postmenopausal women with osteoporosis were divided into two groups (n = 18 each) : land-based or water-based.	Each session was for 45 minutes. 2 sessions/week for 12 weeks.	Improvement in postural control Improvement in dynamic balance

Rangey, P. B., & Shah, N. (2024). Effect of physiotherapy on menopausal symptoms in females–A **systematic review**. *Physiotherapy-The Journal of Indian Association of Physiotherapists*, 18(2), 126-133.

Physiotherapy provides an **inexpensive, nonpharmacological alternative to hormone replacement therapy** which forms the current **mainstay of management of menopausal symptoms**. Among physiotherapy interventions, **land-based exercises are rather convenient to perform** for the subjects. The objective of the systematic review was to study the effect of land-based exercises on these menopausal symptoms.

The results suggest a need for **high-quality randomized controlled trials**.

Shojaa, M., Von Stengel, S., Schoene, D., Kohl, M., Barone, G., Bragonzoni, L., Dallolio, L., Marni, S., Murphy, M. H., Stephenson, A., Mänty, M., Julin, M., Risto, T., & Kemmler, W. (2020). Effect of exercise training on bone mineral density in post-menopausal women: a systematic review and meta-analysis of intervention studies. *Frontiers in Physiology*, *11*, 652.

Osteoporosis is a major health problem in post-menopausal women (PMW). Exercise training is considered a cost-effective strategy to prevent osteoporosis in middle aged-older people. The purpose of this study is to summarize the effect of exercise on BMD among PMW.

The pooled number of participants was 5,300 (intervention group: $n = 2,901$, control group: $n = 2,399$).

In the present meta-analysis, there was a significant ($p < 0.001$), but rather low effect (SMD = 0.33–0.40) of exercise on BMD at LS and proximal femur.

A large variation among the single study findings was observed, with highly effective studies but also studies that trigger significant negative results. These findings can be largely attributed to differences among the exercise protocols of the studies. Findings suggest that the true effect of exercise on BMD is diluted by a considerable amount of studies with inadequate exercise protocols.

Wolf, D. F., Carvalho, C., Padovez, R. D. F. C. M., de Oliveira, M. P. B., & da Silva Serrão, P. R. M. (2024). Effects of physical exercise on muscle function of the knee, pain and quality of life in postmenopausal women with knee osteoarthritis: **A systematic review with meta-analysis**. *Musculoskeletal Science and Practice*, 102929.

Objective of this study was to **investigate the effects of physical exercise on muscle function of the knee, pain and quality of life** in postmenopausal women with knee osteoarthritis (OA).

The findings demonstrated the **effectiveness of physical exercise in improving physical function**, assessed through the **Six-Minute Walk Test and the WOMAC scale's physical function domain**, compared to the control group.

However, **no significant differences** were observed in **pain or stiffness** outcomes between the treatment and control groups. Unfortunately, **insufficient data** precluded a meta-analysis for knee muscle function and quality of life outcomes. **Despite the potential of physical exercise** to enhance physical function in postmenopausal women with knee OA, the study highlights a **lack of standardization in assessment tools and tests**, limiting the feasibility of meta-analysis.

Hsu, H. H., Chiu, C. Y., Chen, W. C., Yang, Y. R., & Wang, R. Y. (2024). Effects of exercise on bone density and physical performance in postmenopausal women: A systematic review and meta-analysis. *PM&R*, 16(12), 1358-1383.

Postmenopausal bone loss and decreased physical performance are commonly presented issues. This study aimed through systematic review and meta-analysis to examine the benefits of adding exercise to medicine/supplements in postmenopausal women.

Nineteen articles with 1249 participants were included in this study for systematic review and meta-analysis. The results showed that additional exercise was not associated with significantly improved BMD at the lumbar spine and hip joint compared with medicine/supplements only.

However, results of subgroup analysis of exercise types showed a significant improvement in lumbar spine BMD by combining multiple types of exercise training.

López-Pérez, M. P., Afanador-Restrepo, D. F., Rivas-Campo, Y., Hita-Contreras, F., Carcelen-Fraile, M. D. C., Castellote-Caballero, Y., Rodríguez-López, C., & Aibar-Almazán, A. (2023). Pelvic floor muscle exercises as a treatment for urinary incontinence in postmenopausal women: a systematic review of randomized controlled trials. In *Healthcare* (Vol. 11, No. 2, p. 216). MDPI.

Women frequently suffer from urinary incontinence due to atrophic changes in the urogenital tract. Recommended conservative treatment includes evaluation of pelvic-floor strength and the functional use of pelvic-floor-muscle (PFM) training.

