fizjoterapia polska

POLISH JOURNAL OF PHYSIOTHERAPY

OFICJALNE PISMO POLSKIEGO TOWARZYSTWA FIZJOTERAPII

THE OFFICIAL JOURNAL OF THE POLISH SOCIETY OF PHYSIOTHERAPY

NR 1/2019 (19) KWARTALNIK ISSN 1642-0136

Ocena wpływu kompleksowej terapii uzdrowiskowej z zastosowaniem wód leczniczych radoczynnych na poziom hemoglobiny – badania wstępne

Assessment of the influence of comprehensive spa therapy with therapeutic radon waters on hemoglobin levels: preliminary study

Problem trudno gojących się ran i odleżyn w fizjoterapii

The problem of difficult to heal wounds and pressure ulcers in physiotherapy

Dr. Comfort®

NAGRODA POLSKIEGO TOWARZYSTWA REHABILITACJI

ACCEPTED
AMERICAN PODIATRIC MEDICAL ASSOCIATION

APROBATA AMERYKAŃSKIEGO MEDYCZNEGO STOWARZYSZENIA PODIATRYCZNEGO

CE WYRÓB MEDYCZNY

Nowy wymiar wygody dla stóp z problemami

Obuwie profilaktyczno-zdrowotne o atrakcyjnym wzornictwie i modnym wyglądzie

Miękki, wyściełany kołnierz cholewki
Minimalizuje podrażnienia

Wyściełany język
Zmniejsza tarcie i ulepsza dopasowanie

Stabilny, wzmocniony i wyściełany zapiętek
Zapewnia silniejsze wsparcie łuku podłużnego stopy

Lekka konstrukcja
Zmniejsza codzienne zmęczenie

Zwiększona szerokość i głębokość w obrębie palców i przodostopia
Minimalizuje ucisk i zapobiega urazom

Antypoźlizgowa, wytrzymała podeszwa o lekkiej konstrukcji
Zwiększa przyczepność, amortyzuje i odciąża stopy

Ochronna przestrzeń na palce - brak szwów w rejonie przodostopia
Minimalizuje możliwość zranień

Wysoka jakość materiałów - naturalne skóry, oddychające siatki i Lycra
Dostosowują się do stopy, utrzymują je w suchości i zapobiegają przegrzewaniu

Trzy rozmiary szerokości

Podwyższona tęgość

Zwiększona przestrzeń na palce

WSKAZANIA
• haluksy • wkładki specjalistyczne • palce młotkowate, szponiaste • cukrzyca (stopa cukrzycowa) • reumatoidalne zapalenie stawów • bóle pięty i podeszwy stopy (zapalenie rozcięgna podeszwowego - ostroga piętowa) • płaskostopie (stopa poprzecznie płaska) • bóle pleców • wysokie podbicie • praca stojąca • nerwiak Mortona • obrzęk limfatyczny • opatrunki • ortezy i bandaże • obrzęki • modzele • protezy • odciski • urazy wpływające na ścięgna, mięśnie i kości (np. ścięgno Achillesa) • wrastające paznokcie

Wyłączny dystrybutor w Polsce:

KALMED
Iwona Renz, Poznań

ul. Wilczak 3
61-623 Poznań
tel. 61 828 06 86
fax. 61 828 06 87
kom. 601 640 223, 601 647 877
e-mail: kalmed@kalmed.com.pl
www.kalmed.com.pl

www.butydlazdrowia.pl **www.dr-comfort.pl**

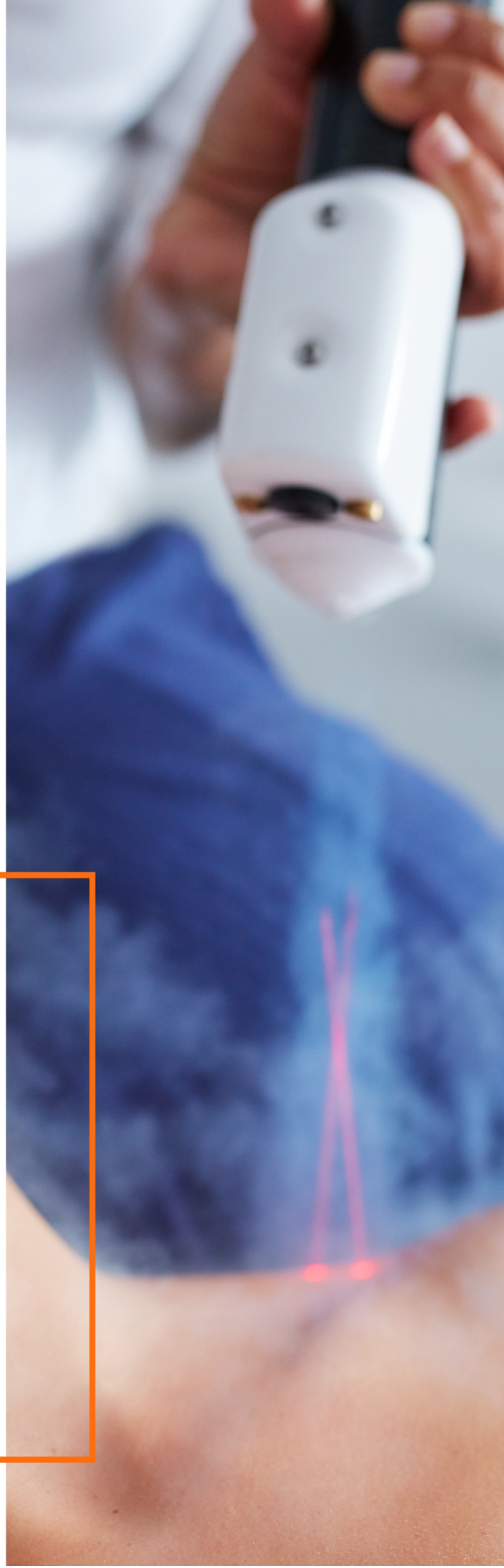
METRUM CRYOFLEX

CRYO-T ELEPHANT

Polski produkt. Serwis i produkcja w Polsce.

Zaawansowany aparat do kriostymulacji miejscowej dla fizjoterapeutów, ośrodków SPA oraz gabinetów medycyny estetycznej.

- Czujnik temperatury skóry zapobiegający przemrożeniom
- Laserowy wskaźnik optymalnej odległości głowicy
- Jedyny na rynku nieprzemarzający przewód kriogeniczny
- Duży wybór pojemności zbiorników na ciekły azot
- Wskaźnik poziomu azotu



Polecamy również aparaty na dwutlenek węgla.
Sprawdź na: **www.metrum.com.pl**

ULTRASONOGRAFY
DLA FIZJOTERAPEUTÓW I ORTOPEDÓW

CHCESZ MIEĆ W GABINECIE?
- najlepszy, przenośny ultrasonograf b/w na świecie
- nowoczesne 128-elem. głowice
- 3 lata gwarancji
- dobrą cenę

CHCESZ MIEĆ?
- szybką i trafną diagnozę narządu ruchu i skutecznie dobrane leczenie
- sonofeedback w leczeniu schorzeń i rehabilitcji pod kontrolą USG
- wyselekcjonowanie pacjentów już na pierwszej wizycie (rehabilitacja czy skierowanie do szpitala)

CHCESZ IŚĆ na profesjonalne szkolenie dla fizjoterapeutów kupując USG?

CHCESZ MIEĆ super warunki leasingu i uproszczoną procedurę przy zakupie USG?

NIE CZEKAJ, AŻ INNI CIĘ WYPRZEDZĄ! JUŻ PONAD 300 FIZJOTERAPEUTÓW NAM ZAUFAŁO

HONDA 2200

- Najlepszy, przenośny ultrasonograf b/w na świecie.
- Najczęściej kupowany przez fizjoterapeutów.
- Krystalicznie czysty obraz.
- 3 lata gwarancji.
- Sondy 128-elem.

!

Przy zakupie USG Profesjonalne szkolenie GRATIS!

Made in Japan

Atrakcyjne warunki leasingu!

