

HOME CARE AND THE EFFECTS OF *HYPERICUM TETRAPTERUM* OIL EXTRACT IN THE TREATMENT OF CHRONIC WOUNDS DURING THE COVID-19 PANDEMIC

Elizabeta Markoska^{1†}, Nikola Gramatnikovski^{2†},
Iskra Pechijareva-Sadikarijo³, Svetlana Krstevska-Blazhevaska⁴, Vlado Matevski^{5,6}

¹ Biomedika dijagnostika Ltd., Skopje, RN Macedonia

² University clinic for thoracic and vascular surgery, Skopje, RN Macedonia

³ Agency for Medicines and Medical Devices, Skopje, RN Macedonia

⁴ Clinical Hospital "Acibadem Sistina", Skopje, RN Macedonia

⁵ Institute of Biology, Faculty of Natural Sciences and Mathematics, "Ss. Cyril and Methodius" University, Skopje, RN Macedonia

⁶ Macedonian Academy of Sciences and Arts, Skopje, RN Macedonia

Corresponding author: Elizabeta Markoska, Biomedika dijagnostika Ltd., Skopje, RN Macedonia, E-mail: markoskae@yahoo.com

† These authors have contributed equally to this work

ABSTRACT

The COVID-19 pandemic and the need for social distancing brought about sudden changes in the health system and treatment strategies. Patients with chronic wounds were affected by these changes and had limited access to professional treatment in hospitals. They were at a higher risk of infection with COVID-19 due to comorbidities and advanced age. The aim of the study was to develop an appropriate protocol for the in-home treatment of chronic wounds due to the COVID-19 pandemic when access to hospitals is limited and the risk of infection for these patients is high. In our case, *Hypericum tetrapterum* oil extract was applied for four months on a volunteer, a 78-year-old male patient with a chronic wound, additionally infected with *Pseudomonas aeruginosa* and comorbidities. His healing status was monitored by measuring the wound size and microbiological analysis at certain intervals. The scab of wound DPHR² (right lower leg chronic wound 2), with its diameters of d1 (40 mm) and d2 (20 mm), fell off after 22 days of the first *Hypericum tetrapterum* oil extract application. The scab of wound DPHR¹ (right lower leg chronic wound 1), with its diameters of d1 (74 mm) and d2 (35 mm), fell off after two and a half months of treatment with *Hypericum tetrapterum* oil extract. The results of our study indicated that *Hypericum tetrapterum* oil extract has a significant wound-healing potential and might be used as traditional medicine in the treatment of chronic wounds.

Keywords: chronic wound, home care, *Hypericum tetrapterum* oil extract, COVID-19 pandemic

INTRODUCTION

Chronic wounds often manifest as ulcers on the lower legs. Chronic leg ulcers can be defined as a breach in the epithelial integrity of the skin which occurs between the ankle and the knee for a period of over six weeks [1]. They can be thought

of as dysregulated inflammatory processes produced by inadequate blood supply, tissue anoxia, oedema, cell death, and infection, among other factors [2]. When the COVID-19 pandemic led to a rapidly increasing number of hospitalizations,

hospital wards were converted into dedicated COVID-19 wards, bringing many changes in the organization of the health systems, treatment strategies, and thus enforced re-evaluation of wound care management [3]. The COVID-19 pandemic reduced the ability to practice wound healing in normal conditions and brought a dilemma about how to treat these individuals during the pandemic [4, 5].

Treatment of lower extremity ulcers might be misclassified as non-essential during the pandemic. However, in this vulnerable patient population without regular wound care, these ulcers are at risk of becoming quickly infected, which may lead to an increased rate of septicemia, amputations, and even deaths [6]. Usually, these patients have comorbidities such as cardiac problems, hypertension, chronic renal failure, chronic lung disease, neurological problems, and diabetes which make them vulnerable to become infected with COVID-19 [7]. The goal of every clinician treating chronic wounds is early successful treatment of wound infections which can prevent complications and decrease the hospital stay of inpatients [8]. In pandemic conditions many wound care centers have started to use telemedicine to keep their patients away from medical facilities. Telemedicine has been used worldwide for a long time. During the COVID-19 pandemic, the most frequently used method is taking a photo in combination with text messages [9]. The shift from hospitals to community care places has increased the demand for family caregivers, a valuable constant during this uncertain time [4].

