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Journal of the Sociedade Portuguesa de Quemaduras (SPQ),

Journal of the Federación Ibero-latinoamericana de Quemaduras (FEI),

Journal of the Association Tunisienne de Traitement des Brûlures et des Plaies (ATTBP),

Journal of the Asociación Española de Quemaduras (AEQUE),

Journal of the Romanian Association of Plastic Surgeons (ROAPS),

Journal of the Hellenic Society of Wound Healing (HSWH),

Journal of the Hellenic Society of Plastic Reconstructive and Aesthetic Society (HESPRAS).

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Euro-Mediterranean Council for Burns and Fire Disasters

XXI st MBC MEETING (Casablanca) - WEBINAR Virtual Meeting May 15, 2021

Organized & Coordinated by
Association of Plastic Surgeons
of Lebanese Descent



APSLD



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With the participation of:

Moroccan Society of Plastic and Reconstructive Surgery (SOMCPRE)

Moroccan Society of Anesthesia and Intensive Care (SMAR)

Federación Iberolatinoamericana de Quemaduras (FELAQ)

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Société Francophone de Brûlologie (SFB)

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Euro- Mediterranean Council for Burns & Fire Disasters



MBC

WHO Collaborating Centre for Prevention and Treatment of Burns and Fire Disasters
NGO in Special Consultative Status with ECOSOC of United Nations



MBC was originally founded in 1983 as the "Mediterranean Burns Club" with the aim of creating a permanent dialogue on burns among specialists from countries of the Mediterranean basin, linked by common historical, cultural and intellectual bonds.

The objective of the Euro-Mediterranean Council for Burns and Fire Disasters (MBC) is to involve the surgical, scientific and intellectual forces of all the Mediterranean countries in an open exchange of opinion and action in order to analyze common themes, analogies and contrasts in the fields of prevention, treatment and functional recovery of burns and in fire disasters. The MBC strives to create a permanent dialogue on burns and fire disasters, a forum for the study and evaluation of the actual situations in the various individual countries, to promote permanent contacts and comparisons with regard to clinical, therapeutic, scientific, didactic and nursing problems, and to endeavor to eliminate any gaps that may exist.

The MBC is considered not only as a "league" and "pact" or "alliance" willing to offer its experience, cooperation and medical expertise in any area of the Mediterranean. It is a "Council" of kindred professionals, and one of its main benefits is undoubtedly in bringing together the various peoples and surgeons of the Mediterranean, and promoting close ties of friendship between its members as well as specialists further afield.

The World Health Organization (WHO) has designated the Euro-Mediterranean Council for Burns and Fire Disasters – MBC a WHO Collaborating Centre, with the full title of WHO Collaborating Centre for Prevention and Treatment of Burns and Fire Disasters. Action of MBC thus and its presence extend beyond the countries of the Mediterranean. To reflect this global importance the MBC Bureau has nominated one Regional Representative for each of the six geographic Regions of the World Health Organization. MBC is also an NGO in Special Consultative Status with ECOSOC of United Nations.

www.medbc.com

PROGRAM AT A GLANCE

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Beirut UTC+3	09:50-19:10 (9:50 AM-7:10 PM)
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Casablanca UTC	06:50-16:10 (6:50 AM-4:10 PM)
Washington D.C. UTC-4	02:50-12:10 (2:50 AM-12:10 PM)
Santiago UTC-3	03:50-13:10 (3:50 AM-1:10 PM)

TIME: UTC

6:50-7:00	Introduction
7:00-8:00	SESSION 1: Romanian Society of Plastic Surgery (ROAPS)
8:00-9:00	SESSION 2: Hellenic Society of Wound Healing (HSWHS)
9:00-9:30	Break
9:30-10:30	SESSION 3: Società Italiana Ustioni (SIUst)
10:30-11:30	SESSION 4: Société Francophone de Brûlologie (SFB)
11:30-12:30	SESSION 5: Moroccan Society of Plastic and Reconstructive Surgery (SOMCPRE) Moroccan Society of Anesthesia and Intensive Care (SMAR)
12:30-12:45	Break
12:45-14:00	SESSION 6: Wounds, Scars and Reconstruction
14:00-15:00	SESSION 7: Asociación Española de Quemaduras (AEQUE)
15:00-16:00	SESSION 8: Federación Ibero-latinoamericana de Quemaduras (FELAQ)
16:00-16:10	Live Polling - Evaluation of Presentations

LIVE INTERACTIVE Q&A

Abstracts to be published in Annals of Burns and Fire Disasters

July 15-18, 2020 were the dates for what was to be a very exciting and informative XXIIth MBC meeting at the Hayat Regency Hotel in Casablanca. Unfortunately, due to the Covid-19 pandemic, this event could not be held as planned. Instead, the MBC in collaboration with the Moroccan society of Plastic Surgery and Moroccan society of Anesthesia, Federación Ibero-latinoamericana de Quemaduras, Società Italiana Ustioni, Société Francophone de Brûlologie, Asociación Española de Quemaduras, Hellenic Society of Wound Healing, Romanian Society of Plastic Surgery, and Association of Plastic Surgeons of Lebanese Descent, extends an invitation to all plastic surgeons and burn specialists as well as all nurses and paramedical personnel involved in burn care in Europe and the Mediterranean basin to a Webinar coordinated from Beirut on May 15, 2021. The webinar will comprise various round tables with internationally renowned speakers about hot topics in burn patients-care. With world-class participants, the Webinar will be a rewarding scientific event.

SCIENTIFIC PROGRAM

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UTC

6:50-7:00 **Introduction**
Hassan BOUKIND, President SOMCPRE
Bishara ATIYEH, President MBC

SESSION 1: Romanian Society of Plastic Surgery (ROAPS)

Moderators: Dan Mircea ENESCU (Romania)
Abd Alhamid ABD ALKHALEK (Egypt, Kuwait)
Paula EGIPTO (Portugal)

7:00-7:15 **(S1-1) The value of presepsine in diagnosis and prognosis of burn sepsis: a retrospective study. Correlations with other markers**
Sorin PARASCA (Romania)

7:15-7:30 **(S1-2) New technologies in modern burns treatment how to select and implement them**
Cristian Radu JECAN (Romania)

7:30-7:45 **(S1-3) Aesthetic in plastic surgery for children**
Dan Mircea ENESCU (Romania)

7:45-8:00 **Discussion**

SESSION 2: Hellenic Society of Wound Healing (HSWHS)

Moderators: Dimosthenis TSOUTSOS (Greece)
Ouranaia CASTANA (Greece)
Amira ALADAB (UAE)

8:00-8:15 **(S2-1) The role of early physiotherapy and post acute functional rehabilitation in patients with burns**
Emmanuel S. PAPADOPOULOS (Greece)

8:15-8:30 **(S2-2) Postburn scars of the head and hands**
Eugenia Jenny KYRIOPOULOS (Greece)

8:30-8:45 **(S2-3) Postburn scars of the neck and torso: prevention and treatment**
Athanasios KARONIDIS (Greece)

8:40-9:00 **Discussion**

9:00-9:30 **Break**

SESSION 3: Società Italiana Ustioni (SIUst)

Moderators: Michele MASELLIS (Italy)
Maurizio STELLA (Italy)
Romeu FADUL (Brazil)