03-287 Warszawa, ul. Skarbka z Gór 67/16
tel. 22 / 855 52 60, fax 22 / 855 52 61, **kom. 695 980 190**

polrentgen®

www.polrentgen.pl

KOORDYNACJA

Medyczna Strona Technologii

PRODUCENT
DYSTRYBUTOR

NEUROREHABILITACJA
KINEZYTERAPIA
FIZYKOTERAPIA
DIAGNOSTYKA
PODOLOGIA

660-404-464
INFO@KOORDYNACJA.COM.PL

WWW.KOORDYNACJA.COM.PL

TB POLSKA®
terapiasportfitness

www.tb-polska.pl

NIEZBĘDNE W FIZJOTERAPII

NAJWYŻSZA JAKOŚĆ PRODUKTÓW

TAŚMY, DYSKI, PIŁKI, KINESIOLOGY TAPE

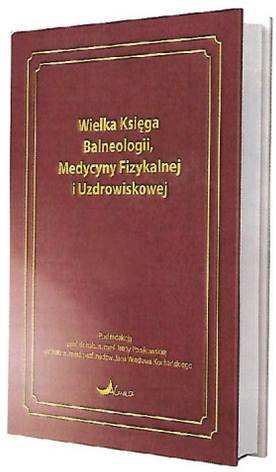
PRZYROST SIŁY MIĘŚNIOWEJ
STABILIZACJA STAWOWA
MOBILIZACJA I ODCIĄŻENIE KRĘGOSŁUPA

ZAPYTAJ O AKTUALNE PROMOCJE

+48 32 382 06 90 **biuro@tb-polska.pl**

Wielka Księga Balneologii, Medycyny Fizykalnej i Uzdrowiskowej

Unikalne w skali światowej opracowanie wymienionych w tytule tematów. Księga pod redakcją prof. Ireny Ponikowskiej składa się z dwóch tomów, zawiera łącznie 59 rozdziałów opracowanych przez 62 znamienitych autorów, w tekście zamieszczono dużo kolorowych zdjęć, rycin i tabel. Starannie wydana, okładki w okleinie imitującej oprawę materiałową w kolorze burgunda.



www.wielkaksiegabalneologii.pl

Acta Balneologica
jest naukowym czasopismem Polskiego Towarzystwa Balneologii i Medycyny Fizykalnej.
Ukazuje się od 1905 roku.

Na łamach kwartalnika publikowane są recenzowane prace z zakresu medycyny uzdrowiskowej – balneologii, bioklimatologii, balneochemii, hydrogeologii i medycyny fizykalnej – fizjoterapii, krioterapii, kinezyterapii, presoterapii, a także rehabilitacji.

Czasopismo indeksowane w bazie Emerging Sources Citation Index (ESCI) Web of Science.

www.actabalneologica.pl

Prenumerata roczna kosztuje 100 zł.
Koszty wysyłki na terenie kraju wliczone w cenę prenumeraty.
Ceny zawierają 5% VAT.

Zamówienia prenumeraty i książek oraz wszelkie pytania prosimy kierować na adres:
prenumerata@wydawnictwo-aluna.pl
Wydawnictwo ALUNA, Z.M.Przesmyckiego 29, 05-510 Konstancin-Jeziorna, tel. 22 245 10 55 w godz. 9-15.

INDYWIDUALNE WKŁADKI ORTOPEDYCZNE

PODIATECH
SIDAS MEDICAL

TERMOFORMOWALNE WKŁADKI SIDAS TO:

- 100%-owe dopasowanie do stopy;
- szybkość wykonania (około godziny);
- szerokie zastosowanie: wkładki ortopedyczne dla stóp z patologiami, wkładki sportowe oraz wkładki komfortowe (także do czółenek i butów wizytowych);
- wysoka jakość i trwałość.

OFERUJEMY:

- kompleksowe wyposażenie gabinetów do diagnostyki stóp i postawy ciała pacjenta;
- urządzenia do wykonywania indywidualnych wkładek ortopedycznych;
- szeroką gamę wysokiej jakości gotowych baz wkładek oraz materiałów technicznych;
- doradztwo i wsparcie na każdym etapie rozwoju gabinetu;
- specjalistyczne szkolenia prowadzone przez międzynarodowych ekspertów Sidas.

WindSport

Skontaktuj się z nami!
Tel.: 603 289 589
E-mail: sidasmedical@windsport.pl
www.sidas.pl

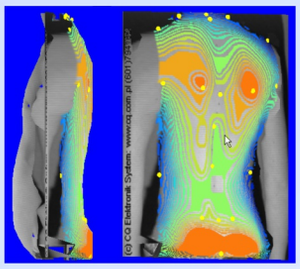
CQ Elektronik System

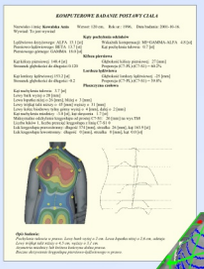
Nowoczesna diagnostyka
Terapia rehabilitacyjna

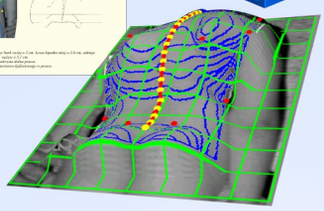
www.cq.com.pl

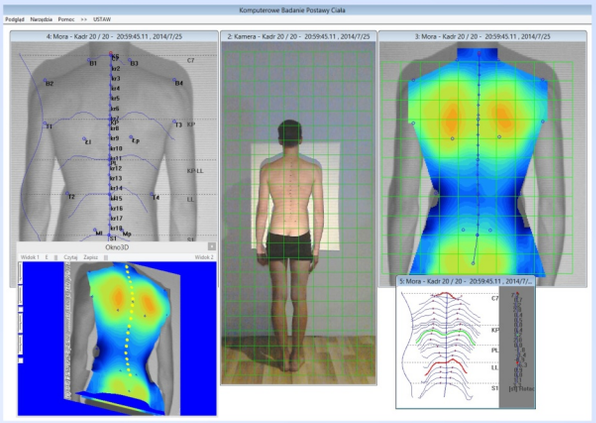
ZESTAW APARATURY DO LABORATORIUM KOMPUTEROWEJ DIAGNOSTYKI I KOREKCJI POSTAWY CIAŁA

SYSTEM MORA 4G





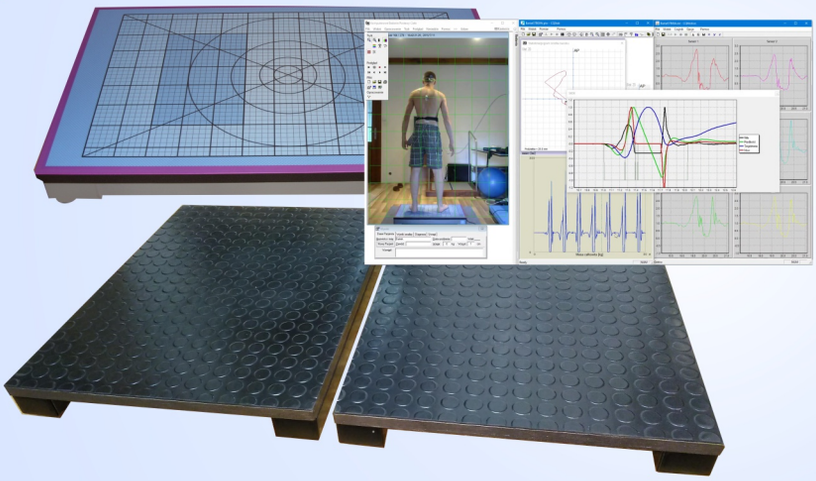


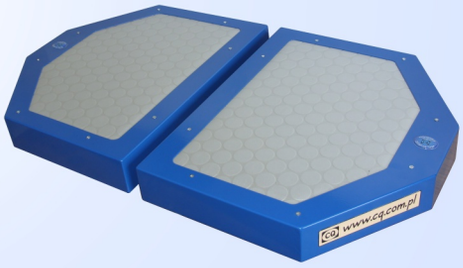


Fotogrametria przestrzenna 3D
Druga kamera całosylwetkowa

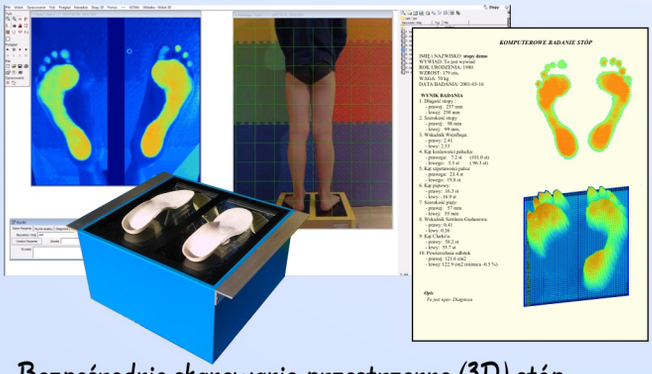
Platformy CQ-Stab2P

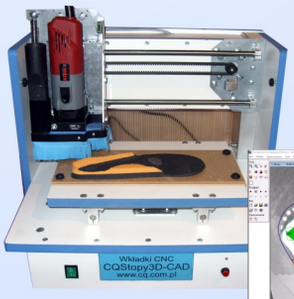
stabilograficzne i DYNAMOMETRYCZNE
jedno i DWUPŁYTOWE
do badania wyskoku dla SPORTOWCÓW

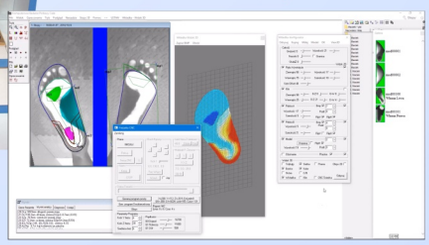




CQ-Stopy3D CAD-CNC







Bezpośrednie skanowanie przestrzenne (3D) stóp
System komputerowego wykonywania indywidualnych wkładek
Dokładna diagnostyka stóp i koślawości/szpotawości kolan i pięt

KOMPUTEROWE FREZOWANIE WKŁADEK
NA MIEJSCU, NA MIARĘ, NA CZAS !