Following the PRISMA 2020 guidelines, a search was conducted in the electronic databases PubMed, Web of Science, and Scopus for articles with at least one group performing PFM exercises in postmenopausal women with urinary incontinence.

The volume or duration, frequency, and number of sessions were heterogeneous. All the studies reported significant differences in favor of PFM exercise in strength, quality of life, and/or severity of urinary incontinence.

PFM exercise is a highly recommended intervention to treat urinary incontinence in postmenopausal women. However, more research is needed to establish specific factors such as dose-response relationships and to standardize methods for measuring effects.

ZAKLJUČAK



- Menopauza – retrospektivno unazad 12 mj.; inducirana
- Klimakterij – fiziološke promjene
- Simptomi – često neprijavljeni; socijalni i kulturološki aspekt
- Vazomotorni simptomi, CVD, mišićno-koštani problemi
- Fizioterapija dobra alternativna farmakološkoj; više RCT istraživanja

Veleučilište „Lavoslav Ružička” u Vukovaru

Odjel za zdravstvene studije

VJEŽBE U PREVENCIJI I LIJEČENJU STRES INKONTINENCIJE

predavanje

Vesna Šeper, Ph.D. in Physical Education and Sport, prof. struč.
studija

Vukovar, 2026.

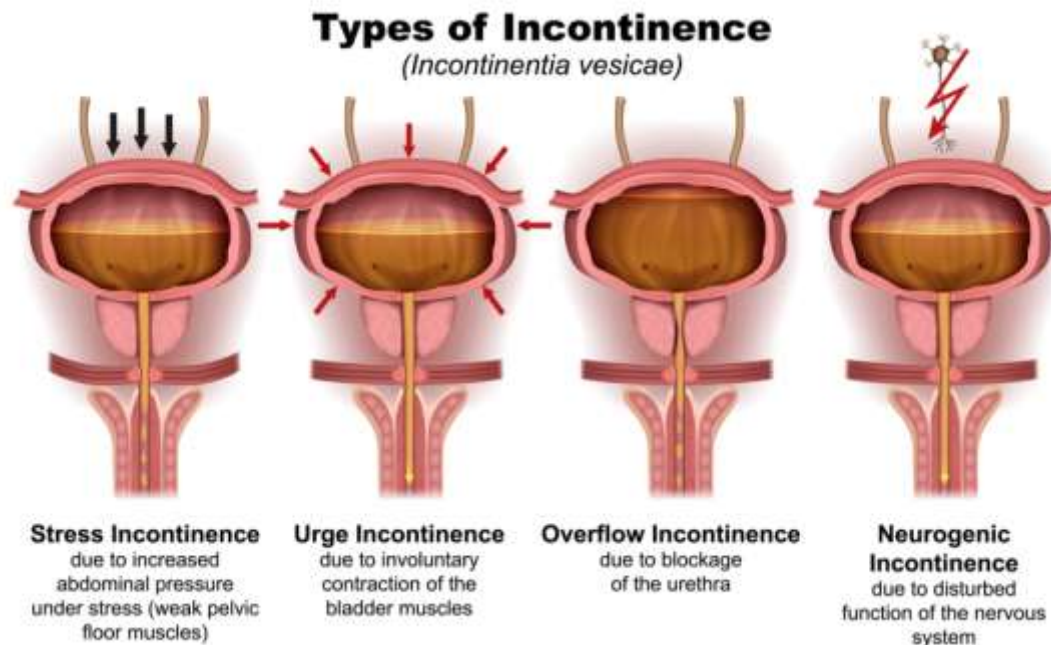


UVOD

Tip inkontinencije	Glavni simptom	Kada se javlja	Najčešći uzrok	Tipične osobe
Stresna	Curenje mokraće bez nagona	Kašalj, kihanje, smijeh, fizički napor	Slabi mišići dna zdjelice, insuficijencija sfinktera	Žene nakon poroda, menopauza
Urgentna	Nagla, neodgodiva potreba za mokrenjem	Bez očitog napora	Preaktivni mokraćni mjehur, neurološki uzroci	Starije osobe, neurološki bolesnici
Mješovita	Kombinacija stresne i urgentne	Napor + iznenadni nagon	Kombinirani mehanizmi	Žene srednje i starije dobi
Prelijevajuća (overflow)	Stalno kapanje, slab mlaz	Nakon nepotpunog pražnjenja mjehura	Opstrukcija, neurogeni mjehur	Muškarci s povećanom prostatom
Funkcionalna	Nemogućnost dolaska do WC-a na vrijeme	Kod fizičkih ili kognitivnih ograničenja	Nepokretnost, demencija, slabost	Starije osobe
Refleksna	Mokrenje bez osjećaja potrebe	Neovisno o volji	Oštećenje središnjeg živčanog sustava	Ozljede leđne moždine
Noćna (enureza)	Mokrenje tijekom sna	Noću	Hormonalni, neurološki, razvojni razlozi	Djeca, rjeđe odrasli

1. Što je stres inkontinencija?

