

TECHNOLOGICAL INNOVATION

Development and validation of a nursing clinical protocol for dermatitis associated with incontinence in pediatrics*

HIGHLIGHTS

1. Dermatitis associated with incontinence: common injury in pediatrics.
2. Low-intensity laser therapy: adjuvant in wound treatment.
3. Clinical protocol: evidence-based to guide the nurse's actions.
4. Laser therapy is effective in the treatment of IAD in pediatrics.

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ABSTRACT

Objective: To develop and validate the content of a nursing clinical protocol for the treatment of children with dermatitis associated with incontinence using low-intensity laser therapy as an adjuvant. **Method:** Methodological study conducted between 2022 and 2024, through the stages of literature review, construction, and validation of the clinical protocol. This protocol was structured into 10 topics based on the recommendations of the methodological guidelines for the development of clinical protocols from the Ministry of Health, evaluated by specialist nurses considering the themes of clarity, coherence, relevance, and completeness. **Results:** The contents were structured around the use of disposable diapers with frequent changes, the use of appropriate products for hygiene, and the application of products for skin protection, as recommended by the literature, in addition to the use of Low-Intensity Laser Therapy as an adjuvant treatment. The content validation index for each verified topic ranged from 91.6% to 100%. **Conclusion:** The clinical protocol was considered valid for the treatment of dermatitis associated with incontinence in the pediatric context.

DESCRIPTORS: Pediatric Nursing; Child Health; Low-Level Light Therapy; Enterostomal Therapy; Diaper Rash.

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INTRODUCTION

Among the most common skin lesions in pediatrics, Incontinence Associated Dermatitis (IAD) stands out, characterized by a breakdown of the skin barrier function, leading to lesions characterized by rashes, erosion, erythema, and maceration in the skin in the perineal, perigenital, perianal regions and adjacent areas. These wounds are primarily caused by moisture from contact with urine and feces, depending on the duration and frequency of skin exposure to these irritating agents. They are also related to hyper-hydration and maceration of the tissue, as well as the elevation of temperature in the area due to the use of diapers and friction¹⁻³.

This occurs due to the alteration of the skin's pH, as the alkalinity of urine and feces favors the activation of lipases and proteases that contribute to the erosion of the epidermis and dermis, as it impairs the skin barrier property. The pH of infant skin ranges from 5 to 6, therefore, it is necessary to maintain an acidic environment to promote cohesion in the stratum corneum, providing resistance to rupture and preventing colonization by potentially pathogenic microorganisms⁴⁻⁵.

The cause of IAD is multifactorial, and certain clinical situations can increase the occurrence of this lesion, such as intestinal malabsorption syndromes, infections like rotavirus gastroenteritis and *Clostridium difficile*. These conditions can contribute to an increase in the number of elimination episodes, with liquid stools and an even more alkaline pH⁶.

In this context, the related care aims to prevent further damage to the skin, minimizing contact with irritating agents, preserving skin integrity and its barrier function. To achieve this, three main strategies are used, such as the appropriate selection of the diaper or containment device; skin cleaning techniques; and the application of topical barrier products⁶⁻⁷.

These care practices need to be structured on scientific evidence, thus highlighting the benefits of developing a structured protocol for promoting and preventing skin care in children. And, once IAD is present, bring therapeutic possibilities to assist in treatment^{2,6}.

Due to advances in nursing science and health in general, new modalities of care have been employed, among them, the use of Low-Intensity Laser Therapy (LILT) as an adjunct in the treatment of wounds, considering that the use of red and infrared light spectrum has anti-inflammatory, analgesic actions and aids the tissue healing process⁸⁻⁹.

LILT acts on the components of the cellular respiratory chain, such as mitochondria and the plasma membrane, resulting in the production of cellular adenosine triphosphate (ATP) and reactive oxygen species (ROS). Thus, a response of differentiation and protein synthesis occurs, including cellular growth factors and an increase in the proliferative process. There is also an increase in serotonin and endorphin levels, and a decrease in prostaglandin and interleukin beta levels, which reduces pain⁸.