PROJEKTUJEMY RÓWNIEŻ NA INDYWIDUALNE ZAMÓWIENIA
W OFERCIE · KOMPUTEROWE BADANIE POSTAWY · RUCHU · TREMORU · SIŁY · BALANSU · TRENINGU

Polski PRODUCENT * ul.Wiśniowa 15 * Czernica * tel.(71)3180104 * (601)794162

gymna.PRO

innowacyjność - funkcjonalność - design

NOWE TRENDY

Stała pozycja pacjenta

Ergomax
maksymalny komfort i higiena

System „One-Click"
jednoczesna regulacja podłokietników

„One-Click" jednoczesna
regulacja podłokietników

Pakiet LED

System bezpieczeństwa SDM
automatyczne wykrywanie ruchu

Pamięć ustawień wysokości

elecpol ul.Łużycka 34a, 61-614 Poznań, 61 825 60 50, biuro@elecpol.pl, www.elecpol.pl

URZĄDZENIA DO REHABILITACJI, KRIOTERAPII, KINEZYTERAPII, FIZYKOTERAPII, HYDROTERAPII

TONUS | QAL Medical OrthoAgility | isoforce | BELA | hydrosun® | gymna | Zimmer MedizinSysteme | UNBESCHEIDEN Baden-Baden

TROMED TRAINING

program szkoleniowy

- Diagnostyka i leczenie manualne w dysfunkcjach stawu kolanowego
- Mobilność i stabilność – profilaktyka urazów w treningu sportowym i fizjoterapii
- Współczesne metody leczenia wybranych dysfunkcji stawu skokowego i stopy
- Schorzenia narządów ruchu u dzieci i młodzieży
- Mózgowe Porażenie Dziecięce - algorytm postępowania diagnostyczno-terapeutycznego
- Rehabilitacja Kardiologiczna w praktyce
- Podstawy neurorehabilitacji - udar mózgu
- Dysfagia - zaburzenia połykania w pracy z pacjentem neurologicznym
- Podstawy neuromobilizacji nerwów obwodowych - diagnostyka i praktyczne zastosowanie w fizjoterapii
- Terapia pacjentów z obrzękiem limfatycznym
- Fizjoterapia w onkologii
- Zaopatrzenie dla osób po urazie rdzenia kręgowego
- Zaopatrzenie dla osób po udarze mózgu
- Wybrane elementy zaopatrzenia ortopedycznego w praktyce
- Narzędzia coachigowe w pracy z pacjentem
- Trening diagnostyczno-rozwojowy personelu medycznego
- Skuteczna komunikacja z pacjentem i jego otoczeniem

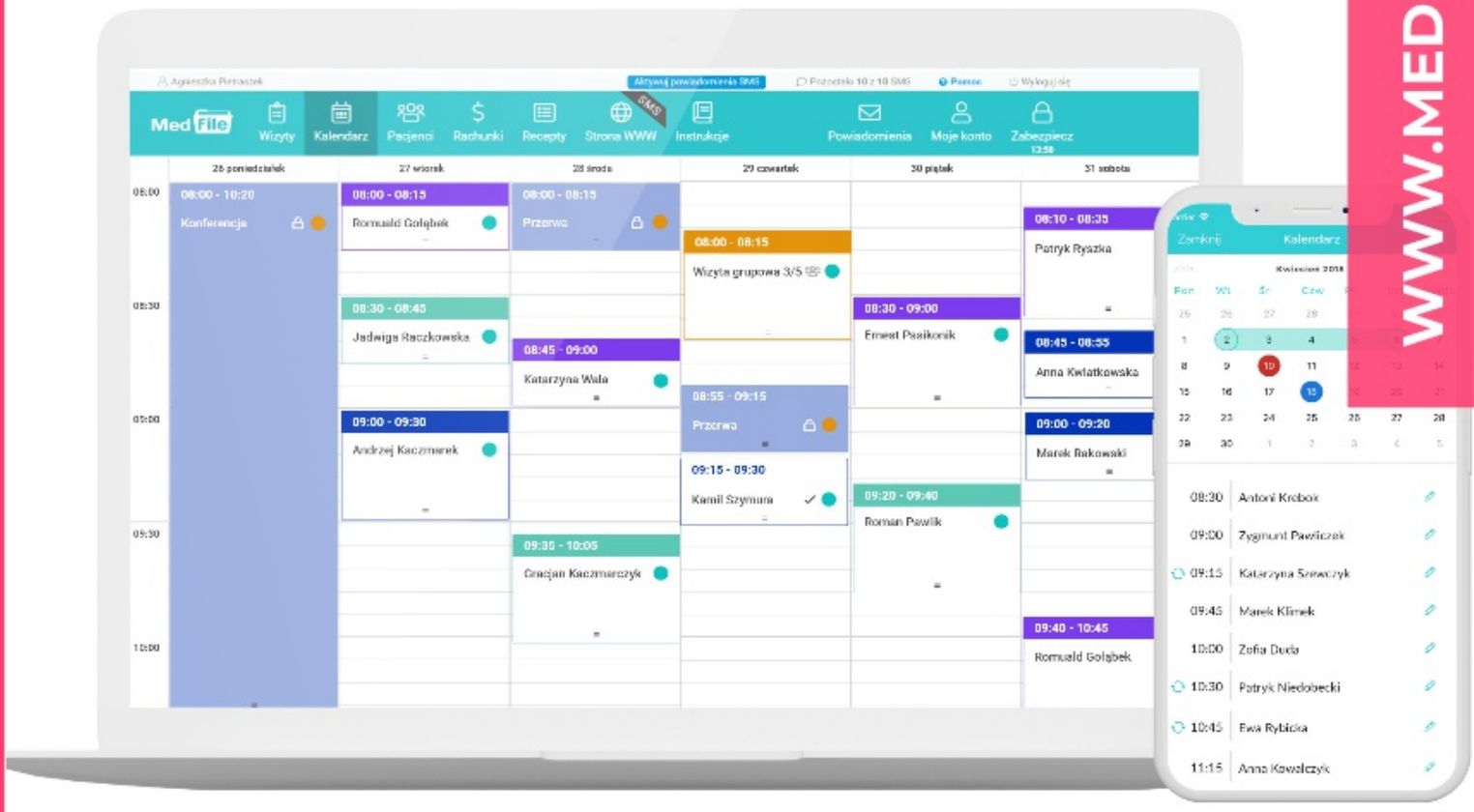
Informacje i zapisy

TROMED Zaopatrzenie Medyczne
93-309 Łódź, ul. Grażyny 2/4 (wejście Rzgowska 169/171)
tel. 42 684 32 02, 501 893 590
e-mail: szkolenia@tromed.pl
www.szkolenia.tromed.pl

MedFile

Elektroniczna Dokumentacja Medyczna

WWW.MEDFILE.PL



Darmowy kompleksowy program

dla gabinetu fizjoterapeutycznego

- ✓ Wielofunkcyjny kalendarz
- ✓ Kartoteka pacjentów
- ✓ Kody ICD-9, ICD-10, ICF
- ✓ Kreator formularzy - testy
- ✓ Dedykowana karta wizyty
- ✓ Rejestracja pacjentów online 24/7
- ✓ Powiadomienia SMS
- ✓ Aplikacje mobilne (iOS, Android)

- ✓ Testuj wszystkie funkcje **14 dni za darmo**
- ✓ **Medfile Free** - dla małego gabinetu
- ✓ **Medfile Plus** - licencja roczna już od ~~990zł~~ **590 zł**

Kod promocyjny: ptf03

Umów się
na prezentację:

Anna Baron
abaron@medfile.pl
731 030 629

BIOSTAT® MORE THAN STATISTICS **Zaufany Partner służby zdrowia od 15 lat | www.biostat.com.pl**

fizjoterapia polska
nr 1/2019 (19)