In such pandemic conditions, when access for these patients to the hospitals is limited and when drug deficiency may occur, an alternative approach to the treatment is of great importance. *Hypericum perforatum* L. (Hypericaceae) or St. John's wort, is a well-known medicinal herb, often associated with the treatment of anxiety and depression. Additionally, an oil macerate (Oleum Hyperici) of its flowering aerial parts is widely used in traditional medicine throughout the Balkans. Topically applied, it is used for the treatment of burn wounds and chronic ulcers [10]. Lyles et al. have demonstrated that topical traditional medical therapy with Oleum Hyperici reduces both wound size and healing time and could be used as safe and efficacious therapy for skin and soft tissue infections, including ulcers and wounds

[11]. A layer of sterile gauze impregnated with Hypericum oil directly applied on the wound, another sterile gauze layer and occlusive Leukoflex foil reduced the total wound area by 37.6% in 15 days [12]. The clinical rationale for the effective use of St. John's wort oil extract in the management of wounds might be due to its antimicrobial and anti-inflammatory activities, as well as stimulatory effects on fibroblast motility, collagen production, and keratinocyte differentiation [13].

Less is known in the literature about the use of *H. tetrapterum* oil extract as a topical wound and ulcer salve. The aim of this study was to demonstrate the effects of *H. tetrapterum* oil extract and provide guidance in the managing of chronic wounds at home during the COVID-19 pandemic.

CASE REPORT

A 78-year-old male patient suffering from vascular dementia, diabetes, hyperlipidemia, prostate problems, gallstones, thrombosis, and hypertension underwent surgery due to heart failure in December 2019. Correction of mitral and tricuspid valves and one Coronary Artery Bypass (MV repair with CG ring 28 mm, TV repair with 3d Ring 32 mm, CABGx1, SVG-Diagonal) was done. Abdominal paresis occurred postoperatively due to an obstructed abdominal aorta/abdominal aortic aneurysm. After the period of two and half months swelling, redness, and then cellulitis with bullae appeared on the right lower leg. The problem occurred in the area where the venous graft was taken (Fig. 1a and 1b). Then the patient was hospitalized because of pneumonia and treated for the same. The next hospitalization was because of the planned vascular surgery intervention, but it was not performed due to the increased risk associated with the intervention and possible complications. He was taken home at the request of his family and treated at home for a period of six months with telemedicine supervision by the relevant health care professionals.

Three months after surgery the first microbiological analysis from the wounds, sampled (Fig. 2a and 2b) at home detected presence of the pathogen *Pseudomonas aeruginosa* in necrotic tissue (Fig. 2c and 2d).

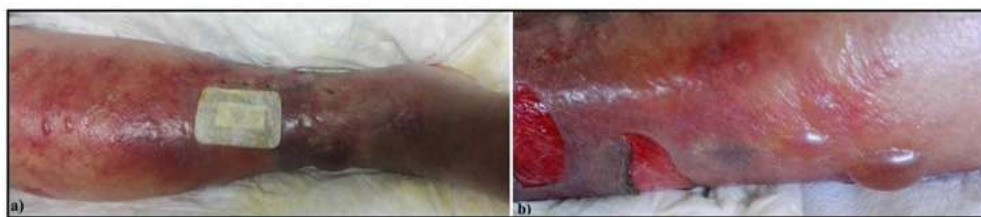


Figure 1. Right lower leg (a and b) swelling, redness, and cellulitis with bullae appeared on the area where the venous graft was taken 3rd day from the first symptoms



Figure 2. (a and b) Wounds sampling for microbiological analysis; (c and d) Necrotic tissue