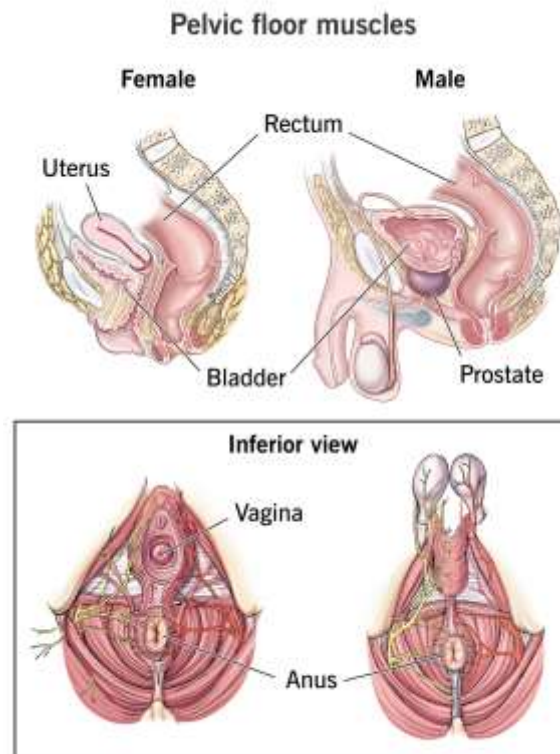
- Stres inkontinencija podrazumijeva nevoljno otjecanje manje količine urina – prilikom kihanja, kašljanja, smijanja, kod fizičkih aktivnosti



Vrste inkontinencije: (Izvor: <https://lupilu.hr/vase-zdravlje/urinarna-inkontinencija/>)

2. Što uzrokuje stres inkontinenciju?

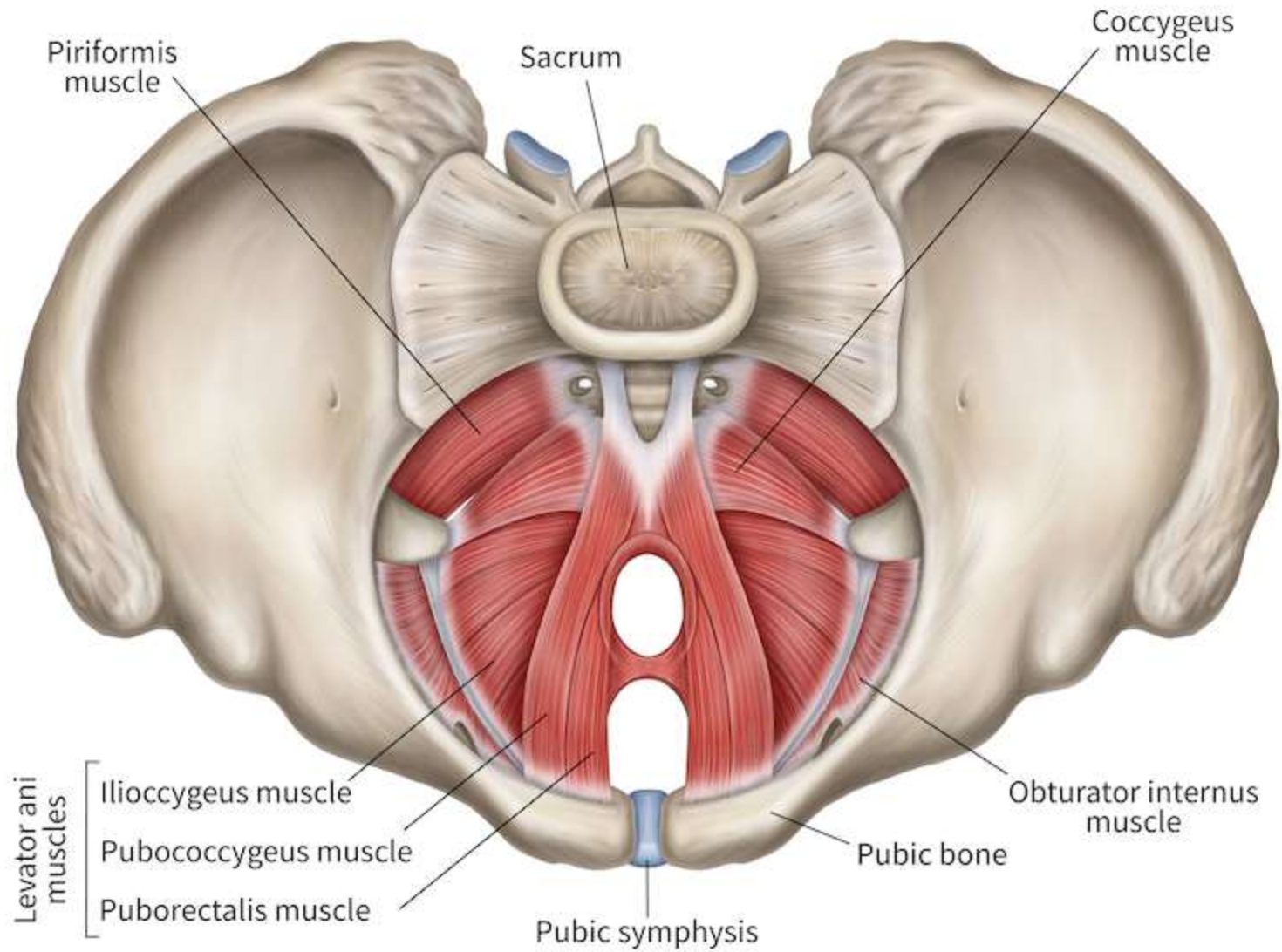
- Stres inkontinenciju uzrokuje slabost mišića koji pridržavaju mokraćni mjehur i slabost mišića koji kontroliraju protok urina