Thus, this study aimed to develop and validate the content of a clinical nursing protocol for the treatment of children with incontinence-associated dermatitis using adjunctive low-intensity laser therapy.

METHOD

This is a methodological study, carried out through three stages: literature review¹⁰, construction and verification of the content validity evidence of the clinical protocol by specialist nurses.

Based on the literature review on the subject¹⁰, the clinical protocol was developed from November 2023 to March 2024, after which the content was validated by specialist nurses from May to June 2024.

For the construction of the Clinical Protocol, the document from the Ministry of Health entitled was used as a methodological reference: Methodological Guidelines: Development of Clinical Guidelines¹¹, which aims to provide a standardized roadmap for the preparation, adaptation, and evaluation of the quality of clinical guidelines such as clinical protocols, whether of national scope or developed by health services.

Thus, the protocol presents 10 topics, namely: 1. Introduction; 2. Medical and Nursing Diagnosis; 2.1 International Statistical Classification of Diseases and Related Health Problems (ICD-10); 2.2 International Classification for Nursing Practice (ICNP) version 2019/2020; 3. Classification of Dermatitis Associated with Incontinence; 4. Criteria for Using the Protocol; 4.1 Inclusion Criteria; 4.2 Exclusion Criteria; 5. Diagnostic Assessment; 6. Non-Pharmacological Treatment; 7. Pharmacological Treatment; 8. Dosimetry for Low-Intensity Laser Therapy; 9. Monitoring; 10. Nursing Care Flowchart; References.

The validation of the clinical protocol was carried out through the participation of specialist nurses. The sample was characterized as non-probabilistic, where nurses associated with the Brazilian Association of Stomatherapy from the Santa Catarina section (SOBEST/SC) were initially invited and asked to indicate other nurses according to the snowball method *snowball* or Snowball.

The inclusion criteria were to be a Stomatherapist or Dermatotherapist, of Brazilian nationality, and to have obtained a minimum score of five points on the criteria listed based on the adaptation of the classification of *Fehring*¹², where scored: Minimum experience of 12 months in Nursing assistance in Stomatherapy and/or Dermatology and/or Pediatrics (three points); Specialization in Stomatherapy and/or Dermatology and/or Pediatrics (two points); Thesis and/or dissertation on the topic of Stomatherapy and/or Dermatology and/or Pediatrics and/or Low-Intensity Laser Therapy (two points); Authorship of articles published in national and/or international journals, focusing on the topic of Stomatherapy and/or Dermatology and/or Pediatrics associated with the use of Low-Intensity Laser Therapy (two points); Minimum practical experience of 12 months in the use of Low-Intensity Laser Therapy (three points); Experience in the validation of instruments and/or content (one point); and Participation in research groups/projects that work with the topic of Stomatherapy and/or Dermatology and/or Pediatrics (one point).

Regarding the exclusion criteria, it was established: nurses who did not respond to the invitation letter via email within 15 days, after two attempts by the researchers.

To participate in the study, the judge signed the Free and Informed Consent Term, and after this process, gained access to the form on *Google Forms*; which was composed of two parts: identification data of the specialist (sociodemographic characterization, area of expertise, and knowledge about the topic) and the clinical protocol divided by the items that composed it.

For the evaluation of the clinical protocol, the *Delphi* technique was used, which seeks to obtain consensus among specialist judges, evaluating the requirements: Clarity (is the item described clearly, being easy to understand?); Coherence (is the item coherent, rational, and able to present a sequence of logical information?); Relevance (is the item relevant to be included in the Clinical Protocol?); Completeness (does the item present complete information?).