Ciprofloxacin tablets of 500 mg (two tablets per day) were administered for 21 days as treatment of the infection with *P. aeruginosa*. Sodium chloride 0.9% intravenous infusion as an isotonic solution was used externally to rinse the wound. Local application of gentamicin injection of 120 mg and the application of Microdacyn[®] (oxidised water, sodium chloride, hypochlorous acid, sodium hypochlorite) spray and Octenisept[®] (octenidine dihydrochloride, phenoxyethanol) spray were also a part of the treatment. Sterile gauze, bandage and elastic tubular net bandage were used for the wound dressings. After five days, the Vivamel (medical honey) alginate dressing was included in the treatment of the two largest and most problematic wounds. Due to the lack of Vivamel alginate dressing, a silver dressing AQUACEL[®] Ag+ Extra[™] (sodium carboxymethylcellulose

impregnated with ionic silver) was used during the next five days. Application of *H. tetrapterum* oil extract with tested microbiological purity was used after two and half months of home treatment. The necessary amount of oil extract was prepared by traditional maceration of the fresh flowering tops of *H. tetrapterum* in olive oil (1:5 ratio).

Removal of necrotic tissue from the larger two wounds was performed at a clinic after 19 days from the beginning of home care management (Fig. 3a and 3b).

Dezintal[®] (benzalkonium chloride) 0.2% solution and 70% ethanol were used for cleaning and disinfection of objects and the treatment area. After one week of treatment the results from microbiological control analysis showed that the infection with *P. aeruginosa* was cured. The wound dressing was changed every 2-3 days. Showering



Figure 3. (a) Before outpatient treatment (b) After outpatient treatment (19th day of home treatment)



Figure 4. (a) 60th day of treatment at home), (b) 64th day of treatment at home

of the leg with antibacterial soap (medical) once a week commenced one month later. Wound healing

was improved after two months of treatment at home (Fig. 4a and 4b).



Figure 5. (a and b) Small wound on the back side of the leg treated with *H. tetrapterum* oil extract (64th day of the home treatment); (c) Small wound on the front side of the leg treated with *H. tetrapterum* oil extract (68th day of home treatment)

The application of *H. tetrapterum* oil extract started on the smaller wound on the back side of the leg, two months after the home treatment (Fig. 5a and 5b). One week later, *H. tetrapterum*

oil extract was applied on another wound, on the front side of the leg, for the first time (Fig. 5c).

The measuring of the two selected wounds started in the third month of the treatment (Fig. 6a and 6b) marked as DPHR¹ (right lower leg

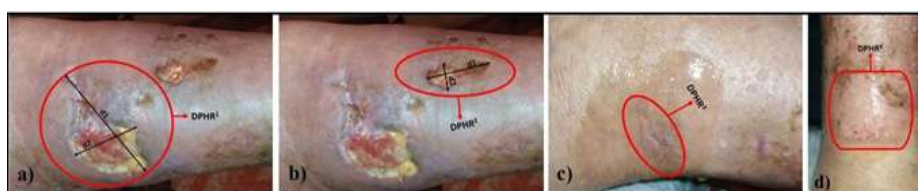


Figure 6. (a) DPHR¹ with measured diameters $d1$ and $d2$; (b) DPHR² with measured diameters $d1$ and $d2$; (c) DPHR³; (d) DPHR⁴ (76th day of home treatment)

chronic wound 1) and DPHR² (right lower leg chronic wound 2). The other two selected wounds (Fig. 6c and 6d) marked as DPHR³ (right lower leg chronic wound 3) and DPHR⁴ (right lower leg chronic wound 4) were observed only visually. Progress in the healing process of the patient has also been documented with the photos.

Measuring the wounds served as a tool for objectively monitoring the wound healing process and assessing the effectiveness of the therapy, as

well as predicting its outcome. Wound measuring was carried out with a graduated ruler. The results from the measuring of DPHR¹ and DPHR² wounds during the period of 3 months are given in the Appendix.