3. Koji su to mišići zdjeličnog dna?

- **Diaphragma pelvis:** dva parna mišića – m. levator ani i m. coccygis

Kod slabosti ovih mišića postoji opasnost od prolapsa maternice i rodnice



Dijafragma pelvis (Izvor: <https://thevagwhisperer.com/2020/05/08/what-is-a-pelvic-floor-anywaynbsp/>)

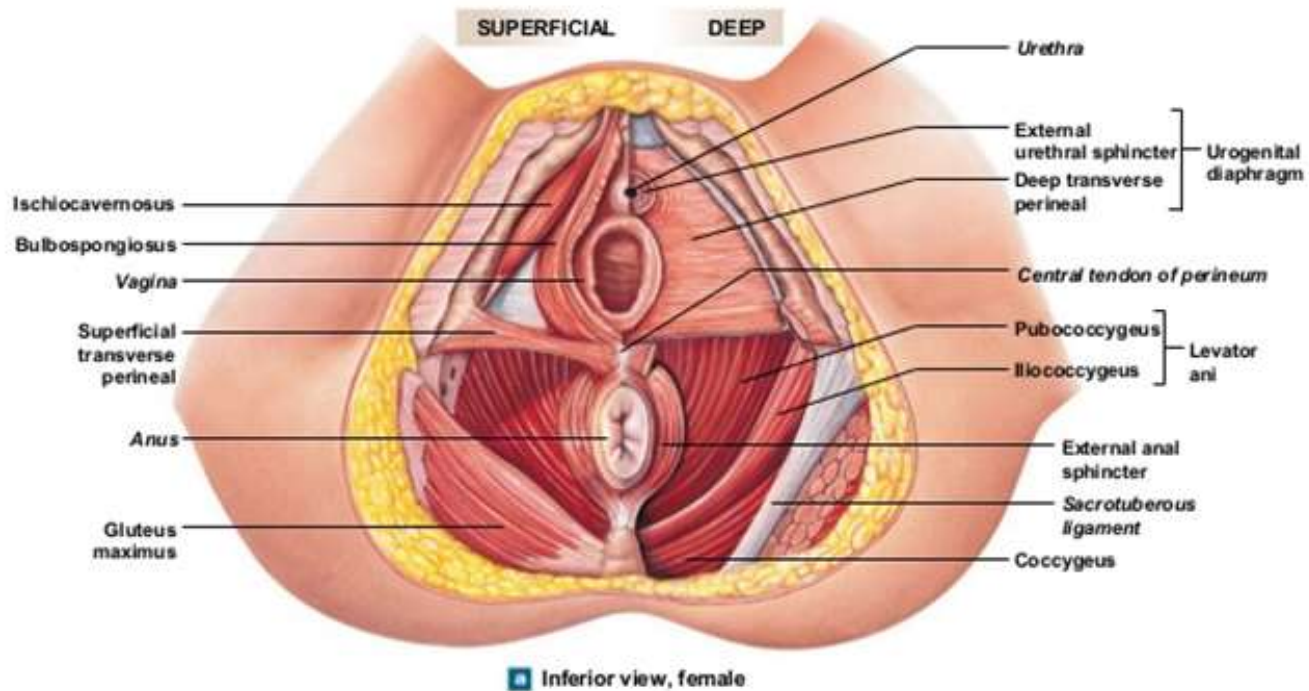
- **Diaphragma urogenitale:** površinski i dubinski sloj