To this end, a Likert scale containing four points was used to evaluate the aspects presented earlier, namely: 1) Not at all; 2) A little; 3) Yes, satisfactory; 4) Yes, very satisfactory. The item was considered valid if it obtained a Content Validity Index (CVI) above 80%, summing the items Yes, satisfactory and Yes, very satisfactory¹³⁻¹⁴. The specialist should justify when their indication was Not at all or A little; they could also make suggestions or comments if deemed appropriate.

The research was approved by the Ethics Committee in Research of the Universidade Federal de Santa Catarina, according to opinion no. 6.793.430, CAAE 77506124.0.0000.0121.

RESULTS

Twenty nurses were invited, and 12 responses were obtained. Of these, 10 (83.3%) self-identified as women and two (16.7%) as men. The age ranged from 30 to 54 years (mean 40.16 and standard deviation of 7.798) and the time of training in Nursing ranged from 6 to 32 years (mean 15.91 and standard deviation of 7.433); nine (75%) of the nurses have specialization in Stomatherapy and two (16.7%) in Dermatology; one (8.3%) had a master's degree in Stomatherapy, four (33.3%) a master's degree in other areas of nursing, and one nurse (8.3%) had a doctorate in other areas.

All participants had experience in Stomatherapy and/or Dermatology, with a working time of one to 12 years (mean of 4.9 years and standard deviation of 3.9); in addition to using LILT for one to 10 years (mean of four years and standard deviation of 3.05).

Table 1 shows the evidence of content validity of the clinical protocol, according to its clarity, coherence, relevance, and completeness.

Table 1. Evidence of content validity of the clinical protocol according to clarity, coherence, relevance, and completeness. Florianópolis, SC, Brazil, 2024

Item	Clarity	Coherence	Relevance	Completeness
1. Introduction	100%	91.6%	100%	91.6%
2. Medical and Nursing Diagnosis	100%	100%	100%	91.6%
3. Classification of Dermatitis Associated with Incontinence	100%	100%	100%	100%
4. Criteria for the Use of the Protocol	91.6%	91.6%	100%	91.6%
5. Diagnostic Assessment	100%	100%	100%	100%
6. Non-Pharmacological Treatment	100%	100%	100%	100%
7. Pharmacological Treatment	100%	91.6%	100%	91.6%
8. Low-Intensity Laser Therapy in the Adjuvant Treatment of IAD in Pediatrics	100%	100%	100%	91.6%
9. Monitoring	100%	91.6%	100%	91.6%
10. Nursing Care Flowchart	100%	91.6%	100%	100%

Source: The authors, 2024.

Regarding the qualitative data of the study, the results of improvements to the protocol are presented in Chart 1, but it is worth noting that not all suggestions were accepted, as described in the discussion.

Chart 1. Suggestions from experts on the items of the clinical protocol for low-intensity laser therapy in the treatment of dermatitis associated with incontinence in pediatrics. Florianópolis, SC, Brazil, 2024

