

Aesthetic resources applied to burns: literature review.

Recursos estéticos aplicados ao tratamento das queimaduras: revisão de literatura.

Érica Pierini⁽¹⁾, Flávia Fernanda de Oliveira Assunção⁽²⁾.

Centro Universitário de Araraquara (UNIARA), Araraquara (SP), Brazil.

Abstract

Introduction: Burns are injuries to the tissue lining of the body, caused by thermal, chemical, electrical or radioactive agents, which may totally or partially destroying the skin and its annexes, and to reach deeper layers as muscles, tendons and bones. The local response to cellular injury include the release of vasoactive agents (histamine, serotonin, bradykinin, prostaglandins, leukotrienes, platelet activating factors) and an immediate increase in osmolality of the interstitial being classified into first, second, third and fourth grade (electrical burn) which involves the complete destruction of all tissues, the specific injury takes varying proportions, depending on the exposure time and the type of the causative agent, the extent and depth of the damaged area. **Objective:** To investigate and gather through literature Bibliographic aesthetic features that help in the prevention and improvement of sequelae caused by burn injuries. **Method:** This is a search for bibliographic and descriptive review, consisting of scientific articles and books on the subject aesthetic resources for "burn injuries". The realization of this research was carried out by consulting the papers, looking for topics as "burn" and "aesthetic resources for burn injuries". To survey the material searches were conducted through the portals: SCIELO; UNIFIA; HSVP; FACISA; ASSETS and PORTALBIOCURSOS and with cross between the words: Burns, injuries and aesthetic resources. **Results:** eight articles and fifteen books including twenty-three references in this research, published between 1967-2010 found. Ultrasound, manual therapies, Electro resources (Microcurrent, Transcutaneous electrical nerve termination, excitomotor current) and laser therapy: Among the four studies aesthetic features which have good results when applied to burn injuries, they being found. **Conclusions:** The findings contribute to the understanding and application of aesthetic resources in burn injuries, in order to improve the quality of scars, skin suppleness, increasing self-esteem and quality of life.

Keywords: Burns, Scars and Aesthetic Equipment.

Resumo

Introdução: As queimaduras são lesões no tecido do revestimento do corpo, causada por agentes térmicos, químicos, radioativos ou elétricos, podendo destruir total ou parcialmente a pele e seus anexos, e até atingir camadas mais profundas como os músculos, tendões e ossos. A resposta local a lesão celular inclui a liberação de agentes vasoativos (histamina, serotonina, bradicinina, prostaglandinas, leucotrienos, fatores ativadores de plaquetas) e um aumento imediato da osmolaridade intersticial, sendo classificadas em primeiro, segundo, terceiro e quarto grau (queimadura elétrica) que envolve a completa destruição de todos os tecidos, a injúria determinada assume variadas proporções, dependendo do tempo de exposição e do tipo do agente causal, da extensão e profundidade da área lesada. **Objetivo:** Pesquisar e reunir por meio de literatura bibliográfica recursos estéticos que ajudam na prevenção e melhora de sequelas causadas por lesões de queimadura. **Método:** Trata-se de uma pesquisa de revisão bibliográfica e descritiva, constituída de artigos científicos e livros acerca do tema "recursos estéticos para lesões por queimaduras". A realização dessa pesquisa foi feita por meio de consulta a artigos científicos, procurando temas como "queimadura" e "recursos estéticos para lesões por queimadura". Para levantamento do material foram realizadas buscas pelos portais SCIELO; UNIFIA; HSVP; FACISA; ASSETS e PORTALBIOCURSOS, com cruzamento entre as palavras: Queimaduras, Lesões e Recursos estéticos. **Resultados:** Foram encontrados quinze livros e oito artigos incluindo vinte e três referências nesta pesquisa, publicados entre 1967 a 2010. Dentre os estudos foram encontrados quatro recursos estéticos que apresentam bons resultados quando aplicados a lesões por queimadura, sendo eles: Ultrassom, terapias manuais, recursos eletroestimuladores (microcorrentes, Estimulação elétrica nervosa transcutânea e correntes excitomotoras) e laser terapêutico. **Conclusão:** Os achados contribuem para ampliar o conhecimento e aplicação de recursos estéticos em lesões por queimadura, a fim de melhorar a qualidade das cicatrizes, maleabilidade da pele, aumento assim a auto-estima e a qualidade de vida.