Problem trudno gojących się ran i odleżyn w fizjoterapii

The problem of difficult to heal wounds and pressure ulcers in physiotherapy

理疗中难愈合的伤口和褥疮问题

Beata Skolik[1,3(A,B,D,E)], Paula Migała[2(A,B,E,F)], Mariusz Migała[1,3(A,B,E,G)]

1 Katedra Podstaw Fizjoterapii, Instytut Fizjoterapii, Wydział Wychowania Fizycznego i Fizjoterapii, Politechnika Opolska / Department of Physiotherapy Basics, The Institute of Physiotherapy, Faculty of Physical Education and Physiotherapy of the Opole University of Technology, Opole, Poland
2 Studenckie Koło Naukowe „Pogromcy mitów", Wydział Wychowania Fizycznego i Fizjoterapii, Politechnika Opolska / Student Science Club "Pogromcy mitów", Faculty of Physical Education and Physiotherapy of the Opole University of Technology, Opole, Poland
3 Szpital Specjalistyczny MSWiA w Głuchołazach im. św. Jana Pawła II / St. John Paul II Specialistic Hospital of Ministry of the Interior and Administration in Głuchołazy of Republic of Poland, Głuchołazy, Poland

Streszczenie

Poruszony temat przedstawia zjawisko występowania odleżyn i trudno gojących się ran pooperacyjnych, jako czynniki utrudniające, spowalniające czy nawet uniemożliwiające wprowadzenie celowanej fizjoterapii. Protokół postępowania terapeutycznego przedstawiono na przykładzie chorego z odleżyną okolicy kości krzyżowej powstałej po zabiegu kardiochirurgicznym oraz na przykładzie chorej z odleżyną/trudno gojącą się raną podudzia, która wystąpiła w wyniku rozejścia się szwów po przebytej operacji zespalającej po dwukostkowym złamaniu kończyny dolnej. Rana pojawiła się pod opatrunkiem gipsowym po około miesiącu od jego założenia.

W pracy przedstawiono efekty prowadzenia terapii z wykorzystaniem biostymulacji laserowej i światła spolaryzowanego, w przypadku trudno gojącej się rany po rozejściu szwów oraz światła spolaryzowanego w leczeniu odleżyny kości krzyżowej. Omówiona została profilaktyka zapobiegania ww. zjawisku oraz wpływ laseroterapii i światłolecznictwa, z wykorzystaniem lampy Bioptron, na regenerację tkanek. Podjęto rozważania związane z ograniczeniami prowadzenia procesu terapeutycznego. Przedstawiono także konsekwencje związane ze spowolnieniem powrotu chorego do pełnej sprawności wynikające z powstania ran jako problemu terapeutycznego.

Słowa kluczowe:

odleżyna, światło spolaryzowane, leczenie odleżyn, kość krzyżowa, trudno gojące się rany

Abstract

The paper presents the effectiveness of treatment of pressure ulcers and difficult to heal wounds with the use of phototherapy, more precisely polarized light, which is one of the elements of modern physical therapy, and thus physiotherapy. The aim of the work was to show the positive effect of polarized light on accelerating the healing process, tissue regeneration and improving the quality of life of a patient with a pressure ulcer with high exudate and a patient with non-surgical wound healing.

The lecture presents the effects of conducting therapy with the use of laser biostimulation and polarized light, in the case of a difficult to heal wound after dissection of sutures and polarized light in the treatment of sacral ulcer. The prophylaxis of prevention of the above-mentioned was discussed. phenomenon and the effect of laser therapy and phototherapy, using the Bioptron lamp, for tissue regeneration. There are considerations related to the limitations of the therapeutic process. Also presented are the consequences associated with slowing the patient's return to full efficiency resulting from the formation of wounds as a therapeutic problem.

Key words:

bedsore, polarized light, treatment of bedsore, sacrum, hard to heal wounds

摘要

讨论的主题在提出术后褥疮出现及伤口难愈合的现象，这些是阻碍、减缓甚至阻止达成理疗目标的因素。疗程报告以心脏手术后患骶骨褥疮及有褥疮和小腿伤口难愈合的患者为例，该患者在下肢三踝骨折联合手术后缝线裂开，伤口于一个月后在膏药敷料下方出现。

研究中介绍了使用激光生物刺激及偏振光对拆线后难愈合的伤口进行治疗的效果，及使用偏振光对骶骨褥疮进行治疗的效果。谈论了上述现象的预防方法及使用 Bioptron 灯的激光治疗和光疗等对组织再生的效果，另外也考虑疗程局限等相关问题，还提出因伤口出现形成治疗问题导致患者体能完全恢复的速度减缓等相关后果。

关键词：

褥疮、偏振光、褥疮治疗、骶骨、难愈合的伤口

Introduction

Decubitus ulcers and chronic wounds are a serious cause of decreasing the patient's quality of life, as well as impeding the conduct of targeted physiotherapy.

The term "decubitus" is derived from the Latin word "decumbre" and means "lie flat" and the decubitus definition itself refers to local necrosis of the skin, subcutaneous tissue, sometimes also muscular, leading to extensive and deep ulceration. It is most often formed as a result of chronic or repetitive compression within the tissues, between hard bone protrusions and the substrate, e.g. a mattress, a gypsum dressing, resulting in ischemia and hypoxia [1]. Initially, it is manifested by the redness of the area subjected to increased pressure, tissue disruption, and death. Separated necrotic tissues are susceptible to infection. Most often they occur in deprived patients with limited mobility, hence the long-term pressure on the tissues causing the development of necrosis is recognized as the main aetiological factor [2]. Although pressure is very important in the formation of pressure sores, it is also significantly influenced by increased humidity, impaired trophism of the skin due to venous stasis, metabolic problems, tissue hypoxia or impaired vasomotor function [3]. The decubitus ulcer alone is not a disease but the result of inadequate patient care [4].

The term "chronic wound" refers to a wound that has not healed for 4-6 weeks, with the European Wound Management Association (EWMA) proposing that the term "chronic wound" be replaced by the term "non-healing wound" [5, 6].

Sick unconscious or immobilized is characterized by the inability to reflexively relieve the oppressed areas and improve blood supply to the tissues through independent transfer, changing the position. Individual conditions, such as age, sex, body structure, eating disorders and skin condition of patients before the incident, are of key importance in carrying out anti-bedsore prophylaxis.

The patient in a plaster dressing is particularly exposed to pressure ulcers and this is not only the case of long-term immobilization (most often in the region of the sacrum, heel, trochanter, shoulder blades), but also the creation of a wound under the dressing. Therefore, any complaint reported by a patient lying in a plaster cast should draw the attention of medical staff to check the affected areas. In addition, in patients with plaster dressings, it is important to observe the peripheral circulation to ensure that the dressing is properly placed [4].

It is estimated that about 10-15% of chronically ill people, elderly, dependent or subjected to long-term immobility struggle with the problem of pressure ulcers [3].

Assumptions and aim of work

The aim of the study is to present the problem of the occurrence of difficult to heal post-operative wounds and the formation of bedsores, as factors hindering, slowing down or even preventing the introduction of targeted physiotherapy. The therapeutic treatment protocol was presented on the example of a patient with a pressure ulcer of the sacrum bone formed after cardiac surgery and on the example of a patient with a decubitus ulcer that occurred as a result of splitting the sutures after a combined operation after a trichoty of the lower limb. The wound

appeared under the plaster dressing about a month after its foundation.
The paper presents the effects of conducting therapy with the use of polarized light and laser therapy in the case of the decubitus ulcer and polarized light in the treatment of pressure ulcer around the sacrum. The prophylaxis of prevention of the above-mentioned was discussed. phenomenon and the effect of laser therapy and phototherapy, using polarized light, for tissue regeneration. There are considerations related to the limitations of the therapeutic process. Also presented are the consequences associated with slowing the patient's return to full efficiency resulting from the formation of wounds as a therapeutic problem.