1. Introduction	<i>Could you include the information that the protocol is intended for general use, at all levels of care (E9)</i>
3. Classification of Dermatitis Associated with Incontinence	<i>Does GLOBIAD have Brazilian validation and adaptation? I did not find it. Was the scale translated by yourself? (E9)</i>
4. Criteria for the Use of the Protocol	<i>In the exclusion criteria, the exclusion/contraindication criteria for laser therapy can be added (which are few, but what specifically applies to the IAD region/clinical picture of the child). Considering the bone epiphysis, areas of bruising, careful evaluation of the oncological issue and application site, etc.). (E5)</i>
	<i>I understand that the exclusion criterion is not having incontinence, but if the child still has the lesion and the incontinence is resolved, does she stop receiving the laser?(E9)</i>
	<i>I believe that some differentiation related to lesions suggestive of allergy needs to be made. I think the protocol will be used by some professionals with little experience. (E11)</i>
7. Pharmacological Treatment	<i>Thinking about professional autonomy and the law of professional practice, I see no impediment for the treatment with topical antibiotics and antifungals to be prescribed by the nurse. I suggest this change with the observation that extensive infections or those that do not respond to treatment in the first 48 hours should be referred for medical evaluation. I understand that in hospital care this may be a bit more difficult, however, the prescription is guaranteed when it is described in an institutional protocol.(E9)</i>
8. Low-Intensity Laser Therapy in the Adjuvant Treatment of IAD in Pediatrics	<i>Here we use surfactant for disinfection, I do not know if there are any recommendations or contraindications. (E1)</i>
	<i>It should be added: it may only be applied by qualified professionals. Regarding the interval between applications, despite the controversy in the literature on the subject, it is possible to see significant improvement with an interval of every 72 hours. (E11)</i>
	<i>About the application of the laser, it can be red or infrared. In the chart: Point technique and contact (since there is the sweeping one), and about the distance between the points, separate what is in the bed and what is on the edge and peri-lesion. (E12)</i>
9. Monitoring	<i>For each evaluation, is a form used? I suggest keeping this for the initial evaluation and making a control chart with date, classification, dose used, inflammatory signs, etc. (E9)</i>
	<i>I suggest adding the presence of pain, since this symptom can be minimized, and it can have a beneficial effect with the laser.(E12)</i>

Source: The authors, 2024.

Access to the clinical protocol for the treatment of dermatitis associated with incontinence in pediatrics with the adjunct therapy of low-intensity laser therapy is available in digital format through the QR Code (Figure 1).



Figure 1. QR Code for access to the complete Clinical Protocol. Florianópolis, SC, Brazil, 2024

Source: Provided by the authors, 2024.

DISCUSSION

Evidence-based clinical protocols are progressively being used in care practices, replacing traditional routine models, aiming for greater transparency, methodological rigor, and legitimacy. They are systematically structured recommendations, aimed at guiding decisions of health professionals and/or users regarding appropriate care in specific clinical circumstances. These recommendations are also based on the technological and economic evaluation of health services and the assurance of their quality¹³.

One of the important aspects of building a clinical protocol is its validation, as it ensures the safety in using the instrument by verifying if the proposed objectives are adequately and reliably met¹⁴. Thus, the suggestions from specialists become important to improve the developed protocol.

In the introduction, it was suggested to add the information that the protocol can be used in any area of practice. This suggestion was accepted, considering that, although the work was structured for the hospital area, the information is relevant for other care contexts that serve these children, such as primary care, clinics, home care, and others.

Regarding the scale used, a participant commented on the issue of the translation of the instrument, using the *Ghent Global IAD Categorisation Tool* (GLOBIAD), as it is one of the most used and recommended scales in studies worldwide, originally developed in English and translated into Portuguese by the authors themselves; so far, there is no transcultural adaptation and validation for Brazil¹⁵.

In the inclusion and exclusion criteria listed in the clinical protocol, two specific exclusion criteria for the use of this protocol are mentioned by the participants, namely patients without urinary and/or fecal incontinence and patients with contact or allergic lesions in the perianal region. The developed protocol is exclusively intended for the treatment of dermatitis associated with Incontinence (IAD); thus, patients presenting other lesions in the perineal, perigenital, perianal regions, and adjacent areas, such as contact dermatitis, pressure injuries, among others, may also be indicated for the use of LILT, with the health professional responsible for distinguishing them and verifying

the best treatment; however, this is not the focus of this protocol, hence the exclusion of these cases is mentioned.

It is worth noting that IAD presents characteristics such as barrier rupture, showing rash, epidermal and dermal erosion, and may present a macerated appearance due to moisture from contact with urine and feces, causing pain and burning. Thus, for the diagnosis of IAD, the presence of urinary and/or fecal incontinence must be present²⁻³.

In other situations, such as contact dermatitis, whether allergic or irritative, they are caused by direct contact with substances on the skin, not related to moisture from urine and feces. They are often related to the products used in this area, such as wet wipes and diapers, which result in pain and itching in the area, as well as inflammatory signs and even skin rupture^{2,16}.

