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# ZNAČAJ BALNEOTERAPIJE U REDUKCIJI BOLA STARIJIH PACIJENATA SA CERVIKALNIM SINDROMOM

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**SAŽETAK**

**Uvod/Cilj:** Bol u vratnom delu kičme je jedan od najčeščih muskuloskeletnih bolova koji se javlja kod 2/3 svetske populacije, bilo kada u toku života. On može biti povezan sa degenerativnim promenama, psihosocijalnim faktorima, sedentarnim načinom života, smanjenom fizičkom aktivnošću i stresom. Cilj ove studije je da se ispita značaj balneoterapije u redukciji bola kod starijih osoba sa umereno jakim bolom usled cervikalnog sindroma.

**Metode:** U ovu panel studiju je uključeno deset muškaraca i 52 žene uzrasta od 61 do 80 godina sa umereno jakim bolom usled cervikalnog sindroma, a koji nisu imali kontraindikaciju za primenu balneološke i kineziterapije. Vizuelna analogna skala (VAS) je korišćena za merenje inteziteta bola pre i posle balneoterapije i kineziterapije.

**Rezultati:** Između muškaraca i žena nije bilo značajnih razlika u odnosu na uzrast i propagaciju cervikalnog bola. Posle deset dana terapije, kod oko jedne trećine ispitanika koji su imali umereno jak cervikalni bol posle korišćenja termomineralne kupke sa i bez vežbanja došlo je do prestanka bola. Kod svakog drugog ispitanika sa umereno jakim intezitom cervikalnog bola došlo je do nestanka bola posle deset dana od korišćenja termomineralne kupke do ⅔ kade, a kod ⅓ ispitanika posle korišćenja termonimenalnog bazena i vežbi. Značajno bolji efekat u eliminisanju bola je bio posle korišćenja termominiralne kupke sa vodom do ⅔ kade ($p = 0.001$) i termomineralnog bazena sa vežbama ($p = 0.009$), nego posle termomineralne kupke sa vodom do ½ kade. Nije utvrđeno da postoji značajna razlika u redukciji cervikalnog bola posle primene termomineralne kupke do ⅔ vode u kadi i korišćenja termomineralnog bazena sa vežbama.

**Zaključak:** Balneoterapija zauzima veoma važno mesto u redukciji bola kod starijih osoba sa srednje jakim intezitetom bola uzrokovanim cervikalnim sindromom. Neophodna su dalja detaljnija istraživanja značaja balneoterapije i kineziterapije za redukciju bola kod cervikalnog sindroma pogotovo ako se ima u vidu činjenica da dolazi do starenja populacije.

**Ključne reči:** Cervikalni sindrom, balneoterapija, umereno jak bol

## Uvod

Istraživanja ukazuju da balneološka terapija zauzima veoma važno mesto u lečenju pacijenata sa cervikalnim sindromom (1). Balneoterapija je jedna od najstarijih terapijskih procedura. Prirodna mineralna voda je voda koja potiče iz podzemnog sloja i izbija na površinu iz jednog ili više izvora, a koja se odlikuje karakterističnim organoleptičkim osobinama i fizičko hemijskim sastavom, a sadrži najmanje 1000 mg/l čvrstih rastvorenih sastojaka i najviše 4 g/l $CO_2$. Prirodne mineralne vode predstavljaju posebnu grupu podzemnih voda. Zahvaljujući fizičko hemijskim osobinama povoljno deluju na ljudski organizam, koriste se za profilaksu i lečenje. Mineralna voda treba da ima stalnu temperaturu iznad 20°C, da sadrži više od jednog grama čvrstih supstanci na 1 litar vode, sa predominacijom katjona: $Na^+$, $Ca^{++}$, $Mg^{++}$, i anjona: $HCO_3^-$, $Cl^-$, $SO_4^{--}$. Od rastvorenih gasova koje nalazimo u mineralnim vodama, za balneologiju najveći značaj imaju: ugljendioksid, vodoniksulfid, odnosno hidrosulfidni joni (2).

Termomineralna voda Banje Vrućice (Bosna i Hercegovina) je visoko mineralna i ugljeno-kisela, nema neprijatan miris jer u svom sastavu ne sadrži sumpor (1). Koristi se za pijenje, kupanje u kadama, hidroterapiju u bazenu, inhalaciju aerosola i ugljendioksida za gasne kupke. Termomineralne vode imaju mehanički,

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# THE SIGNIFICANCE OF BALNEOTHERAPY FOR THE REDUCTION OF PAIN IN ELDERLY PATIENTS WITH THE CERVICAL SYNDROME