Palavras-chave: Queimaduras, Cicatriz e Aparelhos para estética.

Received: 27 November 2013. Accepted: 12 March 2014. Published: 30 March 2014.

1. Post Graduate in body and facial aesthetics, Centro Universitário de Araraquara (UNIARA), Araraquara (SP), Brazil.

2. Invited professor of post Graduate in body and facial aesthetics. Centro Universitário de Araraquara (UNIARA), Araraquara (SP), Brazil.

Corresponding Author:

Érica Pierini - Address: Rua Pedro Bim, 33 - Bebedouro (SP), Brazil. Zip Code: 14706-106 - Phone: (17) 3342-5798 - e-mail: erica_pierini@hotmail.com

INTRODUCTION

Burns are injuries to the tissue lining of the body, caused by thermal, chemical, electrical or radioactive agents, which may totally or partially destroying the skin and its annexes, and to reach deeper layers as muscles, tendons and bones.⁽¹⁾ The burn compromises the functional integrity of the skin responsible for electrolyte homeostasis, internal temperature control, flexibility and lubrication of body surface.⁽²⁾ The local response to cellular injury include the release of vasoactive agents (histamine, serotonin, bradykinin, prostaglandins, leukotrienes, platelet activating factors) and an immediate increase in interstitial osmolarity.⁽³⁾ The thermal injury causes a local response in the body translated as coagulation necrosis of tissue and progressive thrombosis of adjacent vessels within 12-48 hours. Firstly the burn wound is sterile, but quickly becomes a necrotic tissue colonized by endogenous and exogenous bacteria proteases producing, which lead to liquefaction and separation of eschar, giving rise to granulation tissue responsible for the healing of the wound that is characterized for high capacity retraction and fibrosis in third degree burns.⁽²⁾

The classification as to the depth of the burn is observed in degrees (I, II, III, IV). The first burns degrees are limited to the epidermis, are superficial and do not present clinical or hemodynamic changes. The second-degree reach the epidermis and part of dermis presenting bubbles or flictemas. The third degree are considered serious because they affect the epidermis, dermis, may in many cases damage the subcutaneous tissue, muscle and bone tissue. A fourth degree burn is the electrical burn, which involves complete destruction of all tissues. The prognosis in this case is uncertain, an extensive surgical excision or even amputation is required.⁽⁴⁾

When making an assessment of the causes of burns, it is observed that, in most cases, the lack of care is the main element responsible.⁽⁵⁾ Exposure to hot substances or heat source is the most cases of burns, followed by exposure to smoke, fire and flames, and the electric current comes as a minor cause,⁽⁶⁾ most accidents happen in the home environment.⁽⁷⁾ In relation to body regions affected by burns, trunk and upper limbs are the most common followed by burns of multiple regions of the hip and lower limb, head and neck, eye and internal organ and effect of smoke in the lungs.⁽⁶⁾

Severe nonfatal burn caused by heat, electricity, chemicals and radiant agents is considered the most serious injury that the human body can suffer.⁽⁸⁾ The pain will begin when the direct excitation of nerve endings in the skin by heat due to destruction of superficial layers of the skin and thus exposure of sensory nerve endings.⁽⁹⁾ A burn injury is not just a medical emergency, but it triggers serious physical, psychological and financial

problems for the patient, their family and society. The effects of major burns can be considered as irreparable in all areas of life of the patient.⁽¹⁰⁾ In addition to causing death, causes disfiguring burn scars and dysfunctional, psychological trauma and significant loss of productivity in the economic area.⁽¹¹⁾ May also cause feelings of depression, denial, fear, anxiety and impaired autonomy and body image.⁽¹²⁾ It appears that the sequelae of burn affect in any way the continuity of the work done by prior victims affected by the damage, not preventing them to return to work, however, many need to undertake activities requiring different skills from those mobilized by its former function. Among those who do not return to work, the burn is identified as a cause of incapacity for work, or by required special care, or a reduction or loss of functional capacity.⁽¹²⁾

In this research literature review four aesthetic resources were found, with findings that demonstrate when applied to the sequelae of burn, great contribution, as can good results.