9:30-9:45 **(S3-1) The use of the stromal vascular fraction (SVF) in the treatment of intermediate-deep burns: minimal invasive modality**
Michelangelo VESTITA (Italy)

9:45-10:00 **(S3-2) Italian recommendations on enzymatic debridement in burn surgery**
Elena LUCATELLI (Italy)

10:00-10:15 **(S3-3) Reduce patient's stress and anxiety without drugs: the power of words**
Nadia DEPETRIS (Italy)

10:15-10:30 **Discussion**

SESSION 4: Société Francophone de Brûlologie (SFB)

Moderators: Wassim RAFFOUL (Switzerland)
Albin STRITAR (Slovenia)
Georges GHANIMEH (Lebanon)

10:30-10:40 **(S4-1) Ethics and burns**
Pierre-Joachim MAHÉ (France)

10:40-10:50 **(S4-2) Rehabilitation and humanitarian medicine**
Valérie CHAUVINEAU (France)

10:50-11:00 **(S4-3) Platelet Rich Plasma in burns**
Alain Ali MOJALLAL (France)

11:00-11:10 **(S4-4) Gas truck incidents related casualties**
Ronan LE FLOCH (France)

11:10-11:30 **Discussion**

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SESSION 5:

Moroccan Society of Plastic and Reconstructive Surgery (SOMCPRE)

Moroccan Society of Anesthesia and Intensive Care (SMAR)

- Moderators: Mohamed KADRY (Egypt)
Abdo KHOURY (France)
Amen Allah MESSADI (Tunisia)
- 11:30-11:40 **(S5-1) Prise en charge préhospitalière du brûlé grave**
Samir SIAH (Maroc)
- 11:40-11:50 **(S5-2) Epidémiologie du brûlé en période COVID 19**
Mounia DIOURI (Maroc)
- 11:50-12:00 **(S5-3) Prise en charge des brûlures électrique chez l'enfant**
Nawfal FEJJAL (Maroc)
- 12:00-12:10 **(S5-4) Coût de la prise en charge des brûlés hospitalisés au C.H.U. Mohamed VI Marrakech**
Yassine BENCHEMKHA (Maroc)
- 12:10-12:20 **(S5-5) Regenerative medicine in wound healing**
Hassan BOUKIND (Maroc)
- 12:20-12:30 **Discussion**
- 12:30-12:45 **Break**

SESSION 6:

Wounds, Scars and Reconstruction

- Moderators: Georgia KOULERMOU (Cyprus)
Rado Zic (Croatia)
Amir IBRAHIM (Lebanon)
- 12:45-13:00 **(S6-1) Microsurgical and complex burn reconstructions**
Amir IBRAHIM (Lebanon)
- 13:00-13:15 **(S6-2) Tissue expanders**
Branko BOJOVIC (USA)
- 13:15-13:30 **(S6-3) Role of release of tension in hypertrophic scar reduction and treatment**
Jeremy GOVERMAN (USA)
- 13:30-13:45 **(S6-4) 8 years follow-up laser remodeling of burn scars**
Katuska RIVERA (Venezuela)
- 13:45-14:00 **Discussion**

SESSION 7:

Asociación Española de Quemaduras (AEQUE)

- Moderators: Julia MOLINA MORALES (Spain)
Maria Dolores PÉREZ DEL CAZ (Spain)
Mustafa DEVECI (Turkey)
- 14:00-14:15 **(S7-1) The new era of enzymatic debridement**
Jose Ramón MARTINEZ (Spain)
- 14:15-14:30 **(S7-2) Biomarkers in burn infection**
Luis CABRAL (Portugal)
- 14:30-14:45 **(S7-3) The importance of rehabilitation in the integral treatment of the great burn patient**
Pedro MARTÍNEZ AMOROS (Spain)
- 14:45-15:00 **Discussion**

SESSION 8:

Federación Ibero-latinoamericana de Quemaduras (FELAQ)

- Moderators: Enrique MONCLÚS FUERTES (Spain)
Luiz Philipe MOLINA (Brazil)
- 15:00-15:15 **(S8-1) State of the art: the dermal matrices for acute burns and sequela**
Ricardo ROA (Chile)
- 15:15-15:30 **(S8-2) What's new in epidermic substitutes?**
Ariel MIRANDA (Mexico)
- 15:30-15:45 **(S8-3) Is the 3D skin printing possible?**
Alberto BOLGIANI (Argentina)
- 15:45-16:00 **Discussion**

Live Polling Evaluation of Presentations

Certificate of attendance will be delivered by e-mail only to those who participate in the live polling and submit their evaluation

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Meet our Faculty

Outstanding faculty and renowned experts recognized as innovators of the most advanced techniques in burns management

Hassan Boukind



Bishara Atiyeh



Session 1: Romanian Society of Plastic Surgery (ROAPS)



Dan Mircea Enescu (Romania)

Vice-President of the Romanian Academy of Medical Sciences, Past President of the Romanian Society of Plastic Surgeons, Honorary Professor of the Academic Union, Oxford, UK, Member in the Board of Governors World Wide Society



Sorin Parasca (Romania)

Member of Association of plastic surgeons in Romania and the Romanian Association of Bariatric Surgery and Advanced Treatment of Obesity



Cristian Radu Jecan (Romania)

President Romanian Association of Plastic Surgeons.
Head of department Aesthetic, Plastic and Reconstructive Microsurgery
Carol Davila University of Medicine, University Emergency Hospital
"Prof dr Agrippa Ionescu", Bucharest.



Abd Alhamid Abd Elkhalek (Egypt, Kuwait)



Paula Egipto (Portugal)

Anaesthesiologist, Burn Unit, Porto Hospital de Sao João, Past Vice-president of the Portuguese Society of Burns

Session 2: Hellenic Society of Wound Healing (HSWHS)



Emmanuel S. Papadopoulos (Greece)

Head of physiotherapy department at Evangelismos General Hospital, Athens, Member of European Tissue Repair Society



Eugenia Jenny Kyriopoulos (Greece)

Attending Plastic Surgeon, Department of Plastic Surgery, Microsurgery and Burn Center, General Hospital of Athens "G.Genimatas", Director of the MBC Burn Academy



Athanasios Karonidis (Greece)

MD, MBA, PhD, MRCS, FEBOPRAS
Attending Plastic Surgeon
Department of Plastic Surgery, Microsurgery & Burns Unit
General Hospital of Athens "G. Gennimatas"



Dimosthenis Tsoutsos (Greece)

Director of Plastic surgery department Burn and Melanoma Center - General Hospital of Athens G. Gennimatas, Athens



Ourania Castana (Greece)

Director of the prevention and treatment Melanoma Center, Athens, Euroclinic, Professor at University of West Attica, Visiting professor at EAWT



Amira ALADAB (UAE)

Consultant Plastic Surgeon, Al Qassimi hospital, Sharjah

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Session 3: Società Italiana Ustioni (SIUst)



Michelangelo Vestita (Italy)

Dermatologist; Plastic Surgery resident; Fellow at Brigham and Women's Mohs and Dermatologic Surgery Center. Università degli Studi di Bari Aldo Moro, Bari



Michele Masellis (Italy)

MBC, Past President
MBC General Director



Elena Lucattelli (Italy)

Plastic and Reconstructive Surgery, Careggi University Hospital, Florence



Maurizio Stella (Italy)

Director, S.C. Grandi Ustioni e della Banca della Cute di Torino, A.O.U. Città della Salute e della Scienza, Ospedale C.T.O.