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**SUMMARY**

**Introduction/Aim:** Neck pain is one of the most common musculoskeletal conditions, which is experienced by two thirds of world population at some stage in life. It can be associated with degenerative changes, psychosocial factors, sedentary way of life, reduced physical activity and stress. The aim of this study is to examine the significance of balneotherapy for the reduction of pain in elderly persons with moderately severe pain caused by cervical syndrome.
**Methods:** Ten men and fifty-two women aged 61 to 80 years, who experienced a moderately severe pain caused by the cervical syndrome and who did not have contraindications for the application of balneotherapy and kinesitherapy, were included in this panel study. A Visual Analogue Scale (VAS) was used to measure the intensity of pain before and after balneotherapy and kinesitherapy.
**Results:** There was no significant difference between men and women regarding age and propagation of cervical pain. After ten days of therapy, the pain stopped in around one-third of examinees, who experienced a moderately severe cervical pain and who used the thermal mineral bath with and without exercises. In every other examinee with the moderately severe intensity of cervical pain, this pain stopped after ten days of using thermal mineral water that reached ⅔ of the bathtub, and in one-third of examinees who used the thermal mineral pool and who exercised. A significantly better effect in pain elimination was achieved after the thermal mineral bath with water that filled ⅔ of the bathtub ($p = 0.001$) and the thermal mineral pool with exercises ($p = 0.009$) than after themal mineral bath with water that filled ½ of the bathtub. It was not determined whether there was a significant difference regarding the reduction of cervical pain after the application of thermal mineral bath with ⅔ of water in the bathtub and after the use of the thermo-mineral pool with exercises.
**Conclusion:** Balneotherapy takes an important place in the reduction of pain in elderly persons with a moderately severe pain caused by the cervical syndrome. However, more detailed research is needed to explore the significance of balneotherapy and kinesitherapy for the reduction of pain caused by cervical syndrome, especially if population aging is taken into consideration.

**Keywords:** cervical syndrome, balneotherapy, moderately severe pain

## Intoduction

Research studies have shown that balneotherapy takes an important place in the treatment of patients with cervical syndrome (1). Balneotherapy is one of the oldest therapeutic procedures. Natural mineral water originates from the underground layer and it emerges onto the land surface from one or more springs. It is characterized by specific organoleptic properties, as well as physical and chemical composition and it contains at least 1000 mg/l of dissolved solids and no more than 4g/l of CO2. Natural mineral waters present a special group of underground waters. Thanks to their physical-chemical properties, they have a positive influence on the human body and they are used in prophylaxis and treatment. Mineral water has a constant temperature above 20°C, contains more than one gram of solid substances per one liter of water, with the predominance of the following cations: $Na^{+}$, $Ca^{++}$, $Mg^{++}$, and the following anions: $HCO_3^{-}$, $Cl^{-}$, $SO4^{--}$. Of all dissolved gases that are found in mineral waters, for balneology, the most significant ones are the following: carbon dioxide, hydrogen sulfide, that is, hydrosulfide ions (2).

termalni i hemijski efekat. Mehanički efekat se odnosi na aktivno potpomognute vežbe u kadama ili bazenima. Kada je u pitanju termalni efekat, vežbe koje se rade u vodi dosta su olakšane i samim tim lakše se postižu pokreti kod određenih oštećenja zglobova. Ugljendioksid iz vode prodire u kožu i hemijskim putem draži završetke termoreceptora u samoj koži. Ova draž izaziva refleksnim putem vazodilataciju na periferiji, što je značajno za primenu kod oboljenja krvnih sudova gde je toplota kontraindikovana (2). Uglendioksid snižava tonus arterija i povećava tonus venskih sudova i na taj način smanjuje periferni otpor u arterijskom sistemu, samim tim srce olakšano radi, tj. dolazi do lakše preraspodele krvi u organizmu. Sistola se pojačava, a dijastola produžava, pri čemu se srce odmara uz poboljšanje koronarnog krvotoka i metabolizma u srčanom mišiću. Ugljendioksid svojim pozitivnim dejstvom na centar za disanje dovodi do produbljivanja disanja i povećanja ventilacije pluća. Takođe, termomineralna voda, svojim termičkim i mehaničkim dejstvom ublažava spazam mišića i stišava bolove, čime se postiže poboljšanje pokretljivosti ekstremiteta, odnosno kičmenog stuba. Bitno je naglasiti da termomineralna voda ima povoljan uticaj i na bolesti koštano-zglobnog sistema, stanja posle velikih ortopedskih operacija i traumatskih povreda i paralize perifernih živaca.

Nema apsolutne kontraindikacije za primenu ove vode, a relativne kontraindikacije mogu biti srčana dekompenzacija, aktivna tuberkuloza, febrilna stanja i maligni poremećaji srčanog ritma (2). U dugoj tradiciji primene termalnih voda sačinjeni su i protokoli o načinu primene termalne vode, količine pijenja, trajanju same procedure, i ukupnom trajanju banjskog lečenja (3).