The ultrasound accelerates the inflammatory response releasing histamine and growth factors by macrophages granulation, mast cells and platelets, and increases the synthesis of collagen and fibroblasts.⁽¹³⁾ Manual therapy that aims to improve the appearance of the scar plan and release adhesions, making it more elastic and smooth.⁽¹⁴⁾ Laser therapy that has efficient anti-inflammatory and analgesic action, helping in the tissue repair process.⁽¹⁵⁾ And the microcurrent that is effective for wound healing and may therefore be used for the regeneration of injured tissue.⁽¹⁴⁾

The objectives of this study are to search and to gather through literature bibliographic aesthetic features that help in the prevention and improvement of sequelae caused by burn injuries.

METHODS

It is a search for bibliographic and descriptive review, consisting of scientific articles and books on the subject "aesthetic resources for burn injuries." The achievement of this research was through consultation to scientific articles and books, looking for themes like burn and aesthetic resources for burn injuries, using the cross between the words: burns, aesthetic resources and burn injuries.

To survey the material were conducted searches through the portals SCIELO; UNIFIA; HSVP; FACISA; ASSETS and PORTALBIOCURSOS. After gather the material, reading and selection of book chapters and scientific articles that contributed to the research, in order to meet the inclusion criteria was performed. Studies published in Portuguese, who underwent intervention for burn treatment for aesthetic appeal (electric or manual) in humans. Were included all articles and books that contributed to the understanding of the formation of a

burn injury and what the best treatments for their improvement.

RESULTS

Six books and three articles were found. After reading the titles and abstracts of articles as well as book chapters, nine references were included in this research, being approached more than one resource by book. Among the studies the following aesthetic resources were found in burn injuries: Ultras-sound with five related studies, manual therapies with three studies, electro resources with three studies and therapeutic laser three studies were found.

There is a consensus that ultrasound can accelerate the inflammatory response, leading between the effects produced by this process, the release of histamine, growth of granulation by macrophages, mast cells and platelet factors, besides increasing the synthesis of fibroblasts and collagen.^(13,14,16)

Ultrasound can also accelerate the inflammatory response by synthesis of fibroblasts and collagen used in dosages of 1 to 2 W / cm² (14) and directly on the scar, being applied in six to eight minutes. This process may facilitate increases in range of motion and may reduce the pain associated with scarring.⁽¹⁶⁾ This device also has the function of phonophoresis,⁽¹⁷⁾ phonophoresis is a term that describes the ability of ultrasound to enhance the penetration of pharmacologically active agents through the skin, in the case of an alternative transport substances with active ingredients through the skin.⁽¹³⁾ When associated with hyaluronidase, an enzyme capable of modifying the connective tissue through the hydrolysis of hyaluronic acid and disseminate exudate transudates to make it less viscous tissue,⁽¹⁸⁾ is proved effective in the treatment of keloids, as noted improvement in pressure sensitivity up to 10.0 g and fine sensitivity to 2.0 g, decreased length and width as well as the alleviation of itching.⁽¹⁹⁾ Among other effects of ultrasound can highlight neovascularization with consequent increased movement, rearrangement and increased extensibility of collagen fibers and improves the mechanical properties of tissue.⁽¹³⁾

Manual therapy plays a key role in the rehabilitation of burn patients, in order to improve the appearance of the scar adhesions and release plan, making it more elastic and smooth.⁽¹⁴⁾ The classic massage improves circulation and facilitates the penetration of lubricating agents, lymphatic drainage and reduces swelling lymphedema, the deep transverse massage breaks up adhesions, allowing an increase in tissue pliability and reflex massage releases adhesions, increases circulation and has analgesia effect.⁽¹³⁾ When massage is used along with exercise, the immature scar can be stretched more easily and contracture can be corrected. Although no study has validated its use in patients with burn injuries, in a long-term

manageability and texture of the skin seem to improve with the use of massage. Scars firmly massaged routinely tend to soften. The edges or seams of the grafts or any area that is highly rigid and can benefit from massage. Scars are to be massaged slowly and firmly, for 5 to 10 minutes, 3 to 6 times per day.⁽²⁰⁾