After the treatment of IAD, with the skin completely intact, care related to the prevention of new episodes should be taken, such as frequent diaper changes, adequate hygiene, and protection. However, regarding the use of LILT, it is observed that, so far, there are no studies indicating to maintain the application after skin improvement or proving the effectiveness of its use for the prevention of new lesions. Therefore, it must be considered that the laser light will act on cells that have suffered injuries, which is not present when the tissue is fully regenerated.

Regarding the presence of bruises or ecchymoses in the area, that is, blood leakage from blood vessels to the skin, the use of LILT may be utilized, as in addition to treating IAD, research indicates that it will bring benefits to the improvement of ecchymoses and bruises, as well as for edema and pain¹⁷⁻¹⁹. It is also recommended to check the etiology of this bruise and/or ecchymosis in the perigenital and/or perianal region of the child.

Another point raised by the nurses is the use of LILT in children undergoing oncological treatment, being a population with a high incidence of IAD, considering the alteration of the pH of feces due to the administration of chemotherapy or antibiotic therapy, for example. Research indicates that it is safe to use on non-oncological lesions, as seen in dentistry, which has been used to treat mucositis in oncological patients for years, without harming oncological treatment¹⁹⁻²⁰. Thus, the location where this application will be performed is safe, as long as there are no cancerous lesions in the area affected by IAD.

Regarding the disinfection of the LILT device, one of the participants recommends the use of other products, such as surfactants for disinfection. The protocol included the use of 70% alcohol, considering that this is the manufacturer's recommendation for the model of the device used in the research. However, this recommendation may vary according to the brand used or the institutional protocol.

Regarding the prescription of topical products to apply in IAD, such as antifungals and antibiotics by nurses, it was not mentioned in the work in question, as the research institution does not provide protocols for such activity. However, it is emphasized that since 1986, in law no. 7.498²¹, the prescription of medications by nurses is authorized as long as it is in routines approved by the health institution or established in public health programs.

In Nursing, the performance of Low-Intensity Laser Therapy is exclusive to trained nurses, given that the Federal Nursing Council (COFEN) in opinion no. 13 of 2018 describes that LILT is a non-invasive, non-thermal, aseptic, painless therapy with no side

effects, being a technique widely used for tissue healing, due to its effects on modulating the inflammatory process, increasing collagen synthesis and epithelialization²².

The opinion emphasizes that for the use of this therapy, the nurse must be properly trained through a course, presenting knowledge related to physics, biophotonics, laser interaction and biological tissue, dosimetry, as well as physiology and rehabilitation²². Although it does not specify in its resolutions or opinions a minimum mandatory load for training courses in laser, it is up to the professional to engage in continuous study to use this technology as an ally in their clinical practice.

Regarding the application interval, it was adjusted in the protocol to 48 to 72 hours, aiming at the clinical reasoning of the professional to define the best time between applications. However, a minimum interval of 48 hours between applications is recommended, as research indicates better results with the application of LILT during this period^{20,23-24}.

Additionally, regarding the application of LILT, one of the participating nurses suggested using it in a point technique and sweeping technique. The point technique consists of applying it to specific points over the area to be irradiated, respecting a distance of approximately 1 cm between the application points on the lesion bed and 2 cm between points in the perilesional region. In contrast, in the sweeping technique, irradiation is performed over the entire extent of the lesion, through the execution of alternating movements²⁵⁻²⁶.

The use of the point technique is indicated in the current literature, as it provides greater utilization of the light applied in the area, due to the shorter distance between the device and the tissue. The sweeping technique is more indicated for the application of High-Intensity Laser, avoiding burns in the area^{24,27}.

Regarding the choice of the type of laser light, the red wavelength (660 nm) has less penetration in the tissue compared to infrared (808 nm), due to the absorption of laser light by the chromophores present in the tissue. Thus, red light is more indicated for the treatment of superficial tissues due to its low penetration and high absorption, while infrared is indicated for treating deeper tissues, as it has low absorption and high penetration in the tissue, both presenting healing and analgesic effects²⁴⁻²⁸.