Nadia Depetris (Italy)

Medical executive anesthetist, City of Health and Science CTO Turin, EBA, Executive Committee Member



Romeu Fadul (Brazil)

Coordinator of Plastic Surgery Meetings and Courses of Research Institute Sirio Libanês Hospital, São Paulo

Session 4: Société Francophone de Brûlologie (SFB)

Pierre-Joachim Mahé (France)

Réanimation chirurgicale et des brûlés, Centre Hospitalier Universitaire de Nantes



Valérie Chauvineau (France)

Médecine Physique Et Réadaptation, Hopital Leon Berard, Hyères



Wassim Raffoul (Switzerland)

Professor, Head of Department Plastic, Reconstructive and Hand Surgery, Lausanne University Hospital, Lausanne (CHUV)



Alain Ali Mojallal (France)

Professeur agrégé en chirurgie plastique, esthétique et reconstructrice, faculté de médecine Lyon Sud Charles Mérieux, Chirurgien aux Hospices Civils de Lyon



Albin Stritar (Slovenia)

Assistant Professor, Head of Burns Unit University Medical Center Ljubljana, Slovenia



Ronan Le Floch (France)

President, Société Francophone de Brûlologie (SFB), Réanimation chirurgicale et des brûlés, Centre Hospitalier Universitaire de Nantes



Georges Ghanimeh (Lebanon)

Professeur Titulaire Chef de Département de Chirurgie et de Chirurgie Plastique, Hopital Libanais Getawi

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Session 5: Moroccan Society of Plastic and Reconstructive Surgery (SOMCPRE) Moroccan Society of Anesthesia and Intensive Care (SMAR)



Samir Siah (Maroc)

Chef de service de chirurgie plastique reconstructrice et des brûlés, Hôpital Militaire Mohammed V, Rabat



Mounia Diouri (Maroc)

Chirurgien Esthétique, C.H.U. Ibn Rochd, Casablanca



Nawfal Fejjal (Maroc)

Associate professor of Plastic Surgery; Université Mohamed V Souissi, Hôpital d'enfants, C.H.U. Avicenne, Rabat



Yassine Benchemkha (Maroc)

Chirurgien esthétique et plastique; C.H.U. Mohamed VI Marrakech



Hassan Boukind (Maroc)

Professeur en chirurgie plastique et esthétique, Casablanca



Mohamed Kadry (Egypt)

Emeritus Professor, of Plastic Surgery Faculty of Medicine Cairo University



Abdo Khoury (France)

President, European Society for Emergency Medicine (EUSEM)



Amen Allah Messadi (Tunisia)

Chef de service de réanimation des brûlés, Centre de Traumatologie et des grands Brûlés, Ben Arous, Tunis

Session 6: Wounds, Scars and Reconstruction



Amir Ibrahim (Lebanon)

Assistant Professor, Plastic and Reconstructive Surgery, American University of Beirut



Branko Bojovic (USA)

Assistant Professor, Chief of Plastic Surgery at Shriners Hospitals for Children, Boston, Massachusetts



Jeremy Goverman (USA)

Assistant Professor of Surgery, Harvard Medical School, Massachusetts General Hospital Burns Center, Boston



Katriuska RIVERA (Venezuela)

Aesthetic Medicine, Advanced Medical Aesthetics and Photomedicine, Caracas



Georgia Koulermou (Cyprus)

Emeritus Professor Plastic Surgery Medical School University of Nicosia



Rado Zic (Croatia)

Vice-President of the Croatian Society for Plastic, Reconstructive and Aesthetic Surgery, member of European Board of Plastic, Reconstructive and Aesthetic Surgeons (EBOPRAS)

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Session 7: Asociación Española de Quemaduras (AEQUE)



Jose Ramón Martínez (Spain)

Head of Burns Section of Hospital Universitario La Paz, Madrid



Julia Molina Morales (Spain)

Plastic surgeon of the Burn Unit of Hospital Virgen del Rocío de Sevilla



Luis Cabral (Portugal)

Department of Plastic Surgery and Burns Unit, Coimbra Hospital and University Centre (CHUC) Coimbra EBA, Executive Committee Member



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Pedro Martínez Amoros (Spain)

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Mustafa Deveci (Turkey)

Professor, plastic, cosmetic, and reconstructive surgery, Ankara

Session 8: Federación Iberolatinoamericana de Quemaduras (FELAQ)



Ricardo Roa (Chile)

Chief of the Plastic Surgery and Burns Department, Hospital del Trabajador, Santiago



Enrique Monclús Fuertes (Spain)

President AEQUE
General secretary FELAQ



Ariel Miranda (Mexico)

University of Guadalajara, Guadalajara



Luiz Philipe Molina (Brazil)

Cirurgião Plástico - ex-Presidente Sociedade Brasileira de Queimaduras



Alberto Bolgiani (Argentina)

Presidente de FELAQ 2011-2013 (Federación Latino Americana de Quemaduras)
Medico especialista en quemados. Jefe de la Unidad de Quemados de la Fundacion Benaim. Chief of staff of Benaim Foundation Burn Unit
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XXIst MBC MEETING (Casablanca) – WEBINAR
Virtual Meeting – May 15, 2021
SPEAKERS & ABSTRACTS



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(S1-1)

AESTHETICS IN PLASTIC SURGERY FOR CHILDREN

Dan Mircea Enescu^{1,2}, Raluca Tatar^{1,2}, Maria Tomita², Bogdan Prisecaru², Iulia Nacea², Cristina Stoica²

¹Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

²Department of Plastic Reconstructive Surgery and Burns, Grigore Alexandrescu Emergency Clinical Hospital for Children, Bucharest, Romania

Aesthetic surgery is generally associated with the adults seeking to improve their body appearance or to reduce the effects of ageing. The concept of aesthetic surgery for children represents a new approach and a completely different concept that is centered on the idea that every child is unique, and that every intervention made in childhood has to be projected up to the point where that child surpasses the teen years and becomes an adult.

We have to keep in mind constantly the fact that the child is not a tiny adult, for he has physiological and developmental features that should not be overlooked. Every plastic surgery operation in a child, for burns, trauma, congenital malformations (cleft lip and palate, microtia, syndactyly, polydactyly etc.), gigantic nevi or tumors, like infantile hemangiomas, gliomas etc., must be planned in the long term, considering also the developmental potential and the wound healing characteristics of this age. Every surgical intervention requires a wide experience, adapted to the child's constantly changing condition. The results are visible at the age of 18; they may differ from the initial ones. We consider that surgeries of the entire plastic surgery pathology of children should get close to aesthetic perfection, because they influence the future life of children.



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(S1-2)

THE ROLE OF PRESEPSIN IN PREDICTING SEPSIS IN PATIENTS WITH LARGE BURNS

Parasca SV, Cantacioiu Diana, Smeu Maria-Magdalena, Dumitrescu A, Boiangiu Ileana

Background: Presepsin is the soluble part of CD14 (cluster of differentiation 14) which acts as a receptor for the complex lipopolysaccharide-lipopolysaccharide binding protein (LPS-LBP). In previous studies, it has been used as a biomarker for the prediction of sepsis and for discriminating sepsis from systemic inflammatory response syndrome. However, the majority of these studies regarded non-burn patients and there was only one other study, to our knowledge, which evaluated its utility in sepsis related to burn patients. In this study we investigated the dynamic changes of presepsin levels in burn patients admitted to the intensive care unit (ICU) and its usefulness in predicting sepsis and survival.