Mišići površinskog sloja su: m. ishiocavernosus, m.

bulbospongiosus, m. transversus perinei superficialis

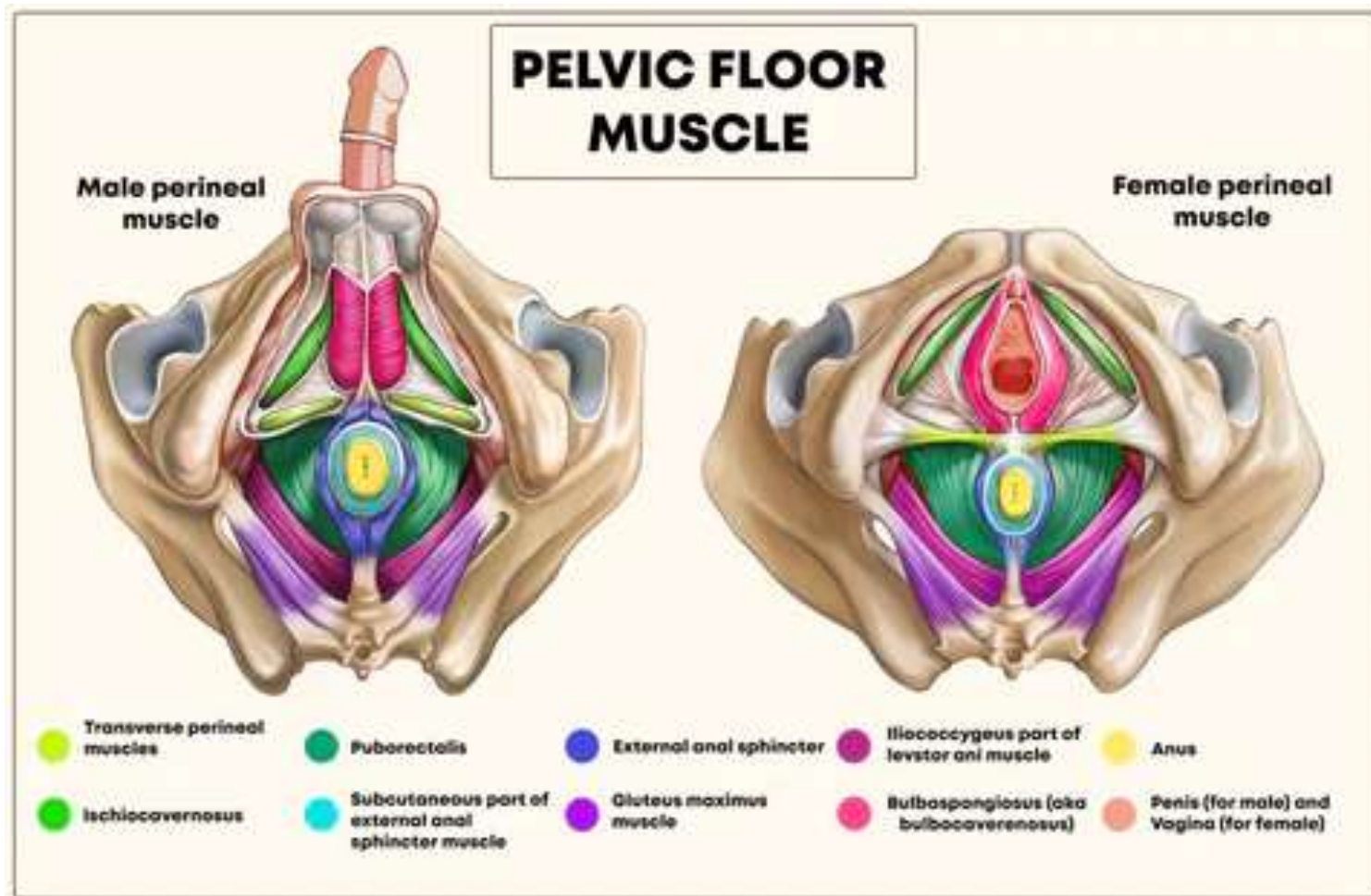
Mišići dubinskog sloja su: m. sfinkter urethrae i m. transversus

perinei profundus



© 2012 Pearson Education, Inc.