Finally, the monitoring form presented in the protocol is a suggestion to be used in printed or digital format, in the electronic system available at the institution. In addition, pain assessment at the site was added, and the information and images used are adapted from the instrument for pre-existing monitoring *The Ghent Global IAD Monitoring Tool* (GLOBIA-M) and *Minimum Data Set for Incontinence-Associated Dermatitis* (MSD-IAD)²⁸.

The limitations of the study are related to the difficulty of response from the participants (experts), considering that 40% did not respond to the research email, and these nurses may have important contributions to the improvement of the study.

CONCLUSION

The nursing clinical protocol for the treatment of children with Incontinence Associated Dermatitis using adjunctive Low-Intensity Laser Therapy has valid evidence regarding clarity, coherence, relevance, and completeness, from the perspective of area specialists. The development of the clinical protocol is an important tool to support the

nurse's decision-making, which can be used by other health institutions, with relevant adjustments made for each reality. It is emphasized that the implementation of this protocol should be based on a training program for the hospital nursing team, in order to guide the team and reduce doubts.

REFERENCES

1. Borges EL, Domansky RC. Manual para Prevenção de Lesões de Pele: recomendações baseadas em evidências. [Internet]. Rio de Janeiro: Rubio. 2012. [cited 2024 Jun 6]. 326 p. Available from: https://issuu.com/editorarubio/docs/issuu_manual_para_prevencao_de_le
2. Beeckman D, Campbell J, Campbell K, Chimentão D, Coyer F, Domansky R, et al. Proceedings of the global IAD Expert Panel. Incontinence associated dermatitis: moving prevention forward. [Internet]. Wounds International. 2015. [cited 2024 Aug 1]. 21 p. Available from: <https://woundsinternational.com/consensus-documents/incontinence-associated-dermatitis-moving-prevention-forward/>
3. Cunha CV, Ferreira D, Nascimento D, Felix F, Cunha P, Penha LHG. Artigo de Revisão -Dermatite associada à incontinência em idosos: caracterização, prevenção e tratamento. Estima [Internet]. 2016 [cited 2024 Jun 3];13(3). Available from: <https://www.revistaestima.com.br/estima/article/view/218>
4. Dunk AM, Broom M, Fourie A, Beeckman D. Clinical signs and symptoms of diaper dermatitis in newborns, infants, and young children: a scoping review. J Tissue Viability [Internet]. 2022 [cited 2024 Aug 1];31(3):404-15. Available from: <https://doi.org/10.1016/j.jtv.2022.03.003>
5. Bernardo AFC, dos Santos K, da Silva DP. Pele: alterações anatômicas e fisiológicas do nascimento à maturidade. Revista Saúde em Foco [Internet]. 2019 [cited 2023 Sep 18];11:1221-33. Available from: <https://www.studocu.com/pt/document/universidade-catolica-portuguesa/direito-medico/pele-alteracoes-anatomicas-e-fisiologicas-do-nascimento-a-maturidade/21992265>
6. Lim YSL, Carville K. Prevention and Management of Incontinence Associated Dermatitis in the Pediatric Population an Integrative Review. Journal of Wound, Ostomy, and Continence Nursing. [Internet]. 2019 [cited 2024 Jun 5];46(1): 30608338. Available from: <https://doi.org/10.1097/won.0000000000000490>
7. Helms LE, Burrows HL. Diaper Dermatitis. Pediatr Rev [Internet]. 2021 [cited 2024 Jul 30];42(1):48-50. Available from: <https://doi.org/10.1542/pir.2020-0128>
8. Moreira FCL. Manual prático para uso dos lasers na odontologia. [Internet]. Goiânia: Cegraf UFG. 2020. [cited 2024 Jun 2]. 42 p. Available from: https://files.cercomp.ufg.br/weby/up/133/o/Manual_Laser.pdf
9. Batista MR, Estrela LA, Alves VMN, Motta AR, Furlan RMMM. Immediate effects of red (660 nm) and infrared (808 nm) photobiomodulation therapy on fatigue of the orbicularis oris muscle: a randomized clinical study. CoDAS [Internet]. 2022 [cited 2023 May 9];34(2):e20200363 Available from: <https://doi.org/10.1590/2317-1782/20212020363>
10. Gapski GB, de Oliveira LB, Girondi JBR, Müller K, Pinto LVD. Tratamento de dermatite associada à incontinência em pediatria. Rev Enferm. Atual In Derme [Internet]. 2024 [cited 2025 Nov 19];98(1):e024271. Available from: <https://revistaenfermagematual.com.br/index.php/revista/article/view/2145>
11. Brasil, Ministério da Saúde. Diretrizes metodológicas: elaboração de diretrizes clínicas. Secretaria de Ciência, Tecnologia, Inovação e Complexo da Saúde, Departamento de Gestão e Incorporação de Tecnologias em Saúde [Internet]. Brasília, DF; 2023 [cited 2023 Nov 28]. 138p. Available from: https://www.gov.br/conitec/pt-br/midias/artigos_publicacoes/diretrizes/diretrizes-metodologicas-elaboracao-de-diretrizes-clinicas-2020.pdf
12. Fehring RJ. Methods to validate nursing diagnoses. Heart Lung. [Internet]. 1987. [cited 2024 May 19];16(6 Pt 1): 3679856. Available from: https://www.researchgate.net/publication/40505773_Methods_to_Validate_Nursing_Diagnoses