Methods: We conducted a retrospective cohort study on the patients admitted to our burn center from the 1st of January 2020 to the 31th of December 2020. Sepsis diagnosis was established based on the American Burn Association Criteria (ABA) set in 2007. We classified patients in 2 groups: sepsis (S) and non-sepsis (NS). Furthermore, we created 2 subsets of each group: survivor (s) and non-survivor (ns). We investigated the kinetics of presepsin at different time points, correlating the results with the moment of the surgical intervention and with the initiation of antibiotic therapy. Patients who died within two days from admission were excluded.

Results: Seventy-seven patients were included in the study. Mean presepsin levels were similar during the first three days in both groups, sepsis (S) and non-sepsis (NS), at 448,9 pg/ml and 454,3 pg/ml, respectively. However, a more important increase in presepsin was observed in patients who later developed sepsis, the mean maximum value being 5321.81 pg/ml in the S group compared to 814 pg/ml in the NS group. Presepsin levels displayed a rising trend despite antibiotic treatment. Nevertheless, in the S group an increase of 52,13% in presepsin level was seen compared to baseline, whereas the increase was of only 24.22% in the NS group. Presepsin levels showed a similar evolution for survivors and non-survivors with sepsis episodes, although higher values were noted in the non-survivor group.

Conclusion: Presepsin can be used as a sepsis predictor in severely burned patients and its kinetics may guide antibiotic therapy and help monitor the postoperative evolution.



Cristian Radu JECAN (Romania)

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(S1-3)

NOVEL THERAPIES IN DIAGNOSIS AND TREATMENT OF BURNS

Cristian R. Jecan^{1,2}, Cristina N. Marina^{1,2}, Laura Raducu^{1,2}, Corina Stefan¹, Adelaida Avino¹

1. Emergency Clinical Hospital "Prof. Dr. Agrippa Ionescu", Department of Plastic and Reconstructive Surgery, Bucharest, Romania

2. Carol Davila University of Medicine and Pharmacy, Department of Plastic and Reconstructive Surgery, Bucharest, Romania

Introduction

Burns represent a severe form of traumatic injury with high mortality, high care costs and long term rehabilitation. Survival depends on the presence of inhalation injury and also on the degree and burn surface¹.

Material and method

This paper describes the recent technologies that are used nowadays for burns diagnosis and treatment that permitted an increase of overall survival.

Results

Assessment of the burn depth is an important step in evaluating survival and in deciding the type of treatment. This assessment can be realized through clinical evaluation, but novel technologies improved the accuracy from 71% to 97%. One of this technology is the Laser Doppler imaging system that is usually used between 48 hours and 5 days after burn injury and evaluates the depth of the injured tissue¹. Another system is the thermal camera that evaluates local temperature, measuring indirect the blood perfusion to the skin and to the wound and the possibility of healing without surgical treatment.

Surgical treatment consists in excision of nonviable tissue and covering using autologous skin grafts. When the surface is too large to be covered by autologous skin grafts, skin substitutes like Integra, Biobrane and Transcyte are used. Another grafting technology called the Meek grafting technique can be used in order to increase the expansion ration to 1:9, being effective, less prone to infections than another skin substitutes and also less expensive than keratinocytes cultures or autologous tissue engineered skin¹.

Other novel technologies used for tissue covering are the Expansion Micrografting system and the fractional skin harvesting system that provide also dermis in the grafts and promotes wound healing².

Burns dressings have also evolved and nowadays hydrogels are highly used in burns showing a foster healing³.

Conclusions

The novel therapies used nowadays in burns management improved the early diagnosis accuracy and permits choosing an adequate treatment. Also, the new skin substitutes and grafting techniques increased the treatment's success, increasing overall the survival rate.



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(S2-1)

**THE ROLE OF EARLY PHYSIOTHERAPY AND POST ACUTE FUNCTIONAL REHABILITATION
IN PATIENTS WITH BURNS**



Physiotherapeutic management of wounds is very important and should be prescribed from the acute stage of patient admission to the hospital. The objective of early physiotherapy is to prevent motor and respiratory complications and to restore strength, mobility and neuromuscular coordination, as close as possible, to the normal levels. In the acute phase, a detailed physiotherapeutic evaluation should take place in order to assess the degree and extent of burns, set the therapeutic aims and implement an appropriate rehabilitation strategy. Positioning of high risk joints for the development of scar tissue, in safe elongation should be done on a daily basis, since the prevention of hypertrophic burned scars and joint contractures is more important and more feasible than correcting them, at the chronic stage. Passive joint mobilisation plays a very important role in maintaining full range of motion and is vital for the subsequent functional recovery. In the sub-acute phase, physiotherapy aims at preventing muscular atrophy, osteoporosis and improving neuromuscular coordination and consists of active exercises, resistance training and stretching, in full range of motion with progressively increasing load. In the chronic phase, after hospital discharge, personalized exercise programs are implemented, tailored to the needs of each patient with the aim of complete functional rehabilitation. The combination of predefined aerobic and anaerobic exercise programs can accelerate recovery and contribute significantly to a gradual return to daily activities.

In conclusion, physiotherapeutic intervention is very important in all phases of recovery and providing it commences from the early stages, it can largely determine the optimal rehabilitation of patients with burns.



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(S2-2)
POSTBURN SCARS OF THE HEAD AND HANDS



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(S2-3)
POSTBURN SCARS OF THE NECK AND TORSO: PREVENTION AND TREATMENT



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(S3-1)

THE USE OF THE STROMAL VASCULAR FRACTION (SVF) IN THE TREATMENT OF INTERMEDIATE-DEEP BURNS: THE MINIMAL INVASIVE MODALITY



Abstract

PURPOSE. Given the stromal vascular fraction (SVF) documented benefits in other fields of plastic surgery, and the lack of studies on acute burns, we wanted to investigate the use of the SVF in treating intermediate-deep burns.

MATERIALS. From January to October 2017 we enrolled 20 patients affected with thermal intermediate-deep burns. After enzymatic escharectomy, for each patient two symmetrical areas of comparable extension and depth were randomized to study (SVF+hyaluronic acid scaffold) or control (scaffold only). At 15 days, case and control areas were blindly assessed by wound area tracing. Further assessments were made at 20, 25 and 30 and 180 days. At 15 days biopsies were taken to assess for CD31 expression by immunohistochemistry. The Vancouver Scar Scale (VSS) and the patient scar satisfaction VAS were also recorded at the 180 days follow up.

RESULTS. 18 patients were included in the complete analysis. Each treated area showed presence of marginal and central reepithelization at 15 days, and subtotal healing at 25 days in all cases. Each control area failed to heal spontaneously and was eventually repaired with a split thickness skin graft in all cases. CD31 marking showed an increased mean vascular density in the case areas when compared to the control ones. The mean VSS and VAS were significantly improved for the case areas. No protocol specific adverse events were recorded.

CONCLUSIONS. Our results indicate an improved wound healing in intermediate-deep burns treated with the SVF, both in terms of time to heal and final cosmetic outcome.