Cilj ove studije je da se ispita značaj balneoterapije u redukciji bola kod starijih osoba sa cervikalnim sindromom lečenih u Zdravstveno-turističkom centru Banja Vrućica.

## Metode

Istraživanje je sprovedeno u Zdravstveno turističkom centru Banja Vrućica u Tesliću, u periodu od 1. oktobra 2018. godine do 11. oktobra 2018. godine. U ovom periodu kod 75 pacijenata, uzrasta od 61 do 80 godina života, dijagnostifikovan je cervikalni sindrom na osnovu kliničkog pregleda i radiološkim metodama (tomografija, CT). U cilju sagledavanja značaja baleneoterapije u redukciji bola isključene su sve one osobe kojima je bilo kontraindikovano korišćenje ove terapije (jedan muškarac i 12 žena, jer su bili srčano dekompenzovani ili sa poremećajem srčanog ritma) i koje su koristile analgetike. U studiju su uključene sve one osobe koje su imale umereno jak bol (intezitet bola od 4 do 6 na vizuelno analognoj skali).

Sve osobe sa cervikalnim sindromom lečene su jednom od sledećih balneoloških procedura: termomineralne kupke kada su kade napunjene termomineralnom vodom do polovine, termomineralne kupke kada su kade napunjene termomineralnom vodom do dve trećine kade, ili u termalnom bazenu sa vežbama, do deset dana. Primena balneoterapije zavisi od zdravstvenog stanja pacijenta. Ako pacijent ima ugrađen pejsmejker ili hipertenziju, nivo vode u kadi može da bude do nivoa srca, ili umbilikalne regije, a nikad preko nivoa srca zbog hidrostatskog pritiska. Temperatura vode u kadama je 34°C do 36°C, a svaka osoba boravi u vodi do 20 minuta svaki drugi dan. U termalnom bazenu temperatura vode je do 33°C, i tu osoba provodi 30 minuta, svaki drugi dan. Vežbe u bazenu su grupne ili pojedinačne sa vremenskim trajanjem od maksimalno 30 minuta. To su vežbe za jačanje kardio-respiratornog sistema, vežbe za jačanje gornjih ekstremiteta i vratnog dela kičmenog stuba, većinom se vežbe sprovode kroz vodu sa istovremenim blagim čučnjem i vežbama izdržljivosti i za gornje i za donje ekstemitetete, kao i vežbama za povećanje obima pokreta gornjih ekstemiteta. Nakon boravka u termomineralnoj vodi pacijenti se moraju odmarati 30 minuta u prostoriji za odmaranje.

Uspešnost balneoterapije određivana je merenjem intenziteta bola vizuelno-analognom skalom (VAS). VAS je podeljena u podeoke od po 1 cm, od 0 do 10. Bolesnik na skali pokazuje svoj intenzitet bola, gde 0 označava stanje bez bola, a 10 maksimalni bol. Isti test je urađen pre i posle terapije. Slab bol je označen sa 1 do 3, umereno jak bol sa 4 do 6, a jak bol od 7 do 10.

U statističkoj analizi podataka korišćen je $\chi^2$ ili *Fisher*-ov test.

The thermal mineral water from Spa Vrucica (Bosnia and Herzegovina) is highly mineral water and it belongs to the category of carbo-acidic waters. It does not have an unpleasant smell because it does not contain sulfur (1). It is used for drinking, bathing in bathtubs, hydrotherapy in pools, and the inhalation of aerosols and carbon dioxide in gas baths. Thermal mineral waters have mechanical, thermal, and chemical effects. The mechanical effect is related to the active-assisted exercises in bathtubs or pools. As far as the thermal effect is concerned, exercises that are done in pools are made easier, and therefore, it is easier to make some motions in case of joint damage. Carbon dioxide from water penetrates into the skin and chemically stimulates the endings of thermoreceptors in the skin. This stimulus causes vasodilatation on the periphery, which is important in diseases of blood vessels, in which contraindications include heat (2). Carbon dioxide lowers the arterial tonus and increases the tonus of veins, thus reducing the peripheral resistance in the arterial system. Therefore, the heart works more easily, and blood flows more easily in the organism. The systole is strengthened, while the diastole is prolonged, and the heart takes rest with the improvement of coronary circulation of blood and metabolism in the heart muscle. Carbon dioxide, which has a positive influence on the center for breathing, causes deeper breaths and an increase of pulmonary ventilation. Also, thermal mineral water, with its thermal and mechanical effect, alleviates the spasm of muscles and causes pain relief, thus improving the mobility of extremities, and spine, as well. It is important to emphasize that thermal mineral water has a favorable effect on the diseases of the skeletal system, conditions after orthopedic surgeries and traumatic injuries, and peripheral nerve paralysis.