13. Polit DF, Beck CT. Fundamentos de pesquisa em enfermagem: avaliação de evidências para a prática da enfermagem. 9 ed. Porto Alegre, RS: Editora Artmed 2019. 456p.
14. Beeckman D, Bussche KVD, Kottner J. The Ghent Global IAD Categorisation Tool (GLOBIAD). University Centre for Nursing and Midwifery. Skin Integrity Research Group - Ghent University. Belgium. [Internet]. 2017. [cited 2024 Jun 19]. 5p. Available from: https://images.skintghent.be/20244241395447_globiad-br-portuguese-v1.0-042024.pdf
15. Weber CW, Belluco PES, Mendes KAP, Sarinho ESC, Sales VSF, Rubini NPM. Dermatite de contato. São Paulo: Atheneu;. 2022. 236 p.
16. Mukhtar S, Bains VK, Chandra C, Srivastava R. Evaluation of low-level laser therapy and platelet-rich fibrin on donor site healing after vascularized interpositional periosteal connective tissue flap: a randomized clinical study. *Lasers Med Sci* [Internet]. 2023 [cited 2024 Jul 2];38(68):1-13. Available from: <https://doi.org/10.1007/s10103-023-03725-1>
17. Karimi S, Sadeghi M, Amali A, Saedi B. Effect of photobiomodulation on ecchymosis after rhinoplasty: a randomized single-blind controlled trial. *Aesth Plast Surg*. [Internet]. 2020. [cited 2024 Jul 2];44:1685-91. Available from: <https://doi.org/10.1007/s00266-020-01760-9>
18. Bensadoun RJ, Epstein JB, Nair RG, Barasch A, Raber-Durlacher JE, Migliorati C, et al. Safety and efficacy of photobiomodulation therapy in oncology: a systematic review. *Cancer Med* [Internet]. 2020 [cited 2024 Jun 25];9:8279-8300. Available from: <https://link.springer.com/article/10.1007/s00266-020-01760-9>
19. Tam SY, Tam VCW, Ramkumar S, Khaw ML, Law HKW, Lee SWY. Review on the cellular mechanisms of low-level laser therapy use in oncology. *Front. Oncol.* [Internet]. 2020 [cited 2024 Jun 25];10:1255. Available from: <https://doi.org/10.3389/fonc.2020.01255>
20. Brasil. Lei nº 7.498, de 25 de junho de 1986. Dispõe sobre a regulamentação do exercício da enfermagem, e dá outras providências. *Diário Oficial da União* [Internet]. 1986 Jun 25 [cited 2024 Nov 7];3(Seção 1):363. Available from: <https://www2.camara.leg.br/legin/fed/lei/1980-1987/lei-7498-25-junho-1986-368005-publicacaooriginal-1-pl.html>
21. Conselho Federal de Enfermagem (COFEN). Parecer de Câmara Técnica nº 13/2018/CTLN/COFEN. Legislação profissional. uso de laserterapia de baixa intensidade em lesões mamilares. [Internet]. Brasília, DF: COFEN; 2018. [cited 2024 Jan 14]. Available from: <https://www.cofen.gov.br/parecer-n-13-2018-cofen-ctln/>