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(S3-2)

ITALIAN RECOMMENDATIONS ON ENZYMATIC DEBRIDEMENT IN BURN SURGERY

Abstract

Introduction: Surgical debridement is currently considered the standard of care for eschar removal in burn patients. Early eschar removal may improve the outcome of burn wound treatment. Moreover, surgical debridement often results in significant blood and heat loss, and it is hindered by poor selectivity, which means both viable and necrotic tissue may be excised. To try and overcome these limitations, several alternative techniques for eschar removal have been developed over the years. Nexobrid, a bromelain-based type of enzymatic debridement, has recently become more popular. Here we present the recommendations on Nexobrid's role based on the practice knowledge of expert Italian users.

Methods: The Italian recommendations, endorsed by SIUST (Italian Society of Burn Surgery), on using enzymatic debridement to remove eschars for burn treatment were defined. The definition followed a process to evaluate the level of agreement (a measure of consensus) among selected experts, representing Italian burn centers, concerning defined clinical aspects of enzymatic debridement. The consensus involved a multi-phase process based on the Delphi method.

Results: The consensus process produced 27 statements that address the clinical features of enzymatic debridement and reflect the experience of the selected 14 centers in Italy, with 1068 cumulative cases treated as of the start date of the consensus process. At the end of round 3 of the Delphi method, the panel reached 100% consensus on 26 out of 27 statements. The panel achieved full, strong consensus (all respondents strongly agreed on the statement) on 24 out of 27 statements.

Conclusion: The statements provided by the Italian consensus panel represent a "ready to use" set of recommendations for enzymatic debridement in burn surgery that both draw from and complete the existing scientific literature



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(S3-3)

REDUCE PATIENT'S STRESS AND ANXIETY WITHOUT DRUGS: THE POWER OF WORDS

Burn patients suffer daily from pain and anxiety related to procedures (dressing changes, wound cleansing, physical and occupational therapy).

Many publications have shown that pain, anxiety, and delirium increase morbidity, protract hospital length of stay, and even increase mortality. Consequently, pain relief and anxiety and delirium prevention and management should be a priority for burn care professionals. Nevertheless, the use of analgesics and sedative drugs should be minimized and tailored to each patient. Their well-known collateral effects (e.g., sedation, dizziness, nausea, vomiting, constipation, physical dependence, tolerance, and respiratory depression) could significantly affect and compromise clinical patients' course and even increase delirium presentation.

Current literature shows that integrating non-pharmacological interventions with pharmacological approaches efficiently affects pain, anxiety, and delirium prevention and management, having a tangible effect on patient's outcomes and reducing costs.

In the presentation, an overview of this "humanizing care" approach will be delivered, starting from current literature pieces of evidence to practical integration into burn care everyday practice, with specific references to the implementation of clinical hypnosis, comfort talk, and narrative medicine.



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(S4-1)

ÉTHIQUE ET BRÛLURES

Les grands brûlés nécessitent des soins lourds de réanimation, généralement sous sédation les rendant ainsi non communicants, ce qui peut créer des situations éthiques difficiles. En effet, le patient n'est plus en capacité de participer aux décisions parfois très lourdes (amputation, séquelles fonctionnelles, esthétiques) le concernant.

La personne de confiance du patient (si elle a été désigné) peut nous aider à la prise de décision, mais il est difficile d'avoir une perspective appropriée sur le traitement des brûlures et les résultats probables long terme. En outre, les décisions de limitation ou d'arrêt des thérapeutiques (LATA) sont source de fortes émotions, notamment chez des patients jeunes et/ou dans un contexte d'autolyse.

À quel moment la prise en charge du patient gravement brûlé devient-elle futile, qui la définit comme telle ?

Alors que les publications et les algorithmes sont nombreux pour guider les LATA en réanimation générale, très peu de principes bien définis orientent la prise de décision éthique dans la gestion des brûlés graves. Les décisions de LATA en brûlologie doivent s'appuyer sur une expertise approfondie de la prise en charge des grands brûlés, mobiliser une équipe multidisciplinaire médicale comme paramédicale et nécessitent une étroite collaboration avec l'entourage du patient (notamment à la recherche des directives anticipées de celui-ci).



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(S4-2)

RÉHABILITATION DES BRÛLURES ET MÉDECINE HUMANITAIRE

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La prévention des complications cicatricielles post-brûlure nécessite une prise en charge spécialisée sur le plan chirurgical et sur le plan de la rééducation. La rééducation doit être initiée le plus précocement possible et se prolonger pendant toute la période de maturation cicatricielle. Dans les zones de conflit et/ou à ressources limitées, si l'accès à la chirurgie est difficile, l'accès à la rééducation l'est encore plus¹ : manque de moyens matériels et humains, formation insuffisante. A l'initiative d'associations humanitaires, nous rapportons deux exemples de collaboration entre équipes locales et équipe spécialisée en rééducation des brûlés en France, afin d'améliorer la prise en charge locale des patients.

Nous rapportons premièrement la collaboration entre un SSR spécialisé brûlés (France) et MSF Fondation, pour la fabrication d'appareillage compressifs transparents pour brûlures de la face et du cou de patients traités à Amman en Jordanie et Port-au-Prince en Haïti. Après évaluation des lésions par télé-médecine en France, la prise d'empreinte numérisée par scanner des zones à traiter est effectuée par l'équipe locale. Elle est suivie d'une rectification numérique de la forme 3D pour une compression optimale par le SSR spécialisé. La forme modifiée permet enfin à l'équipe locale, l'impression 3D d'un moule adapté pour la fabrication de l'appareillage. Nous rapportons également l'expérience de notre équipe de rééducation, au cours d'une mission d'enseignement mandatée par Kinés-du-monde à Dakar. L'enseignement d'une semaine à l'attention de kinésithérapeutes est organisé sous la forme de cours théoriques, ateliers pratiques et avis sur la prise en charge de patients. L'évaluation des étudiants pré et post enseignement montre une progression des connaissances théoriques et des compétences pratiques.

Ces interventions soulignent l'intérêt du développement de la télé-médecine et de l'enseignement auprès des équipes locales pour la rééducation des brûlés et la prévention des séquelles en médecine humanitaire.

1 : F. Bassetto, A. Staffieri, F. Reho, F. Facchin, J. Shehata, D. Maged, and C. Tiengo: Management of complex pediatric burn scars in a humanitarian collaboration. Ann Burns Fire Disasters. 2015 Mar 31; 28(1): 46-49.

BURNS REHABILITATION AND HUMANITARIAN MEDICINE

Most of the time, in the field of humanitarian medicine, burn victims are treated while short missions involving multidisciplinary and specialized teams with surgeon, anesthesiologist, nurse, physiotherapist who take care on the spot. Regardless of acute burns or burn sequelae, the main point is to prevent burn scar complications such as hypertrophic scars or skin contractures. Post-surgery specialized rehabilitation must be started as soon as possible to succeed. Burns rehabilitation

Sa mise en œuvre est pourtant difficile dans les zones de conflit et/ou à ressources limitées, sur le plan matériel et humain. Afin d'améliorer la rééducation post-opératoire, nous relatons ici deux exemples de collaboration entre SSR spécialisés brûlures en

France et associations humanitaires.