There are no absolute contraindications for the application of this water, while relative contraindications can be heart decompensation, active tuberculosis, febrile conditions, and malign disorders of heart rate (2). In the long tradition of application of thermal waters, protocols have been made regarding its application, its quantity, the length of the procedure, and the total length of spa treatment (3).

The aim of this study was to examine the significance of balneotherapy for the reduction of pain in elderly persons with cervical syndrome, who were treated in the Hospital and Tourism Center - Vrucica Spa.

**Methods**

The research was conducted in the Hospital and Tourism Center Vrucica Spa, in Teslic, from October 1st, 2018 to October 11th, 2018. In this period, cervical syndrome was diagnosed in 75 patients, aged 61 to 80 years, and the diagnosis was made on the basis of clinical examination and radiological findings (tomography, CT). With the aim of perceiving the significance of balneotherapy for the reduction of pain, all persons, who had contraindications for this therapy, were excluded from the study (one man and 12 women, because they had heart decompensation or heart rate disorders, or they used analgetics). All persons, who had moderately severe pain, were included in the study (the intensity of pain was 4 to 6 on the Visual Analogue Scale).

All persons with the cervical syndrome were treated with one of the following balneology procedures: thermal mineral baths, when water filled one half of the bathtub; thermal mineral baths, when water in the bathtubs filled two-thirds of the bathtub, or thermal pools with exercises, up to 10 days. The application of balneotherapy depends on the patient's health condition. If the patient has a pacemaker or hypertension, the level of water in the bathtub can reach the level of the heart, or umbilical region, and never above the level of the heart due to the hydrostatic pressure. The temperature of the water in bathtubs was 34°C to 36°C, and each person spent up to 20 minutes in that water every other day. The temperature of the water in the thermal pool was up to 33°C, and persons spent 30 minutes in the pool, every other day. Exercises in the pool were a group or individual exercises, lasting 30 minutes maximum. These were exercises that strengthen the cardio-respiratory system, upper extremities, and neck part of the spine. They were mainly done in water with the simultaneous mild squat position and exercises of endurance for upper and lower extremities, and exercises that improved the

**Tabela 1.** Distribucija muškaraca i žena sa cervikalnim sindromom prema uzrastu

| **Uzrasne grupe/** ***Age groups*** | **Muškarci/*Men* (N=10) Broj/*No* (%)** | **Žene/*Women* (N=52) Broj/*No* (%)** | **Ukupno/*Total* (N=62) Broj/*No* (%)** |
|---|---|---|---|
| 61-70 godina/*years* | 6 (60.0) | 32 (61.5) | 38 (61.3) |
| 71-80 godina/*years* | 4 (40.0) | 20 (38.5) | 24 (38.7) |
| Ukupno/*Total* | 10 (100.0) | 52 (100.0) | 62 (100.0) |

$\chi^2$=0.302; p=0.582

## Rezultati

Istraživanjem su obuhvaćena 62 pacijenta sa cervikalnim sindromom uzrasta 61 do 80 godina, od kojih su 83,9% činile žene i 16,1% muškarci (Tabela 1). Između muškaraca i žena nije bilo značajne razlike u odnosu na uzast.

Kod ispitanika sa cervikalnim sindromom cervikalni bol se najčešće širio u oba ramena obe ruke kod 48,4% ispitanika ili jedno rame kod 46,8% ispitanika, a najređe u potiljak (4,8%) (Tabela 2). Između muškaraca i žena nije bilo značajne razlike u odnosu na projekciju cervikalnog bola.

Najveći broj ispitanika sa cervikalnim sindromom (50,0% muškaraca i 40,4% žena) je koristio mineralne kupke sa polovinom vode u kadama, a najmanje mineralni bazen sa vežbama (25,0% žena i 10,0% muškaraca) (Tabela 3).

Posle deset dana terapije, kod jedne trećine ispitanika koji su imali umereno jak cervikalni bol, posle korišćenja termonineralne kupke sa i bez bazena došlo je do prestanka bola (Tabela 4). Kod svakog drugog ispitanika sa umereno jakim intezitom cervikalnog bola došlo je do nestanka bola posle deset dana od korišćenja termomineralne kupke do ⅔ kade, a kod jedne trećine ispitanika posle korišćenja termomineralnog bazena i vežbi. Značajno bolji efekat u eliminisanju bola bio je posle termomineralne kupke sa vodom do ⅔ kade i termomineralnog bazena sa vežbama, nego posle korišćenja termomineralne kupke sa vodom ½ kade. Nije utvrđeno da postoji značajna razlika u redukciji cervikalnog bola posle primene termomineralne kupke do ⅔ vode u kadi i korišćenja termomineralnog bazena sa vežbama.