The measurements started after the first application of *H. tetrapterum* oil extract on DPHR². The application of *H. tetrapterum* oil extract on DPHR¹ wound started one week later (Fig. 7a). The oil extract was applied beneath the Vivamel



Figure 7. (a)DPHR¹ treated with *H. tetrapterum* oil extract; (b) DPHR² treated with *H. tetrapterum* oil extract; (c) DPHR³ treated with *H. tetrapterum* oil extract; (d) DPHR⁴ treated with *H. tetrapterum* oil extract (79th -82nd day of home treatment)



Figure 8. (a) DPHR¹ treated with *H. tetrapterum* oil extract; (b) The scab of DPHR² wound fell off (c) DPHR³ treated with *H. tetrapterum* oil extract; (d) DPHR⁴ treated with *H. tetrapterum* oil extract (98th day of home treatment)

alginate dressing. The other measured wound DPHR² was treated with oil extract and covered with sterile gauze (Fig. 7a and 7b). Two other smaller wounds DPHR³ and DPHR⁴ were also treated with *H. tetrapterum* oil extract (Fig. 7c and 7d). Then the right lower leg was bandaged all over.

Three weeks after the first application of *H. tetrapterum* oil extract on DPHR² the scab of the wound fell off (Fig. 8b). The rest of the wounds were treated with *H. tetrapterum* oil extract (Fig. 8a, c and d) in accordance with the established protocol (Appendix).

In some specific situations, when certain changes appeared on some parts of the leg (redness of the skin), antibacterial or antifungal creams were applied. Travaderm cream (Isoconazole nitrate, Diflucortolone valerate) was used for a period of two weeks on the part of the leg where the redness occurred. The surface of the lower leg that was not in the group of marked wounds was treated with Gentamicin unguent, and after that *H. tetrapterum* oil was used.

About two months after the start of the measurement of the wound diameters, the leg was bandaged with elastic tubular net bandage on top of the sterile gauze. This option of bandaging was used for several reasons. The wounds were healed on most of the surface of the lower leg. The elastic tubular net bandage also pro-

vided better aeration of the leg, which enabled faster healing. Another reason was the presence of dementia in the patient and his nervousness from the bandage and the already high ambient temperature characteristics for Macedonia in that time of the year. The presence of dementia was a significant problem because the patient was scratching himself uncontrollably and making small sores. In this period, Hydrocycilin® (hydrocortisonum, oxytetracyclinum) was also used once daily on the small sores (Fig. 9b).

Two and a half months after the first application of *H. tetrapterum* oil extract on DPHR¹ the scab of the wound fell off (Fig. 9a). The other two observed wounds were in a good healing condition (Fig. 9c and d).

About two months after the start of the bandaging, the right lower leg was left without a bandage every day for 30 to 40 minutes, and the home treatment was successfully completed after six months (Fig. 10a, b, c and d).

The patient was advised to take self-care and not to go out in the sun with an uncovered right lower leg, not to scratch the leg and to walk as much as possible. The leg was completely healed and only scars remained in the places of the largest wounds (Fig. 11 a, b, c and d). Due to problems with dementia, the patient had to be reminded not to scratch the legs because he was making small sores that could become infected.



Figure 9. (a) The scab of DPHR¹ wound fell off; (b) DPHR² treated with *H. tetrapterum* oil extract and Hydrocycclin®; (c) DPHR³ treated with *H. tetrapterum* oil extract; (d) DPHR⁴ treated with *H. tetrapterum* oil extract (149th day of home treatment)



Figure 10. (a) DPHR¹ after six months home treatment; (b) DPHR² after six months home treatment; (c) DPHR³ after six months home treatment; (d) DPHR⁴ after six months home treatment (190th day of home treatment)



Figure 11. (a) Right lower leg – front side; (b) Right lower leg – back side; (c) Right lower leg – right side; (d) Comparison of the right and left lower leg (203rd day of home treatment)