Pathogenesis and causes of bedsores

The cause of pressure ulcers may be chronic low-pressure effects as well as incidents of increased metabolism. Exceeding the capillary pressure (2.1-4.4 kPa, 16-33 mmHg), acting on the skin and subcutaneous tissue, may cause tissue ischemia during prolonged periods of time, and thus the formation of pressure ulcers. Exceeding the pressure of 5.3 kPa (40 mmHg) and maintaining it for a long time, almost always leads to necrosis, while the pressure at 8.0 kPa (60 mmHg) impairs the lymphatic system by disturbing the outflow of lymph, which can also damage tissues [3].Maintaining an appropriate level of work of cellular metabolism can prevent the death of cells and tissues. The balance between the supply of nutrients and the removal of harmful substances is essential for the proper functioning of the whole organism. Skin hygiene is equally important, maintained both by the patient and the medical staff. The stratum corneum is a barrier separating us from pathogenic microorganisms. Metabolic disorders and increased alkalinity of the skin increases the risk of pressure ulcers and infections [3].
The time of pressure ulcer formation is determined by many factors, usually ranging from 2 to a dozen or so hours [3].
The causes of bedsores can be divided into internal and external:
• inside:
◦ poor general condition of the patient, old age,
◦ disorders of the musculoskeletal system (long-term immobilization),
◦ neurological disorders (paresis and paralysis, elimination or weakening of pain sensation),
◦ eating disorders (malnutrition, excessive overweight, obesity, dehydration, protein, zinc and vitamin C deficiency),
◦ incontinence of the sphincter of the urethra and anus (maceration of the skin, infection) [5];
• outside:
◦ friction forces (inadequate positioning technique),
◦ shearing forces (a person sitting half-sitting or sitting down due to gravitational forces slides down the mattress). The skin stays in the original position – contact with the ground – the bone structures move, causing tension, twisting, and even tissue crushing; damage to blood vessels – tissue ischemia),
◦ oppression,
◦ injuries,
◦ folded bed linen, personal,

◦ bad environmental conditions (humidity, too low and too high temperature),
◦ negligence on the part of staff (staff shortages, lack of anti-bedsore equipment) [7].
We distinguish three types of oppression:
• Simple pressure: on the one hand, the skeleton exerts pressure on soft tissues, on the other hand, soft tissues are oppressed by the substrate.
• Friction: moving the body surface on the ground.
• Side-stretching and shearing forces: endothelial microcirculation disorders [8].
The stages of pressure ulcer formation are divided into:
1. Chronic pressure on the skin and subcutaneous tissue.
2. Slowing down metabolism, tissue ischemia.
3. Cell death.
4. decubitus ulcer / wound [3].
Most common positions of foundation and types of foundry
The areas most susceptible to pressure sores are areas with a small amount of subcutaneous tissue. The effect of pressure over bone heights is the blockage of blood flow in the capillaries and the difficult outflow of lymph [9].
When lying on the back, particular risks are characterized by:
• occipital bone area,
• areas on the ear molluscs,
• blade area,
• the area of elbow processes,
• the region of the sacrum and the sacral bone [7].

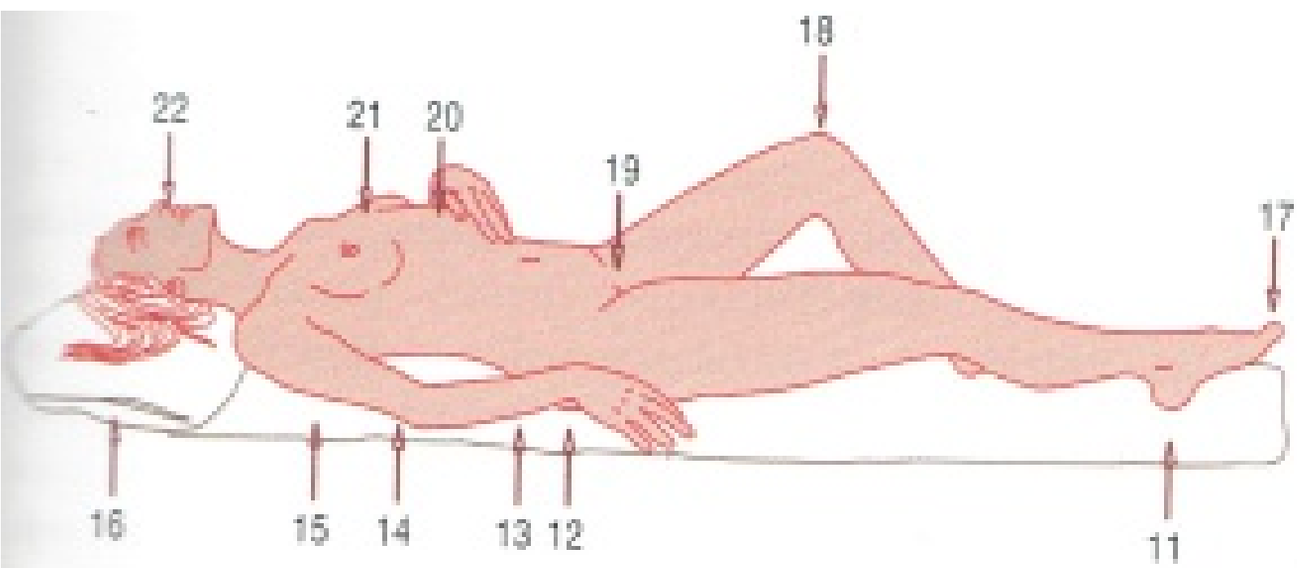


Fig. 1. Location of bedsores in supine position (Source: J. Rosińczuk-Tonderys, I. Uchmanowicz, M. Arendarczyk: Profilaktyka i leczenie odleżyn, Wrocław 2005, p.19.)

When lying on the side of pressure ulcers, you may see:
• near the ears,
• in the area of hip joints,
• on the medial side of the knee joints (the place where the two knees meet) [7].

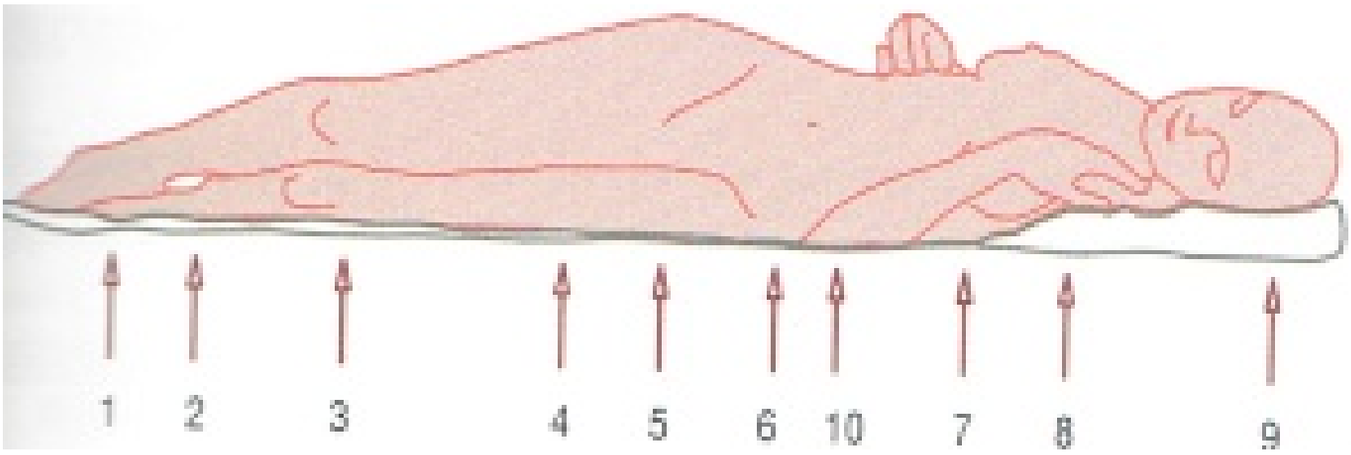


Fig. 2. Placement of pressure ulcers lying on the side (Source: Ibid, p.19.)

Separation of pressure ulcers

The process of creating pressure ulcers can take place in two ways:

- from the outside: superficial "benign" approx. 80%;
- deep tissues: deep "malignant" [9].

Types of pressure ulcers

1. Decubitus at the stage of formation (redness or paleness with slight edema).
2. Decubitus ulcers, surface (a horny layer of the epidermis with an exposed part of the living and accompanying exudate).

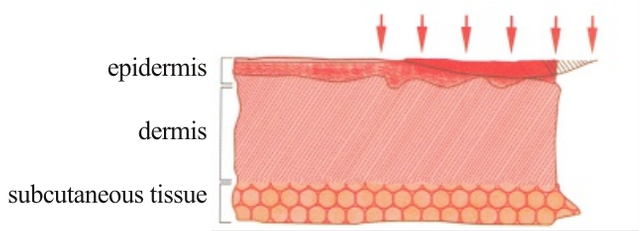


Fig. 3. Epidermal ulcer (Source: Ibid, p.21.)

3. Cutaneous bedsores (necrosis of whole dermis, up to the subcutaneous, fat tissue) from the pale brown to black necrotic focus, in subcutaneous tissue exudative inflammatory reaction.