The therapeutic laser has effective anti-inflammatory and analgesic properties and helps in tissue repair, reduces the inflammatory infiltrate and increased vascularization and fibroblast proliferation.⁽¹⁵⁾ The therapeutic light is a very small portion of the spectrum comprising wavelengths from visible to near infrared (330-1100 nm), lower power 500 mw and smaller dosages 35j/cm.⁽²¹⁾ The lasers used by health professionals are of helium Neon (He-Ne), Gallium Arsenide (GaAs), gallium-aluminum-indium-phosphate (AlGaInP) and Gallium arsenide-aluminum-(GaAlAs), known as therapeutic lasers, low-intensity lasers or low power.⁽¹³⁾ Positive effects have been reported on the application of infrared light on wounds, such as infiltrate inflammatory decreased, increased vascularization and fibroblast proliferation.⁽⁵⁾ The confirmation of the positive effects of irradiation with therapeutic laser, it was observed that burn in experimental group treated by sweep method were healed at day 14, whereas an experimental group treated by point method and a control group not were healed.⁽²¹⁾

Features found on electrical stimulation were: Microcurrent, transcutaneous electrical nerve stimulation (TENS) and excitomotor currents. The microcurrent proved extremely effective in wound healing can therefore be used for tissue regeneration of wounds by first degree burns.⁽¹⁴⁾ Excitomotor currents produce therapeutic effects, electrical stimulation enables an increase in muscle activity that results in increased strength in individuals and are important for recovery hipotrofiados muscles from disuse.⁽¹³⁾ TENS is useful for the treatment of various pain problems, particularly those involving the shoulder due to prolonged or faulty positioning.⁽²²⁾ About transcutaneous electrical stimulation, we propose the application of TENS for 20 to 30 minutes, with the order to lessen the pain and tension of patients with changes dressings programming.⁽¹³⁾

DISCUSSION

There is a consensus that ultrasound can accelerate the inflammatory response of a burn injury.^(13,14,16) Studies show its ability to increase the synthesis of fibroblasts, perform a realignment of collagen fibers, perform neovascularization, and improve the mechanical properties of the tissue, but there is only one study suggests the possibility of "softening" of the scar tissue by means of ultrasound,⁽¹³⁾ all through most of the studies found during the preparation of this article claimed that this feature can even participate in the mobilization of adherent scars.^(14,16,19) The intensity used in ultrasound

is mentioned by authors who claim that should be used at a dosage of 1 to 2 W / cm² in continuous mode.^(14,16) In another aspect, the ultrasound is applied directly to the scar for six to eight minutes may facilitate increases in range of motion and may reduce the pain associated with scarring.⁽¹⁴⁾ Another study of ultrasound stresses associated phonophoresis effect of hyaluronidase as a good resource to use for burn injuries.⁽¹⁹⁾ Through a survey conducted in the laboratory of physical therapy at the Universidade de Passo Fundo proved the effectiveness of this remedy. Was used apparatus ultrasound model Avatar III, KLD ® brand with 3MHz frequency, intensity 0.8 W / cm² and continuous emission. As the coupling agent was then employed a gel with hyaluronidase 10,000 UTR (Reducing Turbidity Units), 1 minute being calculated effective radiation area, totaling 15 minutes of application. The study was performed on a female subject, white, 13 years old, holder of unsightly scars caused by third degree burns caused by thermal agent subscapularis, located in the anterior chest and left lesions was were eight years, there has been grafted.⁽¹⁹⁾ After 10 sessions were observed improvement in the sensitivity of pressure to 10.0 g and fine sensitivity of up to 2.0 g, decreased length and width as well as the alleviation of itching reported by the patient.⁽¹⁹⁾ Effectiveness is proven in ultrasound resource for unsightly scars treatments, however, it is remarkable dearth of good studies that clarify through concrete research clear-cut scientific data on the sample, the cause of their injuries, the treatment time, intensity, and frequency, as well as mention of the report of calibration equipment.