Nous rapportons la collaboration SSR spécialisés-MSF Fondation pour l'aide à la fabrication d'appareillage compressifs thermoformés transparents dans le cas de brûlures de la face et du cou de patients traités à Amman en Jordanie et Port-au-Prince en Haïti. Après évaluation des lésions par télé-médecine en France, la prise d'empreinte numérisée par scanner des zones à traiter est effectuée par l'équipe locale. Elle est suivie d'une rectification numérique de la forme 3D pour une compression optimale par le SSR spécialisé. La forme modifiée permet enfin à l'équipe locale, l'impression 3D d'un moule adapté pour la fabrication de l'appareillage. Nous rapportons également l'expérience d'une équipe pluridisciplinaire spécialisée en rééducation des brûlés, au cours d'une mission d'enseignement mandatée par Kinés-du-monde à Dakar. L'enseignement d'une semaine à l'attention de kinésithérapeutes est organisé sous la forme de cours théoriques, ateliers pratiques et avis sur la prise en charge de patients. L'évaluation des étudiants pré et post enseignement montre une progression des connaissances théoriques et des compétences pratiques. L'intérêt d'une prise en charge précoce post-opératoire et d'une communication renforcée entre chirurgiens-rééducateurs pour une coordination optimale des soins et la prévention des séquelles a été bien compris.

- 1- Brûlures et humanitaire : exemples d'un bénévolat sans limites. C. Echinard. Chap 46 : 427-434. Les Brûlures. Ed MASSON 2010.



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(S4-3)

PLATELET RICH PLASMA IN BURNS



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(S4-4)

CATASTROPHES LIÉES AU TRANSPORT D'HYDROCARBURE : FRÉQUENTES MAIS TELLEMENT ÉVITABLES

Si la catastrophe de Los Alfaques en 1978 a profondément marqué les esprits européens, elle n'est pas loin s'en faut, la seule liée au transport routier d'hydrocarbures. Ce type d'accident reste fréquent mais intéresse bien moins la littérature scientifique que les media grand public. On relève toutefois une revue récente dans Burns.¹

Ces accidents sont un peu moins fréquents dans les pays développés mais surtout beaucoup plus dévastateurs dans les pays en développement (mortalité x 15 pour nombre d'accidents x 1,5). Dans les pays développés, les décès surviennent habituellement lors de l'accident quand, dans les pays en développement, ils sont plus fréquemment secondaires, la citerne explosant quand les témoins ameutent l'entourage pour récupérer le liquide coulant de la carcasse de la citerne.

Ce sont l'Inde et le Pakistan qui déplorent le plus d'accidents et de morts, l'Afrique intertropicale étant elle aussi très impactée.

La prévention primaire repose sur un réseau routier de qualité et régulièrement entretenu, comme devraient l'être les véhicules, ce qui suppose des dépenses majeures des pays et des propriétaires desdits véhicules.

La prévention « primo- secondaire » consiste en particulier à décourager les récupérations d'hydrocarbure après accident. On constate alors qu'avec 1 mois de salaire moyen, un indien peut acheter 184 L d'essence, un pakistanais 203 L, un français 1 418 L. Un nigérian peut n'en acheter que 402 L quand son pays est le premier producteur Africain de pétrole. Mais que, ne disposant pas de raffinerie, il importe l'essence.

La prévention dans les pays en développement ne dépend dès lors pas uniquement d'eux mais bien d'une gouvernance internationale bien hypothétique car elle se heurterait à des oppositions massives du privé.

1- Ewbank C et coll : A systematic review of oil tanker truck disasters: identifying prevention targets. Burns; 45: 905- 13, 2019



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**(S5-1)
MANAGEMENT OF A SEVERE PREHOSPITAL BURN**

In order to avoid any delay of care and in case of a bad luck for a severe burn, it is recommended to:

I. At the scene of the accident

Perform the first aid gestures (water cooling for the first quarter of an hour with running water at 15 °, vascular filling 20 ml / kg the first hour Isotonic Saline Serum, wrap in a clean sheet, paracetamol)

- Make an evaluation of the SCB burned skin surface using the Wallace's Rule of 9 -
Make a depth assessment, specify the mechanism of the burn, determine the locations at risk and the presence of inhalation of fire fumes.

- The severity of the burn depends on the surface (SCB greater than 30%), depth, location and associated lesions

- The emergency doctor will contact the service of plastic surgery and burns of the Mohammed V Military Hospital of Rabat on the telephone by calling 06 37 48 00 39/40 and he can send the photographs of the victim.

- The emergency doctor will evacuate the victim to the nearest hospital facility Level 2.

II. Proximity hospital

1. Continuation of the vascular filling for the first 8 hours: 20 ml / kg the 1st hour then 2ml / kg / % SCB

2. Oxygen mask with high analgesic concentration,

3. Make a dressing using flamazine, wrap in sterile fields then isotherm cover to avoid hypothermia

4. Control vital functions ABC (Airway, breathing, circulation), hourly measurement of diuresis, TA, Fc,

5. Reviews of the surgeon and the resuscitator if syndrome of the lodges, discharge incisions will be made in the operating room of the local hospital.

III. Decision of EVASAN at the Plastic Surgery and Burns Center of Military Hospital Mohammed V, Rabat



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**(S5-2)
PRISE EN CHARGE DES BRÛLURES ÉLECTRIQUE CHEZ L'ENFANT**



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(S5-3)

LA PRISE EN CHARGE DES BRÛLURES ÉLECTRIQUES CHEZ L'ENFANT (SÉRIE DE 36 CAS)

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Les brûlures électriques de l'enfant correspondent à l'ensemble des manifestations dues au passage du courant électrique dans l'organisme, entre un point d'entrée et un point de sortie. Elles représentent un motif peu fréquent de consultation mais grave pouvant engager le pronostic vital et nécessitant une prise en charge urgente.

La prise en charge doit se faire dans des centres spécialisés par une équipe qualifiée. La phase aigue est dominée par le risque infectieux, l'insuffisance rénale due au crush syndrome. Les séquelles sont dominées par l'handicap lié à la perte d'un membre ou d'un segment de membre et aux brides avec raideurs articulaires.

Les auteurs rapportent leur expérience à travers une série de 36 cas colligés entre juin 2011 et Janvier 2021 à l'Unité de Chirurgie Plastique Pédiatrique de l'Hôpital d'enfants de Rabat.

La brûlure était due à un courant de haut voltage dans 6 cas et de bas voltage (domestique) dans 30 cas. Tous nos patients ont été hospitalisés en réanimation et ont bénéficié d'un bilan initial comprenant un bilan cardiaque et un bilan rénal et de rhabdomyolyse.

La prise en charge chirurgicale a consisté en une excision des tissus nécrosés après délimitation des lésions. La perte de substance dans les autres cas a été couverte par des greffes de peau et par différents lambeaux dans les cas d'exposition d'éléments nobles.

Tous nos patients ont cicatrisé. Les suites ont été marquées par des séquelles (bride, microstomie, dyschromies et raideurs) ayant nécessité des gestes de chirurgie plastique (plasties en Z, greffe de peau, commissuroplasties et lambeaux au niveau de la main...) et de la rééducation fonctionnelle.

Le meilleur traitement des brûlures électriques reste la prévention par l'éducation des enfants, la surveillance et l'instauration de mesures de sécurité avec des campagnes d'information.