## Diskusija

Sindrom bolnog vrata u većini razvijenih zemalja, pa i u zemljama u razvoju, je vodeći uzrok za upućivanje pacijenata lekaru porodične medicine i fizijatru, a prema podacima zvanične statistike za Bosnu i Hercegovinu, u strukturi

**Tabela 2.** Distribucija muškaraca i žena sa cervikalnim sindromom u odnosu na lokaciju i projekciju bola

| **Projekcija cervikalnog bola/** ***Projection of cervical pain*** | **Muškarci/*Men* (N=10) Broj/*No* (%)** | **Žene/*Women* (N=52) Broj/*No* (%)** | **Ukupno/*Total* (N=62) Broj/*No* (%)** |
|---|---|---|---|
| Cervikalan bol sa širenjem u oba ramena, obe ruke/ *Cervical pain that spreads to both shoulders, both arms* | 7 (70.0) | 23 (44.2) | 30 (48.3) |
| Cervikalan bol sa širenjem u jedno rame/ *Cervical pain that spreads to one shoulder* | 2 (20.0) | 27 (51.9) | 29 (47.7) |
| Cervikalna bol sa širenjem u potiljak/ *Cervical pain that spreads to the nape of the neck* | 1 (10.0) | 2 (3.9) | 3 (4.0) |

$\chi^2$=3.635; p=0.162

**Table 1.** Distribution of men and women with the cervical syndrome by age

| **Uzrasne grupe/** ***Age groups*** | **Muškarci/*Men* (N=10) Broj/*No* (%)** | **Žene/*Women* (N=52) Broj/*No* (%)** | **Ukupno/*Total* (N=62) Broj/*No* (%)** |
|---|---|---|---|
| 61-70 godina/*years* | 6 (60.0) | 32 (61.5) | 38 (61.3) |
| 71-80 godina/*years* | 4 (40.0) | 20 (38.5) | 24 (38.7) |
| Ukupno/*Total* | 10 (100.0) | 52 (100.0) | 62 (100.0) |

$\chi^2$=0.302; p=0.582

mobility of upper extremities. After their stay in thermal mineral water, patients had to rest for 30 minutes in the room for resting.

The Visual Analogue Scale (VAS) was used to measure the intensity of pain and therefore, determine the success of balneotherapy. The Visual Analogue Scale is divided into subscales of 1 cm, from 0 to 10. The patient rates the intensity of his/her pain on the scale, where 0 denotes condition without pain, while 10 is maximum pain. The same test was done before and after therapy. Mild pain was classified as 1 to 3, moderately severe pain as 4 to 6, while severe pain was classified as 7 to 10.

In the statistical analysis of data, $\chi^2$ test or Fisher test was used.

## Results

The research included 62 patients with cervical syndrome, aged 61 to 80 years, of whom 83.9% were women and 16.1% were men (Table 1). There was no significant difference between men and women in relation to age.

In examinees with the cervical syndrome, this cervical pain spread most frequently to both shoulders and both arms in 48.8% of examinees or one shoulder in 46.8% of examinees, and least frequently into the nape of the neck (4.9%) (Table 2). There was no significant difference between men and women regarding the projection of cervical pain.

The greatest number of examinees with the cervical syndrome (50.0% of men and 40.4% of women) used mineral baths with one half of water in the bathtubs, and the smallest number of them used the mineral pool with exercises (25.0% of women and 10.0% of men) (Table 3).

After ten days of therapy, in around one-third of examinees, who had moderately severe cervical pain, the pain stopped after the thermal mineral bath with and without exercises (Table 4). In every other examinee with the moderately severe intensity of cervical pain, this pain was eliminated after ten days of using the thermal mineral bath with water that reached ⅔ of the bathtub, while in every third examinee that

**Table 2.** Distribution of men and women with cervical syndrome by location and projection of pain

| **Projekcija cervikalnog bola/** ***Projection of cervical pain*** | **Muškarci/*Men* (N=10) Broj/*No* (%)** | **Žene/*Women* (N=52) Broj/*No* (%)** | **Ukupno/*Total* (N=62) Broj/*No* (%)** |
|---|---|---|---|
| Cervikalan bol sa širenjem u oba ramena, obe ruke/ *Cervical pain that spreads to both shoulders, both arms* | 7 (70.0) | 23 (44.2) | 30 (48.3) |
| Cervikalan bol sa širenjem u jedno rame/ *Cervical pain that spreads to one shoulder* | 2 (20.0) | 27 (51.9) | 29 (47.7) |
| Cervikalna bol sa širenjem u potiljak/ *Cervical pain that spreads to the nape of the neck* | 1 (10.0) | 2 (3.9) | 3 (4.0) |