The role of manual therapy in burn injuries is unanimous answer, which is able to release adhesions, enhance the flexibility of the fabric, making it more elastic and smooth.^(13,14,20) The massage modalities used are: Classical massage, lymphatic drainage, transverse massage and reflex massage. The classic massage improves circulation and facilitates the penetration of lubricating agents, lymphatic drainage and reduces swelling lymphedema, deep transverse massage and reflex in turn aims to release adhesions.⁽¹³⁾

Massage can be used in scarred regions, grafted or even donor regions, observed since the type of scar.⁽¹⁴⁾ Scars should be slowly and firmly massaged, for 5 to 10 minutes, 3 to 6 times per day.⁽²⁰⁾ should be avoided maneuvers conventional massage or drainage sliding movement during at least 20 days.⁽¹³⁾

The therapeutic laser used for aesthetic purposes represents a small portion of the spectrum comprising wavelengths from visible to near infrared (330-1100 nm), power lower than 500 Mw and dosages smaller than 35 J/cm².⁽²¹⁾ The lasers used by health professionals are the Helium Neon (He-Ne), Gallium Arsenide (GaAs), gallium-aluminum-indium-phosphate (AlGaInP) and Gallium Arsenide-Aluminum-(GaAlAs), known as therapeutic

lasers⁽¹³⁾ can be widely used when the burn injury has been open since bioestimula regeneration of the area through the tissue repair.⁽¹³⁾ Tem excelente ação anti-inflamatória e analgésica, ajudando no processo de reparação tecidual.⁽¹⁵⁾ Research reports positive effects of infrared light on wounds application, such as decreased inflammatory infiltrate, increased vascularization and fibroblast proliferation.⁽⁵⁾ The positive effects of irradiation with the therapeutic laser, was observed in burns in a experimental group treated by the scan method, the lesions were healed at 14 days, while the experimental group treated by the method and the point in the control group were unhealed.⁽²¹⁾ It is noticeable that therapeutic laser is little used in order to treat burn injuries, this is due to few studies and surveys in burnt, which is a mistake since this is one of the few aesthetic features that can be still used to open the lesion, by the ability of tissue regeneration.⁽¹³⁾

Resource utilization of electrical stimulation is also effective in the treatment of burn injuries, one study reports that the use of microcurrent proved extremely effective for healing wounds and can therefore be used for tissue regeneration of wounds caused by burns first degree.⁽¹⁴⁾ Excitomotor currents, produces therapeutic effects, is widely used in the recovery of lost or impaired motor function, enabling an increase in muscle activity, and are important for recovery hipotrofiados muscles from disuse.⁽¹³⁾ TENS is applied as a treatment for pain problems, particularly those involving the shoulder due to prolonged or faulty positioning⁽²²⁾ so it is proposed the application of TENS for 20 to 30 minutes.⁽¹³⁾ In a survey conducted in Ribeirão Preto, state of São Paulo, during the year 2008, were collected data from two studies of the Research Group on Rehabilitation and Quality of Life (GIRQ), the School of Nursing of Ribeirão Preto, Universidade de São Paulo (EERP-USP). Among 19 subjects, 10 reported feeling uncomfortable regarding the scar either by the prying eyes of others, whether by own brand appearance, almost all participants stressed their efforts to hide the scars either by closed or isolating clothes. The respondents were suffering before the reaction circle of friends and revealed the strong concussion suffered bodily self-image.⁽⁸⁾

The human body is subject to aesthetic demands. In contemporary Western societies the body beauty is associated with perfection: Symmetry, youth, slenderness, among other attributes, making a sign of inequality all that alienates this stereotype individuals established⁽²³⁾ This underscores the importance of research in the area of resources manual and electric to improve the appearance of burn injuries.

There is scarce number of studies that correlate aesthetic features for use on burns as ultrasound associated with manual therapy, since the two complement, and ultrasound to increase the ability of fibroblast syn-

thesis, perform a realignment of collagen fibers and performing neovascularization, manual therapy has moreover releasing adhesions and improving the suppleness of the fabric.

CONCLUSION

In this study, a literature review, it was found that there are few resources for application to the treatment

of sequelae of burns, and little is explored about its actual effects on the skin, in national publications. The need to search for such features and to expand the ability to perform better professional in search of better results in both in the prevention and in treatment of sequelae of burns. We also stress the need for studies on larger samples, randomization and laboratory testing for explanation of the results.