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(S5-4)

COÛT DE LA PRISE EN CHARGE DES BRÛLÉS HOSPITALISÉS AU C.H.U. MOHAMED VI
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(S5-5)

REGENERATIVE MEDICINE IN WOUND HEALING



Session 6:

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(S6-1)

MICROSURGICAL AND COMPLEX BURN RECONSTRUCTIONS

Burn injury poses unique challenges for the reconstructive surgeon, both in the acute and delayed settings. Once resuscitative measures are optimized, early excision and coverage is performed usually using split thickness skin grafts. However, in certain injuries, depending on its extent and nature, skin grafting, local tissue rearrangement or local flaps may not be a reasonable option; in these cases, free tissue transfer may provide a viable reconstructive alternative. While free flap reconstruction is rare in burn surgery, particularly in the acute setting, burn injuries that expose vital structures, such as tendon, nerve, bone, or deep vessels, require robust flap coverage. In the delayed setting, unsightly scar formation and contracture often occurs secondary to skin graft coverage. These significant patient morbidities are often amenable to free tissue transfer as well. We discuss the indications, applications, and problems with free flap surgery for burn injuries in both the acute and delayed setting.



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(S6-2)

TISSUE EXPANDERS



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(S6-3)

ROLE OF RELEASE OF TENSION IN HYPERTROPHIC SCAR REDUCTION AND TREATMENT

Hypertrophic scarring remains a common problem after burn injury and results in significant morbidity. In addition to physically deforming and range of motion-limiting contractures, hypertrophic scars are often accompanied by pruritis, neuropathic pain, and pigment abnormalities. The reticular dermis plays a critical role in the development of post-burn hypertrophic scarring, as superficial injury, above this layer, does not result in abnormal scarring. Ongoing and prolonged inflammation within the reticular dermis, from various etiologies, is the primary inciting event for this pathological scarring. Hypertrophic scars have been shown to contain an abnormally elevated number of inflammatory cells, fibroblasts, blood vessels, and collagen. Scarring develops after epithelial closure, often 2-4 months post re-epithelialization; however, inflammation of the reticular dermis begins immediately after burn injury and therefore healing may initially appear normal.

Factors associated with hypertrophic scarring can be injury related (depth of burn, technique of excision and dermal preservation, microbiologic burden, burn location), patient related (genetic, SNPs), and/or treatment related (time to wound closure, modulation of inflammation, tension). The common inciting event is protracted dermal inflammation; and in burn reconstruction, one of the primary causes of abnormal burn scarring is related to mechanical forces and tension. In 2007, Aarabi et. al. were the first to clearly demonstrate that mechanical stress applied to a healing wound is sufficient to produce hypertrophic scars in mice.¹ They showed that mechanical stress resulted in scars that were structurally identical to human hypertrophic scars, with a 20-fold increase in volume and cellular density and a 4-fold decrease in apoptosis. Mechanical loading early in the proliferative phase of wound healing was shown to produce hypertrophic scar by inhibition of apoptosis. In 2012, Wong et. al. further elucidated the molecular pathways involved in mechanical stress-related formation of hypertrophic scarring, demonstrating that focal adhesion kinase (FAK) played a central role in transmitting the inflammatory and physical signals that induce fibrosis.² Furthermore, they have shown that FAK inhibition results in improved wound healing and decreased scar formation. Lastly in 2014, Longaker et. al. demonstrated that mechanical offloading of incisions can decrease hypertrophic scarring in humans.³

A scar under mechanical tension and constant movement results in chronic inflammation which, for the reasons stated above, results in hypertrophic scarring. The release of tension, therefore, should play a central role in burn reconstruction. As described by M. Donelan et al., "scars under tension are angry and respond with erythema, hypertrophy, pruritus, pain, and tenderness. Relaxed scars are happy scars. They respond by flattening, softening, and becoming pale and asymptomatic...Scar rehabilitation is usually a better alternative for the patient than scar excision."⁴ A reduction in tension via contracture release with local tissue, grafts, or flaps, results in dramatic changes in proximal scars as well as more distant surrounding scars. Even the thickest hypertrophic scar, when offloaded of tensile forces, has a chance of normalizing.

1. Aarabi S, Bhatt KA, Shi Y, et. al. Mechanical load initiates hypertrophic scar formation through decreased cellular apoptosis. *FASEB J.* 2007 Oct;21(12):3250-61.
2. Wong VW, Rustad KC, kaishi S, et. al. Focal adhesion kinase links mechanical

force to skin fibrosis via inflammatory signaling. *Nat Med*. 2011 Dec 11;18(1):148-52.

3. Longaker MT, Rohrich RJ, Greenberg L, et. al. A randomized controlled trial of the embrace advanced scar therapy device to reduce incisional scar formation. *Plast Reconstr Surg*. 2014 Sep;134(3):536-546.
4. Donelan M & Liao EC. Plastic surgery, PART II, SKIN AND SOFT TISSUE, CHAPTER 16: PRINCIPLES OF BURN RECONSTRUCTION.
<https://doctorlib.info/surgery/plastic/16.html>



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(S6-4)

8 YEARS FOLLOW-UP LASER REMODELING OF BURN SCARS

Background: It is well known the use of laser in the treatment of hypertrophic scars and keloids, however there is a lack of data about the long-term follow-up. The objective of this study is to analyze the functional and cosmetic outcomes after 8 years follow-up in the treatment of burn scars, regarding textural and color changes over time.

Methods: A prospective single-site study was conducted between 2011 and 2013 in 39 patients with burn scars that underwent for several sessions of 1064 nm ND-Yag and fractional CO2 laser. Blinded independent investigators evaluated the scars using the Vancouver Scar Scale (VSS) at baseline and 1 month after last treatment. A new photographic evaluation was performed after 6 years of annual treatment in 13 patients of that initial group, as the subjective assessment by the patient using the patient component of the Patient and Observer Scar Assessment Scale (POSAS).

Results: Of 39 burn scars (phototype III - VI) four lost the follow-up. Thirteen burn scars were enrolled. The mean age was 19 years (range 5-63), 66% male. VSS average at baseline and after treatment was 10 pts and 3 pts respectively with a final improvement of 73%. Regard to POSAS, there was a rating before and after treatment of 58 pts and 16 pts respectively, with improvement of 71%. Only 1 patient had not significant outcomes after treatment with overall improvement of 30 % for both scales.

Conclusion Laser remodeling of burn scars is an excellent alternative for the treatment of extensive hypertrophic scars, proving as session-depending treatment, significant progress in aesthetic, clinical and functional characteristic, with not side effects in long term follow-up.



Session 7:

Asociación Española de Quemaduras (AEQUE)



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(S7-1)

NEW ERA IN ENZYMATIC DEBRIDEMENT

Since the appearance of the bromelain-based enzymatic debridement in 2014 in our market, many papers have been published showing great results. During that time it was applied in different areas of burns, focused in less than 15% of TBSA, achieving close 95% of success in efficient debridement. We have seen a reduction in the grafting area, in the blood replacement and in the time until complete debridement of the burned surface. That good results were collected in several guidelines in the different countries that used this new product, and also an European guidelines for its use. Our focus during the last three years were patients over 15% TBSA, so different approaches to that patients were done. The difficulties that are related to patients with higher burned surface, and the different temporary coverages available were tested to allow select the best option for our patients. Two groups were collected and compared based on length of stay, blood transfusions, number of surgeries and escharotomies. Despite the benefits that were found after comparing SOC with enzymatic debridement, differences in mortality ratio or length of stay were not shown in our series, but a reduction in the number of days in the ICU were found, as well as in the number of escharotomies.