Dijafragma urogenitale



Mišići zdjeličnog dna kod muškaraca i žena

(Izvor: <https://www.yamunausa.com/blogs/womens-wisdom/your-pelvic-floor-muscles>)

4. Koji su čimbenici rizika za nastanak stres inkontinencije?

- Čimbenici rizika se odnose na:

dob (češće kod starijih žena i žena koje su rađale)

spol (češće kod žena, nego muškaraca)

tjelesnu težinu (kod pretilih osoba)

trudnoću (kod žena koje su rađale jednom, ili više puta)

pojavu kroničnih bolesti (kronični kašalj!)

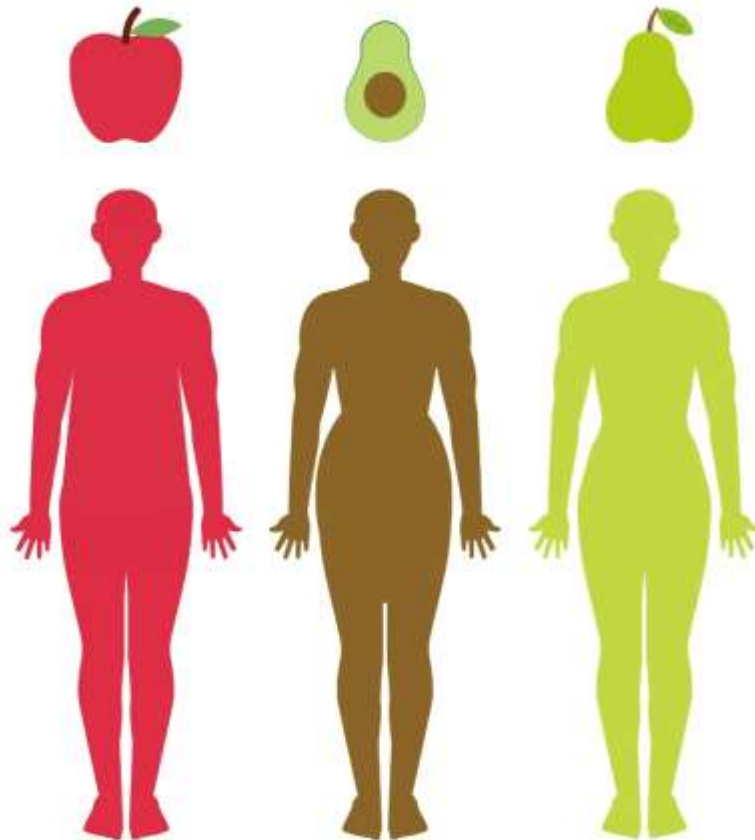
menopauza

Ostali čimbenici

moguće na njih utjecati:

- **Debljina** (veća povezanost s WHR, nego BMI; pad TT/kg ublažava simptome)
- **Tjelesna aktivnost** (ukupna tjelesna aktivnost i hodanje smanjuju simptome)
- **Pušenje** (češće kod onih koji puše – kašalj; prestanak pušenja neće dovesti do smanjenja simptoma)





WHAT YOUR WAIST-TO-HIP RATIO MEAN

Women	Health Risk	Body Shape
0.80 or below	Low	Pear
0.81 to 0.85	Moderate	Avocado
0.85+	High	Apple

Men	Health Risk	Body Shape
0.95 or below	Low	Pear
0.96 to 1.0	Moderate	Avocado
1.0+	High	Apple



Prehrana

kofein (nema povezanosti)

dnevni unos tekućine (nema povezanosti s inkontinencijom, ali ako je smanjen dovodi do dehidracije, zatvora i mogućnosti infekcije)

alkohol (nema povezanosti)

- simptomi u onih koji jedu masno, piju slatke sokove, Zn, B12;
manje simptoma u onih koji jedu povrće, kruh, piletinu, vit D, Fe

5. Što uključuje prevencija, a što liječenje?