REFERENCES

1. Serra MC, Maciel E. Tratado de Queimaduras. São Paulo: Atheneu, 2004.
2. Vale ECS. Primeiro atendimento em queimaduras: a abordagem do dermatologista. Rio de Janeiro, 2005.
3. Osborne E, Kottke FJ. Tratado de medicina física e reabilitação de krusen. 4º. Ed. São Paulo, Manole, 1994.
4. Guirro E, Guirro R. Fisioterapia Dermato-Funcional. 3.ed. São Paulo: Manole, 2002.
5. Rocha M, Rocha E, Souza J. Fisioterapia em queimados: Uma pesquisa bibliográfica acerca dos principais recursos fisioterapêuticos e seus benefícios. Revista Tema. 2009/2010;9(13/14).
6. Martins CBG, Andrade SM. Queimaduras em crianças e adolescentes: análise da morbidade hospitalar e mortalidade. Acta Paul Enferm. 2007;20(4):464-9.
7. Serra MCVF. Tratamento com queimaduras - um guia prático. Rio de Janeiro. Revinter, 1999.
8. Herson MR, Neto NT, Paggiaro AO, Carvalho VF, Machado CCL, Ueda T, et al. Estudo epidemiológico das sequelas de queimaduras: 12 anos de experiência da Unidade de Queimaduras da Divisão de CirurgiaPlástica do Hospital das Clínicas da Faculdade de Medicina da USP. Rev Bras Queimaduras. 2009;8(3):82-86.
9. Russo AC. Tratamento das queimaduras. São Paulo: Savier, 1967.
10. Soltani K, Zand R, Mirghasemi A. Epidemiology and mortality of Burns in Tehran. Burns. 1998;24(4):325-8.
11. Rogge FJ, Cambier B. Safe and effective treatment of problem scars with the purely thermal non-ablative Er:YAG laser scar mode. J Cosmet Laser Ther. 2008;10(3):143-7.
12. Costa MCS, Rossi LA, Dantas RAS, Trigueros LF. Imagem corporal e satisfação no trabalho entre adultos em reabilitação de queimaduras. Cogitare Enferm. 2010;15(2):209-216.
13. Guirro ECO, Guirro RRJ. Fisioterapia Dermato Funcional: Fundamentos, Recursos e Patologias. Barueri, SP: Manole, 2007.
14. Borges FS. Dermato-Funcional: modalidades terapêuticas nas disfunções estéticas. São Paulo: Phorte, 2006.
15. Pinto NC, Pereira MHC, Stolf NAG, Chavantes MC. Laser de baixa intensidade em deiscência aguda de safenectomia: proposta terapêutica. Rev Bras Cir Cardiovasc. 2009;24(1):88-91.
16. Júnior EM, Serra MCVF. Tratado de Queimaduras. São Paulo: Atheneu, 2006.
17. Mardegan MFB, Guirro RRJ. Agentes de Acoplamento de Ultra-som Terapêutico e Fonoforese. Fisioterapia Brasil. 2005;6(3):211-216.
18. Dicionário de Especialidades Farmacêuticas. 26ª ed. São Paulo: Editora de Publicações Científicas LTDA. 1997/1998.
19. Mesquita E, Vicenzi C, Lorenzini S. Ação da Fonoforese Associada à Enzima Hialuronidase no Tratamento de Cicatrizes Inestéticas Tardias Provocadas por Queimaduras de Terceiro Grau. Revista Médica. 2005;17(37):82-86.
20. O'Sullivan SB, Schimitz TJ. Fisioterapia: avaliação e tratamento. 4ed. São Paulo: Manole, 2004.
21. Andrade AG, Lima CF, Albuquerque AKB. Efeitos do laser terapêutico no processo de cicatrização das queimaduras: uma revisão bibliográfica. Rev Bras Queimaduras. 2010;9(1):21-30.
22. Delisa JA. Tratado de medicina de reabilitação. Princípios e Práticas. 3. ed. São Paulo: Manole, 2002.
23. LeBreton D. Adeus ao corpo: antropologia e sociedade. Campinas: Papirus; 2003.