New investigations should be done to find out the impact of the enzymatic debridement in the treatment of major burns, however we have seen that its application could show a faster recovery and an efficient approach to them.



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(S7-2)

BIOMARKERS IN BURN INFECTION

Despite the continuous advances in burn treatment and infection control in the last decades, sepsis is still the main cause of death in burn patients and severe burns still have a high mortality. The early institution of antimicrobial therapy is essential to optimize results, but superfluous therapy increases adverse events, microbial resistance and costs. On the other hand, systemic inflammatory response triggered by burns mimics the presentation of sepsis, making early diagnosis difficult. The use of biomarkers, necessarily combined with a rigorous clinical examination, has been recommended to assist in the diagnosis and also to predict outcomes, to stratify patients who need critical care and to monitor the effectiveness of antimicrobial therapy, allowing a faster de-escalation or interruption, potentially reducing the development of resistance and possibly the financial burden. Among the classic biomarkers, procalcitonin proved to be the most accurate in burn patients, but it is certainly not perfect. New biomarkers, whether biochemical or system-based, are under development and may play an important role in the diagnosis, prognosis and treatment of burn infections in a near future.



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(S7-3)

THE IMPORTANCE OF REHABILITATION IN THE INTEGRAL TREATMENT OF THE GREAT BURN PATIENT

Introduction: The objective of a great burnt patient rehabilitation program is to prevent possible complications arising from the suffered aggression and to achieve maximum functional recovery that guarantees a reintegration with the best possible quality of life. During recent years there have been great advances in the knowledge of the management of these patients, with different proposed protocols that are developed in Burns departments of hospitals that have the necessary collaboration of a multidisciplinary team. However, there is a lack of consensus on how these programs should be addressed.

Objective: To expose the integral rehabilitation program of the great burnt patient of the Hospital La-Fe de Valencia and to establish standards that guarantee adequate assistance.

Material and methods: A multidisciplinary rehabilitation program of the great burnt patient is proposed with a series of cases entered in the Burn Unit of the Hospital La-Fe de Valencia. The program covers the entire evolution of the patient, from resuscitation to total functional recovery or sequel establishment. In addition, a review of the evidence described in the current literature is carried out.

Results: A targeted rehabilitation program reduces sequelae and improves functionality with the consequent improvement in quality of life.

Conclusions: Burns produce functional sequelae that can be prevented. As rehabilitative physicians we must assess the risk of loss of function and establish timely preventive measures. It is essential to have a coordinated multidisciplinary team in the actions, with consensual decisions to improve the quality of care.

LA IMPORTANCIA DE LA REHABILITACIÓN EN EL TRATAMIENTO INTEGRAL DEL PACIENTE GRAN QUEMADO.

Introducción: El objetivo de un programa de rehabilitación del paciente gran quemado consiste en prevenir las posibles complicaciones derivadas de la agresión sufrida y alcanzar la máxima recuperación funcional que garantice una reintegración con la mejor calidad de vida posible.

Durante los últimos años se han producido grandes avances en los conocimientos del manejo de estos pacientes, proponiéndose distintos protocolos que se desarrollan en unidades de quemados de hospitales que cuentan con la necesaria colaboración de un equipo multidisciplinar. Sin embargo, falta consenso sobre cómo deben dirigirse estos programas.

Objetivo: Exponer el programa de rehabilitación integral del paciente gran quemado del Hospital La-Fe de Valencia y establecer unos estándares que garanticen una asistencia adecuada.

Material y métodos: Se propone un programa de rehabilitación multidisciplinar del paciente gran quemado con una serie de casos ingresados en la Unidad de quemados del Hospital La-Fe de Valencia. El programa abarca toda la evolución del paciente, desde el ingreso en reanimación hasta la recuperación funcional total o establecimiento de secuelas. Además, se realiza una revisión de la evidencia descrita en la literatura actual.

Resultados: Mediante un programa de rehabilitación dirigido se consigue reducir las secuelas y mejorar la funcionalidad con la consiguiente mejora en la calidad de vida.

Conclusiones: Las quemaduras producen secuelas funcionales que pueden prevenirse. Como médicos rehabilitadores debemos valorar el riesgo de pérdida de función y

establecer medidas preventivas oportunas. Resulta imprescindible contar con un equipo multidisciplinar coordinado en las actuaciones, con decisiones consensuadas para mejorar la calidad asistencial.



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(S8-1)

STATE OF THE ART: THE DERMAL MATRICES FOR ACUTE BURNS AND SEQUELA



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(S8-2)

WHAT'S NEW IN EPIDERMIC SUBSTITUTES?





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(S8-3)

ADVANCES IN THE DEVELOPMENT OF TISSUE ENGINEERING APPLIED TO THE SKIN USING 3D BIO-PRINTERS FOR THE TREATMENT OF BURN PATIENTS

Abstract

In 1975, Dr. Burke and Dr. Yahanas (at MGH and MIT) were the first to develop an idea and prototype of an artificial dermis. In the year of 1976, Dr. Green (at MGH) got a sheet of keratinocytes in vitro. In the year of 1980, there is the clinical use and improvement of the technique. In the year of 1982, a laminar system of cells is achieved. In 2000, the development in vitro of the dermis and epidermis is achieved. In 2010, the development of 3D skin printers with the ability to print the dermis and epidermis with the cells of the patient with thickness control and printing area is produced.

The concept of 3D printing was developed in 1980. The idea of 3D printing to manufacture objects was established by Charles Hull in the year of 1986. His idea was that successive layers of a base material could be added at the top of each to manufacture (print) objects. The first 3D printing was designed by Sachs in 1993 to print plastics and metals. Then, a series of 3D printers have been developed with different applications.

Besides, in 2002 (Italy), another dermal regeneration matrix (hyalomatrix) was developed with hyaluronic acid and silastic fibers, mimicking the epidermis. In 2003 (Mexico) an allogeneic keratinocyte culture is developed as a system for the release of growth factors in skin lesions. In the last 10 years, 15 matrices of dermal regeneration have appeared.

It has had a great impact in engineering and medicine. In the medical field, a very important application is the tissue engineering, not only for the manufacture of skin and grafting but also for conducting scientific experimentation in the evaluation and discovery of drugs. Bio-printing of tissues can also help to the study of skin disorders and diseases.

By using 3D bio-printing, the respective aggregation layer by layer of the cells is obtained. It allows the organization of multiple cell types in a desired structure⁵. Then, the respective cell culture is performed in vitro (3 to 4 weeks), allowing the respective growth and maturation to achieve the desired tissue. Thus, the tissue implantation is performed.

The conventional methods of tissue engineering (without 3D bio-printers) have little spatial relationship between the individual elements (cells) of the desired tissue. For other hand, the 3D bio-printing technique improves both spatial resolution and reproducibility. Therefore, it is possible to obtain the optimal conditions for cell incubation and maturation.

Besides, organ transplantation is one of the biggest treatments in medicine for many organ disorders. However, the supply of donors is limited and thus, the biofabrication of organs and tissues can help for the respective transplant.

We present a new technique in skin bioprinting with an ad hoc device that allows to perform all the procedure in the operating room with the epithelial cells mixed in the new kind of ink, that preserve the cell viability during the total grafting time.

In this way the epithelial cell cultures finish in the patient, it is cheaper and more efficient.