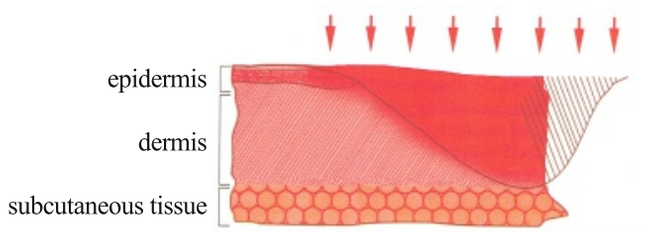


Fig. 4. Skin ulcer (Source: Ibid, p.21.)

4. skin and subcutaneous bedsores (necrosis up to the subcutaneous tissue, also includes the fascia, the exudative reaction turns into purulent exudate).

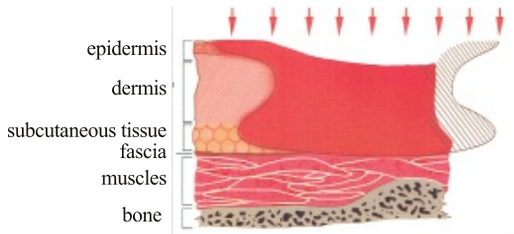


Fig. 5. Skin and subcutaneous syphilis (Source: Ibid, p.22.)

5. Subcutaneous bedsores (slight swelling, slight inflammatory symptom, characteristic increase in body temperature even up to 40°C, originally sterile may be secondary to infection).

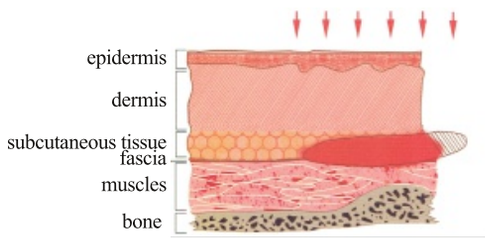


Fig. 6. A subcutaneous squeezer (Source: Ibid, p.22.)

6. Total decubitus ulcers (necrosis of whole dermis, subcutaneous tissue, fascia, muscles and bone tissue, there is penetration of oil into the bone tissue).

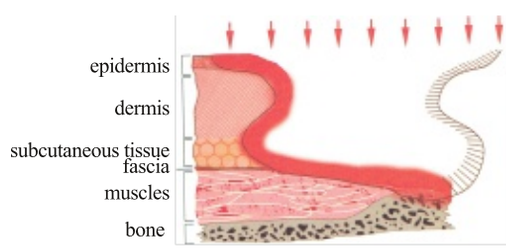


Fig. 7. Total decay (Source: Ibid, p.22.)

7. Old bedsores (there are several years, treated sporadically or not treated at all, may take the form of a cyst).
8. Fistulas (closed or open, they can secrete oil) [3].

Degrees of pressure ulcers

We distinguish the following pressure sores:
Black: covered with dry necrosis, the presence of exudate and colonized bacteria (the most effective method of removing "black" ulcers is removal through surgical excision).
Yellow: covered with fluent necrosis, accumulation of a large amount of exudate (removal by keeping the environment moist, getting wet and removing the separated necrotic tissue).
Red: granulation, repair processes, growth of capillaries (granulation support by keeping the environment moist, protection against injuries).
Pink: epidermal, migration of epidermal cells from the edges of the wound to its center [3].

Fig. 8. A pictorial method of wound evaluation

Procedure in the case of foundry's treatment

In the case of pressure ulcers, wound healing occurs through granulation. This is due to the significant loss of necrotic tissue. The cavity from the bottom is filled with a granulation tissue, onto which the skin begins to overlap with the scar creating a scar. Often, treatment requires so-called the original surgical study, involving the excision of dead tissue and refreshing the edges of the wound [1, 9].

Stimulation of wound healing:

• maintaining a moist wound treatment environment,

• lowering the pH of the wound environment, which inhibits the multiplication of bacteria,

• occlusion, or close wound closure,

• maintaining the temperature at 37°C, which accelerates cell division and regeneration of damaged tissues [7].

Examples of supplies and dressings used for deep wounds with high exudation:

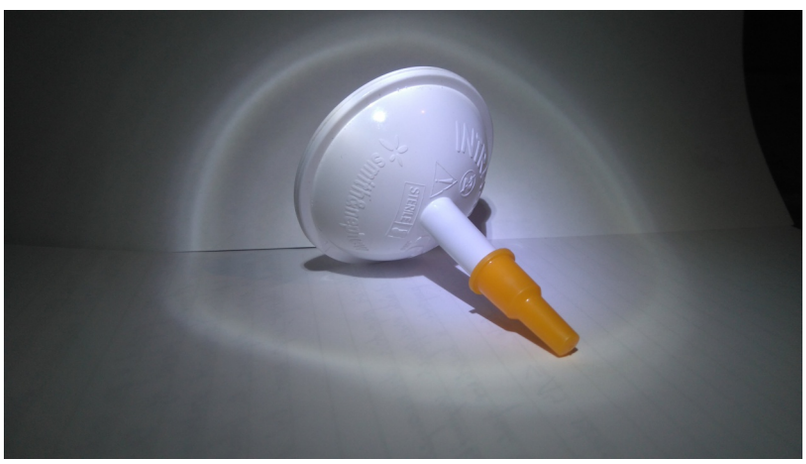


Fig. 9. Hydrogel for painless removal of necrotic tissues. It allows you to leave healthy tissues and skin around the wound intact. It creates a moist wound healing environment, which speeds up the healing process

Fig.10. A dressing made of polyurethane foam. Used for the treatment of large wounds and moderate exudate. Thanks to the permeable coating, it allows the evaporation of excess exudate thus maintaining a properly moist wound environment

Fig. 11. Absorbent gel dressing, ideal for granulation wounds with exudate, such as decubitus ulcers

The phases of wound healing

1. Purification phase (inflammatory)
- black and yellow wounds occur,
- there is an inflammatory reaction and pain (trial the destruction of bacteria by the body and solation of dead tissues).
2. Growth phase (tissue reconstruction)
Granulation – replenishment of tissue defects,
Skinning – covering with a new skin.
3. The ripening phase
- a scar is created,
- the process of acquiring strength is carried out [7].

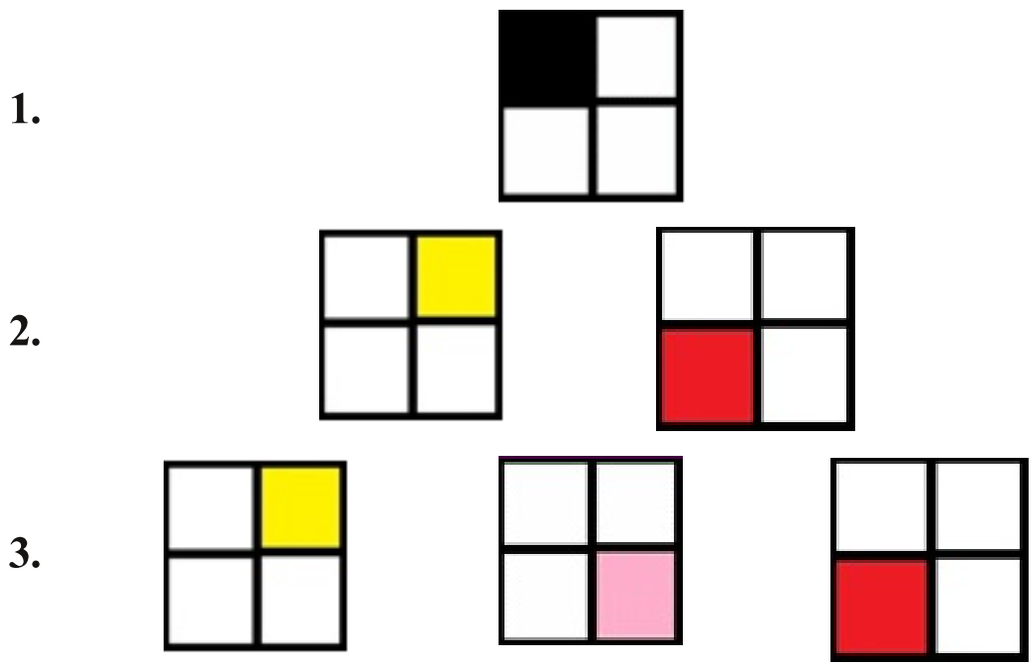


Fig. 12. The phases of wound healing

Anti-dandructive prophylaxis

Prevention is the most perfect way to manage bedsores. Reliable fulfillment of the duties of all medical personnel and support from the family of the respondent avoid or reduce the problem of decubitus ulcers. Thanks to the use of preventive

methods, we can significantly accelerate the treatment process and reduce its costs [10].
It is important to determine the risk of developing pressure ulcers in newly admitted patients (Norton scale) and to control the general condition of the patient. It is also important: anti-bedsoreal prophylaxis, anti-decubitus devices (eliminating the effects of friction, shearing and pressure), using slips or sleepers (anti-friction), anti-bedsore mattresses, systematics of changing the position of the patient in complete immobilization, maintaining the patient's psychological and physical condition, motivation for independent physical activity or changing the position of the patient, observation and hygiene of the skin, the use of appropriate bed linen and personal and absorbent articles [7, 9].