- Antenatalna i natalna priprema
- Postnatalna fizioterapija
- Kontrola tjelesne težine
- Kontrola kroničnog kašlja
- Edukacija i provođenje vježbi mišića zdjeličnog dna
- **Trening mjehura**
- **Primjena elektrostimulacije**
- **Primjena pesara i uložaka**



6. Koje su to vježbe koje se koriste u prevenciji i liječenju stres inkontinencije?

- Vježbe opažanja mišića zdjeličnog dna
- Vježbe otkrivanja
- Vježbe relaksacije
- Vježbe jačanja



7. Zašto vježbe opažanja i otkrivanja?

- Određen broj ljudi ne zna o kojim je mišićima riječ
- Određen broj ne izvodi pravilno stiskanje i podizanje tih mišića

Tablica 1. Razlozi otežanog izvođenja vježbi (Bo, 2015.)

1. mišići su maleni i unutar zdjelice

2. ako nije potrebno njihova se kontrakcija posebno ne uči

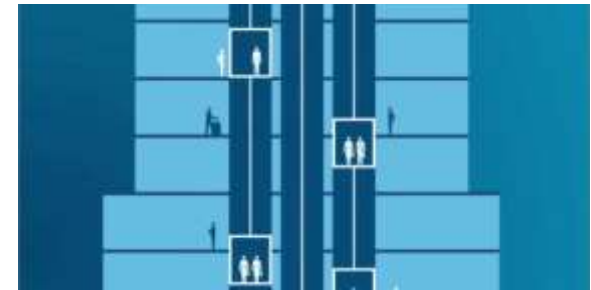
3. zato što su maleni teže ih je kontrahirati

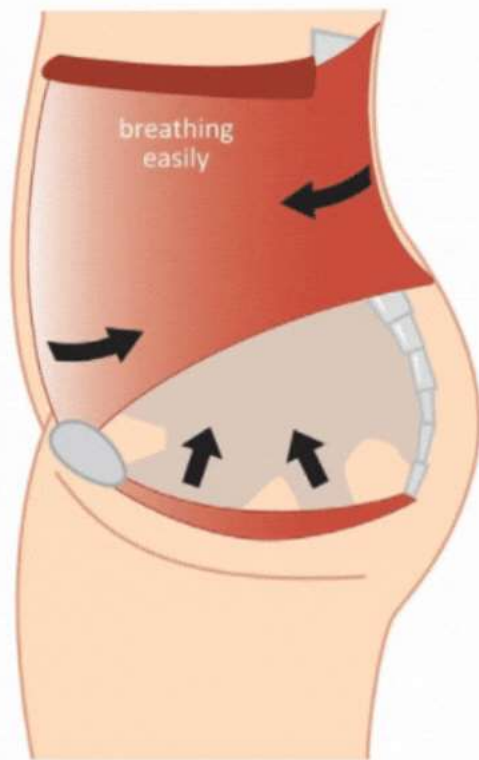
4. često se povezuju samo uz mokrenje i defekaciju - istiskivanje

- Najčešće greške pri izvođenju vježbi MZD: kontrakcija mišića trbuha, aduktora natkoljenice, gluteusa, zaustavljanje disanja, duboko udisanje, guranje umjesto povlačenje mišića prema gore

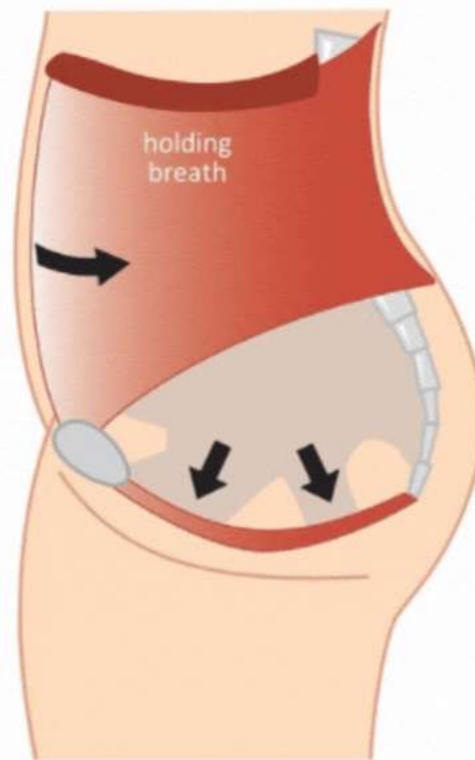
8. Kako osvijestiti mišiće zdjeličnog dna?