DISCUSSION

In the present case report, we have successfully described a method for the home care treatment of chronic wounds with a combination of traditional and modern remedies. Different treatment strategies and approaches for chronic leg ulcers or wounds were applied. The current methods of wound management involve the use of antibiotic creams, L-Mesitran (honey) cream, collagenase based (enzymatic) chemical debridement, surgical debridement, and vacuum negative pressure dressings. All these treatments promote the development of granulation tissue, while slowing the development of inflammation or production of exudate [14]. Laboratory and medical examinations supported by photo evidence in our study confirm that patients with chronic leg ulcers often suffer from chronic pain, wound infections, decreased mobility, impaired work capacity, negative body

image, reduced health-related quality of life, and an increased risk of amputations. This was previously described by De Silva and Enoch [1]. While such mechanisms would not cause local necrosis in other parts of the body, this is different in the legs where the venous drainage against the forces of gravity is a critical factor, even in normal veins [15].

The right lower leg ulcer in our case was quite complex because of the presence of several comorbidities, mainly including dementia, diabetes, thrombosis and hypertension. Also, the changes in the microcirculation in the small arteries and the arterioles due to both diabetes and hypertension, contributed to the local skin defect. The sudden outbreak of COVID-19 makes the management of chronic wounds more difficult [5, 16]. The COVID-19 pandemic has presented a great challenge for the healthcare systems. In the beginning of the pandemic, all elective procedures and treatments had either been canceled or postponed [9]. Every clinician should aim at keeping

the chronic wound patients and related health care workers safe during such a highly infective stage of COVID-19 pandemic [8].

In our study, an additional infection with *P. aeruginosa* made the case more complex. Modified triage pathway, in accordance with both chronic wound severity and comorbidities, was applied during the home care and treatment during the COVID-19 pandemic. The patient was treated at home for a period of six months. The data exchange between caregivers and healthcare professionals was a combination of photos and text messages sent via the Viber application. In such cases, it is very important to shoot proper photos of the wounds and legs (i.e., adjusting lighting and focus). Each time the measuring of wounds should be carried out by using the same graduated ruler and noting the values [17, 18]. The wound measurements and photos serve as tools for the medical personnel for objective monitoring of wound healing and for assessing the effectiveness of the therapy and predicting its outcome. It is also very important to have a history of all comorbidities, recent specialist reports for all other diseases from which the patient is suffering and results from laboratory tests [17]. In our study, the patient was suffering from several comorbidities (dementia, diabetes, hyperlipidemia, prostate problem, gallstones, thrombosis, hypertension, cardiovascular issues) and for each of them there was a medical history that helped provide a more comprehensive approach in the treatment of chronic wounds.

Healing of chronic leg ulcers can be supported by systemic electromagnetic fields that interact with peripheral blood mononuclear cells via Ca^{++} channels, activating signal transduction cascades, promoting cytokine synthesis, and changing cell proliferation patterns or with the use of radiofrequency [17, 19]. We used *Hypericum tetrapterum* oil extract in addition to the alginate dressing and modern medicine remedies. Unna's boot, a wet zinc oxide bandage applied from toes to knee and covered with elastic compression bandage, is commonly used in the United States [20]. Both acute and chronic wounds are susceptible to contamination and colonization by a wide variety of aerobic and anaerobic microorganisms. Most chronic wounds (e.g., leg ulcers, foot ulcers, and pressure ulcers) are characterized by a polymicrobial aerobic-anaerobic microflora and consequently, the careful use of broad spectrum antimicrobial agents is likely to be the most suc-

cessful treatment in the management of infected chronic wounds [21].

Wounds sampling and microbiological examination of the samples was the first step before we started with the treatment. Results from microbiological examinations showed the presence of *Pseudomonas aeruginosa* in necrotic tissue. Ciprofloxacin tablets and locally applied gentamicin injection were used as antibiotic therapy. Microdacyn® and Octenisept® spray were also a part of the treatment. After one week of treatment, the results from microbiological control showed the absence of *P. aeruginosa*. It is good practice to wash the wound and remove slough and necrotic skin containing surface contaminants before swabbing viable tissue [17]. In our study, a sodium chloride 0.9% intravenous infusion was used for rinsing the wound and antibacterial soap for showering the leg. Care for the objects and other people living in the same house must be taken due to the possible microbiological contamination during the treatment of the wounds, including bandaging, as well as leg bathing. Wearing gloves, protective masks and regular disinfection of the treatment area must be done. The necrotic tissue from the larger two wounds was removed at a clinic after 19 days from the beginning of home care management.