Tab. 1. Norton scale (Source: https://www.opiekunowie.eu/2017/07/poznajemy-skale-oceny-ryzyka-rozwoju.html, on: 15/08/2018)

	Punctation			
Risk factor	4	3	2	1
Physical condition	Good	Pretty good	Hard	Very heavy
State of consciousness	Full consciousness and consciousness	Apathy	Disturbances of consciousness	Coma
Activity (mobility)	He walks alone	It comes with a safeguard	Sit	Lying in bed
Mobility (degree of independence when changing position)	Full	Limited to a limited extent	Very limited	Total disability
The function of the sphincter of the anus and urethra	Full efficiency of sphincter	Occasional wetting	Frequent incontinence	Complete incontinence and stool incontinence

Physiotherapy in case of foundation
The work of a physiotherapist consists primarily of respiratory and circulatory prophylaxis, passive "bedside" physiotherapy, lymphatic drainage.
The aim of the procedure should be to reduce or, if possible, reduce the pressure on the area affected by pressure ulcers, maintain the normal trophism of the skin surrounding the change, conduct therapy in order to avoid granulation damage, increase physical activity during the day, which will speed up the treatment [3].
The physiotherapist's task is to educate the patient and his family in the field of post-operative therapy, position changes, the use of relief of body postures and hygiene of preventive activities. Paying attention to proper nutrition and supplementation of vitamin C, thanks to which it will be possible to prevent relapse and the emergence of new pressure sores. An important element

of treatment is the use of orthopedic equipment in the form of wedges, shafts, supports or anti-bedsore pillows and mattresses. It should be remembered that first and foremost we should act to improve the quality of a patient's life, improve comfort and in no case make it uncomfortable [11].
In the prevention and treatment of pressure ulcers, physiotherapeutic procedures, especially in the field of phototherapy and laser therapy, play an important role.

Characteristics of the polarized light
Polarized light is a non-coherent, polychromatic (wide spectrum of colors) radiation with a wavelength of 480-3400 nm (visible light 480-700 nm, infrared light 700-3400 nm). It seems that what many years ago was just an assumption has actually become a fact based on research. It is known that polarized light not only relieves pain but also affects wound healing. It significantly speeds up the treatment process and stimulates resistant, hard to heal wounds for regeneration [12, 13].
Biostimulatory biosimulator works on the principle of stimulation of receptors, thus improving the blood supply to the skin and increasing the activity of energy cell membranes. [14, 15]. The exact, real mechanisms of the interaction of polarized light at the molecular level are not finally understood. It is assumed that the biological effects are a consequence of changes taking place under the influence of polarized light in the bilayer lipid layer of the cell membrane - polarized light orders the metastable state of the lipid membrane, and this affects intracellular processes, i.e. the arrangement of polar heads of membrane phospholipids is ordered, and because proteins and lipids they remain in close contact, energy is transferred between them, which intensifies the processes taking place in the cell. The cascade of the immune response is released, causing the transport of immune cells (causative cells, lymphocytes) to the site of injury [16, 17].
Through photostimulation, the energy of visible light is absorbed by the mitochondria. This stimulates the process of tissue renewal by activating the chain of molecular changes (increase of energy in the cell) and stimulating the synthesis of nucleic acids. Polarized light allows interaction at the level of the cell membrane through photophysical stimulation of calcium channels. We gain a more efficient blood flow by expanding peripheral vessels in a place subject to photophilicity, thanks to which oxygen delivery and transport of nutrients to the ulcer site are improved - necessary for wound healing [3, 18].
Biological effect of polarized light: increases the negative charge of the electric field of the cell, increases the activity of the cell membrane, stimulates metabolism, accelerates regenerative processes, improves mood, generally strengthens the body. Indications for the treatment of wounds and skin lesions: skin damage, cuts, surgical wounds, diabetic wounds, leg ulcers, decubitus ulcers, difficult to heal wounds, skin diseases: herpes, shingles, acne, alopecia areata [19]. Contraindications: malignant tumors documented histologically, cervical segment in hyperthyroidism, epilepsy, direct irradiation of the retina, i.e. irradiation of eyes with open eyelids, exposure of the abdominal region in pregnant women. In addition, it is not advisable to light up due to illness or taking drugs that cause

hypersensitivity to light and use the adapter too close to people with pacemakers [20].

Characteristics of laser biostimulation

Changes in the functioning of the body as a result of the use of laser biostimulation appear on many levels: subcellular – an increase in the rate of protein synthesis, DNA, RNA, collagen, intensification of oxidation-reduction processes causing a change in the oxygen balance; cellular – change in the electrical potential of the cell, increase in reproductive activity; tissue – development of microcirculation, pH change of intercellular fluid; organ - the return of the normal function of the organ; systemic – an increase in the immunity and adaptability of the body, which is reflected in the lowering of the inclination to disease.

Laser biostimulation improves blood supply and nutrition of tissues, dilates blood vessels, increases collateral circulation and microcirculation, stimulates cell regeneration, blood vessels, regulates blood pressure, stimulates protein synthesis, collagen formation, callus formation, analgesic and anti-inflammatory, accelerates epidermis and granulation, increases the secretion of endomorphins, ATP synthesis, strengthens the immune system, does not increase the temperature of tissues [19, 21]. Indications for the treatment of wounds and skin lesions: difficult to heal wounds, acne, postoperative wounds, skin grafts, decubitus ulcers. Contraindications: pregnancy, menstruation, cardiac pacemaker, bacterial diseases, feverish, hyperactivity of the endocrine glands, epilepsy, neoplasms, decompensated diabetes, mastoid fibromyalgia, sensitization to light, perecardium and eyeball (damage to the cornea and retina), contraindications to IR radiation and UV tissues [19, 21].

Case description

Case 1: man, age 76, order Silesian Province. On 15/06/2015, the patient underwent resection of the aneurysm with preliminary mitral valve implantation CABG-FAC. For 1.5 months, the patient was in a pharmacological coma. A pressure ulcer was found around the sacrum bone. On 20/07/2015, the patient was awakened from a coma and a bacterial infection was found within the pressure ulcer. At the turn of August and September 2015, the patient was hospitalized for four weeks in the Specialist Hospital of the Ministry of Interior and Administration in Głuchołazy, in the department of cardiac rehabilitation, in order to overcome the effects of long immobilization and improve the efficiency and fitness of the body. Individual rehabilitation at the patient's bed was conducted. During the stay, a surgical debridement of the wound from necrotic tissue was performed. Then the patient was treated with polarized light using the BIO-V2 tripod lamp. During the period of less than four weeks, an 8-minute session of illumination of the area and interior of the wound was performed twice a day (7 days a week).

After one week of using the lamp, the bacterial infection was eradicated, which was confirmed by the result of a wound swab examination. On the day of initiation of therapy with polarized light, ie on August 26, 2015, the wound had dimensions of 5.5 cm / 6.5 cm and a depth of about 3.5 cm. After the first week of therapy, i.e. on 03.09.2015, the wound decreased to

a size of 4 cm / 5.5 and shallow to about 2 cm. However, after 26 days the size decreased to 2 cm / 3 cm and a depth of 1.5 cm. Thanks to the photographic documentation (Fig.13), significant changes can be observed within the area around the wound, its interior and the decreasing size of pressure ulcer. Unfortunately, the patient's therapy was not completed, because the process of patient's hospital rehabilitation was completed, which prevented her from continuing. Nevertheless, after 26 days, satisfactory effects of therapy were observed, ie decreasing the size of pressure ulcer, reducing pain, improving the patient's general condition and quality of life.

A satisfactory result of treatment of a pressure ulcer using polarized light in the described patient confirms the effects known to date described in the literature. They prove that polarized light significantly improves the healing process and improves the quality of life of a patient with an I, II and III degree, or even grade IV ulcer. In other scientific studies it has been shown that polarized light also has - besides infrared and ultraviolet – high biological activity, which most probably results from electromagnetic interactions occurring under the influence of polarized light in cells of living organisms [12, 16].