22. Otsuka ACVG, Moreira CLV, Pasquarelli EW, Pavani KCP, dos Anjos PP, Hashimoto SY, et al. Low-level laser therapy in the management of skin wound healing. *Rev Bras Cir Plást* [Internet]. 2022. [cited 2024 Oct 7];37(4):451-6. Available from: <https://doi.org/10.5935/2177-1235.2022RBCP.640-en>
23. Tonazio CHS, Girondi JBR, Silva RA, Frison SS. Fotobiomodulação no tratamento de feridas: evidências para a atuação do enfermeiro. Rio de Janeiro: Thieme Revinter, 2024.
24. Tricarico PM, Zupin L, Ottaviani G, Rupel K, Celsi F, Genovese G, et al. Photobiomodulation as potential novel third line tool for non-invasive treatment of hidradenitis suppurativa. *G Ital Dermatol Venereol* [Internet]. 2020 [cited 2024 Sep 3];155(1):88-98. Available from: <https://www.minervamedica.it/en/journals/Ital-J-Dermatol-Venereol/article.php?cod=R23Y2020N01A0088>
25. Kazemikhoo N, Ghadimi T, Vaghardoost R, Momeni M, Nilforoushadeh MA, Ansari F, et al. Effects of photobiomodulation and split-thickness skin grafting in the prognosis of wound healing in children with deep burn ulcers. *Photobiomodul Photomed Laser Surg* [Internet]. 2022 [cited 2024 Sep 3];40(2):148-54. Available from: <https://doi.org/10.1089/photob.2021.0107>
26. Stephers BJ, Jones LR. Tissue optics. In: Hamblin MR, de Sousa MVP, Agrawal T. *Handbook of Low-Level Laser Therapy*. Singapore: Pan Stanford Publishing; 2021. p. 67-86.
27. Mosca RC, Ong AA, Albasha O, Bass K, Araby P. Photobiomodulation therapy for wound care: a potent, noninvasive, photoceutical approach. *Adv Skin Wound Care* [Internet]. 2019 [cited 2023 Feb 7];32(4):157-67. Available from: <https://doi.org/10.1097/01.asw.0000553600.97572.d2>

28. Bussche KVD, Verhaeghe S, Hecke AV, Beeckman D. The ghent global iad monitoring tool (GLOBIAD-M) to monitor the healing of incontinence-associated dermatitis (IAD): design and reliability study. Int Wound J [Internet]. 2018 [cited 2024 Jan 18];15(4):555-64. Available from: <https://doi.org/10.1111/iwj.12898>

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - **Gapski GB, Girond JBR, Anders JC, dos Santos KB, Bittencourt AJT**. Drafting the work or revising it critically for important intellectual content - **Gapski GB, Girond JBR, Anders JC, dos Santos KB, Bittencourt AJT**. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - **Gapski GB, Girond JBR, Anders JC, dos Santos KB, Bittencourt AJT**. All authors approved the final version of the text.

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