Present results from our study showed that treatment of chronic wounds with *Hypericum tetrapterum* oil extract, in addition to the modern medicine remedies may contribute to a better and a more cost-effective treatment of chronic wounds. After six months of home treatment the leg was completely healed. Only scars remained in the places of largest wounds. Evaluation of the results obtained from the macroscopical and histopathological evaluations have shown that oil extract of St. John's wort provided significant efficacy in the treatment of pressure sore wounds [13]. To our knowledge, this is the first case report of treating chronic wounds with *Hypericum tetrapterum* oil extract. The oil extract was applied for four months and showed significant efficacy in the treatment of wounds. Evaluation of the results obtained from the measurements of the size of wounds and photos show that *Hypericum tetrapterum* oil extract reduces both wound size and healing time. Therapeutic effects on improving epithelialization have also been observed. The *Hypericum tetrapterum* oil extract showed synergistic activities with Vivamel medical honey dressings in all phases of wound healing.

CONCLUSION

Hypericum tetrapterum oil extract possesses wound-healing properties and can be used as potential traditional medicine in the clinical treatment of chronic wounds. Generally, when access to hospitals for patients with chronic wounds is limited and drug deficiency may occur, an alternative approach, such as application of *Hypericum tetrapterum* oil extract can be of great importance. The treatment provided satisfactory recurrence-free healing of chronic wounds in a period of 6 months.

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Appendix. *Measurement values of DPHR¹ and DPHR² wounds during the period of 3 months*

Protocol	Date	DPHR ¹ Wound diameter d1xd2 (mm)	DPHR ² Wound diameter d1xd2 (mm)
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ² ; DPHR ³ ; DPHR ⁴)	06.06.2020	74 x 35	40 x 20
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ² ; DPHR ³ ; DPHR ⁴)	09.06.2020	73 x 34	30 x 16
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	12.06.2020	65 x 34	27 x 12
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	14.06.2020	55 x 30	24.8 x 11
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	16.06.2020	31 x 29	24 x 10.5
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	19.06.2020	30 x 28	23 x 9.8
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	22.06.2020	26 x 27	20 x 8.9
Spray Microdacyn [®] ; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	26.06.2020	19 x 26	19 x 7.5
Sodium chloride 0.9% sol.; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	28.06.2020	17 x 24	14 x 7 (0 x 0) The scab of wound fell off after the application of Hyperici oleum
Sodium chloride 0.9% sol.; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	01.07.2020	13 x 22	Visual
Sodium chloride 0.9% sol.; Gentamicin injection; Vivamel alginate dressing (DPHR ¹); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	05.07.2020	11 x 19	Visual
Sodium chloride 0.9% sol.; Gentamicin injection; Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	07.07.2020	10 x 17.5	Visual
Sodium chloride 0.9% sol.; Gentamicin injection; Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	08.07.2020	9.5 x 17	Visual
Sodium chloride 0.9% sol.; Gentamicin injection; Octenisept [®] spray (antiseptic); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	10.07.2020	9 x 16	Visual
Sodium chloride 0.9% sol.; Gentamicin injection; Octenisept [®] spray (antiseptic); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	13.07.2020	8.5 x 14.5	Visual
Sodium chloride 0.9% sol.; Gentamicin injection; Octenisept [®] spray (antiseptic); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	15.07.2020	7 x 11	Visual
Gentamicin injection; Octenisept [®] spray (antiseptic); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	17.07.2020	7 x 11	Visual

Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	19.07.2020	6.5 x 10.5	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	21.07.2020	6 x 10	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	23.07.2020	5.5 x 9	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	25.07.2020	4.5 x 7	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	27.07.2020	3.5 x 5	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	29.07.2020	3 x 4	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	31.07.2020	2 x 3	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	02.08.2020	1 x 1.5	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	04.08.2020	1 x 1	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	06.08.2020	0.8 x 0.8	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	07.08.2020	0.5 x 0.5	Visual
Gentamicin injection; Octenisept® spray (antiseptic) Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	10.08.2020	0.5 x 0.5 The wound is dry, there was only the scab	Visual
Sodium chloride 0.9% sol.; Gentamicin injection; Microdacyn® spray (antiseptic); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	13.08.2020	0.5 x 0.5 The wound is dry, there was only the scab	Visual
Sodium chloride 0.9% sol.; Microdacyn® spray (antiseptic); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	19.08.2020	0 x 0 The scab of wound was fell off	Visual
Sodium chloride 0.9% sol.; Microdacyn® spray (antiseptic); Hyperici oleum (DPHR ¹ ; DPHR ² ; DPHR ³ ; DPHR ⁴)	21.08- 26.09.2021	Visual (process of epithelialization)	Visual (process of epithelialization)

DPHR¹: right lower leg chronic wound 1; DPHR²: right lower leg chronic wound 2; DPHR³: right lower leg chronic wound 3; DPHR⁴: right lower leg chronic wound 4.

Резиме

ДОМАШНА НЕГА И ЕФЕКТИ НА МАСЛЕН ЕКСТРАКТ ОД *HYPERICUM TETRAPTERUM* ВО ЛЕКУВАЊЕ НА ХРОНИЧНИ РАНИ ЗА ВРЕМЕ НА ПАНДЕМИЈАТА ОД КОВИД-19

Елизабета Маркоска¹, Никола Граматниковски²,
Искра Печијарева-Садикаријо³, Светлана Крстевска-Блажевска⁴, Владо Матевски^{5,6}

¹ Биомедика дијагностика ДООЕЛ, Скопје, РС Македонија

² ЈЗУ Универзитетска клиника за торакална и васкуларна хирургија, Скопје, РС Македонија

³ Агенција за лекови и медицински средства, Скопје, РС Македонија

⁴ Клиничка болница „Ацибадем Систина“, Скопје, РС Македонија

⁵ Универзитет „Св. Кирил и Методиј“, Природно-математички факултет, Институт за биологија, Скопје, РС Македонија

⁶ Македонска академија на науките и уметностите, Скопје, РС Македонија

Пандемијата на КОВИД-19 и потребата за социјално дистанцирање донесоа ненадејни промени во здравствениот систем и на стратегијата за лекување. Особено погодени од овие промени и ограничениот пристап до професионален третман во болница беа пациентите со хронични рани. Тие беа изложени на поголем ризик од инфекција со КОВИД-19 поради возраста и коморбидитетите. Целта на ова истражување беше да се развие соодветен протокол за третман на хронични рани за време на пандемијата на КОВИД-19 во домашни услови, кога пристапот до болниците е ограничен и ризикот од инфекција кај овие пациенти е зголемен. Во нашиот случај маслен екстракт од *Hypericum tetrapterum* беше применуван на 78-годишен машки пациент со рана и коморбидитети, дополнително инфициран со *Pseudomonas aeruginosa*. Процесот на заздравување беше следен со мерење на големината на раната и микробиолошка анализа во одреден временски интервал. Корупката на раната DPHR² (хронична рана 2 на десната потколеница) со измерени дијаметри d1 (40 mm) и d2 (20 mm) отпадна по 22-риот ден од првото нанесување на маслото од *Hypericum tetrapterum*. Корупката на раната DPHR¹ (хронична рана 1 на десната потколеница) со измерени дијаметри d1 (74 mm) и d2 (35 mm) отпадна по два и пол месеца од првото нанесување на маслото од *Hypericum tetrapterum*. Резултатите од нашата студија покажаа дека екстрактот од маслото на *Hypericum tetrapterum* има значителен потенцијал за заздравување на раните и може да се користи како традиционален лек во лекувањето хронични рани.

Клучни зборови: хронична рана, домашна нега, маслен екстракт од *Hypericum tetrapterum*, пандемија на КОВИД-19