$\chi^2$=3.635; p=0.162

**Tabela 3.** Distribucija muškaraca i žena sa cervikalnim sindromom u odnosu na vrstu balneoterapije

| **Balneoterapija/** ***Balneotherapy*** | **Muškarci/*Men* (N=10) Broj/*No* (%)** | **Žene/*Women* (N=52) Broj/*No* (%)** | **Ukupno/*Total* (N=62) Broj/*No* (%)** |
|---|---|---|---|
| Termomineralne kupke ½ kade/ *Thermal mineral baths ½ of the bathtub* | 5 (50.0) | 21 (40.4) | 26 (41.9) |
| Termomineralne kupke ⅔ kade/ *Thermal mineral baths ½ of the bathtub* | 4 (40.0) | 18 (34.6) | 22 (35.5) |
| Termomineralni bazen sa vežbama/ *Thermal mineral baths ½ of the bathtub* | 1 (10.0) | 13 (25.0) | 14 (22.6) |

$\chi^2$=1.089; p=0.580

najčešćih oboljenja u ambulantno-polikliničkoj praksi za 2004. godinu (1). U opštoj populaciji, oko dve trećine svih osoba tokom života ima bol u vratnom delu kičme (1). U našem radu najčešća je projekcija cervikalnog bola u jedno rame ili oba ramena, a najređe u potiljak. Studije na zdravim ispitanicima potvrđuju tvrdnje da se osetljivost na bol povećava u kranijalnom pravcu kičmenog stuba (3,4). Navodi se da predeo potiljka pokazuje najniže vrednosti praga bola, predeo ramena srednje, a najviše lumbosakralni predeo (4). Utvrđeno je i da paraspinalni lumbalni mišići i srednji glutealni mišić imaju viši prag bola od trapeznog mišića (5).

U našoj studiji, u terapiji cervikalnog bolnog sindroma od fizikalnih i balneoloških procedura koristile su se termomineralne kupke i termo-mineralni bazen sa vežbama. Značajno bolji efekat u eliminisanju bola je bio posle termo-mineralne kupke sa vodom do ⅔ kade i termomineralnog bazena sa vežbama, nego posle korišćenja termomineralne kupke sa vodom do ½ kade. Nije utvrđeno da postoji značajna razlika u redukciji cervikalnog bola

**Tabela 4.** Intenzitet bola prema vizuelno analognoj skali (VAS) pre i posle desetodnevne balneoterapije

| **Balneoterapija/** ***Balneotherapy*** | **Sa srednje jakim bolom pre terapije/*With a moderately severe pain before therapy* (N=62) Broj/*No* (%)** | **Bez bola posle terapije/ *No pain after therapy* (N=17) Broj/*No* (%)** |
|---|---|---|
| Termomineralne kupke ½kade (grupa 1)/ *Thermal mineral baths ½ of the bathtub (group 1)* (N=26) | 26 (100.0) | 0 (0.0) |
| Termomineralne kupke ⅔ kade (grupa 2)/ *Thermal mineral baths ⅔ of the bathtub (group 2)* (N=22) | 22 (100.0) | 12 (54.5) |
| Termomineralni bazen sa vežbama (grupa 3)/ *Thermal mineral pool with exercises (group 3)* (N=14) | 14 (100.0) | 5 (35.7) |
| Ukupno/*Total* | 62 (100.0) | 17 (27.4) |

Grupa 1: Grupa 2/*Group 1:Group 2*, *Fisher*-ov test/*Fisher test* p = 0.001
Grupa 1: Grupa 3/*Group 1:Group 3*, *Fisher*-ov test/*Fisher test* p = 0.009
Grupa 2: Grupa 3/*Group 2:Group* 3, $\chi^2$ test = 0.451; p = 0.502

**Table 3.** Distribution of men and women with the cervical syndrome according to the type of balneotherapy

| **Balneoterapija/** ***Balneotherapy*** | **Muškarci/*Men* (N=10) Broj/*No* (%)** | **Žene/*Women* (N=52) Broj/*No* (%)** | **Ukupno/*Total* (N=62) Broj/*No* (%)** |
|---|---|---|---|
| Termomineralne kupke ½ kade/ *Thermal mineral baths ½ of the bathtub* | 5 (50.0) | 21 (40.4) | 26 (41.9) |
| Termomineralne kupke ⅔ kade/ *Thermal mineral baths ½ of the bathtub* | 4 (40.0) | 18 (34.6) | 22 (35.5) |
| Termomineralni bazen sa vežbama/ *Thermal mineral baths ½ of the bathtub* | 1 (10.0) | 13 (25.0) | 14 (22.6) |

$\chi^2$=1.089; p=0.580

used thermal mineral pool and exercises. A significantly better effect in pain elimination was achieved after the thermal mineral bath with water that filled ⅔ of the bathtub and after the thermal mineral pool with exercises than after the thermal mineral bath with water that filled ½ of the bathtub. It was not determined whether there was a significant difference regarding the cervical pain elimination between the usage of thermal mineral bath that filled ⅔ of the bathtub and thermal mineral pool with exercises.