- verbalne upute, uz anatomske crteže i modele
- fizioterapeut demonstrira kontrakciju mišića u stojećem položaju – nema kontrakcije aduktora i gluteusa
- uz vizualizaciju (lift!)
- objasniti funkciju mišića uz koštani model zdjelice
- sjesti na ugao stola, uz abducirane natkoljenice, stopala na podu i leđa ravno – proprioceptivni podražaj perineuma; pokušati ustati bez podizanja od stola
- zaustavljanje mlaza mokraće – samo kao metoda provjere, ne vježbe





Correct action
The pelvic floor lifts, the deep abdominals draw in and there is no change in breathing



Incorrect action
Pulling the belly button in towards the backbone and holding your breath can cause bearing-down on pelvic floor

Lower 3rd abs contract in and up air flows out open mouth Pelvic floor rises

Mid abs contract air is held downward pressure on Pelvic floor

9. Zašto vježbe jačanja?

- poprečno prugasti mišići
- povećanje snage i promjene u morfologiji (povećanje poprečnog presjeka, broja NMJ koje se aktiviraju, poboljšanje tonusa)
- 1 set kod početnika i starijih, 2 seta poboljšanje snage, a više poboljšanje izdržljivosti
- prema Kegelu najmanje 500 kontrakcija dnevno

Steps for Doing Kegels.



Locate your pelvic floor muscles by lying flat on the floor with your knees bent.



Draw your pelvic floor muscles up and in. (It should feel like holding the flow of pee or like you're pulling your genitals up and in.)



Tighten your pelvic floor muscles for 3 seconds. Then relax them for 3 seconds. This is one Kegel. Repeat this until you've done 10 Kegels.



10 kegels



10 kegels

Do Kegels once in the morning and once in the evening.

KEGEL EXERCISES for men

(Izvor: <https://centarzdravihrijesenja.hr/blog/kegelove-vjebze-u-sluzbi-postizanja-i-zadrzavanja-erckcije/>)



Tablica 2. Preporuke o intenzitetu opterećenja (na osnovu vježbi za donje ekstremitete)

izdržljivost	snaga	jakost
15-20 ponavljanja s manje od 50% 1 RM	8-12 ponavljanja s 20-50% 1RM i manje za starije	10-15 ponavljanja na 40-50% 1 RM kod početnika i starijih
		8-12 ponavljanja na 60-70% 1RM za srednje kategorije
		više od 80% 1RM za iskusne vježbače

Povećanje opterećenja

Prema Bo, 2015.

1. korak: što jača kontrakcija bez zadržavanja
 2. korak: kontrakcija uz što dulje zadržavanje
 3. korak: 3-4 brze kontrakcije na već postojeću kontrakciju
- promjena položaja vježbe: iz ležećeg u stojeći, a zatim polučučanj

10. Trening mjehura

- kod pretjerano aktivnog mjehura
- hitno, često, odmah, noću
- kod SUI i MUI
- nije jasno kako točno utječe na simptome inkontinencije
- 3 dijela: 1. anatomija i funkcija mjehura, 2. planiranje odlaska na toalet, uz sve veće razmake, 3. psihoterapija



11. Elektrostimulacija

- MZD, mjehura i korijena sakralnih živaca
- stimulira se n. pudendus
- nije prvi izbor
- može se koristiti samostalno ili uz vježbe MZD
- koristi se kao neurostimulacija, ili neuromodulacija



motornih vlakana



modulacija refleksnog luka

12. Utezi za rodnicu



No. 1	4.9 g
No. 2	20.5 g
No. 3	32.0 g
No. 4	44.0 g
No. 5	55.0 g

- različite veličine i težine
- počinje se s onom težinom utega koji je moguće držati 1 min. u stojećem položaju
- Cilj: držati uteg 20 min
- Nedostaci: nemogućnost izvođenja, bol

USE METHOD



Specifikacija:

Model	FM-LILAC-201	
Maksimalna razina buke	≤85dB	VAGINAL
Materijal	Medicinski silikon/ABS	
Vodootpornost	IPX6	VAGINAL
Dimenzije	Dužina: 101.7mm. Promjer: 35mm	
Težina	61g	
Senzor pritiska	10mmx3	
Frekvencija vibracije	7200 RPM	
Ulazni napon	5V	
Kapacitet baterije	200AH Li-Ion Polimer	UTERUS
Vrijeme rada	Neprekinuti rad 3 sata	
Radni uvjeti	Temperatura: 5°C-40°C. Vlaga: ≤80%. Tlak: 86kPa-106kPa	
Uvjeti čuvanja	Temperatura: -20°C-55°C. Vlaga: ≤93%. Tlak: 70kPa-106kPa	VAGINAL

SHR

RELAX

PELVIC FLOOR MUSCLES

URETHRA



- gumeni ili plastični
- pridržavaju maternicu
- prevencija prolapsa



Pesari za rodnicu (Izvor: <https://www.locum-trade.hr/pesari-317/317/>)

3