Fig. 13. Appearance and size of pressure ulcer in the described case after the application of polarized light therapy: a) on the first day, b) after 6 days, c) after 21 days, d) after 26 days

Case 2: woman, aged 48,. Opole province. Patient with a multiple-leg fracture of the right lower leg with tearing of the tibio-sagittal tibio-tibial ligament and subluxation of the foot. On 04/12/2017, the fracture adjustment with internal stabilization was performed - Kirschner screw and wire assembly, stitching of the ligaments and joint capsule. A gypsum shoe was put on for 6 weeks. Two days after the operation, a window was removed for a change of dressing, which was performed every 3 days. The patient was improved by the physiotherapist and went with the help of 2 elbow crutches without straining the limb. After 4 days, she was discharged home. On 18.12.1017, the seams were removed. Ten days before the plaster was removed, i.e. a month after the surgery (about 04.01.2018), necrosis was noted. On 26/02/2018, material for examination from purulent wound was sent (Fig.14). After 24-hour incubation no bacterial growth was observed under aerobic conditions. On 19/03/2018, the patient applied for physiotherapeutic procedures in the outpatient department of the Department of Medical Improvement of the Specialist Hospital of the Ministry of Interior and Administration in Głuchołazy in order to activate the ankle joint.

Fig. 14. Wound 2.5 months after surgery

In the first stage of therapy, ie from 19/03/2018 to 16/04/2018, only treatments using light polarized with a Bioptron lamp, once a day and laser biostimulation, once a day were performed. The bilateral wound decreased accordingly: length from 4 cm to 2.5 cm; width from 1.5 cm to about 0.6 cm. There was also a significant shallowing of the wound and acceleration of healing. The second stage of therapy, i.e. individual exercises, was introduced after "healing" the wounds from 16/04/2018, which were performed until August 2018 (Fig. 15).

Fig. 15. Appearance and size of a difficult to heal postoperative wound in the described case after the application of polarized light therapy and laser biostimulation: a, b) on the first day, c, d) after 15 days, e,f) after 1,5 month

In both the case of the patient with pressure ulcer (case 1) and the patient with post-operative pressure sore (case 2), physiotherapy was significantly impaired. In the case of a patient with a decubitus ulcer, there were difficulties with the implementation of cardiac rehabilitation, because the problem was the mere change in bedding or using the toilet. Therefore, in the first two weeks, the improvement exercises were kept to a minimum. In the case of a patient with a post-operative wound, individual exercises increasing the range of ankle joint

mobility were introduced only after 4 weeks from applying for physiotherapy. Unfortunately, non-healing wounds very often limit the conduct of the therapeutic process and constitute a significant therapeutic problem. As a consequence, they significantly slow down to full fitness and reduce the quality of life of the patient.
Therefore, it seems that in such situations prevention and prevention of pressure ulcers is extremely important first of all. It's all about caring for the patient by rubbing places susceptible to pressure sores, chatting, massage, frequent position changes, or using special relieving pads. And if the ulcer is formed, before starting the planned physiotherapy, or a rehabilitation stay in stationary conditions, first of all it should be dealt with a full recovery of pressure ulcer, and then think about planning physiotherapy for a specific dysfunction or disease. This sequence of proceedings will be both more economical and more effective.

Conclusions

1. Decubitus ulcers are a significant problem hindering and often preventing physiotherapy.
2. Polarized light and laser biostimulation are treatments that work well in the treatment of pressure ulcers and difficult to heal wounds.
3. Due to their small size and ease of use, they are suitable for both clinical and sanatorium treatment as well as in the patient's home.
4. To avoid problems caused by pressure sores or wounds, related with delay in the introduction of basic physiotherapy, prevention and prevention are essential.

Adres do korespondencji / Corresponding author

Mariusz Migała

e-mail: mariuszmigala@o2.pl

Piśmiennictwo/ References

1. Rożniatowski T.: Mała encyklopedia medycyny, t. II, Warszawa 1990.
2. Sopata M.: Profilaktyka i sposoby leczenia odleżyn przy zastosowaniu „kolorowego" systemu klasyfikacji, „Nowa Medycyna. Ból i opieka paliatywna II" 2000, nr 1, http://www.czytelniamedyczna.pl/1311,profilaktyka-i-sposoby-leczenia-odlezyn-przy-zastosowaniu-kolorowego-systemu-kla.html (na dzień 16.08.2018).
3. Rosińczuk- Tonderys J., Uchmanowicz I., Arendarczyk M.: Profilaktyka i leczenie odleżyn, Wrocław 2005.
4. Jeske W.: Zasady pielęgnacji chorych ortopedycznych, [w:] Ortopedia i rehabilitacja pod red. W. Degi, Warszawa 1968, s. 171-184.
5. Szewczyk M.T., Cwajda J., Cierzniakowska K., Jawień A.: Wybrane aspekty leczenia ran przewlekłych, „Przew Lek" 2005, 5, 54-60.
6. Gottrup F., Apelqvist J., Price P.: Wyniki kontrolowanych i porównawczych badań nad ranami niegojącymi się: zalecenia służące podniesieniu jakości danych w opiece i leczeniu ran, „Leczenie Ran" 2010, 7, 1-2,s.13-44.
7. Barańska M., Grączewska K., Hain-Listewnik J., Janowicz A., Kaliszewska K., Łukawska B., Orłowska M., Smułek K., Składanowska D., Szymkiewicz H., Krakowiek P.: Damy radę. Jak opiekować się osobą przewlekle chorą, Fundacja razem zmieniamy świat, Toruń 2014.
8. Szwałkiewicz E.: Odleżyny. Zapobieganie i leczenia, Naczelna Rada Pielęgniarek i Położnych 1996.
9. Strugała M., Krysiak I.: Potrzeba ruchu i wypoczynku, [w:] Talarska D., Wieczorowska-Tobis K., Szwałkiewicz E. (red.): Opieka nad osobami przewlekle chorymi, w wieku podeszłym i niesamodzielnymi. Podręcznik dla opiekunów medycznych, Warszawa 2014, s.211-219.
10. Garber S. L., Blair S.L., Krouskop T.: Odleżyny, [w:] Garrison S. J. (red.): Podstawy rehabilitacji i medycyny fizykalnej, Warszawa 1997, s.296-317.
11. Sopata M.: Aktualne metody leczenia odleżyn, „Inforanek" 2009, nr 1(4), s.7-11.
12. Kuźdżał A., Walaszek R.: Zastosowanie widzialnego polichromatycznego światła spolaryzowanego (VIP Light) w rehabilitacji. Część I.: Charakterystyka właściwości fizycznych światła VIP oraz mechanizm oddziaływania biofizycznego, „Fizjoterapia" 2001, t. 9, nr 4, s.48-53.
13. Kuźdżał A., Walaszek R.: Zastosowanie widzialnego polichromatycznego światła spolaryzowanego (VIP Light) w rehabilitacji. Część II: Mechanizm biologicznego oddziaływania polichromatycznego światła spolaryzowanego liniowo VIP, „Fizjoterapia" 2002, t. 10, nr 3-4, s.65-71.
14. Instrukcja obsługi polaryzatora biostymulacyjnego do profesjonalnej fototerapii światłem spolaryzowanym BIO V, Pacov 2007.
15. Pasek J., Pasek T., Sieroń A.: Leczenie światłem spolaryzowanym- nowe metody światłolecznictwa? „Balneologia Polska" 2008, nr 50, s.93-98.
16. Janosik E.: Światło spolaryzowane i jego zastosowanie w medycynie, „Prace Instytutu Elektrotechniki" 2006, z.228, s.317-326.
17. Kuźdżał A., Walaszek R.: Zastosowanie widzialnego polichromatycznego światła spolaryzowanego (VIP Light) w rehabilitacji. Część IV.: Przydatność światła VIP w leczeniu trudno gojących się ran, „Fizjoterapia" 2004, t. 12, nr 2, s.55-63.
18. Pasek J., Pasek T., Sieroń A.: Światło spolaryzowane w poradni rehabilitacyjnej, „Rehabilitacja w praktyce" 2008, 3, s.22-24.
19. Szczegielniak J., Migała M.: Światłolecznictwo, [w:] Fizykoterapia w praktyce. Skrypt dla studentów kierunku fizjoterapia, Opole 2005, s.37-38.
20. Sieroń A., Żydowicz G.: Światło spolaryzowane w fizjoterapii, [w:] Śliwiński Z., Sieroń A. (red.), Wielka fizjoterapia, t. 1, Wrocław 2014, s.264-267.
21. Bauer A., Wiecheć M.: Przewodnik metodyczny po wybranych zabiegach fizykalnych, Wrocław 2005.