## Discussion

The syndrome of neck pain in the majority of developed countries, as well as in developing countries, presents a leading cause of referring patients to their family doctors or physiatrists, while according to the data of the official statistics for Bosnia and Herzegovina, it represented one of the most common diseases in the ambulance-clinical practice in 2014 (1). In the general population, around two-thirds of people at some stage in life experience neck pain (1). In our study, the most common projection of cervical

**Table 4.** Intensity of pain according to the Visual Analogue Scale (VAS) before and after ten days of balneotherapy

| **Balneoterapija/** ***Balneotherapy*** | **Sa srednje jakim bolom pre terapije/*With a moderately severe pain before therapy* (N=62) Broj/*No* (%)** | **Bez bola posle terapije/ *No pain after therapy* (N=17) Broj/*No* (%)** |
|---|---|---|
| Termomineralne kupke ½kade (grupa 1)/ *Thermal mineral baths ½ of the bathtub (group 1)* (N=26) | 26 (100.0) | 0 (0.0) |
| Termomineralne kupke ⅔ kade (grupa 2)/ *Thermal mineral baths ⅔ of the bathtub (group 2)* (N=22) | 22 (100.0) | 12 (54.5) |
| Termomineralni bazen sa vežbama (grupa 3)/ *Thermal mineral pool with exercises (group 3)* (N=14) | 14 (100.0) | 5 (35.7) |
| Ukupno/*Total* | 62 (100.0) | 17 (27.4) |

Grupa 1: Grupa 2/*Group 1:Group 2*, *Fisher*-ov test/*Fisher test* p = 0.001
Grupa 1: Grupa 3/*Group 1:Group 3*, *Fisher*-ov test/*Fisher test* p = 0.009
Grupa 2: Grupa 3/*Group 2:Group* 3, $\chi^2$ test = 0.451; p = 0.502

posle primene termomineralne kupke do ⅔ vode u kadi i korišćenja termomineralnog bazena sa vežbama.

Neke studije navode da često emocionalne promene, u vidu depresije i anksioznosti, mogu da prate hroničan bol kod cervikalnog sindroma, kao i disfunkcionalni i maladaptivni obrasci ponašanja, što jasno ukazuje da pristup u lečenju pacijenata sa cervikalnim sindromom mora biti multidisciplinaran (6,7). Nekoliko studija ističe značajan uticaj bio-psihosocijalnih faktora na intenzitet bola (7-9), dok drugačije mišljenje iznose *Walton* i sar. (9), tvrdeći da psihološki faktori, kao što su katastrofizam, strah od pokreta ili povrede, depresija i anksioznost nemaju bitnu ulogu u doživljaju bola. Uočeno je da pacijenti sa preteranom negativnom orjentacijom prema bolu (katastrofizmom) imaju jači intenzitet bola i veću onesposobljenost u odnosu na pacijente bez katastrofizma (10). *Lamé* i sar. (11) ističu da katastrofizacija ima najvažniji uticaj na kvalitet života pacijenata sa hroničnim bolom. Hroničan bol može se razviti još više u slučajevima psihološkog stresa. Psihološka podrška može pomoći pacijentima u suočavanju sa bolom koji ne može biti tretiran medikamentima ili hirurški (12).

U brojnim radovima ukazuje se na značajne efekte mineralne vode i to prvenstveno kada su u pitanju reumatska oboljenja, jer dovode do poboljšanja opšteg stanja, smanjenja bola i ukočenosti (13-16). Međutim, nije mali broj studija koje ukazuju na pozitivne efekte balneoterapije, odnosno poboljšanja kvaliteta života, boljeg raspoloženja, smanjivanja tumor markera itd., kada su u pitanju pacijenti sa malignim oboljenjima (17,18), mada ima i protivnika po pitanju primene ove terapije kada je reč o pacijentima sa malignim bolestima (19).

Balneoterapija i kineziterapija su od neprocenjivog značaja jer svetska populacija stari i postoji jasna potreba za novim pristupima u terapiji bola ove populacije (20,21). Trenutna saznanja nikako nisu dovoljna za lečenje starih u našem društvu, tako da istraživanja treba da budu usmerena ka unapređenju kliničke prakse, i bolje strategije lečenja bola. Takođe, neophodni su validni naučni dokazi za efektivnost specifične mineralne vode u rehabilitaciji osoba sa cervikalnim sindromom.

Ova studija ukazuje na aktuelnu problematiku i mogućnosti primene balneoterapije i kineziterapije u redukciji ili eliminisanju bola kod cervikalnog sindroma osoba sa srednje jakim bolom, ali, sa druge strane, nedostatak ove studije je mali broj ispitanika i nedovoljan broj praćenih parametara koji mogu imati određen uticaj na krajnje ishode istraživanja, kao na primer prisustvo depresivnosti, komorbiditeta, dužina trajanja cervikalnog bola i uzrok njegovog nastanka.

## Zaključak

Balneoterapija i kineziterapija zauzimaju veoma važno mesto u redukciji bola kod osoba sa srednje jakim intezitetom bola uzrokovanim cervikalnim sindromom. Neophodna su dalja detaljnija istraživanja značaja balneoterapije i kineziterapije za redukciju bola kod cervikalnog sindroma. Timski pristup, kroz otvorenu kominikaciju fizijatra, psihologa, ali i ostalih članova tima, svakako jeste preduslov za izbor dobre terapije i bolji funkcionalni oporavak osoba. Bolje informisanje bolesnika o načinu nastanka bolesti i pravilna upustva za lečenje i ponašanje u periodu posle rehabilitacije u kućnim uslovima značajno smanjuju recidive cervikalnog sindroma.

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pain was into one shoulder or both shoulders, while the least frequent projection was in the nape of the neck. Studies on healthy examinees confirmed that sensitivity to pain increased in the cranial direction of the spine (3,4). It was stated that the nape of the neck showed the lowest values of the pain threshold, while the region of shoulders showed the moderate and the lumbosacral showed the greatest values (4). It was found out that lumbar parasacral muscles and gluteus medius had a higher pain tolerance than the trapezius muscle (5).

In our study, physical and balneology procedures that were used for the treatment of cervical pain syndrome were thermal mineral baths and thermal mineral pool with exercises. A significantly better effect was achieved after the thermal mineral bath with water that filled ⅔ of the bathtub and thermal mineral pool with exercises than after the thermal mineral bath with water that filled ½ of the bathtub. It was not determined whether there was a significant difference regarding the reduction of pain between the thermal mineral bath with water that filled ⅔ of the bathtub and the usage of thermal mineral pool with exercises.

Some studies state that emotional changes in the form of depression and anxiety can often accompany the chronic pain in cervical syndrome, as well as dysfunctional and maladaptive patterns of behavior, which clearly points to the fact that the approach in treating patients with cervical syndrome has to be multidisciplinary (6,7). Several studies emphasize the significant influence of biopsychosocial factors on the intensity of the pain (7-9), while different opinion is presented by Walton and associates (9), who claim that psychological factors, such as catastrophism, fear of movement or injury, depression and anxiety do not have an important role in the experience of pain. It was noticed that patients with exaggerated negative orientation towards pain (catastrophism) experienced more severe pain and greater disability in comparison with patients without catastrophism (10). Lamé and associates (11) point out that catastrophic thinking has the most significant influence on the quality of life of patients with chronic pain. Chronic pain can develop even more in case of psychological stress. Psychological support can help patients to deal with pain, which cannot be treated with medicines or surgically (12).

In numerous studies, significant effects of mineral water are pointed to, especially in the case of rheumatoid diseases, because it leads to the improvement of overall condition, to the reduction of pain and stiffness (13-16). However, there are a lot of studies which point to the positive effects of balneotherapy, that is, a better quality of life, better mood, or reduction of tumor markers in patients with malign diseases (17,18), although there are some opponents of this therapy regarding patients with malign diseases (19).

Balneotherapy and kinesitherapy are of utmost importance because the world population gets older and there is a clear need for new approaches in the treatment of this population (20,21). Current knowledge is not sufficient for the treatment of the elderly in our society, and therefore, research should be directed towards the improvement of clinical practice, and better strategies regarding the treatment of pain. Also, valid scientific evidence is necessary to prove the efficiency of specific mineral water in the rehabilitation of persons with cervical syndrome.

This study points to the actual topic and possibilities of the application of balneotherapy and kinesitherapy in the reduction or elimination of pain in persons with cervical pain and with moderately severe pain. However, the lack of this study may be the small number of participants and the insufficient number of observed parameters that could have some influence on the final outcomes of the research, such as the presence of depression, comorbidities, duration of cervical pain, and the cause of its occurrence.

## Conclusion

Balneotherapy and kinesitherapy take an important place in the reduction of pain in persons with moderately severe pain intensity caused by the cervical syndrome. More detailed research is needed to examine the significance of balneotherapy and kinesitherapy for the reduction of pain in persons with the cervical syndrome. The team approach, that is, the open communication between physiatrists, psychologists and other team members is a precondition for the choice of appropriate therapy or better functional recovery of patients.

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Informing patients about disease occurrence and adequate guidelines for the treatment and behavior during home rehabilitation significantly reduce the recurrence of cervical syndrome.

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